THE RAINBOW BOOK OF
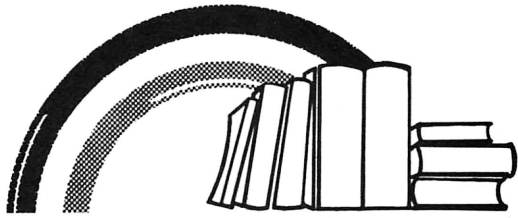
SIMULATIONS

**20 NEW PROGRAMS
JUST FOR
THE TRS-80© COLOR AND TDP-100 COMPUTERS**

The Rainbow Bookshelf ™

Just for the TRS-80® Color and TDP-100 computers

The Rainbow Book of

SIMULATIONS

20 New Programs

The Rainbow Book of
SIMULATIONS

Edited by Charles L. Springer
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Special Thanks To: Barbara and Stephen Springer

FOREWORD

The Rainbow Book of Simulations represents Falsoft, Inc.'s commitment to a new series of publications, which I believe will complement those already available to TRS-80 Color and TDP-100 computer owners.

While there are indeed some fine books dedicated to the Color Computer, there also exists a lack of variety. It's a shortage we all feel when we frequent the computer section of our local bookseller. Color Computer owners are a ravenous lot, hungry for more information and programs for their machine. We hope to make those visits to the bookstore a more pleasant experience in the coming months as we attempt to help meet the desperate need through a variety of books marketed under The Rainbow Bookshelf umbrella. We welcome and encourage your suggestions on future publications.

It is important that we continue to expand the base of knowledge about the Color Computer. This basic need and the remarkable capabilities of our favorite computer will help us determine the full potential of CoCo — a potential that is vast, indeed.

For the Rainbow Book of Simulations, I wish to thank Charles Springer, who served as Editor; Neal Lauron, the art director; and Fred W. Crawford, our artist. The people who really made it possible, however, were people like you who spent hundreds of hours in programming the Simulations. These programs are, of course, available on cassette if you want to save the time of typing them in (See the ad on page 196). Each simulation is a new and original experience and I'm confident that you will enjoy all of them.

Lawrence C. Falk
Publisher

INTRODUCTION

Just a few years ago Lonnie Falk and I were dissecting thin-crusted, plain cheese pizzas at a Pizza Hut located near the University of Louisville campus. The conversation ranged from university politics to U of L basketball, topics with which we knew the other was already well-versed.

The pace of the conversation picked up considerably when Lonnie, who then served as the school's public information officer, casually mentioned that he had recently purchased a personal computer.

"A what?" I said. "What in the world are you going to do with a computer?" In those days, the very idea of a non-engineer/mathematics type owning a computer was incredulous indeed.

"A little word processing, a little this, a little that," he said, matter of factly. "I like playing around with electronics. Who knows where it could lead?"

Several months later Lonnie stopped by *Louisville Magazine*, where I was managing editor, dropping off an official CBS-TV NCAA luggage tag (which I still use, by the way). "When is the magazine going to do something on computers?" he asked, and added, "How about something by the editor of a national computer newsletter?"

I thought Lonnie was pulling my leg (he's been known to do that) and wondered what kind of audience a newsletter on computers would have.

A few weeks later I was invited to the 40th birthday party of my old friend Jim Reed (now managing editor of THE RAINBOW). There was a lot of festivity that night, but the real attraction was the TRS-80 Color Computer that was hooked up to the television. Dazzling graphics, super games, word-processing, all the things that CoCo does best.

"I bought it from Lonnie," Jim explained, extolling its virtues. "He's doing a magazine now and it is really doing well."

That was the night I really got the fever, even offering to give up my season basketball tickets if my wife, Barbara, would agree to us getting a computer for the family that Christmas. I bought mine from Lonnie, too, and since opening that package not a day has passed without my spending significant time at the keyboard.

Lonnie, with the astounding success of THE RAINBOW under his belt, has since launched three other publications, moving from his family basement to offices adjacent to the Prospect, Ky., post office where, I understand, even the postmaster has purchased a Color Computer.

It's an incredible success story and fun to be a part of as a free-lance writer and reviewer.

A lot of the enthusiasm comes from knowing that there are many other new computer users out there who are experiencing the same excitement of discovering all they can do with a computer and, just as importantly, the unlimited potential of the Color Computer. Those of us who have used other computers know the relative ease of using our CoCo as compared to most other and much more expensive models. The Color Computer actually spoils you.

There's a sense of anticipation with each new submission that I review, knowing that it could contain something innovative, possibly even revolutionary, giving us all new capabilities. There are Color Computer users out there at this very moment who are exploring, experimenting, tinkering around, and uncovering new dimensions. They're not your average computer users; they are people having fun pursuing what in many cases could easily become a full-time hobby. Someday some of them are going to set the computer world on its ear.

Some of the capabilities are displayed in the Simulations selected for this book. You will enjoy every one of them, I believe, not just for the situations presented but for the new horizons they unveil. While I have labored many hours over the introductions in most cases, the real credit goes to the programmers in each instance who invested much more of their valuable time.

I agree with Dr. Robert Tyson, a senior systems engineer at United Technologies Research Center in Jupiter, Fla., when he says that prophecy by computer is at once an art form and a science. Simulations are used to examine events, which can or will be duplicated in the real world. They are particularly useful when random occurrences determine the outcome of a series of events, since a computer can simulate literally thousands of events.

They also make it possible for you to experience situations that would not otherwise be possible, giving you a better understanding of why people in decision-making positions must sometimes make unpopular decisions. I think you will agree that Simulations also can be fun.

While Simulations do contain some adventurous aspects, there is a big difference between Simulations and Adventure games. Simulations contain rational decision processes in realistic situations based upon a person's normal preparation for a particular challenge, situation or job, taking into consideration the available options a person could reasonably assume to be a normal part of that experience. Adventure games, on the other hand, involve make-believe situations involving fantasy characters, escape situations, and treasure hunts. The rewards of a successful conclusion in either case can be just as great for computer users.

Charles Springer

(Charles Springer is a veteran journalist in Louisville, Ky., where he is assistant publisher at Blake Publications, Inc. He has also served as public information officer for the Louisville Chamber of Commerce, as managing editor of Louisville Magazine, *as editor of a suburban weekly newspaper, and as a sportswriter for* The Courier-Journal.*)*
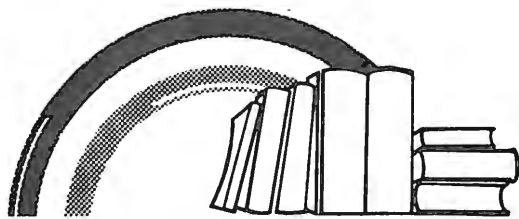
The Rainbow Bookshelf ™

(Don Bradford is a junior at Torry Pines High School in Solana Beach, Calif., and is president of the North County Color Computer Club, which currently has 45 members.)

CIVIL WAR

DON BRADFORD

Hopefully you've taken care of your great-grandfather's Civil War uniform that was discovered stashed away in the attic a few years ago because orders have finally come through making you the supreme commander of the Confederate Army.

Since you were among those who never forgot or forgave, you were the logical choice for the position. Your responsibility, of course, is to lead the South to victory this time. There should be no reason to fail since reams of material have been written since the great war, outlining in detail the mistakes of your ancestors.

As the general-in-chief, the only person you have to answer to is President Jefferson Davis who has returned to help you avenge the defeat inflicted upon the South under his first term a century ago. The President has complete confidence in your ability to lead and will intervene only when your budget is too far in the red.

The bad news is that the commander-in-chief of the Union Army is none other than General CoCo, who is sworn to uphold the integrity of history and knows the terrain a lot better than you — even though all of the conflict occurs on southern soil.

You each will have between 20,000 and 140,000 men to command during 13 separate battles. You've got a lot of homework to do if you hope to have a place among such generals as Robert E. Lee or Ulysses S. Grant. In order for the South to be victorious, you must kill more Union soldiers than die under your command. Other factors include the number of desertions on each side and the total of the prisoners of war.

As the commanding general, you will learn quickly that your considerations in the overall picture include much more than the obviously important skirmishes. You must submit a budget to the President before each battle. How you spend the money is, in this game as in real life, a factor that strongly influences the eventual outcome of the war.

Outspending the enemy can have several effects. It will allow more and better medical supplies, as well as better food and good salaries — all of which will keep morale high and thus slow down desertions. Be sure to budget a substantial amount for weapons, of course.

Ah, but how much to spend and where? It is possible to go into the red, but the deficit is controlled by President Davis. For starters, try allocating approximately one-fourth of the budget to each of the categories, giving slightly more for weapons and salaries. Experiment. Soon you will find the correct distribution.

Remember, ignoring any aspect would be disastrous. Your men may be fat with good food and have the best medical care possible, but what are they going to fight with? Drumsticks and tongue depressors? Also, being too tight in any of these categories will hurt morale. The men know where the money is being spent and they want their share. You don't want 50,000 unhappy troops on your hands. (Note: Be aware of the inflation rate. Your buying power goes up every time you win, but it shrinks when you lose.)

When your budget has been approved, you are ready for battle, and a map showing the location of the conflict is revealed. In addition to the voluminous history books that have been written, you have the use of reports from your spies in the field.

The six offensive and defensive strategies are:

Offense	**Defense**
1) Artillery Attack	1) Artillery Defense
2) Frontal Attack	2) Defense to Frontal Attack
3) Flanking Maneuvers	3) Defense to Flanking Maneuvers
4) Encirclement	4) Fall Back
5) Surrender Battle	5) Surrender Battle
6) Surrender War	6) Surrender War

After a few attempts you should become comfortable with which strategies work best. Surrender can be useful when you're desperate. Just remember that it is always better to lose a battle but win the war. Don't let patriotism or pride hinder your better judgment. If you do have to surrender, the balance of your budget will be credited to the next battle, which you will have a better chance of winning. You have the option of receiving a full report on the progress of the war after each battle.

You should know that if you do lose the war and bring shame on the South again, you and your staff will be court-martialed as war criminals. You should also know that the sentence is carried out on the gallows. Good luck, sir!

Program Loading Instructions

Before typing in *Civil War* (Listing 1), be sure to key in *DATA MAKE* (Listing 2) and run its data on a separate tape.

Then type in the *Civil War* listing and save it on another tape. The program will run much smoother if two tapes are used.

After *Civil War* has been loaded, immediately position the data tape into your cassette player. *Civil War* will access the data three times for graphics purposes. Do not run *Civil War* until the data tape is in position.

LISTING 1

```
10 ''''''''''''''''''''''''''''
20 ''   CIVIL WAR SIMULATION   ''
30 ''            BY            ''
40 ''        DON BRADFORD      ''
50 ''''''''''''''''''''''''''''
60 ' MAIN LOOP 70 TO 3110
70 CLS
80 CLEAR 900
90 GOSUB 5240
100 FOR A=0 TO 61
110 SET (A,0,C):SET(ABS(63-A),31
,C)
120 SET (0,A/1.96,C):SET(63,ABS(
31-(A/2)),C)
130 NEXT A
140 FOR A= 4 TO 58
150 SET (A,2,C+1):SET(ABS(63-A),
29,C+1)
160 SET(3,A/2,C+1):SET(60,ABS(31
-(A/2)),C+1)
170 NEXT A
180 FOR A=7 TO 55
190 SET (A,4,C+2):SET(ABS(63-A),
27,C+2)
200 SET(6,1+A/2.04,C+2):SET(57,A
BS(31-(A/2.04)),C+2)
210 NEXT A
220 PRINT@134,"civil"+CHR$(128)+
"war"+CHR$(128)+"simulation";
230 PRINT@207,"by";
240 PRINT@266,"don"+CHR$(128)+"b
radford";
250 PRINT@330,"please"+CHR$(128)
+"wait";
260 E$="press"+CHR$(128)+"any"+C
HR$(128)+"key"
270 IF BB=0 THEN GOSUB 5050
280 TIMER=0
290 FOR A=1 TO LEN(E$)
300 PRINT@328+A, MID$(E$,A,1);
310 IF TIMER>300 THEN PRINT @328
,;:FOR A=1 TO 14:PRINT CHR$(128)
;:NEXT:C=RND(6):BB=1:GOTO 100
320 NEXT A
330 FOR B=1 TO 100: NEXT B
340 FOR A= 1 TO LEN(E$)
350 PRINT @328+A,CHR$(128);
360 A$=INKEY$:IF A$<>"" THEN 400
370 NEXT A
380 FOR B=1 TO 100:NEXT B
390 GOTO 290
400 PRINT @327,"instructions"+CH
R$(128)+CHR$(123)+"y"+CHR$(124)+
"n"+CHR$(125);
410 A$=INKEY$:IF A$="Y" OR A$= "
N" THEN 420 ELSE 410
420 GOSUB 4990
430 IF A$="N" THEN FOR A=1 TO 20
```

23

```
0:READ A$:IF A$="#" THEN 590 ELS        780 A$(5)="ORDERS YOU, GENERAL"
E NEXT A                                790 A$(6)=MAME$
440 ' INSTRUCTIONS                      800 A$(7)="TO ATTACK THE NORTHER
450 POKE 359,57:SCREEN 0,1              N"
460 FOR A= 1 TO 8                       810 A$(8)="FORCES AT THE BATTLE
470 READ A$:IF A$="#" THEN 580          OF"
480 FOR B=1 TO LEN(A$)                  820 A$(9)=BA$+"."
490 IF MID$(A$,B,1)="$" THEN MID        830 Q=9:GOSUB 3490
$(A$,B,1)=","                           840 ' DECIDE SOUTHERN AND NORTHE
500 NEXT B                              RN MEN AND MONEY
510 IF LEN(A$)<24 THEN A$=A$+" "        850 SY=SY+RND(10000)-RND(5000):N
:GOTO 510                               Y=NY+RND(5000)-RND(2500):SY=SY+S
520 PRINT @PT,A$;                       L:SL=0:NY=NY+NL:NL=0:NY=INT(NY):
530 PT=PT+32                            SY=INT(SY)
540 NEXT A                              860 SM=SM+RND(9000):NM=NM+RND(60
550 PT=100                              00)-RND(3000)
560 GOSUB 4950                          870 IF BS=1.1 THEN RS=0 ELSE RS=
570 GOTO 460                            BS
580 GOSUB 4950:POKE 369,126:SCRE        880 IF BN=1.1 THEN RN=0 ELSE RN=
EN 0                                    BN
590 ' START CIVIL WAR                   890 GOSUB 4620
600 CLS:B$=""                           900 'PRINT STATS
610 PRINT @75,"COMMANDER,"              910 PRINT "BATTLE: ";BA$
620 PRINT @128, "ENTER YOUR NAME        920 PRINT "STATE : ";ST$
 FOR THE RECORD"                        930 PRINT "DATE  : ";DA$","YR$
630 FOR A=228 TO 251:B$=B$+CHR$(        940 PRINT "------------------------
128):NEXT A:PRINT @228,B$:PRINT         -----------"
@251,"<";                               950 PRINT @139,"STATISTICS";
640 PRINT @228,"";:LINEINPUT ">"        960 PRINT @202,"SOUTH":PRINT@214
;MA$                                    ,"NORTH"
650 CLS                                 970 PRINT "MONEY":PRINT@233,SY;:
660 PRINT @64, "GENERAL "MAME$",        IF QU=1 THEN PRINT @245,INT(NY)
"                                       ELSE PRINT @248,"?"
670 PRINT @162,"PREPARE YOURSELF        980 S1=SY
 FOR . . ."                            990 PRINT "MEN":PRINT@265,SM:SZ=
680 PRINT @261, "------------------      SM:NZ=NM:IF QU=1 THEN PRINT @277
-----"                                  ,NM ELSE PRINT @280,"?"
690 PRINT @295, "-C I V I L   W A       1000 PRINT "INFLATION":PRINT@297
R !-"                                   ,IS"%":IF QU=1 THEN PRINT @309,I
700 PRINT @328, "------------------      N"%" ELSE PRINT@312,"?"
-----":GOSUB 4590                       1010 PRINT "BATTLES":PRINT@329,B
710 IF BF=13 THEN 2910 ELSE BF=B        F-1:IF QU=1 THEN PRINT @341,BF-1
F+1:READ BA$,SM,NM,SY,NY,ST$,N(1         ELSE PRINT@344,"?"
),N(2),N(3),N(4),S(1),S(2),S(3),        1020 PRINT "WON":PRINT@361,RS:IF
S(4),BX,BY,DA$,YR$,XX,YY                 QU=1 THEN PRINT@373,RN ELSE PRI
720 PRINT@1,"YOU HAVE RECEIVED N        NT@376,"?"
EW ORDERS!":PRINT                       1030 PRINT "------------------------
730 A$(0)="A TELEGRAM DATED "+DA        -----------"
$+","                                   1040 PRINT@416, "DECIDE EXPENDIT
740 A$(1)=YR$+" FROM THE SOUTHER        URE FOR";
N"                                      1050 PRINT @448,"";:LINEINPUT "F
750 PMODE 3,1:IF PPOINT(184,96)=        OOD $ ";SF$:SF=VAL(SF$):IF SF=<0
6 THEN A$(2)="CAPITAL, RICHMOND          THEN 1050
VIRGINIA." ELSE A$(2)="CAPITAL,         1060 S1=S1-SF:GOSUB 4550
ATLANTA GEORGIA "                       1070 PRINT @448,"";:LINE INPUT"W
760 A$(3)="========================      EAPONS $ ";SW$:SW=VAL(SW$):IF SW
======"                                 =<0 THEN 1070
770 A$(4)="PRESIDENT JEFFERSON D        1080 S1=S1-SW:GOSUB 4550
AVIS"                                   1090 PRINT @448,"";:LINE INPUT"S
```

```
ALARIES $ ";SS$:SS=VAL(SS$):IF S
S<=0 THEN 1090
1100 S1=S1-SS:GOSUB 4550
1110 PRINT @448,"";:LINE INPUT"M
EDICAL $ ";SQ$:SQ=VAL(SQ$):IF SQ
<=0 THEN 1110
1120 S1=S1-SQ:GOSUB 4550
1130 CLS
1140 PRINT@8,"SOUTHERN BUDGET":P
RINT
1150 PRINT "FOOD",:PU=SF:GOSUB 4
520
1160 PRINT "WEAPONS",:PU=SW:GOSU
B 4520
1170 PRINT "SALARIES",:PU=SS:GOS
UB 4520
1180 PRINT "MEDICAL",:PU=SQ:GOSU
B 4520
1190 PRINT "","----------"
1200 PRINT "TOTAL BUDGET",:PU=SY
:GOSUB 4520
1210 PRINT"TOTAL SPENT",:PU=SF+S
W+SS+SQ:GOSUB 4520
1220 PRINT"","----------"
1230 SL=SY-(SF+SW+SS+SQ)
1240 PRINT"LEFT OVER",:PU=SL:GOS
UB 4520
1250 PRINT @384,"GENERAL "MA$" D
O YOU"
1260 PRINT @416,"ENDORSE THIS BU
DGET ";:INPUT"(Y/N)";A$
1270 IF A$="N" THEN CLS:GOTO 900
1280 PRINT @448,"BUDGET HAS BEEN
 SENT TO "MID$(A$(2),10,8);
1290 PRINT @480,"FOR EVALUATION
AND APPROVAL";
1300 IF SY>=SS+SF+SW+SQ THEN 142
0
1310 IF SY*1.1>=SS+SF+SW+SQ THEN
 A=RND(10):IF A>6 THEN 1420
1320 FOR A=1TO 800:NEXT:CLS

1330 PRINT @12,"BAD NEWS!":PRINT
1340 A$(4)="PRESIDENT JEFFERSON
DAVIS"
1350 A$(5)="HEREBY denies YOUR N
EW"
1360 A$(6)="BUDGET FOR THE BATTL
E OF"
1370 A$(7)=BA$+"."
1380 A$(8)="YOU ARE HEREBY order
ed"
1390 A$(9)="TO REWORK AND RESUBM
IT THE"
1400 A$(10)="WHOLE BUDGET IMMEDI
ATELY!"
1410 Q=10:GOSUB 3490:GOTO 900
1420 FOR A=1 TO 800:NEXT:CLS
1430 PRINT @11,"GOOD NEWS":PRINT
:QU=0
1440 A$(4)="PRESIDENT JEFFERSON
DAVIS"
1450 A$(5)="HAS COMPLETELY APPRO
VED"
1460 A$(6)="YOUR BUDGET FOR THE
BATTLE"
1470 A$(7)="OF "+BA$+"."
1480 A$(8)="HE ALSO orders YOU T
O"
1490 A$(9)="CONTINUE YOUR CAMPAI
GN"
1500 A$(10)="AGAINST THE NORTH."
1510 Q=10:GOSUB 3490
1520 'DECIDE NORTHERN BUDG.
1530 NF=NY*(.2+RND(0)*.1)
1540 NS=NY*(.3+RND(0)*.1)
1550 NW=NY*(.3+RND(0)*.1)
1560 NQ=NY*(.1+RND(0)*.1)
1570 IF 0>= NF OR 0>= NS OR 0>=N
W OR 0>=NQ THEN 1530
1580 IF NF+NS+NQ+NW>NY*1.1 THEN
1520
1590 IF NF+NS+NQ+NW>NY THEN A=RN
D(10):IF A<6 THEN 1520
1600 NL=NY-(NF+NS+NQ+NW)
1610 ' CALCULATE BATTLE POWER AN
D WHO IS ON OFFENSE
1620 SB=SY/NY+2*(SS/NS)+3*(SW/NW
)+1.5*(SF/NF)+SM/NM+1.2*(SQ/NQ)
1630 NB=NY/SY+2*(NS/SS)+3*(NW/SW
)+1.5*(NF/SF)+NM/SM+1.1*(NQ/SQ)
1640 SB=SB-(SB*(IS*.01))
1650 NB=NB-(NB*(IN*.01))
1660 MS=SB/NB+INT(BS)/INT(RND(BS
)+1)
1670 MN=NB/SB+INT(BN)/INT(RND(BN
)+1)
1680 IF MS+RND(3)>MN+RND(3) THEN
 FO=1 ELSE FO=2
1690 ' START BATTLE
1700 CLS:IF FO=1 THEN PRINT "SOU
```

```
TH IS ON OFFENSE" ELSE PRINT "SO        2100 NP=INT(ND/(2+RND(Ø))):ND=ND
UTH IS ON DEFENSE"                           -NP
1710 GOSUB 4490                         2110 SA=SD/SM:SA=SA*10
1720 IF FO=1 THEN GOSUB 4350 ELS        2120 NA=ND/NM:NA=NA*10
E GOSUB 4210                            2130 A=RND(10):IFA<4THENGOSUB 32
1730 ' BATTLE POWER +                        70
1740 CLSØ                               2140 IF SA>SB THEN 2150 ELSE SB=
1750 IF O=1 AND D=1 THEN OF=-1:D             SB-SA
E=Ø                                     2150 IF NA>NB THEN 2160 ELSE NB=
1760 IF O=1 AND D=2 THEN OF=2:DE             NB-NA
=-2                                     2160 PMODE 4,1:SCREEN 1
1770 IF O=1 AND D=3 THEN OF=1:DE        2170 X=1:Y=172
=-1                                     2180 B$(1)=" ":B$(2)="STATE :":B
1780 IF O=1 AND D=4 THEN OF=-1:D        $(3)="DATE  : ":B$(4)="BATTLE: "
=1                                      2190 GOSUB 3200
1790 IF O=2 AND D=1 THEN OF=-1:D        2200 X=48:Y=172
E=2                                     2210 B$(1)=" ":B$(2)=ST$:B$(3)=D
1800 IF O=2 AND D=2 THEN OF=-2:D        A$+" "+YR$:B$(4)=BA$
=2                                      2220 GOSUB 3200
1810 IF O=2 AND D=3 THEN OF=Ø:DE        2230 PMODE 3,1:PLAY "T255L25505"
=1                                      2240 FOR A=1 TO 50
1820 IF O=2 AND D=4 THEN OF=2:DE        2250 B=B+1:IF B>=4 THEN B=Ø
=-1                                     2260 COLOR B:LINE (BX,BY)-(BX+1,
1830 IF O=3 AND D=1 THEN OF=1:DE        BY+1),PSET,BF
=-1                                     2270 PLAY "DCD"
1840 IF O=3 AND D=2 THEN OF=2:DE        2280 NEXT A
=-1                                     2290 COLOR Ø:LINE (BX,BY)-(BX+1,
1850 IF O=3 AND D=3 THEN OF=-2:D        BY+1),PSET,BF
E=2                                     2300 PLAY "O1"
1860 IF O=3 AND D=4 THEN OF=Ø:DE        2310 FOR A=1 TO SK STEP SK/RND(5
=-1                                     )+5
1870 IF O=4 AND D=1 THEN OF=2:DE        2320 PAINT (XX,YY),2,Ø
=-2                                     2330 PLAY "CDC"
1880 IF O=4 AND D=2 THEN OF=1:DE        2340 PAINT (XX,YY),3,Ø
=-1                                     2350 NEXT A
1890 IF O=4 AND D=3 THEN OF=1:DE        2360 KS=SK+(SP+SD)/2:KN=NK+(NP+N
=Ø                                      D)/2
1900 IF O=4 AND D=4 THEN OF=-2:D        2370 IF KS=>KN THEN GOSUB 3160 E
E=2                                     LSE GOSUB 3120
1910 'IF SURRENDER                      2380 IF KS>=KN THEN B$(1)="NORTH
1920 IF O=5 OR O=6 THEN3680              WINS" ELSE B$(1)="SOUTH WINS"
1930 IF D=5 OR D=6 THEN 3680            2390 PMODE4,1:B$(2)="":X=1:Y=172
1940 IF FO=2 THEN 2000                  :GOSUB 3200
1950 'FBP- SOUTH OFFENSE                2400 PLAY "O1L255T255"
1960 SBP=SBP+OF+MS                       2410 FOR B=30TO1STEP-1
1970 NBP=NBP+DE+MN                       2420 PLAY "V"+STR$(B)+"CDF":NEXTB
1980 GOSUB 3600                          2430 X=100:Y=8:B$(1)="PRESS ANY
1990 GOTO 2040                          KEY":B$(2)="FOR FINAL RESULTS":B
2000 'FBP- NORTH OFFENSE                $(3)="":GOSUB 3200
2010 SBP=SBP+DE+MS                       2440 A$=INKEY$:IF A$=""THEN 2440
2020 NBP=NBP+OF+MN                        ELSE SOUND 1,1
2030 GOSUB 3600                          2450 COLOR Ø:LINE (100,4)-(220,1
2040 'START BATTLE                      4),PSET,BF
2050 ' DECIDE DESERTIONS                2460 LINE (0,168)-(76,192),PSET,
2060 SM=SM-SK:NM=NM-NK                   BF
2070 SD=INT(SK/3):SK=SK-SD              2470 LINE (76,172)-(165,192),PSE
2080 ND=INT(NK/3):NK=NK-ND              T,BF
2090 SP=INT(SD/(2+RND(Ø))):SD=SD        2480 CLS:SCREEN Ø
-SP                                     2490 PRINT@6,"FINAL BATTLE RESUL
```

```
TS"
2500 PRINT@38,"------------------
---"
2510 PRINT @109,"SOUTH":PRINT@11
9,"NORTH"
2520 PRINT @128,"MONEY SPENT";:P
RINT TAB(13)INT(SY-SL);:PRINT TA
B(22)INT(NY-NL);
2530 PRINT @160,"MEN INVOLVED";:
PRINT TAB(13)SZ;:PRINT TAB(22)NZ
;
2540 PRINT @192,"MEN KILLED";:PR
INT TAB(13)SK;:PRINT TAB(22)NK;
2550 PRINT @224,"DESERTIONS";:PR
INT TAB(13)SD;:PRINT TAB(22)ND;
2560 PRINT @256,"POW'S";:PRINT T
AB(13)SP;:PRINT TAB(22)NP;
2570 PRINT @288,"STRATEGY";
2580 IF FO=1 THEN PRINT TAB(13)"
O";O;:PRINT TAB(22)"D";D; ELSE P
RINT TAB(13)"D";D;:PRINT TAB(22)
"O";O;
2590 PRINT @320,"EFFECTIVE?";
2600 IF FO=1 AND OF>0 THEN PRINT
 TAB(15)"Y";:PRINT TAB(24)"N"; E
LSE IF FO=1 AND OF<=0 THEN PRINT
 TAB(15)"N";:PRINT TAB(24)"Y";
2610 IF FO=2 AND OF>0 THEN PRINT
 TAB(15)"N";:PRINT TAB(24)"Y"; E
LSE IF FO=2 AND OF<=0 THEN PRINT
 TAB(15)"Y";:PRINT TAB(24)"N";
2620 PRINT@352,"WINNER"
2630 IF KN<=KS THEN B$(1)="  UN
ION   ":B$(2)="   union   ":GOTO
 2650
2640 B$(1)="CONFEDERACY":B$(2)="
confederacy"
2650 PRINT @489,"PRESS ANY KEY";
2660 PLAY "V4L10T10"
2670 FOR A=1 TO 2
2680 PRINT @365,B$(A)
2690 A$=INKEY$:IFA$="" THEN PLAY
"CD":NEXT:GOTO 2670
2700 IF KS>=KN AND BN=1.1 THEN B
N=1:IS=IS+(1+RND(3)):IN=IN-(1+RN
D(3)):GOTO 2740
2710 IF KN>KS AND BS=1.1 THEN BS
=1:IS=IS-(1+RND(3)):IN=IN+(1+RND
(3)):GOTO 2740
2720 IF KS>=KN THEN BN=BN+1:IN=I
N-(1+RND(3)):IS=IS+(1+RND(3))
2730 IF KN>KS THEN BS=BS+1:IS=IS
-(RND(3)+1):IN=IN+(RND(3)+1)
2740 CS=CS+INT(KS):CN=CN+INT(KN)
2750 DS=DS+INT(SD):DN=DN+INT(ND)
2760 PS=PS+INT(SP):PN=PN+INT(NP)
2770 ME=ME+INT(NY-NL):MW=MW+INT(
SY-SL)
2780 CLS:PRINT "DO YOU WISH TO S
EE A RECORD OF  ALL BATTLES UP T
O "DA$",        "YR$" (Y/N)";:INPU
T A$
2790 IF A$="N" THEN CLS:PLAY"V15
":GOTO 710
2800 CLS
2810 PRINT "STATS ON ALL CIVIL W
AR BATTLES"
2820 PRINT "------------------------
------------";
2830 PRINT@109,"SOUTH":PRINT@119
,"NORTH"
2840 PRINT@128,"MONEY SPENT";:PR
INT TAB(13)MW;:PRINTTAB(22)ME;
2850 PRINT @160,"MEN KILLED";:PR
INT TAB(13)CS;:PRINT TAB(22)CN;
2860 PRINT @192,"DESERTIONS";:PR
INT TAB(13)DS;:PRINT TAB(22)DN;
2870 PRINT @224,"POW'S";:PRINT T
AB(13)PS;:PRINT TAB(22)PN;
2880 GOSUB 4590
2890 PLAY"V15":CLS:GOTO 710
2900 ' END OF GAME GOSUB
2910 CLS
2920 PRINT @225,"*** THE CIVIL W
AR IS OVER ***"
2930 PLAY "T255L255V3002"
2940 FOR A=30 TO 1 STEP-1
2950 PLAY "V"+STR$(A)+"CBC"
2960 NEXT A
2970 PLAY "V15"
2980 CLS
2990 IF RS>RN THEN A$(0)="A TELE
GRAM FROM ATLANTA,":A$(1)="GEORG
IA.  THE UNION HAS":A$(2)="BEEN
CRUSHED!!!":A$(3)="--------------
------------------------":A$(4)="PRES
IDENT JEFFERSON DAVIS":A$(5)="HA
S CONTACTED THE NORTH" ELSE 3020
3000 A$(6)="AND THEY HAVE AGREED
 TO":A$(7)="RECOGNIZE THE CONFED
ERACY":A$(8)="IN ADDITION TO HAL
TING ALL":A$(9)="HOSTILITIES.  T
HE PRES-":A$(10)="IDENT WOULD LI
KE TO COMMEND":A$(11)="YOU ON YO
UR EXCELLENT":A$(12)="SERVICE, G
ENERAL":A$(13)=MA$+"."
3010 Q=13:GOSUB 3490:GOTO 3070
3020 IF RS<=RN THEN A$(0)="A TEL
EGRAM FROM ATLANTA,":A$(1)="GEOR
GIA.  THE CONFEDERACY":A$(2)="HA
S BEEN DEFEATED.  PRES-":A$(3)="
IDENT JEFFERSON DAVIS HAS":A$(4)
="CONCEDED ON THIS DATE":A$(5)=D
A$+", "+YR$+", DEFEAT":A$(6)="OF
 THE CONFEDERACY BY THE"
3030 A$(7)="UNITED STATES OF AME
RICA.":A$(8)="THIS DEFEAT INCLUD
ES AN":A$(9)="UNCONDITIONAL SURR
```

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ENDER":A$(10)="BY THE SOUTH AND          3340 PRINT @260,"SOUTHERN SPY RE
OF ALL":A$(11)="ITS TERRITORIES          PORTS";
ALONG":A$(12)="WITH AN ADMISSION         3350 PRINT @292,"THAT THE NORTH
OF GUILT"                                SEEMS";
3040 Q=13:GOSUB 3490                      3360 PRINT @325,"TO BE SHOWING A
3050 CLS:A$(0)="AND WRONG-DOING.          (N)";
   THE":A$(1)="COMMANDERS AND LEA        3370 PRINT @354,;
DERS OF":A$(2)="THE CONFEDERACY           3380 IF FO=2 AND O=1 THEN PRINT
WILL BE":A$(3)="TRIED AS WAR CRI          "ARTILLERY ATTACK";
MINALS.":A$(4)="":A$(5)="COMMAND          3390 IF FO=2 AND O=2 THEN PRINT
ER "+MA$+",":A$(6)="YOU HAVE FAI          "FRONTAL ATTACK";
LED.    THE":A$(7)="CONFEDERACY IS        3400 IF FO=2 AND O=3 THEN PRINT
 NOW IN THE"                             "FLANKING MANEUVERS";
3060 A$(8)="POSSESSION OF THE UN          3410 IF FO=2 AND O=4 THEN PRINT
ION.":A$(9)="":A$(10)="YOU SHALL          "ENCERCLEMENT";
 HANG!":Q=10:GOSUB 3490                   3420 IF FO=1 AND D=1 THEN PRINT
3070 CLS4:PRINT@101,"CIVIL WAR S          "ARTILERY DEFENSE";
IMULATION";:PRINT @193,"SHALL WE          3430 IF FO=1 AND D=2 THEN PRINT"
 JOIN IN BATTLE AGAIN";                   DEFENSE TO FRONTAL ATTACK";
3080 PRINT@301,"(Y/N)";:PRINT @3          3440 IF FO=1 AND D=3 THEN PRINT"
67,;:LINE INPUT A$                        DEFENSE TO FLANKING MANEUVERS";
3090 IF A$="Y" THEN PRINT @430,"          3450 IF FO=1 AND D=4 THEN PRINT
GOOD";:GOSUB 4590:RUN                     "FALL BACK";
3100 PRINT @419,"VERY WELL, TILL          3460 PRINT @394,"STRATEGY";
 NEXT TIME!";                             3470 GOSUB 4590
3110 GOTO 3110                            3480 RETURN
3120 'STATE PAINT GOSUB                   3490 ' TELEGRAM GOSUB
3130 FOR K=1 TO 4                         3500 PLAY "T155L12501"
3140 IF S(K)<>0 THEN PAINT (XA(S          3510 FOR A=0 TO Q
(K)),YA(S(K))),2,0                        3520 FOR B=1 TO LEN(A$(A))
3150 NEXT:RETURN                          3530 PLAY "DA"
3160 'STATE PAINT GOSUB                   3540 PRINT MID$(A$(A),B,1);
3170 FOR K=1 TO 4                         3550 NEXT B
3180 IF N(K)<>0 THEN PAINT (XA(N          3560 PRINT TAB(27);"-STOP";:PLAY
(K)),YA(N(K))),3,0                        "CDB"
3190 NEXT :RETURN                         3570 IF A=2 AND LEFT$(A$(3),1)="
3200 'GRAPHIC PRINT GOSUB                 =" THEN PRINT
3210 FOR A=1 TO 4                         3580 NEXT
3220 DRAW "S2BM"+STR$(X)+","+STR          3590 GOSUB 4590:RETURN
$(Y)                                      3600 'MEN KILLED GOSUB
3230 FOR B=1 TO LEN(B$(A))                3610 KS=NBP/SBP:KN=SBP/NBP
3240 IF B$(A)="" THEN RETURN              3620 SK=SM*(KS/4)
3250 C$=MID$(B$(A),B,1):DRAW L$(          3630 NK=NM*(KN/4)
ASC(C$)-32):NEXT B:Y=Y+6:NEXT A          3640 IF SK>SM THEN A=2:SK=SM-INT
3260 RETURN                               (RND(SM/A)):A=A+1:GOTO 3640
3270 ' SPY STRAT GOSUB                    3650 IF NK>NM THEN B=2:NK=NM-INT
3280 CLS:PRINT:PRINT:PRINT                (RND(NM/B)):B=B+1:GOTO 3650
3290 FOR A=1 TO 12:IF A=1 OR A=1          3660 SK=INT(SK/3):NK=INT(NK/3)
2 THEN PRINT "=================          3670 B=0:A=0:RETURN
===============";  ELSE PRINT "=          3680 ' SURRENDER GOSUB
                        =";              3690 CLS
3300 NEXT:PRINT@37,"<SOUTHERN SP          3700 IF (FO=1 AND O=5) OR (FO=2
Y REPORT>"                               AND D=5) THEN GOSUB 3740
3310 PRINT@129,"SOUTHERN SPY HAS          3710 IF (FO=1 AND O=6) OR (FO=2
 INFORMATION!";                          AND D=6) THEN GOSUB 3850
3320 PRINT @163,"SHOULD HE REPOR          3720 IF (FO=1 AND D=5) OR (FO=2
T TO YOU ?";:PRINT @205,;:LINE I          AND O=5) THEN GOSUB 3990
NPUT "(Y/N) ";A$                         3730 IF (FO=1 AND D=6) OR (FO=2
3330 IF A$="N" THEN CLS:RETURN            AND O=6) THEN GOSUB 4120
```

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3740 PRINT@2,"A DECLARATION OF S
URRENDER":PRINT
3750 A$(0)="I, GENERAL "+MA$+", "
3760 A$(1)="AS THE COMMANDER OF
THE"
3770 A$(2)="CONFEDERATE FORCES D
O"
3780 A$(3)="HEREBY SURRENDER MY"
3790 A$(4)="TROOPS AT THE BATTLE
 OF"
3800 A$(5)=BA$+"."
3810 A$(6)="THIS ACTION, ALTHOUG
H"
3820 A$(7)="REGRETTABLE, IS NECE
SSARY"
3830 A$(8)="FOR THE FINAL VICTOR
Y"
3840 A$(9)="OF THE CONFEDERACY."
:Q=9:GOSUB 3490:PS=SM:DS=INT(PS/
RND(5)+4):PS=PS-DS:COLOR0:LINE(B
X,BY)-(BX+1,BY+1),PSET,BF:GOSUB
3160:GOTO 2770
3850 PRINT@0, "A DECLARATION OF
TOTAL SURRENDER":PRINT
3860 A$(0)="A TELEGRAM TO ABRAHA
M"
3870 A$(1)="LINCOLN AND TO YOU,"
3880 A$(2)="COMMANDER "+MA$+"."
3890 A$(3)="--------------------
-----"
3900 A$(4)="BECAUSE OF CONTINUED
"
3910 A$(5)="LOSSES IN ADDITION T
O A"
3920 A$(6)="REQUEST FROM MY TOP"
3930 A$(7)="GENERAL, "+MA$+"."
3940 A$(8)="I, JEFFERSON DAVIS,
DO"
3950 A$(9)="FORMALLY SUE FOR PEA
CE."
3960 A$(10)="AND CONSENT TO AN"
3970 A$(11)="UNCONDITIONAL SURRE
NDER. "
3980 Q=11:GOSUB 3490:BN=20:GOTO
2910
3990 PRINT@3,"A MESSAGE FROM THE
 NORTH":PRINT
4000 A$(0)="GENERAL "+MA$+"."
4010 A$(1)="AS YOU MUST ALREADY"
4020 A$(2)="HAVE REALIZED, MY SI
TUATION"
4030 A$(3)="AS THE NORTH'S GENER
AL"
4040 A$(4)="FOR THE BATTLE OF"
4050 A$(5)=BA$+" IS"
4060 A$(6)="NOT VERY ADVANTAGEOU
S TO"
4070 A$(7)="THE NORTH.  INSTEAD
OF"
4080 A$(8)="STARTING A 'BLOODBAT
H' I"
4090 A$(9)="REGRETTABLY MUST SUR
RENDER"
4100 A$(10)="MY ARMY TO THE CONF
EDERACY"
4110 Q=10:GOSUB 3490:PN=NM:DN=IN
T(PN/RND(5)+4):PN=PN-DN:LINE(BX,
BY)-(BX+1,BY+1),PSET,BF:GOSUB 31
20:GOTO 2770
4120 PRINT @0,"A TELEGRAM FROM A
BRAHAM LINCON":PRINT
4130 A$(0)="BECAUSE OF CONTINUED
 LOSSES"
4140 A$(1)="AND A GENERAL DISLIK
E OF"
4150 A$(2)="THE WAR EFFORT, ON T
HIS"
4160 A$(3)="DATE, "+DA$+YR$+"THE
"
4170 A$(4)="UNION RECONGNIZES TH
E"
4180 A$(5)="SOVEREIGNTY OF THE S
OUTH"
4190 A$(6)="AND SUES FOR PEACE."
4200 Q=6:GOSUB 3490:BS=20:GOTO 2
910
4210 ' SOUTH ON DEFENSE
4220 PRINT:PRINT"PICK YOUR STRAT
EGY"
4230 PRINT "-------------------"
4240 PRINT:PRINT"1) ARTILLERY DE
FENSE"
4250 PRINT "2) DEFENSE TO FRONTA
L ATTACK"
4260 PRINT "3) DEFENSE TO FLANKI
NG MANEUVERS";
```
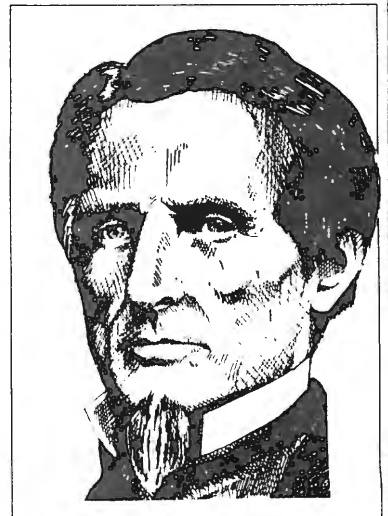
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4270 PRINT "4) FALL BACK"
4280 PRINT "5) SURRENDER BATTLE"
4290 PRINT "6) SURRENDER WAR"
4300 PRINT @448,"YOUR CHOICE, GE
NERAL";
4310 INPUT D:IF D<1 OR D>6 THEN
4300
4320 ' NORTH DECIDES STRAT
4330 O=RND(4):IF BS>BN+4 AND SBP
>NBP AND SM>NM THEN O=RND(5)+1
4340 RETURN
4350 ' SOUTH IS ON OFFENSE
4360 PRINT:PRINT "PICK YOUR STRE
TAGY"
4370 PRINT "------------------"
4380 PRINT:PRINT "1) ARTILLERY A
TTACK"
4390 PRINT "2) FRONTAL ATTACK"
4400 PRINT "3) FLANKING MANEUVER
S"
4410 PRINT "4) ENCIRCLEMENT"
4420 PRINT "5) SURRENDER BATTLE"
4430 PRINT "6) SURRENDER WAR"
4440 PRINT @448,"YOUR CHOICE, GE
NERAL";
4450 INPUT O:IF O<1 OR O>6 THEN
4440
4460 ' NORTH DECIDES STRAT
4470 D=RND(4):IF BS>BN+4 AND SBP
>NBP AND SM>NM THEN D=RND(5)+1
4480 RETURN
4490 'MORALE GOSUB
4500 IF MS/MN>1.5 THEN PRINT "MO
RALE IS EXCELLENT" ELSE IF MS/MN
>1 THEN PRINT "MORALE IS GOOD" E
LSE IF MS/MN>.5 THEN PRINT "MORA
LE IS POOR" ELSE IF MS/MN<=.5 TH
EN PRINT "MORALE IS TERRIBLE"
4510 RETURN
4520 ' PRINT USING GOSUB
4530 PRINT USING"$#########,";PU
4540 RETURN
4550 ' SUBTRACT MONEY GOSUB
4560 PRINT @448,"
                        ";
4570 PRINT @233,S1;
4580 RETURN
4590 'INKEY GOSUB
4600 PRINT @489,"PRESS ANY KEY";
4610 A$=INKEY$:IF A$="" THEN 461
0 ELSE CLS:RETURN
4620 'SPY GOSUB
4630 SS=RND(10)
4640 PRINT:PRINT:PRINT
4650 FOR A= 1 TO 12
4660 IF A=1 OR A=12 THEN PRINT "
====================================
"; ELSE PRINT "=
                   =";
```
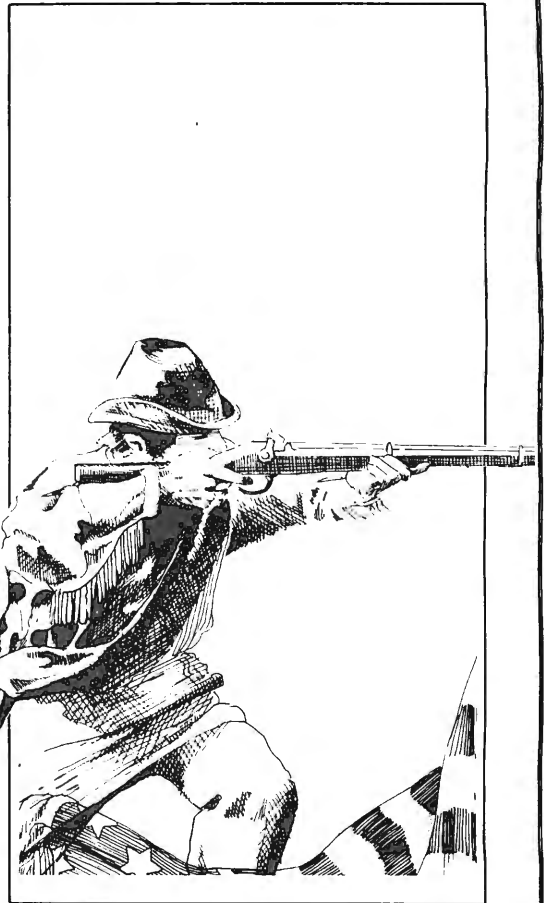


```
4670 NEXT A
4680 PRINT @37,"<SOUTHERN SPY RE
PORT>"
4690 IF SS>7 AND SS<=10 THEN 470
0 ELSE IF SS>4 AND SS<=7 THEN 48
20 ELSE 4880
4700 PRINT @129,"SOUTHERN SPY HA
S INFORMATION!";
4710 PRINT @163,"SHOULD HE REPOR
T TO YOU ?";
4720 PRINT @205,;:LINEINPUT "(Y/
N) ";A$
4730 IF A$="N" THEN CLS:RETURN
4740 PRINT @264,"NORTHERN STATS"
;
4750 PRINT @296,"----------------"
;
4760 PRINT @328,"MONEY          ";
NY;
4770 PRINT @360,"MEN            ";
NM;
4780 PRINT @392,"INFLATION      ";
IN;"%";
```

ETA\X

Sharp

Crampton

S FERRY

eesburg

VIRGI\
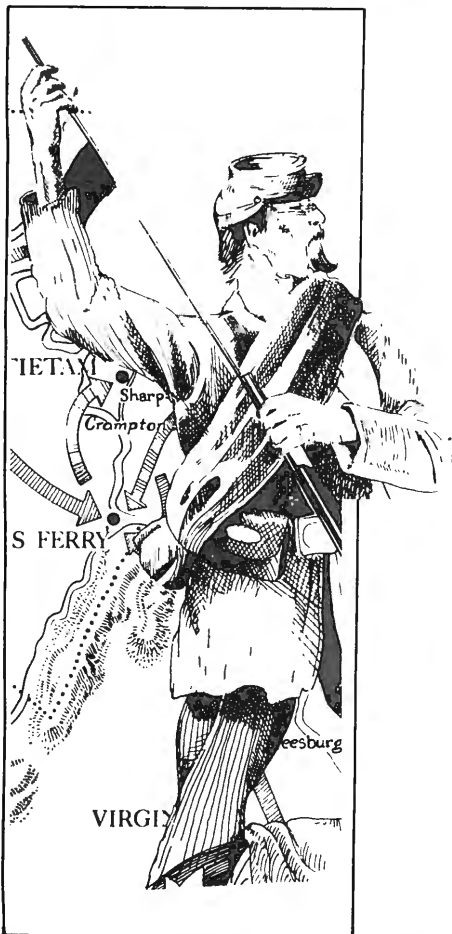
```
4790 PRINT @424,"BATTLES WON   ";
RBN;
4800 QU=1:GOSUB 4590
4810 CLS:RETURN
4820 ' NO SPIES REPORTED
4830 PRINT @193,"NO SPIES REPORT
ED BACK IN TIME";
4840 PRINT@265, "FOR BATTLE OF";
4850 PRINT @328,BA$".";
4860 GOSUB 4590
4870 CLS:RETURN
4880 'SPY COUGHT
4890 PRINT@162,"THE SOUTHERN SPY
 IS OVERDUE";
4900 PRINT@235, "BY";RND(10)+2;"
DAYS!";
4910 PRINT@289, "HE MUST HAVE BE
EN CAPTURED BY";
4920 PRINT @353,"THE ADVANCING N
ORTHERN TROOPS.";
4930 GOSUB 4590
4940 CLS:RETURN
```

```
4950 ' CLEAR SCREEN SUB
4960 PRINT @393,"press"+CHR$(128
)+"any"+CHR$(128)+"key";
4970 A$=INKEY$:IF A$="" THEN 497
0
4980 FOR A=0 TO 12:PRINT@393+A,C
HR$(128);:NEXT A
4990 FOR A = 4 TO 27
5000 PRINT @ PA+A,CHR$(128);
5010 NEXT A
5020 PA=PA+32
5030 IF PA>415 THEN PA=96:RETURN
5040 GOTO 4990
5050 REM DRAW MAP IN PMODE 3
5060 PMODE 3,1:PCLS
5070 OPEN "I",#-1,"MAPDATA"
5080 INPUT #-1,X,Y:IF X=999 THEN
 5100 ELSE IF X<0 THEN X1=-X:Y1=
Y:INPUT #-1,X,Y:LINE(X1,Y1)-(X,Y
),PSET
5090 IFX>0THENLINE-(X,Y),PSET:GO
TO5080
5100 DRAW"C4S5BM6,17U8R8BD8L8BR1
2BD15BL12BU8R8BL4D8BL4R8BR4BD15B
L12BU8D4F4E4U4BD8BR4BD15BL12BU8R
8BL4D8BL4R8BL4BD15BL4U8BD8R8BR4B
D25BL12U8BR8D8H4G4BR12BD15BL12U8
R8D4L8BR8D4BR4BD15BL12U8R8D4L8BR
4F4BR4S6"
5110 COLOR 2:LINE (2,4)-(20,158)
,PSET,B
5120 INPUT#-1,X,Y,CC:IFX<>300THE
NPAINT(X,Y),CC,4:GOTO5120
5130 CLOSE #-1
5140 DRAW"BM230,55C2R15BD1C4L15B
D1C2R15BD1C4L15BD1C2R15BD1C4L15B
D1C2R15BD1C4L15BD1C2R15BD1C4L15B
D1C2R15BD1C4L15BD1C2R15BM220,175
S3C2U20L1G4D1U1E4R1BU6BL4U8F8U8S
4"
5150 COLOR3,1:LINE(230,55)-(236,
61),PSET,BF
5160 COLOR 2,1:LINE(40,140)-(62,
153),PSET,BF
5170 COLOR 3,1:LINE(40,140)-(62,
153),PSET
5180 LINE (41,140)-(62,152),PSET
5190 LINE (40,141)-(61,153),PSET
5200 LINE (40,153)-(62,140),PSET
5210 LINE (40,152)-(61,140),PSET
5220 LINE (41,152)-(62,141),PSET
5230 RETURN
5240 'INITILIZATION
5250 IS=15:IN=10:BS=1.1:BN=1.1:C
=1:PA=96:PT=100
5260 DIM A$(13)
5270 DIM L$(57)
5280 Z=RND (-TIMER)
5290 OPEN "I",#-1,"STPTDAT"
```

```
5300 IF EOF(-1) THEN CLOSE #-1:G
OTO 5320
5310 A=A+1:INPUT #-1,XA(A),YA(A)
:GOTO 5300
5320 PRINT @6, "HI RES SCREEN TE
ST"
5330 PRINT:PRINT "UPPER RECTANGL
E SHOULD BE RED     AND THE LOWER
ONE SHOULD BE      BLUE. ";
5340 PRINT "IF THE COLORS ON THE
  HI  RES SCREEN ARE CORRECT, PRE
SS    <ENTER> TO CONTINUE ON TO T
HE     SIMULATION.   ";
5350 PRINT "IF THE COLORS ARE  S
WITCHED, PRESS RESET AND RERUN P
ROGRAM (NOTE: CASSETTE USERS,  R
EWIND TAPE!)."
5360 PRINT:PRINT @357,"PRESS <EN
TER> TO TEST"
5370 A$=INKEY$:IFA$="" THEN 5370
5380 PMODE 3,1:PCLS 5
5390 COLOR 6:LINE (20,20)-(236,7
5),PSET,BF
5400 COLOR 7:LINE (20,116)-(236,
172),PSET,BF
5410 PMODE 4,1:SCREEN 1,1:CLS Ø
5420 A$=INKEY$:IF A$="" THEN 542
Ø
5430 OPEN "I",#-1,"LETTERS"
5440 INPUT #-1,L$(Ø)
5450 FOR A=17 TO 26:INPUT #-1,L$
(A):NEXT
5460 INPUT #-1,L$(31)
5470 FOR A=33 TO 57:INPUT #-1,L$
(A):NEXT
5480 CLOSE #-1:PMODE 3,1:SCREEN
Ø:RETURN
5490 ' INSTRUCTION DATA
5500 DATA CIVIL WAR IS A SIMULA-
,TION OF THE AMERICAN,CIVIL WAR.
   YOU HAVE,BEEN GIVEN THE COMMAN
D,OF THE CONFDERATE,FORCES.   YOU
R JOB IS TO,DEFEAT THE NORTH AS,
WELL AS DEFENDING THE,SOUTH FROM
 THE UNION'S
5510 DATA ATTACKS.   AS THE,COMMA
NDER YOU WILL,DECIDE WHERE THE S
OUTH'S,FUNDS WILL BE EXPENDED.,I
N ADDITION$ THE,ACTIONS OF THE W
HOLE,SOUTHERN ARMY IS UNDER,YOUR
  CONTROL.   I WILL,PROMPT YOU FOR
 ANY
5520 DATANEEDED INPUT DURRING TH
E,COURSE OF THE SIMU-,LATION.   P
ERIODICALLY$,DEPENDING ON YOUR S
UC-,CESS$ YOU WILL RECEIVE,MESSA
GES FROM YOUR,SUPERIOR$ PRESIDEN
T JEF-,FERSON DAVIS.   OTHER,MESS
AGES YOU RECEIVE,WILL BE FROM SO
UTHERN,SPIES REPORTING ON
5530 DATANORTH'S ESTIMATED POWER
,AND MODE OF ATTACK.,   THE WAR W
ILL CONTINUE,UNTIL THIRTEEN BATT
LES,HAVE BEEN JOINED.,GOOD LUCK$
 AND REMEMBER,YOU WILL BE FIGHTI
NG AN,ARMY COMMANDED BY ME$,A TR
S-80 COLOR COMPUTER!,#
5540 ' BATTLE DATA
5550 DATA BULL RUN,19000,18000,8
2000,80000,VIRGINIA,3,Ø,Ø,Ø,3,Ø,
Ø,Ø,191,84,JULY 21,1861,184,96
5560 DATA SHILOH,46000,45000,200
000,200000,TENNESSEE,4,Ø,Ø,Ø,4,Ø
,Ø,Ø,116,120,APRIL 6,1862,136,11
1
5570 DATASEVEN DAYS,120000,12000
0,49000,50000,VIRGINIA,3,Ø,Ø,Ø,3
,Ø,Ø,Ø,194,93,JUNE 26,1862,184,9
6
5580 DATA SECOND BULL RUN,63000,
62000,330000,300000,VIRGINIA,3,Ø
,Ø,Ø,3,Ø,Ø,Ø,191,84,AUGUST 29,18
62,184,96
5590 DATA ANTIETAM,55000,50000,2
00000,225000,MARYLAND,2,Ø,Ø,Ø,2,
3,Ø,Ø,194,78,SEPTEMBER 17,1862,1
96,78
5600 DATA FREDERICSBURG,130000,1
20000,395000,400000,VIRGINIA,3,2
,Ø,Ø,3,Ø,Ø,Ø,200,93,DECEMBER 19,
1862,184,96
5610 DATA MURFREESBURO,42000,440
00,235000,200000,TENNESSEE,4,Ø,Ø
,Ø,4,Ø,Ø,Ø,131,114,DECEMBER 31,1
863,136,111
5620 DATA CHANCELLORSVILLE,87000
,80000,180000,200000,VIRGINIA,3,
2,Ø,Ø,3,Ø,Ø,Ø,197,90,MAY 1,1863,
184,96
5630 DATA VICKSBURG,65000,70000,
290000,310000,MISSISSIPPI,5,Ø,Ø,
Ø,5,Ø,Ø,Ø,102,144,JULY 4,1863,10
8,132
5640 DATA GETTYSBURG,75000,83000
,320000,315000,PENNSLYVANIA,1,Ø,
Ø,Ø,1,2,3,Ø,197,70,JULY 1,1863,1
72,69
5650 DATA CHATTANOOGA,50000,6000
0,220000,250000,TENNESSEE,4,Ø,Ø,
Ø,4,5,Ø,Ø,138,119,NOVEMBER 24,18
63,136,111
5660 DATA AVERYSBORO,86000,10000
0,370000,400000,NORTH CAROLINA,6
,3,2,1,6,Ø,Ø,Ø,194,111,MARCH 16,
1865,188,111
5670 DATA ATLANTA,80000,97000,39
9000,460000,GEORGIA,7,4,Ø,Ø,7,Ø,
Ø,Ø,158,138,JULY 20,1865,168,144
```
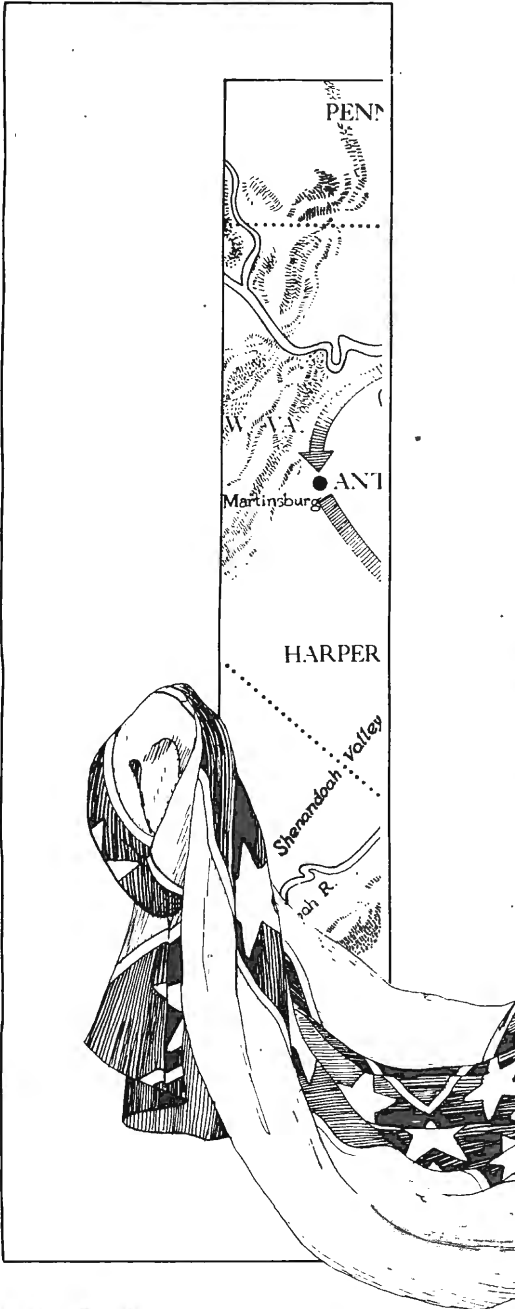
LISTING 2

```
10 '''''''''''''''''''''''''''''''
20 ''  DATA MAKE FOR CIVIL WAR ''
30 ''             BY             ''
40 ''        DON BRADFORD        ''
50 '''''''''''''''''''''''''''''''
60 CLS:PRINT "INSERT CASSETTE IN
TO RECORDER,   SKIP PAST LEADER,
PRESS PLAY     AND RECORD.  PRESS
 <ENTER> WHEN READY."
70 A$=INKEY$:IF A$="" THEN 70
80 CLS:PRINT "SAVING DATA SET NU
MBER 1"
90 OPEN "O",#-1,"STPTDAT"
100 READ A
110 PRINT #-1,A
120 IF A=144 THEN CLOSE #-1:GOTO
 140
130 GOTO 100
140 PRINT "SAVING DATA SET NUMBE
R 2"
150 OPEN "O",#-1,"LETTERS"
160 READ A$
170 PRINT #-1,A$
180 IF LEFT$(A$,4)="BU8F" THEN C
LOSE #-1:GOTO 200
190 GOTO 160
200 PRINT "SAVING DATA SET NUMBE
R 3"
210 OPEN "O",#-1,"MAPDATA"
220 READ A
230 PRINT #-1,A
240 IF A=0 AND B=.1 THEN CLOSE #
-1:PRINT "FINISHED WITH ALL DATA
.  NOW     PLEASE REWIND CASSETTE
 AND LOAD CIVIL WAR.  HAVE THIS
CASSETTE   READY IN THE RECORDER
WHEN YOU   TYPE RUN AS CIVIL WAR
WILL       ATTEMPT TO LOAD DATA I
MMIDATLY.":END
250 B=A
260 GOTO 220
280 'STATE PAINT DATA
```

```
290 DATA 172,69
300 DATA 196,78
310 DATA 184,96
320 DATA 136,111
330 DATA 108,132
340 DATA 188,111
350 DATA 168,144
360 'GRAPHIC SYMBOLS DATA
370 DATA BR14
380 DATA BR2R4L2U8G2E2D8BR10
390 DATA R8L8U4R8U4L8BD8BR15
400 DATA R8U4L6R6U4L8BD8BR6
410 DATA BU4U4D4R8U4D8BR6
420 DATA BU4U4R8BD4L8BR8D4L8BR14
430 DATA R8U4L8D4U8R8BD8BR6
440 DATA BR4E4U4L8D2U2R8BD8BR6
450 DATA U8R8D8L8U4R8D4BR6
460 DATA BR8U8L8D4R8D4BR6
470 DATA BR4BU2U1BU4U1BD6BR10
480 DATA BR4U1BU2U2R4U4L6BD8BR12
490 DATA U8R8D4L8BR8D4BR6
500 DATA U8R6F2D2L8BR8D2G2L6BR14
510 DATA U8R8BD8L8BR14
520 DATA U8R6F2D4G2L6BR14
530 DATA U8R8BD4L8BD4R8BR6
540 DATA U8R8BD4L8BD4BR14
550 DATA U8R8BD4L4BR4D4L8BR14
560 DATA U8BR8D8BU4L8BD4BR14
570 DATA BU8R8BL4D8BL4R8BR6
580 DATAU4BU4BR8D8L8BR14
590 DATA U8BR8G4L4BR4F4BR6
600 DATA U8BD8R8BR6
610 DATA U8F4E4D8BR6
620 DATA U8F8U8BD8BR6
630 DATA U8R8D8L8BR14
640 DATA U8R8D4L8BD4BR14
650 DATA U8R8D8H4BG4R8BR6
660 DATA U8R8D4L8BR4F4BR6
670 DATA BU4U4R8BD4L8BR8D4L8BR14
680 DATA BU8R8BL4D8BR10
690 DATA U8BR8D8L8BR14
700 DATA BU8D4F4E4U4BD8BR6
710 DATA U8BR8D8H4G4BR14
720 DATA E8BL8F8BR6
730 DATA BU8F4E4BG4D4BR10
740 ' MAP DATA
750 DATA-55,9,67,9,68,6,70,7,71,
11,83,13,100,17,87,28,96,28,100,
27,112,20,109,26,113,25,120,27,1
29,25,134,26,134,28,123,32,120,3
5,115,45,116,52,117,60,118,64,12
0,67,123,66,125,64,127,60,125,49
,124,44,126,39,129,35,133,33,141
,35,143,40,143,43,141,48,142
760 DATA49,147,44,149,46,150,50,
151,54,149,56,147,60,146,62,148,
64,152,65,156,64,164,60,175,49,1
74,47,180,45,190,40,188,36,199,2
4,206,23,216,19,220,15,221,11,22
```

34
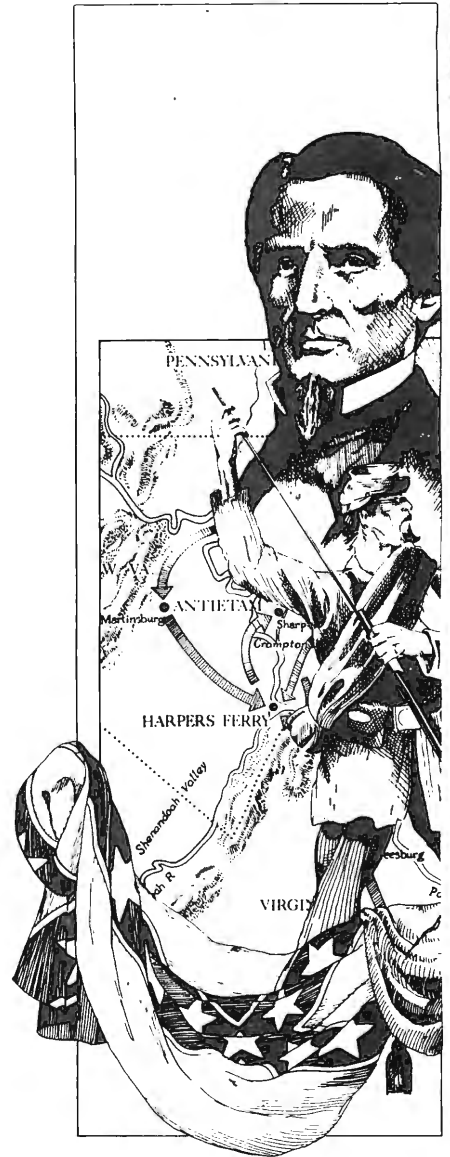
```
0,7,221,4,224,1,229,1,234,3,241,
10,243,12,242,16,236,20,228,30,2
26,36,227,41,229,44,232,46
770 DATA212,60,209,77,203,72,208
,80,204,92,205,96,209,104,205,11
3,193,124,177,142,174,148,176,15
2,179,164,184,172,188,180,189,18
5,189,187,187,190,184,191,180,19
0,172,184,167,178,168,170,160,16
3,156,161,148,166,144,162,140,16
0,116,162,111,164,112,168,110
780 DATA171,103,171,78,168,80,16
4,80,154,76,148,76,137,73,135,71
,90,59,62,60,55,60,40,57,37,59,3
4,55,9,-87,28,85,33,83,35,83,43,
91,51,93,54,97,62,101,64,100,68,
96,72,96,76,93,81,100,94,102,92,
102,96,107,101,110,106,104,124,9
8,136,100,144,100,147,97,157
790 DATA111,157,112,164,-72,112,
107,111,120,110,120,108,144,107,
168,104,206,98,-104,124,159,119,
165,116,172,116,176,118,183,117,
193,124,-113,102,117,103,120,98,
124,99,130,96,132,96,140,87,142,
86,148,89,153,88,156,91,161,97,1
63,99,166,95,173,94,176,87
800 DATA184,78,186,79,189,77,195
,85,201,87,202,84,204,88,204,92,
-60,55,93,54,-64,78,93,79,-76,14
0,98,140,-97,62,117,61,-123,66,1
47,64,-136,65,140,87,-120,122,12
2,161,-119,66,120,77,122,83,120,
93,116,98,110,106,-128,161,128,1
55,148,154,144,136,138,121
810 DATA-148,154,149,156,176,155
,-144,121,168,104,-156,120,177,1
42,-152,106,161,97,-164,60,168,7
7,202,72,208,77,-176,76,176,80,1
85,78,-156,90,158,85,169,77,-103
,25,120,35,-169,57,170,59,197,53
,204,57,212,60,-204,57,202,61,20
4,64,206,67,202,72,201,73
820 DATA203,82,208,81,-205,23,21
1,43,211,54,213,58,-218,18,226,3
6,-215,19,213,42,210,43,-215,42,
226,37,-211,49,224,46,229,49,-22
1,47,224,52,-233,46,234,45,234,4
4,232,43,999,0,168,159,2,168,144
,2,128,144,2,176,129,2,108,132,2
,88,153,2,172,108,2,92,129,2
830 DATA136,111,2,184,96,2,172,8
4,3,228,21,3,216,33,3,196,48,3,2
16,45,3,172,69,3,216,51,3,223,48
,3,208,27,3,148,72,3,148,102,3,1
28,81,3,140,54,3,116,30,3,68,30,
3,72,63,3,100,48,3,108,75,3,204,
78,3,84,96,3,196,78,3,208,63,3,3
00,.1,0
```
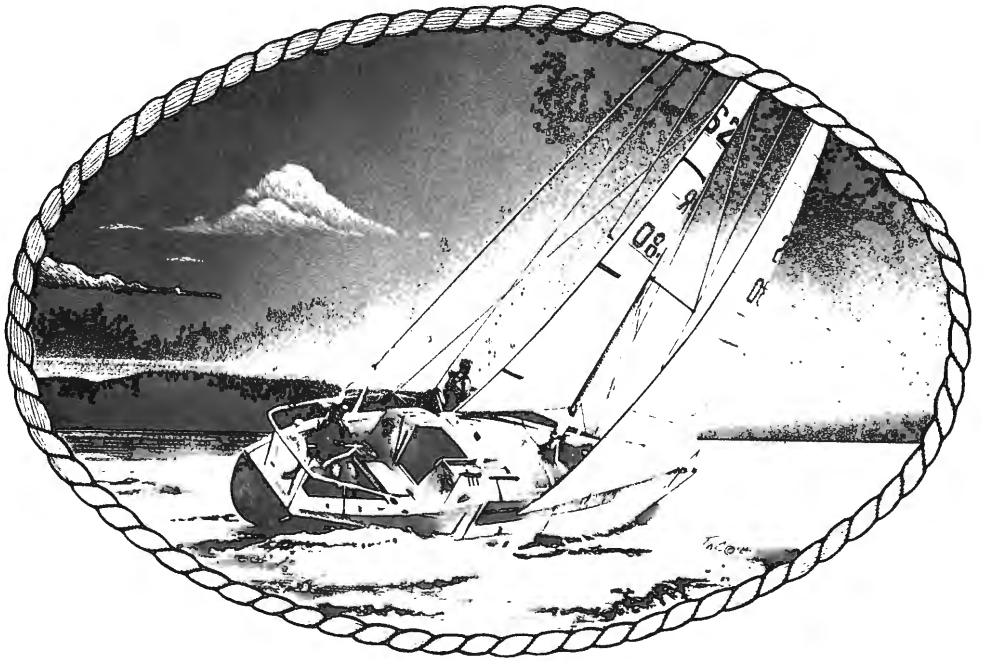
(*Bradd Belasco, who is currently a junior at Mansfield High School, was a machine language illiterate when he made* Sailing, *but is now experimenting with assembly language. He is enrolled in a BASIC and FORTRAN course and soon hopes to learn PASCAL as well.*)

SAILING

BRADD BELASCO

One of life's scenic wonders is that of a sailboat gliding slowly across the water, her majestic sails reaching toward the clouds. It is a peaceful sight, reflecting the ultimate use of leisure time for relaxation, a seemingly effortless indulgence.

Appearances can be deceiving, especially if you add a little wind, some churning waters, a few hazards, and a rainstorm. Then the scene becomes one fraught with peril.

Since you are probably among the many of us who have never given in to the urge to launch your own sailboat, CoCo is going to make it easier for you to learn. The water is calm today and there's not a cloud in the sky.

But don't expect sailing to be easy, even under ideal circumstances. There's a lot to learn and concentration is required at all times, so please pay attention to the instructions.

You will be given randomly generated starting points and destinations in this simulation. You must mentally plot a course to your destination and use sailing techniques to survive. The wind direction is always easterly, but the random starting and ending points require you to exercise many sailing maneuvers.

After typing *RUN*, a high resolution screen appears, divided in three parts. The upper left section is a side view of your sailboat, informing you of your sail status (whether raised or lowered).

The top right portion of the screen includes an aerial view of your boat. This information, which includes boom position, boat direction, and rudder direction, determines the path your boat will sail.

The bottom half of the screen is the lake. On the left and right sides of the screen are your launching point (a single lit point) and your docking place (a half circle). Those obstacles in the lake are reefs that you must avoid if you are to reach your destination.

After you have determined the direction in which you wish to proceed, you will be prompted by the computer for the necessary navigational information:

Boat Direction? — Pull the toggle switch on your right joystick to the left. When the arrow in the upper right of your screen is facing the desired direction, press your fire button.

Boom Direction? — Holds the main sail. Press your fire button when the desired direction is displayed.

Rudder Direction? — The rudder is used to steer the boat. There are three possible directions: 'R' (right), 'L' (left), and 'S' (straight). Push your fire button.

Main Sail? — The main sail can be raised or lowered by typing 'R' (raise) or 'L' (lower). If your answer is delayed, the sail is automatically dumped.

Extra Sail? — The extra sail is optional and may be raised or lowered by typing 'Y' or 'N'. Its primary usage is to increase speed while jibing.

After answering the last question, quickly press your fire button and hold for as long as you want to travel in that direction. When it becomes necessary to change direction, simply release the fire button and enter the necessary data again.

You must avoid hitting the shore or a reef to continue on your desired course.

Also, be careful not to place the boom in such a position that the wind will cause it to swing around. A "danger" sign will flash if this happens. Let it occur two times in succession and somebody will be knocked overboard, probably you.

When you reach your destination (the half circle), you must lower all sails to complete the simulation.

Good luck, Captain!

Rudiments of Sailing

Boom: The bar that controls the direction of the main sail.

Tacking: Sailing against the wind if you are located downwind, you must use tacking tactics, which are controlled primarily by the rudder.

Jibe: Sailing with the wind.

Speed: Controlled by exposing as much of the surface area of your sail as possible to the wind.

```
1 'SAILING SIMULATION
   BY BRADD BELASCO
   119 SAMOSET AVE.
   MANSFIELD, MA 02048
   (1983)
2 'SAILING TECHNIQUES CONTRIBUTE
DBY ANTHONY MEHALICK:MUSIC CONTR
IBUTED BY JAMES JARDIN
3 'GRAPHIC LETTERING TAKEN FROM
 ENDRES,M.H.;"PRINTING CHARACTER
SON THE GRAPHIC SCREEN."(1982 MA
Y)RAINBOW MAGAZINE
4 CLS
5 CLEAR500
6 DIMBB(30):DIMBD$(5):DIMRD$(3):
DIMBOATDIRECTION$(4)
7 DATA 45,10,15,40,18,20,35,27,2
5,30,35,30,25,43,35,20,51,40,15,
60,45,10,68,50
8 'assign variables
9 A$="U4E2F2D2L4R4D2BR3":B$="RU6
LR3FDGL2R2FDGL3BR7":C$="BR4BUGL2
HU4ER2FDBD4BR3":D$="RU6LR3FD4GL2
BR6":E$="U3R4L4U3R4BD6L4R4BR3":I
$="BRR2LU6LR2BRBD6BR3":L$="R4L4U
6BR4BD6BR3":M$="U6F2E2D6BR3":N$=
"U6DF4U5D6BR3":O$="R4L4U6R4D6BR3
":R$="U6R3FDGL3RF3BR3"
10 G$="BR2BU3R2D2GL2HU4ER2FBD5BR
3":H$="U6D3R4U3D6BR3":P$="U6R3FD
2GL3D2BR7":Z$="M+4,-6L4BD6R4BR3"
11 LB$="H10R100D5G5E5U5L75U70D65
R5UR55"
12 L$="U6D6R4BR3":S$="BUFR2EUHL2
HUER2FBD5BR3":T$="BU6R4L2D6BR5":
U$="U6D6R4U6D6BR3":W$="U6D6E2F2U
6D6BR3":X$="UE2H2UDF2E2UDG2F2DBR
3":Y$="BU6DF2E2UDG2D3BR5":QU$="B
U5ER2FDG2BD2UBR2BDBR3":EP$="BR2U
0BU2U4BM+5,6":V$="BU6M+2,+6M+2,-
6BD6BR3"
13 SB$="BM205,27":BD$(1)="R30":B
D$(2)="F30":BD$(3)="D30":BD$(4)=
"G30":BD$(5)="L30"
14 RD$(1)="G7":RD$(2)="D7":RD$(3
)="F7":R1$="BM205,62":R2$="BM177
,27A1":R3$="BM205,10A2":R4$="BM2
31,27A3"
15 BO$(4)="BM170,10L7H2E2R7":BO$
(1)="BM166,10U7E2F2D7":BO$(2)="B
M170,10R7E2H2L7":BO$(3)="BM166,1
0D7F2E2U7"
16 PMODE4,1:PCLS:SCREEN1,1:GET(6
0,0)-(160,8),BB,G
17 LINE(0,81)-(255,81),PSET:LINE
(0,80)-(255,80),PSET:LINE(155,8)
-(155,80),PSET:LINE(60,9)-(155,9
),PSET
18 DRAW"BM20,68F10R100M+5,-10L12
```

```
5R40U65RD55R70DL65U"
19 DRAW"BM138,136R10D3L10D3R10D3
L10D3R10D3L10D3R10D3L10D3R10D3L1
0"
20 DRAW"BM118,95D10R3U10R3D10R3U
10R3D10R3U10R3D10R3U10R3D10R3U10
R3D10"
21 DRAW"BM70,105D10R3U10R3D10R3U
10R3D10R3U10"
22 DRAW"BM70,130":FORJ=1TO10:DRA
W"R10D3L10D3":NEXT
23 PB$="D4F10D40G5L10H5U40E10A0"
:P1$="BM205,3A0":P2$="BM238,27A1
":P3$="BM205,69A2":P4$="BM172,27
A3"
24 DRAW"BM60,17"+E$+A$+S$+T$+E$+
R$+L$+Y$+"BR4"+W$+I$+N$+D$+S$:DR
AW"BM135,30U2BM-2,-2"+N$+"BM135,
30R2BM+3,3"+E$+"BM135,30D2BM-2,
+8"+S$+"BM135,30L2BM-7,+3"+W$
25 GOSUB106
26 ' accept input
27 TIMER=0
28 DP=2:DRAW"BM60,7"+B$+O$+A$+T$
+"BR4"+D$+I$+R$+E$+C$+T$+I$+O$+N
$+QU$:GOSUB130:GOSUB161
29 DRAW"BM60,7"+B$+O$+O$+M$+"BR4
"+D$+I$+R$+E$+C$+T$+I$+O$+N$+QU$
:GOSUB113:GOSUB161
30 DRAW"BM60,7"+R$+U$+D$+D$+E$+R
$+QU$:GOSUB124:IFBO=1THENDRAWR1$
+RD$(RD)
31 IFBO=2THENDRAW"A1"+R2$+RD$(RD
)
32 IFBO=3THENDRAW"A2"+R3$+RD$(RD
)
33 IFBO=4THENDRAW"A3"+R4$+RD$(RD
)
34 DRAW"A0":PLAY"L100C":GOSUB161
35 DRAW"BM60,7"+M$+A$+I$+N$+"BR4
"+S$+A$+I$+L$+QU$
36 J$=INKEY$:IFJ$=""THEN36
37 IFJ$="R"THENGOSUB141:GOSUB161
:GOTO40
38 IFJ$="L"THENGOSUB146:GOSUB161
:GOTO40
39 GOTO35
40 DRAW"BM60,7"+E$+X$+T$+R$+A$+"
BR4"+S$+A$+I$+L$+QU$
41 J$=INKEY$:IFJ$=""THEN41
42 IFJ$="Y"THENGOSUB152:GOSUB161
:GOTO48
43 IFJ$="N"THENGOSUB156:GOSUB161
:GOTO48
44 GOTO41
45 FORJ=1TO19:LINE(156,J)-(179,J
),PRESET:NEXT:RETURN
46 FORJ=1TO79:LINE(156,J)-(255,J
),PRESET:NEXT:RETURN
```

```
47  FORJ=1TO80:NEXT:RETURN
48  IFMS=0THEN76
49  IFBO=4THEN76
50  IFBO=1ANDBD=2ANDRD=2THENGOSUB
81:GOTO78
51  IFBO=1ANDBD=3ANDRD=2THENGOSUB
82:GOTO78
52  IFBO=1ANDBD=2ANDRD=3THENGOSUB
83:GOTO78
53  IFBO=1THENIFBD=3THENIFRD=3THE
NGOSUB85:GOTO78
54  IFBO=1ANDBD=2ANDRD=1THENGOSUB
99:GOTO78
55  IFBO=1ANDBD=3ANDRD=1THENGOSUB
100:GOTO78
56  IFBO=2ANDBD=2ANDRD=1THENGOSUB
83:GOTO78
57  IFBO=2ANDBD=4ANDRD=1THENGOSUB
83:GOTO78
58  IFBO=2ANDBD=1ANDRD=1THENGOSUB
85:GOTO78
59  IFBO=2ANDBD=5ANDRD=1THENGOSUB
85:GOTO78
60  IFBO=2ANDBD=2ANDRD=2THENGOSUB
87:GOTO78
61  IFBO=2ANDBD=4ANDRD=2THENGOSUB
87:GOTO78
62  IFBO=2ANDBD=5ANDRD=2THENGOSUB
89:GOTO78
63  IFBO=2ANDBD=1ANDRD=2THENGOSUB
89:GOTO78
64  IFBO=2ANDBD=2ANDRD=3THENGOSUB
91:GOTO78
65  IFBO=2ANDBD=4ANDRD=3THENGOSUB
91:GOTO78
66  IFBO=2ANDBD=1ANDRD=3THENGOSUB
93:GOTO78
67  IFBO=2ANDBD=5ANDRD=3THENGOSUB
93:GOTO78
68  IFBO=3ANDBD=4ANDRD=1THENGOSUB
91:GOTO78
69  IFBO=3ANDBD=3ANDRD=1THENGOSUB
93:GOTO78
70  IFBO=3ANDBD=4ANDRD=2THENGOSUB
95:GOTO78
71  IFBO=3ANDBD=3ANDRD=2THENGOSUB
96:GOTO78
72  IFBO=3ANDBD=4ANDRD=3THENGOSUB
97:GOTO78
73  IFBO=3ANDBD=3ANDRD=3THENGOSUB
98:GOTO78
74  IFBO=1ANDBD=4THENGOSUB102:GOT
O78
75  IFBO=3ANDBD=2THENGOSUB102:GOT
O78
76  GOSUB101:IFMS=1THENGOSUB 147
77  GOTO78
78  PLAY"L255C04CD":GOSUB164:IFPE
EK(65280)/2=INT(PEEK(65280)/2)TH
ENGOSUB161:DRAW"BM60,7"+S$+T$+E$
+A$+D$+Y$:GOTO48
79  GOSUB161:GOSUB46:GOTO28
80  'plot move
81  XX=X:YY=Y-1:GOSUB103:RETURN
82  XX=X:YY=Y-2:GOSUB103:RETURN
83  IFBO=2ANDXS=1THENAD=2ELSEAD=1
84  XX=X+AD:YY=Y-AD:GOSUB103:RETU
RN
85  IFBO=2ANDXS=1THENAD=3ELSEAD=2
86  XX=X+AD:YY=Y-AD:GOSUB103:RETU
RN
87  IFXS=1THENAD=2ELSEAD=1
88  XX=X+AD:YY=Y:GOSUB103:RETURN
89  IFXS=1THENAD=3ELSEAD=2
90  XX=X+AD:YY=Y:GOSUB103:RETURN
91  IFBO=2ANDXS=1THENAD=2ELSEAD=1
92  XX=X+AD:YY=Y-AD:GOSUB103:RETU
RN
93  IFBO=2ANDXS=1THENAD=3ELSEAD=2
94  XX=X+AD:YY=Y+AD:GOSUB103:RETU
RN
95  XX=X:YY=Y+1:GOSUB103:RETURN
96  XX=X:YY=Y+2:GOSUB103:RETURN
97  XX=X-1:YY=Y+1:GOSUB103:RETURN
98  XX=X-2:YY=Y+2:GOSUB103:RETURN
99  XX=X-1:YY=Y-1:GOSUB103:RETURN
100 XX=X-2:YY=Y-2:GOSUB103:RETUR
N
101 GOSUB161:DRAW"BM60,7"+S$+T$+
A$+L$+L$:FORJ=1TO40:NEXT
102 GOSUB161:DRAW"BM60,7"+D$+A$+
N$+G$+E$+R$+EP$:FORJ=1TO40:NEXT:
DP=DP-1:RETURN
103 IFX<0THEN173
104 IFY>191THEN173
105 LINE(X,Y)-(XX,YY),PSET:X=XX:
Y=YY:RETURN
106 'random spoint
107 RR=RND(2):IFRR=1THENSX=1ELSE
SX=256
108 SY=RND(110)+81:IFRR=1THENEX=
SX+254ELSEEX=SX-255
109 EY=RND(110)+81
110 X=SX:Y=SY
111 PSET(X,Y):CIRCLE(EX,EY),5
112 RETURN
113 ' determine boom direction
114 DRAW"C0"+BD$(BD):DRAW"C5"
115 A=JOYSTK(0):IF A<5 THEN BD=B
D+1:IF BD>5 THEN BD=BD-1
116 IF A>58 THEN BD=BD-1:IF BD<1
 THEN BD=BD+1
117 IFBO=1THENDRAWSB$+BD$(BD):GO
SUB47
118 IFBO=2THENDRAW"A1"+SB$+BD$(B
D):GOSUB47:
119 IFBO=3THENDRAW"A2"+SB$+"BU20
"+BD$(BD):GOSUB47
```

```
120 IFBO=4THENDRAW"A3"+SB$+BD$(B
D):GOSUB47
121 IF PEEK(65280)/2=INT(PEEK(65
280)/2)THEN123ELSEIFBO<>3THENDRA
W"C0"+SB$+BD$(BD)ELSEDRAW"C0"+SB
$+"BU20"+BD$(BD)
122 DRAW"C5":GOTO115
123 DRAW"A0":PLAY"L100C":RETURN
124 ' determine rudder      di
rection
125 J$=INKEY$:IF J$=""THEN125
126 IFJ$="L"THENRD=1:RETURN
127 IFJ$="S"THENRD=2:RETURN
128 IFJ$="R"THENRD=3:RETURN
129 GOTO125
130 ' determine boat direction
131 DRAW"C0"+BO$(BO)
132 A=JOYSTK(0):IFA>60THENBO=BO+
1:IFBO>4THENBO=1
133 IFA<5THENBO=BO-1:IFBO<1THENB
O=4
134 DRAW"C5"+BO$(BO):FORJ=1TO150
:NEXT:IFPEEK(65280)/2=INT(PEEK(6
5280)/2)THEN136ELSEDRAW"C0"+BO$(
BO)
135 GOTO132
136 GOSUB45:IFBO=1THENDRAWP1$+PB
$
137 IFBO=2THENDRAWP2$+PB$
138 IFBO=3THENDRAWP3$+PB$
139 IFBO=4THENDRAWP4$+PB$
140 PLAY"L100C":RETURN
141 ' full sails
142 FOR J=0TO55STEP5
143 LINE(53,3+J)-(53+J,58),PSET
144 NEXT J
145 MS=1:PLAY"L100C":RETURN
146 ' limp sails
147 FOR J=0TO50STEP5
148 LINE(53,3+J)-(53+J,58),PRESE
T
149 NEXT
150 LINE(53,3+J)-(53+J,58),PSET
151 MS=0:PLAY"L100C":RETURN
152 'hoist xtra sail
153 DRAW"BM10,68M+40,-66"
154 FORJ=1TO8:READX1,Y1,X2:LINE(
X1,Y1)-(X2,68),PSET:NEXTJ
155 XS=1:RESTORE:PLAY"L100C":RET
URN
156 'lower xtra sail
157 DRAW"C0BM10,68M+40,-66C5"
158 FORJ=1TO8:READX1,Y1,X2:LINE(
X1,Y1)-(X2,68),PRESET:NEXTJ
159 LINE(10,68)-(60,68),PSET
160 XS=0:RESTORE:PLAY"L100C":RET
URN
161 PUT(60,0)-(160,8),BB,PSET:RE
TURN

162 GOSUB46:GOTO28
163 ' crashes
164 IFY<81THEN173
165 IFX>256THEN173
166 IFDP=<0THEN176
167 IFX<148ANDX>138ANDY>136ANDY<
163THEN173
168 IFX>118ANDX<148ANDY>95ANDY<1
05THEN173
169 IFABS(X-EX)<6ANDABS(Y-EY)<6A
NDMS=0ANDXS=0THEN178
170 IFX>70ANDX<75ANDY>105ANDY<11
5THEN173
171 IFX>70ANDX<80ANDY>130ANDY<19
0THEN173
172 RETURN
173 PCLS:LINE(0,150)-(256,150),P
SET:DRAW"BM20,150E10R10E5R5E4R20
E20R10E5R2F10R5F34":DRAW"BM165,1
50H15U15F15NE45F15BR5E30D5U5G10D
15G5":PAINT(40,149),5
174 DRAW"BM112,22"+C$+R$+A$+S$+H
$+EP$+EP$+EP$
175 GOTO180
176 PCLS:LINE(0,150)-(256,150),P
SET:DRAW"BM90,150"+LB$+"BM210,15
0R3NE5L6H5":DRAW"BM90,22"+M$+A$+
N$+"BR4"+O$+V$+E$+R$+B$+O$+A$+R$
+D$+EP$:CIRCLE(210,147),3:DRAW"B
M215,140"+H$+E$+L$+P$+EP$+EP$
177 GOTO187
178 PCLS:LINE(0,150)-(256,150),P
SET:FORJ=1TO3:CIRCLE(128,150),13
0+J,,.84,.5,1:NEXT:DRAW"BM90,150
"+LB$:DRAW"BM100,22"+S$+U$+C$+C$
+E$+S$+S$+EP$+EP$
179 GOTO181
180 PLAY"V31":FORJ=1TO31:PLAY"V-
T20O2CDL1CDCDCDCDCDP1":NEXT:GOT
O191
181 PLAY"T3O1L4;7;A;L3;B;L4;7;A;
L6;O2;E;L4;O1;B;L4;7;;A;L3;B;L4;A;7"
182 PLAY"T4O1L4;7;A;L8;A;B;L4;B;
O2;L16;D;2;D;2;D;2;D;2;O1;L8;A;B
;L4;B
183 PLAY"T3O3;L8;E;E;D;L4;E;O2;L
4;B;A#;A;L8;E;L4;GE"
184 FORJ=1TO1000:NEXT
185 CLS:SCREEN0,0:IF(TIMER/60)/6
0<3THENPRINT"YOUR A TRUE SAILOR!
"ELSEPRINT"WORK ON IT!!"
186 GOTO192
187 FORJ=1TO10:PLAY"O4L10BC":NEXT
190 FORJ=255TO1STEP-5:SOUNDJ,1:N
EXT
191 FORJ=1TO1000:NEXT:SCREEN0,0:
PRINT"TOUGH BREAK!":GOTO192
192 SCREEN0,0:PRINT"TYPE RUN TO
TRY AGAIN":END
```
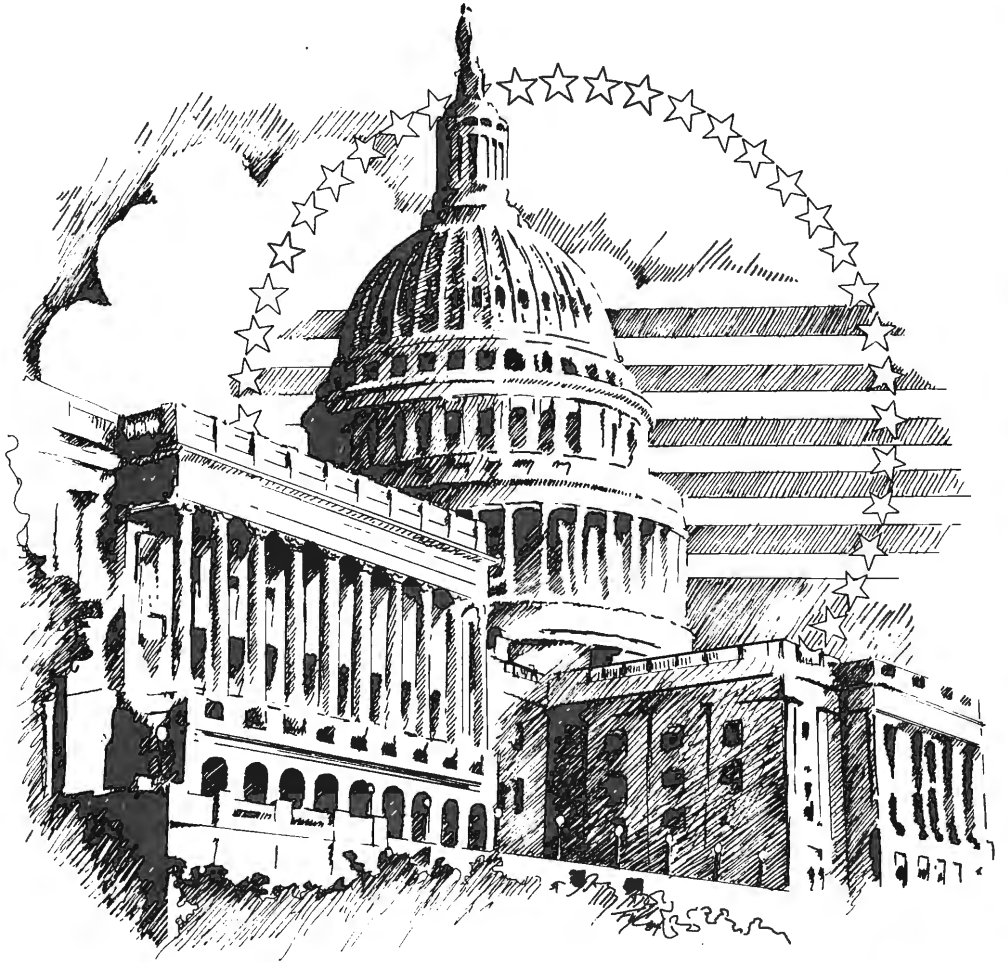
(Jeff Stevens, who teaches high school social studies, has a masters degree in instructional technology from Ohio State University. He is a past president of the Columbus Diocesan Education Association, a Catholic school teachers' organization, and has been teaching for 14 years.)

CONGRESS

JEFF STEVENS

Most of us have at some time imagined what it would be like to be President. We were told by our teacher in the third or fourth grade that any one could grow up to be our nation's leader. And as we studied the ornately framed pictures of George Washington or Abraham Lincoln that seemed omnipresent in most classrooms, the possibility, even then, appeared to be fairly remote.

Now, thanks to the magic of CoCo, all you have to do is complete a Presidential Candidate Application and, when the band plays "Hail to the Chief," it plays for you.

You can dispense with the time-consuming and politically exhausting task of selecting a cabinet because CoCo will be your personal advisor, keeping you informed of what is going on in Congress and carrying out your orders.

Before you become involved with Congress, however, you need to establish your administration's policies on the key issues. Naturally you want most of your legislative programs to pass because, now that you have become President, you want to go down in history as one of our country's greatest. Destiny has nothing to do with it; you have to earn your eventual rating.

On defense, you will have to decide whether to (1) build up defenses, or (2) maintain current levels.

Your tax reform program will need your decision on whether (1) to close loopholes and lower the maximum taxes paid by the wealthy, or (2) reduce taxes for middle- and low-income taxpayers.

You also will have to have positions on foreign aid programs and environmental

regulations.

If you're fairly liberal on these issues, you should fare well in Congress because the Democrats usually outnumber the Grand Old Party in reality, as in this simulation of how a bill becomes law.

But don't take anything for granted because you must constantly win friends and influence people to get bills out of committee, and through both halls of Congress. You've got to be able to wheel and deal, to compromise your ideas of perfection, and to dish out your share of pork barrel legislation.

Use your influence carefully, however, because you will be compared with your predecessors. You *could* be as popular as William Howard Taft after the stock market crash or Richard Nixon after the Watergate scandal.

Your first act should be to type in a *PCLEAR4* before running the program. Good luck, Mr. (or Ms.) President!

★

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10 '"CONGRESS" -- A SIMULATION
   OF HOW A BILL BECOMES A LAW
20 'COPYRIGHT 1983  JEFF STEVENS
30 '3314 MC GUFFEY RD., COLS,OH
   43224
40 DIM TP(5),AM(5),PB(5),PB$(5),
PL$(5)
50 CLEAR 1000
60 CLS
70 PRINT@5,"presidential";CHR$(1
28);"candidate";:PRINT@40,"appli
cation";CHR$(128);"form";
80 PRINT@480," PRESS <enter> AFT
ER EACH INPUT";
90 PRINT@128,"last name:";:FORX=
138 TO 159:PRINT@X,"-";:NEXTX
100 PRINT@192,"first name:";:FOR
X=203 TO 223:PRINT@X,"-";:NEXTX
110 PRINT@288,"political party (
D/R):";"--";
120 PRINT@384,"do you want intro
duction(Y/N):";"--";
130 PRINT@138,"";:LINE INPUT LN$
140 PRINT@203,"";:LINE INPUT NF$
150 PRINT@310,"";:LINE INPUT PP$
:IF PP$="R" OR PP$="D" THEN 160
ELSE 150
160 PRINT@414,"";:LINE INPUT A$:
```

```
IF A$="N" THEN GOSUB3340:CLS:PRI
NT@64,"CONGRATULATIONS, PRESIDEN
T      ";LN$;", YOU HAVE JUST":P
RINT"BEEN RE-ELECTED.  LET'S CHO
OSE  YOUR PROGRAM NOW.":GOSUB 31
30:GOTO340
170 CLS(2)
180 GOSUB 3340
190 PRINT@32,"CONGRATULATIONS, B
OSS! YOU HAVE JUST BEEN ELECTED
PRESIDENT OF  THE UNITED STATES.
   FROM NOW ON I GUESS I'LL HAVE
TO CALL YOU    MR. PRESIDENT.  TH
AT SURE SOUNDSGOOD, PRES. ";NF$+
" "+LN$+"."
200 GOSUB3130
210 CLS(2)
220 PRINT@0,"I NEVER THOUGHT THA
T I, COCO,    WOULD BE CONGRESSIO
NAL ADVISOR  TO THE PRESIDENT OF
 THE U.S.    I GUESS IT WILL BE
MY JOB TO     KEEP YOU INFORMED O
F WHAT IS    HAPPENING IN CONGRE
SS AND CARRY OUT YOUR ORDERS."
230 PRINT@256,"YOU UNDERSTAND, M
R. PRESIDENT,   THAT YOU ARE GOIN
G TO HAVE TO   PUT TOGETHER A PR
OGRAM THAT     YOUR ALLIES AND L
```

OBBYISTS IN   CONGRESS CAN GET
THROUGH THE   NEWLY ELECTED HOU
SE AND SENATE."
240 GOSUB3130
250 CLS(2)
260 PRINT@0,"YOU MUST GET A LARG
E PORTION OF YOUR PROGRAM THROUG
H CONGRESS IFYOU WANT TO GO DOWN
 IN HISTORY   AS A GREAT PRESIDEN
T. IT WON'T BE EASY.   YOU ONLY
HAVE TWO   SESSIONS OF A YEAR
EACH TO DO   IT. I'LL KEEP YOU P
OSTED ON ALL PROGRESS."
270 PRINT@288,"I HAVE HIRED 20 L
OBBYISTS TO   HELP PUSH OUR BIL
LS THROUGH   CONGRESS. YOU CAN
 CHANGE THEIR   ASSIGNMENTS EVERY
 TIME A BILL   ENTERS THE HOUSE.
"
280 GOSUB3130
290 CLS(2)
300 PRINT@0,"WELL,PRESIDENT "+LN
$+",":PRINT@32,"IT IS TIME FOR U
S TO GET TO WORKLET'S PUT THE PR
ESIDENTIAL   PROGRAM TOGETHER
."
310 PRINT@160,"WORKING TOGETHER
I KNOW THAT WE CAN MAKE YOU THE
BEST PRESIDENT THE COUNTRY HAS E
VER HAD!"
320 GOSUB 3130
330 'BEGIN SIMULATION
340 CLS(3)
350 PRINT@8,"defense";CHR$(128);
"program";
360 PRINT@192," (1) BUILD UP DEF
ENSES":PRINT@256," (2) MAINTAIN
CURRENT LEVELS"
370 GOSUB3140
380 INPUTPB(1)
390 IF PB(1)<1 OR PB(1)>2 THEN 3
40
400 CLS(3)
410 PRINT@7,"tax";CHR$(128);"ref
orm";CHR$(128);"program";
420 PRINT@192," (1) CLOSE LOOPHO
LES & LOWER   MAX. % PAID
BY WEALTHY":PRINT@288," (2) REDU
CE TAXES FOR MIDDLE   AND
LOW INCOME TAXPAYERS
430 GOSUB 3140
440 INPUTPB(2)
450 IF PB(2)<1 OR PB(2)>2 THEN 4
00
460 CLS(3)
470 PRINT@9,"social";CHR$(128);"
program";
480 PRINT@192," (1) INCREASE UN
EMPLOYMENT &   WELFARE PAY

MENTS--MORE   MEDICAL HEL
P FOR ELDERLY":PRINT@320," (2)
ESTABLISH WORKFARE PROGRAM
BAIL OUT SOCIAL SECURITY"
490 GOSUB 3140
500 INPUT PB(3)
510 IF PB(3)<1 OR PB(3)>2 THEN 4
60
520 CLS(3)
530 PRINT@5,"environmental";CHR$
(128);"program";
540 PRINT@192," (1) STRICT POLL
UTION LAWS WITH   STRICT ENFO
RCEMENT":PRINT@288," (2) ADEQUA
TE LAWS WITH   ENFORC
EMENT LEFT UP TO   THE PR
ESIDENT"
550 GOSUB 3140
560 INPUT PB(4)
570 IF PB(4)<1 OR PB(4)>2 THEN 5
20
580 CLS(3)
590 PRINT@6,"foreign";CHR$(128);
"aid";CHR$(128);"program";
600 PRINT@192," (1) LARGE AMOUN
T TO 3RD WORLD   COUNTRIES W
ITH NO BIAS   SHOWN":PRIN
T@320," (2) AID TO COUNTRIES WH
O   TRADE WITH AND ARE
              FRIENDLY TO THE U.S
."
610 GOSUB 3140
620 INPUT PB(5)
630 IF PB(5)<1 OR PB(5)>2 THEN 5
80
640 FOR X=1 TO 5:IF PP$="R" AND
X<3 AND PB(X)=2 THEN SRV=SRV-3:S
DV=SDV+3:HRV=HRV-5:HDV=HDV+5
650 IF PP$="R" AND X=>3 AND PB(X
)=1 THEN SRV=SRV-3:SDV=SDV+3:HRV
=HRV-5:HDV=HDV+5
660 IF PP$="D" AND X<3 AND PB(X)
=1 THEN SDV=SDV-3:SRV=SRV+3:HDV=
HDV-5:HRV=HRV+5
670 IF PP$="D" AND X=>3 AND PB(X
)=2 THEN SDV=SDV-3:SRV=SRV+3:HDV
=HDV-5:HRV=HRV+5
680 NEXT X
690 CLS(2)
700 PRINT@0,"THIS LOOKS LIKE A G
OOD PROGRAM, MR. PRESIDENT. THE
RE ARE A FEW DETAILS TO TAKE CAR
E OF BEFORE WE SEND THESE TO CO
NGRESS."
710 PRINT@160,"SOME PORK-BARREL
LEGISLATION   COULD BUY US SOME
 FRIENDS IN   THE CONGRESS. FI
VE STATE   PROJECTS SHOULD B
E ENOUGH."

```
720 GOSUB 3130
730 'PORK-BARREL DECISIONS
740 CLS(3)
750 PRINT@0,"CHOOSE THE 5 STATES
 BELOW THAT   YOU WISH TO AID THR
OUGH PORK-    BARREL LEGISLATION"
760 PRINT@128,"(1) CALIFORNIA  (
6) NEW YORK      (2) FLORIDA    (
7) IOWA          (3) MASS.      (
8) OHIO          (4) TEXAS      (
9) NEVADA        (5) WASHINGTON (
10)ARKANSAS"
770 FOR X=1 TO 5
780 PRINT@352,"ENTER NUMBER OF C
HOICE # ";X;:SOUND 50,2:INPUT P(
X):IF P(X)<1 OR P(X)>10 THEN 780
790 NEXT X
800 'ELECTIONS TO CONGRESS
810 CLS(3):PRINT"WELL, PRES. ";L
N$:PRINT@32,"THE NEW CONGRESS HA
S JUST BEEN    ELECTED.  HERE IS T
HE BREAKDOWN:";
820 PRINT@132,"house";CHR$(128);
"of";CHR$(128);"representatives"
;:PRINT@170,"435 MEMBERS";:RH=RN
D(335):IF RH<101 THEN RH=RH+100
830 DH=435-RH:PRINT@224,RH;" REP
UBLICANS";DH;" DEMOCRATS";:RS=RN
D(80):IF RS<20 THEN RS=RS+20
840 DS=100-RS:PRINT@301,"senate"
;:PRINT@330,"100 MEMBERS";:PRINT
@ 384,RS;" REPUBLICANS   ";DS;" D
EMOCRATS";
850 GOSUB 3130
860 CLS(2)
870 LR=RND(10):IF LR<5 THEN LR=L
R+4
880 FOR X=1TO 5:IF P(X)=3 OR P(X
)=4 OR P(X)=6 OR P(X)=10 AND PP$
="R" THEN HRV=RH+15:HDV=DH-15:SR
V=RS+2:SDV=DS-2
890 IF P(X)=1 OR P(X)=2 OR P(X)=
5 OR P(X)=7 AND PP$="D" THEN HDV
=DH+15:HRV=RH-15:SDV=DS+2:SRV=RS
-2
900 NEXT X
910 IF CC=1 THEN  RETURN
920 PRINT@0,"MR. PRESIDENT, I BE
LIEVE THAT    OVER THE LAST YEAR
OR SO YOU      HAVE DONE SEVERAL F
AVORS FOR     SOME KEY CONGRESSME
N ON THE NEW CONFERENCE COMMITTE
ES. I THINK   THAT WE CAN COUNT O
N FAVORS FROMAT LEAST ";LR;" OF
THEM."
930 PRINT@256,"WITH A LITTLE LOG
-ROLLING I    THINK WE CAN KEEP
 SOME AMEND-  MENTS THAT WE OPP
OSE FROM BEING ADDED TO OUR BILL
S."
940 GOSUB 3130
950 'INTRODUCING BILLS TO HOPPER
960 CLS(2)
970 PB$(1)="DEFENSE PROG":PB$(2)
="TAX REFORM  ":PB$(3)="SOCIAL P
ROG ":PB$(4)="ENVIRON PROG":PB$(
5)="FOREIGN AID "
980 FOR X=1 TO 5:PL$(X)=PB$(X):N
EXTX
990 PRINT@0,"IT IS NOW TIME FOR
ME TO TAKE    THE BILLS OVER TO T
HE HILL AND   GET THEM PUT INTO T
HE HOPPER.    I HOPE WE CAN GET T
HEM PASSED.   I'LL CALL LATER FOR
 FURTHER      ORDERS AND TO KEEP
YOU INFORMED."
1000 GOSUB 3130
1010 GOSUB 1300
1020 GOSUB 1480
1030 GOSUB1420
1040 GOSUB 1520
1050 GOSUB 2030
1060 GOSUB 2750
1070 'NO MORE BILLS GAME OVER
1080 CLS(2):PRINT@32,"CONGRATULA
TIONS, MR. PRESIDENT, YOU HAVE S
UCCESSFULLY DIRECTED  YOUR PROGR
AM THROUGH CONGRESS."
1090 GOTO 1110
1100 CLS(2):PRINT@32,"SORRY, MR.
 PRESIDENT, BUT YOU    FAILED TO
GET ALL OF YOUR BILLS THROUGH TH
E CONGRESS BEFORE THISTERM WAS O
VER."
1110 PRINT@192,"A POPULARITY AND
 EFFECTIVENESS  POLL HAS RECENTL
Y BEEN TAKEN TO SEE HOW YOUR ADM
INISTRATION      STACKS UP TO OTH
ER PRESIDENTS'   TERMS IN OFFICE.
 WE ARE NOW      WAITING FOR THE
RESULTS."
1120 PRINT@416,"LET'S LOOK AT YO
UR RECORD."
1130 GOSUB 3540
1140 GOSUB 3130
1150 GOSUB 3660
1160 CLS(2)
1170 PRINT@32,"YOUR RATING WAS";
TP(0);" OUT OF A":PRINT@64,"POSS
IBLE 500 POINTS."
1180 Z$="YOU ARE CONSIDERED AS E
FFECTIVE AS":Y$="YOU ARE ALMOST
AS POPULAR AS    "
1190 IF TP(0)<41 THEN PRINT @160
,Z$;" WARREN G. HARDING":PRINT@2
56,Y$;"ANDREW JOHNSON AFTER HIS
TRIAL  FOR IMPEACHMENT.":PRINT@3
84,"I'M EMBARRASED TO SAY THAT I
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            WORKED FOR YOU. COUNT COCO O
UT    FROM NOW ON.";
1200 IF TP(0)=>41 AND TP(0)<111
THEN PRINT@160,Z$;" WILLIAM HOWA
RD TAFT.":PRINT@256,Y$;"HERBERT
HOOVER AFTER THE STOCK   MARKET C
RASH.":PRINT@384,"WELL, MAYBE IT
 WASN'T YOUR FAULTBUT DON'T CALL ·
 ME--I'LL CALL     YOU.";
1210 IF TP(0)=>111 AND TP(0)<171
 THEN PRINT@160,Z$;" MARTIN VAN
BUREN.":PRINT@256,Y$;"RICHARD NI
XON AFTER THE WATER-  GATE SCAND
LE.":PRINT@384,"WE COULD HAVE DO
NE MUCH BETTER. I WOULD ADVISE Y
OU TO LEAVE      POLITICS AS SOON
 AS POSSIBLE.";
1220 IF TP(0)=>171 AND TP(0)<210
 THEN PRINT@160,Z$;" JIMMY CARTE
R.":PRINT@256,Y$;"LYNDON JOHNSON
   DURING THE      VIETNAM WAR.":
PRINT@384,"WELL, BOSS, WE HAD SO
ME GOOD    TIMES--BUT WE NEEDED
A FEW MORE.";
1230 IF TP(0)=>210 AND TP(0)<261
 THEN PRINT@160,Z$;" THOMAS JEFF
ERSON.":PRINT@256,Y$;"WOODROW WI
LSON AFTER THE GREAT  WAR.":PRIN
T@384,"IT'S BEEN FUN.  IF YOU EV
ER NEEDCOCO AGAIN JUST LOAD ME U
P.";
1240 IF TP(0)=>311 AND TP(0)<421
 THEN PRINT@160,Z$;" HARRY TRUMA
N.":PRINT@256,Y$;"TEDDY ROOSEVEL
T AT THE END OF   HIS TERM.":PRI
NT@384,"THIS HAS BEEN A ONCE IN
A LIFE- TIME EXPERIENCE.  THANKS
   FOR    HAVING ME ALONG.";
1250 IF TP(0)=>261 AND TP(0)<311
 THEN PRINT@160,Z$;" JAMES K. PO
LK.":PRINT@256,Y$;"JOHN F. KENNE
DY WHEN HE WAS      ASSASSINATED.
":PRINT@384,"I'M PROUD TO HAVE B
EEN A SMALL   PART OF THE MAKING
OF HISTORY   WITH YOU. CONGRATUL
ATIONS!";
1260 IF TP(0)>421 ANDTP(0)<495 T
HEN PRINT@160,Z$;" FRANKLIN D. R
OOSEVELT":PRINT@256,Y$;"GEORGE W
ASHINGTON":PRINT@384,"CONGRATULA
TIONS! I AM PROUD TO  HAVE BEEN
YOUR ADVISOR AND AID. YOUR PLACE
 IN HISTORY IS ASSURED";
1270 IF TP(0)>494 THEN PRINT@160
,"YOU ARE THE BEST PRESIDENT THI
S COUNTRY HAS EVER HAD OR IS EVE
R LIKELY TO HAVE FOR A LONG TIME
.":PRINT@384,"I, COCO, AM IN AWE
  OF YOUR       ACCOMPLISHMENTS. Y
```

```
OU ARE THE    BEST THAT HAS BEEN
  OR WILL BE.";
1280 FOR X=1 TO 15000:NEXTX
1290 RUN
1300 ' ASSIGN LOBBYISTS
1310 CLS(3):PRINT@0,"WHERE SHALL
 WE USE OUR LOBBYISTSTHIS MONTH?
 PLEASE ASSIGN THE 20TO THE HOUS
E OR THE SENATE."
1320 SOUND 50,2:PRINT@224:INPUT"
CHOOSE THE NUMBER TO BE ASSIGNED
TO THE HOUSE.   THE REST WILL BE
FOR THE SENATE.";HL
1330 IF HL<0 OR HL>20 THEN 1320
1340 SL=20-HL
1350 IF PP$="D" THENFR=RND(3):HD
V=HDV+(FR*HL):HRV=HRV-(FR*HL)
1360 IF PP$="R" THEN FR=RND(3):H
RV=HRV+(FR*HL):HDV=HDV-(FR*HL)
1370 IF PP$="R" AND HL=0 THEN D=
RND(10):HRV=HRV-D:HDV=HDV+D
1380 IF PP$="D" AND HL=0 THEN D=
RND(10): HDV=HDV-D:HRV=HRV+D
1390 IF PP$="R" AND HL=20 THEN D
=RND(5):SRV=SRV-D:SDV=SDV+D
1400 IF PP$="D" AND HL=20 THEN D
=RND(5):SDV=SDV-D:SRV=SRV+D
1410 RETURN
1420 'HOPPER HOUSEKEEPING
1430 CLS(3):PRINT@134,"(1) ";PB$
(1);:PRINT@166,"(2)  " ;PB$(2);:P
RINT@198,"(3) ";PB$(3);:PRINT@23
0,"(4) ";PB$(4);:PRINT@262,"(5)
";PB$(5);
1440 PRINT@32,"CHOOSE THE NEXT B
ILL FOR THE      HOPPER";:SOUND 11
0,2:INPUT C
1450 IF C<1 ORC>5 THEN 1440
1460 IF PB$(C)="" THEN 1440
1470 RETURN
1480 T=T+1:'TIME KEEPING
1490 ON T GOSUB 3180,3190,3200,3
210,3220,3230,3240,3250,3260,327
0,3280,3290,3180,3190,3200,3210,
3220,3230,3240,3250,3260,3270,32
80,3290
1500 IF T>24 THEN GOTO 1100
1510 RETURN
1520 'HOUSE ACTION
1530 CLS(3):PRINT@10,"house";CHR
$(128);"action";
1540 RESTORE:FOR X=1TO88:READ A:
PRINT@A,CHR$(143+48);:NEXT X
1550 IF CC=1 THEN RETURN
1560 PRINT@40,"house";CHR$(128);
CHR$(128);"committee";
1570 PRINT@424,"full";CHR$(128);
"house";CHR$(128);"floor";
1580 PRINT@96,CHR$(128);"enter";
```

```
CHR$(128);
1590 PRINT@0,"REP";RH;:PRINT@32,
"DEM";DH;
1600 GOSUB 3160
1610 GOSUB 3150:PRINT@106,PB$(C)
;
1620 IF PP$="D" AND HRV=>HDV THE
N VT=RND(3)
1630 IF PP$="D" AND HRV<HDV THEN
 IF (HRV+40)<HDV THEN VT=RND(5)
:GOTO1650
1640 VT=RND(4)
1650 IF PP$="R" AND HDV=>HRV THE
N VT=RND(3)
1660 IF PP$="R" AND HDV<HRV THEN
 IF (HDV+40)<HRD THEN VT =RND(5)
:GOTO 1680
1670 VT=RND(4)
1680 IF Q=1 THEN GOTO 1810
1690 ON VT GOSUB 1960,1980,1990,
1990,1980
1700 GOSUB3150
1710 PRINT @138,VT$;:GOSUB3170
1720 IF VT$=" PIGEONHOLE "THEN G
OSUB 3150:GOTO1010
1730 GOSUB 3150
1740 GOSUB 3150
1750 PRINT@106,"            ";:P
RINT@137,"             ";
1760 PRINT@207,CHR$(128);:FOR X=
1 TO 500:NEXTX:PRINT@207,CHR$(14
3+32);:FOR X=1 TO 500:NEXT X:PRI
NT@207,CHR$(128);
1770 GOSUB 3150
1780 PRINT@266,PB$(C);:GOSUB3150
1790 PRINT@327,"DEBATE IN PROGRE
SS";:GOSUB3150:PRINT @327,"
              ";:GOSUB 3150
1800 Q=1:GOTO 1620
1810 Q=0:ON VT GOSUB2000,2010,20
20,2020,2010
1820 GOSUB 3170
1830 GOSUB 3150
1840 PRINT@327,VT$;:GOSUB3150
1850 IF VT$="SENT BACK-COMMITTEE
" THEN GOSUB 1480:GOSUB 3150:GOT
O1520
1860 SOUND50,2:PRINT@257,"YEA";:
PRINT@284,"NAY";:GOSUB3150:IF H
DV=<0 THEN HRV=435:HDV=0
1870 IF HRV=<0 THEN HDV=435:HRV=
0
1880 IF PP$="D"THEN FOR X=0 TO H
DV:PRINT@320,X;:NEXTX:FOR X=0TO
HRV:PRINT@347,X;:NEXTX
1890 IF PP$="R"THEN FOR X=1 TO H
RV:PRINT@320,X;:NEXTX:FOR X=1 TO
 HDV:PRINT@347,X;:NEXTX
1900 IF PP$="D" AND HRV=>HDV THE
```
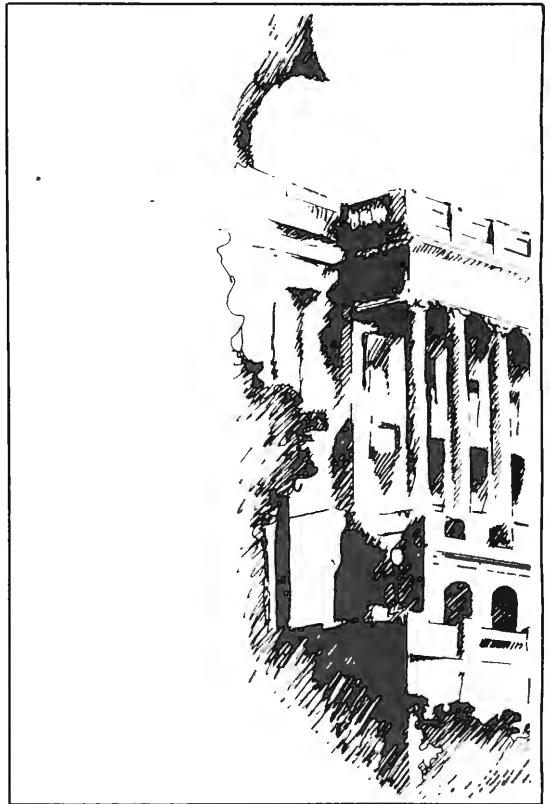
```
N PLAY"L2A;C":PRINT@327,"THIS BI
LL IS DEAD ";:GOSUB 3150:GOTO101
0
1910 IF PP$="R" AND HDV=>HRV THE
N PLAY"L2A;C":PRINT@327,"THIS BI
LL IS DEAD ";:GOSUB 3150:GOTO101
0
1920 PRINT@327," THIS BILL PASSE
S ";:GOSUB3150
1930 PRINT@483,"this";CHR$(128);
"bill";CHR$(128);"advances";CHR$
(128);"to";CHR$(128);"senate";:S
OUND110,3:GOSUB 1480
1940 MA=AM(C):GOSUB 3150:GOSUB 3
150
1950 RETURN
1960 'VOTE RESULTS
1970 VT$=" PIGEONHOLE ":RETURN
1980 VT$="AMEND & PASS":AM(C)=AM
(C)+RND(8):RETURN
1990 VT$="PASS-NO AMEND":GOSUB 3
150:RETURN
2000 VT$="SENT BACK-COMMITTEE":R
ETURN
```

```
2010 VT$="AMENDED":AM=RND(6):AM(
C)=AM(C)+AM:PRINT @ 327,VT$;AM;"
 TIMES";:GOSUB3150:PRINT@327,"
               ";
2020 VT$="VOTE IN PROGRESS":RETU
RN
2030 'SENATE ACTION
2040 CLS(4):PRINT@9,"senate";CHR
$(128);"action";
2050 RESTORE:FOR X=1 TO 88:READA
:PRINT@A,CHR$(143+32);:NEXTX
2060 IF CC=1 THEN RETURN
2070 PRINT@40,"senate";CHR$(128)
;"committee";
2080 PRINT@426,"senate";CHR$(128
);"floor";
2090 PRINT@96,"from";CHR$(128);:
PRINT@130,"house";
2100 PRINT@0,"DEM";DS;:PRINT@32,
"REP";RS;
2110 GOSUB 3160
2120 GOSUB3150:PRINT@106,PB$(C);
2130 IF PP$="D"AND SRV=>SDV THEN
 VT=RND(3)
2140 IF PP$="D"AND SRV<SDV THEN
IF (SDV+40)<SRD THEN VT=RND(5):G
OTO 2160
2150 VT=RND(4)
2160 IF PP$="R" AND SDV=>SRV THE
N VT=RND(3)
2170 IF PP$="R" AND SDV<SRV THEN
 IF (SDV+30)<SRD THEN VT=RND(5):
GOTO2190
2180 VT=RND(4)
2190 IF Q=1 THEN 2320
2200 ON VT GOSUB 1960,1980,1990,
1990,1980
2210 GOSUB 3150
2220 PRINT@138,VT$;:GOSUB 3170
2230 IF VT$=" PIGEONHOLE " THEN
GOSUB 3150:GOSUB 1480:GOTO 2030
2240 GOSUB 3150
2250 GOSUB 3150
2260 PRINT@106,"           ";:P
RINT@137,"              ";
2270 PRINT @207,CHR$(128);:FOR X
=1 TO 500:NEXT X:PRINT@207,CHR$(
143+48);:FOR X=1 TO 500:NEXT X:P
RINT@207,CHR$(128);
2280 GOSUB 3150
2290 PRINT@266,PB$(C);:GOSUB 315
0
2300 PRINT@327,"DEBATE IN PROGRE
SS";:GOSUB 3150:PRINT@327,"
              ";:GOSUB 3150
2310 Q=1:GOTO2130
2320 Q=0:ON VT GOSUB 2000,2010,2
020,2020,2010
2330 GOSUB 3170

2340 GOSUB 3150
2350 PRINT@327,VT$;:GOSUB 3150
2360 IF VT$="SENT BACK-COMMITTEE
" THEN GOSUB 3150:GOSUB 1480:GOT
O 2030
2370 SOUND 50,2:PRINT@ 257,"YEA"
;:PRINT@284,"NAY";:GOSUB3150
2380 IF PP$="D" THEN SDV=SDV+INT
(SL/2):SRV=SRV-INT(SL/2)
2390 IF PP$="R" THEN SRV=SRV+INT
(SL/2):SDV=SDV-INT(SL/2)
2400 IF SRV=<0 THEN SRV=0:SDV=10
0
2410 IF SDV=<0 THEN SRV=100:SDV=
0
2420 IF PP$="D" THEN FOR X=0 TO
SDV:PRINT@320,X;:FOR I=1 TO 5:NE
XTI,X:FOR X=0 TO SRV:PRINT@347,X
;:FOR I=1 TO 5:NEXTI,X
2430 IF PP$="R" THEN FOR X=1TOSR
V:PRINT@320,X;:FOR I=1 TO 5:NEXT
I,X:FOR X=1 TO SDV:PRINT@347,X;:
FOR I=1 TO 5:NEXTI,X
2440 IF PP$="D" AND SRV=>SDV THE
NPLAY"L2A;C":PRINT@327,"THIS BIL
L IS DEAD ";:GOSUB 3150:GOTO 101
0
2450 IF PP$="R" AND SDV=>SRV THE
NPLAY"L2A;C":PRINT@327,"THIS BIL
L IS DEAD ";:GOSUB 3150:GOTO 101
0
2460 PRINT@327," THIS BILL PASSE
S ";:GOSUB 3150
2470 IF AM(C)<>MA THEN PRINT@482
,"sent";CHR$(128);"to";CHR$(128)
;"conference";CHR$(128);"committ
ee";:SOUND 110,3:GOSUB 3150:GOSU
B 3150:GOSUB 2490
2480 IF AM(C)=MA THEN PRINT@487,
"sent";CHR$(128);"to";CHR$(128);
"president";:SOUND 25,2:SOUND 50
,3:GOSUB3150:GOTO 1060
2490 'CONFERENCE COMMITTEE
2500 GOSUB 1480
2510 CLS(0):PRINT@3,"joint";CHR$
(128);"conference";CHR$(128);"co
mmittee";
2520 FOR X=1 TO 54:READ A:PRINT@
A,CHR$(143+16);:NEXTX
2530 GOSUB 3160
2540 PRINT@136,"DEALS BEING MADE
";:GOSUB 3150
2550 PRINT@234,PB$(C);:GOSUB 315
0
2560 PRINT@384," DO YOU WANT TO
CALL IN A FAVOR (Y/N)";:SOUND 50
,2:INPUTA$:IF A$="N" OR A$="Y" T
HEN 2570 ELSE 2560
2570 IF A$="N" THEN 2620
```
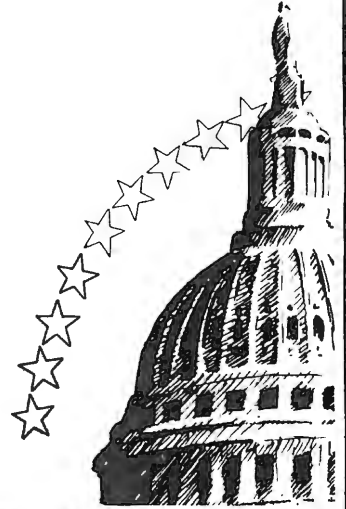
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2580 IF LR=<Ø AND A$="Y"  THEN P
RINT@384,"SORRY, YOU USED UP ALL
 OF YOUR  FAVORS.":SOUND 35,5:GO
SUB 3150:GOTO 2620
2590 GOSUB 3300
2600 PRINT@384,"WE CAN USE UP TO
 ";LR;" FAVORS TO   GET AMENDMENT
S REMOVED.":GOSUB 3150:GOSUB 315
Ø
2610 GOSUB 3300:PRINT@384,"HOW M
ANY SHALL WE USE?";LR;"ARE       A
VAILABLE.   ";:SOUND 50,2:INPUT"T
YPE NUMBER";A:LR=LR-A:IF LR<ØTHE
N 2580 ELSEAM(C)=AM(C)-(A*RND(3)
):IF AM(C)<Ø THEN AM(C)=Ø
2620 PRINT@384,"THIS BILL PASSED
 THROUGH THE     COMMITTEE WITH "
;AM(C);" AMENDMENTS.":GOSUB 3150
:GOSUB3150
2630 GOSUB 3300
2640 PRINT@384,"IT MUST NOW BE R
ETURNED TO THE   HOUSE FOR FINAL
APPROVAL.":GOSUB3150:GOSUB3150
2650 CC=1:GOSUB 1520
2660 CC=Ø:PRINT@456,"final";CHR$
(128);"house";CHR$(128);"vote";
2670 PRINT@106,PB$(C);:PRINT@139
,"FLOOR VOTE";
2680 SOUND50,2:PRINT@257,"YEA";:
PRINT@284,"NAY";:GOSUB3150:A=RND
(2Ø):IFA=1ØTHENB=RND(1Ø):FORX=1T
O(217-B):PRINT@320,X;:NEXTX:FORX
=1TO(435-(217-B)):PRINT@347,X;:N
EXTX:PLAY"L2A;C":PRINT@295,"THIS
 BILL IS DEAD";:AM(C)=Ø:GOSUB 31
5Ø:GOTO 1010
2690 B=RND(20):FOR X=1 TO 435-(2
18-B):PRINT@320,X;:NEXTX:FOR X=1
 TO 218-B :PRINT@347,X;:NEXTX:PR
INT@296,"passed";CHR$(128);"to";
CHR$(128);"senate";:SOUND110,3:G
OSUB 3150
2700 CC=1:GOSUB 2030
2710 CC=Ø:PRINT@456,"final";CHR$
(128);"senate";CHR$(128);"vote";
2720 PRINT@106,PB$(C);:PRINT@139
,"FLOOR VOTE";
2730 SOUND110,3:PRINT@257,"YEA";
:PRINT@284,"NAY";:GOSUB3150:A=RN
D(20):IFA=1ØTHENB=RND(5):FORX=1
TO(50-B):PRINT@320,X;:NEXTX:FORX
=1TO(100-(50-B)):PRINT@347,X;:NE
XTX:PLAY"L2A;C":PRINT@328,"this
bill is dead";:AM(C)=Ø:GOSUB3150
:GOSUB 3150:GOTO 1010
2740 B=RND(20):FOR X=1 TO 100-(5
Ø-B):PRINT@320,X;:FORI=1 TO 5:NE
XTI,X:FORX=1 TO 50-B:PRINT@347,X
;:FORI=1 TO 5:NEXTI,X:SOUND 25,4
:SOUND 50,4:PRINT@295,"sent";CHR
```
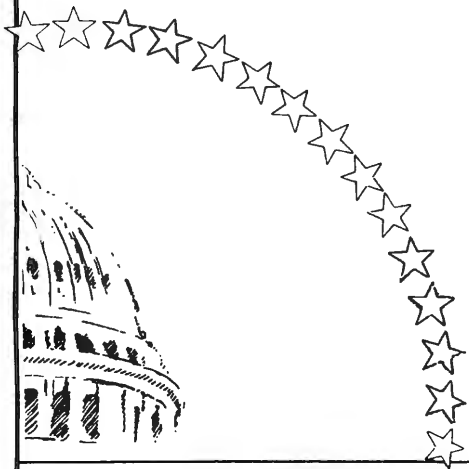
```
$(128);"to";CHR$(128);"president
";:GOSUB 3150
2750 'PRESIDENTIAL ACTION
2760 GOSUB 3150
2770 CLS(6):PRINT@32,"MR. PRESID
ENT, YOUR ";PB$(C):PRINT@64,"HAS
  BEEN PASSED. MORE THAN FIVE AME
NDMENTS WILL BEGIN TO HURT    YOU
R RATING.   OVER TEN WILL      DAM
AGE YOU CONSIDERABLY.   THIS  ONE
  HAS BEEN AMENDED";AM(C);"TIMES.
"
2780 PRINT@324,"(1) SIGN INTO LA
W";:PRINT@356,"(2) VETO";:PRINT@
388,"(3) BECOME LAW W/O SIGNING"
;:PRINT@256,"MAKE YOUR CHOICE";:
SOUND 110,3:INPUT A
2790 IF A<1 OR A>3 THEN 2780
2800 IF A=2 THEN2820
2810 TP(C)=TP(C)+100
2820 ON A GOSUB 2830,2960,3080
2830 'SIGN BILL INTO LAW
2840 GOSUB 3340
2850 CLS(2):FOR X=1 TO 5:IF PB$(
X)="" THEN NEXT X ELSEPRINT@32,P
B$(C);" HAS NOW BECOME":PRINT@64
,"LAW. LET'S GET GOING ON ANOTHE
R ONE."
2860 IF AM(C)>5 AND AM(C)<11 THE
N ON AM(C) GOSUB 10,10,10,10,10,
```

```
2910,2920,2930,2940,2950
2870 IF AM(C)>10 THEN TP(C)=TP(C
)-(100+((AM(C)-5)*2))
2880 HDV=DH:SDV=DS:SRV=RS:HRV=RH
:CC=1:GOSUB 880:CC=0
2890 PB$(C)="":GOSUB 3150:GOSUB3
150:FOR X=1 TO 5:IF PB$(X)="" TH
EN NEXT X ELSE 1010
2900 GOTO 1070
2910 TP(C)=TP(C)-5:RETURN
2920 TP(C)=TP(C)-10:RETURN
2930 TP(C)=TP(C)-20:RETURN
2940 TP(C)=TP(C)-30:RETURN
2950 TP(C)=TP(C)-50:RETURN
2960 'VETO
2970 CLS(4):PRINT@32,"THE ";PB$(
C);" WILL NOW GO TO":PRINT@64,"C
ONGRESS TO ATTEMPT TO OVER-RIDEY
OUR VETO."
2980 GOSUB 3130
2990 CC=1:GOSUB 1520:CC=0
3000 PRINT@108,"OVER-RIDE";:PRIN
T@142,"VOTE";
3010 GOSUB 3150:PRINT@266,PB$(C)
;:PRINT@257,"YEA";:PRINT@284,"NA
Y";:GOSUB 3150
3020 IFPP$="D" AND RH>290 OR PP$
="R" AND DH>290 THEN FOR X=1 TO
(290+B):PRINT@320,X;:NEXTX:FOR X
=1TO (435-(290-B)):PRINT@347,X;:
```

51
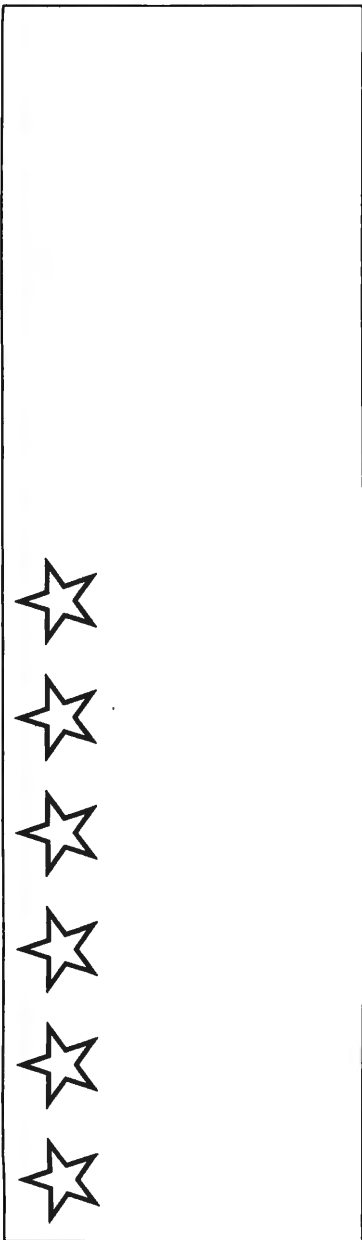
```
NEXTX:SOUND25,2:SOUND50,3:PRINT@
328,"VETO OVER-RIDDEN";:GOSUB 31
50:PRINT@489,"sent to senate";:G
OSUB3150:GOTO 3040
3030 A=RND(289):FORX=1 TO A:PRIN
T@320,X;:NEXTX:FORX=1 TO 435-A:P
RINT@347,X;:NEXTX:PRINT@329,"LES
S THAN 2/3";:SOUND 25,2:SOUND50,
3:PRINT@487,"this bill is dead";
:GOSUB3150:GOSUB 3150:AM(C)=0:GO
TO 1010
3040 CC=1:GOSUB2030:CC=0:PRINT@1
08,"OVER-RIDE";:PRINT@142,"VETO"
;
3050 GOSUB 3150:PRINT@266,PB$(C)
;:PRINT@257,"YEA";:PRINT@284,"NA
Y";:GOSUB 3150
3060 B=RND(10):IFPP$="D"ANDRS>66
ORPP$="R" ANDDS>66THENFORX=1TO(6
6+B):PRINT@320,X;:NEXTX:FORX=1TO
(100-(66-B)):PRINT@347,X;:NEXTX:
SOUND25,2:SOUND50,3:PRINT@328,"V
ETO OVER-RIDDEN";:GOSUB3150:PRIN
T@488,"this bill is law";:GOSUB3
150:A=1:TP(C)=70:GOTO2820
3070 A=RND(66):FOR X=1 TO A:PRIN
T@320,X;:NEXTX:FORX=1 TO 100-A:P
RINT@347,X;:NEXTX:PRINT@329,"LES
S THAN 2/3";:SOUND25,2:SOUND50,3
:PRINT@487,"this bill is dead";:
GOSUB3150:GOSUB3150:AM(C)=0:GOTO
1010
3080 'LAW W/O SIGNATURE
3090 IF AM(C)<6 THEN TP(C)=TP(C)
-(10+(2*AM(C)))
3100 IF AM(C)<11 AND AM(C)>5  TH
EN TP(C)=TP(C)-((AM(C)-1)*2)
3110 IF AM(C)>10 THEN 2870
3120 GOTO 2880
3130 PRINT@483,"PRESS <enter> TO
 CONTINUE";:LINE INPUTA$:RETURN
3140 PRINT@96,"WHICH DO YOU FAVO
R MOST";:SOUND 110,3:RETURN
3150 FOR X=1TO700:NEXT X:RETURN
3160 SOUND 200,2:PRINT@58,M$;:IF
 T<13 THEN PRINT@62,"1";ELSE PRI
NT@62,"2";
3170 PRINT@122,"TOTAL";:PRINT@15
4,"AMEND";:PRINT@187,AM(C);:RETU
RN
3180 M$="JAN":RETURN
3190 M$="FEB":RETURN
3200 M$="MAR":RETURN
3210 M$="APR":RETURN
3220 M$="MAY":RETURN
3230 M$="JUN":RETURN
3240 M$="JUL":RETURN
3250 M$="AUG":RETURN
3260 M$="SEP":RETURN
3270 M$="OCT":RETURN
3280 M$="NOV":RETURN
3290 M$="DEC":RETURN
3300 PRINT@384,"

                          ";:GOSUB 3150:RE
TURN
3310 RESTORE:DATA 72,73,74,75,76
```

```
,77,78,79,80,81,82,83,84,85,86,8
7,104,119,136,151,168,169,170,17
1,172,173,174,175,176,177,178,17
9,180,181,182,183
3320 DATA 229,230,231,232,233,23
4,235,236,237,238,239,240,241,24
2,243,244,245,246,247,248,249,25
0,261,282,293,314,325,346,357,37
8,389,390,391,392,393,394,395,39
6,397,398,399,400,401,402,403,40
4,405,406,407,408,409,410
3330 DATA 70,71,72,73,74,75,76,7
7,78,79,80,81,82,83,84,85,86,87,
88,89,102,121,134,153,166,185,19
8,217,230,249,262,281,294,313,32
6,327,328,329,330,331,332,333,33
4,335,336,337,338,339,340,341,34
2,343,344,345
3340 'FLAG
3350 PMODE 1,1
3360 PCLS(2)
3370 SCREEN 1,0:COLOR 0,4
3380 ST$="BM0,0;C3;R92;D82;L92;U
82":SP$="BM94,0;C4;R160;D2;L160;
D2;R160;D2;L160;D2;R160;D2;L160"
3390 S2$="BM94,24;C4;R160;D2;L16
0;D2;R160;D2;L160;D2;R160;D2;L16
0;D2;R160":S3$="BM94,48;C4;R160;
D2;L160;D2;R160;D2;L160;D2;R160;
D2;L160;D2;R160"
3400 S5$="BM0,96;C4;R254;D2;L254
;D2;R254;D2;L254;D2;R254;D2;L254
;D2;R254":S6$="BM0,120;C4;R254;D
2;L254;D2;R254;D2;L254;D2;R254;D
2;L254;D2;R254":S7$="BM0,144;C4;
R254;D2;L254;D2;R254;D2;L254;D2;
R254;D2;L254;D2;R254"
3410 DRAW ST$
3420 DRAW SP$
3430 DRAW S2$
3440 DRAW S3$
3450 DRAW S4$
3460 DRAW S5$
3470 DRAW S6$
3480 DRAW S7$
3490 DRAW ST$
3500 PAINT(1,160),1,4
3510 PAINT(2,2),3,3
3520 FORL=4 TO 92 STEP16:FORD=8
TO 76 STEP 16:PSET(L,D,2):NEXTD,
L:FORL=12 TO 90STEP 16:FOR D=16
TO 68 STEP 16:PSET(L,D,2):NEXT D
,L
3530 IF A=1 THEN ON C GOTO 3560,
3580,3600,3620,3640
3540 PLAY"T2;V30;O3;L4;F;L8.;G;L
16;A;L4;B-;L8;A;G;L8;F;L16;G;L8;
```

```
F;D;L4;C;L4.;C;P16;L4;O3;F;L8.;B
-;L16;O4;C;L4;D;L8;C;O3;B-;L8.;O
4;C;L16;O3;B-;L8;O4;C;D;L2;C;"
3550 RETURN:'HAIL TO THE CHIEF
3560 PLAY"V31;O2L4G;P255;G;A;L4.
F+;L8G;L4A;B;P255;B;O3C;O2L4.B;L
8A;L4G;A;G;F+;L2G;
3570 RETURN:'MY COUNTRY 'TIS OF
THEE
3580 PLAY "T3;V31;O2;L4;G;L8;B;L
4;B;L4;O3;D;L4;D;L8;G;L4.;G;P32;
L4;B;L4;B;P32;L8.;G;L4.;G;P32;L4
;D;L4;D;P32;O2;L8;B;L4.;B;"
3590 RETURN:'HAPPY DAYS ARE HERE
 AGAIN
3600 PLAY"T2;V31;O2L8F;P255;L8F;
P255;F;P255;L8.F;L16E-;L8.D;L16F
;L8.B-;O3L16C;L8.D;P255;L16D;P25
5;L8.D;L16C;O2L2B-;P100;L8B-;P25
5;B-;L8.B;P255;L16G;P255;L8.G;L1
6A;L8.B-;L16B-;L8.A;;L16G;L8.F;L
16G;L8.F;L16D;L4F;
3610 RETURN:'BATTLE HYMN OF THE
REPUBLIC
3620 PLAY"T2;V31;O2L16G;E;L8C;P2
55;C;L16C;D;E;F;L8G;P255;G;P255;
G;E;A;P255;A;P255;L8.A;L16G;L8.A
;L16G;A;B;O3C;D;L4.E;L16C;O2G;O3
L4.C;O2L16G;E;L4.G;L16D;E;L4C;"
3630 RETURN:'DIXIE LAND
3640 PLAY"T3;V31;O2;L8G;L8F;L4E;
G;P255;G;P255;G;P255;A;L2G;L4F;E
;G;O3;L4.C;L8D;L2.E;"
3650 RETURN:'YELLOW ROSE OF TEXA
S
3660 ' RECORD
3670 FORX=1 TO 5:IF PB$(X)="" TH
EN PA$(X)="Y" ELSE PA$(X)="N"
3680 NEXT X
3690 CLS:PRINT@1,"RECORD OF THE
ADMINISTRATION OF";
3700 L=INT((32-(LEN(LN$)+LEN(NF$
)))/2)+32
3710 PRINT@L,NF$;" ";LN$
3720 PRINT@96,"  bill      amen
d points  pass"
3730 FORX=1 TO 32:PRINT"-";:NEXT
X
3740 GG$="%           %  ##     +#
##        !"
3750 FOR X=1 TO 5:PRINT USING GG
$;PL$(X);AM(X);TP(X);PA$(X):NEXT
 X
3760 FOR X=1TO5:TP(0)=TP(0)+TP(X
):NEXTX
3770 PRINT:PRINT"YOUR TOTAL POIN
TS = ";TP(0);
3780 GOSUB 3130
3790 RETURN
```

53

MODEL ROCKETRY

DAVID MATT

Model rockets today are the equivalent of yesteryear's model airplanes with the miniature gasoline motors. We all admire them and would like to own one, but we're not confident that we can trust ourselves with them.

They are perceived, justly or unjustly, as dangerous toys, to be handled only in the presence of adults who know how to cope with them.

But there's a fascination with rockets that says to each of us that this is a thrill we must experience at least once.

Here's where CoCo comes in, making it possible for each of us to play the role of a space engineer, to witness the blastoff, to marvel as the rocket soars into space, to admire the daring astronaut as the parachute opens and he (or she) glides safely back to Earth, and to drink a toast to our ingenuity.

Just for fun, we've structured the program so that from one to four people can compete. Let's say the winner will be selected to attend the next launch of the spaceship *Columbia*, or that he or she will be invited to be the first civilian on the next manned space station to go into orbit. The object is to make the rocket go as high as possible and to have it land as close as possible to the launching pad.

A major consideration, just as it is in real life, is the wind, which blows from the right side of the screen to the left and varies from one to 20 in intensity. The rocket will turn into the wind after blastoff.

After the wind speed is shown, you will have your choice of engines: 'A' is the least powerful, 'B' is average, and 'C' is the most powerful. Next, you will select thrust ranging from a low of one to a high of nine. A 'B' engine with "1" thrust is more

(David Matt plans to major in computer science/electrical engineering at Marquette University. He has written a large number of programs for the CoCo and Apple II.)

powerful than an 'A' engine with "9" thrust. You may then choose from one to nine seconds for when you want the parachute to open.

The maximum altitude varies some between turns, even if the wind and engine are the same. This is due to humidity, slight wind gusts, and acts of nature. Also, your parachute may fail at certain times and work at others, even though all conditions are similar.
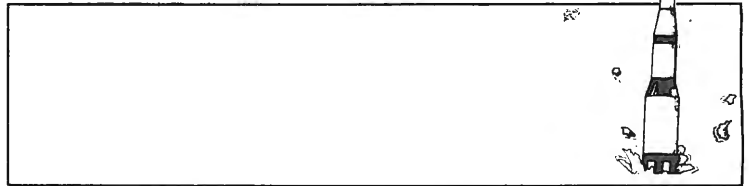
```
0 R=RND(-TIMER)
1 DIMO$(26),V1(2),V2(2),V3(3),V4
(3),V5(5),V6(3),V7(3),V8(3),Z1(4
),Z2(4),Z3(4),Z4(7),Z5(6)
2 RESTORE:H$(1)="BR1R1NR1U6G1BR6
BD5":H$(2)="NR4U1E1R1E2U1H1L2G1B
R7BD5":H$(3)="BU1F1R2E1H2E2H1L3B
R7BD6":H$(4)="BR3U2NR1L3U1E3D3BR
4BD3":H$(5)="BU1F1R2E1U2H1L3U2R4
BR3BD6"
3 DATAU4E2F2D2NL4D2BR3,U6R3F1D1G
1NL3F1D1G1L3BR7,BR1H1U4E1R2F1BD4
G1L2BR6,U6R3F1D4G1L3BR7,NR4U3NR2
U3R4BR3BD6,U3NR2U3R4BR3BD6,BR1H1
U4E1R2F1BD2NL1D2G1L2BR6,U3NU3R4N
U3D3BR3,BR1R1NR1U6NL1R1BR4BD6,BU
1F1R1E1U5NL1R1BR3BD6,U3NU3R1NE3F
3BR3,NU6R4U1BR3BD1
4 DATAU6F2ND1E2D6BR3,U6F1D1F2D1F
1NU6BR3,BR1H1U4E1R2F1D4G1L2BR6,U
6R3F1D1G1L3BR7BD3,BR1H1U4E1R2F1D
3G1NH1NF1G1L1BR6,U6R3F1D1G1L2NL1
F3BR3,BU1F1R2E1U1H1L2H1U1E1R2F1B
R3BD5,BR2U6NL2R2BR3BD6,BU1NU5F1R
2E1U5BR3BD6,BU6D2F1D1F1ND1E1U1E1
U2BR3BD6
5 DATANU6E2NU1F2U6BR3BD6,U1E4U1B
L4D1F4D1BR3,BU6D2F2ND2E2U2BR3BD6
,NR4U1E4U1L4BR7BD6
6 FORT=1TO26:READO$(T):NEXTT:H$(
6)="BR4BU5H1L2G1D4F1R2E1U1H1L3BR
7BD3":H$(7)="U1E4U1L4BR7BD6":H$(
8)="BR1H1U1E1H1U1E1R2F1D1G1NL2F1
D1G1L2BR6":H$(9)="BU1F1R2E1U4H1L
2G1D1F1R2BR4BD3":H$(0)=O$(15)
7 PMODE4,1:PCLS:CLS0
8 X=128:Y=90:LINE(X-1,Y-3)-(X+1,
Y+3),PSET,BF:PSET(X,Y-4):LINE(X-
2,Y+2)-(X-2,Y+4),PSET:LINE(X+2,Y
+2)-(X+2,Y+4),PSET:GET(X-3,Y-5)-
(X+3,Y+6),V1,G
9 PCLS:LINE(X-2,Y+3)-(X-1,Y-3),P
SET:LINE(X-1,Y+3)-(X,Y-4),PSET:L
INE(X,Y+3)-(X-1,Y-3),PSET:LINE(X
-1,Y+2)-(X-3,Y+4),PSET:LINE(X+1,
Y+2)-(X,Y+4),PSET:GET(X-4,Y-5)-(
X+3,Y+6),V2,G
10 PCLS:LINE(X-2,Y+3)-(X,Y-3),PS
ET:LINE(X-1,Y+3)-(X+1,Y-4),PSET:
LINE(X,Y+3)-(X+2,Y-3),PSET:LINE(
X-2,Y+2)-(X-3,Y+4),PSET:LINE(X+1
,Y+2)-(X+1,Y+5),PSET:GET(X-4,Y-5
)-(X+4,Y+7),V3,G
11 PCLS:LINE(X-3,Y+3)-(X+1,Y-3),
PSET:LINE(X-1,Y+3)-(X+3,Y-3),PSE
T:LINE(X-2,Y+3)-(X+2,Y-3),PSET:L
INE(X-3,Y+2)-(X-4,Y+4),PSET:LINE
(X,Y+2)-(X,Y+5),PSET:GET(X-4,Y-5
)-(X+4,Y+7),V4,G
12 PCLS:LINE(X-4,Y+3)-(X+2,Y-3),
PSET:LINE(X-3,Y+3)-(X+4,Y-4),PSE
T:LINE(X-2,Y+3)-(X+4,Y-3),PSET:L
INE(X-4,Y+2)-(X-6,Y+4),PSET:LINE
(X-1,Y+2)-(X-2,Y+5),PSET:GET(X-8
,Y-5)-(X+6,Y+8),V5,G
13 PCLS:LINE(X-4,Y+2)-(X+4,Y-2),
PSET:LINE(X-5,Y+1)-(X+3,Y-2),PSE
T:LINE(X-3,Y)-(X-6,Y),PSET:LINE(
X-4,Y+3)-(X-6,Y+3),PSET:GET(X-8,
Y-3)-(X+5,Y+7),V6,G
14 PCLS:LINE(X-5,Y+1)-(X+4,Y-1),
PSET:LINE(X-4,Y+2)-(X+4,Y),PSET:
LINE(X-3,Y)-(X-7,Y+1),PSET:LINE(
X-3,Y+2)-(X-6,Y+3),PSET:GET(X-9,
Y-2)-(X+6,Y+6),V7,G
15 PCLS:LINE(X-4,Y-1)-(X+3,Y+1),
PSET,BF:PSET(X+4,Y):LINE(X-3,Y-2
)-(X-5,Y-2),PSET:LINE(X-3,Y+2)-(
X-5,Y+2),PSET:GET(X-8,Y-3)-(X+5,
Y+5),V8,G
16 PCLS:LINE(X-3,Y-3)-(X+3,Y+3),
PSET:LINE(X-4,Y-2)-(X+4,Y+4),PSE
T:LINE(X-4,Y-1)-(X+2,Y+4),PSET:L
INE(X-2,Y-3)-(X-5,Y-4),PSET:LINE
```

```
(X-4,Y)-(X-6,Y-2),PSET:GET(X-8,Y
-5)-(X+5,Y+5),Z1,G
17 PCLS:LINE(X-1,Y-3)-(X+1,Y+3),
PSET,BF:PSET(X,Y+4):LINE(X-2,Y-2
)-(X-2,Y-4),PSET:LINE(X+2,Y+2)-(
X+2,Y-4),PSET:GET(X-7,Y-5)-(X+5,
Y+5),Z2,G
18 PCLS:LINE(X-1,Y-3)-(X+1,Y),PS
ET,BF:LINE(X-1,Y)-(X-3,Y+2),PSET
:LINE(X,Y)-(X-3,Y+3),PSET:LINE(X
+1,Y)-(X-1,Y+2),PSET:LINE(X-2,Y-
2)-(X-2,Y-4),PSET:LINE(X+2,Y-2)-
(X+2,Y-4),PSET:FORI=1TO5:PSET(RN
D(10)-4+X,RND(16)-8+Y):NEXTI:GET
(X-5,Y-8)-(X+5,Y+8),Z3,G
19 PCLS:LINE(X-3,Y+3)-(X,Y),PSET
:LINE-(X+3,Y+3),PSET:LINE(X,Y-11
)-(X,Y),PSET:PUT(X+1,Y-11)-(X+7,
Y),V1,PSET:GET(X-5,Y-13)-(X+9,Y+
5),Z4,G
20 PCLS:LINE(X-1,Y-1)-(X+1,Y+3),
PSET,BF:LINE(X-2,Y+2)-(X-2,Y+4),
PSET:LINE(X+2,Y+2)-(X+2,Y+4),PSE
T:LINE(X+3,Y-1)-(X+5,Y+1),PSET,B
F:PSET(X+4,Y+2):LINE(X,Y-2)-(X+2
,Y-4),PSET:LINE-(X+4,Y-2),PSET:L
INE(X+2,Y-4)-(X+2,Y-6),PSET
21 CIRCLE(X+2,Y-6),5,5,.75,.5,1:
LINE(X+7,Y-6)-(X-3,Y-6),PSET:LIN
E-(X+2,Y-4),PSET:LINE-(X+7,Y-6),
PSET:PAINT(X+2,Y-8),5,5:GET(X-4,
Y-14)-(X+9,Y+4),Z5,G
22 P1$="L255T255V2005CGCEC"
23 PMODE1,1:PCLS:SCREEN1,1:FORI=
50TO56STEP2:DRAW"BM"+STR$(I)+",7
0S12C"+STR$(RND(3)+5):R$="ROCKET
RY":GOSUB73:NEXTI:FORI=110TO116S
TEP2:DRAW"BM"+STR$(I)+",90S8C"+S
TR$(RND(3)+5):R$="BY":GOSUB73:NE
XTI
24 FORI=80TO86STEP2:DRAW"BM"+STR
$(I)+",45S12C"+STR$(RND(3)+5):R$
="MODEL":GOSUB73:NEXTI:FORI=20TO
26STEP2:DRAW"BM"+STR$(I)+",120S1
2C"+STR$(RND(3)+5):R$="DAVID MAT
T":GOSUB73:NEXTI
25 FORI=1TO2:PCOPYI TO I+2:NEXTI
:FORI=1TO3:COLOR5+I:LINE(I*4,I*4
)-(255-I*4,191-I*4),PSET,B:NEXTI
:PMODE1,3:FORI=1TO3:COLOR5+I:LIN
E(I*4+2,I*4+2)-(253-I*4,189-I*4)
,PSET,B:NEXTI
26 SCREEN1,1
27 A$=INKEY$:IFA$=""THENIFH=1THE
NPMODE1,1:SCREEN1,1:H=0:GOTO27EL
SEIFA$=""THENH=1:PMODE1,3:SCREEN
1,1:GOTO27
28 GOSUB101:CLSRND(8)
29 PRINT@10,"INSTRUCTIONS";:PRIN
T@64,"THIS PROGRAM SIMULATES A M
ODEL  ROCKETRY CONTEST BETWEEN O
NE TO FOUR PEOPLE. YOU POSITION
THE    ROCKET ON THE FIELD USING
THE    ARROW KEYS. WHEN YOU ARE R
EADY "
30 PRINT"LAUCH IT, PRESS THE SPA
CE BAR.  THE COMPUTER WILL ASK Y
OU WHICH TYPE OF ENGINE YOU WANT
 TO USE. 'A' IS THE LEAST POWERF
UL, 'B'  IS AVERAGE, AND 'C' IS
THE MOST POWERFUL. THE COMPUTER
WILL THENASK YOU HOW MUCH THRUST
 YOU WANT"
31 PRINT@484,"HIT <SPACE BAR> TO
GO ON";:GOSUB102
32 CLSRND(8):PRINT@32,"FOR THRUS
T, TYPE IN A NUMBER     BETWEEN 1
AND 9. 1 IS THE LEAST AMOUNT OF
 THRUST, 9 IS THE MOST.A 'B' ENG
INE WITH 1 THRUST IS   MORE POWE
RFUL THAN AN 'A' ENGINEWITH 9 TH
RUST. THE COMPUTER WILLTHEN ASK
YOU HOW MUCH TIME YOU "
33 PRINT"WANT BEFORE THE PARACHU
TE OPENS.1 IS THE SOONEST, 9 IS
THE LONG-EST. IF THE PARACHUTE O
PENS TOO SOON, IT MAY NOT WORK.
IF IT    OPENS TOO LATE, IT MAY
HAVE     FLOWN OFF THE FIELD. TH
E WIND   SPEED OFTEN DETERMINES
HOW HIGH"
34 PRINT@484,"HIT <SPACE BAR> TO
 GO ON";:GOSUB102:CLSRND(8):PRIN
T@32,"AND HOW FAR THE ROCKET WIL
L GO. YOU WANT TO MAKE THE ROCKE
T GO  AS HIGH AS POSSIBLE AND HA
VE IT LAND AS CLOSE AS POSSIBLE
TO THELAUNCHING PAD. IF THE ROCK
ET    "
35 PRINT"FLIES OFF THE SCREEN, Y
OU LOSE  POINTS. THE WIND BLOWS
FROM THE RIGHT SIDE OF THE SCREE
N TO THE LEFT, AND THE ROCKET WI
LL TURN   INTO THE WIND.":PRINT@3
96,"GOOD LUCK";:PRINT@484,"HIT <
SPACE BAR> TO GO ON";:GOSUB102
36 CLSRND(8):PRINT@4,;:INPUT"HOW
 MANY PLAYERS <1-4>";A:IFA<1ORA>
4THEN36
37 PMODE4,1:PCLS:SCREEN1,1:DIMSC
(A,5):NP=A
38 FORI=1TONP:PRINT"NAME #";I;:I
NPUTPN$(I):NEXTI
39 POKE65495,0:FORRO=1TO5:FORPL=
1TONP
40 PCLS:GOSUB72:X=128:Y=160:SCRE
EN1,1:PUT(X-5,Y-13)-(X+9,Y+5),Z4
,PSET
```

```
41 WI=RND(20):DRAW"S4C5BM10,60":
R$="WIND SPEED ":GOSUB73:S=WI:GO
SUB74
42 P=PEEK(135):IFP=8THENX=X-2ELS
EIFP=9THENX=X+2ELSEIFP=94THENY=Y
-2ELSEIFP=10THENY=Y+2ELSEIFP=32T
HENGOTO49
43 IFY<156ANDY>132THENPLAYP1$:GO
SUB72
44 IFX<550R X>2040R Y>172THENPLA
YP1$:GOSUB72
45 IFX<7THENX=7ELSEIFX>243THENX=
243
46 IFY>185THENY=185ELSEIFY<130TH
ENY=130
47 PUT(X-5,Y-13)-(X+9,Y+5),Z4,PS
ET
48 GOTO42
49 DRAW"S4C5BM10,10":R$="WHAT TY
PE OF ENGINE ":GOSUB73
50 A$=INKEY$:IF A$<"A"ORA$>"C"TH
EN50
51 EN$=A$:R$=" "+A$:GOSUB73
52 DRAW"BM10,20":R$="AMOUNT OF T
HRUST ":GOSUB73
53 A$=INKEY$:A=VAL(A$):IFA<10RA>
9THEN53
54 TH=A:S=A:GOSUB74
55 DRAW"BM10,30":R$="AMOUNT OF T
IME BEFORE PARACHUTE":GOSUB73:DR
AW"BM10,40":R$="EJECTION ":GOSUB
73
56 A$=INKEY$:A=VAL(A$):IFA<10RA>
9THEN56
57 ET=A:S=A:GOSUB74
58 DRAW"BM10,50":FORI=9TO0STEP-1
:DRAWH$(I)+"NU1BR5U1BM+5,+1":U=1
0-I:PLAY"T"+STR$(U)+"L403CP4":NE
XTI
59 IFEN$="A"THENPO=2ELSEIFEN$="B
"THENPO=4ELSEIFEN$="C"THENPO=8
60 PO=PO*10:TH=TH/2
61 AL=PO+TH+RND(20):A1=TH:A2=TH:
A3=TH*2:A4=TH*RND(2):A5=TH:AH=PO
*TH-(WI*2):A6=ET*5
62 AD=AL+A1+INT(A2*.75)+INT(A3*.
5)+INT(A4*.25)+6-INT(AH*.1)-INT(
A6*.5)
63 LINE(0,0)-(255,100),PRESET,BF
:PP=AL/ET+(WI/4):X=X+4:Y=Y-8:FOR
I=1TO30STEP3:PSET(RND(10)-5+X,RN
D(5)+Y+3):PLAY"V"+STR$(I)+"01T2L
255CDECDE":NEXTI
64 GOSUB75:DRAW"BM10,20S4":R$="P
LAYER ":GOSUB73:DRAWH$(PL):DRAW"
BM10,30":R$="ROUND ":GOSUB73:DRA
WH$(RO):DRAW"BM10,40":R$="SCORE
":S=SC:SC(PL,RO)=SC:GOSUB73:GOSU
B74
65 A$=INKEY$:IFA$=""THEN65
66 NEXTPL,RO
67 CLS:PRINT@64,"PLAYER";:PRINT@
73,"1    2    3    4    5"
68 FORI=1TONP:PRINT@64+(32*I),PN
$(I);:PRINT@72+(32*I),SC(I,1);:P
RINT@77+32*I,SC(I,2);:PRINT@82+3
2*I,SC(I,3);:PRINT@87+32*I,SC(I,
4);:PRINT@92+32*I,SC(I,5):SS(I)=
SC(I,1)+SC(I,2)+SC(I,3)+SC(I,4)+
SC(I,5):NEXTI
69 FORI=1TONP:PRINT@320+32*I,"PL
AYER #";I;"HAS";SS(I);"POINTS":N
EXTI
70 A$=INKEY$:IFA$=""THEN70
71 CLEAR:GOTO1
72 DRAW"C5S20BM10,180E8R40G8L40"
:RETURN
73 L=LEN(R$):FORTY=1TOL:M=ASC(MI
D$(R$,TY,1))-64:IFM=-32THENDRAW"
BR10":NEXTTY:RETURN ELSE DRAWO$(
M):NEXTTY:RETURN
74 S$=STR$(S):L=LEN(S$):FORTY=2T
OL:M$=MID$(S$,TY,1):M=VAL(M$):DR
AWH$(M):NEXTTY:RETURN
75 X1=X:Y1=Y:FORI=1TOAL:PUT(X-3,
Y-5)-(X+3,Y+6),V1,PSET:Y=Y-1:IFY
<154ANDY>130THENGOSUB72
76 IFY<5THEN100ELSENEXTI
77 IFPP>30THENPF=1:GOTO92ELSEFOR
I=1TOA1:PUT(X-4,Y-5)-(X+3,Y+6),V
2,PSET:Y=Y-1:X=X+.25:IFY<154ANDY
>130THENGOSUB72
78 IFY<5THEN100ELSENEXTI
79 IFPP>27THENPF=RND(2):GOTO92EL
SEFORI=1TOA2:PUT(X-4,Y-5)-(X+4,Y
+7),V3,PSET:Y=Y-.75:X=X+.25:IFY<
7THEN100
80 NEXTI
81 IFPP>25THENPF=RND(3):GOTO92EL
SEFORI=1TOA4:PUT(X-4,Y-5)-(X+4,Y+
7),V4,PSET:X=X+.5:Y=Y-.5:IFY<7TH
EN100
82 NEXTI
83 IFPP>23THENPF=RND(4):GOTO92EL
SEFORI=1TOA3:PUT(X-8,Y-5)-(X+6,Y
+8),V5,PSET:X=X+.75:Y=Y-.5
84 IFY<70RX>247THEN100ELSENEXTI
85 IFPP>21THENPF=RND(5):GOTO92EL
SEFORI=1TOA4:PUT(X-8,Y-3)-(X+5,Y
+7),V6,PSET:X=X+.75:Y=Y-.25:IFX>
2480R Y<5THEN100
86 NEXTI
87 IFPP>19THENPF=RND(6):GOTO92EL
SEFORI=1TO25:PUT(X-9,Y-2)-(X+6,Y
+6),V7,PSET:X=X+1:Y=Y-.25:IFX>24
70RY<4THEN100
88 NEXTI
89 IFPP>17THENPF=RND(7):GOTO92EL
```

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```
SEFORO=1TO AH:PUT(X-8,Y-3)-(X+5,
Y+5),V8,PSET:X=X+1:Y=Y+.1:IFX>24
8THEN100
90 NEXTO
91 FORI=1TOA6:PUT(X-8,Y-5)-(X+5,
Y+5),Z1,PSET:X=X+1:Y=Y+.5:IFX>24
8THEN100ELSENEXTI:PF=RND(10)
```
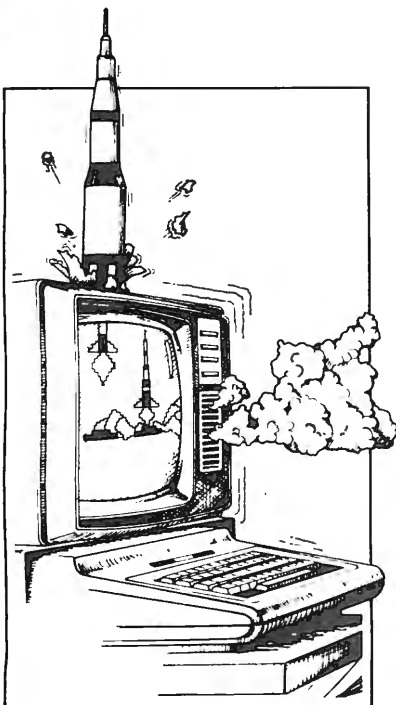


```
92 IFPF>2THEN98
93 DRAW"BM40,1084C5":R$="PARACHU
TE DOES NOT OPEN":GOSUB73:FORI=1
TO AD:PUT(X-7,Y-5)-(X+5,Y+5),Z2,
PSET:Y=Y+1:IFY<154ANDY>130THENGO
SUB72:NEXTI ELSENEXTI
94 X=INT(X):Y=INT(Y):PUT(X-5,Y-8
)-(X+5,Y+8),Z3,PSET:FORI=1TO60:P
```

```
RESET(X+RND(10)-5,Y+RND(10)-5):P
SET(X+RND(20)-10,Y+RND(15)-20):N
EXTI:FORI=Y-20TOY+10:FORU=X-10TO
 X+10:PRESET(U,I):IFRND(3)=1THEN
PSET(U,I+RND(2)+1)
95 IFI=140THENGOSUB72
96 NEXTU,I
97 SC=0:RETURN
98 IFY<16THEN100ELSEFORI=1TO (AD
+AD*.50):PUT(X-4,Y-14)-(X+9,Y+4)
,Z5,PSET:Y=Y+.75:X=X-RND(WI/7):I
FY<156ANDY>130THENGOSUB72
99 IFY<180ORX<6THEN100ELSENEXTI:S
C=INT(AL+A1+INT(A2*.75)+INT(A3*.
5)+INT(A4*.25)+6-ABS(X1-X)-ABS(Y
1-Y)):SC=SC+250:RETURN
100 LINE(0,0)-(255,Y+10),PRESET,
BF:DRAW"BM30,9084C5":R$="ROCKET
HAS LEFT FLIGHT FIELD":GOSUB73:S
C=0:RETURN
101 RESTORE:FORI=1TO26:READA$:NE
XTI:RETURN
102 A$=INKEY$:IFA$=" "THENRETURN
103 READR$:IFR$="END"THENGOSUB10
1
104 PLAYR$:GOTO102
105 DATAT203V25L4CP64,L8.O2AP64,
L16AP64,L4AP64,AP64,L2B-L4C,P4,D
P64,L8.DP64,L16DP64,L4DP64,FP64,
L2GL4C,P4,B-P64,L8.B-P64,L16B-P6
4,L4B-P64,O3DP64
106 DATAL2.CP64,O2L16DP64,L8.EP6
4,L16FP64,L8G,P4
107 DATAO3L4CP64,L8.CP64,L16CP64
,L4CP64,CP64,O2L2.CP64,L32DC#DC#
DC#DP64,L4DP64,DP64,DP64,F#P64,L
2.GP64,L32B-AB-AB-AB-P64,L4B-P64
,L8.B-P64,L16B-P64,L4B-P64,B-P64
108 DATAO1L2.B-P64,L32O2CO1B-O2C
O1B-O2CO1B-O2CP64,L8.CP64,L16CP6
4,L8.CP64,L16CP64,L8.CP64,L16CP6
4,L8.CP64,L16CP64,L2.CP64,P4
109 DATAL4A-P64,L8.FP64,L16FP64,
L4FP64,FP64,L2GL4E-P64,FP64,FP64
,L8.E-P64,L16E-P64,L4D-P64,D-P64
,L2.E-P64,L4CP64,DP64,L8.DP64,L1
6DP64,L4DP64,DP64
110 DATAL8CP8,L4FL8EP8,L4DL8EP8,
P4,O3L4CP64,O2BP64,L8O3CP8,P4,O2
L4GP64,FP64,L8EP8,P4
111 DATAO2L4CP64,T3P8,L8AP64,GP6
4,FP64,GP64,AP64,AGP64,GP64,AGP6
4,GP64,AGP64,GP64,T2L4F,T3P8,L8A
P64,GP64,FP64,GP64,AP64,AGP64,GP
64,AGP64,GP64,AGP64,GP64,GFP64,F
P64,GFP64,FP64,AGP64,GP64,GFP64,
FP64,GFP64,FP64,AGP64,GP64,L1A,P
4,P4,P4
112 DATAEND
```
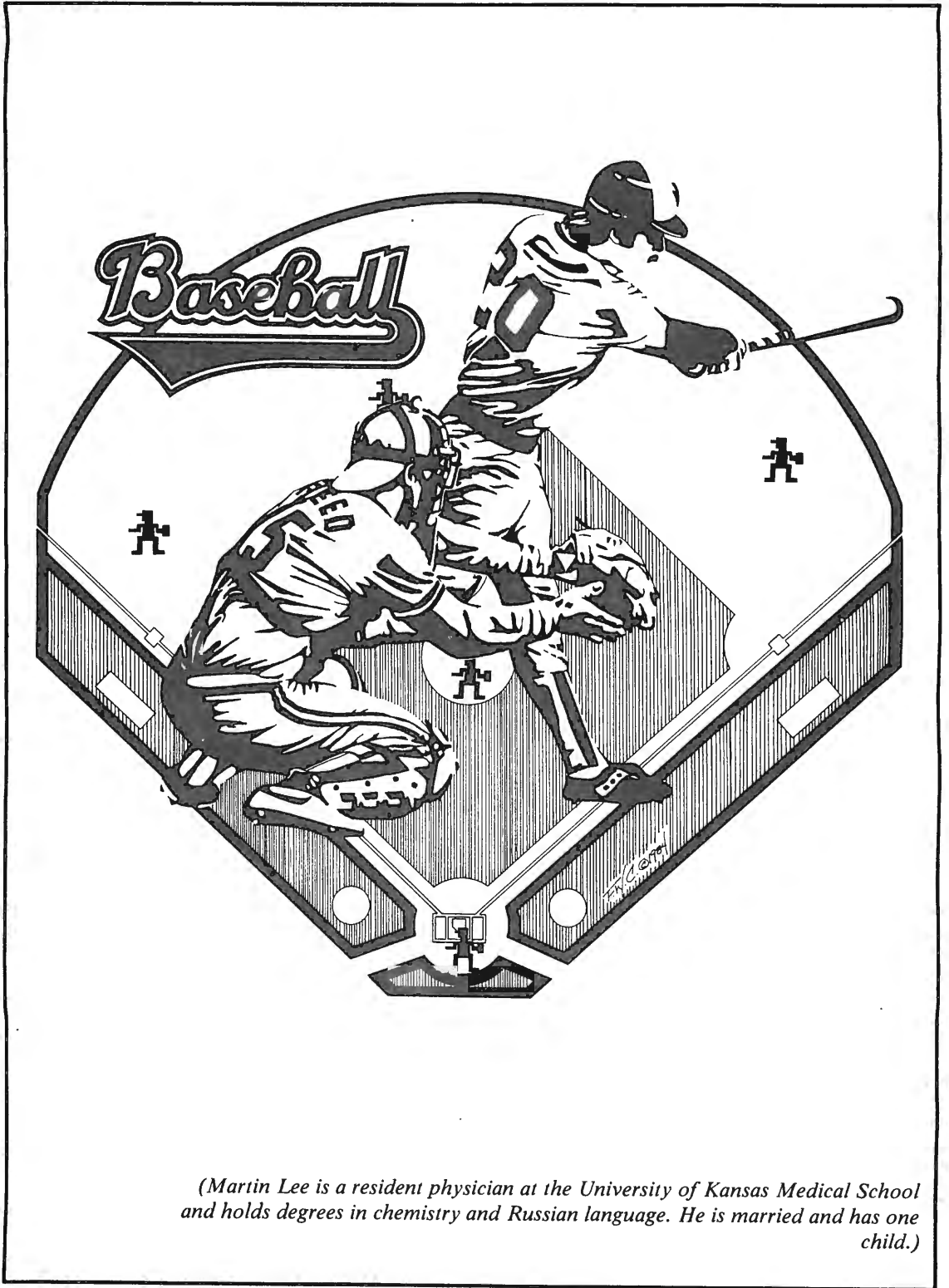
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(Martin Lee is a resident physician at the University of Kansas Medical School and holds degrees in chemistry and Russian language. He is married and has one child.)

BASEBALL

MARTIN W. LEE

Parker Brothers-type board games simulating major league baseball action have been around for at least 30 years. Currently there are approximately 15 different games that rely upon actual players' averages to lend authenticity to the fun.

With the heavy reliance upon statistics, it was only a matter of time before CoCo would be called upon to put more life into situations depicting America's favorite pastime. You now can tuck those cards and charts away and let them increase in value as collectors' items.

As manager, you will guide your team through every exciting situation that would be faced by a big-league manager in a real game. Players will perform with amazing statistical accuracy. For example, Willie Wilson and Robin Yount will battle it out for the American League batting title, just as they did in 1982. The game relies upon accuracy only on statistics that are readily available in your local newspaper or from such publications as *The Sporting News.*

As listed, the program is a simulation of the final game of the 1982 World Series between the St. Louis Cardinals and the Milwaukee Brewers, which the Cards actually won 6-3. The program can be changed to recreate any other game (real or hypothetical) that you can imagine. Wouldn't it be interesting to create a game between the 1927 New York Yankees with Babe Ruth and Lou Gehrig against their modern-day counterparts? Or how about the 1933 All-Stars against the 1984 team? The possibilities are endless.

The action begins with a display of the lineups of the opposing team, followed by options available to the home team's manager for placement of infielders and

outfielders against the lead-off batter. After defensive strategy has been developed, the manager taps the ENTER key to allow the offense to make selections. At any time during the game, you will have the option of displaying the game situation or the stadium scoreboard.

If you want to speed up the game, you can dispense with the managerial functions, and simply press ENTER repeatedly to provide continuous game action. After each time at bat, the computer automatically will display the play result and position of each base runner. Batting orders and outs are incremented, and the computer will switch teams each half-inning.

One of the major problems with statistical baseball games is that it is extremely difficult to reproduce accurately the intangible factors, such as pitchers who tire during a game or who lose control of their pitches for no apparent reason. Some board games have attempted to get around this problem by using a formula to simulate this aspect of the game. Unfortunately, these formulae do little but introduce randomness to the game, interfering with overall statistical accuracy.

For this reason, only starting pitchers are used in this version. For similar reasons (prediction of slumps, etc.), pinch hitters are not used. You also will note that statistical adjustments have not been made for the supposed advantage of the pitcher when a batter is left-handed against a left-handed pitcher, etc. Such statistics, while readily available to managers, are not widely disseminated. Most of us don't want to get that technical, anyway.

Bring on the popcorn and Cracker Jacks, the hotdogs and sodas! It's time to "Play Ball"!

```
1 CLS:PRINT "PRESS ENTER TO STAR
T GAME"
3 A$=INKEY$:IF A$="" THEN A=RND(
Ø):GOTO3
4 DIMAA(7),DD(7):FORY=1TO7:READA
A(Y),DD(Y):NEXTY:CLS:DATA1ØØ,8,1
8Ø,4,165,4,152,4,136,4,152,12,11
5,12
6 DIMEE(6),FF(6):FORY=1TO6:READE
E(Y),FF(Y):NEXTY
7 DATA 147,2,176,2,193,2,2Ø4,4,1
93,2,2Ø4,8
15 PRINT@69,"*******************
**"
2Ø PRINT@133,"MAJOR LEAGUE BASEB
ALL":PRINT@2Ø6,"BY":PRINT@298,"M
ARTY LEE"
25 PRINT@357,"*****************
***"
27 GOSUB15ØØ
3Ø DIMTE$(2),NA$(2,1Ø),PO(2,9),A
B(2,9),H(2,9),DO(2,9),TR(2,9),HR
(2,9),IP(2),PH(2),PB(2),PS(2),SN
(2,9),BB(2,9),SO(2,9),OU(2,9),RE
(2Ø,4),PL$(2Ø),CH(2Ø),F(1Ø)
35 DIMRG(2),HG(2),EG(2),RI(2,15)
,HI(2,15),PL(4),XY(5),BA(2),AT(2
,9),HT(2,9),SC(4),SB(2,9),PF(2)
4Ø FORI=1TO2:READTEAM$(I):NEXTI
45 FORI=1TO2
5Ø FORJ=1TO9
55 READNA$(I,J),PO(I,J),AB(I,J),
H(I,J),DO(I,J),TR(I,J),HR(I,J),S
B(I,J)
6Ø AT(I,J)=AB(I,J):HT(I,J)=H(I,J
)
7Ø NEXTJ
75 NEXTI
8Ø FORI=1TO2
85 READNA$(I,1Ø),IP(I),PH(I),PB(
I),PS(I)
9Ø PF(I)=IP(I)*3+PB(I)+PH(I)
95 NEXTI
1ØØ GOSUB5ØØØ
2ØØ FORI=1TO2Ø
2Ø5 FORJ=4TO1STEP-1
21Ø READRE(I,J)
215 NEXTJ
22Ø NEXTI
225 FORI=1TO2Ø:READPL$(I):NEXTI
23Ø IN=1:BA(1)=1:BA(2)=Ø:X=1:Y=2
232 DIMKG(2),BG(2)
233 KI=Ø:KG(1)=Ø:KG(2)=Ø:BI=Ø:BG
(1)=Ø:BG(2)=Ø
```
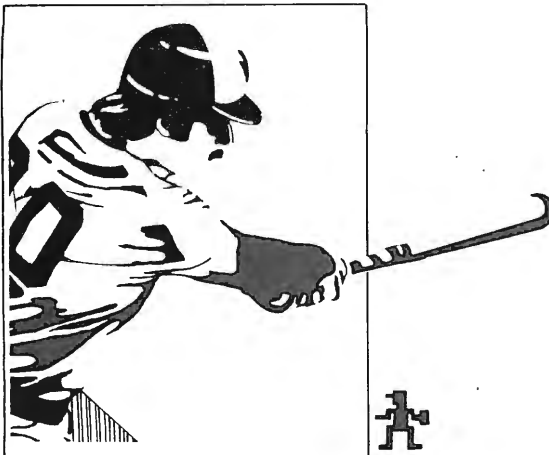
```
235 CLS:GOSUB3000
240 O=0:FORI=1TO5:XY(I)=0:NEXTI
245 XY(1)=BA(X)
250 GOTO4000
255 A=RND(0)
260 FORI=1TO15
265 IFA<=CH(I)THEN275
270 NEXTI
275 IFI=14ANDO=2THENI=12
277 IFI=14ORI=12ANDXY(2)=0 THEN
I=13
280 FORJ=4TO1STEP-1
285 PL(J)=RE(I,J)
286 IFJ=1THEN290
287 IFI=8ANDXY(J-1)=0THENPL(J)=0
290 NEXTJ
291 IFI=15THENEG(Y)=EG(Y)+1
292 IFI=9THENKI=KI+1:KG(Y)=KG(Y)
+1
293 IFI=8THENBI=BI+1:BG(Y)=BG(Y)
+1
295 FORJ=4TO1STEP-1
300 IFPL(J)=-1ANDXY(J)<>0THENO=0
+1:XY(J)=0
310 IFO>=3THEN400
315 NEXTJ
317 IF I=8 OR I=12 OR I>=15 AND
I<>17   THENHI(X,IN)=HI(X,IN)-1:H
G(X)=HG(X)-1
320 FORJ=4TO1STEP-1
325 IFPL(J)>-1ANDXY(J)<>0THENXY(
J+PL(J))=XY(J)
330 IFPL(J)>0ANDXY(J)<>0THENXY(J
)=0
335 IFJ=1ANDPL(J)>0THENHG(X)=HG(
X)+1:HI(X,IN)=HI(X,IN)+1
345 IFXY(5)<>0THENRG(X)=RG(X)+1:
RI(X,IN)=RI(X,IN)+1:SC(J)=XY(5)
360 XY(5)=0
363 IFIN>=10ANDX=2ANDRG(2)>RG(1)
THEN500
365 NEXTJ
375 GOSUB7000
385 BA(X)=BA(X)+1
390 IFBA(X)=10THENBA(X)=1
395 GOTO245
400 FORJ=1TO5:XY(J)=0:NEXTJ
405 GOSUB7000
407 GOSUB8000
410 IFX=2THENIN=IN+1
415 IFIN>=10ANDX=2ANDRG(1)<>RG(2
)THEN500
420 IFIN=9ANDX=1ANDRG(2)>RG(1)TH
EN500
425 X=Y
427 Y=2:IFX=2THENY=1
428 KI=0:BI=0
430 BA(X)=BA(X)+1
435 IFBA(X)=10THENBA(X)=1
440 GOTO240
500 END
1500 FORCC=1TO7:SOUNDAA(CC),DD(C
C):NEXTCC:RETURN
1550 FORCC=150TO255STEP7:SOUNDCC
,1:NEXTCC:RETURN
1600 SOUND150,4:SOUND55,4:RETURN
1650 FORCC=1TO6:SOUNDEE(CC),FF(C
C):NEXTCC:RETURN
2000 DATAMIL.,ST.L.
2010 DATAMOLITOR,5,666,201,26,8,
19,41
2020 DATAYOUNT,6,635,210,46,12,2
9,14
2030 DATACOOPER,3,654,205,38,3,3
2,2
2040 DATASIMMONS,2,539,145,29,0,
23,0
2050 DATAOGLIVIE,7,602,147,22,1,
34,3
2060 DATATHOMAS,8,567,139,29,1,3
9,3
2070 DATAHOWELL,0,300,78,11,2,4,
0
```

ER,SACRIFICE BUNT SUCCESSFUL,RUN
NER AT 2ND OUT ON BUNT,RUNNER AT
 1ST OUT ON BUNT,RUNNER AT 3RD O
UT ON SQUEEZE

```
2080 DATAMOORE,9,456,116,22,4,6,
2
2090 DATAGANTNER,4,447,132,17,2,
4,6
2100 DATAL.SMITH,7,592,182,35,8,
8,68
2110 DATAOBERKFELL,5,470,136,22,
5,2,11
2120 DATAHERNANDEZ,3,579,173,33,
6,7,19
2130 DATAHENDRICK,9,515,145,20,5
,19,3
2140 DATAPORTER,2,373,86,18,5,12
,1
2150 DATAIORG,0,238,70,14,1,0,0
2160 DATAMCGEE,8,422,125,12,8,4,
24
2170 DATAHERR,4,493,131,19,4,0,2
5
2180 DATAO.SMITH,6,488,121,24,1,
2,25
2200 DATAVUCKOVICH,223,234,102,1
05
2210 DATAANDUJAR,265,237,50,137
2300 DATA 1,2,3,4,1,2,3,3,1,2,3,
2,1,2,2,2,1,1,1,1,1,2,1,1,1,2,2,
1,1,1,1,1,0,0,0,-1,0,0,0,-1,1,0,
0,-1,1,1,-1,1,1,1,1,1,-1,1,1,-1,-1
,1,1,1,1,-1,1,1,1,1,1,-1,1,-1,-1,
1,1,1,1,-1,1,-1,1,1,1
2350 DATA HITS A HOME RUN!,HITS
A TRIPLE!,DOUBLES TO DEEP CENTER
!,DOUBLES!,SINGLES TO LEFT,SINGL
ES TO CENTER,SINGLES TO RIGHT,WA
LKS,STRIKES OUT,FLIES OUT,FLIES
OUT DEEP TO CENTER,GROUNDS INTO
A FORCE,GROUNDS OUT,HITS INTO A
DOUBLE PLAY
2355 DATA REACHES BASE ON AN ERR
OR,RUNNER OUT AT PLATE ON GROUND
```

```
3000 PRINT"********************
*********"
3002 PRINT"BATTING ORDERS :"
3010 PRINTTE$(1),TE$(2)
3020 FORI=1TO9
3030 PRINTPO(1,I);" ";NA$(1,I),P
O(2,I);" ";NA$(2,I)
3040 NEXTI
3045 PRINT "********************
***********"
3050 PRINT "PITCHERS :"
3060 FORI=1TO2:PRINT"     ";NA$(I
,10),:NEXTI
3070 A$=INKEY$:IF A$="" THEN 307
0
3080 RETURN
4000 GOSUB8500
4002 GOSUB 6000
4003 FORJ=1TO10:F(J)=0:NEXTJ
4005 CLS
4010 PRINT "********************
***********"
4020 PRINT "        DEFENSIVE OPTI
ONS"
4025 PRINT@78-LEN(TE$(Y))/2,TE$(
Y)
4030 PRINT"********************
**********"
4035 PRINT"AT BAT: ";NA$(X,BA(X)
)
4040 PRINT "     1) INFIELD IN"
4050 PRINT "     2) INFIELD DEEP"
4070 PRINT "     3) OUTFIELD DEEP
"
4080 PRINT "     4) PROTECT FOUL
LINES"
4090 PRINT "     5) PITCHOUT"
4100 PRINT "     6) INTENTIONAL W
ALK"
4110 PRINT "     7) REVIEW SITUAT
ION/ORDERS"
4120 PRINT "     8) DISPLAY SCORE
BOARD"
4130 PRINT "     0) NO OPTIONS RE
QUESTED"
4200 INPUTDE:SOUND175,2
4205 DE=INT(DE):IF DE>8 THEN 420
0
4210 IFDE=7THENGOSUB8500:GOTO400
5
4220 IFDE=8THENGOSUB8000:GOTO400
5
4230 IFDE=0THEN4500
4240 IF F(DE)=1 THEN PRINT"OPTIO
N ALREADY EXECUTED":FORJ=1TO600:
```
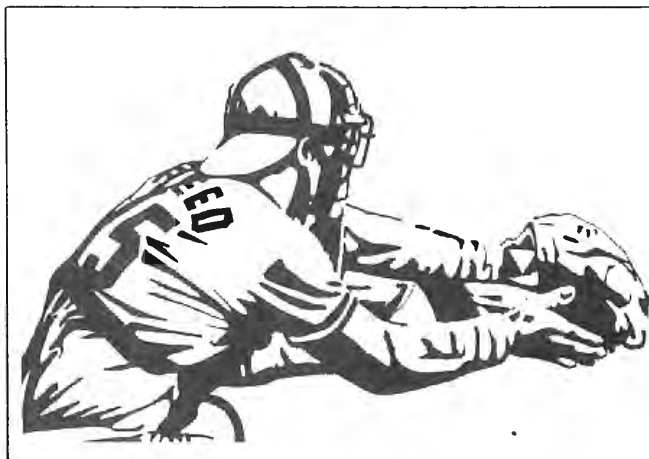
```
NEXTJ:GOTO4005                           4735 A=RND(0):N=0:ON OF GOTO4740
4250 F(DE)=1                             ,4790,4820,4820
4300 ON DE GOTO4320,4350,4390,44         4740 IFXY(3)<>0 OR XY(2)=0THEN P
10,4430,4450                             RINT"ILLEGAL REQUEST":GOTO4500
4320 A=RND(0)                            4745 Z=SB(X,XY(2))/AT(X,XY(2))
4325 IFXY(4)<>0ANDA>.9THENI=16:G          4747 IFPO=1THENZ=Z/2:PO=0
OTO280                                   4750 IFZ>.075ANDA<.60THENN=1
4330 FORJ=5TO8:CH(J)=CH(J)+.02:N         4752 IFZ>.04ANDA<.5THENN=1
EXTJ                                     4754 IFZ>.02ANDA<.4THENN=1
4335 GOTO4470                            4756 IFZ>.02ANDA<.3THENN=1
4350 FORJ=5TO8:CH(J)=CH(J)+.02:N         4760 IFN=1THENPRINT"SAFE AT SECO
EXTJ                                     ND!":GOSUB1650:FORZZ=1TO750:NEXT
4355 CH(13)=CH(13)-.02:GOTO4470          ZZ:XY(3)=XY(2):XY(2)=0
4370 -4420                               4765 IFN=1THEN4000
4390 CH(2)=CH(1)                         4770 IFN=0THEN PRINT"RUNNER OUT
4395 FORJ=3TO4:CH(J)=CH(J)-.015:        AT SECOND":XY(2)=0:O=O+1:GOSUB16
NEXTJ                                    00
4400 FORJ=5TO8:CH(J)=CH(J)+.02:N         4775 IFO>=3THEN PRINT"SIDE RETIR
EXTJ:GOTO4470                            ED":FORZZ=1TO750:NEXTZZ:BAT(X)=B
4410 FORJ=3TO4:CH(J)=CH(J)-.01:N         AT(X)-1
EXTJ                                     4777 FORZZ=1TO5:IFO>=3THENXY(ZZ)
4415 FORJ=5TO8:CH(J)=CH(J)+.015:        =0:NEXTZZ:GOTO4007
NEXTJ:GOTO4470                           4780 GOTO4920
4430 PO=1:CH(8)=CH(8)+.035:GOTO4         4790 IFXY(4)<>0 OR XY(3)=0THENPR
470                                      INT"ILLEGAL REQUEST":GOTO4500
4450 I=8:GOTO280                         4795 Z=SB(X,XY(3))/AT(X,XY(3))
4470 FORJ=1TO300:NEXTJ:GOTO4005          4797 IFPO=1THENZ=Z/2:PO=0
4500 FORJ=1TO300:NEXTJ:CLS               4800 IFZ>.075ANDA<.4THENN=1
4510 PRINT "*********************         4805 IFZ>.02ANDA<.2THENN=1
***********"                             4810 IFN=1THEN PRINT"SAFE AT THI
4520 PRINT "        OFFENSIVE OPTI       RD!":GOSUB1650:FORZZ=1TO750:NEXT
ONS"                                     ZZ:XY(4)=XY(3):XY(3)=0
4525 PRINT@78-LEN(TE$(X))/2,TE$(         4812 IFN=1THEN4920
X)                                       4814 IFN=0THEN PRINT"RUNNER OUT
4530 PRINT "*********************         AT THIRD":GOSUB1600:XY(3)=0:O=O+
***********"                             1
4535 PRINT"AT BAT: ";NA$(X,BA(X)         4816 IFO>=3THEN PRINT"SIDE RETIR
)                                        ED":FORZZ=1TO750:NEXTZZ:BAT(X)=B
4540 PRINT "      1) STEAL ATTEMPT        AT(X)-1
  (1>2)"                                 4818 FORZZ=1TO5:IFO>=3THENXY(ZZ)
4550 PRINT "      2) STEAL ATTEMPT        =0:NEXTZZ:GOTO4007
  (2>3)"                                 4819 GOTO4920
4570 PRINT "      3) SACRIFICE BUN       4820 FORJ=2TO4:N=N+XY(J):NEXTJ
T"                                       4825 IFN=0THEN PRINT"ILLEGAL REQ
4580 PRINT "      4) HIT AND RUN"        UEST":GOTO4500
4600 PRINT "      5) REVIEW SITUAT       4827 IF OF=4THEN4880
ION/ORDERS"                             4830 IFA>.55THENI=17:GOTO280
4610 PRINT "      6) DISPLAY SCORE       4835 IFXY(4)<>0THENI=20:GOTO280
BOARD"                                   4840 IFXY(3)<>0THENI=18:GOTO280
4620 PRINT "      0) NO OPTION REQ       4845 IFXY(2)<>0THENI=19:GOTO280
UESTED"                                  4880 CH(1)=0:CH(2)=.005:CH(3)=.0
4700 INPUTOF:SOUND175,2                  1:CH(4)=.02:CH(5)=CH(5)-.02:CH(6
4705 OF=INT(OF):IF OF>6 THEN 470         )=CH(6)-.02
0                                        4890 GOTO255
4710 IFOF=5THENGOSUB8500:GOTO450         4920 FORJ=1TO750:NEXTJ:GOTO4000
0                                        4950 GOTO255
4720 IFOF=6THENGOSUB8000:GOTO450         5000 FORI=1TO2
0                                        5020 K=2:IFI=2THENK=1
4730 IFOF=0THEN4950                      5030 FORJ=1TO9
```

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```
5040 AB(I,J)=AB(I,J)+PB(K)/(IP(K
)*3+PH(K))*AB(I,J)
5050 DO(I,J)=DO(I,J)/H(I,J)
5060 TR(I,J)=TR(I,J)/H(I,J)
5070 HR(I,J)=HR(I,J)/H(I,J)
5080 H(I,J)=(H(I,J)/AB(I,J)+PH(K
)/PF(K))/2
5090 DO(I,J)=DO(I,J)*H(I,J)
5100 TR(I,J)=TR(I,J)*H(I,J)
5110 HR(I,J)=HR(I,J)*H(I,J)
5120 SN(I,J)=H(I,J)-DO(I,J)-TR(I
,J)-HR(I,J)
5130 BB(I,J)=PB(K)/PF(K)
5140 SO(I,J)=PS(K)/PF(K)
5150 OU(I,J)=1-H(I,J)-SO(I,J)-BB
(I,J)
5160 NEXTJ
5170 NEXTI
5180 RETURN
6000 CH(1)=HR(X,BA(X))
6010 CH(2)=TR(X,BA(X))+CH(1)
6015 CH(3)=9/28*DO(X,BA(X))+CH(2
)
6020 CH(4)=19/28*DO(X,BA(X))+CH(
3)
6025 CH(5)=43/118*SN(X,BA(X))+CH
(4)
6030 CH(6)=24/118*SN(X,BA(X))+CH
(5)
6035 CH(7)=51/118*SN(X,BA(X))+CH
(6)
6040 CH(8)=BB(X,BA(X))+CH(7)
6045 CH(9)=SO(X,BA(X))+CH(8)
6050 CH(10)=150/566*OU(X,BA(X))+
CH(9)
6055 CH(11)=110/566*OU(X,BA(X))+
CH(10)
6060 CH(12)=121/566*OU(X,BA(X))+
CH(11)
6065 CH(13)=88/566*OU(X,BA(X))+C
H(12)
6070 CH(14)=.985
6075 CH(15)=1
6080 RETURN
7000 CLS:PRINT"*****************
***************"
7010 PRINT"BATTING FOR ";TE$(X);
":"
7015 PRINTNA$(X,BA(X)),"AVERAGE:
";INT(1000*HT(X,BA(X))/AT(X,BA(X
)))/1000
7016 PRINT@96,"******************
**************"
7020 PRINTPL$(I)
7022 PRINT@160,"*****************
***************"
7025 IFI=1THENGOSUB1500
7026 IFI<9ANDI<>1ORI=15THEN GOSU
B1650
7027 IFI>8ANDI<>15THENGOSUB1600
7040 IFO=3THENPRINT"SIDE RETIRED
":GOTO7100
7045 FORJ=4TO1STEP-1
7046 IFSC(J)>0THEN PRINTNA$(X,SC
(J));" SCORES":GOSUB1550
7047 SC(J)=0
7048 NEXTJ
7060 IFXY(4)>0THEN PRINTNA$(X,XY
(4));" ON THIRD BASE"
7070 IFXY(3)>0THEN PRINTNA$(X,XY
(3));" ON SECOND BASE"
7080 IFXY(2)>0THEN PRINTNA$(X,XY
(2));" ON FIRST BASE"
7090 IF(XY(4)+XY(3)+XY(2))=0THEN
 PRINT"BASES EMPTY"
7100 PRINT@352,"****************
****************"
7110 PRINT" SCORE: ";TE$(1);" ";
RG(1);"   ";TE$(2);" ";RG(2):PRIN
T
```

```
7115 PRINT"    OUTS: ";O,"INNING     8130 PRINT KI;"STRIKE OUTS AND";
: ";IN                                   BI;"WALKS "
7120 A$=INKEY$:IF A$="" THEN 712     8135 PRINT "HIS GAME TOTAL IS";K
0                                        G(Y);"STRIKE OUTS"
7150 RETURN                          8136 PRINT "AND";BG(Y);"WALKS."
8000 CLS                             8493 IFO=3THENGOSUB1500
8010 PRINT "*********************    8495 A$=INKEY$:IF A$="" THEN 849
***********"                             5
8015 PRINT@42,"SCOREBOARD"           8499 RETURN
8020 PRINT "*********************    8500 CLS
***********"                         8510 PRINT "*********************
8025 PRINT@96,"        1 2 3 4 5     ***********"
6 7 8 9 R H  E"                      8520 PRINT "       SITUATION DISP
8030 PRINT@128,TE$(1)                LAY"
8035 FORJ=1TO9                       8522 PRINT "*********************
8040 IFJ>IN THEN8055                 ***********"
8045 PRINT@(132+J*2),RI(1,J)         8525 PRINT "    OUTS:";O;"      I
8050 NEXTJ                           NNING:";INN
8055 PRINT@152,RG(1):PRINT@154,H     8530 A$=CHR$(143+16)
G(1):PRINT@157,EG(1)                 8540 J=XY(3):IFJ=0THEN8560
8060 PRINT@160,TE$(2)                8545 J=LEN(NA$(X,XY(3)))
8065 FORJ=1TO9                       8550 PRINT@143-J/2,NA$(X,XY(3))
8067 IFJ=IN AND X=1THEN8085          8560 PRINT@174,A$
8070 IFJ>IN THEN8085                 8570 J=XY(4):IFJ=0THEN8590
8075 PRINT@(164+J*2),RI(2,J)         8575 J=LEN(NA$(X,XY(4)))
8080 NEXTJ                           8580 PRINT@262-J/2,NA$(X,XY(4))
8085 PRINT@184,RG(2):PRINT@186,H     8590 PRINT@293,A$
G(2):PRINT@189,EG(2)                 8600 J=XY(2):IFJ=0THEN8620
8090 PRINT@192,"*****************    8605 J=LEN(NA$(X,XY(2)))
***************"                      8610 PRINT@280-J/2,NA$(X,XY(2))
8095 PRINT@226,"OUTS:";O:PRINT@2     8620 PRINT@311,A$
39,"AT BAT: ";NA$(X,BA(X))           8622 J=XY(1)
8100 PRINT@256,"*****************    8625 J=LEN(NA$(X,XY(1)))
***************"                      8630 PRINT@429-J,NA$(X,XY(1))
8105 PRINT "--------INNING SUMMAR    8635 PRINT@430,A$
Y----------"                         8900 A$=INKEY$:IF A$="" THEN 890
8110 PRINTTE$(X);":";RI(X,IN);"R     0
UNS ON";HI(X,IN);"HITS"              8925 IFDE<>7ANDOF<>5THEN8990
8125 PRINT"FOR THE ";TE$(Y);" PI     8950 CLS:GOSUB3000
TCHER ";NA$(Y,10);":" .              8990 RETURN
```


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AIR TRAFFIC CONTROL
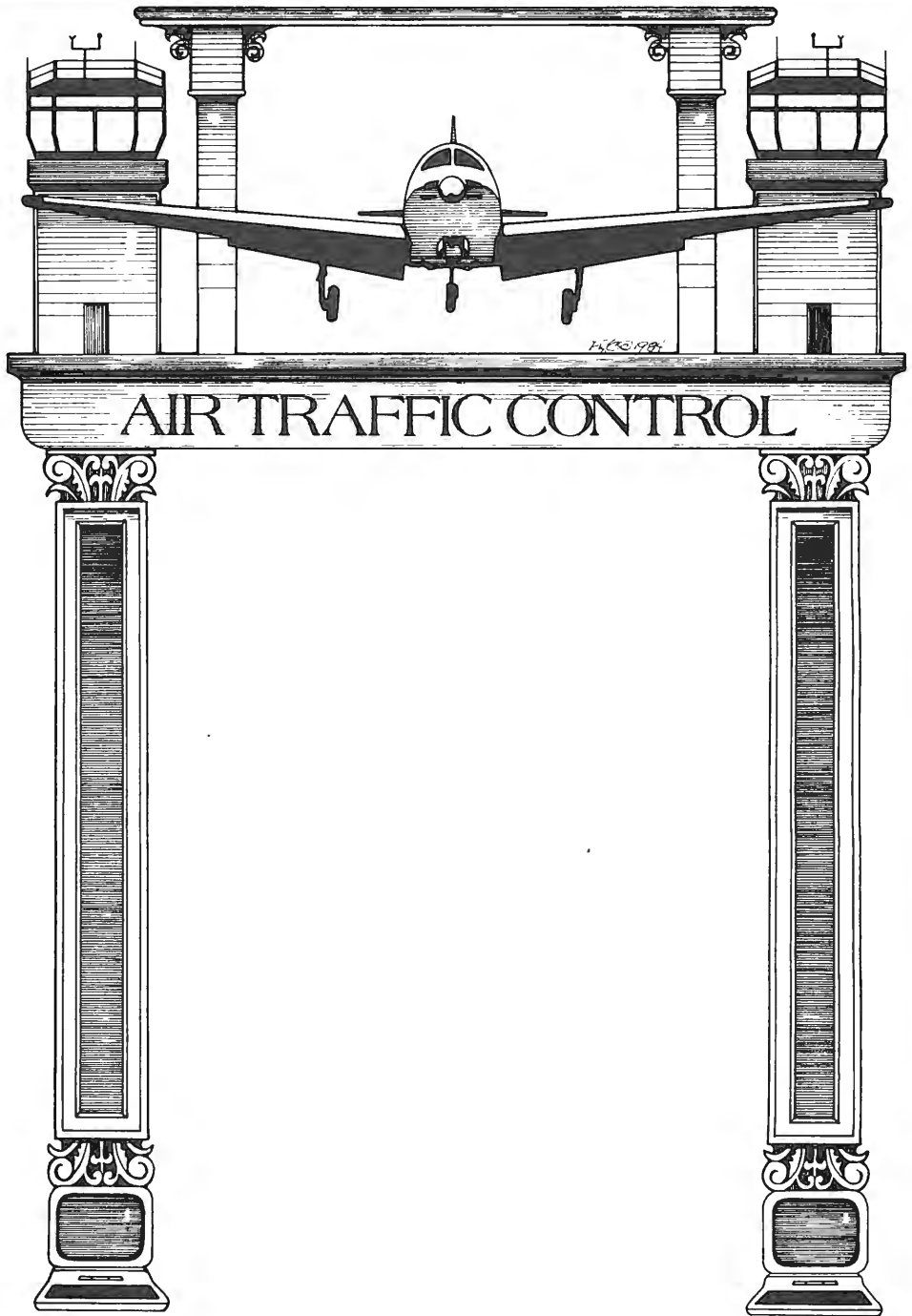
(G.K. Marek is an aerospace engineer in marketing operations for Pratt & Whitney, producers of jet aircraft engines. Along with his two sons, computers are a family hobby.)

AIR TRAFFIC CONTROLLER

G. K. MAREK

16K ECB

Those who felt the air traffic controllers were exaggerating about the skills and concentration needed for the job when they went on strike a few years ago may be in for a few surprises.

Take your seat, please, because one of the newly trained controllers called in sick today and you are the only person available for the duty.

As an air traffic controller, you are expected to safely direct several aircraft through your sector of approach to the local airport. Information is supplied to you via the monitor, which is divided into a radar display and a flight computer screen. You control the aircraft under your jurisdiction by determining their proper altitude and speed. Any misjudgement will result in mid-air crashes or missed approaches —and massive fatalities.

Before loading be sure to key in a *PCLEAR1* command. Should you get an SN Error upon typing *RUN*, simply type *RUN* again and the program will begin.

Information must be relayed between you and the pilots of incoming aircraft and between you and your computer/radar network. The computer display provides information about aircraft location, speed and status.

The top screen displays information about each aircraft, including the following:

FLT — Flight number
ALT — Altitude in thousands of feet
SPD — Aircraft speed in knots (nautical miles per hour)
RANGE — Distance from airport in nautical miles
REQUEST — Requests to controller from pilots

The lower portion of the top screen displays information from the flight computer such as which runway or transponder setting should be sent to the pilot of a given flight. It also displays the total number of aircraft under your jurisdiction. You initially will be given four airplanes and others will be added when a flight has landed until there are 10 in the air.

The bottom screen is the radar display of the ships currently in your sector. Figures along the right-hand side of the display indicate altitude (ALT) in thousands of feet. Those across the bottom indicate ground track distance from the airport (RANGE) in nautical miles. Each airplane in your sector will be displayed by its flight number.

A speed selection of from one to four determines how fast the aircraft will fly across the screen. It does not alter their flight speed in the game.

Once you have mastered the task of directing aircraft speed and separation, you have the option of advancing to another level by selecting the mode for pilot requests. During the course of flight, pilots will request information, which if supplied correctly, will give you extra points. Some of this information is readily available on your console and merely needs to be relayed to the pilot. Other data is stored in the air traffic computer and must be requested by you before forwarding to the pilot.

All aircraft enter your sector at altitudes between 6,000 and 14,000 feet, in increments of 2,000 feet (i.e., 6, 8, 10, 12 or 14). Their initial range will vary randomly between 91 and 130 nautical miles — some will appear right away, others won't be apparent until entering radar area. Aircraft speeds will always begin between 240 and 340 knots. All requests for changes in speed must be in increments of 20 knots and all changes in altitude must be in increments of 2,000 feet. Legal ranges are:

	Minimum	Maximum	Increment
Altitude	2k.	16k.	2k.
Speed	200 Kts.	360 Kts.	20. Kts.

For a safe landing, an aircraft must not be in a collision situation and must be at 2k. altitude, between 200 and 240 knots in airspeed and within six miles of the runway. The landing is credited when the controller "hands off" the aircraft to the airport tower by sending the pilot the correct tower radio frequency (see 'T' command).

All transmissions between you and the flight computer and you and the pilot are handled from the keyboard. To eliminate laborious typing, there's a simple input code. Once a keyboard entry has begun, the computer stops to receive it in its entirety, so typing speed is not a factor. These instructions are in four parts, as follow:

Part:	1	2	3	4
	AA7	D	12	Space Bar

(The translation: "American Airlines Flight 7 please Descend and maintain 12,000 feet.")

The spaces in the input code as shown above are meant to clarify the instructions and *are not* used when entering commands. The Space Bar is only used to conclude a complete instruction — the ENTER key is not used at all.

Part 1 is the flight number and is always two letters and one digit. The computer ensures that no two flights have the same flight digit, thus eliminating ambiguity on the radar display. The letters designate U.S. domestic airlines as follow:

AA	—	American Airlines
EA	—	Eastern Airlines
DL	—	Delta Air Lines
UA	—	United Airlines
AL	—	US Air
SW	—	Southwest Airlines
TW	—	Trans World Airways
PA	—	Pan Am

The computer always will expect the first three numbers to be a valid three-character flight number. Since the computer may be busy with another controller (a blue flag is displayed in the lower left corner when the computer is busy), listen for a high chirp after entering the first character and then continue once the computer has your attention (the blue flag will become a '?' when the computer acknowledges you). If an invalid number is received, the computer will give a deep aural signal and the transmission must be repeated. If the flight number is okay, the computer will wait for the other parts of the message.

Part 2 is the command mode, always a single letter that specifies what action is being indicated by the controller. Part 3 is the command detail, which specifies a numeric value for that code instruction. Part 4, the Space Bar, is used to conclude every instruction with the exception of "Hold" (H) and "Go-Around" (G). These two codes are deemed emergency measures and are performed immediately.

There are 12 valid command code/detail combinations:

DY	Descend to Alt. Y	Pilot Instruction
CY	Climb to Alt. Y	Pilot Instruction
SY	Change Speed to Y Knots	Pilot Instruction
H	Hold this Alt. & Speed	Pilot Instruction
G	Go-Around: Leave pattern	Pilot Instruction

TY	Tower radio frequency Y	Pilot Landing Clearance
AY	Airport Altimeter Y	Pilot Information
WY	Surface Winds Y	Pilot Information
QX	Query Transponder	Computer Data Request
QR	Query Runway Number	Computer Data Request
XY	Transponder setting Y	Pilot Information
RY	Landing Runway No. Y	Pilot Information

The first group of codes (D,C,S) are instructions to pilots to change altitude (D,C) or speed (S) to a new value 'Y'. 'Y' must be a legal value of altitude or speed as specified earlier. This value will appear in the "target" display as acknowledgement by the pilot and will disappear when the aircraft reaches the new condition.

The second set of codes (H,G) are also instructions to pilots but these require no argument (Part 3 or Part 4) and are executed immediately. Hold (H) maintains the present altitude/speed condition, regardless of prior instruction and should be used to stop the descent of an aircraft that might cross in front of another if the descent continued.

The Tower (T) instruction is used to "hand-off" the airplane to the control tower just prior to landing. For this to be successful the airplane must be in a safe landing status as described earlier. Once the aircraft is safely handed off, it will disappear from the screen and the score will be credited.

Special Instructions

Pilot Request Option

When pilots request wind and altimeter data, this information (which appears in the lower portion of the top screen) is simply relayed by the 'W' and 'A' commands. If the pilots request runway or transponder settings, however, the controller must first ask the flight computer for this data by using the query command before sending it to the pilots. For example:

AA7   Q   R   Space Bar

This is a request for the computer to display which runway American Flight 7 should use. Once the data is shown (supposing it was "AA717L"), the controller relays it to the pilot with "AA7 R 17L Space Bar" saying, "American Airlines 7 please land Runway 17 Left." Transponder requests are handled in a similar manner.

If a mistake is made while keying in a command, merely press the slash key '/' and re-enter the command (not the flight code). The computer will immediately detect and flag an illegal flight code.

Recognizing the diversity and multitude of instructions necessary for this program, a help screen is included. Typing a question mark, '?', will automatically display a summary of all of the instructions. In actual practice, the commands are easy to use.

Good luck and happy landings!

Scoring

Points are awarded or detracted from your score based upon the following events:

Safe Landing, four points; awarded when the aircraft has been safely handed over to the tower at the proper altitude and speed.

Go-Around, two points; awarded when an aircraft which cannot fit into the current landing pattern is instructed to make another landing attempt. This will immediately remove the aircraft from your sector and send it to another. Used to prevent serious situations when traffic cannot be safely separated.

Requests, one or two points; awarded upon correct response to pilot-requested information. Only operational if selected as game option. More difficult requests receive two points.

Overshoot, minus one point; if aircraft passes over airport without either a correct hand-over or a go-around.

Midair Crash, minus two points; deducted when two aircraft are within 10 miles of each other or have less than 2,000 feet of vertical separation (ALT). No collision can occur until both aircraft are within 90 miles of the airport in order to allow you time to maneuver positions and speeds.
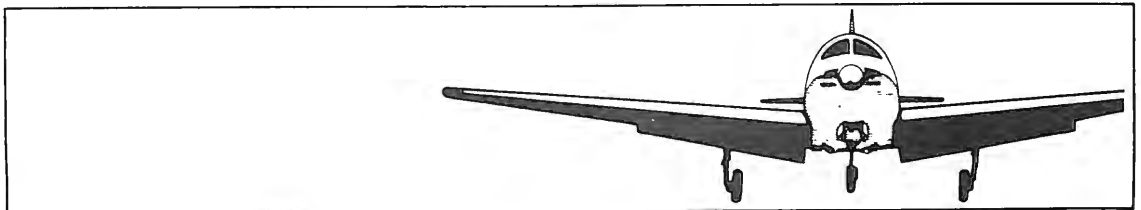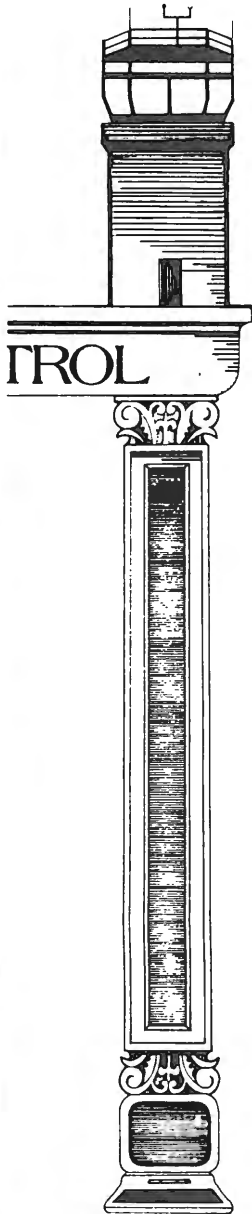
```
10 'AIR TRAFFIC CONTROL SIMULATI
ON  V2.2
20 'GEOGRAPHICS SOFTWARE (C) JAN
.,1982
30 PCLEAR 1
40 CLEAR 2000 : CLS1
50 PRINT@101,"A I R    T R A F F
I C";
60 PRINT@169,"C O N T R O L";
70 SOUND5,2:SOUND32,2:SOUND5,2:S
OUND45,4
80 PRINT@388,"ENTER SPEED LEVEL
(1-4)";
90 SOUND 200,1
100 Z$=INKEY$:X=RND(100):IF Z$="
" GOTO 100
110 IF ASC(Z$)<49 OR ASC(Z$)>52
THEN SOUND 1,3:GOTO 100
120 SL=VAL(Z$)
130 PRINT@388,"PILOT REQUESTS? (
Y OR N)         ";:SOUND 200,1
140 Z$=INKEY$:X=RND(100):IF Z$="
" GOTO 140
150 IF Z$="Y" THEN RY=1 :GOTO 17
0
160 IF Z$="N" THEN RY=0 ELSE SOU
ND 1,3:GOTO 140
170 SOUND 200,1
180 PRINT@388,"STANDBY FOR SCOPE
 DISPLAY";
190 DIM A(9,8),A$(9),RQ$(8),AR$(
9),C$(11),CH(12)
200 B$="        ":WD$="NESESWNW":B
R$=STRING$(11,191):BY$=STRING$(1
1,159)
210 FOR I=1 TO 4:G(I)=257:NEXT I
220 DATA AA,EA,DL,UA,AL,SW,TW,PA
230 RQ$(0)="        ":RQ$(1)="XP
ONDER ":RQ$(2)=RQ$(0):RQ$(4)=RQ$
(0):RQ$(6)=RQ$(0)
240 RQ$(3)="ALTIMETR":RQ$(5)="RU
NWAY  ":RQ$(7)="WINDS   ":RQ$(8)
=RQ$(0)
250 DATA H,G,D,C,S,W,X,T,Q,A,R
260 DATA 1,2,1,3,1,4,2,3,2,4,3,4
270 FOR I=1 TO 8:READ A$(I):NEXT
 I
280 FOR I=1 TO 11:READ C$(I):NEX
T I
290 FOR I=1 TO 12:READ CH(I):NEX
T I
300 FOR I=1 TO 9:AR$(I)="       "
:NEXT I
310 TA=4:GE=0:SP=50*(5-SL)
320 FOR AC=1 TO 4
330 GOSUB 370:NEXT AC
```

```
340 CL=0:GOSUB 1930:IF CL<>0 GOT
O 320
350 GOTO 540
360 '********** LOAD AIRPLANE DA
TA **********
370 AN(AC)=RND(9)
380 FOR J=1 TO 4
390 IF AN(AC)=AN(J) AND AC<>J TH
EN GOTO 370
400 NEXT J
410 AC$(AC)=A$(RND(8))+MID$(STR$
(AN(AC)),2,1)
420 A(AC,1)=4+2*RND(5): 'ALTITUD
E
430 A(AC,2)=220+20*RND(5) :'SPEE
D
440 A(AC,3)=90+RND(40) :'RANGE
450 IF TA>4 THEN A(AC,3)=99
460 IF RY=0 THEN A(AC,4)=0 ELSE
A(AC,4)=1:'REQUEST
470 A(AC,5)=A(AC,2):'SPEED TARGE
T
480 A(AC,6)=A(AC,1):'ALTITUDE TA
RGET
490 X$(AC)=MID$(STR$(100+RND(90)
+RND(10)/10),2,5)
500 RN$(AC)=MID$("10172835",(RND
(4)-1)*2+1,2)+MID$("LR",RND(2),1
)
510 IF TA>10 THEN A(AC,3)=-100:G
E=GE+1
520 RETURN
530 '********** INITIALIZE OTHER
 PARAMETERS AND SCREEN **********
*
540 W$=MID$(WD$,RND(3)*2-1,2)+MI
D$(STR$(10+RND(10)),2,2)
550 AT$=MID$(STR$(28+(13*RND(9))
/100),2,5)
560 TF$=MID$(STR$(200+RND(80)+(R
ND(8)+1)/10),2,5)
570 CLS1:C=1
580 PRINT"FLT ALT SPD RNG TARGET
  REQUEST";SL;
590 PRINT@192,"ALT:";AT$;" WINDS
:";W$;" TOWER:";TF$;
600 FOR I=1 TO 7:PRINT@510-32*I,
USING"##";I*2;:NEXT I
610 PRINT@224,STRING$(32,201);
620 FOR I=1 TO 9 : PRINT@479+3*I
,100-I*10;:NEXT I:PRINT"A";
630 '********** READ KEYBOARD **
********
640 TIMER=0
650 T$=""
660 GOSUB 1280 :'READ FLT NO.
670 PRINT@480,"?";
680 T$=T$+Z$
690 IF LEN(T$)=1 THEN SOUND 250,
1
700 IF LEN(T$)<>3 GOTO 660
710 AC=0
720 FOR I=1 TO 4
730 IF T$=AC$(I) THEN AC=I
740 NEXT I
750 IF AC=0 THEN SOUND 1,3 : GOT
O 650
760 GOSUB 1280 :'READ COMMAND CO
DE
770 CN=0
780 FOR I=1 TO 11
790 IF Z$=C$(I) THEN CN=I
800 NEXT I
810 IF CN=0 THEN SOUND 1,3:GOTO
650
820 IF CN<3 THEN PRINT@480,CHR$(
143);:GOTO 930
830 GOSUB 1280: 'READ COMMAND DE
TAILS
840 IF Z$=CHR$(32) GOTO 880: 'EN
D WITH BLANK
850 IF Z$="/" THEN SOUND 200,1:T
$="XXX":SOUND220,1:SOUND200,1:GO
TO760
860 IF CN<6 AND (ASC(Z$)>57 OR A
SC(Z$)<48) THEN SOUND 1,3:GOTO 6
50
870 T$=T$+Z$:GOTO 830
880 PRINT@480,CHR$(143);
890 T$=RIGHT$(T$,LEN(T$)-3)
900 IF CN<6 THEN T=VAL(T$)
910 '********** PROCESS CHOSEN C
OMMAND **********
920 '          H   G   D   C
 S   W   X   T   Q   A
R
930 ON CN GOTO 940,950,1010,1030
,1050,1070,1090,1110,1190,1230,1
250
940 A(AC,5)=A(AC,2):A(AC,6)=A(AC
,1):SOUND 200,1:GOTO 1260
950 PRINT@32*AC+5,B$;B$;B$;"GOOD
 DAY";
960 PRINT@G(AC),CHR$(143);:SOUND
 50,1:SOUND75,1:SOUND50,1
970 FOR J=1 TO 500:NEXT J:PRINT@
32*AC,STRING$(32,143);
980 SC=SC+2 :TA=TA+1
```


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```
990 GOSUB 370:CL=0:GOSUB 1930:IF
  CL<>0 GOTO 990
1000 GOTO 1260
1010 IF T<2 OR T>16 OR INT(T/2)*
2<>T OR T>=A(AC,1) THEN SOUND 1,
3:GOTO 650
1020 A(AC,6)=T :SOUND 200,1: GOT
O 1260
1030 IF T<2 OR T>16 OR INT(T/2)*
2<>T OR T<=A(AC,1) THEN SOUND1,3
:GOTO 650
1040 A(AC,6)=T :SOUND 200,1: GOT
O 1260
1050 IF T<200 OR T>360 OR INT(T/
20)*20<>T OR T=A(AC,2) THEN SOUN
D1,3:GOTO 650
1060 A(AC,5)=VAL(T$):SOUND 200,1
:GOTO 1260
1070 IF T$=W$ AND LEFT$(AR$(AC),
1)="W" THEN A(AC,4)=A(AC,4)+1:SC
=SC+1:SOUND 200,1:GOTO 1260
1080 SOUND 1,3:GOTO 1260
1090 IF T$=X$(AC) AND LEFT$(AR$(
AC),1)="X" THEN A(AC,4)=A(AC,4)+
1: SC=SC+2:SOUND 200,1:PRINT@16
4," ";B$;B$;:GOTO 1260
1100 SOUND 1,3:GOTO 1260
1110 IF A(AC,1)=2 AND A(AC,3)<=6
 AND T$=TF$ AND A(AC,2)<=240 GOT
O 1130
1120 SOUND1,3 : GOTO 1260
1130 SC=SC+4:TA=TA+1
1140 PRINT@32*AC+5,B$;B$;B$;"GOO
D DAY"
1150 FOR J=1 TO 10:SOUND180,1:SO
UND220,1:NEXT J
1160 PRINT@32*AC,STRING$(32,143)
;:PRINT@G(AC),CHR$(143);
1170 GOSUB 370:CL=0:GOSUB1930:IF
  CL<>0 GOTO 1170
1180 GOTO 1260
1190 IF LEFT$(T$,1)="X" THEN PRI
NT@164,"**";AC$(AC);":";X$(AC);"
**       ";
1200 IF LEFT$(T$,1)="R" THEN PRI
NT@164,"**";AC$(AC);":";RN$(AC);
"**       ";
1210 SOUND 200,1
1220 GOTO 1260
1230 IF T$=AT$ AND LEFT$(AR$(AC)
,1)="A" THEN A(AC,4)=A(AC,4)+1:S
C=SC+1:SOUND 200,1:GOTO 1260
1240 SOUND 1,3:GOTO 1260
1250 IF T$=RN$(AC) AND LEFT$(AR$
(AC),1)="R" THEN A(AC,4)=A(AC,4)
+1:SC=SC+2:SOUND 200,1:PRINT@164
," ";B$;B$;:GOTO 1260
1260 GOTO 640
1270 '********** READ KEYBOARD -
  CALL INSTRUCTION SCREEN *******
***
1280 Z$=INKEY$
1290 IF TIMER>50 AND LEN(T$)=0 T
HEN GOSUB 1340
1300 IF Z$="" GOTO 1280
1310 IF Z$="?" GOTO 2050 :Z$=""
1320 RETURN
1330 '********** PROCESS CALCULA
TIONS AND SCREEN UPDATES *******
***
1340 C=C+1:IF C=5 THEN C=1
1350 PRINT@480,CHR$(175);
1360 IF RND(5)<>1 GOTO 1420
1370 Y$=MID$(STR$(RND(9)),2,1)
1380 ON RND(3) GOTO 1390,1400,14
10
1390 MID$(W$,4,1)=Y$:PRINT@211,Y
$;:GOTO 1420
1400 MID$(AT$,5,1)=Y$:PRINT@200,
Y$;:GOTO 1420
1410 MID$(TF$,5,1)=Y$:PRINT@223,
Y$;:GOTO 1420
1420 IF GE>=4 GOTO 1710
1430 IF C<>1 GOTO 1470 :'FOR C=1
 TO 4
1440 CL=0 :GOSUB 2000
1450 IF CL<>0 GOSUB 1790
1460 IF GE>=4 GOTO 1710
1470 IF A(C,3)=-100 GOTO 1700
1480 A(C,3)=A(C,3)-A(C,2)/SP
1490 IF A(C,3)>100 GOTO 1700
1500 IF A(C,2)<>A(C,5) THEN A(C,
2)=A(C,2)+20*SGN(A(C,5)-A(C,2))
1510 IF A(C,1)<>A(C,6) THEN A(C,
1)=A(C,1)+SGN(A(C,6)-A(C,1))
1520 AR$(C)=RQ$(A(C,4))
1530 IF RY<>1 GOTO 1570
1540 IF A(C,3)<60 AND A(C,3)>55
AND A(C,4)<3 THEN A(C,4)=3
1550 IF A(C,3)<40 AND A(C,3)>35
AND A(C,4)<5 THEN A(C,4)=5
1560 IF A(C,3)<20 AND A(C,3)>15
AND A(C,4)<7 THEN A(C,4)=7
1570 PRINT@32*C, AC$(C);:PRINTUS
ING"####";A(C,1);A(C,2);INT(A(C,
3));:PRINT" ";
1580 IF A(C,1)<>A(C,6) THEN PRIN
T USING"##";A(C,6); ELSE PRINT "
  ";
1590 PRINT"#";
1600 IF A(C,2)<>A(C,5) THEN PRIN
T USING"###";A(C,5); ELSE PRINT
"   ";
1610 PRINT " ";AR$(C)
1620 PRINT@G(C)," ";
1630 PR=480-32*(INT(A(C,1)/2))+I
NT(30*(1-A(C,3)/100))
1640 IF A(C,3)>1 THEN PRINT@PR,U
```

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```
SING"#";AN(C);:G(C)=PR:GOTO 1700
1650 PRINT@32*C+5,BY$;"  **OVERS
HOOT**";:SOUND50,1:SOUND25,1:SOU
ND50,1:SOUND25,1:SOUND50,1
1660 FOR J=1 TO 1000:NEXT J
1670 SC=SC-1:PRINT@32*C,STRING$(
32,143);
1680 PRINT@G(C),CHR$(143);:TA=TA
+1
1690 AC=C:GOSUB370:CL=0:GOSUB193
0:IF CL<>0 GOTO 1690
1700 'NEXT C
1710 PRINT@280,"SCORE";:IF TA>10
 THEN X=10 ELSE X=TA
1720 PRINT@312,"<";:PRINT USING"
###";SC;:PRINT">";
1730 PRINT@187,"AC:";
1740 PRINT@190, USING"##";X;
1750 PRINT@480,CHR$(143);:TIMER=
0
1760 IF GE>=4 GOTO 2220
1770 RETURN
1780 '********** PROCESS MIDAIR
COLLISION **********
1790 SC=SC-2:TA=TA+2
1800 PRINT@32*CH(CL)+5,BR$;"MIDA
IR COLLISION";
1810 PRINT@32*CH(CL+1)+5,BR$;"MI
DAIR COLLISION";
1820 PRINT@G(CH(CL)),CHR$(191);
1830 PRINT@G(CH(CL+1)),CHR$(191)
;
1840 FOR I=1 TO 10:SOUND50,1:SOU
ND250,1:NEXT I
1850 FOR J=1 TO 1000:NEXT J
1860 PRINT@G(CH(CL)),CHR$(143);:
PRINT@G(CH(CL+1)),CHR$(143);
1870 PRINT@32*CH(CL),STRING$(32,
143);:PRINT@32*CH(CL+1),STRING$(
32,143);
1880 A1=CH(CL):A2=CH(CL+1)
1890 AC=A1:GOSUB 370:CL=0:GOSUB
1930:IF CL<>0 GOTO 1890
1900 AC=A2:GOSUB 370:CL=0:GOSUB
1930:IF CL<>0 GOTO 1900
1910 RETURN
1920 '********** NEW PLANE SETUP
 - COLLISION AVOIDANCE CHECK ***
*******
1930 FOR K=1 TO 11 STEP 2
1940 IF CH(K)=AC OR CH(K+1)=AC G
OTO 1950 ELSE GOTO 1960
1950 IF ABS(A(CH(K),1)-A(CH(K+1)
,1))<2 AND ABS(A(CH(K),3)-A(CH(K
+1),3))<10 AND A(CH(K),3)>0 AND
A(CH(K+1),3)>0 THEN CL=K
1960 NEXT K
1970 'PRINT#-2,CL
1980 RETURN

1990 '********** COLLISION TEST
ROUTINE **********
2000 FOR K=1 TO 11 STEP 2
2010 IF ABS(A(CH(K),1)-A(CH(K+1)
,1))<2 AND ABS(A(CH(K),3)-A(CH(K
+1),3))<10 AND A(CH(K),3)<90 AND
 A(CH(K+1),3)<90 AND A(CH(K),3)>
0 AND A(CH(K+1),3)>0 THEN CL=K :
'COLLISION
2020 NEXT K
2030 RETURN
2040 '********** CONTROLLER COMM
AND DESCRIPTION SCREEN *********
*
2050 CLS1:PRINT@5,"CONTROLLER CO
MMANDS";
2060 PRINT@36,"(PRECEDE BY FLT C
ODE)"
2070 PRINT@64,"H      HOLD PRESEN
T ALT & SPEED"
2080 PRINT@96,"G      GO AROUND-L
EAVE PATTERN"
2090 PRINT@128,"D 12  DESCEND TO
 12,000 FT."
2100 PRINT@160,"C 10  CLIMB TO 1
0,000 FT."
2110 PRINT@192,"S 240 CHANGE SPE
ED TO 240 KTS."
2120 PRINT@224,"W NE8   WIND INF
O-NORTHEAST@8KTS"
2130 PRINT@256,"X 217.1 TRANSPON
DER SETTING"
2140 PRINT@288,"Q X,R   QUERY:X-
XPONDR R-RUNWAY"
2150 PRINT@320,"A 28.87 ALTIMETE
R INFO."
2160 PRINT@352,"R 320L  RUNWAY I
NFO-320DEG,LEFT"
2170 PRINT@384,"T 224.6 CONTACT
TOWER TO LAND"
2180 PRINT@425,"AT FREQUENCY 224
.6"
2190 PRINT@482,"EXAMPLE- UA3D12
(NO SPACES)";
2200 Z$=INKEY$:IF Z$=""GOTO 2200
2210 GOTO 570
2220 PRINT@391,"G A M E   O V E
R";
2230 PRINT@418,"(PRESS ANY KEY F
OR NEW GAME)";
2240 PRINT@340,"MAX:";60+RY*40;
2250 FOR I=1 TO 200 STEP 30
2260 SOUND I,2:SOUNDI+50,1:NEXT
I
2270 FOR I=1 TO 1000:NEXT
2280 PLAY"L4;FE;L8;C;L4;D;L2;C"
2290 Z$=INKEY$:IFZ$="" GOTO 2290
2300 GOTO 40
2310 END
```

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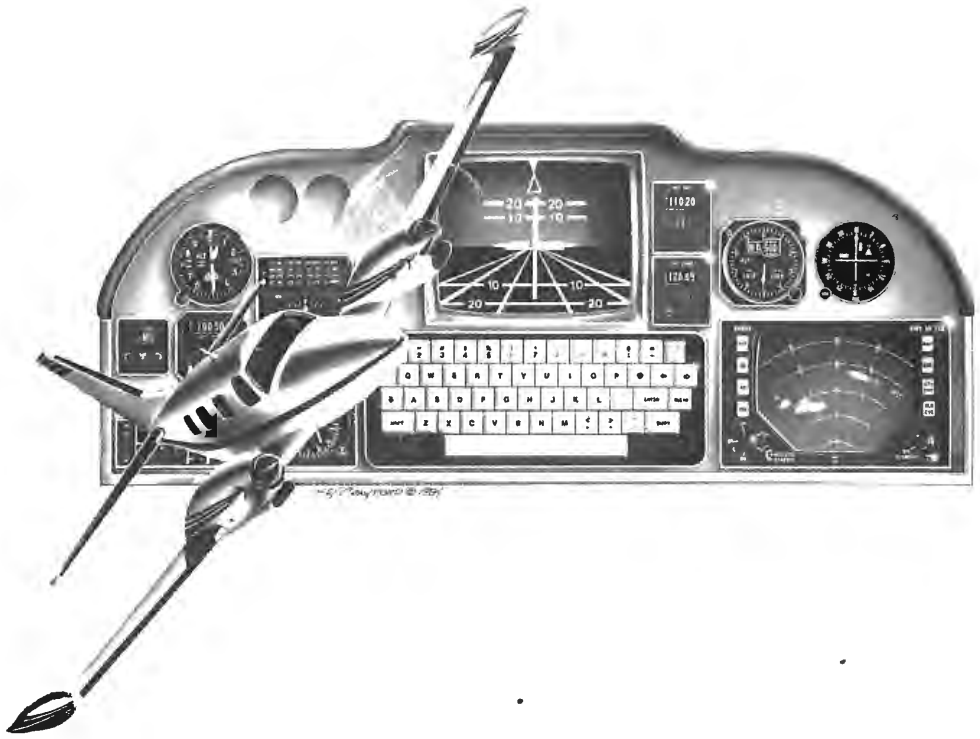
(F. W. McKenzie is currently employed as a computer salesman. He had no prior experience with computers before purchasing a Color Computer.)

FLIGHT

F. W. McKENZIE

Flight simulation programs come in a variety of formats with degrees of difficulty ranging from easy to very complex. One thing they all have in common is a strong attraction to those of us who have never learned to fly.

This one is just for fun. You must try to follow an imaginary flight path toward an airfield while maintaining enough altitude to avoid natural and man-made barriers along the way.

Part of the fun of flying is the view of the landscape, and there is plenty to see in this version, including mountains, forests and a major city skyline. But don't get carried away by the scenery, because you could get carried off in an ambulance.

Landing procedures are fairly straightforward once you spot the runway. Using the arrow keys, lower your altitude and speed simultaneously so that when you are about 100 feet above the field your speed will be approximately 100 miles per hour. Tap the Space Bar once more to cut your power and you should land safely.

While you are flying, pay particular attention to your radar, making sure that your altitude is at or above the level of the objects you are viewing from the cockpit. You don't want to crash and so you shouldn't be flying too high and fast when the runway appears.

Letting your speed get too low will cause you to stall, and dropping too low will produce the same results. If you miss the field, you may have another chance if you have conserved your fuel.

Those of you who persevere will be rewarded. It requires strategy, thinking ahead, and a little luck. The simulation requires 16K Extended BASIC, but make

sure that no string space has been cleared before running the program.

Let us give credit for the on-screen scoring routine to Charles Santee, whose article on same appeared in the April 1982 issue of THE RAINBOW. What we have done is simply repeated his scoring routine four times. You could have many more, depending on memory size. Scaling of graphics was used to produce the appearance of flight.

You are cleared for takeoff.

```
10 CLEAR950:DIMG(10)
20 GOSUB1160
30 GOTO110
40 'CHANGE ALT.,SPEED,FUEL
50 I$=INKEY$:IFI$=""THEN50
60 IF I$=CHR$(10)THEN AL=AL-150:
SP=SP+50:FU=FU-5
70 IF I$=CHR$(94)THENAL=AL+100:S
P=SP-25:FU=FU-10
80 IF I$=CHR$(32)THEN SP=SP-50:A
L=AL-100:FU=FU-5
90 IF I$=CHR$(13)THEN SP=SP+25:A
L=AL+50:FU=FU-15
100 'ZERO OUT GRAPHIC STRINGS
110 AT$="":SD$="":FL$="":RD$=""
120 'ALTITUDE GRAPHICS
130 AL$=STR$(AL)
140 LS=LEN(AL$):AL$=RIGHT$(AL$,L
S-1)
150 L=LEN(AL$)
160 FORA=1 TO L
170 N$=MID$(AL$,A,1)
180 V=VAL(N$)
190 AT$=AT$+G$(V)
200 NEXTA
210 DRAW"S4BM11,191;C5"+OG$
220 OG$=AT$
230 DRAW"BM11,191;C0"+AT$
240 'SPEED GRAPHICS
250 SP$=STR$(SP)
260 SL=LEN(SP$):SP$=RIGHT$(SP$,S
L-1)
270 M=LEN(SP$)
280 FORB=1TO M
290 K$=MID$(SP$,B,1)
300 U=VAL(K$)
310 SD$=SD$+G$(U)
320 NEXTB
330 DRAW"BM80,191;C5"+SG$
340 SG$=SD$
350 DRAW"BM80,191;C0"+SD$
360 'RADAR GRAPHICS
370 RA$=STR$(RA)
380 S=LEN(RA$):RA$=RIGHT$(RA$,S-
1)
390 P=LEN(RA$)
400 FORC=1TO P
410 D$=MID$(RA$,C,1)
420 E=VAL(D$)
430 RD$=RD$+G$(E)
440 NEXTC
450 DRAW"BM145,191;C5"+MR$
460 MR$=RD$
470 DRAW"BM145,191;C0"+RD$
480 'FUEL GRAPHICS
490 FU$=STR$(FU)
500 LF=LEN(FU$):FU$=RIGHT$(FU$,L
F-1)
510 R=LEN(FU$)
520 FORQ=1TO R
530 H$=MID$(FU$,Q,1)
540 Z=VAL(H$)
550 FL$=FL$+G$(Z)
560 NEXTQ
570 DRAW"BM207,191;C5"+OF$
580 OF$=FL$
590 DRAW"BM207,191;C0"+FL$
600 'COMPARE ALT,SPEED,FUEL
610 IF AL<0THENAL=0
620 IF AL<100 AND SP<100 THEN PO
KE65494,0:PLAY"V15L4T3P803;GL2GL
8EL4EGL4.GL8DL4DL8..EFGABL2G":CL
S:PRINT@265,"GOOD JOB":GOTO1870
630 IF AL>100 AND SP<100 THEN SO
UND 50,10:GOSUB1920:CLS:PRINT@26
5,"STALLED OUT":GOTO1870
640 IF AL<100 AND SP>150 THEN SO
UND 200,10:GOSUB1920:CLS:PRINT@2
24,"TOO LOW, YOU WERE GOING"SP"M
PH":GOTO1870
650 IF FU<10 AND AL>100 THEN SOU
ND 50,20:GOSUB1920:CLS:PRINT@265
,"OUT OF FUEL":GOTO1870
660 'COUNTER FOR TERRAINS
670 JK=JK+1
680 MT$="E6F1NL2F2E9F2NL4F2E3F2N
L4F7R2E5F2NL4F5BR4"
690 TR$="BU4NE4R4ND4R4NH4BD2BR2U
4NR4L4E4F4BD4BR4U4NR4L4E4F4BD2BR
5U4NR4L4E4F4BD7BR3U4NR4L4E4F4BD2
BR2U4NR4L4E4F4BR11"
700 BD$="U10R4U4E3F3D4R2D4R6U17E
2U2E1R1F1D2F2D11R2E4U2E1U1E1U1R1
U1R1U1R1D1R1D1R1D1F1D1F1D18R5U11
```
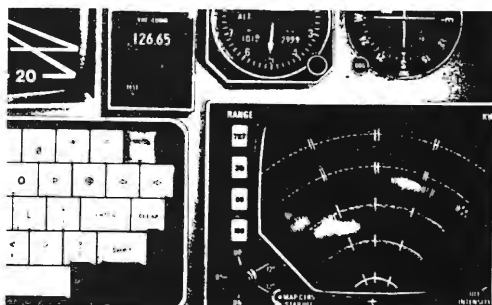
```
R1U1NU6D1R2D11BR6"
710 LD$="BR3NR6U1E1U1E1U1E1U1E1U
1R4D1F1D1F1D1F1D1F1D1L6U1BU1U1BU
1U1BU1U1BU1U1BR7R3NU2R1D1G1D3BL2
U3H1U1BD8BR7"
720 IF JK=1 THENDRAW"S16BM30,150
;C5"+MT$:RA=2400
730 IF JK=2THEN DRAW"S10BM15,95;
C5"+MT$+MT$:GOSUB1840
740 IF JK=4 THEN DRAW"S7BM8,60;C
5"+MT$+MT$+MT$:RA=1800
750 IFJK=6THEN DRAW"S7BM8,60;C0"
+MT$+MT$+MT$:GOSUB1840
760 IF JK=6 THEN DRAW"S4BM4,60;C
5"+TR$+TR$:DRAW"S4BM130,62;C5"+T
R$+TR$
770 IF JK=9 THEN DRAW"S10BM15,95
;C0"+MT$+MT$:RA=1200
780 IF JK=9 THEN DRAW"S7BM15,105
;C5"+TR$+TR$
790 IF JK=11THEN DRAW"S16BM30,15
0;C0"+MT$:GOSUB1840
800 IF JK=11 THEN DRAW"S12BM25,1
60;C5"+TR$:RA=300
810 IF JK=12 THEN DRAW"S4BM4,60;
C0"+TR$+TR$:DRAW"S4BM130,62;C0"+
TR$+TR$:GOSUB1840
820 IF JK=12 THEN DRAW"S7BM8,60;
C5"+MT$+MT$+MT$
830 IF JK=13 THEN DRAW"S7BM15,10
5;C0"+TR$+TR$
840 IF JK=13 THEN DRAW"S10BM15,9
5;C5"+MT$+MT$:RA=1200
850 IF JK=14 THEN DRAW"S12BM25,1
60;C0"+TR$
860 IF JK=14 THEN DRAW"S16BM35,1
50;C5"+MT$:GOSUB1840
870 IF JK=15 THEN DRAW"S7BM8,60;
C0"+MT$+MT$+MT$:RA=800
880 IF JK=15 THEN DRAW"S4BM8,65;
C5"+BD$+BD$:DRAW"S4BM125,65;C5"+
BD$+BD$
890 IF JK=16 THEN DRAW"S10BM15,9
5;C0"+MT$+MT$:GOSUB1840
900 IF JK=16 THEN DRAW"S4BM8,65;
C0"+BD$+BD$:DRAW"S4BM125,65;C0"+
BD$+BD$
910 IF JK=16 THEN DRAW"S8BM15,95
;C5"+BD$+BD$:GOSUB1840
920 IF JK=17 THEN DRAW"S16BM35,1
50;C0"+MT$
930 IF JK=18 THEN DRAW"S8BM15,95
;C0"+BD$+BD$
940 IF JK=18 THEN DRAW"S16BM35,1
50;C5"+BD$:RA=400
950 IF JK=19 THEN DRAW"S16BM35,1
50;C0"+BD$
960 IF JK=19 THEN DRAW"S16BM35,1
70;C5"+BD$:GOSUB1840
970 IF JK=19 THEN DRAW"S7BM8,60;
C5"+MT$+LD$:DRAW"S4BM130,60;C5"+
TR$
980 IF JK=20 THEN DRAW"S16BM35,1
70;C0"+BD$
990 IF JK=20 THEN DRAW"S7BM8,60;
C0"+MT$+LD$:DRAW"S4BM130,60;C0"+
TR$
1000 IF JK=20 THEN DRAW"S9BM8,70
;C5"+MT$+LD$:DRAW"S6BM175,70;C5"
+TR$:RA=300
1010 IF JK=21 THEN DRAW"S9BM8,70
;C0"+MT$+LD$:DRAW"S6BM175,70;C0"
+TR$
1020 IF JK=21THEN DRAW"S12BM8,90
;C5"+MT$+LD$
1030 IF JK=22 THEN DRAW"S12BM8,9
0;C0"+MT$+LD$
1040 IF JK=22THENDRAW"S14BM4,110
;C5"+MT$+LD$:GOSUB1840
1050 IF JK=23 THEN DRAW"S14BM4,1
10;C0"+MT$+LD$:DRAW"S18BM80,120;
C5"+LD$
1060 IF JK=25 THEN DRAW"S18BM80,
120;C0"+LD$:DRAW"S20BM50,130;C5"
```

```
+LD$:RA=150
1070 IF JK=26 THEN DRAW"S20BM50
,130;C0"+LD$:DRAW"S25BM38,140;C5
"+LD$:GOSUB1840
1080 IF JK=27 THEN DRAW"S25BM38,
140;C0"+LD$:DRAW"S30BM36,150;C5"
+LD$
1090 IFJK=28 THEN DRAW"S30BM36,1
50;C0"+LD$:DRAW"S35BM34,160;C5"+
LD$:RA=50
1100 IFJK=29 THENDRAW"S35BM34,16
0;C0"+LD$:DRAW"S40BM25,165;C5"+L
D$:GOSUB1840
1110 IF JK=31 THEN DRAW"S40BM25,
165;C0"+LD$:DRAW"S45BM12,169;C5"
+LD$:RA=0
1120 IF JK=33 THEN DRAW"S45BM12,
169;C0"+LD$:DRAW"S48BM1,173;C5"+
LD$
1130 IF JK=35 THEN DRAW"S48BM1,1
73;C0"+LD$:JK=16:RA=200
1140 GOTO50
1150 'TITLE PAGE
1160 PMODE4,1:PCLS(5):SCREEN1,1
1170 FT$="U6NR4U4R5BR4D10R5BR4R3
NR3U10NL3R3BR5NR5D10R5U3NL2BR4BD
3U5NR5U5BR5D10BR4BU10R3NR3D10"
1180 FORT=41TO45
1190 DRAW"C0S12BM"+STR$(T)+","+S
TR$(T)+FT$
1200 NEXTT
1210 CR$="NR5U10R5BR5ND10R5D10NL
5BR5U10F1D1F1D1F1D1F1D1F1D1R1U10
BR5R3NR3D10BR8U10R5D4G1L4F5BR5NR
5U10R5D10BR5NU10R4"
1220 FORT=31TO35:FORTX=121TO125
1230 DRAW"S12BM"+STR$(T)+","+STR
$(TX)+CR$
1240 NEXTTX:NEXTT
1250 ME$="U8R4D3G1NL3F1D3NL4BR6U
4H1U1H2BR6G2D1G1BR9BD4R4U3H1L3U4
R4BR3D4NE4ND4F4BR3NU8BR3U4NR4U4R
4ND4BR3NR4D4ND4R4U4BR8ND8F3E3ND8
BR2D2R2BU2NL2BR2D4NE4ND4F4BR3NR4
U4NR3U4R4BR3ND8F2D1F2D1F2U8BR3R6
G2D1G2D1G2R6BR3NU8BR3NR4U4NR3U4R
4"
1260 DRAW"S8BM25,188;C0"+ME$
1270 JK=0
1280 FORG=0TO9:READG$(G):NEXTG
1290 TI=RND(-TIMER)
1300 AL=(RND(10)+25)*100:SP=(RND
```
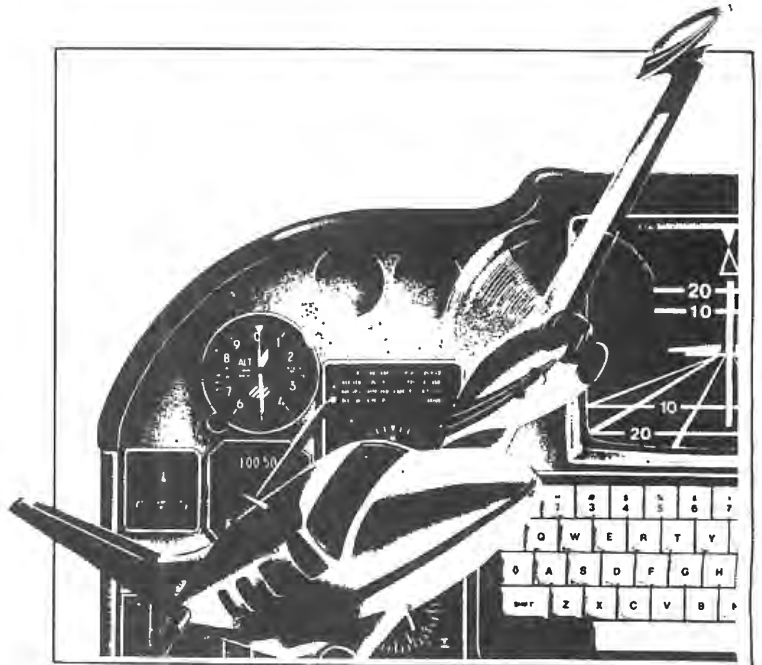
```
(10)+40)*10:FU=(RND(10)+20)*10:R
A=2200
1310 PLAY"V17L45T3P903;AL4DL8FL3
FP8L8E-DCL4.DE-EFL8GL8B-L2B-P8L8
O4CO3B-GL2.F"
1320 'COMMAND PAGE
1330 PMODE4,1:SCREEN0,0:PCLS0:CL
S:PRINT@8,"FLIGHT CONTROL"
1340 PRINT"YOU ARE THE PILOT OF
A SMALL"
1350 PRINT"AIRCRAFT WHICH IS ON
FINAL"
1360 PRINT"APPROACH. FUEL IS LOW
, YOU MAY"
1370 PRINT"ONLY GET ONE CHANCE T
O LAND."
1380 PRINT"YOUR RADAR SHOWS THE
ALTITUDE"
1390 PRINT"OF OBJECTS AHEAD; HOW
EVER,ITS"
1400 PRINT"RANGE IS LIMITED; IF
YOU ARE"
1410 PRINT"TOO LOW AND CAN'T GET
 ALTITUDE,"
1420 PRINT"YOU WILL CRASH. TRY T
O STAY LOW"
1430 PRINT"BUT ABOVE OBJECTS AHE
AD":PRINT
1440 PRINT"  LAND AT 100'-100MPH
 APPROX"
1450 PRINT"  1-HI SPEED**2-REGUL
AR SPEED"
1460 I$=INKEY$:IFI$=""THEN1460
1470 IFI$="1"THEN HI=65495 ELSEH
I=65494
1480 POKE HI,0
1490 CLS:PRINT@8,"<COMMAND LIST>
":PRINT
1500 PRINT"<UP ARROW> INCREASE A
LTITUDE,   DECREASE SPEED":PRINT
1510 PRINT"<DOWN ARROW> DECREASE
 ALTITUDE, INCREASE SPEED":PRINT
1520 PRINT"<SPACE BAR> DECREASE
SPEED,      DECREASE ALTITUDE":PR
INT
1530 PRINT"<ENTER> INCREASE SPEE
D AND ALTI-TUDE":PRINT
1540 PRINT"     PRESS ANY KEY TO
START"
1550 'DRAW GAME SCREEN,SET VAR.
1570 LINE(0,174)-(256,174),PSET
1580 CIRCLE(128,41),160,5,.1,.50
1590 PAINT(128,176),5,5
1600 A$="U5E1R2F1D2NL4D3BR4NU6R3
BR4U6NL2R2BR4D6BR7U6NL2R2BR4D5F1
R2E1U5BR4D6R3E1U4H1L3BR8NR3D3NR3
D3R3"
1610 DRAW"S4BM5,182;C0"+A$
1620 S$="R3E1U2L4U2E1R3BR4ND6R3F
```

```
1D2G1NL3BD2BR5NR3U3NR3U3R3BR4NR3
D3NR3D3R3BR4NR3U6R3F1D4G1"
1630 DRAW"BM80,182;C0"+S$
1640 F$="U3NR3U3R3BR4D5F1R3E1ND1
U5BR4NR3D3R3BR4NU6R3BR2"
1650 DRAW"BM210,182;C0"+F$
1660 RR$="U6R3D2G1L2F3BR4U6R4D3N
L4D3BR4U6R3F1D4G1BR5U6R4D3NL4D3B
R4U6R3D2G1L2F3"
1670 DRAW"BM148,182;C0"+RR$
1680 FORST=1TO70:AR=RND(256):SR=
RND(25):PSET(AR,SR,5):NEXTST
1690 FORMO=1TO5:CIRCLE(20,12),MO
,5:NEXTMO
1700 IF INKEY$=""THEN1700
1710 'GOTO GAME SCREEN
1720 SCREEN1,1
1730 'NUMBERS
1740 DATA"BR4U6R4D6L4BR7"
1750 DATA"BR4NU6BR4"
1760 DATA"BR3BU6R3D2G3D1R3BR4"
1770 DATA"BR3BU6R2F1D2NL3D2G1NL2
BR5"
1780 DATA"BR3BU6D3R3NU3D3BR4"
1790 DATA"BR4BU6NR3D3R3D3NL3BR4"
1800 DATA"BR3BU5NE1D2NR3D3R3E1U1
H1NL3BD3BR4"
1810 DATA"BR3BU6R3D6BR4"
1820 DATA"BR3BU6NR4D3NR4D3R4NU6B
D6BR4"
1830 DATA"BR3BU6NR3D3R3NU3D3BR4"
1840 IFRA>AL THEN FOR H=50TO90:S
OUND(H),1:NEXTH:GOSUB1920:CLS:PR
INT@225,"YOU HAVE TO FLY OVER OB
STACLES":PRINT@257,"YOU CRASHED
AT"SP"MPH":PRINT@289,"OBSTACLE W
AS AT"RA"ALTITUDE":GOTO1870
1850 RETURN
1860 ' END OF GAME,REPLAY
1870 PRINT@454,"FLY AGAIN? [Y/N]
"
1880 I$=INKEY$: IF I$=""THEN1880
1890 IF I$="Y"THEN CLEAR:RESTORE
:GOTO10
1900 POKE65494,0
1910 IF I$<>"Y"THEN END
1920 PCLS:PMODE4,1:SCREEN1,1
1930 FOREX=1TO95STEP5:CIRCLE(128
,96),EX,5:SOUND(EX+50),1:NEXTEX
1940 POKE65494,0:PLAY"V15L4T2P40
3;EL8.EL8EL4EL8.GL8F#L8.F#L8EED#
L4E"
1950 RETURN
1960 'FLIGHT CONTROL
1970 'FLIGHT SIMULATOR
1980 'COPYRIGHT 1983
1990 'BY F.W.'SKIPP' MCKENZIE
2000 '4 MILL LANE
2010 'SAUGERTIES,N.Y. 12477
```
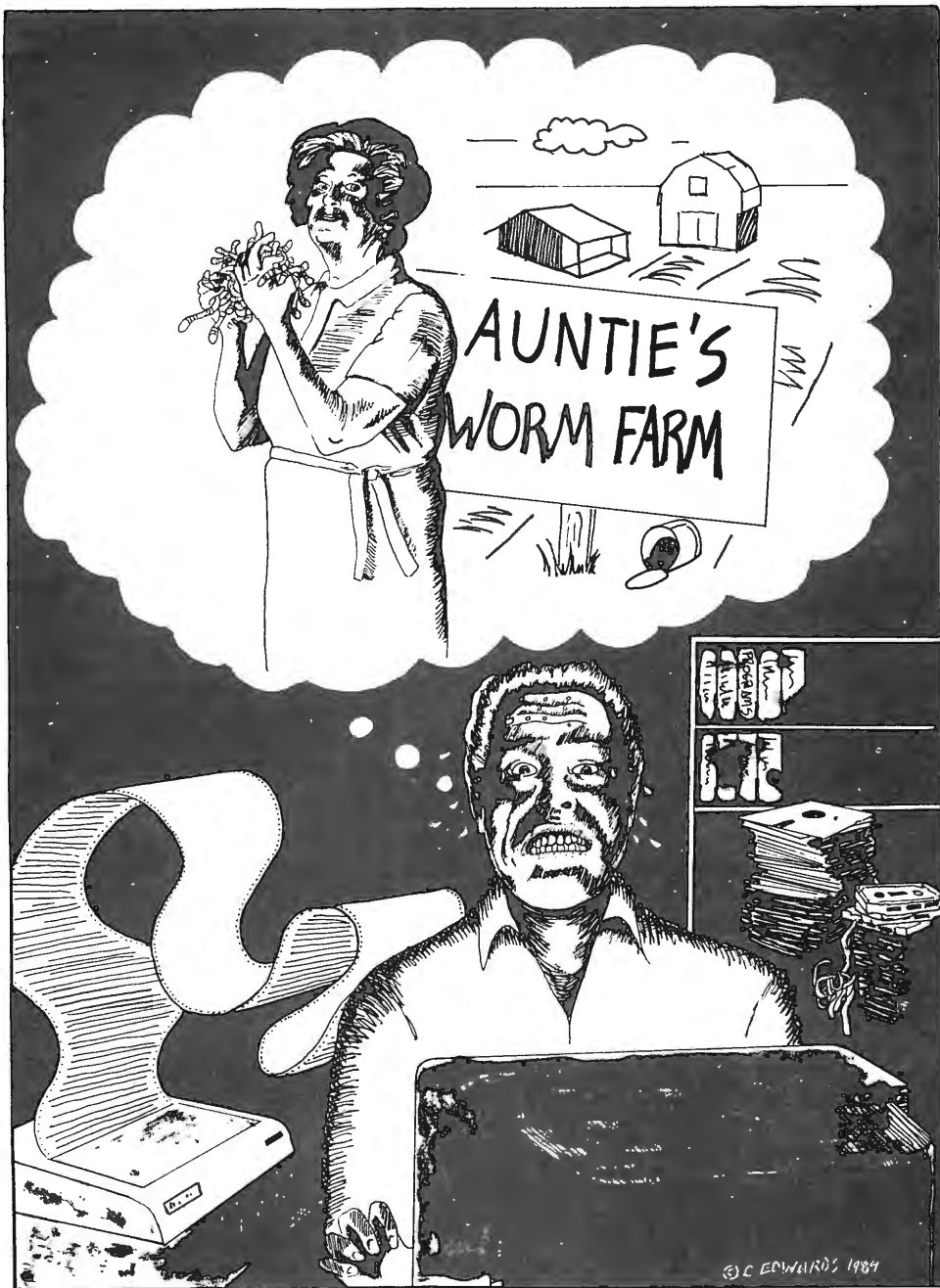
(Pat Pugliano, a junior high teacher, has degrees in both English and Speech
Communications. "Life with CoCo" is Pat's first major program, although he is
in the process of developing two others. His wife and son, reading and writing,
sports and, of course, CoCo, keep him busy.)

LIFE WITH COCO

PAT PUGLIANO

Remember when you opened the carton containing your brand new Color Computer a while back: How your nervousness and apprehension were balanced by feelings of anticipation and promise?

You really didn't know much about computers — just that you felt you wanted your family prepared for the future when four out of every five or so jobs will require some level of computer familiarity.

Aunt Clara was there, asking the irritating question that hounded you in all of the computer stores from the beginning of your search: "What are you going to use it for?"

Your favorite aunt is justified in asking the question, remember, because it was that wadded-up roll of bills she stuck in your palm on your birthday that really made it possible for you to take the plunge.

Now that you spent almost every spare moment hovered over the keyboard for several months, Aunt Clara is calling almost every other night, quizzing you about your progress. She is honestly concerned about your well-being and the only way you're going to get her off your case is to get CoCo to bring in some money.

The object of this Simulation is to earn a living in the computer marketplace for one year. Fortunately, your Aunt Clara will be happy to take you in if you fail. Unfortunately she lives on a worm farm in Vermont and thinks computers are evil. If you go live with her you can raise all the slimy little things your heart desires, but your computer, your magazines, and your software will be sold to buy worm feed.

Now that you are properly motivated you must get organized, because you've got

a lot of work to do before becoming self-sufficient. First, you must decide how to use your time each day. Four hours are required for bathing, cleaning, eating, running errands, etc. The other 20 hours may be spent sleeping, visiting the computer store, working at the grocery and, of course, hacking on your computer.

You begin with $200, a 16K CoCo with cassette base, and a number of great ideas. Remember to keep up your health by eating well and getting plenty of sleep. Remember, too, that the landlord is fed up with CoCo nuts and will be happy to throw you out if your $150 rent is overdue.

Before you do anything, however, be sure to key in a *PCLEAR1* before running the program.

Your job at the grocery doesn't give you the personal satisfaction of the computer but it does pay $5 per hour. The boss likes you so much he pays you daily and lets you work as many hours as you want.

You can earn more money by selling your computer work, especially utilities and magazine articles. As your knowledge increases, you may eventually write your own book on the Color Computer.

One of the keys to unlocking the road to riches is a working knowledge of assembly language, so don't neglect this fertile ground in cultivating your knowledge base. Be patient because it takes a while to catch on to assembly language.

You can buy a number of items at CoCo Gold, the local computer store. A trip to the store takes two hours out of your day. You don't need to buy every item in the store. You may want to check the newspapers daily for special sales. Upgrades, extra peripherals, and new software are inevitable for CoCo lovers.

If you manage your time wisely, are thrifty with the money you earn, buying the extra equipment you really need, and pay your bills on time, you will become famous. RAINBOW Magazine will be pleading to publish those articles you've written, such as "The Origin of BS Errors," "1001 Uses for a Dead Z-80," and "Storing 500 Cassettes in a Shoebox." You may even wind up marketing your own Color Computer — a 128K, 400-color monster with 512- x 768-pixel resolution, a hard double-disk drive, and a built-in monster.

But if you wind up spending too many nights working into the wee hours of the morning on your computer, eating greasy hamburgers instead of decent meals, forgetting to sleep, winding up tired at work, you can kiss your CoCo goodbye. Aunt Clara will expect you to spend all of your time digging worms. Her disk drive is pulled by a mule and there are no resets or breaks except for dinner and supper.

```
5 REM PCLEAR1 ON 32K MACHINE
10 REM 'LIFE WITH COCO'
12 REM LOAD AS 'COCOLIFE'
20 REM BY PAT PUGLIANO
            TIMBER RIDGE DRIVE
            BADEN, PA. 15005
            412  869-4812
30 REM JULY 1983
50 CLS:PRINT"****WELCOME*TO*THE*
WORLD*OF*****
```

```
60 FORR=32TO63:PRINT@R,CHR$(RND(
128)+127);:NEXT
70 PRINT"*******LIFE***WITH***CO
CO*********";
80 FORR=96TO127:PRINT@R,CHR$(RND
(128)+127);:NEXT
90 PRINT"PCLEAR/PCOPY/RND/CSAVEM
/IO ERRORTIMER>LEFT$>MID$>RIGHT$
>STRING$>
100 FORR=192TO255:PRINT@R,CHR$(R
);:NEXT
110 PRINT"CVN-COS-SGN-INT-LOG-SI
N-VAL-LOF-";
120 FORR=1TO32:PRINTCHR$(90+R);:
NEXT
130 PRINT"CIRCLE<PAINT<SCREEN<PL
AY<PRESET<";
140 PRINT"DSKINI;DSKI$;LOADM;KIL
L;MKN$;DIR";
150 FORR=33TO64:PRINTCHR$(R);:NE
XT
160 PRINT"TRON.TROFF.IF.THEN.EIT
HER.OR.AND";
170 PRINT"VARPTR,,HEX$,FC,FO,FM,
FN,FSERROR";
180 PRINT"   <press any key to co
ntinue>";
190 I$=INKEY$
200 IFI$="" THEN 190
210 FORR=508TO1STEP-1:PRINT@R,CH
R$(32);:NEXT
220 CLS:PRINT"     WELCOME TO TH
E WORLD OF":PRINT@40," LIFE WITH
  COCO.
230 PRINT:PRINT"DO YOU NEED INST
RUCTIONS Y/N ?"
240 I$=INKEY$
250 IFI$="" GOTO240
260 IFI$="N" THEN500
270 POKE359,60:CLS:PRINT:PRINT"T
HE MAIN OBJECT OF THE GAME IS   T
O EARN A LIVING IN THE COMPUTERM
ARKET PLACE FOR ONE YEAR. ;
275 PRINT:PRINT"YOU'LL DO THIS B
Y SELLING THE    SOFTWARE AND ART
ICLES YOU CREATETO DIFFERENT COM
PANIES.":GOSUB2670
280 PRINT:PRINT"FORTUNATELY, YOU
R AUNT CLARA    WILL BE HAPPY TO
 TAKE YOU IN IF YOU SHOULD FAIL.
290 GOSUB2670
300 PRINT"UNFORTUNATELY, AUNT CL
ARA LIVES ON A WORM FARM IN VERM
ONT AND    THINKS COMPUTERS ARE E
VIL.
310 PRINT:PRINT"IF YOU GO TO LIV
E WITH HER, YOU WILL  BE TAKEN C
ARE OF AND YOU  MAY RAISE ALL TH
E SLIMY LITTLE    THINGS YOUR HEAR
T DESIRES, BUT   YOUR COMPUTER, Y
OUR BOOKS, AND    YOUR SOFTWARE WI
LL BE SOLD TO    BUY WORM FEED.
320 GOSUB2670
330 PRINT"YOU MUST DECIDE HOW TO
 USE YOUR TIME EACH DAY. FOUR HO
URS ARE    REQUIRED FOR BATHING,
CLEANING, EATING, RUNNING ERRAND
S, ETC.
```
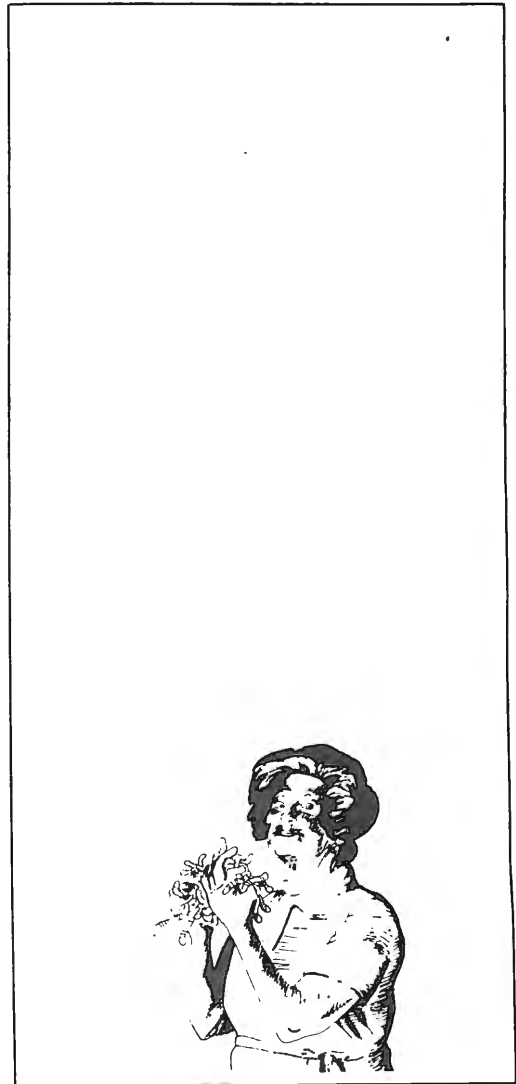
```
340 PRINT:PRINT"THE OTHER 20 HOU
RS MAY BE SPENT SLEEPING, VISITI
NG THE COMPUTER STORE, WORKING A
T THE GROCERY   MARKET AND, OF C
OURSE, WORKING  ON YOUR COCO.
350 GOSUB2670
360 PRINT:PRINT"THE MARKET IS NO
T COMPUTER WORK BUT IT DOES PAY
$5 PER HOUR.    THE BOSS LIKES Y
OU SO MUCH HE   PAYS YOU DAILY A
ND LETS YOU WORKAS MANY HOURS AS
 YOU WANT.
370 GOSUB2670
380 PRINT"YOU EARN MORE MONEY BY
 SELLING  YOUR COMPUTER WORK, ES
PECIALLY   THE UTILITIES AND ARTI
CLES.":PRINT:PRINT"AS YOUR KNOWL
EDGE INCREASES,    YOU MAY EVENT
UALLY WRITE YOUR   OWN BOOK ON C
OCO OR BE INVITED   TO HELP OTHER
 COCO DEVELOPMENT .LABS.
389 GOSUB2670
390 PRINT:PRINT"IT TAKES A GREAT
 DEAL OF TIME    TO LEARN ASSEMBL
Y LANGUAGE.      BE PATIENT AND D
ON'T BREAK       THE COMPUTER."
392 PRINT:PRINT"LEARNING AS MUCH
 AS POSSIBLE     ABOUT ASSEMBLEY
LANGUAGE IS      REALLY THE KEY F
OR PLAYING           'LIFE WITH C
OCO'.":GOSUB2670
400 PRINT"YOU CAN BUY A NUMBER O
F ITEMS    TO SPEED UP YOUR WORK
AND HELP   YOU LEARN ASSEMBLY LAN
GUAGE AT   COCO GOLD, THE LOCAL C
OMPUTER    STORE.  A VISIT HERE T
AKES TWO   HOURS.
405 PRINT:PRINT"YOU DON'T NEED T
O BUY EVERY ITEMIN THE STORE.  Y
OU'LL LEARN     WHICH TO BUY FRO
M EXPERIENCE.":GOSUB2670
410 PRINT:PRINT"YOU CAN FIND OUT
 IF COCO GOLD   IS HAVING A SALE
 BY BUYING THE   LOCAL PAPER.  OT
HER ITEMS OF     INTEREST IN PLAN
NING YOUR DAY   MAY ALSO BE FOUN
D IN THE PAPER.":GOSUB2670
420 PRINT"REMEMBER TO KEEP UP YO
UR HEALTH BY EATING AND SLEEPING
 ENOUGH.
 430 PRINT:PRINT"ALSO REMEMBER TH
AT YOUR LANDLORDIS FED UP WITH C
```



```
OCONUTS AND WILLBE HAPPY TO THRO
W YOU OUT IF THE$150 RENT IS OVE
RDUE.":GOSUB2670
435 PRINT"THE GAME IS OVER WHENE
VER:        1   THE RENT IS OVERDU
E.          2   YOU'RE OUT OF MONE
Y.          3   YOU COLLAPSE FROM
NOT EATING      OR SLEEPING ONCE
TOO OFTEN. 4   365 DAYS ARE COMPL
ETED.       5   YOU FINISH THE COC
O PROJECT.
441 GOSUB2670:PRINT"AT THE END O
F EACH GAME YOUR   SCORE WILL B
E DISPLAYED, ALONG   WITH A COMME
NT.":PRINT
442 PRINT"WITH A LITTLE LUCK AND
 SKILL,    AT THE END OF THE GAME
 YOU'LL    HAVE YOUR OWN WORKING
LAB AND    BE HAPPILY SET FOR LIF
E!
444 GOSUB2670
450 PRINT:PRINT"YOU START OUT WI
TH $200, A 16K  COCO WITH CASSET
TE BASE, AND A   NUMBER OF GREAT
IDEAS.
455 PRINT:PRINT"THE GAME WILL SP
EED UP AS YOU    PLAY ALONG, ESPE
CIALLY AFTER      90 DAYS.":GOSUB2
670
460 CLS:PRINT@100,"WOULD YOU LIK
E TO REVIEW              THE DIRECTI
ONS Y/N ?
470 I$=INKEY$
480 IFI$="" THEN470
490 IFI$="Y" THENRUN270
495 POKE359,126
500 X=RND(10):Y=RND(10):Z=RND(10
):T=1:OO=RND(300)+300
510 CLS:DIMC$(45),M(38),B$(11),B
(11),A$(21),A(21),Y$(22),S$(26),
S(26):GOSUB960:RESTORE
520 CC=1:B$(1)="FROGLEGS":FORR=2
1TO37:M(R)=RND(8):NEXT
530 DA=1:CA=200:RE=RND(10)+10
540 IFS$(1)="" THEN 550 ELSE GOS
UB3200
550 X=RND(10):Y=RND(10):Z=RND(10
):GOSUB2700
560 IFX=Y+Z THEN 3250
565 IFAA$="YOUR BOOK" AND Z=5 TH
EN GOSUB4120
570 IFX>5 ANDDA=>90 THENGOTO3810
580 PRINT@160,"DO YOU WISH TO PA
Y THE RENT      TODAY? Y/N
590 I$=INKEY$
600 IFI$="" THEN 590
610 IFI$<>"Y" THEN640
620 IFCA<150 THEN CLS:SOUND1,1:P
RINT"THIS ISN'T A CHARITY, FRIEN
```

```
D!!":FORR=1TO900:NEXT:GOTO640
630 CA=CA-150:RENT=30+RE
640 PRINT@160,"DO YOU WANT TO BU
Y THE PAPER     TODAY?  Y/N
650 I$=INKEY$
660 IFI$="" THEN 650 ELSE IF I$=
"Y" THEN CA=CA-1:GOSUB2830 ELSEY
=RND(5):X=RND(7):F=0:GOTO670
670 PRINT@160,"DO YOU WISH TO SE
E WHAT YOU HAVEPURCHASED SO FAR?
 Y/N"
680 I$=INKEY$
690 IFI$="" THEN680 ELSE IF I$<>
"Y" THEN720
700 CLS:FORR=1TO20:IFA$(R)="" TH
EN NEXT ELSE PRINTA$(R):IFPEEK(1
312)=96 THEN NEXT ELSE GOSUB2670
:NEXT
710 GOSUB2670
720 PRINT@160,"WILL YOU VISIT TH
E COMPUTER      STORE TODAY? Y/N
"
730 I$=INKEY$
740 IFI$="" THEN730
750 IFI$<>"Y" THEND=0:GOTO760 EL
SED=2:CLS:GOSUB960
760 CLS:PRINT"DAY"DA,"CASH $"CA:
PRINT
770 IF D=2 THEN PRINT"YOU HAVE 1
8 HOURS TO PLAN.":ELSE PRINT"YOU
 HAVE 20 HOURS TO PLAN.
780 IFDA<4 THENPRINT: PRINT"ENTE
R THE TIME YOU WISH TO SPENDON E
ACH OF THE FOLLOWING:
790 PRINT:PRINT:INPUT" HOURS OF
SLEEPING  ";A:TA=TA+A
800 IFV>1 THEN V=V-1:GOTO840
810 INPUT" HOURS AT MARKET    ";
B
820 IFZ=X+Y THENCLS:SOUND50,1:PR
INT"WELL, SURPRISE!":PRINT:PRINT"
AUNT CLARA JUST DROPPED IN TO
SPEND THE DAY.":PRINT:PRINT"NO C
OMPUTER WORK TODAY - JUST   SOME
 GREAT HOME COOKING.":FORR=1TO80
0:NEXT:E=E+15:TA=TA+9:GOTO2640
830 IFZ=X+Y+1 AND P<1000 THENCLS
:SOUND200,1:PRINT"WELL, SOME GOO
D NEWS! A FRIEND  JUST CALLED WI
TH A TIP THAT WILLSPEED UP YOUR
ASSEMBLY LANGUAGE WORK BY"2*Z"HO
URS.":FORR=1TO800:NEXT:TI=TI+(2*
Z):P=P+(2*Z):Z=Z-2:GOTO760
840 INPUT" HOURS AT COMPUTER   ";
C
850 IFX<=8 THEN 870
860 INPUT" HELP THE NEIGHBOR   ";
F
870 PRINT:PRINT"DO YOU WISH TO C

HANGE THIS? Y/N
880 I$=INKEY$
890 IFI$="" THEN880 ELSE IFI$="Y
" THEN760
900 IFA+B+C+D+F>20 THEN SOUND1,1
:PRINT:PRINT:PRINT"ERROR - THERE
'S NOT THAT MANY        HOURS
 IN THE DAY.":FORR=1TO900:NEXT:G
OTO760
910 IF F>0 THENCA=CA+3:E=E+5
920 CA=CA+B*5
930 IFDA>5 AND DA*7>TA THENGOSUB
3060:
940 'IFD<>2 THEN 770
950 GOTO1350
960 DATA$450 DISK DRIVE,$650 DOU
BLE DISK,$ 10 AL BOOK,$ 15 AL BO
OK,$ 22 AL BOOK,$ 11 EDITOR/ASSE
MBLER,$100 EDITOR/ASSEMBLER,$ 75
 32K UPGRADE,$130 64K UPGRADE,$3
50 PRINTER,$ 23 PRINTER PAPER,$
47 WORD PROCESSOR,$ 42 CASSETTE
RECORDER,$ 55 SET OF CHIPS
970 DATA$ 14 BOX OF TAPES,$ 30 N
EWEST ARCADE GAME,$ 20 ADVENTURE
 GAME,$ 75 PRINTER STAND,$170 SP
EECH SYNTHESIZER,$ 35 CHESS GAME
980 DATABOLL WEEVILS,BS ERRORS,D
EAD Z-80'S,TYPING,PLACEKICKING,S
IMULATIONS,LEMONADE,SHOEBOXES,TA
NDY
990 DATA1001COLORS,FAST LOADS,ON
 ERROR,COLOR POKES,128K,BRITANNI
CA,SYNTHESIZER,EPROMS
1000 DATASPECTER ASSOCIATES,PRIC
KLY APPLE,THE WORKING MICRO,END
OF COT SOFTWARE,TOMMY MUCK SOFTW
ARE,E-LIGHT SOFTWARE,AADVACK 83,
FRANK'S LAB
1010 DATARAINBOW,HOT COCO,COLOR
COMPUTER NEWS,COLOR COMPUTER MAG
AZINE,68 MICRO JOURNAL,MAD MAGAZ
INE,THE NATIONAL GEOGRAPHIC,THE
MORNING MESSAGE
1020 DATAA DAY AT THE BEACH,VISI
TING SOME OLD FRIENDS,A DAY OF F
UN IN THE SUN,GOING ON A PICNIC,
A GAME OF GOLF OR HANDBALL,AN AG
ENT FROM BAT BOOKS
1030 FORR=1TO37:READC$(R):NEXT
1040 FORR=1TO22:READY$(R):NEXT
1050 IFDA<1 THEN RETURN
1060 PRINT"WELCOME TO COCO GOLD.
    CASH:":PRINT"IN STOCK TODAY
 WE HAVE:    $";CA
1070 FORR=1TO9
1080 W=RND(20)
1090 IFC$(W)="0" GOTO1080
1100 PRINT"#"W+10;:PRINT" "+C$(W
```

```
)
1110 M(R)=W
1120 C$(W)="0"
1130 NEXT
1140 RESTORE
1150 FORR=1TO29:READC$(R):NEXT
1160 RESTORE
1170 IFY>6 THEN PRINT"  sale- AL
L ITEMS"(Y-5)*10"% OFF!!!":Z=Y-5
1180 PRINT"ARE YOU BUYING TODAY?
 Y/N
1190 I$=INKEY$
1200 IFI$="" THEN1190
1210 IFI$<>"Y" THEN RETURN
1220 PRINT@448,"ENTER ITEM NUMBE
R":INPUTL
1230 IFL=24 THENGG=0
1240 IFL<11 GOTO1280 ELSE IF L>3
0 GOTO 1280
1250 IFA$(L-10)=C$(L-10) THENSOU
ND1,1: PRINT@416,"YOU ALREADY HA
VE THAT ITEM.";:FORR=1TO700:NEXT
:GOTO1220
1260 CLS
1270 FORR=1TO9:IFM(R)+10=L THEN
GOTO1290 ELSE NEXT
1280 CLS:SOUND1,1:PRINT"THAT ITE
M IS NOT AVAILABLE.":PRINT:PRINT
"COME BACK TOMORROW.":FORR=1TO90
0:NEXT:GOTO1340
1290 Z=10-Z
1300 IFY>6 THEN CA=CA-VAL(MID$(C
$(L-10),2,3))*(Z*.1): CA=INT(CA)
 ELSE CA=CA-VAL(MID$(C$(L-10),2,
3))
1310 A$(L-10)=C$(L-10)
1320 IFL<20 THEN P=P+VAL(MID$(C$
(L-10),2,3))
1330 IFCA<1 THENCLS0:SOUND1,10:P
RINT"OH NO.":PRINT"YOUR CHECK TO
 COCO GOLD BOUNCED.AUNT CLARA TO
OK CARE OF IT AND  NOW SHE'S GOI
NG TO TAKE CARE OF YOU.";:FORR=1
TO1900:NEXT:PRINT:PRINT"PERMANEN
TLY!":GOSUB2670:GOTO3320
1340 RETURN
1350 IFC<1 THENGOTO2430ELSE CLS:
 PRINT"HOW WILL YOU SPEND YOUR"C
:PRINT"HOURS ON COCO?":PRINT
1360 IFDA<4 THENPRINT:PRINT"ENTE
R THE NUMBER OF HOURS YOU    WISH
 TO USE ON EACH ACTIVITY.":PRINT
:PRINT
1370 INPUT"    STUDY COCO MAGAZIN
ES";G
1380 IFGG<>0 THEN H=0:J=0:K=0: G
OTO1400
1390 INPUT"    WORK ON A BASIC GA
ME";H
1400 INPUT"STUDY ASSEMBLY LANGUA
GE";I:TI=TI+I:P=P+I
1410 IFGG<>0 THEN 1450
1420 INPUT" WORK ON YOUR UTILITI
ES";J
1430 IFAA$="1" THEN 1440ELSEIFAA
$="YOUR BOOK" THEN 1440 ELSEIFAA
$<>"" THENINPUT"       WORK ON YO
UR BOOK";BS:MM=MM+BS
1440 FORR=21TO29:IFM(R)<80 THEN
1445 ELSE NEXT:K=0:GOTO1450
1445 INPUT"   WORK ON YOUR ARTICL
ES";K
1450 PRINT:PRINT"DO YOU WISH TO
CHANGE THIS? Y/N
1460 I$=INKEY$
1470 IFI$="" THEN1460
1480 IFI$="Y" THEN1350
1490 IFG+H+I+J+K+BS>C THEN SOUND
1,1:PRINT:PRINT"ERROR: YOU DON'T
 HAVE THAT MANY HOURS TO WORK ON
 COCO TODAY.":FORR=1TO900:NEXT:C
LS:GOTO1350
1500 IFG>0 THEN GOSUB3140
1510 IFZ>Y ANDZ=9 THENCLS0:SOUND
1,10:PRINT@32,"SORRY, BUT TERRIB
LE STORMS HAVE STRUCK, WIPING OU
T YOUR DAY'S    WORK ON THE COMPU
TER.":TI=TI-I:P=P-I:GOTO2400
1515 IFBS<1 THEN1550
1520 IF AA$="" THEN1550 ELSEIFMM
>50 THENCLS:GOTO1530 ELSECLS:PRI
NT@6,AA$:PRINT:FORR=1TO300:NEXT:
POKE359,60: FORR=1TO37:PRINTC$(R
);:NEXT:FORR=1TO22:PRINTY$(R);:N
EXT:FORR=1TO333:NEXT:POKE359,126
:CLS
1530 PRINT"   WORDS   WORDS   WOR
DS!!!":PRINT:PRINT"YOU HAVE SO M
ANY WORDS AND IDEASFLOATING AROU
ND IN YOUR MIND!!":PRINT:PRINT"B
UT THE BOOK'S COMING ALONG.":PRI
NT:PRINT""MM "HOURS SO FAR HAVE
GONE INTO":PRINT"        YOUR MAS
TERPIECE,":PRINTAA$
1540 PRINT:PRINT"YOU'RE ABOUT %"
INT(MM/OO*100):PRINT"FINISHED WI
TH THE BOOK.":GOSUB2670:IFMM=>OO
 THEN 3510
1550 IFH<1 THEN1670
1560 CLS:IF CC>9 THENSOUND1,5: P
RINT"THE MARKET IS FLOODED WITH
GAMESAT THIS TIME.   NO ONE IS BU
YING.":GOSUB2670:GOTO1670 ELSEPR
INT"YOU HAVE"H"HOURS TO WORK":PR
INT"ON YOUR GAME IDEAS.":PRINT:P
RINT"       BASIC GAMES:":FORR=1T
OCC:PRINT" "B$(R):NEXT
1570 PRINT:INPUT"WOULD YOU LIKE
```

```
TO START WORK ON ANOTHER GAME  Y
/N";I$:IFI$<>"Y" THEN 1590 ELSEP
RINT: INPUT"ENTER THE NAME OF YO
UR NEW GAME";I$
1572 IFI$="" THEN I$="NONAME"+ST
R$(CC)
1580 CC=CC+1:B$(CC)=I$
1590 CLS:PRINT"YOU HAVE"H"HOURS
TO WORK.":PRINT:PRINT"GAME","HOU
RS SPENT":FORR=1TOCC:PRINTR;B$(R
),B(R):NEXT
1600 PRINT:PRINT:INPUT"WHICH GAM
E WILL YOU WORK ON";R
1605 FORR=1TOCC:IFB(R)<35 THEN G
OTO1610 ELSE NEXT
1607 SOUND1,3:PRINT:PRINT:PRINT"
THERE ARE NO GAMES TO WORK ON.":
GOTO1660
1610 IFR<1 THEN 1590  ELSE IF B(
R)>35 THEN CLS:SOUND1,1:PRINT"TH
AT GAME IS ALREADY FINISHED.":GO
SUB2670:GOTO1590
1620 B(R)=B(R)+H:IFB(R)<35 THEN
1670
1630 CLS:SOUND200,3:PRINT"CONGRA
TULATIONS. YOUR GAME,",B$(R),;"I
S FINISHED."
1640 OI=RND(10)*50
1650 PRINTY$(RND(8)):PRINT"THINK
S IT'S TERRIFIC AND WANTS  TO BU
Y IT NOW!":PRINT"HERE'S A CHECK
FOR $"OI:CA=CA+OI
1660 GOSUB2670
1670 IFI<1 THEN 1800
1680 IF TI<20 GOSUB2970 ELSE IF
TI> 250 GOTO 3530 ELSECLS:PRINT"
UNTIL YOU LEARN MORE ASSEMBLY
LANGUAGE YOU'LL GET VIDEO INTER-
FERENCE.":PRINT@192,"don't hit t
he break key !!":PRINT@288,"THE
MORE GARBAGE LEFT ON THE   SCRE
EN AFTER THIS INTERFERENCE
1690 PRINT@352,"THE MORE ABOUT A
SSEMBLY LANGUAGEYOU STILL HAVE T
O LEARN.":GOSUB2670
1700 M=RND(200)+55:CLS:POKE65497
,0:FORR=1088TO15504-INT(TI*1.65):
POKER,M:NEXT:POKE65496,0
1710 PRINTTI"HOURS SPENT SO FAR
STUDYING   ASSEMBLY LANGUAGE
1720 GOSUB2670
1730 CLS
1740 IFA$(1)="" AND A$(2)="" THE
N PRINT"DISK DRIVES
1750 FORR=3TO5:IFA$(R)=C$(R) THE
N NEXT ELSE PRINT"ASSEMBLY LANGU
AGE BOOKS":GOTO1760
1760 IFA$(6)="" AND A$(7)="" THE
N PRINT"EDITOR/ASSEMBLERS
1770 IFA$(9)="" THEN PRINT"MORE
MEMORY
1780 IFPEEK(1024)<>96 THEN PRINT
:PRINT"THESE ITEMS WOULD MAKE ST
UDYING ASSEMBLY LANGUAGE MUCH SI
MPLER." ELSE GOTO 1800
1790 GOSUB2670
1800 IFJ<1 THEN 2060
1810 IFTI >100 THEN 1850 ELSECLS
:PRINT"YOU HAVE SOME GREAT IDEAS
, BUT   YOU'LL NEED TO KNOW MORE
ABOUT   ASSEMBLY LANGUAGE TO WORK
ON     THESE UTILITIES.
1820 IF TI>50 THENPRINT:PRINT"BE
PATIENT.YOU ARE LEARNING,    BU
T IT TAKES TIME.":FORR=1TO500:NE
XT
1830 IFTI>75 THENPRINT:PRINT"YOU
ALMOST KNOW ENOUGH! GOOD,  KEE
P ON COMPUTING!":FORR=1TO500:NEX
T
1840 GOTO2050
1850 CLS:IF EE> 2 THEN 1960 ELSE
PRINT"  UTILITIES UNDER PROGRESS
:"
1860 PRINT:PRINT"1 1001 COLORS I
N PMODE4
1870 PRINT:PRINT"2 LOAD PROGRAMS
AT FAST FORWARD    SPEEDS
1880 PRINT:PRINT"3 'ON ERROR GOT
O' ROUTINE
1890 PRINT:PRINT"4 CONVERTING MO
DEL III POKES TO    THE COLOR COM
PUTER
1900 PRINT:PRINT"5 MERGING TWO C
OCOS TO PRODUCE     A 128K MACHIN
E
1910 GOSUB2670
1920 CLS:PRINT"6 INTERFACING YOU
R COCO TO THE       BRITANNICA
1930 PRINT:PRINT"7 A MUSICAL SYN
THESIZER CAPABLE    OF ADDRESSING
510 TONES
1940 PRINT:PRINT"8 CREATING YOUR
OWN EPROMS FROM    PLASTIC MILK
CARTONS
1950 GOSUB2670
1960 FORR=30TO37:IFM(R)<100 THEN
1970 ELSE NEXT:CLS:PRINT"THERE'S
REALLY NO MARKET FOR    MORE UT
ILITIES NOW.":PRINT:PRINT"BUT CO
ME BACK.  THERE MAY BE     WORD O
F AN OFFER COMING IN.":GOSUB2670
:IFX>6 THEN 3930 ELSE2060
1970 PRINT"UTILITY","HOURS SPENT
1980 EE=EE+1
1990 FORR=30TO37:PRINTR-29;C$(R)
,M(R):NEXT
2000 PRINT"YOU HAVE"J"HOURS TO W
```

```
ORK.":INPUT"WHICH UTILITY WILL Y
OU WORK ON";R:R=R+29
2010 IFM(R)>100 THEN CLS:SOUND1,
1:PRINT"THAT UTILITY IS ALREADY
FINISHEDAND IN THE MAIL.":FORR=1
TO900:NEXT:CLS:GOTO1960
2020 M(R)=M(R)+J:IFM(R)<100 THEN
2060
2030 CLS:SOUND200,5:PRINT"GREAT
NEWS!  YOUR UTILITY":PRINT:PRINT
C$(R):PRINT:PRINT"IS FINISHED AN
D IN THE MAIL!!":PRINT:PRINT"YOU
 SHOULD HEAR FROM ONE OF THE SOF
TWARE HOUSES WITHIN 30 DAYS.
2040 S$(T)=C$(R):S(T)=RND(30):T=
T+1:P=P+50
2050 GOSUB2670
2060 IFX<>Y OR X<>Z THEN2110 ELS
E CLS:PRINT"YOU JUST HAD A PHONE
 CALL FROM":PRINT:PRINTY$(RND(8)
):PRINT:PRINT"THEY WANT YOU TO F
LY OUT TO MAKEA SPEECH ON":PRINT
:PRINTC$(RND(17)+20):PRINT:PRINT
"THEY'LL PAY $"X*100" FOR"X"DAYS
 OF YOUR TIME.":PRINT
2070 SOUND200,5:FORR=1TO900:NEXT
2080 PRINT"DO YOU WISH TO GO? Y/
N
2090 I$=INKEY$
2100 IFI$="" THEN 2090 ELSEIF I$
<>"Y" THEN2110 ELSE DA=DA+X:RE=R
E-X:CA=CA+(X*100):P=P+50:E=E+(X*
5):TA=TA+(X*8):CLS:GOTO540
2110 IFK<1 THEN2430
2120 IFDA>7 THEN2250 ELSE CLS:PR
INT"    ARTICLES UNDER PROGRESS
2130 PRINT:PRINT"1 USE OF COCO I
N MAPPING MIGRA-    TORY PATTERNS
 OF BOLL WEEVILS
2140 PRINT:PRINT"2 THE ORIGIN OF
 BS ERRORS
2150 PRINT:PRINT"3 1001 USES FOR
 A DEAD Z-80
2160 PRINT:PRINT"4 TYPING ERRORS
 I HAVE KNOWN AND   LOVED
2170 PRINT:PRINT"5 PLACEKICKING
YOUR COCO AND        OTHER 2:00 A
M ADVENTURES
2180 GOSUB2670
2190 PRINT"    ARTICLES UNDER PR
OGRESS
2200 PRINT:PRINT"6 HOW TO WRITE
SIMULATIONS FOR     THE 'RAINBOW'
2210 PRINT:PRINT"7 POKING, PEEKI
NG, LEMONADE AND    OTHER KEYBOAR
D ENTRIES
2220 PRINT:PRINT"8 STORING 500 C
ASSETTES IN A       SHOEBOX
2230 PRINT:PRINT"9 TANDY AND THE
```

```
        SERIOUS COLOR      COMPUTER - A
      THREE ACT FARCE
2240 GOSUB2670
2250 CLS:PRINT"ARTICLE","HOURS S
PENT
2260 IF FF<>0 THEN PRINT"YOU'LL
HAVE TO SEND OUT THE     FIRST A
RTICLE BEFORE YOU START  ON ANOT
HER.":GOSUB2670:GOTO2320
2270 FORR=21TO29:PRINTR-20;C$(R)
,M(R):NEXT
2280 PRINT:PRINT"YOU HAVE"K"HOUR
S TO WORK.":PRINT:INPUT"WHICH AR
TICLE WILL YOU WORK ON";R:IFR<1
THEN 2250 ELSE IF R>9 THEN 2250
ELSER=R+20
2290 IFM(R)>80 THEN CLS:SOUND1,1
:PRINT"YOU COMPLETED THAT ARTICL
E SOME TIME AGO.  TRY ANOTHER ON
E.":GOSUB2670:GOTO2250
2300 M(R)=M(R)+K:IFM(R)<80 THEN
2430
2310 FF=R:O=RND(8)
2320 IFA$(10)="" THEN  CLS:PRINT
"THE ARTICLE":PRINTC$(FF):PRINT"
LOOKS GOOD!":PRINT:PRINT"IN FACT
, IF YOU HAD A DECENT   PRINTER
 TO MAKE A GOOD COPY":PRINTY$(O)
:PRINT"WOULD BUY IT IMMEDIATELY.
":GOSUB2670:GOTO2430
2330 IFA$(11)="" THEN CLS:PRINT"
NOW, IF YOU ONLY HAD PAPER!":GOS
UB2670:GOTO2430
2340 IFA$(12)="" THEN CLS:PRINT"
NOT BAD, NOT BAD!":PRINT:PRINT"B
UT YOUR WORK WOULD BE EASIER TOS
ELL WITHOUT ALL THOSE ERRORS.":P
RINT:PRINT"A WORD PROCESSOR WOUL
D CERTAINLYHELP YOU.":GOSUB2670:
GOTO2430
2350 CLS:SOUND200,5:PRINT"CONGRA
TULATIONS":PRINT"THE ARTICLE ON"
:PRINTC$(FF):PRINT"IS FINISHED":
PRINT:PRINT"IN FACT,"Y$(RND(8)):
PRINT"WANTS IT IMMEDIATELY!!":PR
INT"HERE'S THEIR CHECK FOR $"O*1
50:CA=CA+(O*150):FF=0:M(38)=M(38
)+1
2360 IFAA$="YOUR BOOK " THEN2400
 ELSEIFM(38)<6 THEN2400
2370 GOSUB2670:IFAA$<>"" THEN 24
00 ELSECLS:SOUND200,10:PRINT"YOU
'VE DONE AN OUTSTANDING JOB  WIT
H YOUR WRITING!":PRINT"IN FACT,
 ITS ABOUT TIME YOU     STARTED W
ORK ON YOUR OWN BOOK!":FORR=1TO9
00:NEXT:PRINT:INPUT "  WHAT WILL
 YOU NAME YOUR BOOK";AA$
2380 CLS:PRINT"YOU REALIZE THAT
A PROJECT AS    DIFFICULT AS A BO
OK WILL TAKE A GREAT DEAL OF TIM
E.":PRINT:PRINT"THE PROFITS MAY
BE GREAT, BUT    EVEN A GOOD ROUG
H DRAFT WILL     TAKE HUNDREDS OF
 HOURS.
2390 PRINT:PRINT"WELL, GOOD LUCK
 WITH":PRINTAA$
2400 GOSUB2670
2430 CLS:IFDA>7 AND DA*3>E THENC
LS0:SOUND1,3:PRINT"YOU'RE LOOKIN
G RUN DOWN.":PRINT@96,"YOU SHOUL
D TRY TO KEEP BETTER    DINING HA
BITS.":GOSUB2670:GOSUB2920
2440 IFC>16 THEN GOSUB3790
2450 IFRE=X+Y+Z THENCLS:SOUND200
,2:PRINT"AN OLD FRIEND WANTS TO
TAKE YOU OUT TO DINNER AND TALK
ABOUT":PRINTB$(RND(CC)):PRINT:PR
INT"YOU CAN'T BEAT THAT!":FORR=1
TO500:NEXT:PRINT"FREE FOOD AND G
OOD TALK!":FORR=1TO400:NEXT:E=E+
12:P=P+X:CLS:GOTO2650
2460 CLS:PRINT@12,"EATING
2470 PRINT:PRINT"1   $2    GRAB A
 BITE AT HOME.
2480 PRINT:PRINT"2   $3    TRY MAC
'S GREASE BIN.
2490 PRINT:PRINT"3   $7    HAVE A
DECENT MEAL OUT.
2500 PRINT:PRINT"4   $15   INDULGE
 IN LUXURY.
2510 IFX>8 THEN PRINT:PRINT"5
   DINE WITH YOUR NEIGHBOR.
2520 PRINT:PRINT:PRINT"    WHAT
WILL YOU DO TODAY?
2530 I$=INKEY$
2540 IFI$="" THEN2530
2550 R=VAL(I$)
2560 IFR>5 THEN 2400
2570 IFR=5 AND X<8 THEN CLS:SOUN
D1,2:PRINT"YOU AREN'T INVITED TO
DAY.":FORR=1TO900:NEXT:GOTO2460
2580 IFR=5 ANDF<1 THEN CLS:SOUND
1,2:PRINT"YOU EXPECT HER TO FEED
 YOU      WITHOUT WORKING?  COME
ON!!":FORR=1TO900:NEXT:GOTO2460
2590 IFR=1 THENCA=CA-2:E=E+1
2600 IFR=2 THENCA=CA-3:E=E+2
2610 IFR=3 THENCA=CA-7:E=E+4
2620 IFR=4 THENCA=CA-15:E=E+7
2630 IFR=5 THENE=E+7
2640 CLS
2650 F=0:DA=DA+1:RE=RE-1:IFDA>36
5 THEN 3320 ELSE GOTO540
2660 END
2670 PRINT@480,"  <PRESS ANY KEY
 TO CONTINUE>  ";
2680 I$=INKEY$
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2690 IFI$="" THEN2680 ELSE CLS:R
ETURN
2700 PRINT"DAY "DA,"CASH $"CA,"R
ENT DUE IN "RE" DAYS"
2710 IFRE=>1 THEN 2760 ELSESOUND
1,12: PRINT:PRINT"IT APPEARS THA
T YOUR RENT IS    OVERDUE.":PRIN
T:FORR=1TO999:NEXT: PRINT"UNFORT
UNATELY, YOUR LANDLORD HASEVICTE
D YOU AND HAS THROWN YOUR BELONG
INGS INTO THE STREET.":GOSUB2670
2720 PRINT"FORTUNATELY, DEAR AUN
T CLARA     FOUND OUT ABOUT YOUR
PROBLEMS    AND RACED OVER.  SHE'
S WAITING   NOW IN HER BROWN PICK
UP.":GOSUB2670
2730 PRINT"UNFORTUNATELY, SHE'S
SOLD YOUR   COMPUTER AND ALL RELA
TED ITEMS   TO BUY WORM FEED.":GO
SUB2670
2740 PRINT"FORTUNATELY, THE TWO
OF YOU NOW HAVE ALL THE WORM FEE
D YOU'LL    EVER NEED.":GOSUB2670
2750 GOTO2775
2760 IFCA>1 THEN RETURN ELSE CLS
0:SOUND1,10:PRINT"WELL, WHAT CAN
I SAY?":PRINT@96,"YOU'RE BROKE"
:PRINT@160,"HOPE YOU LIKE WORMS!
"
2770 PRINT@224,"YOU LASTED"DA"DA
YS AND WOUND UP   $"CA-(2*CA) "IN
THE HOLE.":GOSUB2670
2775 GOTO3320
2780 PRINT@320,"WOULD YOU LIKE T
O PLAY AGAIN Y/N
2790 I$=INKEY$
2800 IFI$="" THEN2790
2810 IFI$="Y" THEN RUN460 ELSE C
LS:PRINT"WELL!!":PRINT:PRINT"IF
THAT'S THE WAY YOU FEEL...":FORR
=1TO555:NEXT:SOUND4,8
2820 CLS0:END
2830 Z=RND(10):Y=RND(10):X=RND(1
0)
2840 CLS:PRINTSTRING$(32,42):PRI
NT:PRINT@32,"IN 'THE MORNING MES
SAGE' TODAY:":PRINT
2850 IFZ>7 THEN PRINT"CHANCE OF
THUNDERSTORMS.":PRINT
2860 IFY>6 THEN PRINT"COCO GOLD
IS HAVING A SALE TODAY":PRINT
2870 IFX>8 THENPRINT"A VERY NICE
NEIGHBORHOOD LADY    NEEDS COMPU
TER INSTRUCTIONS.    SHE'LL PAY
$3 PLUS A GREAT MEAL.":PRINT
2880 IFX+Y+Z>7 THEN 2900 ELSEPRI
NTY$(RND(8)):SOUND200,8:PRINT"IS
CONDUCTING A SEMINAR AT THE  LO
CAL COLLEGE ON THE USE OF     AS
SEMBLY LANGUAGE.":PRINT"IT WILL
HELP YOU BUT WILL COST   THREE DA
YS OF YOUR TIME AND $100OF YOUR
MONEY.":PRINT
2888 FORR=1TO600:NEXT
2890 INPUT"DO YOU WISH TO GO Y/N
";I$:CLS:IFI$<>"Y" THEN RETURN E
LSE IFCA<100 THEN CLS:PRINT"SORR
Y, YOU DON'T HAVE THE MONEY.":FO
RR=1TO900:NEXT:RETURN ELSE DA=DA
+3:CA=CA-100:E=E+15:TA=TA+24:TI=
TI+50:P=P+50:GOTO540
2900 IF PEEK(1120)=96 THEN PRINT
"     NOT MUCH HAPPENING.
2910 GOSUB2670:RETURN
2920 AA=AA+1:IF AA=5 THEN GOTO29
30 ELSE RETURN
2930 CLS0:FORR=1TO555:NEXT
2940 SOUND1,12:PRINT"IT SEEMS YO
U'RE SUFFERING FROM   MALNUTRITIO
N.":PRINT@128,X "DAYS IN THE HOS
PITAL WITH     PEACE AND QUIET AR
E NEEDED.
2950 PRINT@256,"MOST OF YOUR STA
Y IS COVERED BY INSURANCE, BUT M
EDICATION COSTS ARE $"(X+Y+Z)*5"
."
2960 TA=TA+7*(X+Y+Z):AA=0:DA=DA+
X:RE=RE-X:E=DA*3:CA=CA-(X+Y+Z)*5
:GOSUB2670:GOSUB2700:GOTO580
2970 CLS:PRINT"00WELCOME TO ASSE
MBLY LANGUAGE00";:FORR=1TO21:PRI
NTRND(2)-1;:NEXT
2980 PRINT" INDEXADDRESSING TWO'
SCOMPLEMENT
2990 FORR=1TO127:PRINTCHR$(R);:N
EXT
3000 PRINT"CONDITIONCODES HEXADE
CIMAL OCTAL";
3010 FORR=128TO255:PRINTCHR$(R);
:NEXT
3020 PRINT"LEAY,+DEC,<-ORG,PSHS,
ZERO-OFFSET";
3030 PRINT"LDA/JMP/STB/INC/CLR/S
EX/RTS/LSRM";
3040 PRINT"USERSTACK-PC-U-S-X-Y-
DP-A-B-LIFO";
3050 GOSUB2670:GOTO1710
3060 CLS0:SOUND1,5:PRINT"YOU'RE
LOOKING RATHER TIRED.":PRINT@96,
"BETTER GET MORE SLEEP.":GOSUB26
70:BB=BB+1:IF BB<3 THEN940 ELSEC
LS0:PRINT"SOME NEIGHBORS FOUND Y
OU IN THE HALL,COLLAPSED.  IT SE
EMS YOU'REEXHAUSTED.
3070 IFZ<2 THENZ=2
3080 PRINT@192,Z"DAYS OF COMPLET
E REST ARE        NEEDED.":PRINT@28
8,"AUNT CLARA WILL TAKE YOU HOME
```

WITH HER AND MAKE SURE THAT
YOU'RE NOT DISTURBED BY THAT
EVIL COMPUTER.
3090 GOSUB2670:RE=RE-Z:DA=DA+Z:B
B=U:TA=DA*7+(RND(10)):E=E+(Z*3):
U=U+1:IFU>2 THEN 3100 ELSE540
3100 U=U+1:IFU>4 THEN 3110 ELSE
CLS0:PRINT"THE DOCTORS DECIDED T
O HOLD YOU FOR AN ADDITIONAL 2 W
EEKS. ONE MORE COLLAPSE AND YOU
'LL BE SENTAWAY TO THE FUNNY COC
ONUT FARM!":GOSUB2670:DA=DA+14:R
E=RE-14:GOTO540
3110 CLS0:PRINT@32,"WELCOME TO T
HE FUNNY FARM!":FORR=1TO50:SOUND
RND(255),1:NEXT:PRINT@128,"YOU C
AN FIND FELLOW COMPUTER FRIED
BRAINS EVERYWHERE!!":FORR=1TO80
0:NEXT:FORR=0TO511STEP2:PRINT@R+
1,"HA":NEXT:FORR=1TO900:NEXT:GOT
O3320
3120 IFU>3 THENCLS0:SOUND1,9:PRI
NT"YOU WERE WARNED, NOW THE BOSS
    HAS FIRED YOU!":PRINT@128,"TH
E DOCTORS ARE CONCERNED AND   HA
VE DECIDED TO KEEP YOU AN   EX
TRA WEEK.":RE=RE-7:DA=DA+7:V=300
:GOSUB2670:GOTO540
3130 IFU>2 THENCLS0:SOUND1,12: P
RINT"YOUR BOSS AT THE GROCERY IS
 FED UP WITH YOUR BEING TIRED AL
L THETIME. HE DOESN'T WANT YOU
BACK FOR 30 DAYS.":V=30:GOSUB267
0:GOTO540
3140 CLS:PRINT"IN "Y$(RND(8)+8):
FORR=0TOG:X=RND(9):IFX=Z-1 GOTO3
150:ELSE NEXT:PRINT"YOU FOUND A
NUMBER OF ITEMS OF INTEREST, BU
T NOTHING THAT WILL HELP ON YOUR
  CURRENT PROJECTS.":GOSUB2670:RE
TURN
3150 PRINT"GREAT!":PRINT"YOU FOU
ND
3160 O=RND(40):IFO>30 THEN PRINT
"AN ARTICLE WHICH WILL SPEED UP
YOUR WORK ON ASSEMBLY LANGUAGE
BY"O"HOURS.":TI=TI+O:GOTO3190
3170 IFO<10 THEN PRINT"SOME USEF
UL INFORMATION WHICH   WILL HELP
 YOUR ARTICLE ON":PRINTC$(20+X):
PRINT"BY"X+5"HOURS.":M(20+X)=M(2
0+X)+X+5:GOTO3190
3180 PRINT"ONE OF YOUR OLD GAMES
  PUBLISHED IN THE MAGAZINE. A C
HECK FOR $"O*6"IS ON THE WAY.
":CA=CA+(O*6)
3190 GOSUB2670:RETURN
3200 CLS
3210 FORR=1TOT-1:S(R)=S(R)-1:IFS

(R)>1 THEN NEXT ELSE S(R)=300:PR
INTS$(R)" IS WONDERFUL!!":NEXT
3220 IFPEEK(1024)=96 THEN RETURN
3230 O=RND(5)*500
3240 SOUND200,10:PRINTY$(RND(8))
:PRINT"LOVES THIS UTILITY!":PRIN
T"THEY SENT A CHECK FOR $"O:CA=C
A+O:GOSUB2670:RETURN
3250 FORR=1TO500:CLS:POKE359,60:
PRINT"YOUR HANDS ARE TREMBLING,
YOUR MIND IS MUSHING, AND YOUR
DREAMSARE FILLED WITH VISIONS OF
 MICROCHIPS DANCING WITH SUGAR P
LUMS.
3260 PRINT:PRINT"IN OTHER WORDS,
 YOU NEED SOME   TIME AWAY FROM
THE COMPUTER!
3270 FORR=1TO900:NEXT
3280 PRINT:PRINTY$(RND(5)+16):PR
INT"WILL ONLY COST YOU $"X:PRINT
"AND WILL DO YOU A WORLD OF GOOD
.
3290 CA=CA-X:RE=RE-1:E=E+7:TA=TA
+10:DA=DA+1:POKE359,126
3300 PRINT:PRINT"RELAX ";:FORR=1
TO666:NEXT:PRINT" YOU'LL COMPUTE
 TOMORROW.
3310 FORR=1TO800:NEXT:CLS:GOTO54
0
3320 POKE359,60:CLS0:PRINT"MY, T
HE GAME IS OVER SO QUICKLY.ISN'T
  IT AMAZING HOW RAPIDLY COMPU
TER TIME PASSES?";
3330 FORR=1TO900:NEXT
3340 PRINT@128,"NOW, AS TO HOW W
ELL YOU DID. . .";
3350 FORR=1TO900:NEXT
3360 PRINT@224,"WELL, YOUR SCORE
...";:PRINT
3370 FORR=1TO900:NEXT
3380 IFQ<1 THEN3420
3400 IFQ>17000THENPRINT"ALMOST L
OOKS LIKE THE WORK OF   AN EXPER
T!":SC=9:GOTO3450
3410 IFQ>5000THENPRINT"OH, YOU A
LMOST HAD IT!":SC=8:GOTO3450 ELS
E IF Q>1000THEN PRINT"GOOD GAME,
  PROGRAMMER!":SC=7:GOTO3450 ELSE
 IF Q>1 THENPRINT"BY GEORGE, I T
HINK YOU'RE   GETTING THE HA
NG OF IT.":SC=6:GOTO3450
3420 IFDA>250 THEN PRINT"NOW YOU
'RE GETTING THE IDEA!":SC=5:GOTO
3450 ELSE IF DA>150 THENPRINT"TH
ERE'S HOPE FOR YOU YET!":SC=4:GO
TO3450
3430 IFDA>100 THENPRINT"BEGINNIN
G TO CATCH ON, ARE YOU?":SC=3:GO
TO3450:ELSE IFDA>50 THEN PRINT"A

```
UNT CLARA IS PATIENTLY WAITING."
:SC=2:GOTO3450
3440 PRINT"YOU BELONG ON A WORM
FARM!":SC=1: IF DA<20 THEN SC=-1
3450 PRINT"ON A SCALE OF 1-10 YO
U EARNED"SC;
3460 IFQ<1 THEN3480ELSESS=1500+P
+(Q/2):IFSS>15000 THEN SS=15000
3470 GOTO3490
3480 SS=DA+(P/2): IF SS>2500 THE
N SS=2500
3490 PRINT"YOUR TOTAL SCORE IS "
SS
3500 POKE359,126:GOSUB2670:GOTO2
780
3510 CLS:SOUND130,3:SOUND200,5:P
RINT@12,"TA-DA!!":PRINTY$(22):PR
INT"IS ABSOLUTELY CERTAIN THAT":
PRINTAA$:PRINT"IS READY FOR PUBL
ICATION!":FORR=1TO800:NEXT:PRINT
:PRINT"YOUR ADVANCE CHECK IS $"1
0*00:PRINT"YOU'LL RECEIVE OTHER
CHECKS FROMTIME TO TIME,
3520 PRINT:PRINT"DEPENDING UPON
HOW WELL":PRINTAA$;:PRINT"   SELL
S":CA=CA+(10*00):AA$="YOUR BOOK"
:BS=0:GOSUB2670:GOTO1670
3530 IFII>2 THEN3610 ELSECLS:SOU
ND200,4:PRINT"WELL, IT LOOKS LIK
E YOU'RE READYFOR THE BIG TIME!"
:PRINT"YOUR KNOWLEDGE OF ASSEMBL
Y     LANGUAGE IS TO THE POINT
THAT   YOU'RE READY FOR THE ULTI
MATE  PROJECT,";:GOSUB2670
3540 IF MM<100 THEN CLS:PRINT:PR
INT"MAYBE YOU'RE NOT QUITE READY
 FORTHIS PROJECT YET.":PRINT:PRI
NT"THE EXPERIENCE OF HAVING YOUR
    OWN BOOK PUBLISHED OFTEN HELP
S. IF YOU DON'T KNOW HOW TO PUBL
ISHYET, KEEP WORKING ON ARTICLES
.":GOSUB2670:GOTO1710
3550 PRINT"THE BIG BABY,THE COCO
   DREAM. . ."
3560 PRINT"IT'S TIME TO BUILD AN
D MARKET   YOUR OWN COLOR COMPUT
ER!":PRINT:PRINT"A 128K,4000 COL
OR MONSTER WITH  512X768 RESOLUT
ION, DOUBLE DISK DRIVE AND A BUI
LT-IN MONITOR.
3570 GOSUB2670
3580 PRINT"AND YOU'RE GOING TO S
ELL IT FOR $500.":PRINT"YOU'LL M
AKE A FORTUNE!"
3590 PRINT"ALL IT WILL NEED ARE
TIME AND   MONEY.":GOSUB2670:PRI
NT:PRINT
3600 II=II+1
3610 IFQ>=40000 THENCLS:SOUND200
```

```
,5:PRINT"YOU'VE ALREADY INVESTED
 ALL THE MONEY NEEDED FOR YOUR P
ROJECT.":PRINT:PRINT"ALL YOU HAV
E TO DO NOW IS LEARN MORE ABOUT
ASSEMBLY LANGUAGE.":GOSUB2670:GO
TO3660
3620 IFP>=4000 THENCLS:SOUND200,
5:PRINT"YOU HAVE ALL THE KNOWLED
GE YOU  NEED TO COMPLETE YOUR PR
OJECT.":PRINT:PRINT"ALL THAT'S N
ECESSARY NOW IS MOREMONEY FOR PA
RTS.":GOSUB2670
3630 CLS:PRINT:INPUT"SO, HOW MUC
H MONEY CAN YOU SPARENOW FOR PUR
CHASE OF MATERIALS    $";I
3640 IFI>CA THENCLS:SOUND1,2:PRI
NT"YOU CAN'T SPEND WHAT YOU DON'
T  HAVE!":GOSUB2670:GOTO3630
3650 Q=Q+I:CA=CA-I
3660 CLS:PRINT@7,"YOUR OWN COCO"
:PRINT:PRINT"HOURS SPENT -  "P:P
RINT:PRINT"MONEY SPENT - $"Q:FOR
R=1TO900:NEXT:CLS:PRINT"IF YOUR
NEW COMPUTER IS WORKING PROPERLY
, THE SCREEN WILL CLEAR COMPLETE
LY AFTER SOME VIDEO      INTERFER
ENCE.
3670 PRINT:PRINT:PRINT"     DO N
OT PRESS ANY KEYS        DURING
 THIS INTERFERENCE,      OR YOUR
PROGRAM WILL BE GONE!!":GOSUB267
0
3680 IFP>4000 THENP=4000 ELSE IF
 Q>40000 THEN Q=40000
3690 M=RND(200)+55:KK=INT(Q/800)
+INT(P/80):IFKK>100 THEN KK=100:
M=96
3700 POKE65497,0:FORR=1024TO1524
-(KK*5):POKER,M:NEXT:POKE65496,0
:FORR=1TO900:NEXT
3710 IFKK=100 THEN3730 ELSE IFKK
>90 THENPRINT"YOU'RE ALMOST THER
E!" ELSE IF KK>70 THENPRINT"WELL
, IT'S NOT QUITE READY!"ELSE IF
KK>50 THENPRINT"MORE THAN HALF-W
AY FINISHED!"ELSE IF KK>25 THENP
RINT"YOU'VE GOT A LONG WAY TO GO
 YET!"ELSEPRINT"OK! YOU'RE OFF
3720 FORR=1TO900:NEXT:GOTO1800
3730 FORR=0TO8:CLSR:FORRR=1TO222
:NEXT:NEXT
3740 SOUND140,5:SOUND170,8:SOUND
200,12:CLS:PRINT"WELL, IT LOOKS
LIKE YOU'RE SET  FOR THE REST OF
 YOUR LIFE!!
3750 PRINT:PRINT"AT THIS VERY MO
MENT CROWDS ARE  GATHERING AT YO
UR DOOR.
3760 PRINT:PRINT"EVEN AUNT CLARA
```

DUG INTO HER   SACRED WORM FEE
D FUND TO BUY ONEOF YOUR SUPER C
OMPUTERS.
3770 PRINT"GREAT GAME, COCO CHAM
P!!
3780 GOSUB2670:PRINT"YOU WON WIT
H "365-DA"DAYS LEFT":FORR=1TO900
:NEXT
3785 PRINT"MAYBE IT SOUNDS SILLY
, BUT. . .":GOSUB2670:GOTO2780
3790 IFZ<6 THEN RETURN ELSE CLS:
SOUND1,4:PRINT"YOU KNOW YOU'RE T
AKING A CHANCE THAT COCO MIGHT O
VERHEAT WHEN   YOU USE IT THIS L
ONG.":PRINT:PRINT"IT'S A LITTLE
WARM TODAY.":GOSUB2670
3800 IFZ<>10 THEN RETURN ELSE CL
S0:SOUND1,10:PRINT"WELL, COCO JU
ST DIED FROM THE   HEAT. YOU'LL
 NEED NEW CHIPS   BEFORE YOU CA
N USE IT AGAIN.":GG=1:A$(14)="":
GOSUB2670:RETURN
3810 CLS:PRINT" DAY"DA;" RENT "R
E;" CASH $"CA:PRINT:IFDA=>200 TH
EN3850
3820 SOUND150,12:PRINT"YOU'VE BE
EN WORKING WITH COCO   LONG ENOU
GH THAT YOU CAN, AT   TIMES, ST
ART PLANNING YOUR WORK BY THE WE
EK INSTEAD OF DAILY.
3830 PRINT:PRINT"DURING THESE TI
MES,YOUR SLEEPINGAND EATING WILL
BE TAKEN CARE OF.FOOD WILL COST
YOU $40 PER WEEK.HOWEVER,THERE W
ILL BE NO WORK ATTHE GROCERY, NO
 MAIL DELIVERED, AND NO VISITING
 COMPUTER GOLD   FOR THE WEEK.
3840 GOSUB2670
3850 PRINT"DO YOU WISH TO PLAY N
OW ONE   WEEK AT A TIME? Y/N
3860 I$=INKEY$
3870 IFI$="" THEN3860
3880 IFI$<>"Y" THENCLS:PRINT"DAY
"DA,"CASH $ "CA:GOTO580
3890 C=RND(20)+90
3900 CLS:PRINT"OKAY, AFTER MAKIN
G ALLOWANCES   FOR SLEEPING AND
EATING, YOU   HAVE" C "HOURS TO
 WORK THIS WEEK
3910 DA=DA+7:RE=RE-7:E=E+22:TA=T
A+60:P=P+OO:CA=CA-40:Z=RND(4)
3920 GOSUB2670:GOTO1350
3930 CLS5:FORR=1TO444:NEXT:CLS:S
OUND200,10:PRINT:PRINT"BUT WHAT'
S THIS IN THE MAIL?":PRINT:PRINT
"GREAT NEWS!!":PRINTY$(RND(8))
3940 PRINT"WAS SO IMPRESSED BY Y
OUR WORK   ON YOUR BASIC GAME,":
PRINTB$(RND(CC)):PRINT"AND ON YO

UR UTILITY CONCERNING":PRINTC$(R
ND(8)+22)
3950 PRINT"THAT THEY WANT YOU TO
 WORK ON A SPECIAL PROJECT FOR T
HEM.
3960 PRINT:PRINT"ARE YOU INTERES
TED ? Y/N
3970 I$=INKEY$
3980 IFI$="" THEN 3970
3990 IFI$<>"Y" THEN 2060
4000 RN=RND(30):CLS:PRINT"THEIR
PROPOSAL IS RATHER SIMPLE.THEY W
ANT YOUR SERVICES FOR"RN :PRINT"
DAYS TO HELP ON A PROJECT.
4010 PRINT:PRINT"THEY'LL PAY YOU
R RENT AND FEED   YOU, AND ALSO P
AY A SALARY OF $100 A DAY.":PR
INT
4020 PRINT:PRINT"THERE MAY ALSO
BE A SMALL CHANCEOF A BONUS IF T
HE WORK GOES WELL
4030 PRINT:PRINT"WELL, ARE YOU I
NTERESTED? Y/N
4040 I$=INKEY$
4050 IFI$="" THEN4040
4060 IFI$<>"Y" THEN2060
4080 RE=RE+30:CA=CA+(RN*100):DA=
DA+RN:E=E+(5*RN):TA=TA+(7*RN)
4082 IFDA>365 THEN DA=365
4085 CLS:FORR=1TO900:NEXT:PRINT"
WELL, THAT WAS A PRETTY EASY   "
RN*100 "DOLLARS!":FORR=1TO900:NE
XT:PRINT
4090 X=RND(10):IFX<6 THEN540 ELS
ECLS:PRINT"ALL RIGHT! THE PROJE
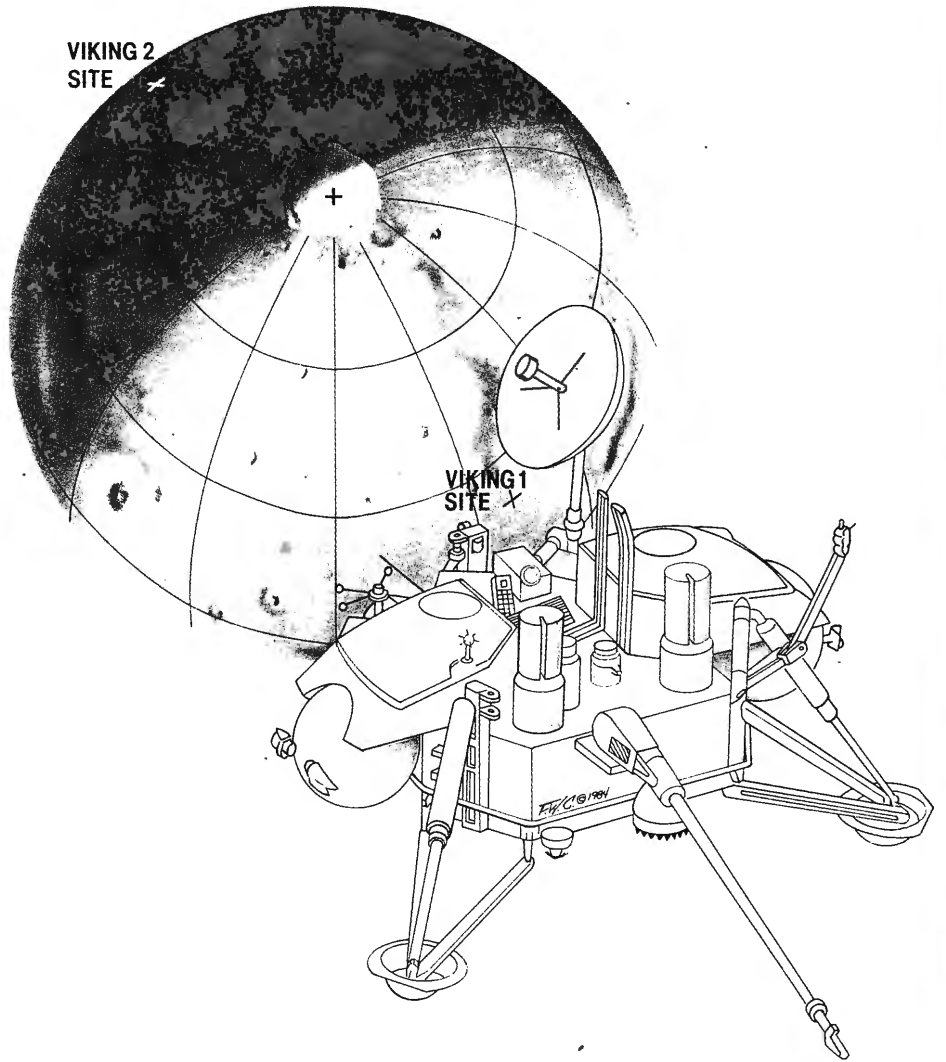CT WENT   BETTER THAN EXPECTED.
   HOW'S A   BONUS OF $"X*100 "SOU
ND?"4100 FORR=1TO900:NEXT:CA=CA+
(X*100):GOTO540
4110 GOSUB2670
4120 MM=RND(1000)+1:CLS:SOUND200
,8:PRINTY$(22):PRINT"STOPPED BY
WITH A CHECK FOR $"MM:PRINTA
A$:PRINT"SEEMS TO BE SELLING WEL
L!":GOSUB2670:CA=CA+MM:RETURN

VIKING 2
SITE

VIKING 1
SITE

(Geoffrey Stark is fifteen years old and has owned a TRS-80 Color Computer for just over a year now.)

MARS

GEOFF STARK

The crimson surface glistens with the white hints of early morning carbon dioxide frost. All instrumentation on the craft is ready and in working order, for now. You can begin your quest to search for life on Mars.

A likely introduction to a movie perhaps, but this program has been thoroughly researched to bring the most true-to-life aspects of a working robot probe.

The probe is powered by a thermonuclear reactor. The system by which power flows is called a thermocouple (a process in which electrons flow from hot to cold). One end of the electric loop is attached to the nuclear reactor and the other to the outside of the ship. The instruments on the ship are joined to this loop and are in turn "charged." Such an electric generator was used on the *Viking* landers, which had pre-programmed robots that took occasional commands from Earth. But a message from Earth takes about eight to 10 minutes at the speed of light to arrive on Mars.

In order to control a Martian probe directly you must either be on the surface or in the immediate vicinity. For this Simulation, imagine yourself in orbit around Mars. You will not be landing until the next few missions pass. However, you do have complete control of the probe.

This is a very sophisticated Simulation with several parts to most segments, so please read the instructions carefully for the six sections, which follow:

1) Press '1' to enter the visual surface scan. After viewing the surface, tap the Space Bar to exit to the command screen. Press the Space Bar again to go back to the command screen. The directional views are: N—laboratory CO_2 tanks; S—thermonuclear reactor; E—transmitter dish and sniffer; W—support shoulder; NE—short range scanner; NW—laboratory chutes; SW—support shoulder *and*

reactor; SE—sniffer and reactor.

2) Arm—The robot's arm, of course. To pick up a rock, open the claw well in advance, find a suitable specimen and maneuver the arm so the tip of the open claw comes close to touching the rock, then close the claw. A tone should sound. Press 'L' to transfer the sample to the laboratory. You cannot drop the rock unless you press 'L'. If the stone you want disappears, don't panic: you probably stirred up some dust. Command controls for the arm: I—forward; M—backward; J—left; K—right; U—up; D—down; O—open claw; C—close claw; L—transport sample to lab.

3) Diagnostic—This section is self-explanatory and is used to check up on those parts that may not be in working order.

4) Microlab—The samples you have gathered are tested here. Options: C—commands; O—let in a generous amount of oxygen; E—add a little Earth light; M—expose to Martian light and gases (also drastically reduces the temperature); H—heat coils on; G—heat coils off (coolant on); S—maintan present temperature; W—add marginal amount of mixed water and nutrients; A—analyze contents of lab; D—discard all specimens in lab (this also is the only way to return to the command page); R—return to lab visual screen.

5) Drill—A rather simple apparatus with a diamond bit. It can bore up to 1.5 meters. The drill will take a core sample 10 centimeters at the tip. To reach the permafrost you must drill over 1.2 meters (about four feet). Scientists say the permafrost could be the storage place for the planet's water and hence it's possible that life might be found there. So far no Mars mission has been successful in getting samples of the permafrost. You may use the drill five times before it shuts down.

6) Sniffer, also known as the air analyzer. Read the messages carefully, especially the wind direction. Should you get a storm warning, you could view in the direction of the wind. Don't worry about the lander being blown away. By pressing '@', you can see the chemicals in the Martian atmosphere (largely consisting of carbon dioxide).

Hint: The core sample from the drill is where you will most likely find life. Just melt the core and add a little water with some CO^2. Be sure to watch the messages in the gas analyzer while you are in the laboratory.

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Gore, Richard, *Sifting for Life in the Sands of Mars, National Geographic Magazine;* Jan. 1977, vol. 151.

Sagan, Carl, *Cosmos*, New York N.Y., Random House, 1980.

PROGRAMMING INFORMATION

Mars requires 32K Extended BASIC and can be loaded in *PCLEAR4* with no other modifications.

The program is structured so that the subroutines of a certain function are contained within the boundaries of the section. This enables the program to run faster. It also makes for easier reading for those who want to have a grasp of how a program works before keying it in.

Here's a basic outline of the simulation's structure:

0-90	Start-up
100-330	Command page
1010-1590	Robot arm
1600-2260	Diagnostic
2270-2730	Laboratory
2740-2680	Drill
2890-3150	Atmospheric probe
3160-3400	Surface string packer and landing routine
3410-3460	Ending routine

In the first and second sections you may notice a slight deviation from the normal color sets with which you may be accustomed. We wanted black, red, pink (but had to settle for blue), and white. All of the objects were drawn in *PMODE3* and then switched to *PMODE4:SCREEN1,1*. This causes a deviation of machine instructions and the colors, of course, come out quite differently. To use this subroutine in your own programs, you must use this color chart:

8 Orange — White
5 Buff — Black
6 Cyan — Blue
7 Magenta — Reddish Orange

If you draw and paint an object in orange, it will come out white in *PMODE4* with color set '0'. As for the reddish orange, on some sets it appears to be green.

The surface views appear the same if you look in the same direction twice —necessary for accuracy. Array S$(0-7) stores the screen contents for each direction. Lines 3160-3400 hold the loop routine to store all of the draw routines in the S$ array. First a random selection is made of the OB$ array of objects. A random X, Y coordinate is added to the beginning of the object and the process is repeated for another object. This string package is then transferred to S$ and the loop is repeated for each direction.

While this is happening, the landing sequence is on screen. Note that the microlab variables can be changed to suit the individual. To determine if there is life, the program section loops through an abundant supply of *IF/THEN* statements.

```
0 CLEAR2000
1 '*****MARS LANDER SIM******
2 '*MARTIAN LANDER SIMULATOR*
3 '*     BY GEOFF STARK      *
4 '*    505 DUNROBIN AVE.    *
5 '*    WINNIPEG, MANITOBA   *
6 '*      CANADA R2K OV1      *
7 '*****TO THE PEACEFUL******
8 '***EXPLORATION OF SPACE***
9 '
10 DIMS$(8),O$(6):BO$=CHR$(173)+
CHR$(174):TIMER=0:DA=1:DET=0:BA=
0:SOL=0:TA=1600:TV=200:RE$=CHR$(
191)+CHR$(191)+CHR$(191):LBB=0:F
L$="EMPTY":TN=20
20 PLAY"V30"
30 AP$(1)="H2E12R4U8E4R4U2R6D8L6
U2G4D4R3E8F4G8DR6E4L3U4R8D4L2D4G
4L12H8F8D4G12H2F2E4H8BH2H2G4F2"
40 AP$(2)="H2E12L4H4U8L2U6R8D6L2
D4F4R4D4FE4F4G4FR4D4F4R4U2R6D8L6
U2L8H4G8H2F2E4H8BH2H2G4F3"
50 CLS:PRINT@197,"IF THE FOLLOWI
NG SCREEN IS   GREY OR BLUE THEN
 RESET AND     RERUN THE CAMERA U
NTIL IT ISN'T.":PRINT@358,"PRESS
 <space> TO START THE     MISSION.
"
60 I$=INKEY$:IFI$=""THEN60
70 PMODE3,1:SCREEN1,1:PCLS7:PMOD
E4:SCREEN1,1
80 A$=INKEY$:IFA$=""THEN80:IFA$=
" "THEN90ELSE80
90 GOTO3180
100 '**COMMAND PAGE**
110 PLAY"V31;T2"
120 GOSUB190:CLS:PRINT@34,"batte
ry n. reactor   ";A$:PRINT@133,"
diag prob.   radar wrn.":PRINT@22
8,"command":PRINT@260,CHR$(134)+
"    "+CHR$(137)
130 PRINT@288,STRING$(32,BO$):PR
INT@320,"mission control:"
140 PRINT@67,BA;" %":PRINT@78,NU
C;" %":PRINT@89,DA
150 DIA=RND(40):IFDIA<2THENPRINT
@168,RE$:FORX=1TO20:PLAY"O4;L125
;1;2;3;4;5;6;7;8;9;10;11;12":NEX
TX:PRINT@388,"SUGGEST YOU DO A D
IAGNOSTICS        TEST"
160 IFDUST>35ANDWD>100THENPRINT@
180,RE$:FORX=1TO20:PLAY"O3;L10;A
D":NEXTX:PRINT@388,"SUGGEST YOU
CHECK THE WIND    DIRECTION, VIEW
 THE SURFACE AND BRACE FOR ACTIO
N."
170 SOUND150,2:PRINT@261,"";:INP
UTCOM$:IFVAL(COM$)<1ORVAL(COM$)>
6THEN170

180 ON VAL(COM$) GOTO340,1010,16
00,2270,2760,2910
190 '**NIGHT AND DAY**
200 IF TIMER>32768THEN A$="NIGHT
":CK=1:ELSEA$="DAY"
210 IFA$="DAY"ANDCK<>0THENDA=DA+
1:CK=0
220 '**NUC. REACTOR**
230 NUC=RND(70)+29:IFTIMER<32760
0AND TIMER>150000THEN NUC=NUC-15
240 '**BATTERY**
250 IF NUC>55THEN BA=RND(70)+29:
RETURN:ELSEBA=RND(50):IF DET<>0T
HENBA=BA-DET
260 IF BA<15 THEN GOTO280
270 RETURN
280 '**LOW BATTERIES**
290 CLS0:PRINT"earth command:":P
RINT@32,"";:PRINTSTRING$(32,BO$)
300 PRINT"  THE VEHICLE HAS BEEN
 PUT ON    CHEMICAL BATTERY POWER
.  WE        SUGGEST YOU CEASE ANY
 FURTHER    ACTIVITY UNTIL THE CRA
FT IS FUL-LY POWERED":BA=25
310 FORX=1TO3000:NEXTX
320 IF TIMER<32700THEN270ELSE330
330 PRINT:PRINT"BATTERIES ARE AL
MOST FUNCTIONAL.":FORX=30TO1STEP
-1:FORC=1TO200:NEXTC:PRINT@362,X
:NEXTX:GOTO270
340 '***VISUAL SURFACE SCAN***
350 IFPB<>0THENCLS5:PRINT"THE CA
MERA IS NOT FUNCTIONAL":IFRND(5)
<3THENPB=0ELSEPB=6:GOTO980
360 IFTIMER>35000THENCLS0:PRINT@
256,"IT'S NIGHT.  NOT MUCH TO SE
E";:I$=INKEY$:IFI$=""THEN360ELSE
100
370 CLS:PRINT@6,"visual surface
scan":PRINT:PRINT"  TO PRODUCE A
N ELECTRONIC       PICTURE, PRESS
 THE NUMBER OF THEDIRECTION LIST
ED BELOW:":PRINT
380 PRINT@202,"1. NORTH":PRINT@2
34,"2. SOUTH":PRINT@266,"3. EAST
":PRINT@298,"4. WEST":PRINT@330,
"5. N.E.":PRINT@362,"6. N.W.":PR
INT@394,"7. S.W.":PRINT@426,"8.
S.E."
390 PRINT@449,"PRESS space TO RE
TURN TO MENU.":I$=INKEY$:IF I$="
"THEN390
400 IFI$=" "THEN100
410 I=VAL(I$):IFI<10RI>8THEN340
420 ON I GOTO430,500,570,640,700
,760,820,880
430 GOSUB970
440 DRAW"S4"+S$(0):GOSUB940
450 DRAW"BM0,168;C8;R200L96D20BD
```

```
4BL40BU8L24E8R8F8BU16BR4BU2U26H4
L8G4R16L16D28R28U12L12E4R4F4N"
460 PAINT(0,169),8,8:PAINT(54,14
8),8,8:PAINT(54,180),5,8
470 DRAW"BM30,60;E4R15F2R6F2"
480 IFDUST>35ANDW$="N"THENGOSUB9
60
490 GOTO930
500 GOSUB970
510 DRAW"S4"+S$(1):GOSUB940
520 LINE(40,0)-(130,160),PSET:DR
AW"BM0,160;R148D8R52":DRAW"BM92,
60;E12R28F4R8E10R2F10R12F4R8E10N
"
530 LINE(20,0)-(70,144),PSET:LIN
E(1,0)-(8,144),PSET:DRAW"BM4,60;
C1R38BRR31":LINE(0,60)-(20,60),P
RESET
540 PAINT(48,100),1,8:PAINT(20,2
0),1,8:PAINT(120,56),7,8:PAINT(4
0,40),1,8:PAINT(16,164),8,8
550 IFDUST>35ANDW$="S"THENGOSUB9
60
560 GOTO930
570 GOSUB970
580 DRAW"S4"+S$(2):GOSUB940
590 LINE(0,160)-(200,160),PSET:D
RAW"BM80,160;U12R8D4R4U4R16U4R16
D4R16D4R4U4R8D12":CIRCLE(0,80),9
0:DRAW"C1;BM4,176;U170"
600 PAINT(20,88),8,8:PAINT(116,1
56),1,8
610 CIRCLE(0,80),90,1:CIRCLE(0,8
0),10,1
620 IFDUST>35ANDW$="E"THENGOSUB9
60
630 GOTO930
640 GOSUB970
650 DRAW"S4"+S$(3):GOSUB940
660 LINE(0,160)-(200,163),PSET:D
RAW"BM40,160U8R28U4R8D12":DRAW"B
M172,60;E8R12F4E4"
670 PAINT(52,156),8,8:PAINT(52,1
68),8,8:PAINT(180,56),8,8
680 IFDUST>35ANDW$="W"THENGOSUB9
60
690 GOTO930
700 GOSUB970
710 DRAW"S4"+S$(4):GOSUB940
720 LINE(0,160)-(200,160),PSET:D
RAW"BM0,120R8D16R8D24R56U12R16U8
5D85R20D4R8D8":DRAW"BM44,60E4U4R
8F4R8E4F4R36F4"
730 PAINT(0,124),8,8:PAINT(88,15
2),8,8:PAINT(4,164),8,8:PAINT(52
,56),7,8:LINE(0,160)-(200,160),P
RESET
740 IFDUST>35ANDW$="NE"THENGOSUB
960
750 GOTO930
760 GOSUB970
770 DRAW"S4"+S$(5):GOSUB940
780 LINE(0,160)-(200,160),PSET:D
RAW"BM0,172F20":DRAW"BM96,160U28
R28D28BD12BR4R28F16L28H16"
790 PAINT(0,184),1,8:PAINT(104,1
48),8,8:PAINT(144,182),1,8:PAINT
(0,164),8,8
800 IFDUST>35ANDW$="NW"THENGOSUB
960
810 GOTO930
820 GOSUB970
830 DRAW"S4"+S$(6):GOSUB940
840 LINE(0,160)-(200,160),PSET:D
RAW"BM0,152;R16D12":DRAW"BM188,1
60U12R8U4R4":DRAW"BM12,60E24F4R
12F8R8F8R16E8R8F12"
850 PAINT(0,156),8,8:PAINT(199,1
56),8,8:PAINT(32,48),7,8:PAINT(0
,168),8,8:LINE(0,160)-(200,160),
PRESET
860 IFDUST>35ANDW$="SW"THENGOSUB
960
870 GOTO930
880 GOSUB970
890 DRAW"S4"+S$(7):GOSUB940
900 LINE(0,160)-(200,160),PSET:D
RAW"BM0,148R8D4R4U4R8D12":DRAW"B
M164,160U8R36":DRAW"BM40,60E8R8E
4R8F8E8F12":LINE(200,116)-(176,1
52),PSET
910 PAINT(0,152),8,8:PAINT(0,164
),8,8:PAINT(168,156),8,8:PAINT(1
96,132),1,8:PAINT(64,56),7,8
920 IFDUST>35ANDW$="SE"THENGOSUB
960
930 PMODE4,1:SCREEN1,1:GOTO980
940 FORNUM=1TO20:DRAW"C1;BM"+STR
$(RND(160))+","+STR$(RND(100)+90
)+"R8E2R5ER3F2C0":NEXTNUM
950 RETURN
960 FORX=1TODUST*10:PSET(RND(200
),RND(191),5):NEXTX:RETURN
970 PMODE3,1:SCREEN1,1:PCLS2:COL
OR4:LINE(0,60)-(200,60),PSET:LIN
E(200,0)-(200,191),PSET:PAINT(0,
61),3,4:PAINT(205,0),1,4:RETURN
980 I$=INKEY$:FORX=1TO500:IFX=34
THENPLAY"04;L32;T1;V30;A;V<;A;V<
;A;V<"
990 IFI$=""THENNEXTELSEGOTO340
1000 GOTO980
1010 '***ARM***
1020 IFA$="NIGHT"THENCLS0:PRINT@
256,"IT'S NIGHT. THERE ARE NO LI
GHTS";:I$=INKEY$:IFI$=""THEN1020
ELSEGOTO100
1030 CLS:PRINT@15,"ARM":IFRND(20
```

103

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)=3THENCLS:PRINT"THE ARM IS NOT         1320 IFPPOINT(L1+28,L2-19)=5ANDO
OPERATIONAL":GOTO980                    P<>0THENOJ=1
1040 PRINT@67,"THIS FUNCTION OF         1330 UQ=4:UP=4:IFL1<76THENUP=2:U
THE LANDER   ENABLES YOU TO PICK-       Q=8
UP OBJECTS   ON THE SURFACE AND T       1340 IFL2>144THENUP=8:UQ=2
RANSFER THEM TO THE MICROLAB"           1350 PMODE4:SCREEN1,1:GOTO1120
1050 WR$=AP$(1)                         1360 L4=L4+UP:UR=0:US=0:GOTO1450
1060 L1=88:L2=128:L3=116:L4=124:        1370 L4=L4-UP:UR=0:US=0:GOTO1450
UP=4:UQ=4:PRINT@388,"PRESS <spac        1380 OP=1:WR$=AP$(2)
e> TO CONTINUE":I$=INKEY$:IFI$="        1390 GOTO1450
"THEN1060ELSEIFI$=" "THEN1070           1400 OP=0:WR$=AP$(1)
1070 CLS:PRINT@9,"INSTUCTIONS":P        1410 GOTO1450
RINT@64,"THESE KEYS-PRODUCE THES        1420 IFGR=0THENGOTO1120
E EFFECTS":PRINT@134,"I  = ARM F        1430 CLS:PRINT"THE SAMPLE IS BEI
ORWARD":PRINT@166,"M  = ARM BACK        NG TRANSPORTED":PRINT"PLEASE WAI
WARD":PRINT@198,"J  = ARM LEFT":        T...":FORX=1TO2000:NEXT
PRINT@230,"K  = ARM RIGHT"              1440 LBB=5:UP=4:UQ=4:GOTO100
1080 PRINT@262,"U  =ARM UP":PRIN        1450 SCREEN0,1:CLS:PRINT"PICTURE
T@294,"D  =ARM DOWN":PRINT@326,"         PROCESSING":PMODE3:COLOR7
O  =OPEN HAND":PRINT@358,"C  =CL        1460 LINE(24,168)-(56,188),PSET
OSE HAND":PRINT@390,"L  =MOVE SA        1470 PAINT(L1+3,L2+3),7,7:PAINT(
MPLE TO LAB"                            L3+3,L4+3),7,7
1090 PRINT@452,"PRESS <@> TO BEG        1480 FORX=1TO20:PSET(RND(72)+32,
IN":I$=INKEY$:IFI$=""THEN1090           RND(52)+L4,5):NEXTX
1100 GOSUB1540                          1490 COLOR5:LINE(24,168)-(56,188
1110 FF$=""                             ),PSET
1120 I$=INKEY$                          1500 IFL1<60THENSOUND150,3:UR=UP
1130 IFI$="I"THENUR=UP:US=-UQ           *2:ELSEIFL2<48THENSOUND150,3:US=
1140 IFI$="M"THENUR=-UP:US=UQ           UQ*2
1150 IFI$="J"THENUR=-UP:US=0            1510 IFL3>192THENSOUND150,3:UR=-
1160 IFI$="K"THENUR=0:US=UQ             UP*2:ELSEIFL4>156THENSOUND150,3:
1170 IFI$="U"THEN1360                   US=-UQ*2
1180 IFI$="D"THEN1370                   1520 PMODE4:SCREEN1,1
1190 IFI$="O"THEN1380                   1530 POKE65494,0:GOTO1240
1200 IFI$="C"THEN1400                   1540 PMODE3,1:SCREEN1,1:PCLS3:CO
1210 IFI$="L"THEN1420                   LOR4:LINE(0,24)-(124,12),PSET:LI
1220 IFI$=""THEN1120                    NE-(168,21),PSET:LINE-(192,36),P
1230 GOTO1450                           SET:LINE(148,18)-(255,10),PSET:L
1240 PMODE3:L1=L1+UR:L2=L2+US:L3        INE(0,12)-(64,18),PSET:PAINT(2,2
=L3+UR:L4=L4+US                         ),2,4
1250 LINE(40,176)-(L3,L4),PRESET        1550 COLOR5:DRAW"A0;S6"+S$(0):FO
:LINE-(L3+8,L4+8),PRESET:LINE-(5        RX=1TO30:T=RND(210)+30:TS=RND(16
2,184),PRESET:LINE-(40,176),PRES        0)+20:DRAW"S"+STR$(RND(4))+";B
ET                                      M"+STR$(T)+","+STR$(TS)+";D4F2R3
1260 PAINT(L3+3,L4+3),5,5:PAINT(        U2R2U3L4UL2DL":PAINT(T+3,TS+3),5
53,179),5,5                             ,5:NEXTX
1270 COLOR8:LINE(32,172)-(L1,L2)        1560 FORX=1TO30:DRAW"S4;BM"+STR$
,PSET:LINE-(L1+8,L2+8),PSET:LINE        (RND(240)+10)+","+STR$(RND(130)+
-(44,180),PSET                          20)+"R3E2R3F5":NEXTX
1280 PAINT(L1+3,L2+3),8,8               1570 COLOR8:LINE(0,188)-(24,168)
1290 DRAW"S4A0BM"+STR$(L1+20)+",        ,PSET:LINE-(56,184),PSET:LINE-(5
"+STR$(L2-14)+FF$:DRAW"BM"+STR$(        2,188),PSET:LINE-(176,191),PSET:
L1)+","+STR$(L2)+WR$                     PAINT(24,172),8,8:PMODE4:SCREEN1
1300 PAINT(L1+15,L2),8,8:PAINT(L        ,1:RETURN
1+22,L2-14),8,8                         1580 I$=INKEY$:IFI$=""THEN1580EL
1310 IFOP=0ANDOJ<>0THENSOUND200,        SEIFI$=" "THEN100
5:FF$="D8R6D3R2U4R2U4LD8LLU8LD8L        1590 GOTO100
U8LD8LU8LD8LU8LD8":GR=1:OP=0:CL=        1600 '***DIAGNOSTIC***
0
```

```
1610 CLS:PRINT@10,"system diagno
stic":PRINT@65,"PRESS NUMBER:":Z
=105:RESTORE
1620 DATA1. COMPUTER,2. TRANSMIT
TER,3. NUCLEAR REACTOR,4. LABORA
TORY FUNCTIONS,5. RADAR,6. CAMER
A,7. DRILL,8. AIR TESTER
1630 READZZ$:PRINT@Z,ZZ$:Z=Z+32:
IFZ=361THEN1640ELSEGOTO1630
1640 PRINT@448,"PRESS <space> TO
 EXIT":I$=INKEY$:IFI$=""THEN1640
1650 IFI$=" "THEN100ELSEU=VAL(I$
):IFU<0ORU>8THEN1600
1660 IFDIA=1THENI=RND(8)
1670 ON U GOTO1680,1750,1810,187
0,1950,2030,2110,2180
1680 CLS:PRINT@12,"COMPUTER"
1690 PRINT@66,"MEMORY       SYSTEM
 SCAN":PRINT@162,"TEMP"
1700 FORX=1TO250:PRINT@100,CHR$(
RND(255)):PLAY"O2;L255;4":NEXTX:
FORX=1TO300:PRINT@111,CHR$(RND(2
55)):PLAY"O5;L255;6":NEXTX:CT=RN
D(65):PRINT@195,CT;" C"
1710 CE$="IN GOOD CONDITION":IFC
T>55THENCE$="OVERHEATED":IFDIA<2
THENCE$="IN NEED OF REPAIR"
1720 PRINT@264,"THE COMPUTER IS:
":PRINT@295,CE$
1730 IFDIA>2THENPB=1
1740 GOTO2250
1750 CLS:PRINT@11,"TRANSMITTER"
1760 PRINT@98,"":INPUT"DATA TO B
E TRANSMITTED";DX$:FORX=1TOLEN(D
X$):PRINT@298,"TRANSMITTING":PLA
Y"O3;L255;1;2":NEXTX
1770 IFDIA<2THENDX$="NSDJBCFHB;G
EC-N HNHWENOHOCVWSGINWA"
1780 PRINT@322,"DATA RECEIVED:";
DX$
1790 IFDIA>2THEN PB=2
1800 GOTO2250
1810 CLS:PRINT@5,"NUCLEAR REACTO
R"
1820 PRINT@67,"CORE TEMP     POW
ER OUT":PRINT@163,"NUCLEAR DISCH
ARGE":PRINT@259,"SYSTEM PRESSURE
 CHECK"
1830 PRINT@103,RND(500)+500;" C"
:FORX=1TO500:NEXT:PRINT@118,RND(
70)+30;" %":PRINT@202,RND(0);" %
"
1840 FORX=1TO100:PRINT@297,HEX$(
RND(255)):PLAY"O5;L255;4;O1;5":N
EXTX
1850 PRINT@352,"NUCLEAR CUP IN O
RDER"
1860 GOTO2250
1870 CLS:PRINT@5,"LABORATORY FUN
CTIONS"
1880 PRINT@67,"SYSTEM CHECK
CONTENTS":PRINT@163,"TEMP      L
AB COMPUTER CHECK"
1890 IFLBB<>0THENFL$="IN USE"
1900 FORX=1TO150:PRINT@105,CHR$(
RND(255));" ";HEX$(RND(200)):PLA
Y"L255;O4;5":NEXTX:PRINT@119,FL$
:PRINT@196,RND(100)-100;" C":FOR
X=1TO150:PRINT@212,RND(100):NEXT
X
1910 CF$="LABORATORY IS IN ORDER
":ELSEIF DIA<2THENCF$="LAB IS IN
 NEED OF REPAIR"
1920 PRINT@320,CF$
1930 IFDIA<2THENPB=3
1940 GOTO2250
1950 CLS:PRINT@14,"RADAR"
1960 PRINT@66,"DURING THE TEST T
HE COMPUTER   WILL EJECT A SMALL
RETRACTABLE   BEACON THAT SHOULD
SHOW UP ON    THE NEXT SCREEN":FO
RX=1TO3000:NEXTX
1970 CLS0:ZA=2:IFDIA<2THENGOTO19
90
1980 FORX=1TO10:PRINT@ZA,CHR$(13
7);:FORXX=1TO50:NEXTXX:PRINT@ZA,
CHR$(128);:ZA=ZA+34:FORXX=1TO150
:NEXTXX:NEXTX:GOTO2000
```

VIKING 2
SITE
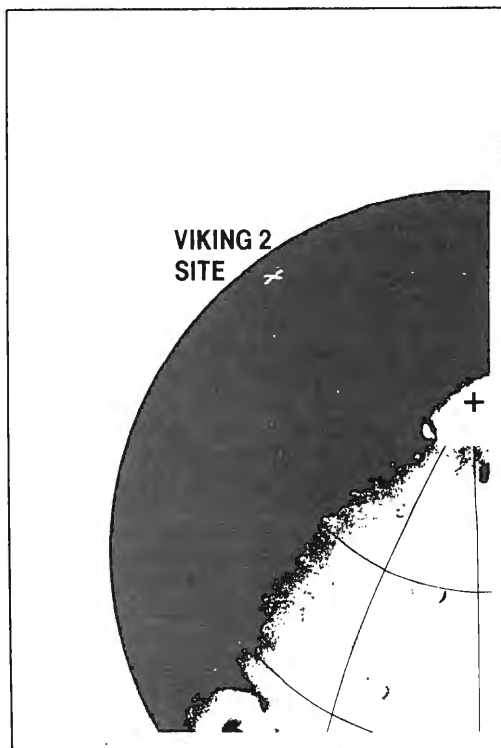
```
1990 CLS0:FORX=1TO250:NEXTX:PRIN
     T@256,"THERE IS A PROBLEM IN RAD
     AR":GOTO2010
2000 PRINT@256,"THE RADAR IS FUN
     CTIONAL"
2010 IFDIA<2THENPB=6
2020 GOTO2250
2030 CLS:PRINT@12,"CAMERA"
2040 PRINT@67,"SYSTEM CHECK":FOR
     X=0TO205:PRINT@103,CHR$(PEEK(X))
     :PLAY"02;L255;1;9":NEXTX
2050 PRINT@162,"ON THE NEXT PAGE
      IS A COLOR   AND VIDEO CENTERIN
     G TEST":PRINT@230,"PLEASE WAIT A
     S THE CAMERA ADJUSTS.":FORX=1TO3
     000:NEXT
2060 PMODE3,1:SCREEN1,1:PCLS:COL
     OR6:LINE(0,0)-(255,191),PSET:COL
     OR7:LINE(255,0)-(0,191),PSET:COL
     OR8:CIRCLE(128,96),50,8
2070 I$=INKEY$:IFI$=""THEN2070
2080 IFDIA<2THENPRINT@320,"CAMER
     A HAS FAILED THE TEST.":GOTO2250
2090 PRINT@320,"THE CAMERA HAS P
     ASSED THE TEST"
2100 GOTO2250
2110 CLS:PRINT@14,"DRILL"
2120 PRINT@65,"R.P.M.":PRINT@133
     ,"2000        SYSTEM CHECK":PRINT@
     229,"1500       DRILL POWER":PRIN
     T@325,"1000":PRINT@421,"500":ZX=
     483
2130 FORX=1TO200:PRINT@180,CHR$(
     RND(255))+CHR$(RND(255)):PLAY"05
     ;L255;4":NEXTX:IFDIA<2THENXC=227
     :ELSEXC=99
2140 PRINT@ZX,CHR$(191);:ZX=ZX-3
     2:PRINT@277,ZX*RND(4):FORX=1TO50
     :NEXTX:PLAY"01;L255;1;3;5":IFZX=
     XC THENGOTO2150ELSEGOTO2140
2150 PRINT@428,"THE DRILL HAS PA
     SSED":IF DIA<2THENPRINT@427,"THE
      DRILL HAS FAILED"
2160 IF DIA<2THENPB=4
2170 GOTO2250
2180 CLS:PRINT@10,"AIR TESTER"
2190 PRINT@99,"POWER          SYST
     EM TEST":PRINT@202,"MECHANICS"
2200 PRINT@132,RND(100);" %":FOR
     X=1TO75:PRINT@149,CHR$(RND(120)+
     128):PLAY"05;L255;1;12":NEXTX
2210 ZX=256:FORX=1TO45:PRINT@ZX,
     CHR$(RND(255)):PLAY"01;L200;6":Z
     X=ZX+1:NEXTX
2220 PRINT@352,"THE AIR 'SNIFFER
     ' HAS PASSED":IF DIA<2 THEN PRIN
     T@352,"THE AIR 'SNIFFER' HAS FAI
     LED"
2230 IF DIA<2THENPB=5

2240 GOTO2250
2250 PRINT@448,"PRESS <space> TO
      EXIT":I$=INKEY$:IFI$=""THEN2250
     ESEIFI$=" "THENGOTO1600
2260 GOTO1600
2270 '***MICROLAB***
2280 CLS:IFPB<>0THENPRINT"THE LA
     B IS NOT FUNCTIONAL":IFNRD(5)<3
     THENPB=0ELSEPB=3:GOTO2740
2290 IFLBB=0THENPRINT"THERE IS N
     OTHING IN THE LAB":GOTO2880
2300 CLS:PRINT@12,"micro-lab":PR
     INT@66,"WHEN YOU ARE IN THE LAB
     PRESS   <C>FOR COMMANDS.":PRINT@2
     91,"PLEASE WAIT...":GOSUB2680
2310 CLS:PRINT@12,"MICRO-LAB":PR
     INT@64,"c=COMMANDS":PRINT"o=LET
     IN OXYGEN":PRINT"e=EXPOSE TO EAR
     TH LIGHT":PRINT"m=EXPOSE TO MARS
      LIGHT":PRINT"h=HEAT COILS ON":P
     RINT"g=HEAT COILS OFF"
2320 PRINT"w=WATER ON FOR 5 SEC.
     ":PRINT"a=GAS ANALASIS":PRINT"d=
     DISCARD SPECIMENS":PRINT"r=RETUR
     N TO LAB":PRINT"s=HOLD TEMPERATU
     RE"
2330 I$=INKEY$
2340 IFI$="C"THENSCREEN0,1:GOTO2
     310
2350 IFI$="R"THENSCREEN1,1:GOTO2
     480
2360 IFI$="H"THENHB=1:PAINT(104,
     12),8,6:PAINT(188,52),8,6:PAINT(
     180,140),8,6:PAINT(84,176),8,6:P
     AINT(20,84),8,6:GOTO2510
2370 IFI$="G"THENHB=-1:PAINT(104
     ,12),5,6:PAINT(188,52),5,6:PAINT
     (180,140),5,6:PAINT(84,176),5,6:
     PAINT(20,84),5,6:GOTO2510
2380 IFI$="E"THENSCREEN1,1:LI=1:
     SOUND100,1:GOTO2510
2390 IFI$="M"THENSCREEN1,0:LI=2:
     SOUND100,1:OX=OX-25:HB=-5:CO=CO+
     47:GOTO2510
2400 IFI$="O"THENPLAY"V31":FORX=
     1TO25:PLAY"L255;01;V-;"+STR$(RND
     (8)):NEXTX:OX=OX+5:GOTO2510
2410 IFI$="W"THENWA=WA+6:COLOR7:
     PLAY"V31;T100":LINE(188,96)-(116
     ,69),PSET:LINE(188,104)-(124,120
     ),PSET:LINE(188,100)-(132,104),P
     SET:FORX=1TO30:PLAY"03;V-;T-;"+S
     TR$(RND(12)):NEXTX:CIRCLE(96,92)
     ,36,8,1.3:PAINT(96,120),7,8:COLO
     R5
2420 IFI$="W"THENFORX=1TO500:NEX
     TX:LINE(188,96)-(116,69),PSET:LI
     NE(188,104)-(124,120),PSET:LINE(
     188,100)-(132,104),PSET
```
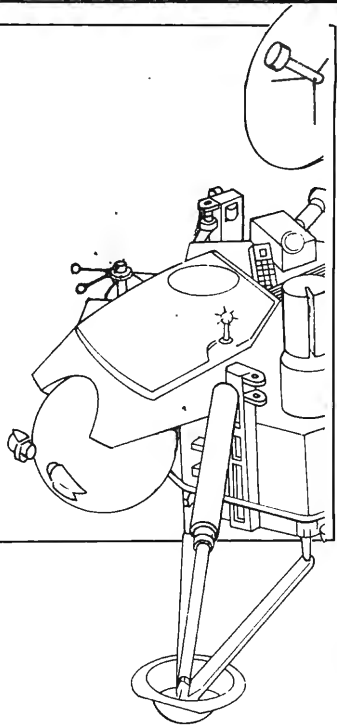
```
2430 IFI$="D"THENPLAY"T1;L16;ABC
DEFGFEDCBA":CLS:INPUT"ARE YOU SU
RE";ZZ$:IFZZ$="N"THEN2330ELSEFOR
X=1TO30:SCREEN1,1:SCREEN1,0:NEXT
X:WA=0:OX=0:HE=0:LBB=0:OG=0:LI=0
:LF=0:CO=0:MSG$="":GOTO100
2440 IFI$="A"THENCLS:SCREEN0,1:P
RINT@11,"ANALYZER":PRINT:PRINTUS
ING"CARBON D  ###PCC TEMP   ### C
";CO;HE:PRINTUSING"OXYGEN     ###
PCC MOISTURE ##.#";OX;WA
2450 IFI$="A"THENPRINTUSING"OTHE
RS      ##.##";RND(0):PRINT:PRINT
:PRINTUSING"  LIFE PERCENT ##.##
#";LF:PRINT@320,MSG$
2460 IFI$="S"THENHB=0:HE=HE
2470 GOTO2510
2480 COLOR8:IFLBB=1THENLINE(84,6
4)-(100,88+(DR/5)),PSET,BF
2490 IFLBB=5THENDRAW"S3BM84,56;D
24F8D12F16D8R28E4R12U12H8E8U28H8
L36G8L8H8":PAINT(88,64),8,8
2500 GOTO2330
2510 HE=HE+HB
2520 IFWA>10THENOX=OX+2:MSG$="OX
YGEN IS FILLING CHAMBER":IFOX>50
0THENOX=500
2530 IFHE>120ANDLBB=1ANDOG=0THEN
COLOR5:LINE(84,64)-(100,88+(DR/5
)),PSET,BF:DRAW"BM88,60;C8;D8F4D
8G4F4D4F8R8F4E4U12H4U8H4E4U4L8G4
L12":PAINT(100,88),8,8:DRAW"C7;B
M92,68;D9L5F6BE2D4H6U5BL5U3F4":O
X=OX-1:OG=1
2540 IFOG=1ANDLI=1ANDOX>20THENLF
=LF+.1:CO=CO+3
2550 IFLF>3THENWA=WA-1:MSG$="SOM
```

107
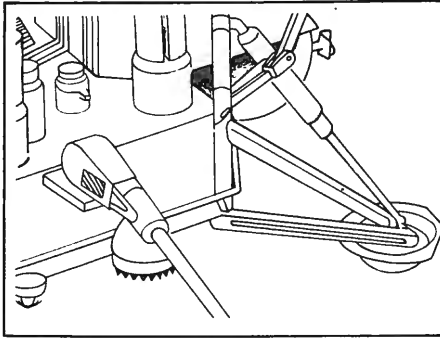
ETHING IS FEEDING ON THE WA- TER
":LF=LF+.2
2560 IF LI=2ANDLF>22ANDHE>-10THE
NOX=OX+4:WA=WA-1
2570 IFLF>10THENHE=HE+2:MSG$="SO
METHING IS GENERATING HEAT":CIRC
LE(RND(36)+60,RND(28)+84),3,6:LF
=-2:CU=CU+1
2580 IFHE<50ANDHE>20ANDWA>10ANDO
X>20THENLF=LF+.1
2590 IFLBB=5ANDH>150THENFORX=1TO
20:SET(RND(36)+60,RND(20)+92,7):
NEXTX
2600 IFLBB=5ANDHE>100ANDWA>15THE
NCOLOR5:LINE(60,48)-(156,140),PS
ET,BF:PLAY"V31":FORX=1TO20:PLAY
V-;O1;"+STR$(RND(5)):NEXTX:FORZ=
1TO30:CIRCLE(RND(92)+48,RND(76)+
60),4,8:PLAY"V15;T100;"+STR$(RND
(10)):NEXTZ:SE=1
2610 IFSE=1THENSCREEN0,1:CLS:PRI
NT"YOUR SAMPLE HAS EXPLODED":LBB
=0:SE=0
2620 IFLBB=1ANDWA>30ANDCO>5THENM
SG$="SOMETHING IS PRODUCING CARB
ON"
2630 IFLBB=5ANDOX>20ANDWA>10THEN
OG=1
2640 IFCU>7THENCLS:GOTO3430
2650 IFHE<-100THENHE=-100
2660 IFHE>200THENHE=200
2670 GOTO2330
2680 PMODE3,1:PCLS:COLOR6:CIRCLE
(108,96),78:CIRCLE(28,28),30:CIR
CLE(168,20),14:CIRCLE(104,12),8:
CIRCLE(188,52),8:CIRCLE(180,140)
,8:CIRCLE(84,176),8:CIRCLE(20,84
),8
2690 DRAW"A0S4;BM164,150;D14R12U
4R28D20R4U8R20U8R12D30L32U4L4D8L
28U16L20U19":DRAW"BM188,96;R16U7
2R30D80L50":LINE(164,16)-(172,24
),PSET,BF
2700 LINE(44,140)-(0,164),PSET:L
INE(68,160)-(28,191),PSET:DRAW"B

M156,28;;D8BR8U4D10"
2710 PAINT(1,1),6,6:PAINT(4,56),
6,6:PAINT(80,1),6,6:PAINT(68,188
),6,6:PAINT(208,28),7,6:PAINT(18
0,164),8,6
2720 DRAW"C5;BM61,19U7L5D7R5BR3B
U1U2R4D4L4D3R4":DRAW"BM208,19;U7
D3R5U3D7BR3BU3U2R4D4L4D3R4BR5BU2
U7R5D7L5"
2730 RETURN
2740 PRINT@448,"PRESS <space> TO
 EXIT":I$=INKEY$:IFI$=""THENGOTO
2740:IFI$=" "THEN100
2750 GOTO100
2760 '***DRILL***
2770 CLS:IFPB<>0THENPRINT"THE DR
ILL IS NOT FUNCTIONAL":IFRND(5)<
3THENPB=0ELSEPB=4:GOTO2890
2780 IFTI>4THENCLS:PRINT"THERE A
RE NO MORE SITES TO BE   DRILLED
 AT.":GOTO2900
2790 NO=0:CLS:PRINT@10,"surface
drill"
2800 PRINT@70,"YOU MAY DRILL UP
TO 150 CMBELOW THE THE SURFACE A
ND BRING UP A SAMPLE 10 CM IN L
ENGTH."
2810 PRINT@194,"":INPUT"HOW DEEP
(<150)";DR:IFDR<0ORDR>150THEN281
0
2820 CLS:PRINT@37,"DRILLING HAS
COMMENCED":PRINT@416,STRING$(32,
BO$)
2830 FORX=0TODR:PLAY"O1;L255;12;
4;12;4;12;5;12;":PRINT@460,X;:NE
XTX
2840 PRINT@99,"DRILLING ACCOMPLI
SHED"
2850 PRINT@195,"":INPUT"DO YOU W
ISH TO TRANSFER CORE   TO LAB";
AN2$:NO=0:IF AN2$="Y"ORAN2$="YES
"THENLBB=1:ELSELBB=0
2860 GOTO2880
2870 PRINT@416,"ENCOUNTERED OBSR
UCTION":GOTO2840
2880 NO=5:TI=TI+1:LAB=1
2890 I$=INKEY$:IFI$=""THEN2890:I
FI$=" "THEN100ELSE2890
2900 GOTO100
2910 '***PROBE***
2920 IFPB<>0THENCLS:PRINT"THE 'S
NIFFER' IS NOT OPERATIONAL":IFRN
D(5)<3THENPB=6ELSEPB=0:GOTO3160
2930 CLS:PRINT@8,"atmosphere pro
be":RESTORE
2940 PRINT@70,"TEMP.   LIGHT"
:PRINT@162,"WIND SPEED   WIND D
IR.":PRINT@257,"PRESS <@> FOR AI
R CHART":PRINT@288,STRING$(32,BO

```
$)
2950 TEM=RND(60)-100:IFTIMER<160
00ANDTIMER>32000THENTEM=TEM+10:I
FTIMER>32767THENTEM=TEM-30:IF DU
ST>20THENTEM=TEM-4
2960 LIT=RND(50):IF TIMER>32767T
HENLIT=RND(5):IF TIMER<1500THEN
LIT=RND(15)
2970 W=RND(8):ON W GOTO2980,2990
,3000,3010,3020,3030,3040,3050
2980 W$="N":GOTO3060
2990 W$="S":GOTO3060
3000 W$="E":GOTO3060
3010 W$="W":GOTO3060
3020 W$="NW":GOTO3060
3030 W$="NE":GOTO3060
3040 W$="SW":GOTO3060
3050 W$="SE":GOTO3060
3060 DUST=RND(50):WD=RND(200)+50
3070 PRINT@102,TEM:PRINT@115,LIT
:PRINT@196,WD;"KPM":PRINT@212,W$
3080 PRINT@321,"report:"
3090 I$=INKEY$:IFI$=""THENGOTO30
90
3100 IFI$="@"THEN3120ELSEIFI$="
"THEN100
3110 GOTO100
3120 CLS3:PRINT@10,"AIR CONTENT"
;:PRINT@230,"moisture:";:PRINT@3
26,"dust:";
3130 CO2=RND(0):O2=RND(0):AR=RND
(0):N=RND(0):MS=RND(0):DUST=RND(
50)
3140 PRINT@66,USING"CARBON DIOX
=95.### %";CO2;:PRINT@98,USING"O
XYGEN    = 1.### %";O2;:PRINT@
130,USING"NITROGEN   = 0.### %"
;N;:PRINT@162,USING"ARGON
= 0.### %";AR;
3150 PRINT@263,USING"0.### PARTS
 PER CC";MS;:PRINT@358,USING"###
# PARTS PER CC";DUST*100;
3160 I$=INKEY$:IFI$=""THEN3160:I
FI$=" "THEN100
3170 GOTO100
3180 '***SURFACE PRODUCER***
3190 O$(0)="C1H4L4H4G4L2D2F2D2R2
0U4L4H2G3L2"
3200 O$(1)="C1L7HL3G2L4HL3U5LDL3
HU3ER4E5R4E3RF2R4F3L3D12BU11BG5L
3U3F4DBL3UBL2U2L2BD3U3"
3210 O$(2)="C1H9L4H4G4LG8L3D4R28
E4U3BL4H7BBL6F6BL4H2L2E2"
3220 O$(3)="C1H6UL2UL4UL8BL6L8DL
4DL2DG8R4UR4L4DL4E8DR2DR4DR24UR4
UR2UBL10BU3L4H4G4L4BD4R10"
3230 O$(4)="C1H8L4UL4UL12DL4DL4G
8R16UR6DR8U2R8DR4H8D2L4DL4DL8UL4
UL4U2BR4BUR12DR3"
```

```
3240 O$(5)="C1L16G2L10G2L7GG2R8E
3R9E2R3F4E2G2H4R10"
3250 O$(6)="C5L28UR32U2L8DL24UR8
UR28U2L16DL8UR10"
3260 CLS:PRINT"mission control:"
:PRINT:PRINT"   THE CRAFT HAS DI
SENGAGED AND    IS BEGINNING ITS
DESCENT.  AS    YET THE SHIP IS O
N COURSE AND    IS DUE TO LAND MO
MENTARILY.":PRINT@234,"*out*":FO
RX=1TO3000:NEXTX
3270 CLS4:FORJ=0TO7
3280 R1=RND(7)-1:R2=RND(7)-1:H1=
RND(160)+30:H2=RND(160)+30:V1=RN
D(90)+90:V2=RND(90)+90:IFR1=6THE
NGOSUB3410
3290 NN$="BM"+STR$(H1)+","+STR$(
V1)+O$(R1)+";BM"+STR$(H2)+","+ST
R$(V2)+O$(R2)
3300 S$(J)=NN$
3310 CLS
3320 TA=TA-200:TV=TV-TN
3330 PRINT@34,USING"ALTITUDE   ##
## METERS";TA:PRINT@98,USING"VEL
OCITY   ### KPM";TV
3340 FORX=1TO32:PRINT@256,STRING
$(X,BO$):NEXTX
3350 IFJ>4THENPRINT@198,"THRUSTE
RS ACITVATED":PLAY"O2;T100;L100;
V<;8;5;4;6;1;8;5;;4;6;1;8;5;4;6;
1":TN=40
3360 PLAY"V31"
3370 IFJ=7THENPRINT@357,"SAFE LA
NDING"
3380 NEXTJ
3390 FORX=1TO500:NEXTX
3400 GOTO100
3410 JJ=RND(5):IFJJ=2 THEN NN$="
BM"+STR$(H1)+","+STR$(V1)+O$(6)+
";BM"+STR$(H1)+","+STR$(V1-3)+"L
4H2L8G2L4R4F2R8GG2E2G2D3F2R2D3L2
4U2R4E2U3N"
3420 RETURN
3430 FORX=1TO15:CLSRND(8):NEXTX:
PRINT@231,"congratulations"
3440 PRINT"YOU NAME WILL BE IN E
VERY NEWS-":PRINT"PAPER ON THE G
LOBE AS BEING THE":PRINT"FIRST P
ERSON TO DISCOVER LIFE ON";:PRIN
T"MARS.  A LATER MISSION WILL BE
":PRINT"SENT TO GET THE SAMPLES"
3450 I$=INKEY$:PRINT@448,"PRESS
<space>":IFI$=""THEN3450
3460 CLS:PRINT"THE NUCLEAR FUEL
IS RUNNING LOW":PRINT"YOUR MISSI
ON HAS BEEN TERMINATED":PRINT"BU
T ALL OF EARTH IS AWAITING":PRIN
T"YOUR SAFE RETURN.":SOUND101,10
:END
```

BIG BUSINESS

GILBERT MURRAY

Although the furor over the availability of energy has passed the panic stage, everybody recognizes that prices have remained high since the crisis of the last decade when a national emergency was declared.

That's why you, as the inventor of EnerTabs, are in a position to make a mint with your new energy storage system. EnerTabs are very small, reasonably cheap, and can store a great amount of electrical energy.

You have entered into an agreement to head up a new company that will be producing EnerTabs in great quantities. Your contract provides a lot of personal security, lasting from six to 10 years.

You will be financially secure, that is, if you manage the company well and continue to reap profits. That means you are responsible for buying and selling, investments, personnel, expansions, etc. It's a big business, which means that you're going to have to sacrifice a lot of your personal life to make the company succeed.

Since coming up with the formula, the word has gotten around and now you are in competition with nine other companies — very stiff competition. Up to 10 people can participate, but the computer will play for the other companies if less than 10 people are playing.

You will receive quarterly reports on how things are going. To assist you, the computer will, from time to time, give analyses of the current business cycle. These are merely speculation as are most predictions. However, based on this cycle and other random factors, the computer will create the consumer demand for the entire EnerTab industry, including estimated annual sales.
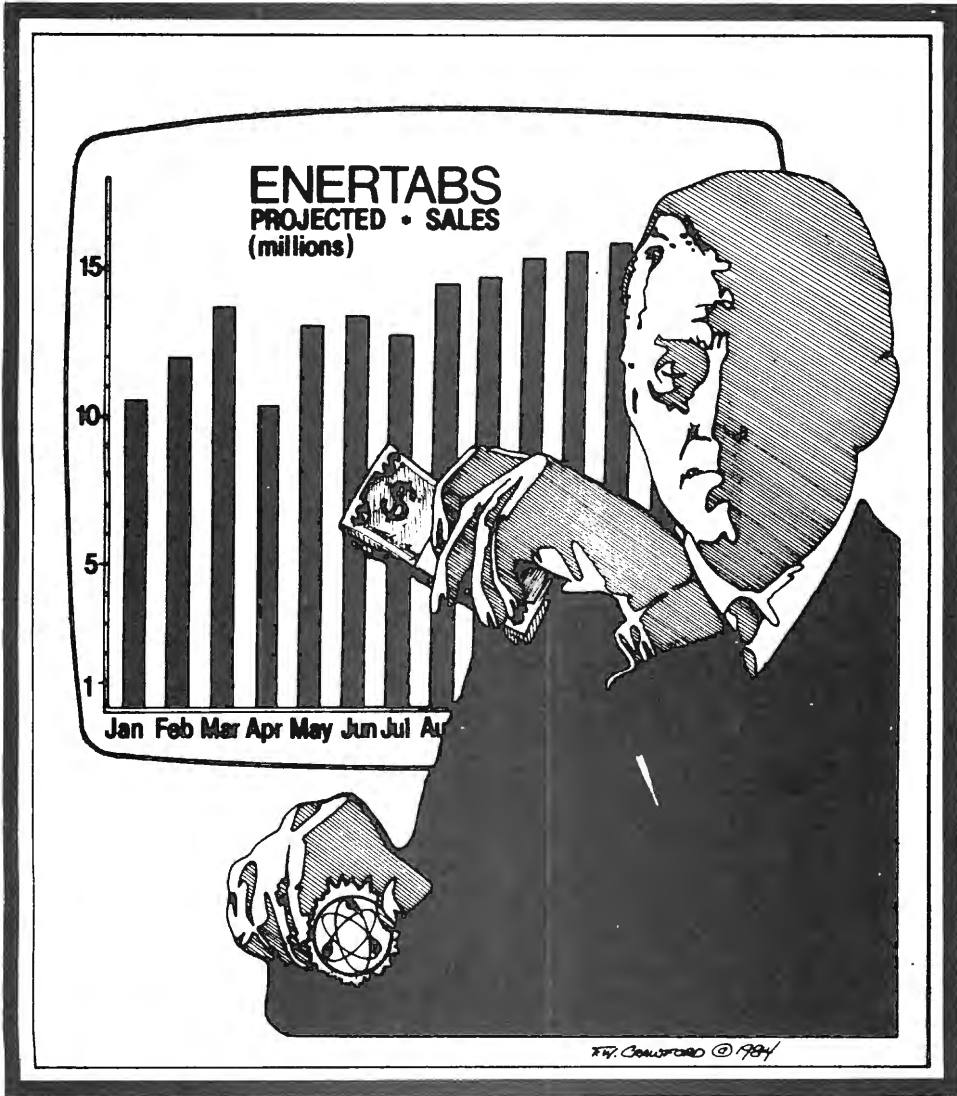
(Gil Murray has a B.S. degree in Chemistry and one in Business Administration. He enjoys the challenge of programming, golfing and fishing. He has a wife and three children.)

After all of the competitors in the game have purchased their plants and equipment, CoCo will obtain equipment for the other companies. Then the simulation is played in quarter year increments, just as the real game is played in the mahogany suite.

You will have to decide how many EnerTabs to produce, based upon how many were sold during the last quarter, and the size of your inventory. If you wish to produce more than last quarter, you should input a positive number. To produce less, enter a negative number. The number you enter will be added to or subtracted from the previous quarter's production.

Just hit the ENTER key if you do not wish to make a change. Entering a decision is like making a commitment. If you change your mind, you could cause trouble in your company.

Next you will be given an opportunity to buy buildings and more machines, sell stock, continue your quest for greater profits, or sell out (quit in other words). Buying another building can be quite expensive and a drain on your resources. If you buy more machines, remember that a building can only hold so many machines and your productivity will suffer. When you sell stock, it will sell for a little less than the last quarter's price. Also, when you sell more stock it dilutes the overall value of the stock. As you continue, the computer will make decisions for the other companies, determine sales results and give "End of Quarter" stock prices. If you decide to quit, you will receive final standings and a critique of your managerial ability.

The computer will determine your ability based upon the decisions you have made about advertising, quality, product design (research and development), the effectiveness of your sales force (number of sales people and pay incentives), and your pricing structure.

Aside from the obvious cost of the salaried and hourly employees, other costs are built in. There is a 16 percent administrative cost (percentage of the gross receipts). There is at least 5 percent in additional costs associated with the sales force. Transportation costs are based on your plant's location and the number of EnerTabs that you produce. Real estate taxes will cost you .7 percent of the building's assessed value per year. There also is a maintenance cost and a depreciation consideration (10-year straight line).·

The serious player could estimate costs and sales volume in order to determine prices and production needs to reach a desired profit level. If you're just winging it, you will still enjoy the excitement of owning your own business . . . and being rich for a change.

You will need to type in a *PCLEAR1* statement before running the program. Good luck, boss!

Program Variables

SA — Total number of EnerTabs purchased per year
YE — Year
JZ — Number of stock shares sold by a company

SP — Stock price
SS — Salespersons' salaries
FW — Number of factory workers
WP — Factory workers' pay rate
AD — Advertising expenditure
CD — Research and development expense
QC — Quality control expense
PR — EnerTab price
UP — Units produced
PN$ — Player's name
NP — Number of players
IR — Interest rate
PM — Player's money
BC — Building cost
NB — Number of buildings
NM — Number of machines
MC — Machines' cost
MN$ — Capacity of company's machines
XX — Bankrupt flag
CI — Current inventory
CP — Production capacity
ES — Estimated sales
MF — Maintenance factor
TC — Transportation factor
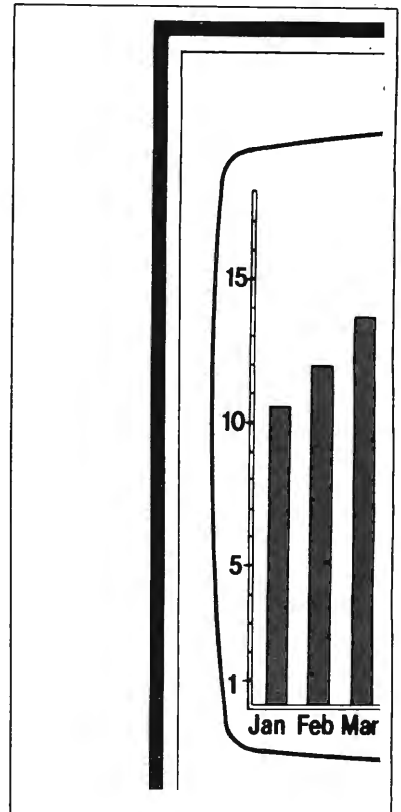
```
5 REM****BIG BUSINESS****
10 REM**BY GILBERT MURRAY**
15 REM*3496 E.DESHLER AVE.*
20 REM*COLUMBUS,OHIO 43227*
25 PCLEAR1:CLEAR1500:K=10
30 CLS:PRINT@200,"**************
*":PRINT@232,"*BIG BUSINESS!*":P
RINT@264,"***************":DIMA(
12)
35 Z$="$$###,###,###":Z1$="###,#
##,###":Z2$="$##.##":L$="LAST QU
ARTER'S":Z3$="$###,###":Z4$=STRI
NG$(8,"*")
40 FORI=1TO4:X=RND(TIMER):READQ$
(I):NEXTI:YE=1984
45 FORI=1TO100:J=RND(TIMER):Z=RN
D(30)+10:X=RND(360):NEXT:X1=X:SA
=RND(10)*1000000
50 FORI=1TO10:JZ(I)=1000000:CC(I
)=1:SP(I)=10:NEXT
55 FORI=1TO10:SF(I)=24+RND(24)-R
ND(24):PM(I)=10000000:SS(I)=1000
0+RND(10000):FW(I)=40+RND(30):WP
(I)=3.5+RND(10):AD(I)=200000+RND
(100000):CD(I)=100000+RND(100000
):QC(I)=100000+RND(100000):PR(I)
=6+RND(0):NEXTI:FORI=1TO3:FORJ=1
TO3:READC(I,J):NEXTJ:NEXTI
60 UP(10)=350000:B=1.5:FORJ=2TO1
0:READ PN$(J):NEXTJ
65 REM
70 GOSUB935:PRINTBS$:FORJ=1TO200
0:NEXTJ
75 J1=RND(5)+5
80 CLS:PRINT@225,"ENTER THE NUMB
ER OF PLAYERS";:INPUT NP:IF NP<1
 OR NP>10 THEN80 ELSEFORI=1TO NP
:PRINT"WHO IS PLAYER NUMBER ";I;
:INPUT PN$(I):NEXTI
85 FORI=1TO NP:CLS:PRINT@74,PN$(
I);" INC."
90 PRINT@128,"YOU ARE ABOUT TO S
TART UP AND   RUN A LARGE MANUFA
CTURING OPER- ATION.":PRINT:PRIN
T"YOUR COMPANY WILL BE MANUFACT-
  URING 'ENERTABS' ,A NEW AND PO
W-ERFUL ENERGY STORAGE SYSTEM(SI
- MILAR TO A BATTERY BUT BETTER)
.":GOSUB1005
95 CLS:PRINT@96,PN$(I)" INC. HAS
 SOLD 1,000,000"," SHARES AT $10
.00 PER SHARE.":PRINT"BUT YOU HA
```

15
10
5
1
Jan Feb Mar

VE BEEN AUTHORIZED A TOTAL OF 2
,000,000 SHARES."
100 PRINT:PRINT"THE LOCAL BANKER
S FEEL THAT YOURCOMPANY HAS A GO
OD CHANCE OF   SUCCESS AND HAS
GRANTED YOU A $10,000,000 LINE
 OF CREDIT":IR(I)=RND(4)+RND(100
)/100+7:PRINT;"AT "IR(I)"%."
105 GOSUB1005
110 CLS:PRINT@74,PN$(I);" INC.":
PRINT@96,"YOUR COMPANY WILL BE I
N COMPETI-TION WITH SEVERAL OTHE
RS":PRINT:PRINTBS$:PRINT:PRINT"I
T HAS BEEN ESTIMATED THAT THE E
NERTAB INDUSTRY WILL SELL ABOUT"
;:PRINTUSINGZ1$;ES;:PRINT" UNITS
 FOR THE":PRINT"COMING YEAR."
115 GOSUB1005:
120 CLS:PRINT@128," YOUR CONTRAC
T IS FOR";J1;"YEARS.":PRINT@192,
"YOUR JOB, AS COMPANY PRESIDENT
, IS TO MAXIMIZE THE COMPANY'
 PROFITS AND MAKE YOUR COMPANY
 THE NUMBER ONE 'ENERTAB' COMPAN
Y.":GOSUB1005
125 REM***START UP DECISSIONS***
130 CLS:PRINTPN$(I):PRINT"YOU HA
VE TO DECIDE BETWEEN FOUR PLANT
LOCATION.THE CHEAPER THE PLANT,
THE MORE REMOTE IT IS."
135 PRINT" SITE NUMBER","   PRI
CE"
140 B(1)=8000000+RND(5)*100000:P
RINT@224,"   1":PRINT@239,USIN
GZ$;B(1)
145 B(2)=7500000+RND(4)*100000:P
RINT@256,"   2":PRINT@271,USIN
GZ$;B(2)
150 B(3)=7000000+RND(4)*100000:P
RINT@288,"   3":PRINT@303,USIN
GZ$;B(3)
155 B(4)=6800000+RND(20)*10000:P
RINT@320,"   4":PRINT@335,USIN
GZ$;B(4)
160 GOSUB1010:IF B9=1 AND VAL(A$
)=0 THEN RETURN ELSEIF VAL(A$)>4
 OR VAL(A$)<1 THEN160
165 FORII=1TO4:IFVAL(A$)=II THEN
PM(I)=PM(I)-B(II): BC(I)=BC(I)+B
(II):B1(I)=BC(I)
170 IFVAL(A$)=II THEN TC(I)=1+(I
I/8)
175 NEXTII:NB(I)=NB(I)+1:IFD<>0T
HEN RETURN
180 REM***SELECT MACHINERY***
185 CLS:PRINT@42,PN$(I)" INC.":P
RINT@64,"NOW YOU MUST EQUIP YOUR
 PLANT.   THERE ARE THREE BASIC M
ACHINES   TO CHOOSE FROM AND THRE

E DIFFER-ENT SUPPLIERS.":PRINT
190 PRINT"THE DIFFERENCE IN THE
THREE   MACHINES IS THE RATE O
F PRODUC-TION.THE DIFFERENCE IN
 THE THREECOMPANIES IS THE AMOUN
T OF QUAL-ITY THAT EACH ONE BUIL
DS INTO   THEIR MACHINES.":GOSUB
1005
195 CLS:PRINT@96,"COMPANY 'A' PU
TS OUT THE BEST   'ENERTAB' MACH
INE THAT MONEY CAN BUY":PRINT:PR
INT"COMPANY 'B' PUTS OUT A GOOD
 'EN-ERTAB' MACHINE.":PRINT:PRINT
"COMPANY 'C' PUTS OUT THE POORES
T BUT THE CHEAPEST MACHINE":GOSU
B1005
200 CLS:PRINT@42,PN$(I)" INC.":P
RINT" SELECT A MACHINE NUMBER AN
D A   COMPANY LETTER (EX 2B).
205 PRINT@130,"FUNDS AVAILABLE:"
;:PRINTUSINGZ$;PM(I):PRINT@130,"
UNITS":PRINT@147,"COMPANY":PRINT
" PER DAY   A   B   C"
210 IFA=1THEN A3=150000ELSEIFA=2
THEN A3=104000ELSEIF A=3THEN A3=
62000
215 PRINT"1) 580 $19,600 $16,80
0 $14,000":PRINT:PRINT"2) 400 $
15,400 $13,000 $11,000":PRINT:PR
INT"3) 250 $9,380 $8,400 $6,7
00":INPUTA$
220 INPUT"ENTER HOW MANY (ENTER
0 TO EXIT";J:PRINT@384,CHR$(30):
IF J=0 AND NM(I)=0 THEN PRINT"BU
T HOW WILL YOU PRODUCE YOUR ENER
TABS WITH NO MACHINES":FOR J=1TO
2500:NEXTJ:GOTO200
225 PRINT:IF J=0 AND B9=1 THEN
RETURN ELSEIF J>19 THEN 1160 ELS
E A=VAL(LEFT$(A$,1)):A$=RIGHT$(A
$,1):IF A$="A" OR A$="B" OR A$="
C" THEN 230 ELSE GOSUB1015:GOTO
200
230 IF A=1 OR A=2 OR A=3 THEN 23
5ELSE GOSUB1015:GOTO200
235 IFA=1THEN A3=150000ELSEIFA=2
THEN A3=104000ELSE A3=62400
240 IFA$="B"ORA$="A"ORA$="C"THEN
245ELSEGOSUB1015:GOTO200
245 IFA$="A"THEN A1=1:MF(I)=MF(I
)+1*J
250 IFA$="B"THENA1=2:MF(I)=MF(I)
+2*J
255 IFA$="C"THENA1=3:MF(I)=MF(I)
+3*J
260 NM(I)=NM(I)+J:IF NM(I)/20>NB
(I) THEN GOTO1155 ELSE CP(I)=CP(
I)+J*A3:P=C(A,A1)*J:MC(I)=MC(I)+
P:PM(I)=PM(I)-P:M1(I)=MC(I):IFPM

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(I)<ØTHENGOSUB1025:GOTO200
265 FOR KB=1TO J:IF A=1THEN MN$(
I)=MN$(I)+"+58"ELSEIFA=2THEN MN$
(I)=MN$(I)+"+40"ELSEIFA=3THEN MN
$(I)=MN$(I)+"+25"
270 NEXTKB
275 PRINT@418,"DO YOU WISH TO MA
KE ANOTHER        PURCHASE(Y/N)":GO
SUB1005:IFA$="Y"THEN200
280 IF D<>Ø THEN RETURN
285 NEXTI:I=Ø
290 CLS:PRINT@234,"WORKING!"
293 REM*****ADD OTHER COMPANIES*
***
300 REM****COMPUTER SELECT BUILD
ING****
305 FORI1=(NP+1)TO10:SOUND(RND(2
30)),1
310 P=RND(4)
315 ON P GOTO 320,325,330,335
320 B1(I1)=8000000+RND(5)*100000
:TC(I1)=1.125:GOTO340
325 B1(I1)=7500000+RND(4)*100000
:TC(I1)=1.25:GOTO340
330 B1(I1)=7000000+RND(4)*100000
:TC(I1)=1.375:GOTO340
335 B1(I1)=800000+RND(20)*10000:
TC(I1)=1.5
340 PM(I1)=PM(I1)-BC(I1):BC(I1)=
BC(I1)+B1(I1):NB(I1)=NB(I1)+1:IF
 B9=1 THEN RETURN ELSE NEXTI1
345 REM****COMPUTER SELECT MACHI
NES*****
350 FORI1=(NP+1)TO10:AT=Ø:SOUND(
RND(230)),1
355 PP=RND(3):P=RND(3):ON P GOTO
 360,365,370
360 MN$(I1)=MN$(I1)+"+58":A=1500
00:GOTO375
365 MN$(I1)=MN$(I1)+"+40":A=1040
00:GOTO375
370 MN$(I1)=MN$(I1)+"+25":A=6240
0
375 ON PP GOTO 380,385,390
380 MF(I1)=MF(I1)+1:GOTO395
385 MF(I1)=MF(I1)+2:GOTO395
390 MF(I1)=MF(I1)+3
395 NM(I1)=NM(I1)+1:MC(I1)=MC(I1
)+C(P,PP):CP(I1)=CP(I1)+A:IF B9=
1THEN RETURNELSEIF CP(I1)>190000
0+RND(1000000)-RND(1000000)THEN4
00ELSE355
400 M1(I1)=MC(I1):NEXTI1:GOTO425
405 REM*******RAISE MONEY*******
410 CLS:PRINT@225," YES. MONEY D
OES MATTER.":GOSUB1165:PRINT" WO
ULD YOU LIKE TO SELL MORE    STO
CK (ENTER Y OR N)";:INPUTA$:IF A
$="Y" THEN415ELSE RETURN
415 PRINT" HOW MANY MORE SHARES
WOULD YOU LIKE TO SELL.";:INPUT
A:IF A+JZ(I)>2000000 THEN PRINT"
 BUT YOU ARE ONLY AUTHORIZED
";2000000-JZ(I);" MORE SHARES.":
GOSUB1165:GOTO415
420 PRINT" YOU SOLD ";A;" SHARES
":O=SP(I)-RND(Ø):PRINT" FOR ";IN
T(O*100)/100" DOLLARS/SHARE":GOS
UB1165:JZ(I)=JZ(I)+A:RETURN
425 REM********** QUARTERLY INPU
T DECISSIONS***********
430 B9=1:IF Q=4THEN YE=YE+1:Q=Ø:
GOSUB935:PRINT:PRINTBS$:GOSUB100
5:IF YE=1984+J1 THEN KK=1:GOTO88
5
435 Q=Q+1:D=1
440 I=I+1:IF XX(I)=-1 THEN I=I+1
:IF I>NP THEN545
445 IFI>NP THEN I=Ø:GOTO545
450 GOTO460
455 CLS:PRINT@0,Z4$:PRINT@9,PN$(
I)" INC.":PRINT@24,Z4$;:PRINT@32
," YEAR "YE,Q;Q$(Q)" QUARTER":PR
INT@68,"E.A.S. :";:PRINTUSINGZ1$
;ES:PRINT" FUNDS AVAILABLE:";:P
RINTUSINGZ$;PM(I):RETURN
```


115
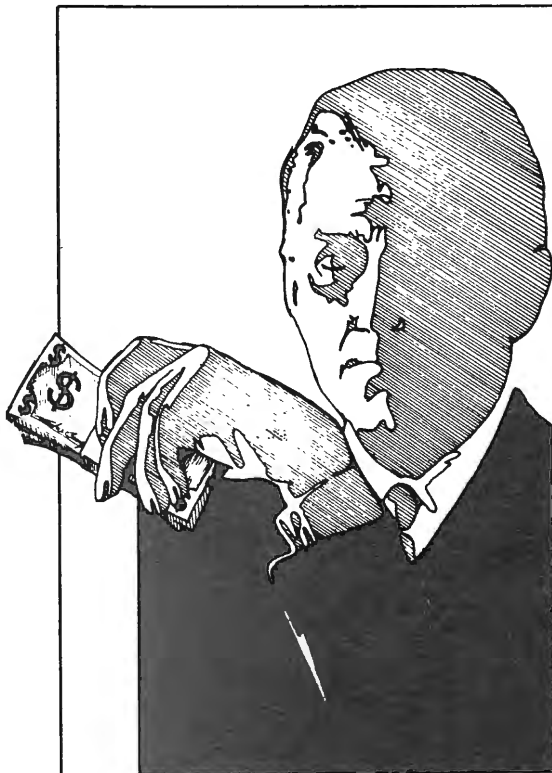
```
460 GOSUB455:PRINT:PRINT"HOW MAN
Y MORE ENERTABS WILL YOU PRODUCE
   THIS QUARTER?":PRINT:PRINT"CURR
ENT INVENTORY=";INT(CI(I)):PRINT
:PRINTL$" SALES=";INT(US(I)):PRI
NT:PRINTL$" PROD.:"INT(UP(I)):IN
PUT A: UP(I)=UP(I)+A:IF UP(I)<1T
HEN UP(I)=0
465 GOSUB455:PRINT:PRINT"HOW MAN
Y MORE SALESMEN WILL YOU HIRE?":
PRINT:PRINTL$" SALES FORCE=";INT
(SF(I)):PRINT:PRINTL$" SALES="IN
T(US(I)):INPUTA:SF(I)=SF(I)+A
470 GOSUB455:PRINT:PRINT"HOW MUC
H MORE WILL YOU PAY EACH SALESMA
N(PER YEAR).":PRINT:PRINTL$" SAL
ARY=";:PRINTUSINGZ3$;SS(I):INPUT
 A:SS(I)=SS(I)+A:IFA<0THEN R1(I)
=R1(I)+5 ELSEIF A<251 THEN RN(I)
=RN(I)+1 ELSEIFA>500 THEN RN(I)=
0:R1(I)=0
475 GOSUB455:PRINT:PRINT"HOW MAN
Y MORE FACTORY WORKERS   WILL YO
U HIRE?":PRINT:PRINTL$" # OF WOR
KERS="FW(I):INPUT A:FW(I)=FW(I)+
A:IF FW(I)<1THENFW(I)=0
480 IF FW(I)<NM(I)*(2+RND(0))THE
N R2(I)=R2(I)+1
485 IF FW(I)<NM(I) THEN UP(I)=UP(
I)*(FW(I)/NM(I))
490 PRINT:PRINT"HOW MUCH MORE WI
LL YOU PAY THEM (PER HOUR)":PRIN
TL$" RATE=";:PRINTUSINGZ2$;WP(I)
:INPUT A:WP(I)=WP(I)+A:IF A>0 AN
D A<=.25   THEN R3(I)=R3(I)+.25 E
LSE IF A<0 THEN R4(I)=R4(I)+5 EL
SEIFA>1 THEN R3(I)=0:R4(I)=0
```



```
495 GOSUB455:PRINT:PRINT" HOW MU
CH MORE WILL YOU SPEND ON     AD
VERTISING?":PRINTL$" ADS. EXPEND
ITURE:";:PRINTUSINGZ3$;AD(I):INP
UT A:AD(I)=A+AD(I)
500 PRINT:PRINT"HOW MUCH MORE WI
LL YOU SPEND ON RESEARCH AND DEV
ELOPMENT.":PRINTL$" EXPENDITURE
FOR R&D:";:PRINTUSINGZ3$;CD(I):I
NPUT A:CD(I)=A+CD(I)
505 GOSUB455:PRINT:PRINT"HOW MUCH MORE
  WILL YOU SPEND FOR QUALITY CONT
ROL":PRINTL$" Q.C. EXPENDITURE:"
;:PRINTUSINGZ3$;QC(I):INPUT A:QC
(I)=A+QC(I)
510 GOSUB455:PRINT:PRINT"HOW MUC
H MORE WILL YOU CHARGE   FOR YOU
R  ENERTABS THIS QUARTER?":PRINT
:PRINTL$" PRICE:$"(INT(PR(I)*100
))/100:PRINT:PRINT"INDUSTRY AVER
AGE";:PRINTUSINGZ2$;P4:INPUT A:P
R(I)=A+ PR(I)
515 REM****DECISION REVIEW****
520 GOSUB455:PRINT"********DECIS
ION REVIEW*********";:PRINT"1. U
NITS TO PRODUCE:";UP(I):PRINT"2.
  SALES FORCE:";SF(I):PRINT"3. SA
LESMEN SALARY:";SS(I):PRINT"4. #
 OF FACTORY WORKERS:"FW(I)
525 PRINT"5. WORKERS PAY/HOUR:"W
P(I):PRINT"6. AD. EXPENDITURE:"A
D(I):PRINT"7. R&D EXPENDITURE:"C
D(I):PRINT"8. Q.C. EXPENDITURE:"
QC(I):PRINT"9. SELLING PRICE:"(I
NT(PR(I)*100))/100:PRINT:PRINT"
PRESS 'X' TO MAKE A CHANGE.":GOS
UB1010:IFA$="X" THEN I=I-1:GO
530 CLS:PRINT@102,"  "PN$(I)" IN
C.":PRINT:PRINT"1. MONEY MATTERS
 ":PRINT"2. BUY ANOTHER BUILDING
":PRINT"3. BUY MORE MACHINES":PR
INT"4. CONTINUE":PRINT"5. QUIT":
GOSUB1005:A=VAL(A$):IFA<1THEN540
ELSE ON A GOSUB 405,130,200,540,
535:GOTO530
535 KK=1:CLS:PRINT@234,"SUMMATIO
N":GOSUB1170:END
540 GOTO440
545 REM****ADD MORE PLAYERS****
550 I=0:CLS:PRINT@234,"WORKING H
ARD!!":FOR J=1TO10:IF XX(J)=-1 T
HEN US(J)=0:NEXTJ
555 FORI1=(NP+1)TO9:SOUND RND(20
0),1:UP(I1)=(ES/4*K)-CI(I1):IF S
F(I1)<P3 THEN SF(I1)=SF(I1)+RND(
SF(I1))ELSESF(I1)=SF(I1)-2
560 IF CI(I1)<1THEN UP(I1)=UP(I1
)*1.15 ELSEIF CI(I1)>100000 THEN
 UP(I1)=UP(I1)-(CI(I1))/2
```

```
565 IF SS(I1)<P5 THEN SS(I1)=SS(
I1)+RND(500)+100
570 FW(I1)=FW(I1)+NM(I1)*3
575 IFWP(I1)< .7*P6 THEN WP(I1)=
WP(I1)+1+RND(0)
580 IF AD(I1)<P1 THEN AD(I1)=AD(
I1)*(((RND(10)+5)/100)+1)ELSE AD(
I1)=AD(I1)*(1-(RND(5))/100)
585 IFRND(4)>2 AND CD(I1)<IA THE
N CD(I1)=CD(I1)*(1+RND(10)/100)
):GOTO595
590 IFRND(10)<3THEN CD(I1)=CD(I1
)*(1-(RND(10)/100))
595 IFQC(I1)<P2 THEN QC(I1)=QC(I
1)*(1+(RND(0)/10))ELSEQC(I1)=QC(
I1)*(.9+(RND(0)/10))
600 PR(I1)=(CO(I1)*1.5)/(UP(I1)+
CI(I1))
605 IF CI(I1)<10000THEN PR(I1)=P
R(I1)*(1.1+RND(0)/10):GOSUB355
610 IF PR(I1)<5.5 THEN PR(I1)=5.
5+RND(0)
615 IF CI(I1)>300000THEN PR(I1)=
PR(I1)*.90:UP(I1)=0
620 IF EQ(I1)<-100000THEN SF(I1)
=SF(I1)*.9:SS(I1)=SS(I1)*.9:WP(I
1)=WP(I1)*.9:AD(I1)=AD(I1)*.9:CD
(I1)=CD(I1)*.9:QC(I1)=QC(I1)*.9:
PR(I1)=P4+RND(0)-RND(0)
625 IF NM(I1)=19 THEN GOSUB 310
630 NEXTI1:PR(10)=6.5:UP(10)=450
000
635 REM*******FIGURES THE NUMBER
 OF MACHINES AND PLANT CAPACITY*
*******
640 GOTO645:FORJ=1TO10:L1=0:L=LE
N(MN$(J)):FORK=1TO L STEP3:G=INS
TR(K,MN$(J),"+"):G$=MID$(MN$(J),
G,3):L1=L1+VAL(G$):NEXTK:NM(J)=L
/3:CP(J)=65*L1*10:NEXTJ
645 REM*****CHECK UP VS. CP*****
*
650 FORI1=1TO10:SOUND(RND(200)),
1:IF UP(I1)>CP(I1)/4 THEN UP(I1)
=CP(I1)/4
655 NEXTI1
660 REM*****DETERMINE COMPANY SA
LES****
665 REM*****AD SCORES*****
670 K=10:P1=0:P2=0:P3=0:P4=0:P5=
0:P6=0:DT=0:FORI1=1TO10:IF XX(I1
)=-1 THEN SS(I1)=0:WP(I1)=0:PR(I
1)=0:CD(I1)=0:SF(I1)=0:QC(I1)=0:
AD(I1)=0:K=K-1
675 NEXTI1
680 FORI1=1TO10:IFPR(I1)<0THEN68
5ELSE P4=P4+PR(I1)/K
685 NEXTI1
690 FOR I1=1TO10:P5=P5+SS(I1)/K:
```

```
P6=P6+WP(I1)/K:P3=P3+SF(I1)/K:P1
=P1+AD(I1)/K:P2=P2+QC(I1)/K:NEXT
I1:FORI1=1TO10:AV(I1)=SF(I1)/P3:
AQ(I1)=AD(I1)/(P1):QS(I1)=QC(I1)
/P2:NEXT I1
695 REM*****PRICE SCORE******
700 FORI1=1TO10:IF XX(I1)=-1THEN
705ELSEIF PR(I1)<0THEN705ELSE PS
(I1)=(P4)/PR(I1)
705 NEXTI1
710 REM***DESIGN POINTS***
715 FOR I1=1TO10:DT=DT+CD(I1):NE
XTI1
720 IA=DT/K:FORI1=1TO10:DS(I1)=C
D(I1)/IA:GOSUB1035:NEXTI1
725 REM*****TOTAL SCORE*****
730 REM*****PENALTIES******
735 P=0:FORI1=1TO10:TS(I1)=DS(I1
)+1.5*AQ(I1)+QS(I1)+AV(I1)+2*PS(
I1):P=P+TS(I1)
740 IF PR(I1)>P4*(1.2+(2*RND(0))
/10) THEN TS(I1)=TS(I1)/2
745 IFPR(I1)>P4*2 THEN TS(I1)=TS
(I1)/10
750 A(I1)=PR(I1):NEXTI1:K1=0
755 FORI1=1TO10: IF A(I1)=0 THEN7
65 ELSE IFA(I1)>=A(I1+1)THEN765
760 B=A(I1+1):A(I1+1)=A(I1):A(I1
)=B
765 NEXTI1:K1=K1+1:IFK1<10THEN75
5
770 FORI1=1TO10: IF PR(I1)>A(10)*
1.5THEN TS(I1)=TS(I1)/(PR(I1)-A(
10))
775 A=0:FOR I1=1TO10: IF XX(I1)=-
1 THEN US(I1)=0:GOTO785
780 US(I1)=(TS(I1)/P)*SA:A=A+US(
I1):IF US(I1)>UP(I1)+CI(I1) THEN
 US(I1)=UP(I1)+CI(I1)
785 NEXTI1
790 IF SA-A>20 THEN795ELSE815
795 A1=0:FOR J=1TO10:IF CI(J)>20
 THEN A1=A1+TS(J)
800 NEXTJ:IF A1<1THEN815
805 A2=0:A2=SA-A:FOR J=1TO10: US
(J)=US(J)+(TS(J)/A1)*A2:IF US(J)
>UP(J)+CI(J)THEN US(J)=UP(J)+CI(
J)
810 NEXTJ
815 FORJ=1TO 10:CI(J)=CI(J)+UP(J
)-US(J):NEXTJ
820 REM**********ACCOUNTING****
******
825 REM******COST******
830 FORI1=1TO10:SOUND(RND(250)),
1:C1(I1)=SF(I1)*SS(I1)*1.05:C2(I
1)=WP(I1)*WF(I1)*535.5:C3(I1)=US
(I1)*PR(I1)*.16:C4(I1)=TF(I1)*UP
(I1)*.1:C5(I1)=UP(I1)*(1+(RND(0)
```

117

```
/10)):C6(I1)=BC(I1)*.00739
835 C7(I1)=.0001*MF(I1)*UP(I1)/N
M(I1):C8(I1)=.6*BC(I1)/80:C9(I1)
=MC(I1)/40:B1(I1)=B1(I1)-C8(I1):
M1(I1)=M1(I1)-C9(I1):NEXTI1
840 FORI1=1TO10:CO(I1)=C1(I1)+C2
(I1)+C3(I1)+C4(I1)+C5(I1)+C6(I1)
+C7(I1)+C8(I1)+C9(I1)+QC(I1)+AD(
I1)+CD(I1)+PN(I1):PN(I1)=0:CO(I1
)=CO(I1)*CC(I1)
845 REM****PLAYERS MONEY+SALES-
COST
850 EQ(I1)=US(I1)*PR(I1)-PN(I1):
PM(I1)=PM(I1)+PM(I1)*(IR(I1)/100
)+EQ(I1)-CO(I1):SP(I1)=(PM(I1)+M
1(I1)+B1(I1))/JZ(I1)
855 IF EQ(I1)<0THEN SP(I1)=SP(I1
)*.75+RND(0)
860 IF SP(I1)<0 THEN SP(I1)=.05
865 NEXTI1
870 FORJ=1TO10:IF PM(J)<-1000000
0 AND SP(J)<.1 THEN SP$(J)="BANK
RUPT":XX(J)=-1:SP(J)=0:GOTO880
875 SP(J)=(INT(SP(J)*100))/100:S
P$(J)=STR$(SP(J))
880 NEXTJ
885 CLS:PRINT@32," COMPANY","STO
CK PRICE":FORJ=1TO10:PRINT@64+J*
32,PN$(J),SP$(J):NEXTJ:GOSUB1005
:IF KK=1 THEN 1170 ELSEGOTO425
890 REM******SORT******
895 K=0:FORJ=1TO10:A(J)=SP(J):YY
$(J)=PN$(J):NEXTJ
900 FOR J=1TO10
905 IF A(J)>=A(J+1)THEN920
910 B=A(J+1):A(J+1)=A(J):A(J)=B
915 C$=YY$(J+1):YY$(J+1)=YY$(J):
YY$(J)=C$
920 NEXTJ
925 K=K+1:IF K<10THEN 900
930 RETURN
935 REM***FIGURES TOTAL SALES***
940 X=X+8
945 Y=57*SIN(X/Z):Y1=57*SIN((X+4
)/Z)
950 SL=(Y1-Y)/4:IF SGN(SL)<>SGN(
SL(0))THENZ=RND(30)+10
955 SA=SA+(SA*INT((SL)))/50:IF S
A<2000000THEN SA=2000000+RND(100
000)
960 ES=INT(4*(SA+RND(SA*.2)-RND(
SA*.2))):ES=INT(ES/100000)*10000
0
965 SL(0)=SL:IN=(5+SL)/100
970 IF SL>3 THEN BS$="THE GROSS
NATIONAL PRODUCT FOR   THE LAST Q
UARTER TOOK A HUGE      LEAP UPWAR
D. BUSINESS ACTIVITY  IS BRISK."
:RETURN
```

```
975 IF SL>2THEN BS$="THE CURRENT
 BUSINESS CLIMATE     APPEARS TO
BE VERY GOOD.":RETURN
980 IF SL>1 THEN BS$="THE GROSS
NATIONAL PRODUCT WAS   UP LAST QU
ARTER. THINGS MAY BE    LOOKING UP
.":RETURN
985 IF SL>0 THEN BS$="THE ECONOM
Y WAS UP ONLY SLIGHTLYLAST QUART
ER. THIS MAY BE A TIMEFOR CAUTIO
N.":RETURN
990 IF SL>-1 THEN BS$="THE GROSS
 NATIONAL PRODUCT WAS   SLIGHTY O
FF (DOWN) FOR THE PAST QUARTER.
THINGS COULD GO EITHER WAY.":RET
URN
995 IF SL>-2 THEN BS$="THE ECONO
MY IS DEFINITELY OFF.  ONLY THE
PRESIDENT IS PREDICTINGAN UPSWIN
G.":RETURN
1000 BS$="THE GNP DROPPED LIKE A
 ROCK.       THINGS COULDN'T GET WO
RSE      (I THINK).":RETURN
1005 A=0:A$="":PRINT@480,"    PRE
SS ANY KEY TO CONTINUE":SOUND 10
0,3
1010 A$=INKEY$:IFA$=""THEN1010EL
SERETURN
1015 CLS:SOUND1,10:PRINT@226,"IN
CORRECT INPUT! TRY AGAIN."
1020 FORI1=1TO2000:NEXTI1:RETURN
1025 SOUND1,10:PRINT:PRINT"YOU C
ANNOT AFFORD THAT.YOU ONLY HAVE"
;:PM(I)=PM(I)+P:PRINTUSINGZ$;PM(
I):GOSUB1020:RETURN
1030 REM*******SPECIAL SITUATION
S********************
1035 IF I1>NP THEN RETURN
1040 IF XX(I1)=-1 THEN 1095 ELSE
 IFQC(I1)<P2*.6THEN PN(I1)=PN(I1
)+US(I1)*PR(I1)*.5:CLS:PRINT@200
,PN$(I1):PRINT@224,"THE CPSC HAS
 DETERMINED THAT THEENERTABS THA
T YOUR COMPANY PRO- DUCED THIS Q
UARTER ARE UNSAFE.  YOU MUST REC
ALL AND DESTROY THEM!:GOSUB215
1045 IF XX(I1)=-1 THEN 1095 ELSE
 IF SS(I1)<P5*.6 THEN CLS:PRINT@
192,"DISGRUNTLED SALESMEN AT";PN
$(I1)" INC. ARE STAGING A 'SICK-
OUT'.":PRINT"IT APPEARS THAT THE
Y ARE UPSET   ABOUT LOW PAY.":AV(
I1)=AV(I1)*.5:GOSUB1165
1050 IF CD(I1)>IA*2 THENCLS:PRIN
T@192,"GREAT NEWS!! SCIENTISTS A
T ":PRINTPN$(I1)" INC. HAVE DEVE
LOPED":PRINT"A CHEAPER PROCESS F
OR MAKING    ENERTABS."PN$(I1)"
INC. HAS":PRINT"REDUCED ITS COST
```

```
       BY";:CC(I1)=CC(I1)-RND(Ø)/10:PR
INTCC(I1)"%":GOSUB1165
1055 IF WP(I1)<3.5 THENCLS:PRINT
@224," THE FACTORY WORKERS REFUS
ED TO WORK FOR SO LITTLE. NONE O
F THEM CAME TO WORK. SUPERVISORY
 PER- SONNEL COULD ONLY PUT OUT
20% OFTHE SCHEDULED WORK.":UP(I1
)=UP(I1)*.2:PN(I1)=-520*WP(I1):G
OTO1095
1060 IF R1(I1)>RND(10) THENCLS:P
RINT@192,"SALESMAN AT ";PN$(I1):
PRINT"ARE UPSET OVER A RECENT PA
Y CUT.ONLY 10% OF THEM ARE REPOR
TING   FOR WORK.":AV(I1)=AV(I1)*.
1:GOSUB1165
1065 IF R4(I1)>RND(10) THEN CLS:
PRINT@192,"WORKERS AT "PN$(I1)"
INC.":PRINT"ARE UPSET ABOUT THE
RECENT PAY  CUT. PRODUCTION IS D
OWN 45%.":UP(I1)=UP(I1)*.55:FOR
J=1TO2500:NEXT J
1070 IF RN(I1)>RND(10) THENCLS:P
RINT@192,"FOR SOME UNKNOWN REASO
N THE      PERSONNEL AT "PN$(I1)"
 INC":PRINT"SEEM TO BE ON A WORK
 SLOW-DOWN.":UP(I1)=UP(I1)*.75:A
V(I1)=AV(I1)*.75:GOSUB1165
1075 IF R2(I1)>RND(10)THEN CLS:P
RINT@192,"THE FACTORY WORKERS AT
 ":PRINTPN$(I1)" INC. HAVE STAGE
D":PRINT"A WILD-CAT STRIKE. TOO
MUCH WORKSEEMS TO BE THEIR BIGGE
ST COM-  PLAINT. ONLY 35% SHOWED
 UP FOR   WORK.":FOR J=1TO2500:NE
XTJ:UP(I1)=UP(I1)*.65
1080 IF R3(I1)>RND(10) THENCLS:P
RINT@192,"WORKERS AT ";PN$(I1)"
INC.":PRINT"ARE UPSET OVER THE L
ACK OF A     SIGNIFICANT PAY RAIS
E OVER THE   PAST FEW QUARTERS .
OUTPUT IS    DOWN 15%."UP(I1)=UP(
I1)*.85:FOR J=1TO2500:NEXT
1085 IF FW(I1)/3<NM(I1) THENCLS:
PRINT@192,PN$(I1)" INC. DID NOT
HIRE ":PRINT"ENOUGH WORKERS TO S
TAFF THEIR    PLANT! PRODUCTION W
AS OFF";:J=(INT(((FW(I1)/3)/(NM(
I1)))*100))/100:PRINTINT((1-J)*1
00)"%":UP(I1)=UP(I1)*(J):GOSUB11
65
1090 IF WP(I1)<P6*.6 THENCLS:PRI
NT@192,"THE WORKERS AT "PN$(I1):
PRINT"HAVE GONE OUT ON STRIKE! T
HERE   SEEMS TO BE A PROBLEM WITH
 THEIRPAY RATE.":UP(I1)=UP(I1)*.
5:FORJ=1TO2500:NEXTJ
1095 RETURN
1100 DATA ST,ND,RD,TH,19600,1680
```



```
0,14000,15400,13000,11000,9380,8
400,6700
1105 DATA KAYTRAN,DELMAR,OHCAL,E
NPLUS,DYNOTON,ELCONON,PHAZON,TAL
CO,SIMTRON
1155 PRINT"YOUR PLANT WILL NOT A
CCOMMODATE SO MUCH EQUIPMENT":NM
(I)=NM(I)-J:FOR J=1 TO 2500:NEXT
J:GOTO225
1160 PRINT"THE MANUFACTURER CANN
OT FILL SO LARGE AN ORDER AT ONE
  TIME":FOR J=1 TO 2500:NEXTJ:GOT
O200
1165 FORJ=1TO2500:NEXTJ:RETURN
1170 REM END GAME
1175 GOSUB890
1180 CLS:PRINT:PRINT"FINAL STAND
INGS":PRINT"COMPANY","STOCK PRIC
E":FORJ=1TO 10:PRINTJ" "YY$(J),A
(J):NEXTJ
1185 GOSUB1165
1190 FORJ=1TO NP:FORI=1TO10:IF Y
Y$(I)=PN$(J)THEN1200ELSENEXTI
1195 NEXTJ
1200 REM******CRITIC******
1205 CLS:PRINT@65,PN$(J)" YOUR P
ERFORMANCE":IF I=1 THENPRINT" WA
S OUTSTANDING! YOU ARE TRULY EXE
CUTIVE MATERIAL.":END
1210 IF I=2THENPRINT" WAS VERY G
OOD. WITH A LITTLE   MORE WORK I
'M SURE YOU CAN MAKE IT TO THE T
OP.":END
1215 IF I=3 THENPRINT" WAS GOOD
BUT YOUR CONTRACT WILL NOT BE RE
NEWED.HOWEVER, I'M    SURE THAT
YOU WON'T HAVE MUCH    TROUBLE FI
NDING A NEW JOB.":END
1220 IF I=4 THENPRINT " WAS ONLY
 FAIR. OUR STOCK HOLD- ERS DESER
VE BETTER. PLEASE SUB- MIT YOUR
RESIGNATION IN THE      MORNING."
:END
1225 IF I=5 THENPRINT " WAS POOR
! YOU ARE FIRED!":END
1230 PRINT" WAS A DISASTER FOR O
UR COMPANY.FIND SOME OTHER LINE
OF WORK":END
```
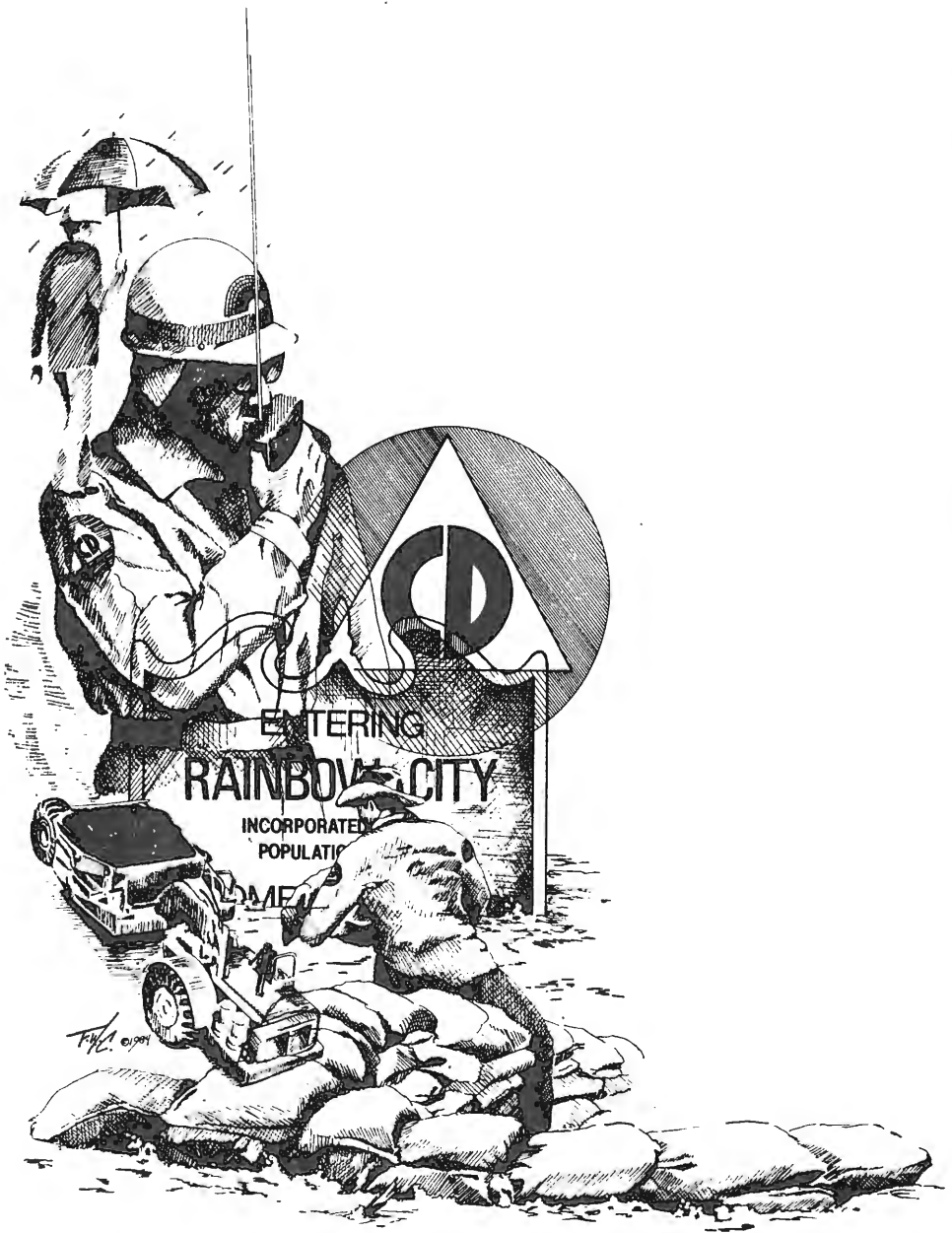
(Greg Clark, a technician for Nynex, enjoys writing Adventure programs, watching Grand National Stock Car races and reading science fiction.)

FLOOD

GREGORY CLARK

That steady patter on the roof has been thumping away at your subconscious all evening, creeping into your dreams and turning them into nightmares, giving you those sudden starts and leading your spouse to suggest that you might be more comfortable in the spare bedroom.

You welcome the phone call in the wee hours of the morning almost with relief because, from years of experience as the civil defense coordinator for Rainbow City, you know that such prolonged downpours are inconveniencing somebody.

This time, the caller reports, the city's very existence could be threatened because the normally tranquil Rainbow River has suddenly been transformed into a raging monster.

You arrive at your headquarters with map in hand, along with weather reports, a fleet of trucks, a stockpile of sandbags, and dozens of volunteers at your disposal. You must move quickly and use your resources wisely, however, if you expect to be successful.

There will be a lot of confusion, as in any disaster scenario, and split-second decisions must be made about where to use men and materials. You also must watch the fuel availability for the trucks and bulldozers, because there is a limited supply.

The length of the game you choose, from one to 10 minutes, will determine how much fuel is available. The time remaining in the game is displayed at regular intervals. You also may choose challenge levels ranging from one to 10.

Don't expect any help from outside sources because your shortwave radio is playing the tune "Down by the Riverside" on every channel. Fortunately, you wisely

ordered surplus Army walkie-talkies so you are able to communicate within the limits of Rainbow City.

You also must continue to battle the elements throughout the day, including sometimes freezing temperatures, heavy winds and snow.

A high resolution map of the city is available, thanks to CoCo, to help with planning logistics. Another feature enables you to enter horizontal and vertical map coordinates for specific information on sections of town. All land levels are expressed as a decimal number (i.e., 5.5). If the current water level is higher than an area's land level, it means that that section is probably flooded (but not necessarily).

Remember, the area north of the floodgates is a key indicator of just how dangerous the situation is; if the water level to the north is higher than to the south, you can raise the floodgates from one to 10 feet (five is the normal level).

And just in case you were wondering, no, there are no boats available. There are no bailouts in this challenge.

Field Commands

D — Distribute Materials
E — Equipment Inventory
H — Option Menu
K — Map Key
L — Land Level of Sections
M — Display Map
Z — Operate Floodgates

```
1 '%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%% FLOOD! %%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
2 '#############################
### WRITTEN BY:GREGORY CLARK ###
####### 122 MALE AVENUE ########
#### SYRACUSE,NEW YORK 13219 ###
######### 315-487-8406 #########
###############################
3 CLEAR2000
9 CLS:PRINT@195,"IF 'OK' PROMPT
IS PRINTED":PRINT@261,"DO not RE
LOAD PROGRAM":PRINT@328,"JUST 'R
UN' AGAIN"
10 PCLEAR8:PMODE4,1:PCLS:PMODE4,
5:PCLS:CLS:PRINT@64,"  YOUR JOB
IS THE CIVIL DEFENSE CO-ORDINATO
R OF rainbow city.     THIS MORN
ING YOU WERE CALLED  AND ADVISED
  THAT DUE TO HEAVY    RAINS THROU
GH THE NIGHT,rainbow river IS IN
 DANGER OF FLOODING."
15 PRINT"  YOU WILL ARRIVE AT YO
UR HEAD- QUARTERS AT 8A AND.ATTE
MPT TO    PREVENT THE FLOODING OF
  YOUR     CITY. WEATHER REPORTS,M
ATERIALS,PERSONNEL AND A MAP ARE
```

```
AT HAND.-----------GOOD LUCK!---
---------"
16 PRINT@44,"flood":POKE1074,33:
N1$="L8AG#L4AL2CL4DL2FAAL4.AL8G#
AGL4F":N2$="L2GL4.GL8F#L4GFL2EFL
4.FL8EL4FDCL8AG#":N3$="L4AL2CL4D
L2FAAL4.AL8G#L4AGL2F":N4$="L4GL2
GL4B-L2AGL1F
18 PLAY"O2;T2"+N1$+N2$:PLAYN3$+N
4$:FORX=1TO500:NEXTX:PLAY"O3"
19 GOSUB58000:GOTO40
20 CLS(3):POKE1292,6:POKE1293,12
:POKE1294,15:POKE1295,15:POKE129
6,4:POKE1297,33:GOSUB26000:PCOPY
1TO5:PCOPY2TO6:PCOPY3TO7:PCOPY4T
O8:FORX=1TO4:FORY=1TO400:NEXTY:S
CREEN1,1:FORY=1TO400:NEXTY:SCREE
N0,0:NEXTX
22 FORY=1TO400:NEXTY:SCREEN1,1:F
ORY=1TO200:NEXTY:PAINT(25,25),3,
3:FORX=1TO300:NEXTX:SCREEN0,0
25 PRINT@434,"by greg clark":POK
E1465,128:POKE1460,128:POKE1471,
175:GOTO100
40 CLS:PRINT@170,"skill level":P
RINT:INPUT"ENTER SKILL LEVEL DES
IRED (1-10)      1=EASIEST/10=HA
```

```
RDEST       ";V:V=INT(V)
50 IFV<1 OR V>10THENPLAY"L100DP1
0D":GOTO40
60 CLS:PRINT@170,"game length":P
RINT:INPUT"ENTER GAME LENGTH DES
IRED (1-10)";L:L=INT(L)
70 IFL<1 OR L>10THENPLAY"L100DP1
0D":GOTO60
75 CLS:PRINT@77,"note":PRINT@194
,"WHEN THE OPTION map IS CALLED,
THE TIMER AUTOMATICALLY STOPS.
   THIS IS DUE TO THE LONG 'REAL
 TIME' THIS OPTION TAKES TO EX-
ECUTE":GOSUB58000:GOTO20
100 G=10:B=3:I=2000*L-(V*25*L):K
=L*1500-(V*50*L):N=3:BB=L*600-(V
*20*L)
105 DIM FL(9,8),W$(11),AB$(20),J
(10),FS(9,8),WS(9,8)
107 FORO=1TO16:READX:READY:NEXTO
:FORX=1TO10:AB$(X)="7,D":NEXTX:F
ORX=1TO3:AH$(X)="7,D":NEXTX:F=V*
.1
108 DATA 1,1,1,2,2,1,2,2,2,3,2,4
,2,5,3,4,3,5,4,5,5,5,6,5,7,6,7,7
,8,7,9,8
110 TIMER=14400:LA=5:LV=5:GOSUB5
5000:GOSUB28000:D=1:GOSUB49000:W
Q=1:GOSUB37000:WQ=0:TIMER=14400:
FM=14300:Z2=5400-(V*360):Z2=INT(
Z2):Z3=Z2+14400:Z1=TIMER
999 REM MAIN INPUT LINE
1000 POKE65494,0:CLS:GOSUB50000
1100 FORX=1TO16:PRINT"<>";:NEXTX
:PRINT
1150 PRINT"     what do you wish
 to do":POKE1275,63:PLAY"L100;DAD
"
1160 X1=INT(F*100)/100:IFX1<0 AN
D FL<4.5THEN X1=0
1180 PRINT@325,"CURRENT RIVER LE
VEL IS":PRINT@361,"ABOVE DAM="L
N:PRINT@393,"BELOW DAM="LS
1185 IFWS(7,4)=1THENFORX=1TO200:
NEXTX:GOTO1212
1187 IFL+1=D AND TIMER>14400 THE
NSU=1:GOTO24000
1190 LL=TIMER+100
1200 D$=INKEY$:IFD$=""THENIFTIME
R=>LL THEN1000ELSE1200
1210 IFWS=72THENCLS:PRINT@194,"r
ainbow city IS ENTIRELY UNDERWAT
ER-YOU HAVE FAILED------":FORX=1T
O2000:NEXTX:GOTO24000
1212 IFWS(7,4)=1THENCLS:PRINT@19
4,"YOUR HEADQUARTERS ARE FLOODED
,rainbow city HAS BEEN LOST----"
:FORX=1TO2000:NEXTX:GOTO24000
1220 IFD$="H"THENGOSUB28000
1230 IFD$="Z"GOSUB20000
1240 IFD$="M"THENCLS:TT=TIMER:PR
INT@128,"JUST A MINUTE-I KNOW TH
E MAP IS      AROUND HERE SOMEWHE
RE!":PRINT@352,"---WHEN MAP HAS
BEEN DISPLAYED----------TONES WI
LL SOUND------------PRESS SPACE
TO CONTINUE----"
1250 IFD$="M"GOSUB37000:GOSUB250
00:POKE65494,0:TIMER=TT
1260 IFD$="L"THENGOSUB27000
1265 IFD$="E"THENGOSUB40000
1270 IFD$="K"THENGOSUB23000
1290 IFD$="D"THENGOSUB29000
1300 PLAY"L100;D":GOTO1000
19999 REM FLOODGATE
20000 CLS:PRINT@10,"flood gate":
PRINT@64,"THE GATE CONTROLS HOW
MUCH WATERIS HELD BACK INTO THE
RIVER TO   THE NORTH. IF THE GATE
  IS RAISEDmore WATER IS HELD BAC
K-RAISING THE WATER LEVEL TO THE
 NORTH"
20010 PRINT:INPUT"AT WHAT LEVEL
DO YOU WANT THE    GATE SET(1-10)
  note-THE GATE IS SET AT A VALUE
 OF 5 AT THE START/ABOVE 5 RAISE
S THE GATE";LA:IFLA<1 OR LA>10 T
HENPLAY"L100; DP10D":GOTO20010ELS
ELA=INT(LA)
20015 KK=.04+(V*.005)
20017 KL=FL*(LA*KK)
20020 IFLA=5THENLN=FL:LS=FL
20030 IFLA>5THENLN=FL+KL:LS=FL-K
L
20040 IFLA<5THENLS=FL+KL:LN=FL-K
L
20050 IFLN<4THENLN=4
20060 IFLS<4THENLS=4
20072 IFFG=1THENFG=0:GOTO37002
20073 IFUU=1THENUU=0:GOTO49990
20075 IFGF=1THENGF=0:RETURN
20080 CLS:PRINT@7,"updated river
  level":PRINT@160,"LEVEL NORTH O
F THE DAM="LN:PRINT@320,"LEVEL S
OUTH OF THE DAM="LS:WQ=1:K1=TIME
R:GOSUB37000:POKE65494,0:TIMER=K
1:WQ=0:GOSUB58000:RETURN
22999 REM MAP KEY
23000 CLS:PRINT@12,"map key":PRI
NT@64,"location       represents":P
RINT@128,"1 G          SAND PIT":P
RINT@160,"2 B          FLOW OF rai
nbow river":PRINT@192,"2 C
  BRIDGE":PRINT@224,"3 E
DAM":PRINT@256,"4 E          BRIDG
E"
23010 PRINT@288,"4,5,6 E+7 F FLO
OD BANKS"
```

```
23020 PRINT@320,"5 A         NORT
H INDICATOR":PRINT@352,"7 A,B,C
     EXAMPLE OF ROADWAY":PRINT@384
,"7 G         rainbow lake":PRINT
@416,"7 D         HEADQUARTERS(DE
POT)":GOSUB58000:RETURN
23999 REM END GAME
24000 POKE65494,0:CLS:SV$="T303;
L2.CCL2CL8DL2.EL2EL8DL2EL8FL2.GP
4L8CCCGGGEEECCCL2GL8FL2EL8DL2.C"
:SU$="T203;L8CDL2.EFL8AL2.GL2EL8
GL2FL8EL2FL8DL2.EL8CDL2.EL2FL8AL
2.GL2EL8GL2FL8EL2FL8DL2.C"
24001 REM FAILURE
24010 IFSU=1THENPLAYSU$:GOTO2412
0ELSECLS(0):PLAYSV$
24020 V5=1055:CLS(0):FORX=1TO15:
PRINT"failure"CHR$(128)"failure"
CHR$(128)"failure"CHR$(128)"fail
ure":POKEV5,128:V5=V5+32:NEXTX
24030 PLAYSV$:FORX=1TO500:NEXTX:
CLS:PRINT@224,"PERHAPS,NEXT TIME
 WILL BE BETTER":FORX=1TO500:NEX
TX:END
24098 END
24099 REM SUCCESS!
24120 PCOPY5TO1:PCOPY6TO2:PCOPY7
TO3:PCOPY8TO4:SCREEN1,1:FORX=1TO
300:NEXT:UW$="BM80,45;R11L5D10BR
10U10D5R10U5D10BR10U10R10D10U5L1
0BD5BR20U10F10U10BD10BR10U10D5R3
NE5NF5
24130 UX$="BM85,155;U5NH5NE5BD5B
R15U10R10D10L10BR20U10D10R10U10B
D10BR10U2BU2U6"
```

```
24140 FORY=1TO5:DRAW"C3"+UW$:DRA
W"C3"+UX$:FORX=1TO500:NEXTX:DRAW
"C2"+UW$:DRAW"C2"+UX$:FORX=1TO50
0:NEXTX:DRAW"C1"+UW$:DRAW"C1"+UX
$:FORX=1TO500:NEXTX:NEXTY:PLAYSU
$:FORX=1TO500:NEXTX
24150 CLS:PRINT@192,"THE NUMBER
OF FLOODED SECTIONS  TOTALED "WS
:PRINT"PERHAPS YOU CAN SAVE MORE
  NEXT  TIME?"
24199 END
24999 REM DISPLAY MAP
25000 SCREEN1,1:PLAY"L100;FP10A"
25010 D$=INKEY$:IFD$=""THEN25010
25998 CLS:RETURN
25999 REM SET UP MAP
26000 SCREEN0,0:PCLS:PMODE3,1
26005 LINE(10,10)-(245,181),PSET
,B:LINE(0,1)-(255,190),PSET,B
26010 DRAW"BM20,10;F4R2D6LD2F5D1
0R3F4D2G3D2R2F4D2RF4D20F2D4RF7D3
G4D2LG2DF4R3F1DF3U1E4R75F35G2DGL
G3D2L3GD2F2D2G4L3G4D2R3F4D2F3DG2
D"
26020 DRAW"BM40,10;F3DRD5F3G2F3D
10R2F6G4DRF3DRG2F3D20F4D2LF5D2G4
DRDREREGDGD2DFR75F35E2RERERF3R2E
1R2E2R2F3D4R2F3D2R3D5R2F5D2FRFRD
5F4R3F2R3D2R5F4D3F2D"
26030 DRAW"BM80,70;H5L45U5L20BD3
R16D62F45D10BR3U13H42R70U30BL3D2
7L68U53R42F5
26040 LINE(80,70)-(210,70),PSET:
LINE-(210,125),PSET:LINE-(170,12
5),PSET:LINE-(140,95),PSET:LINE-
```

```
(80,95),PSET:LINE-(80,70),PSET
26050 DRAW"BM30,140;R3F2DR2F4D2L
3D2G4DL2H3L2U3L1H2ULH3RU2R2D1R2E
3R2
26060 DRAW"BM180,70;U30E10U20BL3
D20G10D30":PAINT(100,90),0,0
26080 PAINT(45,40),3,0:PAINT(56,
90),3,0:PAINT(210,170),3,0
26090 PAINT(200,30),2,0:PAINT(90
,30),2,0:PAINT(20,31),2,0:PAINT(
90,170),2,0:PAINT(20,180),2,0:PA
INT(60,70),2,0:PAINT(40,70),2,0
26100 DRAW"BM47,40;C1;D13NH2RNE2
U13
26110 A$="U7BR26D7BR26U7BR26D7BR
26U7BR26D7BR26U7BR26D7BR26U7BR26
D7":DRAW"C3;BM10,9"+A$:DRAW"C3;B
M10,189"+A$
26120 B$="L6BD22R6BD21L6BD21R6BD
21L6BD21R6BD21L6BD21R6BD22L6":DR
AW"C3;BM9,10"+B$:DRAW"C3;BM253,1
0"+B$
26130 DRAW"C0;BM4,23;U5R5D3L5R5D
2BR237U5R5D3L5R5D2BL5BD21U5R3FGL
2R2FDGL2BL242U5R3FGL2R2FDGL2BD21
BR4L5U5R5BD5BR236R5BU5L5D5BD21U5
R3FDFGDGL3BL242U5R3FDFGDGL3
26140 DRAW"C0;BM4,108;R5L5U3R3L3
U2R5BR242L5D2R3L3D3R5BD21BL5U3R2
L2U2R5BL242L5D2R2L2D3BD21U5R5BG5
R5U3L2BR242R2D3L5U5R5BD21D5U3L5U
2D5BL242U5D2R5U2D5
26150 C$="U5G2BD3BR26R5L5U2R5U3L
5BD5BR26R5U3L3R3U2L5BD5BR26BU3U2
D2R5U2D5BL5BR26R5U3L5U2R5BR26L5D
5R5U3L5BD3BR24E5L5DBB4BR26U5R5D5
L5U3R5D3BR26U5L5D2R5":DRAW"C3;BM
24,8"+C$:DRAW"BM24,188"+C$
26160 DRAW"BM126,40;C1;U7F7U7BL3
BU5U10NF2L2NG2D10":LINE(71,99)-(
75,110),PSET,BF
26180 DRAW"BM82,80;C1;U6R6D3L6R3
F3BR6U6R6D3L6R6D3BR6U6D6BR6U6F6U
6D6BR6U6R5FDGL5R5FDGL5BR12U6R6D6
L6BR13U6D6E3RF3U6D6BR12U6R6BD6L6
BR12U6D6BR6BU6R8L4D6BR14BU3NH3NE
3NG3
26190 CIRCLE(140,119),34,1,1,.75
,0:CIRCLE(148,119),34,1,1,.75,0:
CIRCLE(156,119),34,1,1,.75,0:CIR
CLE(162,119),34,1,1,.75,0:LINE(1
74,119)-(198,119),PSET
26200 PAINT(178,116),3,1:PAINT(1
86,116),2,1:PAINT(192,116),1,1:R
ETURN
26999 REM HEIGHT RELATIVE TO FLO
OD  LEVEL
27000 CLS:PRINT"ALL LAND LEVELS
ARE EXPRESSED ASA DECIMAL NUMBER
(5.5=FIVE AND   ONE-HALF FEET).
IF THE CURRENT   WATER LEVEL IS H
IGHER THAN AN   AREA'S LAND LEVE
L THAT MEANS IT IS POSSIBLE FOR
THAT SECTION TO BE FLOODED."
27100 PRINT:INPUT"ENTER HORIZONT
AL MAP CO-ORDINATE---VALUE OF 1
TO 9";A
27120 IFA<1 OR A>9 THENCLS:GOTO2
7100
27140 INPUT"ENTER VERTICAL MAP C
O-ORDINATE  ---VALUE OF A TO H";
D$
27160 C=ASC(D$)-64:IFC<1 OR C>8
THENPLAY"L100;DP10D":GOTO27140
27180 PRINT"   THE LEVEL OF"A;D$
" ="FL(A,C)"FEET"
27190 PRINT"THE CURRENT RIVER LE
VEL NORTH OFTHE DAM IS"LN:PRINT"
--SOUTH IS"LS
27200 PRINT:GOSUB58000:RETURN
27999 REM PRINT MENU
28000 CLS:PRINT@10,"option menu"
:PRINT@132,"D-DISTRIBUTE MATERIA
LS":PRINT@164,"E-EQUIPMENT INVEN
TORY":PRINT@196,"H-OPTION MENU":
PRINT@228,"K-MAP KEY":PRINT@260,
"L-LAND LEVEL OF SECTIONS":PRINT
@292,"M-DISPLAY MAP":PRINT@324,"
Z-OPERATE FLOOD GATE"
28075 GOSUB58000:RETURN
28999 REM MOVE MATERIALS
29000 CLS:PRINT@2,"move material
 and personnel"
29050 PRINT@101,"DO YOU WISH TO
MOVE:":PRINT@202,"A-BULLDOZER":P
RINT@330,"B-TRUCK":PRINT@426,"EN
TER CHOICE"
29060 D$=INKEY$:IFD$=""THEN29060
ELSEIFD$="A"GOSUB43000ELSEGOSUB4
7000
29080 RETURN
29999 REM WEATHER REPORT UPDATE
OF FLOOD DAMAGE EACH SECTION
30000 K1=TIMER:POKE65495,0:RESTO
RE:ZZ=0:LQ=LN:WS=0:GF=1:GOSUB200
15:FORX=1TO9:FORY=1TO8:WS(X,Y)=0
:NEXTY,X
30010 FORZ=1TO8:READX,Y:XY=X:X=X
+1:YX=Y
30020 X=X-1:IFX<1THENX=X+1:GOTO3
0030
30025 IFFL(X,Y)<LQ THENWS(X,Y)=1
:WS=WS+1:GOTO30020:ELSEX=XY-1:GO
TO30030
30030 X=X+1:IFX>9THENX=XY:Y=Y+1:
GOTO30040
30035 IFFL(X,Y)<LQ THENWS(X,Y)=1
:WS=WS+1:GOTO30030ELSEY=YX-1:GOT
```

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```
030040
30040 X=XY:Y=Y-1:IFY<1THENY=YX:G
OTO30050
30045 IFFL(X,Y)<LQ THENWS(X,Y)=1
:WS=WS+1:GOTO30040ELSEY=YX-1:GOT
O30050
30050 Y=Y+1:IFY>8THENY=Y-1:GOTO3
0060
30055 IFFL(X,Y)<LQ THENWS(X,Y)=1
:WS=WS+1:GOTO30050ELSEGOTO30060
30060 NEXTZ:IFZZ=0THENZZ=1:LQ=LS
:GOTO30010
30065 POKE65494,0:TIMER=K1:RETUR
N
36998 RETURN
36999 REM DETERMINE FLOOD DAMAGE
37000 POKE65495,0:RESTORE:ZZ=0:L
Q=LN:WS=0:PCOPY8TO4:PCOPY7TO3:PC
OPY6TO2:PCOPY5TO1:FG=1:GOTO20015
37002 FORX=1TO9:FORY=1TO8:WS(X,Y
)=0:NEXTY,X
37007 FORZ=1TO8:READX,Y:XY=X:X=X
+1:YX=Y
37010 X=X-1:IFX<1THENX=X+1:GOTO3
7020
37015 IFFL(X,Y)<LQ THENWS(X,Y)=1
:WS=WS+1:GOTO37010:ELSEX=XY-1:GO
TO37020
37020 X=X+1:IFX>9THENX=XY:Y=Y+1:
GOTO37030
37025 IFFL(X,Y)<LQ THENWS(X,Y)=1
:WS=WS+1:GOTO37020ELSEY=YX-1:GOT
O37030
37030 X=XY:Y=Y-1:IFY<1THENY=YX:G
OTO37040
37035 IFFL(X,Y)<LQ THENWS(X,Y)=1
:WS=WS+1:GOTO37030ELSEY=YX-1:GOT
O37040
37040 Y=Y+1:IFY>8THENY=Y-1:GOTO3
7050
37045 IFFL(X,Y)<LQ THENWS(X,Y)=1
:WS=WS+1:GOTO37040ELSEGOTO37050
37050 NEXTZ:IFZZ=0THENZZ=1:LQ=LS
:GOTO37007
37060 IFWQ=1THENRETURN
37075 SCREEN1,1:FORX=1TO9:FORY=1
TO8:IFWS(X,Y)=1THENP=X:Q=Y:GOSUB
38000
37080 NEXTY,X
37110 POKE65494,0:RETURN
37800 IFFL(X,Y)<LQ THENWS(X,Y)=1
37998 RETURN
37999 REMPUT FLOOD DAMAGE ON MAP
38000 P=INT(P):Q=INT(Q)
38100 LINE((P*26)-16,(Q*21)-11)-
((P*26)+10,(Q*21)+11),PSET,B
38110 PAINT((P*26)-14,(Q*21)-9),
3,1:PAINT((P*26)+9,(Q*21)-9),3,1
:PAINT((P*26)-14,(Q*21)+10),3,1:
```


ENTE
RAINBO
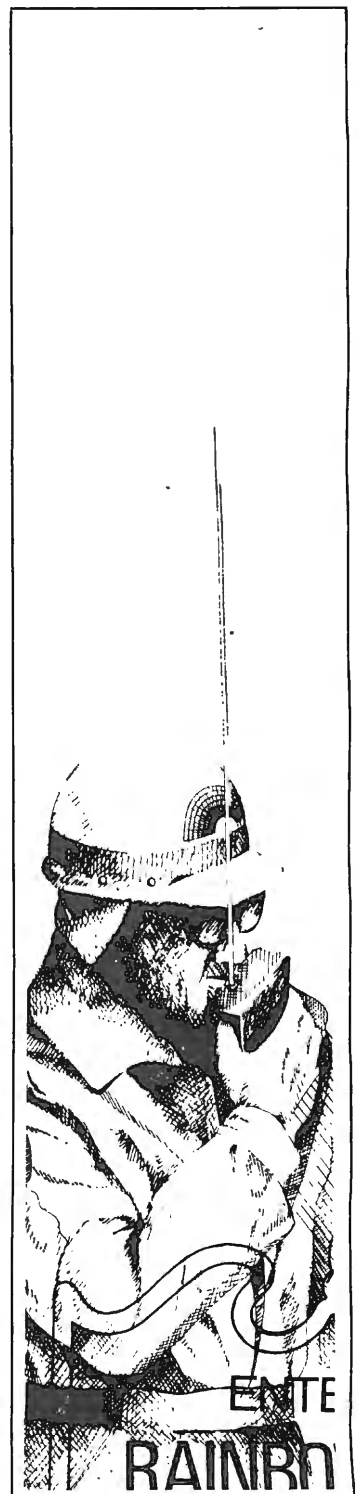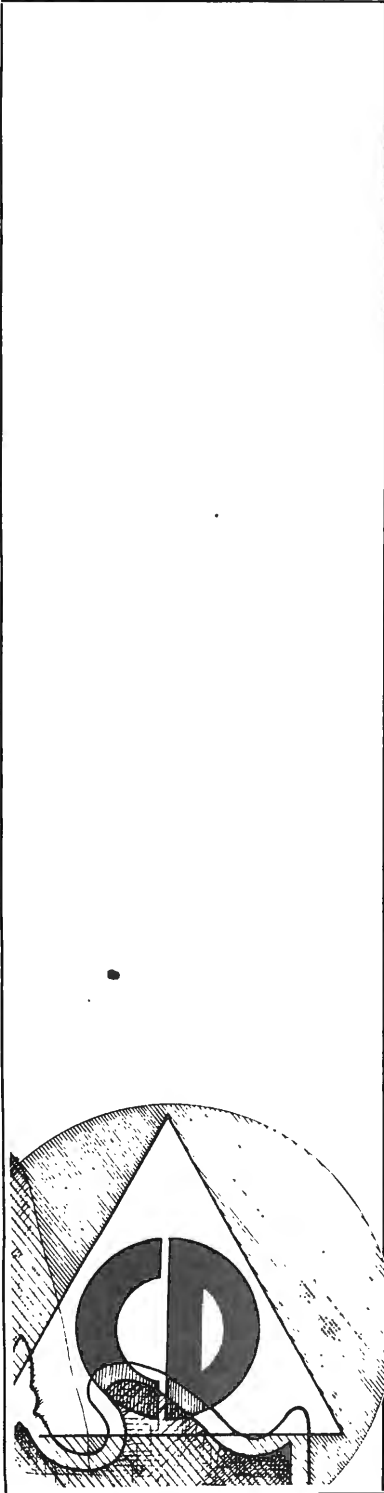
```
PAINT((P*26)+9,(Q*21)+10),3,1
39998 RETURN
39999 REM EQUIPMENT REVIEW
40000 HH=10:CLS:PRINT@12,"equipm
ent":PRINT@96,"SANDBAGS IN DEPOT
="I:PRINT@192,"TRUCK FUEL="K:PRI
NT@288,"DIESEL FUEL="BB
40010 FORX=1TO10:IFAB$(X)="STUCK
"THENHH=HH-1:NEXTX:ELSENEXTX
40020 PRINT@384,"TRUCKS IN SERVI
CE="HH:GOSUB58000:RETURN
41999 REM FUEL SUPPLY
42000 CLS:K=K-50:PRINT@226,"fuel
 remaining="K" GALLONS":PRINT@28
8,"EACH TRIP CONSUMES APPROXIMAT
ELYFIFTY GALLONS. YOU HAVE ENOUG
H  FUEL LEFT FOR"K/50"TRIPS."
42050 GOSUB58000:RETURN
42500 CLS:BB=BB-100:PRINT@224,"D
IESEL FUEL REMAINING="BB" GAL":P
RINT@288,"EACH TRIP CONSUMES APP
ROXIMATELYONE HUNDRED GALLONS. Y
OU HAVE    ENOUGH FUEL LEFT FOR"B
B/100"TRIPS":GOSUB58000:RETURN
42999 REM BULLDOZERS AVAILABLE
43000 IFBB<100THENCLS:PRINT@228,
"no diesel fuel left---":GOSUB58
000:RETURN:ELSECLS:PRINT@10,"bul
ldozers":PRINT@64,"DEPOT LOCATIO
N=7 D":FORX=1TO3:PRINT:PRINT"BUL
LDOZER#"X"LOCATED AT   "AH$(X):NE
XTX:INPUT"MOVING BULLDOZER(1-3)"
;B:IFB<1 OR B>3 THEN43000
43010 B=INT(B):INPUT"NEW HORIZON
TAL CO-ORDINATE(1-9)";AF(B):IFAF
(B)<1 OR AF(B)>10 THEN43010ELSEA
F(B)=INT(AF(B))
43020 INPUT"NEW VERTICAL CO-ORDI
NATE(A-H)";AG$:AG(B)=ASC(AG$)-64
:IFAG(B)<1 OR AG(B)>8THENPLAY"L1
00;DP10D":GOTO43020
43040 AH$(B+3)=CHR$(AF(B)+48)+",
"+AG$
43050 IFAH$(B)<>"7,D" AND AH$(B+
3)<>"7,D"THENPRINT"BULLDOZER"B"H
AS TO RETURN TO THEDEPOT FOR RE-
FUELING BEFORE    GOING TO ANOT
HER LOCATION":FORX=1TO20:PLAY"L1
00;DP10D":NEXTX:CLS:GOTO43000
43060 AH$(B)=AH$(B+3):IFAH$(B)="
7,D"THENRETURNELSEFL(AF(B),AG(B)
)=FL(AF(B),AG(B))+3:GOSUB58000:G
OSUB42500:RETURN
43999 REM WEATHER
44000 IFE=0GOSUB44901
44005 TT=TIMER:CLS:FORX=1TO3:PLA
Y"L100AP8":NEXTX:PRINT@8,"weathe
r report"
44010 F=0:PRINT@104,W$(7)
```
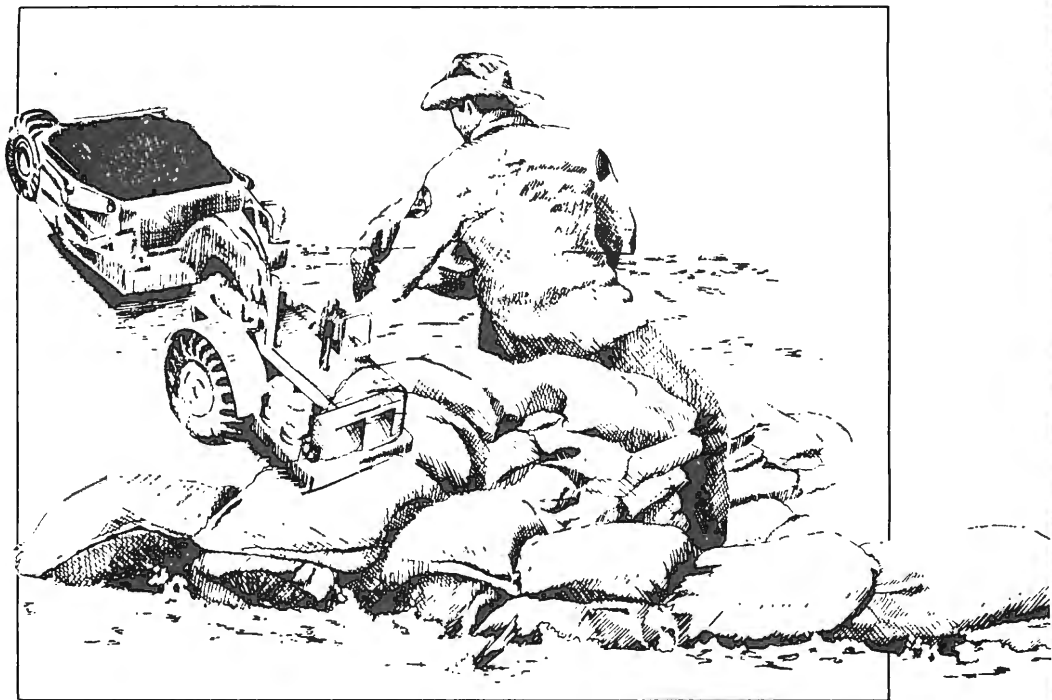
```
44020 R=RND(4):IFR=3 AND V>6 OR
R=2 AND V>5 THENR1=RND(100):IFR1
>50THEN44020
44025 PRINT@136,W$(R-1)
44030 IFR=1THENR=RND(3):PRINT@16
8,W$(R+3):F=F+R*.5:GOTO44070
44040 IFR=4THENR=RND(3):PRINT@16
8,W$(R+3):F=F+R*.2:GOTO44070
44050 IFR=2THENF=F-.8:GOTO44070
44060 IFR=3THENF=F-1.5
44070 R=RND(2):PRINT@232,W$(9):I
FR=1THENPRINT@264,W$(11)+W$(10):
F=F+.25:ELSEPRINT@264,W$(10)
44090 PRINT@328,W$(8):R=RND(3):P
RINT@360,W$(R+3):F=F+(R*.05)
44092 F=F+(V*.05)
44093 IFF<-2 AND V<7 THENF=-2
44094 IFF<-1 AND V>6 THENF=-1
44095 GOSUB49000:GOSUB30000
44100 TIMER=TT:GOSUB58000:CLS:RE
TURN
44900 REM WEATHER STRINGS
44901 W$(0)=" RAIN":W$(1)=" CLEA
RING":W$(2)=" CLEAR":W$(3)=" SNO
W":W$(4)=" LIGHT":W$(5)=" MODERA
TE":W$(6)=" HEAVY":W$(7)=" ":W$(
8)=" WINDS":W$(9)=" TEMPERATURE"
:W$(10)=" FREEZING":W$(11)=" ABO
VE"
44998 E=E+1:RETURN
44999 REM SAND SUPPLY
45000 CLS:PRINT@13,"sandbags":PR
INT@64,"SANDBAG SUPPLY REMAINING
=";I:PRINT@128,"THE MAXIMUM WEIG
HT A TRUCK MAY  CARRY IS 450 SAN
DBAGS."
45050 PRINT@322,"HOW MANY SANDBA
GS(IN MULTIPLESOF 25 ONLY/450 MA
XIMUM)":INPUT"";I(1):IFI(1)/25<>
INT(I(1)/25) OR I-I(1)<0 OR I(1)
>450 THENPLAY"L100;DP10D":PRINT@
384,"     ":GOTO45050
45100 I=I-I(1):GOSUB47501:GOTO47
699
45200 FL(AC(S),AD(S))=FL(AC(S),A
D(S))+I(1)/450
45997 GOSUB58000:RETURN
46999 REM MOVE TRUCKS
47000 IFK<50THENCLS:PRINT@229,"n
o truck fuel left-----":GOSUB580
00:RETURN:ELSECLS:PRINT@13,"truc
ks"
47010 PRINT@64,"DEPOT LOCATION=7
D"
47020 FORX=1TO10:PRINT"TRUCK#"X"
LOCATED AT "AB$(X):NEXTX
47030 INPUT"MOVING TRUCK #(1-10)
";S:IFS<1 OR S>10 THEN47030ELSES
=INT(S)
47040 INPUT"NEW HORIZONTAL CO-OR
```

```
DINATE(1-9)";AC(S):IFAC(S)<1 OR
AC(S)>10 THENPLAY"L100;DP10D":GO
TO47040
47050 INPUT"NEW VERTICAL CO-ORDI
NATE(A-H)";AD$:AD(S)=ASC(AD$)-64
:IFAD(S)<1 OR AD(S)>8THENPLAY"L1
00;DP10D":GOTO47050
47055 AB$(S+10)=CHR$(AC(S)+48)+"
,"+AD$:IFAB$(S)="STUCK" THENCLS:
PRINT@167,"TRUCK#"S"IS STUCK":GO
SUB58000:RETURN
47056 IFAB$(S)<>"7,D" AND AB$(S+
10)<>"7,D"THENPRINT"TRUCK"S"HAS
TO RETURN TO THE      DEPOT FOR RE
-FUELING BEFORE       GOING TO ANO
THER LOCATION":FORX=1TO20:PLAY"L
100;DP10D":NEXTX:CLS:GOTO47010
47057 AB$(S)=AB$(S+10):IFAB$(S)=
"1,G"THENGOSUB47500:RETURNELSEIF
AB$(S)="7,D"THENIFSB(S)=1THENI=I
+450:SB(S)=0:RETURN:ELSERETURN
47070 GOSUB45000:GOSUB42000:RETU
RN
47499 REM TRUCK SENT TO SAND PIT
47500 IFAB$(S)="1,G"THENSB(S)=1:
IFWS(2,3)=1 AND WS(4,5)=1 THENCL
S:PRINT@192,"BOTH BRIDGES ARE FL
OODED,THE       TRUCK CAN'T GET THR
OUGH TO THE    SAND-PIT":AB$(S)="7
,D":SB(S)=0:GOTO47505
47501 IFAC(S)>8 OR AC(S)<3 OR AD
(S)<3 OR AD(S)>6 THEN47502 ELSEI
FAB$(S)="3,E" OR AB$(S)="4,E" OR
 AB$(S)="3,F" OR AB$(S)="4,F" OR
 AB$(S)="5,F" OR AB$(S)="6,E" TH
EN47502ELSE47505
47502 IFWS(2,3)=1 AND WS(4,5)=1
AND WS(7,3)=1 THENCLS:PRINT@192,
"ALL ROADS FROM THE CITY ARE
  UNDER WATER-THE TRUCKS CAN'T GE
TTHROUGH":AB$(S)="7,D":I=I+I(1):
GOSUB58000:GOTO1000
47505 GOSUB58000:RETURN
47699 WQ=1:K1=TIMER:PRINT@224,"T
HE TRUCK IS BEING FUELED AND    T
HE DRIVER IS GETTING HIS MAP.":G
OSUB37000:TIMER=K1:WQ=0
47700 IFWS(AC(S),AD(S))=1THENCLS
:PRINT@192,"TRUCK#"S"IS OUT OF S
ERVICE":PRINT"IT GOT MIRED IN TH
E MUD TRYING    TO GET THROUGH.":A
B$(S)="STUCK":GOSUB58000:RETURN
47799 GOTO45200
48999 REM RIVER LEVEL
49000 IFTIMER-100<FM THENRETURNE
LSEFL=FL+F:IFV>7THENF=F+.2:FL=FL
+.2
49010 FL=INT(FL*100)/100:IFFL<5T
HENFL=5
```

```
49020 UU=1:GOTO20015
49990 IFTIMER>43100THENFM=0ELSEF
M=TIMER
49998 RETURN
49999 REM TIMER SECTION
50000 T=TIMER:IFTIMER=>43200THEN
T=0:TIMER=0:D=D+1:Z3=Z2:FM=0
51000 H=INT(T/1800):IFH=24THENH=
0
52000 M=INT((T-(H*1800))/30):IFM
=>60THENM=0
52100 GOSUB53500
52200 PRINT@64," ":FORX=1TO16:PR
INT"<>";:NEXTX
53000 IFH>20 OR H<6 THENPRINTTAB
(6)"day";D;TAB(12)"hour";H;TAB(2
0)"min";M ELSE PRINTTAB(6)"DAY";
D;TAB(12);"HOUR";H;TAB(20);"MIN"
;M
53400 RETURN
53500 IFT>Z3 THENGOSUB44000:Z3=Z
3+Z2:GOTO50000
53600 RETURN
54999 REM ASSIGN FLOOD LEVELS OF
EACH SECTOR
55000 FORY=1TO8:FORZ=1TO9:READFL
(Z,Y):NEXTZ,Y
56000 DATA 5.8,5.5,5.9,6.3,7.5,7
.7,8,8.3,8.7
56010 DATA 6.3,5.5,6.4,6.7,7.3,8
.6,9.3,8.4,8.5
56020 DATA 6.9,6,7,6.8,8.9,9.4,1
0,8.8,8.9
56030 DATA 7.1,5.5,6.2,10,10.2,9
.5,10.5,9.5,9.7
56040 DATA 7.5,5.8,20,5.9,5.9,9,
8.6,7.6,6.3
56050 DATA 8.4,8.7,9.2,9.4,9.1,8
.7,8.9,5.9,5.8
56060 DATA 10,8.9,9.9,9.5,9.1,8.
2,5.9,5.5,5.7
56070 DATA 9.7,9.5,10.2,9.9,9.8,
7.8,5.5,5.5,5.5
56080 RETURN
57999 REM INKEY$
58000 SV=0:PRINT@452,"press
    to continue":PLAY"L100;D"
58020 POKE1482,60:POKE1483,19:PO
KE1484,16:POKE1485,1:POKE1486,3:
POKE1487,5:POKE1488,62:FORX=1TO2
00:D$=INKEY$:IFD$<>""THENCLS:RET
URN:ELSENEXTX
58040 POKE1482,124:POKE1483,83:P
OKE1484,80:POKE1485,65:POKE1486,
67:POKE1487,69:POKE1488,126:FORX
=1TO200:D$=INKEY$:IFD$<>""THENCL
S:RETURN:ELSENEXTX
58060 SV=SV+1:IFSV>2THENRETURNEL
SE58020
```

VOYAGER II

MIKE FINCKE

You've undoubtedly been involved in dozens of various space wars since obtaining your computer. Let's call a truce, pack up the blasters, and just do a little sightseeing and enjoy some of the beauty of outer space.

How about a tour of the exotic planets of Uranus and Neptune? They are two of the nine major planets, including Earth, that revolve around the sun.

The similarity with Earth ends there. Uranus and Neptune are so far from the sun that some scientists speculate that they are probably just giant rocks wrapped in deep layers of ice.

Temperatures on Uranus average approximately –333 degrees Fahrenheit. It takes 84 years (as compared to 365 days for Earth) to make one revolution around the sun, which is 1.7 million miles away.

A distinctive feature of Uranus is its unusual axis, which is tilted at a 90-degree angle. This means that the planet is lying on its side as it travels through space. It is surrounded by a series of rings, but from Earth they are narrow and dark and barely noticeable.

Neptune is even colder with an average temperature of –365 degrees Fahrenheit. Located 2.7 million miles from the sun, the dimly lit planet requires 165 years to make one revolution of the fiery planet. Neptune has two moons that move in retrograde (backwards) motion in relation to the planet.

A little background is in order before we begin this journey. Two *Voyager* satellites were launched in August and September of 1977, passing Jupiter in 1979 and Saturn in 1981. They are traveling separate paths now, with Voyager I having left
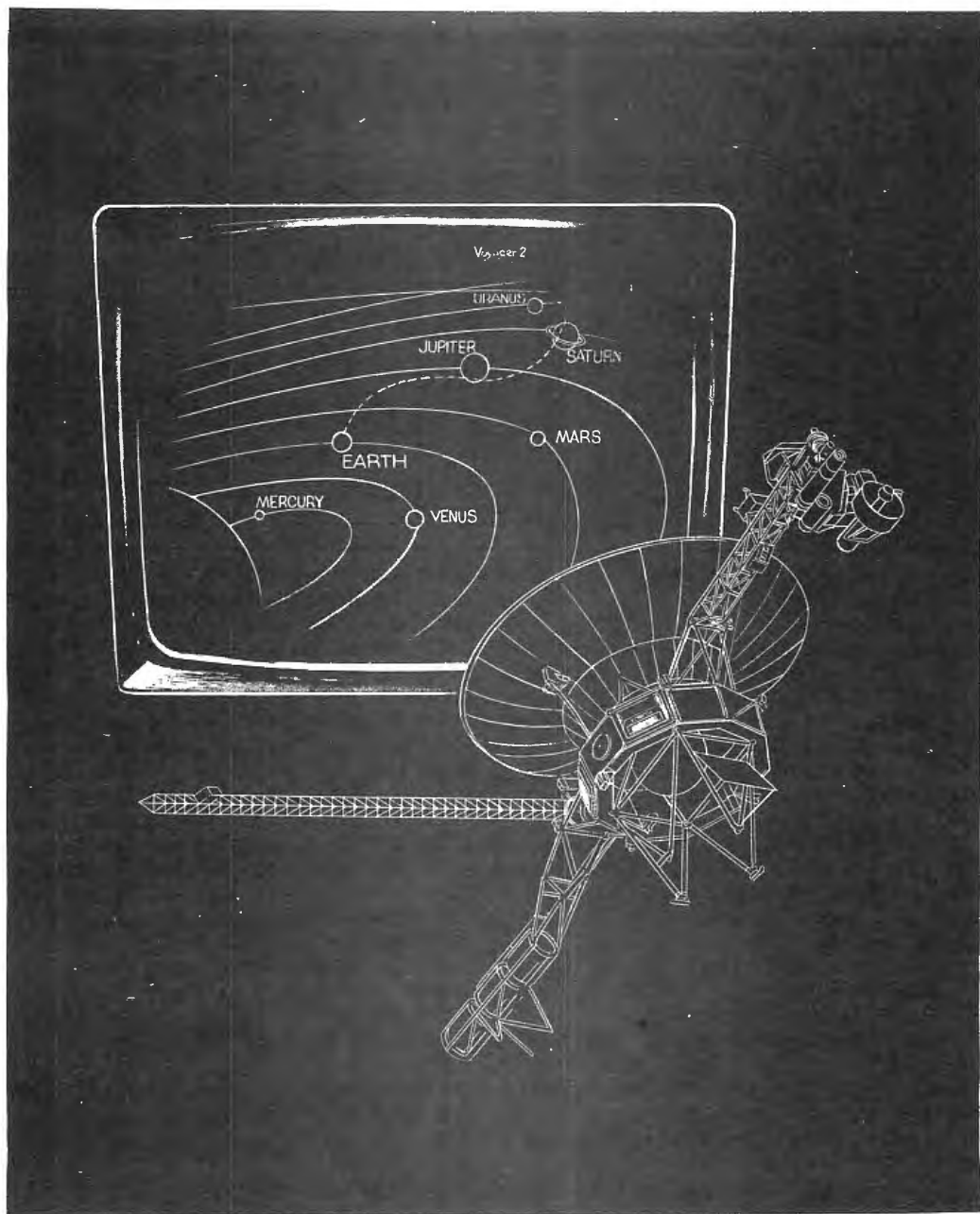
(Mike Fincke is presently a Junior at Sewickley Academy, a high school near Pittsburgh, Pa. He has been programming on his self-earned CoCo for the past four years and he recently won an award for his 'Electronic Shakespeare' program, a discussion on random text generation.)

the solar system and *Voyager II* still exploring its outer reaches.

Voyager II is expected to reach the vicinity of Uranus on or about Jan. 24, 1986, and to give us our first real close-up of Neptune around Aug. 14, 1989.

If the view is anything like the one provided by CoCo, it should really be something!
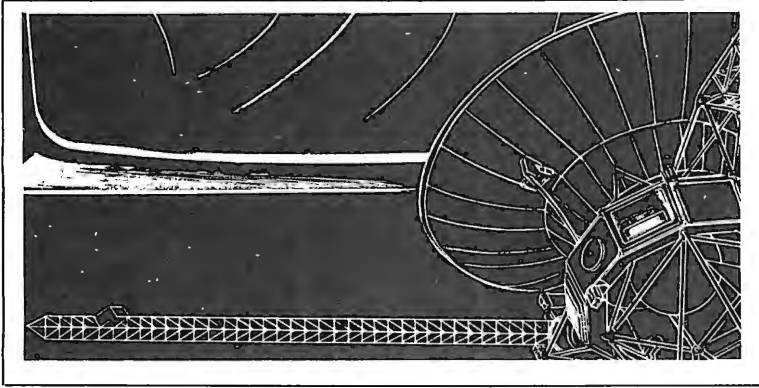

```
0 POKE 65495,0
10 PCLEAR 8
15 CLEAR 300
20 DIM C(125),D(125)
25 CB=1:ZX=1:GOSUB 1000:ZX=0:RES
TORE
29 CLS0:FOR X=1 TO 60:SET(RND(64
)-1,RND(32)-1,5):NEXT
30 PRINT@132,"MIKE FINCKE PRESEN
TS...";:PRINT@290,"VOYAGER TO UR
ANUS AND NEPTUNE";
40 PMODE 0,5:PCLS0:CIRCLE(140,86
),50,1,.9:PAINT(140,86),1,1
50 FOR PA=6 TO 8:PCOPY 5 TO PA:N
EXT PA
53 GOSUB 270
55 GOSUB 2060:RESTORE
60 GOSUB 440
63 GOSUB 280
64 GOSUB 2420:MO=4:GOSUB 165:GOT
O 900
65 PCLS0:CIRCLE(140,86),50,1,.9:
PAINT(140,86),1,1:RETURN
70 PI=ATN(1)*4:X1=COS(X+CO)*V+X9
:Y1=SIN(X+SI)*V1+Y9
80 IF X=0 THEN X2=X1:Y2=Y1
90 LINE(X1,Y1)-(X2,Y2),PSET:X2=X
1:Y2=Y1:RETURN
100 PMODE 0,1:GOSUB 65
110 GOSUB 1000
130 FOR X=70 TO 90 STEP 5
140 CIRCLE(140,86),X,1,.9
150 NEXT X
155 X=0:Y=0:Z=3:GOSUB 2000
157 RETURN
160 FOR MO=2 TO 4
165 IF MO=4 THEN PMODE 0,1:SCREE
N 1,0
170 PMODE 0,MO:GOSUB 65
172 IF MO=2 THEN X=10:Z=11:Y=0:G
OSUB2000
174 IF MO=3 THEN X=26:GOSUB2000
180 ON MO-1 GOSUB 1050,1060,1070
190 FOR F=1 TO 5
200 IF MO=3 THEN HW=1.5:S=F*3+35
210 IF MO=4 THEN HW=3:S=18+F
220 IF MO=2 THEN HW=1.1:S=F*3+55
230 IF MO=4 AND F=5 THEN HW=2.5:
S=S+4
240 CIRCLE(140,86),S+5,1,HW
250 NEXT F
255 IF MO=4 THEN X=38:Z=5:GOSUB
2000
257 RETURN
260 NEXT MO
265 GOTO 900
270 PMODE 0,5:GOSUB 1080:FOR X=1
TO 5:CIRCLE(140,86),X+5,1,8:NEXT
 X:Z=7.5:X=50:Y=0:GOSUB 2000
275 RETURN
280 PMODE 0,6
290 GOSUB 1090
300 CO=0:X9=140:SI=.3::V1=V:Y9=8
8
310 FOR V=15 TO 28 STEP 4
320 FOR X=0 TO 2*PI STEP .25
321 GOTO 330
325 IF X>2.3 AND X<3 THEN X=3.75
:Y1=30:Y2=30
330 V1=V+50
```

```
340 GOSUB70
350 NEXT X,V
355 X=50:Y=10:Z=7.5:GOSUB 2000
360 PMODE 0,7
365 Y=28:X=50:GOSUB 2000
370 GOSUB 1100
380 CO=0:X9=140:SI=.9:V1=V:Y9=88
390 FOR V=35 TO 51 STEP 4
395 IF V=39 THEN GOSUB 2370
400 FOR X=0 TO 2*PI STEP .25
410 V1=V+30
420 GOSUB70
430 NEXT X,V
435 Y=28:X=50:Z=7.5:GOSUB 2000
437 RETURN
440 PMODE 0,8:GOSUB 1110
445 X=50:Y=38:Z=7.5:GOSUB 2000
447 FOR V=55 TO 75 STEP 5
448 IF V=70 THEN GOSUB 2300
450 FOR X=0 TO2*PI STEP .25
460 CO=0:X9=127.5:SI=.8:V1=V:Y9=
96:GOSUB70
470 NEXT X,V
480 RETURN
900 FOR P=1 TO 8
905 PMODE 0,P:SCREEN 1,0
910 PD=P-1:IF PD=0 THEN FOR DL=1
 TO 100:NEXT DL,P
915 PMODE 0,PD
920 LINE(98,80)-(188,90),PSET,BF
:CIRCLE(140,86),50,0,.9:PAINT(14
0,86),0,0:GOSUB 2680:NEXT P
925 FOR PD=7 TO 1 STEP -1:IF PD=
5 THEN NEXT PD
926 PR=PD+1:IF PR=5 THEN PR=6
927 PMODE 0,PR:SCREEN 1,0
930 PMODE 0,PD:CIRCLE(140,86),50
,1,.9:PAINT(140,86),1,1
931 IF PD=7 THEN X=-55:Y=-32:Z=9
:GOSUB 2030
932 IF PD=6 THEN X=-50:Y=-10:Z=9
:GOSUB 2030
933 IF PD=5 THEN X=-50:Y=0:Z=9:G
OSUB 2030
934 IF PD=4 THEN X=-38:Y=0:Z=6:G
OSUB 2030
935 IF PD=3 THEN X=-26:GOSUB 203
0
937 IF PD=2 THEN X=-10:GOSUB 203
0
938 IF PD=1 THEN X=0:Y=0:GOSUB 2
030
970 RT=4:ON PD GOSUB 3090,3080,3
070,3060,3050,3040,3030
980 NEXT PD
985 PMODE 0,1:SCREEN 1,0
998 FOR DL=1 TO 500:NEXT DL:GOTO
 3100
999 GOTO999
```

```
1000 FOR X=0 TO 100
1010 READ C(X),D(X)
1015 IF ZX=1 THEN NEXT X:RETURN
1020 PSET (C(X),D(X),1)
1030 NEXT X
1040 RETURN
1041 BM=0:BN=0:GOSUB 1120
1050 BM=5:BN=0:GOSUB 1120:RETURN
1060 BM=10:BN=0:GOSUB 1120:RETUR
N
1070 BM=15:BN=1:GOSUB 1120:RETUR
N
1080 BM=20:BN=1:GOSUB 1120:RETUR
N
1090 BM=25:BN=5:GOSUB1120:RETURN
1100 BM=30:BN=15:GOSUB1120:RETUR
N
1110 BM=35:BN=25:GOSUB1120:RETUR
N
1120 REM
1125 FOR X=0 TO 100:A=C(X)-BM:Q=
D(X)-BN
1130 IF A<0 THEN A=255-C(X)-BM
1140 IF Q<0 THEN Q=191-D(X)-BN
1150 PSET(A,Q,1):NEXT X:RETURN
2000 FOR V=0 TO Z STEP 2.5
2010 CIRCLE (140-X,86+Y),10*V+17
,0,.94
2020 NEXT V:RETURN
2030 FOR V=0 TO Z STEP 3
2040 CIRCLE (140-X,86+Y),10*V+17
,0,.94
2050 NEXT V: RETURN
2060 PMODE 4,1:PCLS0:CIRCLE(100,
100),50,1,.95:PAINT(100,100),1,1
:FOR X=1 TO 100:READ C(X),D(X):P
SET (C(X),D(X),1):PSET(C(X)+1,D(
X),1):NEXT
2070 FOR X=50 TO 72 STEP 2:LINE(
X,60)-(X,140),PRESET:NEXT X
2080 LINE(62,135)-(65,65),PRESET
,BF
2090 FOR X=76 TO 85 STEP 2.1:LIN
E(X,50)-(X,150),PRESET:NEXT X
2100 FOR X=129 TO 140 STEP 1.8:L
INE(X,50)-(X,150),PRESET:NEXT X
2110 FOR X=88 TO 90 STEP 2:LINE(
X,50)-(X,150),PRESET:NEXT X
2120 FOR X=110 TO 126 STEP 2:LIN
E(X,50)-(X,150),PRESET:NEXT X
2130 LINE(116,50)-(119,150),PRES
ET,BF
2140 FOR X=144 TO 150 STEP 2:LIN
E(X,50)-(X,150),PRESET:NEXT
2150 FOR X=0 TO 3:CIRCLE(100,100
),23+X,1,3,.62,.4:NEXT X
2160 CIRCLE(50,150),7,1,.97:PAIN
T(50,150),1,1
2170 SCREEN 1,1
```

```
2180 POKE 65494,0:PLAY"T405V31;3
;P4;V20;3;P4;V10;;3;V4;P4;3":POK
E 65495,0
2190 PMODE 3,1
2200 II$="C4S8D4F3E3U4S6BD6BR5C3
S4D5F1R3E1U5H1L3G1BD6BR12C2BU8S6
D2F2ND3E2U2BD7C4S4BR5BU7BD1D6U4N
R5U2E1R3F1D6BR4BU7C3BD1D5F1R3E1U
2NL2BU2U1H1L3G1BD6BR5BR5BU9C2S6N
R5D3NR4D4R5BR4BU7C3S6ND7R4D3L4U1
F5D1C4BU7BR6R6L3D7L3R10L3U7R3L8
2210 TT$="C3U8L3R6BR10C4BD2D6L6U
6R6
2220 UR$="S8C4D6F1R3E1U6BR4ND8R4
F1D1G1NL4F1D4BR4BU7BD1D6U4NR5U2E
1R3F1D6BR4BU7D1ND6E1R3F1D6BR4BU7
D6F1R3E1U6BD7BR4BU7BD1D1F1R3F1D2
G1L3H1BU5E1R3F1BD6
2230 DRAW"BM138,50;"+II$
2240 DRAW"BM180,90;" +TT$
2250 DRAW"BM156,105;"+UR$
2260 RETURN
2270 DATA 10,10,7,15,11,14,17,13
,20,5,30,7,25,10,15,29,30,19,15,
41,35,25,31,29,40,25,90,10,85,25
,90,36,110,30,105,10,42,56,47,54
,45,65,50,72,65,70,55,88,60,85,6
5,82,52,105,67,102,65,20,60,35,2
0,65,35,85,10,100,28,120,25,130,
30,135,37,130,36,132,38,131
2280 DATA 48,127,37,142,45,142,3
5,150,27,155,40,153,15,175,35,18
5,130,15,133,20,136,25,140,20,14
5,13,150,25,158,35,166,37,162,17
,175,17,176,25,178,26,191,16,201
,14,210,14,220,13,186,40,200,40,
205,45,55,216,90,80,110,65,120,6
7,125,63,131,63,141,66,145,77
2290 DATA 155,75,159,70,166,70,1
85,70,205,75,219,105,180,100,170
,95,165,95,157,102,156,122,148,1
14,135,95,110,95,105,94,105,100,
101,99,103,110,110,120,155,132,1
70,133,182,133,190,134,185,146,1
86,153,187,160,165,190
2300 CLS3:PRINT@32,;
2310 PRINT"   .DURING THE PERIOD
  BETWEEN    1979 AND 1982, BOTH
VOYAGER I    AND VOYAGER II EXPLO
RED THE     GIANT PLANETS JUPITE
R AND SAT-   URN. ALTHOUGH VOYAGE
```

```
R I HAS     LEFT THE SOLAR SYSTE
M, VOYAGER  II CARRIES ON THE SE
ARCH.  ON    ";
2320 PRINT"JAN. 24,1986, VOYAGER
 II WILL    FLY PAST URANUS,THE 7
TH PLANET   THIS WILL BE THE FIRS
T TIME      MANKIND WILL SEE URAN
US UP       CLOSE. NASA HAS MADE
MANY SIM-   ULATIONS OF THE EVENT
. THIS      PROGRAM WILL ATTEMPT
TO DUPLI-";
2330 PRINT@0,STRING$(32,175);
2340 FOR X=1 TO 14:PRINT @ 32*X,
CHR$(175);:PRINT@32*X+31,CHR$(17
5);:NEXTX
2350 PRINTSTRING$(31,175);
2360 RETURN
2370 CLS6:PRINT@32,;
2380 PRINT" CATE THEIR EFFORTS O
N THE COCO  WE WILL FLY PAST URA
NUS AND     WATCH IT SPIN BEFORE
 OUR VERY   EYES, TAKING FAR LES
S TIME      THAN IT WILL TAKE VO
YAGER II.      SIT BACK WATCH T
HE FAM-     ILIAR CONSTALLATIONS
 SHIFT      IN THE BACKGROUND.
2385 PRINT" BE PREPARED TO TAKE
A VOYAGE    OF THE IMAGINATION T
O THE       SEVENTH PLANET FROM
THE SUN,    THE WORLD ON ITS SID
E, THE      RINGED PLANET URANUS
....";
2400 PRINT@0,STRING$(32,223);:FO
R X=1 TO 14:PRINT@32*X,CHR$(223)
;:PRINT@32*X+31,CHR$(223);:NEXTX

2410 FOR DL=1 TO1000:NEXT DL:RET
URN
2420 PMODE0,1:PCLS0:RESTORE:FOR
X=1 TO 100:PSET(C(X),D(X),1):NEX
T X
2430 FOR X=2 TO 4:PCOPY 1 TO X:N
EXT X
2440 PSET(100,100,1)
2450 FOR R2=2 TO 4
2460 PMODE 0,R2
2470 CIRCLE(100+R2*10.5,100-R2*3
.5),12.5*R2,1,.9
2480 G=R2:IF R2=4 THEN G=5
2490 FOR F=1 TO G
2500 CIRCLE(100+R2*10.5,100-R2*3
```

```
.5),16*R2+5*F,1,.9:NEXT F
2510 PAINT(100+R2*10.5,100-R2*3.
5),1,1
2520 FOR F=0 TO R2-3
2530 CIRCLE(100+R2*10.5,100-R2*3
.5),4*R2+26*F,0,.9
2540 NEXT F
2550 NEXT R2
2560 PMODE 0,1
2570 CIRCLE (103,97),6,1,1.2:PAI
NT(103,97),1,1
2580 CIRCLE(103,97),10,1:CIRCLE(
103,97),3,0
2590 SCREEN 1,0
2600 FOR DL=1 TO 1000:NEXT
2610 LINE(80,80)-(120,120),PRESE
T,BF
2620 CIRCLE (105,95),10,1:PAINT(
109,94),1,1
2630 CIRCLE (105,95),17,1:CIRCLE
(105,95),7,0
2640 FOR DL=1 TO 1000:NEXT
2650 FOR ZO=2 TO 4:PMODE 0,ZO:SC
REEN 1,0:MO=ZO-1:IF MO=1 THEN GO
SUB 100:NEXT ZO ELSE GOSUB 170:N
EXT ZO
2660 PMODE 0,4:SCREEN 1,0
2670 RETURN
2680 IF P=5 OR P=8 THEN 2700
2690 RETURN
2700 IF P=5 THEN MO=1 ELSE IF P=
8 THEN MO=4
2710 PMODE 4,MO
2720 IF MO=4 THEN GOTO 2860
2730 LINE (100,100)-(167,191),PR
ESET,BF
2740 LINE(115,0)-(150,100),PRESE
T,BF
2750  LINE (0,100)-(40,191),PRES
ET,BF
2760 LINE(0,0)-(20,100),PRESET,B
F
2770 LINE(0,50)-(30,100),PRESET,
BF
2780 LINE (243,0)-(255,191),PRES
ET,BF
2790 RETURN
2800 GOTO 2800
2810 LINE(90,100)-(175,191),PRES
ET,BF
2820 LINE(0,100)-(50,191),PRESET
,BF
2830 LINE(0,0)-(30,100),PRESET,B
F
2840 LINE(0,50)-(40,100),PRESET,
BF
2850 RETURN
2860 PMODE 3,4
2870 CIRCLE (70,21),23,4,1
2880 CIRCLE(195,21),23,4,1
2890 CIRCLE(70,70),10,4,3
2900 CIRCLE(195,70),10,4,3
2910 CIRCLE(70,120),15,4,2
2920 CIRCLE(195,120),15,4,2
2930 CIRCLE(70,165),47,4,.5
2940 CIRCLE(195,165),47,4,.5
2950 PAINT(0,0),2,4
2960 PAINT(150,0),2,4:PAINT(150,
0),1,4
2970 PAINT(0,0),1,4
2980 CIRCLE(70,21),23,1,1:CIRCLE
(70,70),10,1,3
2990 CIRCLE(70,120),15,1,2:CIRCL
E(70,165),47,1,.5
3000 CIRCLE(195,120),15,1,2:CIRC
LE(195,70),10,1,3:CIRCLE(195,21)
,23,1,1:CIRCLE(195,165),47,1,.5
3010 LINE(100,0)-(100,191),PRESE
T
3020 RETURN
3030 BM=35:BN=32:GOSUB 1120:RETU
RN
3040 BM=35:BN=40:GOSUB 1120:RETU
RN
3050 BM=42:BN=47:GOSUB 1120:RETU
RN
3060 BM=50:BN=50:GOSUB 1120:RETU
RN
3070 BM=55:BN=50:GOSUB 1120:RETU
RN
3080 BM=60:BN=50:GOSUB 1120:RETU
RN
3090 BM=65:BN=50:GOSUB 1120:RETU
RN
3100 PMODE 0,2:PCLS0:RESTORE: FO
R X=1 TO 100:READ C(X),D(X):PSET
(C(X),D(X),1):NEXT X:FOR Z=2 TO
8:PCOPY 2 TO Z:NEXT Z
3110 FOR MO=2 TO 8:PMODE 0,MO-1:
SCREEN 1,0:PMODE 0,MO
```

```
3120 SI=50-(7*MO)+10:IF MO=8 THE
N SI=1
3130 CIRCLE (140,86),SI,1,.9:PAI
NT(140,86),1,1
3140 IF MO>6 THEN GOTO 3160
3150 FOR X=1 TO 5-MO:CIRCLE (140
,86),1.3*SI+7*X,1,.9:NEXT X
3160 IF SI>6 THEN CIRCLE(140,86)
,SI/3,0,.9
3170 IF SI>14 THEN CIRCLE (140,8
6),SI-3,0,.9
3180 FOR DL=1 TO 50*MO:NEXT DL:N
EXT MO
3190 PMODE 0,8:SCREEN 1,0
3200 POKE 65494,0:PLAY"T405V31;3
;P4V20;3;P4V10;3;V4;P4;3":POKE 6
5495,0
4000 PMODE 4,1:PCLS0:CIRCLE(200,
110),50,1,.9
4005 FOR X=1 TO 111: READ C(X),D
(X):PSET(C(X),D(X),1):PSET(C(X)-
1,D(X),1):NEXT X
4010 CIRCLE(200,50),50,1,.7,.15,
.37:CIRCLE(200,45),50,1,.7,.17,.
35
4015 PAINT(200,75),1,1
4020 CIRCLE(200,77),50,1,.6,.09,
.43: CIRCLE(200,107),50,1,.6,.04
,.48
4025 PAINT(200,105),1,1:PAINT(20
0,150),1,1
4030 FOR X=152 TO 250 STEP 2:LIN
E(X,50)-(X,160),PRESET:NEXT X
4035 CIRCLE(200,110),50,1,.9
4040 CIRCLE(200,77),50,1,.6,.09,
.43: CIRCLE(200,107),50,1,.6,.04
,.48
4045 CIRCLE(200,50),50,1,.7,.15,
.37:CIRCLE(200,45),50,1,.7,.17,.
35
4050 PAINT(200,115),1,1:PAINT(20
0,80),1,1
4055 CIRCLE(200,110),50,0,.7,.03
,.43:CIRCLE(200,60),50,0,.7,.03,
.48: CIRCLE(200,80),50,0,.7,0,.5
:CIRCLE(200,95),50,0,.7,0,.5
4060 CIRCLE(100,150),20,1,.9:PAI
NT(100,150),1,1
4065 SCREEN 1,1:PMODE 3,1
4070 POKE 65494,0:PLAY"T405;V4;3
;P4;V10;3;P4;V20;3;P4;V31;3":POK
E 65495,0
4075 DRAW "BM38,10;"+II$:DRAW"BM
75,45"+TT$
4080 DRAW"BM30,55;S8C4D1ND6E1R3F
1D6BR4BU7NR5D3NR4D4R5;BR4BU7ND7R
4F1D2G1L4BD3BR5BR4BU7R4L2D7BR7BU
7D6F1R3E1U6BR4D1ND6E1R3F1D6BR4BU
7NR5D3NR4D4R5
```

4085 FOR DL=1 TO 2500:NEXT DL
4090 CLS7:PRINT@32,;
4095 PRINT"   TRAVERSING THE D
ISTANCES   OF SPACE AND TIME, V
OYAGER II   WILL FLY OVER THE CL
OUDS OF   THE 8 TH PLANET, NEP
TUNE.   THIS FROZEN WORLD HA
S PUZZLED   HUMANKIND SINCE ITS
DISCOVERY   IN THE 19TH CENTURY.
VOYAGER II WILL LOOK AT THIS"
4100 PRINT" MYSTERY ON   AUG 14
,1989. BUT WE DO NOT   HAVE T
O WAIT UNTIL THEN.   NOT   WHEN W
E HAVE THE COCO TO CHEAT   SPACE
AND TIME.
                       PEOPLE
OF EARTH MEET NEPTUNE...";

```
4105 PRINT@0,STRING$(32,239);:FO
R X=1 TO 14:PRINT@32*X,CHR$(239)
;:PRINT@32*X+31,CHR$(239);:NEXT
X
4110 FOR DL=1 TO 9999:NEXT
4115 PMODE 0,1:PCLS0:FOR X=1 TO
111: PSET(C(X),D(X),1):NEXT X:FO
R X=2 TO 8:PCOPY 1 TO X:NEXT X
4120 FOR MO=1 TO 8:SI=6.25*MO
4125 IF MO=1 THEN 4135
4130 PMODE 0,MO-1:SCREEN 1,1
4135 PMODE 0,MO:CIRCLE(100,100),
SI,1,.9
4140 PAINT (100,100),1,1
4145 FOR X=1 TO 4:CIRCLE(100,100
+SI/1.1),(SI/2)*X,0,.7,.5-(.01*X
),0:NEXT X
4150 CIRCLE(100,100),SI,1,.9
4155 NEXT MO
4160 SCREEN 1,1
4165 PMODE 0,1:PCLS0:CIRCLE(100,
100),55,1,.9:PAINT(100,100),1,1
4170 PCOPY 1 TO 2:PCOPY 1 TO 3:P
COPY 1 TO4
4175 BM=0:BN=10:GOSUB 5000
4180 FOR X=2 TO 6:CIRCLE(100,160
),27.5*X,0,.6,.5,0
4185 NEXT X:CIRCLE(100,100),55,1
,.9:SCREEN 1,1
4190 PMODE 0,2
4195 BM=0:BN=20:GOSUB 5000
4200 FOR X=2 TO 6:CIRCLE(100,167
),27.5*X,0,.57,.5,0
4205 NEXT X:CIRCLE(100,100),55,1
,.9:SCREEN 1,1
4210 PMODE 0,3:BN=30:GOSUB 5000
4215 FOR X=2 TO 6:CIRCLE(100,45)
,27.5*X,0,.6,0,.5
4220 NEXT X:CIRCLE(100,100),55,1
,.9:SCREEN 1,1
4225 PMODE 0,4:BN=40:GOSUB 5000
4230 FOR X=1 TO 5:CIRCLE(100,55)
```

```
,27.5*X,0,.65,0,.5:NEXT X
4235 CIRCLE(100,100),55,1,.9:SCR
EEN 1,1
4240 PMODE 0,5:PCLS0:CIRCLE(100,
100),60,1,.9:PAINT(100,100),1:PC
OPY 5 TO 6:BN=50:GOSUB 5000
4245 FOR X=1 TO 5:CIRCLE(100,60)
,30*X,0,.75,.9+(.05*X),.6-(.05*X
):NEXT X:CIRCLE(100,100),60,1,.9
:SCREEN 1,1
4250 PMODE 0,6:BN=60:GOSUB 5000
4255 FOR X=1 TO 3:CIRCLE(100,70)
,30*X,0,.8:NEXT X:CIRCLE(100,100
),60,1,.9:SCREEN 1,1
4260 PMODE 0,7:PCLS0:CIRCLE(100,
100),70,1,.9:PAINT(100,100),1,1:
PCOPY 7 TO 8:BN=70:GOSUB 5000
4265 FOR X=1 TO 3:CIRCLE(100,80)
,35*X,0,.9:NEXT X:CIRCLE(100,100
),70,1,.9:SCREEN 1,1
4270 PMODE 0,8:BN=80:GOSUB 5000
4275 FOR X=1 TO 2:CIRCLE(100,97)
,35*X,0,.9:NEXT X:CIRCLE(100,100
),70,1,.9:SCREEN 1,1
4280 PMODE 0,7:PCLS0:CIRCLE(100,
100),70,1,.9:PAINT(100,100),1,1:
BN=100:GOSUB 5000
4285 FOR X=1 TO 2:CIRCLE(100,110
),35*X,0,.9:NEXT X:CIRCLE(100,10
0),70,1,.9:SCREEN 1,1
4290 PMODE 0,6:PCLS0:CIRCLE(100,
100),60,1,.9:PAINT(100,100),1,1:
PCOPY 6 TO 5:BN=100:GOSUB 5000
4295 FOR X=1 TO 3:CIRCLE(100,120
),30*X,0,.8:NEXT X:CIRCLE(100,10
0),60,1,.9:SCREEN 1,1
4300 PMODE 0,5:BN=110:GOSUB 5000
:FOR X=1 TO 3:CIRCLE(100,130),30
*X,0,.8:NEXT X:CIRCLE(100,100),6
0,1,.9:SCREEN 1,1
4305 PMODE 0,4:PCLS0:CIRCLE(100,
100),55,1,.9:PAINT(100,100),1,1:
PCOPY 4 TO 3:PCOPY 4 TO 2:PCOPY
4 TO 1:BN=120:GOSUB 5000
4310 FOR X=1 TO 5:CIRCLE(100,55)
,27.5*X,0,.65,0,.5:NEXTX:CIRCLE(
100,100),55,1,.9:SCREEN 1,1
4315 PMODE 0,1:BN=130:GOSUB 5000
:FOR X=2 TO 60:CIRCLE(100,45),27
.5*X,0,.6,0,.5:NEXT X:CIRCLE(100
,100),55,1,.9:SCREEN 1,1
4320 PMODE 0,8:PCLS0:FOR X=1 TO
111:PSET(C(X),D(X),1):NEXT X:FOR
 X=2 TO 7:PCOPY 8 TO X:NEXT X
4325 FOR MO=8 TO 1 STEP-1:SI=6.5
*MO-6.5: IF MO=8 THEN 4335
4330 PMODE 0,MO+1:SCREEN 1,1
4335 PMODE 0,MO:CIRCLE(100,100),
SI,1,.9:PAINT(100,100),1,1
```

```
4340 FOR X=1 TO 4:CIRCLE(100,100
+SI/1.1),(SI/2)*X,0,.7,.5-(.01*X
),0:NEXT X:CIRCLE(100,100),SI,1,
.9:NEXT MO
4345 PMODE 0,1:PCLS0:FOR X=1 TO
111:PSET(C(X),D(X),1):NEXT X:SCR
EEN 1,1
4350 FOR C=1 TO 3
4355 POKE 65494,0:PLAY"T405V31;3
P4V20;3P4V10;3V4P4;3
4360 NEXT C
4365 CLS0:FOR X=1 TO 40:SET(RND(
64)-1,RND(32)-1,5):NEXT X:PRINT@
232,"END OF SIMULATION";
4370 GOTO 4370
5000 FOR X=0 TO 110:A=C(X)-BM:Q=
D(X)-BN
5005 IF A<0 THEN A=255-C(X)-BM
5010 IF Q<0 THEN Q=191-D(X)-BN/2
+4
5015 PSET(A,Q,1):NEXT X:RETURN
5020 DATA 20,25,35,15,35,35,45,2
5,55,10,68,22,30,60,30,75,32,95,
33,110,19,74,45,76,20,127,25,130
,31,132,30,135,23,146,17,156,14,
161,30,160,31,169,25,172,10,10,1
0,45,15,100,25,190,89,11,90,20,9
3,27,96,35,100,30,105,40,110,34,
55,74,63,75,64,70,60,65,59,55
5025 DATA 60,45,70,44,81,45,80,4
9,95,55,110,57,116,60,125,57,135
,50,148,38,136,25,55,95,75,96,84
,97,90,90,73,104,80,105,95,115,1
10,85,125,80,112,108,130,112,117
,97,126,95,52,141,56,138,69,125,
62,127,75,160,85,140,103,137,103
,165,118,147,185,130,187,90
5030 DATA 143,129,150,170,160,14
0,155,50,150,75,175,25,190,25,19
0,25,180,43,191,41,180,55,178,63
,177,65,182,75,155,95,158,101,16
5,103,170,100,171,91,155,10,200,
15,240,10,206,84,225,35,230,50,2
50,65,200,96,220,85,224,96,118,2
33,190,130,185,150,250,147
5035 DATA 244,180,185,170,200,18
0,210,190
```
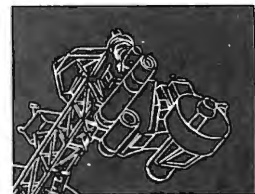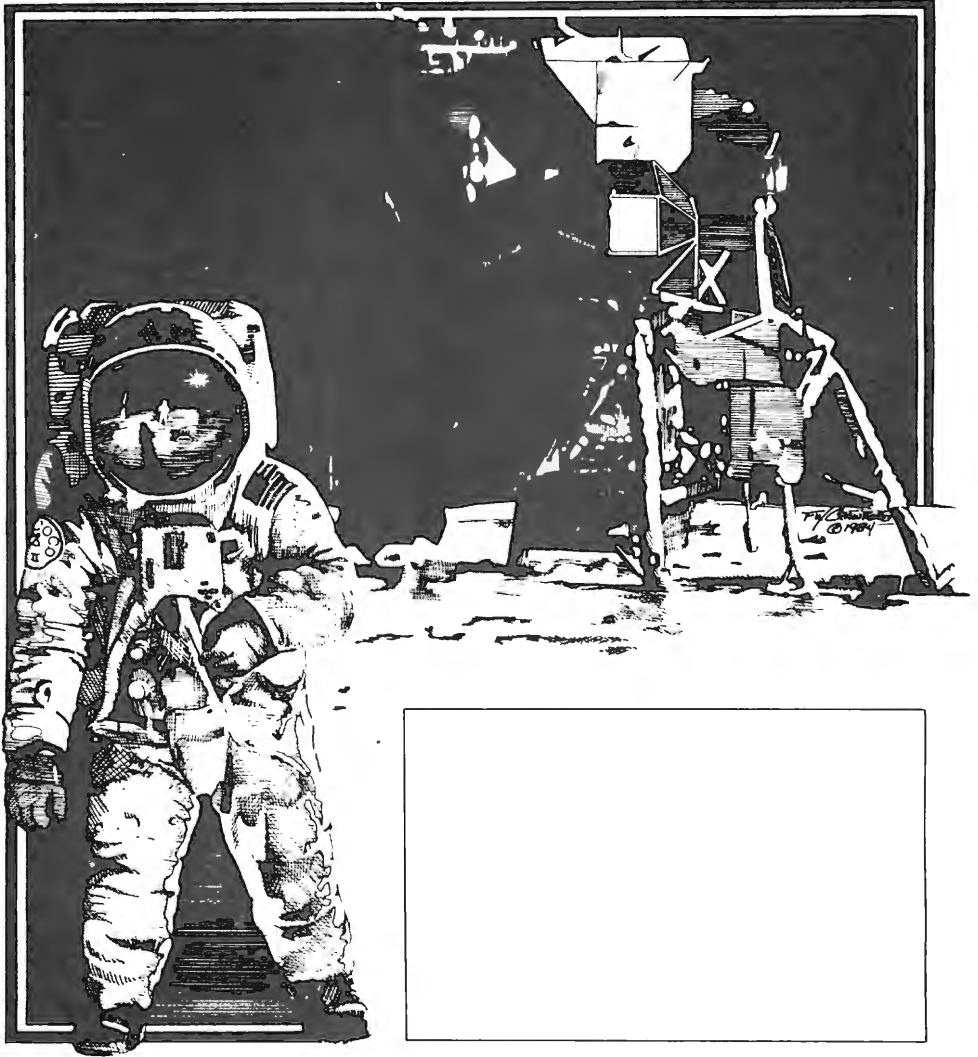
(Marc Amick is a sophomore at Franklin Senior High in Reisterstown, Md., and has had his CoCo for three years. He is experienced in BASIC and machine language and plans to go into a computer-related field.)

LUNAR LANDING

MARC AMICK

Remember where you were on July 20, 1969? It was a significant day in America's space exploration program and a milestone in the evolution of civilization's continually broadening horizons.

It was at 4:17 p.m. (EST) on that date that the world received the message from the moon that the *Eagle* had landed, bringing to a successful climax a program started in 1962 when President John F. Kennedy promised that America would be the first nation to put man on the moon.

As Lieutenant Colonel Michael Collins orbited the moon in the mother ship *Columbia*, Neil Armstrong and Colonel Edwin "Buzz" Aldrin touched down in the Sea of Tranquility. Armstrong was first out of the lunar module, the *Eagle*, declaring, "That's one small step for man, one giant leap for mankind!"

The astronauts quickly erected an American flag, and then bounded around the surface, demonstrating the moon's comparatively mild gravitational restraints. For the next two hours and 13 minutes, Armstrong and Aldrin set up scientific equipment, including a seismometer that a few years later recorded a moonquake. They also collected soil samples and rocks before returning to the mother ship.

It was a time when peoples all over the world took a new look at the moon, seemingly seeking visible evidence of the event. It was one of those events that you knew you would always remember where you were, what you were doing, and who you were with when it occurred.

This simulation gives you an opportunity to relive that marvelous occurrence. It is a graphic presentation and you will need to be patient during the unfolding of the

drama as the computer pauses periodically to draw the upcoming sequence of events.

Be sure to type in a *PCLEAR8* before running the program.

If you are among those who like to share such experiences with their grandchildren, the Color Computer will add a whole dimension to those historic recollections.

```
1 'MADE BY MARC AMICK
2 '12517 SAGMORE FOREST LANE
3 'REISTERSTOWN MARYLAND 21136
10 CLEAR 900:POKE 65495,0
20 CLS0:PRINT@192,"WHEN YOU PRES
S <ENTER> A SCREEN WILL TURN BLU
E OR RED.           IF IT IS RED
PRESS 'R'.          IF IT IS BLUE
  PRESS 'B'."
30 A$=INKEY$:IF A$="" THEN 30
40 PMODE 3,1:PCLS7:PMODE 4,1:SCR
EEN1,1
50 A$=INKEY$
60 IF A$<>"B" AND A$<>"R" THEN 5
0
70 IF A$="B" THEN B=7:R=6 ELSE B
=6:R=7
80 P$="START"
90 CLS0:PRINT@233,"apollo"+CHR$(
&H80)+"landing";
100 PLAY "P1"
110 P=1
120 FOR A=0 TO 360 STEP 4
130 IF A>0 THENIF A/9=INT(A/9) T
HEN CLS:PRINT@224,"***PRESS ANY
KEY TO CONTINUE****":PLAY"T2P4"
140 IF INKEY$<>"" THEN 220
150 GOSUB 3430:PMODE 4,P:PCLS
160 CIRCLE(128,96),50
170 GOSUB 3500
180 X=COS(A/57.295779)*80:Y=SIN(
A/57.295779)*80
190 CIRCLE(128+X,96+Y),10
200 SCREEN1,1:PLAY"L255T255ABC"
210 NEXTA
220 CLS
230 PRINT" ON JULY 20, 1969 A DR
EAM OVER   THOUSANDS OF YEARS OLD
  BECAME A REALITY, MAN LANDED ON
  THE MOON.THIS DREAM WAS FULLFIL
LED BY THEUNITED STATES' APOLLO
11 SPACE- CRAFT. THIS PROGRAM FO
R THE TRS-80 32K ECB COLOR COMPU
TER SIMU- LATES THAT FAMOUS "
240 PRINT"EVENT RIGHT ONYOUR TV
OR MONITOR."
250 PRINT:PRINT"*******MADE BY M
ARC AMICK*******"
260 V=&H5FF:FOR X=&H400 TO &H4FF
:POKE X,PEEK(X)-&H40:POKE V,PEEK
(V)-&H40:V=V-1:NEXTX
270 FOR X=1000 TO 1 STEP -1
280 IF X<500 AND C=0 THEN SCREEN
0,1:C=1
290 NEXTX
300 PMODE 4,1:PCLS
310 S$= "M+2,-7U48NR10U24NR10M+2
,-7U16M+1,-8NR3U8E2F2D8M+1,+8D16
M+2,+7D72M+2,+7L13R6BU30BL1D4R3N
U4BD2L3D2R3D2L3BD2R3D4U2NL3U2L3D
4"
320 X=14:Y=120
330 IF P$="START" THEN DIM EG(22
,11),BG(22,11),DK(11,22),AP(8,20
),SP(20,8)
340 P$="END"
350 A$="BR32L24G8D4F8NU20R1NU20R
23U20L1ND20R1D6NR3D8R3M+10,+4U16
M-10,+4BL22BD5NU4R3NU4BR3R2U2L2U
2R2BR3BD4U3E1R1F1D1NL3D2"
360 DRAW "BM100,90"+A$
370 GET(100,90)-(108,110),AP,G
380 PCLS:DRAW "A1BM100,90"+A$+"A
0"
390 GET(100,90)-(80,98),SP,G
400 EG$="L7D19R7U4BL1NM-9,+8BR1U
3NL7U5NL7U3BL1NM-9,-8BR1NU4E3R2D
1R4F3D3NL11D3NL11D5G3L2D4L6U4NU1
6L1U8R4F4U4BU3U4G4L4D7F4R2"
410 DRAW "BM100,90A3"+EG$+"A0"
420 GET(101,89)-(123,78),EG,G
430 PCLS:DRAW"BM100,90"+EG$:GET(
101,91)-(112,123),DK,G
440 SCREEN0,1:CLS:PRINT@32,"****
*******COUNT DOWN***********":FO
R X=10 TO 0 STEP -1:FOR T=1 TO 3
50:NEXTT:PRINT@237,X:PLAY "T202L
16C":NEXTX
450 P=1
460 A=-1
470 Y=190:F=1
480 PMODE 4,P:IF P=1 THEN P=5 EL
SE P=1
490 PCLS
500 DRAW"BM120,"+STR$(FIX(Y))+S$
510 FOR X=121 TO 133
520 LINE(X,Y)-(X,RND(191-Y)+Y),P
SET
530 NEXTX
540 SCREEN1,1
```

```
550 Y=Y-F:F=F*1.2
560 IF Y>120 THEN 480
570 FOR O=1 TO3:FORN=1 TO 12:PLA
Y"L255T2550"+STR$(O)+"N"+STR$(N)
:NEXTN,O
580 '****GOTO ORBIT
590 PMODE 4,P:PCLS
600 PCLS:CIRCLE(128,191),128,,.5
610 DRAW "S4BM80,133D2L4D2L2DL2D
4L6D1L1D1L1D4L1D3L1D2L1D2L3D2L2D
8G1H1L1U8L2U1L2D3L1U1L2U1L4D1L1D
2L1D2L1D2L1D2L1D3L1D3R1D1R2D
1R2R1U1R1U2R1U3R1U2R1U1R4D1L1D2L
1D3L1D2L1D2L1D3R4U1R3D6R1D2R1D2R
1D1R2BL5U1L1U1L1U1L2U1L2U1L2U1L1
U1L2U1L2U1L3U1L4U1L2L1U1L1U5
620 DRAW "L1U5L1U5L1U4L1D8L2U9
630 DRAW "BM160,130D1R2D2R1D2R1D
4L5D1L7D1L1D11R4D1R1U1R6U1R1U2R1
U3R1U3R1U1R1U1R2U1R3D1R3U1R3D1R2
D1R1D1R1D2R2D1R2D1R2D1R2U1L1U1L1
U1L2U1L2U2R1U1R1U1R1R1D1R1D1R1D1
R2D1R2D1R2D1R2D1R2D1U1R2U1R2U1R2
U3R1"
640 DRAW "BM230,155M-35,+5L12U1L
10U1L8U1D1L8D1D1L2L3D1L2D1L1D1L1
D2L1D3L1D4L1D5L1D6R1D3R1D2R1D1R1
D1"
650 SCREEN1,1
660 FOR C=.55 TO .78 STEP .005
670 CIRCLE(249,192),200,,.7,.54,
C
680 NEXTC
690 FOR O= 1 TO 2:PLAY"L25T20"+S
TR$(O)+"AB":NEXTO
700 '****TO MOON*******
710 GOSUB 3430:PMODE 4,P:PCLS
720 GOSUB 3450
730 SCREEN1,1
740 FOR X=.55 TO .9999 STEP .005
750 CIRCLE(128,96),60,,1,.54,X
760 NEXTX
770 FOR X=.01 TO .45 STEP .005
780 CIRCLE(128,96),60,,1,.99,X
790 NEXTX
800 Y=117
810 FOR X=73 TO 14 STEP -1
820 IF Y<0 THEN LINE(73,117)-(15
,0),PSET:GOTO 850
830 LINE(73,117)-(X,Y),PSET
840 Y=Y-2
850 NEXTX
860 FOR T=1 TO 3:PLAY"L4T25501AB
C":NEXTT:PLAY"ABCL2AB"
870 '******MOON CIRCLE
880 PMODE 4,5:PCLS
890 FOR X=1 TO 100
900 PSET(RND(256)-1,RND(192)-1)
910 NEXTX
920 CIRCLE(128,96),50:PAINT(128,
96),5:PAINT(128,96),0:CIRCLE(128
,96),40
930 FOR X=1 TO 5
940 CIRCLE(RND(50)+103,RND(50)+7
1),RND(5)
950 NEXTX
960 SCREEN1,1
970 FOR X=255 TO 128 STEP -1:LIN
E(255,146)-(X,146),PSET
980 NEXTX
990 FOR X=.27 TO .75 STEP .005
1000 CIRCLE(128,96),50,,1,.25,X
1010 NEXTX
1020 PLAY"L255T25505ABCDEFG03ABC
DEFG01ABCDEFGAABBCC"
1030 '*****MOON LANDING*********
1040 PMODE 4,1:PCLS:SCREEN1,1
1050 AX=200:AY=10
1060 PMODE 4,5:PCLS
1070 P=1
1080 FOR X=200 TO 120 STEP -2
1090 GOSUB 3430
```
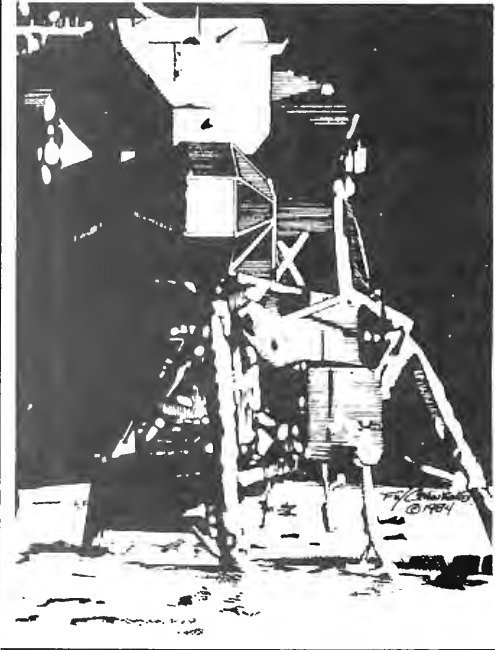
```
1100 PMODE 4,P
1110 PCLS
1120 DRAW "BM200,10"+A$
1130 DRAW "BM"+STR$(X)+",10BL12"
+EG$
1140 SCREEN1,1
1150 NEXTX
1160 FOR Y=10 TO 168 STEP 2
1170 GOSUB 3430
1180 PMODE 4,P:PCLS
1190 DRAW "BM120,"+STR$(Y)+"BL23
BD12A3"+EG$
1200 DRAW "A0BM"+STR$(210-Y)+",1
0"+A$
1210 SCREEN1,1
1220 NEXTY
1230 '****THE EAGLE HAS LANDED
1240 GOSUB 3430:PMODE 4,P:PCLS
1250 Z$="BM0,110F1R1F1E1R1E1R1E1
R1F1R1F2R1F3E2
1260 B$="E1F1E2F2E4F3E5F3E1F3E2F
2E1F2R3E1R1F1E2F2E4R3E4F3E4F3E5F
3R2E3F1R2E3F1E1F1E1E2F3E4E2E3E1F
1E2F1E3F1E4F1F3E1F3E1F2E1F1E1F3E
1F4E1E1F2E3F2E1F3E1F3E1F3E2F3E2F
3E2F3E2R2E1F1E2F1E3F2R2E3R2F1E2F
3E1F2E2E1R1E2R1E3F2F2E1R1F1R1F1E
2F1E1R1E1R1E1F3E1F3"
1270 DRAW Z$
1280 DRAW B$
1290 FOR C=1 TO 6
1300 X=RND(256)-1:Y=RND(50)+140
1310 CIRCLE(X,Y),RND(10),,.5
1320 NEXTC
1330 SCREEN1,1:FOR X=P TOP+3:IF
P=5 THEN PCOPY X TO X-4 ELSE PCO
PY X TO X+4
1340 NEXTX
1350 FOR Y=12 TO 145
1360 YY=Y-14:IF YY<0 THEN YY=0
1370 GOSUB 3430:PMODE 4,P
1380 DRAW "BM0,110"+X$
1390 LINE(116,YY)-(143,Y+10),PRE
SET,BF
1400 DRAW "BM120,"+STR$(Y)+"A3"+
EG$
1410 FOR X=128 TO 131:LINE(X,Y+8
)-(X,Y+RND(8)+8),PSET:NEXTX
1420 IF Y>100 ANDY<110  THENDRAW
 "A0"+Z$:DRAW B$
1430 SCREEN1,1
1440 IF Y=12 THENFOR O=2 TO 1 ST
EP -1:FOR N=12 TO1 STEP -1:PLAY
"L255T2550"+STR$(O)+"N"+STR$(N):
NEXTN,O
1450 NEXTY
1460 LINE(128,Y+7)-(131,Y+15),PR
ESET,BF
1470 G=1:GOSUB 1660:G=0
1480 DRAW "A0BM10,40"+T$+H$+E$+"
BR6":DRAWE$+Q$+G$+L$+E$+"BR6"+H$
+Q$:DRAWS$+"BR6"+L$+Q$+N$+D$+E$+
D$
1490 FOR X=1 TO 51
1500 PLAY "L200CB"
1510 NEXT X
1520 LINE(8,40)-(157,33),PRESET,
BF
1530 '*******1ST MAN ON MOON***
1540 GOSUB 3430:PMODE 4,P:PCLS5:
XX=45
1550 FOR X=1 TO 256
1560 A=RND(3)-2
1570 XX=XX+A:IF XX>50 THEN XX=50
 ELSE IF XX<40 THEN XX=40
1580 IF X=1 THEN LINE-(X-1,XX),P
SET ELSE LINE-(X-1,XX),PRESET
1590 NEXTX
1600 PAINT (0,0),0,0
1610 DRAW"C0BM128,96G1L2D1L3G1D8
G1D6NR5G5D1G1D3G1D3G1D4G1D7L1D4G
1D6R6U1R2E1U3NR1U2H1NL7F1R1U1E2U
2E1U2E2U1E1BD7BL2D8G1D4G1D1G1D6L
1D8G1D3L1G1D9F1R2D1R5U1R1E3U1H1L
1H2L6NG1R6F2R1F1R1NDR1U6E1L5H1L
3H1NL3F1R3F1R5U3E1U1R1E1U2E1U2R1
U2R1E1U2R1D1F1D1F1D2R1D1F1D2F1
1620 DRAW"F1D2F1NR13D3F1D1F1D4F2
R5E1R1E1U1L5H1L3G1L1NG1R1E1R1E1R
3F1R5U1H1U4H1U6L1U5H3U6H1U3H1U5H
1U5L2D1G1L2D1L1G2L2H1L1H1U1L1H1U
2E1U1R2E2U1E2R1E1U2H2BL3U2L10D7R
10U5BR5BD15U3H3BR8BD4R2E6U6H2U2H
1U1H5U14H3L4H1L13BD3G1L1D3G1D7F2
D1R3F1R8U1R3E3U8L4H1L11G1L2"
1630 DRAW"U3R2U1E1R3E1R7F1R1D1R1
F2D1
1640 PAINT(140,106),0,0:PAINT(11
5,145),0,0:PAINT(142,137),0,0:PA
INT(125,182),0,0:PAINT(153,182),
0,0
1650 SCREEN1,1
1660 O$="U7R5D7NL5BR3"
1670 N$="U7F5NU5D2BR3"
1680 E$="NR5U4NR3U3R5BR3BD7"
1690 S$="BU1F1R2E1U2H1L2H1U1E1R2
F1BD6BR3"
1700 M$="U7F2E2D7BR3"
1710 Q$="U5E2F2D1NL4D4BR3"
1720 L$="NU7R5BR3"
1730 T$="BR2U7NL2R3BR2BD7"
1740 P$="U7R4F1D1G1L4D4BR7"
1750 F$="U4NR3U3R5BR3BD7"
1760 R$="U7R4F1D1G1L4R1F4BR2"
1770 G$="BR1NR4H1U5E1R4BD4ND3L1B
D3BR4"
1780 I$="BR1R1NR1U7NL1R1BR4BD7"
1790 K$="U4NU3R1NE3F4BR2"
```

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```
1800 D$="R1U7NL1R3F1D5G1NL3BR4"
1810 H$="U4NU3R5NU3D4BR3"
1820 IF G=1 THEN RETURN
1830 DRAW "BM5,60"+O$+N$+E$+"BR6
"+S$+M$+Q$+L$+L$+"BR6"+S$+T$+E$:
DRAWP$+"BR6"+F$+O$+R$+"BR6"+M$+Q
$+N$
1840 DRAW"BM5,70"+O$+N$+E$+"BR6"
+G$+I$+Q$+N$+T$:DRAW"BR6"+L$+E$+
Q$+P$+"BR6"+F$+O$+R$+"BR6"+M$+Q$
+N$+K$+I$+N$+D$
1850 POKE 65494,0
1860 FOR N=12 TO 1 STEP -2
1870 PLAY"V31"
1880 FOR V=30 TO 0 STEP -1
1890 PLAY"L255T25501V-N"+STR$(N)
1900 NEXTV,N
1910 POKE 65495,0
1920 PLAY "V15"
1930 '********POP GUN BLAST OFF
1940 GOSUB 3430:PMODE 4,P:SCREEN
1,1
1950 LINE(121,144)-(143,133),PRE
SET,BF
1960 FOR Y=144 TO 11 STEP -6
1970 IF Y<144 THEN PUT(121,Y+6)-
(143,Y-5),BG
1980 GET(121,Y)-(143,Y-11),BG
1990 PUT(121,Y)-(143,Y-11),EG,PS
ET
2000 PLAY "T2P20"
2010 NEXTY
2020 PLAY"V0"
2030 FOR V=1 TO 29:PLAY "O1L255T
255V-N"+STR$(INT(V/3+1)):NEXTV
2040 PLAY"V15"
2050 '******DOCKING**********
2060 FOR Y=192 TO 30 STEP -2
2070 GOSUB 3430
2080 PMODE 4,P:PCLS
2090 DRAW "BM200,10"+A$
2100 PUT(120,Y)-(142,Y-11),EG,PS
ET
2110 SCREEN1,1
2120 NEXTY
2130 FOR X=120 TO 188 STEP 2
2140 GOSUB 3430:PMODE 4,P:PCLS
2150 DRAW "BM200,10"+A$
2160 PUT(X,11)-(X+11,33),DK,PSET
2170 SCREEN1,1
2180 NEXTX
2190 PLAY "L255T201BP2B"
2200 FOR X=188 TO 180 STEP -1
2210 GOSUB 3430:PMODE 4,P:PCLS
2220 DRAW "BM200,10"+A$
2230 PUT(X,11)-(X+11,33),DK,PSET
2240 SCREEN1,1
2250 NEXTX
2260 FOR Y=11 TO 36
```

```
2270 GOSUB 3430:PMODE 4,P:PCLS
2280 DRAW "BM200,10"+A$
2290 PUT(180,Y)-(191,Y+22),DK,PS
ET
2300 SCREEN1,1
2310 NEXTY
2320 X=200:Q=1
2330 GOSUB 3430:PMODE 4,P:PCLS
2340 DRAW "BM"+STR$(X)+",10"+A$
2350 FOR Y=13 TO 27:LINE(X+46,Y)
-(RND(255-(X+46))+(X+46),Y),PSET
:NEXTY
2360 PUT(180,36)-(191,58),DK,PSE
T
2370 SCREEN1,1
2380 IF X=0 THEN 2420
2390 X=X-Q:Q=Q*2
2400 IF X<=0 THEN X=0:GOTO 2330
2410 GOTO 2330
2420 FOR N=1 TO 10
2430 PLAY"L255T255N"+STR$(N)+"O"
+STR$(RND(5))
2440 NEXTN
2450 '******GOING HOME********
2460 GOSUB 3430:PMODE 4,P:PCLS
2470 FOR X=1 TO 100:PSET(RND(256
)-1,RND(192)-1):NEXTX
2480 CIRCLE(128,96),50:PAINT(128
,96),5,5:PAINT(128,96),0,0
2490 CIRCLE(128,96),40
2500 FOR X=1 TO 5
2510 CIRCLE(RND(50)+103,RND(50)+
71),RND(5)
2520 NEXTX
2530 SCREEN1,1
2540 FOR X=.87 TO .999999 STEP .
01
2550 CIRCLE(128,96),50,,1,.85,X
2560 NEXTX
2570 CIRCLE(128,96),50,,1,.90,0
2580 FOR X=.1 TO .76 STEP .005
2590 CIRCLE(128,96),50,,1,0,X
2600 NEXTX
2610 FOR X=128 TO 255
2620 LINE(128,46)-(X,46),PSET
2630 NEXTX
2640 FOR T=1 TO 2
2650 FOR N=12 TO 1 STEP -1:PLAY"
L255T255O5N"+STR$(N):NEXTN
2660 NEXTT
2670 '******LOOK! EARTH*******
2680 GOSUB3430:PMODE4,P:PCLS
2690 GOSUB3450
2700 SCREEN1,1
2710 FOR X=0 TO 128
2720 LINE(0,36)-(X,36),PSET
2730 NEXTX
2740 FOR X=.77 TO .999 STEP .005
2750 CIRCLE(128.96),60,,1,.75,X
```

```
2760 NEXTX
2770 '*****EJECT ROCKET
2780 GOSUB 3430:PMODE 4,P:PCLS:D
RAW "BM200,10"+A$:GOSUB 3430:PMO
DE 4,P:PCLS:DRAW "BM200,10"+A$:L
INE(208,10)-(208,30),PRESET
2790 PLAY "L25501T2C"
2800 FOR X=200 TO 120 STEP -1
2810 GOSUB 3430:PMODE 4,P
2820 PUT(X,10)-(X+8,30),AP,PSET
2830 SCREEN1,1
2840 GOSUB 3430:IF X<200 THEN PM
ODE 4,P:LINE(X,10)-(X+9,30),PRES
ET,BF
2850 GOSUB 3430:PMODE 4,P
2860 NEXTX
2870 LINE(120,10)-(128,30),PRESE
T,BF
2880 FOR Y=10 TO 191
2890 LINE(120,Y-1)-(140,Y-1),PRE
SET
2900 PUT(120,Y)-(140,Y+8),SP,PSE
T
2910 NEXTY
2920 FOR O=5 TO 1 STEP -1:FOR N=
12 TO 1 STEP -1:PLAY"L255T2550"+
STR$(O)+"N"+STR$(N):NEXTN,O
2930 '*******REENTERING*******
2940 GOSUB 3430:PMODE 4,P:PCLS
2950 PUT(120,86)-(140,94),SP,PSE
T
2960 SCREEN1,1
2970 FOR F=1 TO 200
2980 LINE(120,94)-(120,94-RND(10
)),PSET
2990 LINE(122,95)-(138,95),PSET
3000 LINE(128,96)-(132,96),PSET
3010 LINE(140,94)-(140,94-RND(10
)),PSET
3020 LINE(120,94)-(120,84),PRESE
T
3030 LINE(140,94)-(140,84),PRESE
T
3040 LINE(122,95)-(138,95),PRESE
T
3050 LINE(128,96)-(132,96),PRESE
T
3060 NEXTF
3070 DRAW "BM120,86BR8U40NR4L1U1
0R6D10L1D40L2U40"
3080 PLAY "P8":LINE(127,85)-(135
,36),PRESET,BF
3090 DRAW "BM120,86BR8H40E20R44F
20G40BL2U40E4F4E4F4E4F4E4F4E4F4B
L42H4G4H4G4H4G4H4G4H4G4H4G4H4G4"
3100 FOR T=1 TO 400:NEXTT
3110 PMODE 3,P:COLOR B,R
3120 FOR X=191 TO 90 STEP -1
3130 LINE(0,X)-(255,X),PSET
```

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```
3140 IF X<95 THEN PUT(120,86)-(1
40,94),SP,OR
3150 NEXTX
3160 PMODE 4,P
3170 FOR X=90 TO 94
3180 LINE(0,X)-(255,X),PRESET
3190 PUT(120,86)-(140,94),SP,OR
3200 NEXTX
3210 LINE(173,26)-(88,85),PRESET
,BF
3220 '******US FLAG******
3230 GOSUB 3430:PMODE3,P:PCLS8
3240 COLOR B
3250 LINE(0,0)-(128,96),PSET,BF
3260 FOR A=.5 TO 9.5
3270 FOR D=.5 TO 4.5
3280 PSET(A*12.8,D*19.2,8)
3290 NEXTD,A
3300 COLOR R:LINE(128,0)-(128,96
),PSET
3310 FOR S=16 TO 96 STEP 16
3320 LINE(128,S)-(255,S),PSET
3330 NEXTS
3340 FOR S=96 TO 191 STEP 16
3350 LINE(0,S)-(255,S),PSET
3360 NEXTS
3370 FOR Z=0 TO 11
3380 IF INT(Z/2)=Z/2 THEN PAINT
(200,Z*16+2),R,R
3390 NEXTZ
3400 PMODE4,P:LINE(127,0)-(127,9
6),PSET
3410 SCREEN1,1
3420 PLAY"T201L4GL4.GL4EEGL4.GL4
DDEFGABL2.GL4GL4.GL4EEGL4.GL4DDO
+DC#DEO-AO+L2.D":GOTO 90
3430 IF P=1 THEN P=5 ELSE P=1
3440 RETURN
3450 '******SUB TO DRAW EARTH***
3460 FOR X=1 TO 100:PSET(RND(256
)-1,RND(192)-1):NEXTX
3470 CIRCLE(128,96),70
3480 IF PPOINT(128,96)=0 THENPAI
NT(128,96),5,5:PAINT(128,96),0,0
ELSE PSET(128,96,0):GOTO 3480
3490 CIRCLE(128,96),50
3500 PSET(140,90):PSET(130,88):P
SET(135,89)
3510 DRAW "BM100,130R1D2R1D2R1D1
R1D1R2D1R3D1R1U1R1U2R1U3R1U4L1U3
L1U2L1U1L2U1M-1,-4M-1,+4M-4,-3U1
L1U1L2D1L1D1L1D1L2D1M+2,+7M+4,+2
"
3520 DRAW "BM82,80R1U1R2U1R2U1R1
U2R1U3R1U4R1U5R2U1R3U1R3U1R1U2R1
U3R3D4R1U3R1U1R2U1R1U1R1U2BM+20,
-2NU2D2R1D1R2D1R1D2L1R1U1R1U2R2U
1R3U1R3D1R3D1R4D1"
3530 RETURN
```

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CHECKERS

TODD BURNS

32K ECB

One thing you could depend upon when entering a country store a few years ago was finding two figures hovering over a checkerboard, scratching their heads while pondering their strategies.

It was a part of the scenery, just like the big jar of pickled bologna on the counter, the Zesta crackers in the wooden barrel, and the storekeeper with the corncob pipe.

Checkers were about as popular as the baseball games that blared over the radio in the back room and those prolonged discussions about the weather and how it was going to affect the crops.

How long has it been since you have experienced this scene? Country stores have been popping up across the country in new, commercialized, chain store versions these days. But you have to look in the back corner on the bottom shelf to even buy the game now.

Could it be that the game of Checkers is in danger of being added to the endangered species list?

Perish the thought! More than likely those old codgers are bunched in front of a Color Computer and a TV monitor in the back room making their moves with joysticks these days.

Probably using a game quite similar to the one offered here, taking the drudgery out of finding the lost pieces when you get the urge to play.

Two players are required, of course. To make a move, use your joystick (assuming it is your turn) so that the dot on the screen appears on the checker you want to move and push the fire button. Then move the dot to the square you select and hit the fire button again.
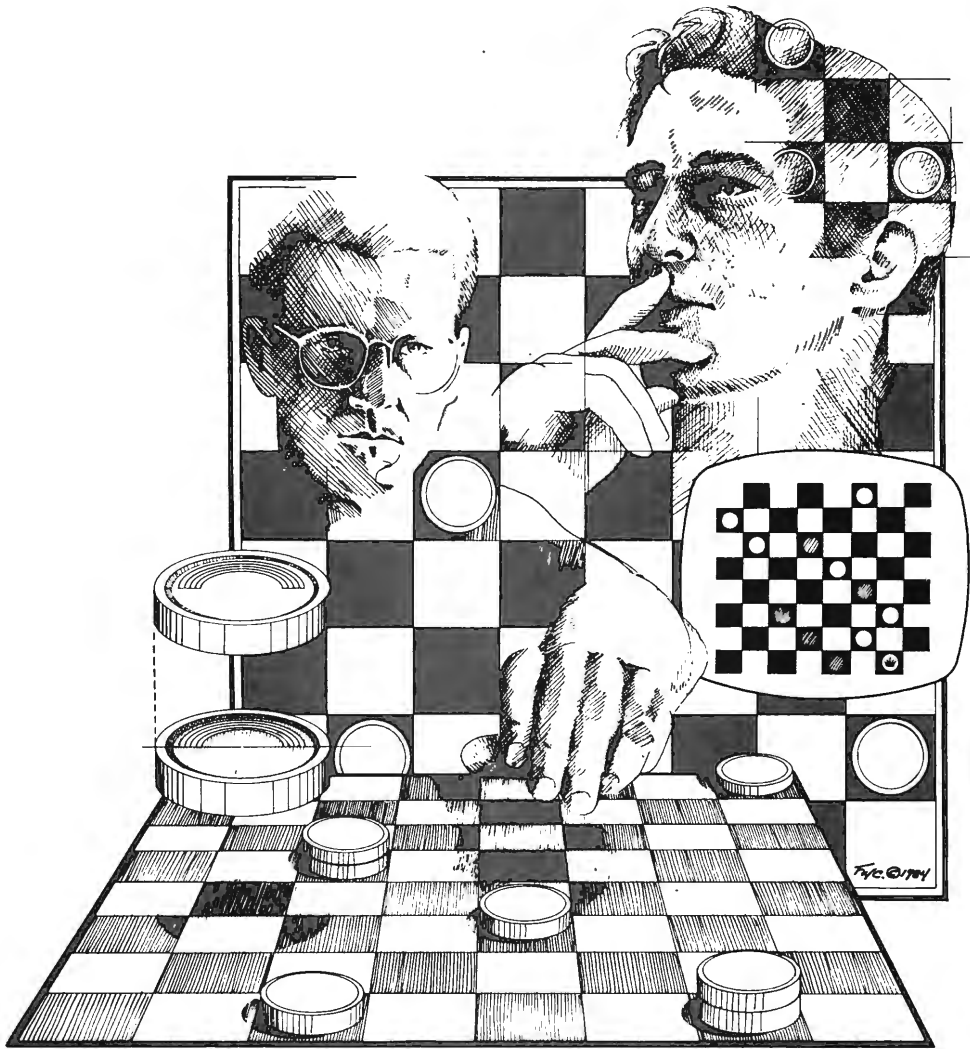
(Todd Burns is a senior at Heidelberg College in Tiffin, Ohio, majoring in
mathematics and computer science. He enjoys working with computers as a
hobby and plans to become a science computer programmer.)

When you have completed jumping one, two or more of your opponent's men, press 'D' to end your turn. If for some reason you are forced to end the game early, press 'Q' and the computer will determine the winner.

Folks who grew up jumping their own men will need to adjust because, just as in the original version, that is a no-no!

Add some crackers and pickled bologna and you can recreate your own country store atmosphere.

```
10 REM==========================
12 REM
14 REM        C H E C K E R S
16 REM
18 REM    BY: TODD BURNS
20 REM        249 N. TWP. RD. 87
22 REM        FOSTORIA, OHIO 44830
24 REM        419-435-8805
26 REM
28 REM    WRITTEN JANUARY 1983
30 REM    FOR 16K MEMORY-EXT BASIC
32 REM
34 REM==========================
36 REM   PUT HEADER ON SCREEN...
38 CLS:PRINT@138,"TODD BURNS":PR
INT@171,"PRESENTS:"
40 PRINT@232,"CHECKERS BUILT":PR
INT@267,"FOR TWO!"
42 REM THIS SECTION PLAYS MUSIC
FOR INTRODUCTION...
44 F$="T603L2.CO2AFCL4DEFL2DL4FL
1..CL2.GO3CO2AFL4DEFL2GL4AL1.G"
46 S$="L4AB-AGO3L2CO2L4AGL1FL4GL
2AL4FL2DL4FDL1CL4CL2FL4AL2GL4CL2
FL4AG"
48 T$="L4AB-O3CO2AFL2GL4CL1F"
50 PLAY F$:PLAY S$:PLAY T$
52 REM   DISPLAY INSTRUCTIONS
        USING INSTRUCTION
        SUBROUTINE...
54 CLS:GOSUB 270
56 REM INITIALIZATION SECTION..
58 PCLEAR 4:PMODE 3,1:PCLS 1:DIM
 K(12,2),A$(8):FOR I=1 TO 12:K(I
,1)=0:K(I,2)=0:NEXT I:S=0
60 REM   DRAW ODD ROWS ON CHECKER
        BOARD...
62 LINE(24,24)-(48,0),PSET,BF:LI
NE(72,24)-(96,0),PSET,BF:LINE(12
0,24)-(144,0),PSET,BF:LINE(168,2
4)-(192,0),PSET,BF
64 LINE(24,72)-(48,48),PSET,BF:L
INE(72,72)-(96,48),PSET,BF:LINE(
120,72)-(144,48),PSET,BF:LINE(16
8,72)-(192,48),PSET,BF
66 LINE(24,120)-(48,96),PSET,BF:
LINE(72,120)-(96,96),PSET,BF:LIN
E(120,120)-(144,96),PSET,BF:LINE
(168,120)-(192,96),PSET,BF
68 LINE(24,168)-(48,144),PSET,BF
:LINE(72,168)-(96,144),PSET,BF:L
INE(120,168)-(144,144),PSET,BF:L
INE(168,168)-(192,144),PSET,BF
70 REM DRAW EVEN ROWS ON CHECKER
        BOARD...
72 LINE(0,48)-(24,24),PSET,BF:LI
NE(48,48)-(72,24),PSET,BF:LINE(9
6,48)-(120,24),PSET,BF:LINE(144,
48)-(168,24),PSET,BF
74 LINE(0,96)-(24,72),PSET,BF:LI
NE(48,96)-(72,72),PSET,BF:LINE(9
6,96)-(120,72),PSET,BF:LINE(144,
96)-(168,72),PSET,BF
76 LINE(0,144)-(24,120),PSET,BF:
LINE(48,144)-(72,120),PSET,BF:LI
NE(96,144)-(120,120),PSET,BF:LIN
E(144,144)-(168,120),PSET,BF
78 LINE(0,192)-(24,168),PSET,BF:
LINE(48,192)-(72,168),PSET,BF:LI
NE(96,192)-(120,168),PSET,BF:LIN
E(144,192)-(168,168),PSET,BF
80 REM DRAW OUTSIDE BOARDER ON
        CHECKER BOARD...
82 LINE(0,0)-(192,0),PSET:LINE -
(192,192),PSET:LINE -(0,192),PSE
T:LINE -(0,0),PSET
84 REM   DRAW CHECKERS ON BOARD..
86 FOR I=36 TO 192 STEP 48
```

```
88 CIRCLE(I,12),8,3:PAINT(I,12),
3,3
90 CIRCLE(I,60),8,3:PAINT(I,60),
3,3
92 CIRCLE(I,156),8,2:PAINT(I,156
),2,2
94 NEXT I
96 FOR I=12 TO 192 STEP 48
98 CIRCLE(I,36),8,3:PAINT(I,36),
3,3
100 CIRCLE(I,132),8,2:PAINT(I,13
2),2,2
102 CIRCLE(I,180),8,2:PAINT(I,18
0),2,2
104 NEXT I
106 PRINT:PRINT:PRINT" -- PRESS
SPACEBAR TO START! --";
108 IF INKEY$<>" "THEN 108
110 REM  THE FOLLOWING IS THE
    MAIN SECTION OF THE PROGRAM..
112 SCREEN 1,0:N=1:S=0:SA=0
114 IF SA<>N THEN GOSUB 226:SA=N
116 FL=0:GOSUB 158:IF PPOINT(H,V
+2)=4 OR PPOINT(H,V+2)=1 OR NP=1
 THEN 116
118 CC=PPOINT(H,V+2):X=H:Y=V:IF
N/2=INT(N/2) THEN CP=3:ELSE CP=2
120 IF CC=CP THEN 114:ELSE SOUND
 130,3
122 GOSUB 158:IF NP=1 THEN N=N+1
:NP=0:GOTO114
124 IF PPOINT(H,V+2)<>4 THEN 122
126 GOSUB 196
128 IF (N/2<>INT(N/2) AND V<Y AN
D KI=0) OR (N/2=INT(N/2) AND V>Y
 AND KI=0) THEN SOUND150,3:SOUND
150,3:SOUND150,3:IF FL=0 THEN 11
4 ELSE 122
130 IF ABS(X-H)=24 AND ABS(Y-V)=
24 AND FL=0 THEN 134
132 IF ABS(X-H)=48 AND ABS(Y-V)=
48 THEN 140:ELSE SOUND 150,3:SOU
ND150,3:SOUND150,3:IF FL=0 THEN
114 ELSE 122
134 SOUND 140,3:N=N+1:PAINT(X,Y)
,4,1:CIRCLE(H,V),8,CC:PAINT(H,V)
,CC,CC
136 IF KI=1 OR NK=1 THEN GOSUB 2
12
138 GOTO 114
140 IF H>X THEN H1=-24 ELSE H1=2
4
142 IF V>Y THEN V1=-24 ELSE V1=2
4
144 IF PPOINT(H+H1,V+V1+2)<>CP A
ND FL=0 THEN SOUND 150,3:SOUND15
0,3:SOUND150,3:GOTO114:ELSE IF P
POINT(H+H1,V+V1+2)<>CP THEN 122
146 SOUND 140,3:FL=1:PAINT(X,Y),
4,1:CIRCLE(H,V),8,CC:PAINT(H,V),
CC,CC:PAINT(H+H1,V+V1),4,1
148 IF KI=1 OR NK=1 THEN GOSUB 2
12
150 DU=0:FOR I=1 TO 12:IF K(I,1)
=H1+H AND K(I,2)=V1+V THEN K(I,1
)=0:K(I,2)=0:S=S-1:DU=I
152 NEXT I
154 IF DU<>0 AND DU<>12 THEN FOR
 I=DU TO 11:K(I,1)=K(I+1,1):K(I,
2)=K(I+1,2):NEXT I
156 FL=1:X=H:Y=V:GOTO 122
158 REM JOYSTICK SECTION...
160 NP=0:IF N/2=INT(N/2) THEN S1
=2:S2=3:ELSE S1=0:S2=1
162 XX=JOYSTK(0):H=INT(JOYSTK(S1
)*3/24)*24+12:V=INT(JOYSTK(S2)*3
/24)*24+12:IF H=0 THEN H=1
164 IF INKEY$="D" OR INKEY$="d"
THEN NP=1:RETURN
166 IF INKEY$="Q" OR INKEY$="q"
THEN 250
168 IF N/2<>INT(N/2) AND (PEEK(6
5280)=254 OR PEEK(65280)=126) TH
EN RETURN
170 IF N/2=INT(N/2) AND (PEEK(65
280)=125 OR PEEK(65280)=253) THE
N RETURN
172 C1=PPOINT(H,V):C2=PPOINT(H+1
,V):C3=PPOINT(H-1,V):C4=PPOINT(H
,V+1):C5=PPOINT(H-1,V+1):C6=PPOI
NT(H+1,V+1)
174 IF C1=0 OR C1=3 OR C1=4 THEN
 D1=1 ELSE D1=4
176 IF INKEY$="D" OR INKEY$="d"
THEN NP=1:RETURN
178 IF C3=0 OR C3=3 OR C3=4 THEN
 D3=1 ELSE D3=4
180 IF C2=0 OR C2=3 OR C2=4 THEN
 D2=1 ELSE D2=4
182 IF C4=0 OR C4=3 OR C4=4 THEN
 D4=1 ELSE D4=4
184 IF C5=0 OR C5=3 OR C5=4 THEN
 D5=1 ELSE D5=4
186 IF C6=0 OR C6=3 OR C6=4 THEN
 D6=1 ELSE D6=4
188 IF INKEY$="Q" OR INKEY$="q"
THEN 250
190 IF INKEY$="D" OR INKEY$="d"
THEN NP=1:RETURN
192 PSET(H,V,D1):PSET(H+1,V,D2):
PSET(H-1,V,D3):PSET(H,V+1,D4):PS
ET(H-1,V+1,D5):PSET(H+1,V+1,D6)
194 PSET(H,V,C1):PSET(H+1,V,C2):
PSET(H-1,V,C3):PSET(H,V+1,C4):PS
ET(H-1,V+1,C5):PSET(H+1,V+1,C6):
GOTO 162
196 REM  THIS SECTION CHECKS TO
SEE IF CHECKER SHOULD BE KINGED.
```
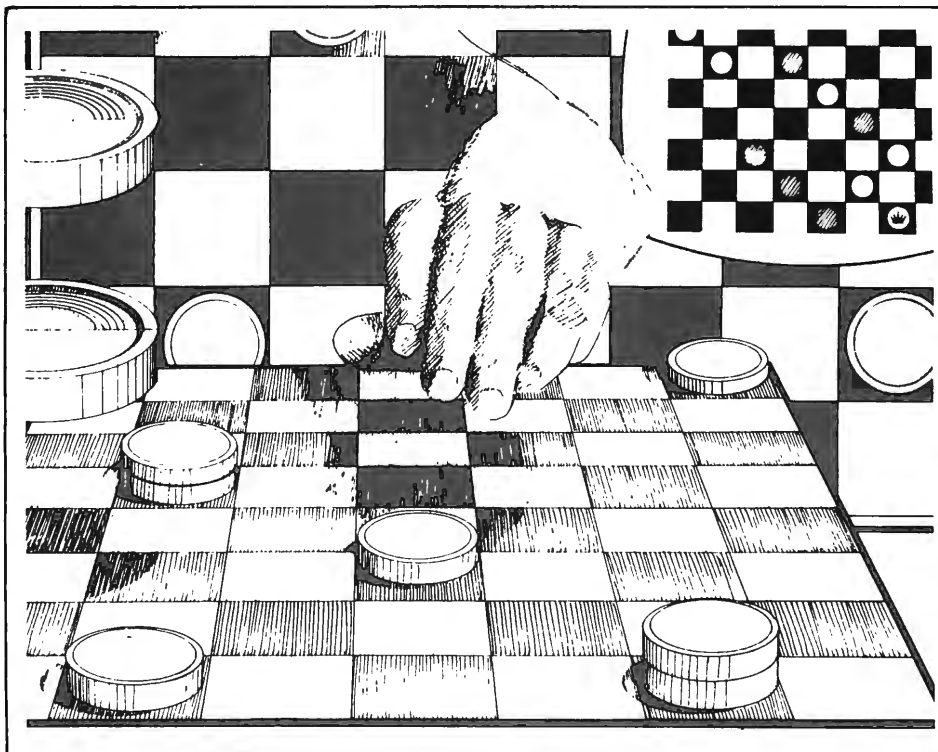
198 NK=Ø
200 IF N/2=INT(N/2) AND V=12 AND PPOINT(X,Y+2)=2 THEN NK=1
202 IF N/2<>INT(N/2) AND V=18Ø AND PPOINT(X,Y+2)=3 THEN NK=1
204 REM CKECK TO SEE IF A KING...
206 KI=Ø
208 IF S=Ø THEN RETURN:ELSE FOR I=1 TO S:IF K(I,1)=X AND K(I,2)=Y THEN KI=1:NK=Ø
210 NEXT I:RETURN
212 REM   THIS SECTION CHANGES A CHIP TO A KING...
214 IF NK=1 THEN S=S+1:K(S,1)=H:K(S,2)=V:GOTO 22Ø
216 FOR I=1 TO 12:IF K(I,1)=X AND K(I,2)=Y THEN K(I,1)=H:K(I,2)=V
218 NEXT I
220 K$="U8BR8G4L4BR4F4BR4"
222 DRAW"S2C"+STR$(CP)+"BM"+STR$(H-2)+","+STR$(V+2)+K$
224 RETURN
226 REM   THIS SECTION PRINTS PLAYERS TURN...
228 A$(1)="U8R8D4L8BD4BR12":A$(2)="U8BD8R8BR4":A$(3)="U8R8D4L8BR8D4BR4":A$(4)="BU8F4E4BG4D4BR8":A$(5)="U8R8BD4L8BD4R8BR4":A$(6)="U8R8D4L8BR4F4BR4"
230 A$(7)="BR12"
232 IF N/2<>INT(N/2) THEN A$(8)="BR2R4BL2U8G2E2D8BR4" ELSE A$(8)="NR8U4R8U4NL6BD8BR4"
234 IF N/2<>INT(N/2) THEN DRAW"S10C1BM223,185NR8U4R8U4NL6BD8BR4" ELSE DRAW "S10C1BM223,185BR2R4BL2U8G2E2D8BR4"
236 NC=Ø
238 FOR W=17 TO 185 STEP 24
240 IF N/2=INT(N/2) THEN U$="2" ELSE U$="3"
242 NC=NC+1:DRAW "S10C"+U$+"BM223,"+STR$(W)+A$(NC)
244 NEXT W
246 SOUND 170,5:SOUND 180,5
248 RETURN
250 REM END OF GAME ROUTINE
252 CLS:PRINT@134,"T H E   W I N N E R":PRINT@206,"I S:"
254 T$="T402L1GL4AL2A#L2G":U$=T$+"O3L1D"
256 PLAY T$+"P4":PLAY U$
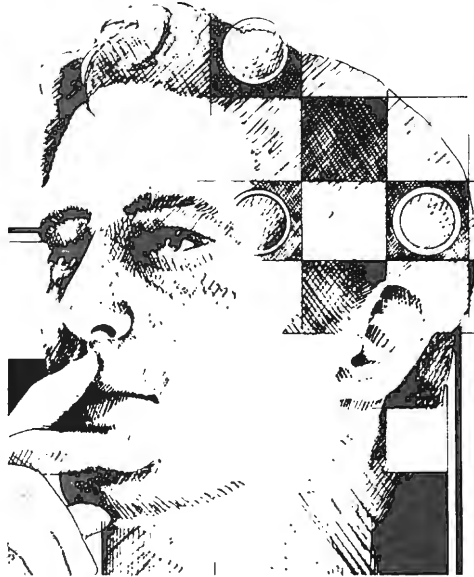
```
258 P1=0:P2=0:FOR I=12 TO 184 ST
EP 24:FOR J=12 TO 184 STEP 24
260 IF PPOINT(J,I+2)=3 THEN P1=P
1+1 ELSE IF PPOINT(J,I+2)=2 THEN
 P2=P2+1
262 NEXTJ:NEXTI:IF P1>P2 THEN A$
="P L A Y E R   1!" ELSE IF P1<P
2 THEN A$="P L A Y E R   2!" ELS
E IF P1=P2 THEN A$="   A    T I E!
"
264 B$=STRING$(16," ")
266 FOR I=1 TO 10:PRINT@264,B$:F
OR J=1 TO 40:NEXT J:PRINT@264,A$
:SOUND150,2:FOR J=1 TO 40:NEXT J
:NEXT I
268 PRINT:PRINT:PRINT:PRINT:END
270 REM INSTRUCTIONS SUBROUTINE
272 PRINT:PRINT"     THIS GAME L
IKE THE ORIGINALBOARD GAME OF CH
ECKERS REQUIRES":PRINT"TWO PEOPL
E TO PLAY AS WELL AS"
274 PRINT"JOYSTICKS.  TO MOVE US
E YOUR":PRINT"JOYSTICK SO THAT T
HE DOT ON THE":PRINT"SCREEN WILL
 APPEAR ON THE PROPERCHECKER YOU
 WISH TO MOVE AND":PRINT"PUSH TH
E RED BUTTON.  THEN DO"
276 PRINT"THIS AGAIN FOR THE SQU
ARE YOU":PRINT"WANT YOUR CHECKER
 TO BE ON.  DO":PRINT"THE SAME F
OR JUMPING YOUR OPPON-ENTS CHECK
ERS.  WHEN JUMPING YOUWILL HAVE
TO JUMP ONE CHECKER "
278 PRINT:PRINT " --PRESS SPACEB
AR TO CONTINUE--";
280 IF INKEY$<>" "THEN 280
282 CLS:PRINT
284 PRINT"AT A TIME.  AFTER YOU
ARE DONE  DOING A SINGLE, DOUBLE
, ETC.   JUMPS, PUSH 'D' TO END
 TURN."
286 PRINT "TO QUIT THIS GAME PUS
H 'Q' AND  THE COMPUTER WILL DET
ERMINE THE WINNER.  ALSO IF YOU
SELECT A   CHECKER AND THEN WISH
 TO START  YOUR MOVE OVER, MAKE
AN INVALID MOVE AND YOU WILL BE
ABLE TO DO"
288 PRINT"SO.  WHEN THE PROGRAM
TERMINATESTHE 'OK' PROMPT WILL A
PPEAR."
290 PRINT "          GOOD LUCK!!!
"
292 RETURN
```
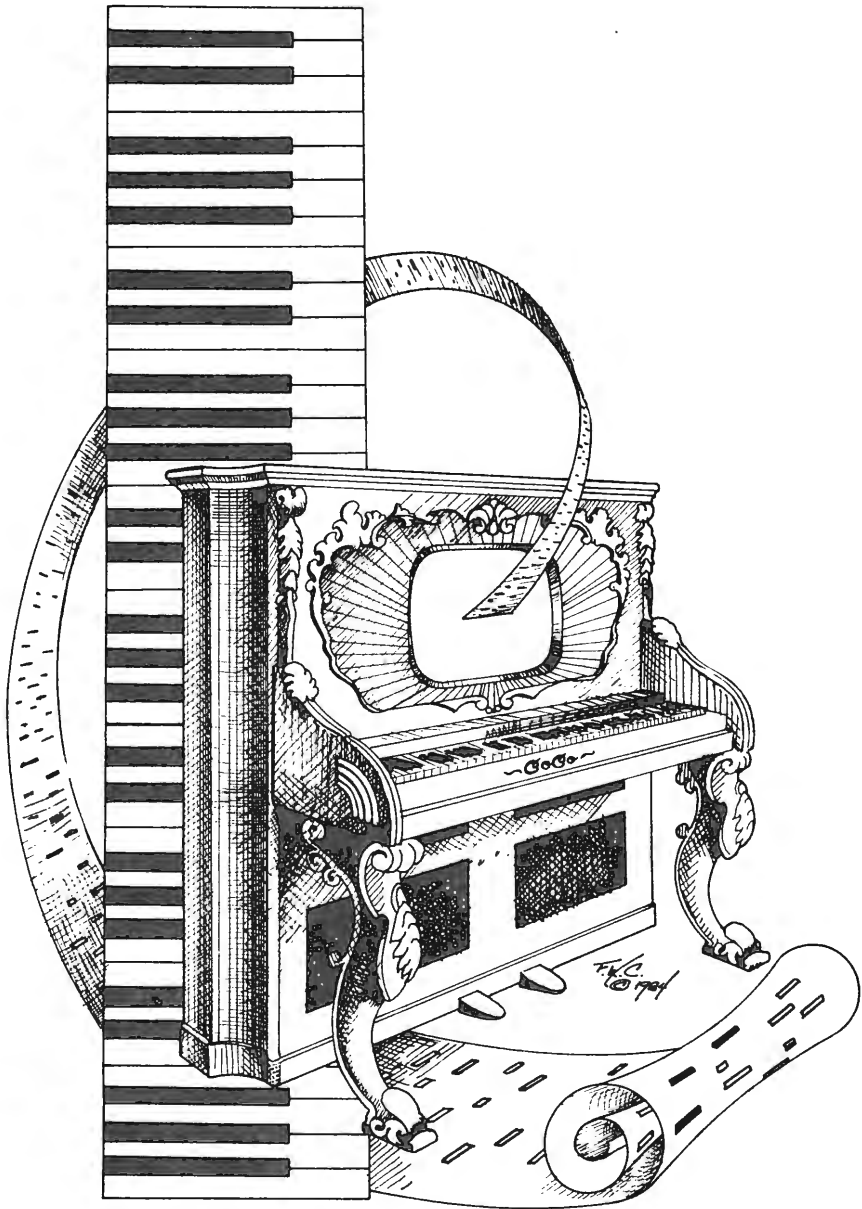
(Jim Davis is a graduate of UNC-Chapel Hill presently working with production control in an industrial office. His first exposure to computers was with the purchase of a CoCo in January 1983, and he hopes that some day it will be more than just a hobby.)

COCO PIANO

JIM DAVIS

One of the lures of the bars that typified so many of those old Western movies had to be the player pianos, those harbingers of modern technology that kept things lively between the brawls and the shootouts.

The player piano might be extinct today were it not for such modern wonders as Walt Disney World in Orlando and Kings Island near Cincinnati. The Queen City model includes a window that enables you to see all of the action inside of the marvelous machine. The music? Well, it's even better than it was in the movies.

Now through the wonder of CoCo, you can enjoy the fascination of the player piano on your very own monitor.

There are seven popular songs that will go with a variety of special occasions, and also a manual mode, which will enable you to key in your own favorites.

Upon running, a title screen appears while the graphics are being drawn. Next a menu appears, and you're ready for the fun.

The music is programmed from sheet music, using $N\$$ for the information on each note and 'P' for the key location on the graphics screen. After each note, the program goes to a subroutine where $N\$$ is played and 'P' is converted to a keyboard location.

In the manual mode the 36 keys on the piano are played on the first nine gray keys of each row on your keyboard, starting at '1' for the lowest note and '.' for the highest. Hit '*' and the piano will play every note and return to manual play. These are done using data statements. Hit '*' to return to the menu. Instructions are given on the screen when the manual mode is chosen.

Have fun. We know you're going to enjoy this one!
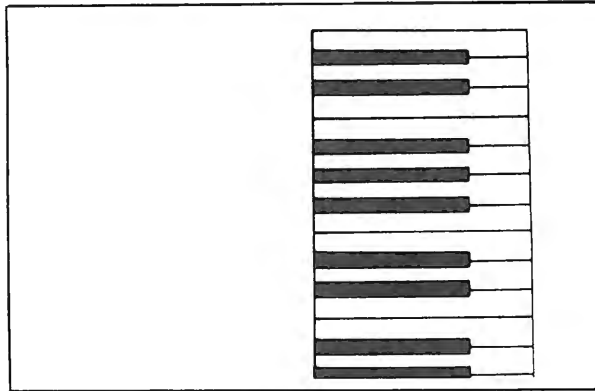
```
1 ' **COCO PIANO**
2 ' BY JIM DAVIS
3 ' RT.7,BOX445
4 ' LUMBERTON, NC 28358
5 POKE65495,0:CLS(2):PRINT@173,"
c o c o";:PRINT@235,"p l a y e r
";:PRINT@300,"p i a n o";
6 FORX=1TO30:PRINT@X,CHR$(137);:
NEXTX:FORX=481TO510:PRINT@X,CHR$
(137);:NEXTX
7 FORX=32TO448STEP32:PRINT@X,CHR
$(137);:NEXTX:FORX=63TO479STEP32
:PRINT@X,CHR$(137);:NEXTX
8 POKE65494,0:PLAY"V31T5L4CDD+EC
DL3.EL3O2BL2O3DC":POKE65495,0:GO
TO29
9 CLS:PRINT@73,"NAME YOUR TUNE";
:PRINT@166,"1) JOY - J.S.BACH";:
PRINT@198,"2) BECAUSE OF YOU";:P
RINT@230,"3) THE ENTERTAINER";:P
RINT@262,"4) SLEIGH RIDE";
10 PRINT@294,"5) JAVA";
11 PRINT@326,"6) HAPPY BIRTHDAY"
;
12 PRINT@358,"7) AULD LANG SYNE"
;
13 PRINT@390,"8) MANUAL MODE";
14 FORX=105TO118:PRINT@(X),"*";:
NEXTX
15 PRINT@455,"PRESS SONG NUMBER"
;:INPUT A
16 POKE65495,0
17 IFA<1 THEN20
18 IFA>8 THEN20
19 GOTO21
20 PRINT@500,"WHAT?";:GOTO15
21 IF A=1 THEN59
22 IF A=2 THEN72
23 IF A=3 THEN86
24 IF A=4 THEN98
25 IF A=5 THEN107
26 IF A=6 THEN126
27 IF A=7 THEN136
28 IF A=8 THEN156
29 PMODE3,1:PCLEAR4:PCLS
30 'DRAW KEYBOARD
31 LINE(0,0)-(255,191),PSET,B:LI
NE(16,132)-(0,160),PSET:LINE(32,
132)-(0,191),PSET:LINE(0,132)-(4
1,132),PSET:LINE(40,156)-(24,191
),PSET:LINE(60,160)-(48,191),PSE
T
32 LINE(196,160)-(208,191),PSET:
LINE(216,152)-(232,191),PSET:LIN
E(224,132)-(255,191),PSET:LINE(2
40,132)-(255,155),PSET:LINE(215,
132)-(255,132),PSET
33 FORX=66TO2 STEP-2:R=RND(4):CI
RCLE(128,175),X,R,.2:NEXTX
34 DRAW"BM44,108;R168U12L168D12;
R8U12R8D12R8U12R8D12R8U12R8D12R8
U12R8D12R8U12R8D12R8U12R8D12R8U1
2R8D12R8U12R8D12R8U12R8D12R8U12R
8D12"
35 DRAW"BM44,104;R168D2L168"
36 DRAW"BM48,96;U8R8D8U8R8D8R8U8
R8D8U8R8D8U8R8D8U8R8D8R8U8R8D8R8
U8R8D8U8R8D8U8R8D8R8U8R8D8U8R8D8
R8U8R8D8U8R8D8U8R8D8"
37 DRAW"BM40,112;R176U28L176D28"
38 'PIANO BODY
39 DRAW"BM40,112;D56R8U56D48R160
U48D56R8U56"
40 DRAW"BM60,152;R136U32L136D32"
41 DRAW"BM44,84;U60R168D60"
42 DRAW"BM52,76;R152U44L152D44"
43 DRAW"BM108,60;R40U24L40D24"
44 PAINT(20,80),2,4
45 DRAW"C4;BM44,83;R168":DRAW"C4
;BM40,85;R176":DRAW"C3;BM44,84;R
168"
46 DIM V(5,5)
47 PAINT(42,110),4,4
48 PAINT(42,114),4,4:PAINT(212,1
```

154
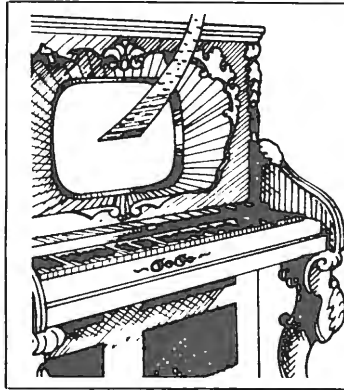
```
66),4,4
49 PAINT(48,82),4,4:PAINT(52,158
),3,4
50 PAINT(56,72),2,4:PAINT(64,148
),2,4
51 DRAW"C3;BM130,140;U16R6D6L6R6
;B;R6;R2U6L2R4L2D6R2;B;R6;D6U12R
6D6L6R6D6;B;R6;D6U18L2R8D18;B;R6
;D6R6U24L6D18"
52 DRAW"C4;BM118,130;U6L4D6R4L4U
6;B;L6;L6D12R6L6U12;B;L6;D18L6U1
8R6L6;B;L6;L6D24R6"
53 DRAW"C3;BM84,52;D1G2L2H2U2E2R
2F2D1U12R4F4L6H2"
54 DRAW"C3;BM172,52;D1G2L2H2U2E2
R2F2E1U12R4F4L6H2"
55 PAINT(82,52),3,3:PAINT(86,41)
,3,3
56 PAINT(170,52),3,3:PAINT(174,4
0),3,3
57 GOTO9
58 '**SONG DATA**
59 'JOY- BACH
60 DRAW"C3;BM114,53;L2U1R2U9L2D1
R2U1R5D10U5L5D5R5;B;R3;U10R5D3L5
R5D7;B;R3;U10R4L4D10R4;B;R4;U10D
5R5U5D10"
61 SCREEN1,0:FORX=1TO460*2:NEXTX
:T=0
62 T=T+1:N$="V31T11L203G":P=136:
GOSUB150:N$="L403C":P=104:GOSUB1
50:N$="L403D":P=104:GOSUB150:N$=
"L403E":P=120:GOSUB150:N$="L403F
":P=128:GOSUB150:N$="L203G":P=13
6:GOSUB150:N$="L203C":P=104:GOSU
B150:N$="P16L203C":P=104:GOSUB15
0
63 N$="L203A":P=144:GOSUB150:N$=
"L403F":P=128:GOSUB150:N$="L403G
":P=136:GOSUB150:N$="L403A":P=14
4:GOSUB150:N$="L403B":P=152:GOSU
B150:N$="L204C":P=160:GOSUB150:N
$="L203C":P=104:GOSUB150:N$="P16
L203C":P=104:GOSUB150:N$="L203F"
:P=128:GOSUB150
64 N$="L403D":P=112:GOSUB150:N$=
"L403G":P=136:GOSUB150:N$="L403F
":P=128:GOSUB150:N$="L403E":P=12
0:GOSUB150:N$="L403D":P=112:GOSU
B150:N$="L203E":P=120:GOSUB150:N
$="L403F":P=128:GOSUB150:N$="L40
3E":P=120:GOSUB150:N$="L403D":P=
112:GOSUB150
65 N$="L403C":P=104:GOSUB150:N$=
"L202B":P=96:GOSUB150
66 N$="L403C":P=104:GOSUB150:N$=
"L403D":P=112:GOSUB150:N$="L403E
":P=120:GOSUB150:N$="L403C":P=10
4:GOSUB150:N$="L203E":P=120:GOSU
B150:N$="L103D":P=112:GOSUB150:N
$="L203G":P=136:GOSUB150:N$="L40
3C":P=104:GOSUB150:N$="L403D":P=
112:GOSUB150
67 N$="L403E":P=120:GOSUB150:N$=
"L403F":P=128:GOSUB150:N$="L203G
":P=136:GOSUB150:N$="L203C":P=10
4:GOSUB150:N$="L203C":P=104:GOSU
B150:N$="L203A":P=144:GOSUB150:N
$="L403F":P=128:GOSUB150:N$="L40
3G":P=136:GOSUB150:N$="L403A":P=
144:GOSUB150
68 N$="L403B":P=152:GOSUB150:N$=
"L204C":P=160:GOSUB150:N$="L203C
":P=104:GOSUB150:N$="L203C":P=10
4:GOSUB150:N$="L203F":P=128:GOSU
B150:N$="L403G":P=136:GOSUB150:N
$="L403F":P=128:GOSUB150:N$="L40
3E":P=120:GOSUB150:N$="L403D":P=
112:GOSUB150
69 N$="L203E":P=120:GOSUB150:N$=
"L403F":P=128:GOSUB150:N$="L403E
":P=120:GOSUB150:N$="L403D":P=11
2:GOSUB150:N$="L403C":P=104:GOSU
B150:N$="L403D":P=112:GOSUB150:N
```
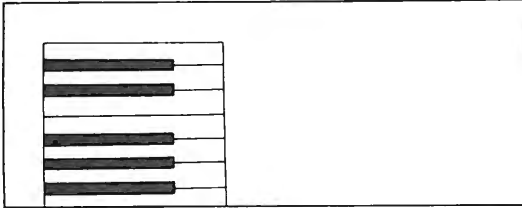
```
$="L403E":P=120:GOSUB150:N$="L20
3F":P=128:GOSUB150:N$="L2.02B":P
=96:GOSUB150
70 N$="L103C":P=104:GOSUB150:IF
T=1 THEN62 ELSE 71
71 CLS:PAINT(128,48),1,4:GOTO9
72 'BECAUSE OF YOU
73 DRAW"C4;BM128,56;E10U3H3L4G3H
3L4G3D3F10":PAINT(128,48),4,4
74 SCREEN1,0:FORX=1TO460*2:NEXTX
:T=0
75 T=T+1:N$="V31T4L402A":P=144:G
OSUB150:N$="L402A+":P=148:GOSUB1
50:N$="L203C":P=160:GOSUB150:N$=
"L402E":P=120:GOSUB150:N$="L402D
+":P=116:GOSUB150:N$="L202D":P=1
12:GOSUB150:N$="L402A+":P=148:GO
SUB150:N$="L403C":P=160:GOSUB150
:N$="L202A":P=144
76 GOSUB150:N$="L402C+":P=108:GO
SUB150:N$="L402D":P=112:GOSUB150
:N$="L402C+":P=108:GOSUB150:N$="
L402C":P=104:GOSUB150:IF T=1 THE
N 75:IF T=3 THEN 81
77 N$="P16L403C":P=160:GOSUB150:
N$="L4.03D":P=168:GOSUB150:N$="L
603C":P=160:GOSUB150:N$="L4.03D+
":P=172:GOSUB150:N$="L603D+":GOS
UB150:N$="L4.03C":P=160:GOSUB150
:N$="L602A+":P=148:GOSUB150:N$="
L4.02A":P=144:GOSUB150:N$="L602A
":GOSUB150
78 N$="L4.02A+":P=148:GOSUB150:N
$="L603C":P=160:GOSUB150:N$="L4.
03D":P=168:GOSUB150:N$="L603D":G
OSUB150:N$="L4.02A+":P=148:GOSUB
150:N$="L602A":P=144:GOSUB150:N$
="L2.02G":P=136:GOSUB150:N$="L60
2D":P=112:GOSUB150:N$="L602A":P=
144:GOSUB150
79 N$="L402A+":P=148:GOSUB150:N$
="L402D":P=112:GOSUB150:N$="L402
A":P=144:GOSUB150:N$="P16L202A":
GOSUB150:N$="L402D":P=112:GOSUB1
50:N$="L402G+":P=140:GOSUB150:N$
="P16L202G+":GOSUB150:N$="L402D"
:P=112:GOSUB150:N$="L2.02G":P=13
6:GOSUB150
80 IF T=2 THEN75
```

```
81 N$="L403C":P=160:GOSUB150:N$=
"L4.03D":P=168:GOSUB150:N$="L603
C":P=160:GOSUB150:N$="L203D+":P=
172:GOSUB150:N$="L4.03C":P=160:G
OSUB150:N$="L602A+":P=148:GOSUB1
50:N$="L402A":P=144:GOSUB150:N$=
"L202G":P=136:GOSUB150
82 N$="L402F+":P=132:GOSUB150:N$
="L2.03D":P=168:GOSUB150:N$="L40
2G":P=136:GOSUB150:N$="L402F+":P
=132:GOSUB150:N$="L402F":P=128:G
OSUB150:N$="L203D":P=168:GOSUB15
0:N$="L403D":GOSUB150:N$="L2.03E
":P=176:GOSUB150
83 N$="L403D":P=168:GOSUB150:N$=
"L2.03E":P=176:GOSUB150:N$="L403
D":P=168:GOSUB150:N$="L403E":P=1
76:GOSUB150:N$="L403F":P=184:GOS
UB150:N$="L403C":P=160:GOSUB150:
N$="L402A":P=144:GOSUB150:N$="L4
02G":P=136:GOSUB150
84 N$="L402F":P=128:GOSUB150:N$=
"L402G":P=136:GOSUB150:N$="L402A
":P=144:GOSUB150:N$="L2.03D":P=1
68:GOSUB150:N$="L403D":GOSUB150:
N$="L2.03E":P=176:GOSUB150:N$="L
403E":GOSUB150:N$="L203F":P=184:
GOSUB150
85 N$="P8L402C+":P=108:GOSUB150:
N$="P8L402C+":GOSUB150:N$="P8L40
2C+":GOSUB150:N$="P8L2.02C":P=10
4:GOSUB150:CLS:PAINT(128,48),1,1
:GOTO9
86 'ENTERTAINER
87 CIRCLE(128,42),5,3:DRAW"C3;BM
128,40;L8R6U3R4D3R6":DRAW"C3;BM1
28,42;D10G6L2R2E6F6R2L2H6U4R4E4G
4L4L7H1"
88 SCREEN1,0:FORX=1TO460*2:NEXTX
:T=0
89 T=T+1:N$="V31T5L802D":P=112:G
OSUB150:N$="L802D+":P=116:GOSUB1
50:N$="L802E":P=120:GOSUB150:N$=
"L403C":P=160:GOSUB150:N$="L802E
":P=120:GOSUB150:N$="L403C":P=16
0:GOSUB150:N$="L402E":P=120:GOSU
B150:N$="L4.03C":P=160:GOSUB150
90 N$="L803C":GOSUB150:N$="L803D
":P=168:GOSUB150:N$="L803D+":P=1
72:GOSUB150:N$="L803E":P=176:GOS
UB150:N$="L803C":P=160:GOSUB150:
N$="L803D":P=168:GOSUB150:N$="L4
03E":P=176:GOSUB150:N$="L802B":P
=152:GOSUB150
91 N$="L403D":P=168:GOSUB150:N$=
"L2.03C":P=160:GOSUB150
92 N$="L802D":P=112:GOSUB150:N$=
"L802D+":P=116:GOSUB150:N$="L802
E":P=120:GOSUB150:N$="L403C":P=1
```

```
60:GOSUB150:N$="L802E":P=120:GOS
UB150:N$="L403C":P=160:GOSUB150:
N$="L402E":P=120:GOSUB150:N$="L2
.03C":P=160:GOSUB150:N$="L802A":
P=144:GOSUB150
93 N$="L802G":P=136:GOSUB150:N$=
"L802F+":P=132:GOSUB150:N$="L802
A":P=144:GOSUB150:N$="L803C":P=1
04:GOSUB150:N$="L403E":P=120:GOS
UB150:N$="L803D":P=112:GOSUB150:
N$="L803C":P=104:GOSUB150:N$="L8
02A":P=144:GOSUB150:N$="L2.03D":
P=112:GOSUB150
94 N$="P8L803C":P=160:GOSUB150:N
$="L803D":P=168:GOSUB150:N$="L80
3E":P=176:GOSUB150:N$="L803C":P=
160:GOSUB150:N$="L803D":P=168:GO
SUB150:N$="L403E":P=176:GOSUB150
:N$="L803C":P=160:GOSUB150:N$="L
803D":P=168:GOSUB150:N$="L803C":
P=160:GOSUB150
95 N$="L803E":P=176:GOSUB150:N$=
"L803C":P=160:GOSUB150:N$="L803D
":P=168:GOSUB150:N$="L403E":P=17
6:GOSUB150:N$="L803C":P=160:GOSU
B150:N$="L803D":P=168:GOSUB150:N
$="L803C":P=160:GOSUB150:N$="L80
3E":P=176:GOSUB150:N$="L803C":P=
160:GOSUB150
96 N$="L803D":P=168:GOSUB150:N$=
"L403E":P=176:GOSUB150:N$="L802B
":P=152:GOSUB150:N$="L4.03D":P=1
68:GOSUB150:N$="L2.03C":P=160:GO
SUB150:IF T=1THEN89
97 CLS:PAINT(130,48),1,4:GOTO9
98 'SLEIGH RIDE
99 DRAW"C3;BM140,52;H12G12R24L10
D4L4U4"
100 DRAW"BM144,40;D16L32U16R32":
PAINT(142,42),2,3:PAINT(116,42),
2,3
101 SCREEN1,0:FORX=1TO460*2:NEXT
X:T=0
102 T=T+1:N$="V31T7L403C":P=160:
GOSUB150:N$="L403C":GOSUB150:N$=
"L403C":GOSUB150:N$="L403C":GOSU
B150:N$="L403D":P=168:GOSUB150:N
$="L803C":P=160:GOSUB150:N$="L80
2A":P=144:GOSUB150:N$="L402F":P=
128:GOSUB150:N$="L402G":P=136:GO
SUB150:N$="L402A"
103 P=144:GOSUB150:N$="L802G":P=
136:GOSUB150:N$="L802E":P=120:GO
SUB150:N$="L402D":P=112:GOSUB150
:N$="L202C":P=104:GOSUB150:N$="L
402D":P=112:GOSUB150:N$="L402E":
P=120:GOSUB150:N$="L402G":P=136:
GOSUB150:N$="L403C":P=160:GOSUB1
50:N$="L403D":P=168
104 GOSUB150:N$="L803C":P=160:GO
SUB150:N$="L802A":P=144:GOSUB150
:N$="L802G":P=136:GOSUB150:N$="L
802F":P=128:GOSUB150:N$="L402G":
P=136:GOSUB150:N$="L802G":GOSUB1
50:N$="L802A":P=144:GOSUB150:N$=
"L802G":P=136:GOSUB150:N$="L802F
":P=128:GOSUB150
105 N$="L402D":P=112:GOSUB150:N$
="L202F":P=128:GOSUB150:IF T<3 T
HEN102
106 CLS:PAINT(132,48),1,4:GOTO9
107 'JAVA
108 DRAW"C3;BM120,48;R12D4R4U4L4
D6L12U6":PAINT(122,50),3,3
109 DRAW"C2;BM130,46;U1E1U1E2U1"
:DRAW"BM126,47;U2H2U1E2U1":DRAW"
BM122,46;U1H1U2H2"
110 SCREEN1,0:FORX=1TO460*2:NEXT
X:T=0
111 T=T+1:N$="V31T5L403C":P=160:
GOSUB150:N$="L802G+":P=140:GOSUB
150:N$="L803C":P=160:GOSUB150:N$
="L803C":GOSUB150:N$="L402A":P=1
44:GOSUB150:N$="L402D":P=112:GOS
UB150:N$="L402C":P=104:GOSUB150:
N$="L802D":P=112:GOSUB150
112 N$="L802F":P=128:GOSUB150:N$
="L802D":P=112:GOSUB150:N$="L802
C":P=104:GOSUB150:N$="L402D":P=1
12:GOSUB150
113 IF T=3 THEN 120
114 N$="L802D":GOSUB150:N$="L802
C":P=104:GOSUB150:N$="L402D":P=1
12:GOSUB150:N$="L802D":GOSUB150:
N$="L802C":P=104:GOSUB150
115 N$="L402D":P=112:GOSUB150:N$
="L802D":GOSUB150:N$="L802C":P=1
04:GOSUB150:N$="L802D":P=112:GOS
UB150
116 IF T=2 THEN 118
117 N$="L802F":P=128:GOSUB150:GO
TO119
118 N$="L802G":P=136:GOSUB150
119 N$="L802D":P=112:GOSUB150:N$
="L802C":P=104:GOSUB150:N$="L802
D":P=112:GOSUB150:GOTO111
120 N$="L403C":P=160:GOSUB150:N$
="L802G":P=136:GOSUB150:N$="L803
C":P=160:GOSUB150:N$="L803C":GOS
UB150:N$="L402G+":P=140:GOSUB150
:N$="L402D":P=112:GOSUB150:N$="L
402C":P=104:GOSUB150:N$="L802D":
P=112:GOSUB150:N$="L802F":P=128:
GOSUB150
121 N$="L802D":P=112:GOSUB150:N$
="L802C":P=104:GOSUB150:N$="L402
D":P=112:GOSUB150:N$="L403C":P=1
60:GOSUB150:N$="L802G+":P=140:GO
```
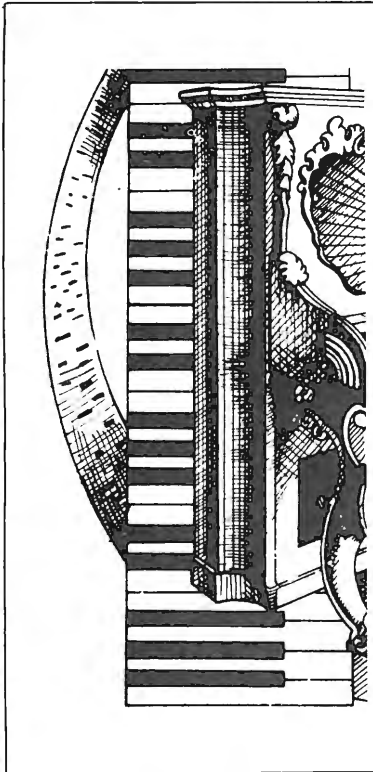
```
SUB150:N$="L803C":P=160:GOSUB150
:N$="L803C":GOSUB150:N$="L402A":
P=144:GOSUB150:N$="L402D":P=112:
GOSUB150:N$="L402C"
122 GOSUB150:N$="L803D":P=168:GO
SUB150:N$="L802D":P=112:GOSUB150
:N$="L803D":P=168:GOSUB150:N$="L
803D":GOSUB150:N$="L403C":P=160:
GOSUB150:N$="L802D":P=112:GOSUB1
50:N$="L802C":P=104:GOSUB150:N$=
"L402D":P=112:GOSUB150:N$="L802D
":GOSUB150
123 N$="L802C":P=104:GOSUB150:N$
="L402D":P=112:GOSUB150:N$="L802
D":GOSUB150:N$="L802C":P=104:GOS
UB150:N$="L802D":P=112:GOSUB150:
N$="L802F":P=128:GOSUB150:N$="L8
02D":P=112:GOSUB150:N$="L802C":P
=104:GOSUB150
124 N$="L402F":P=128:GOSUB150
125 PAINT(132,48),1,4:GOTO9
126 'HAPPY BIRTHDAY
127 DRAW"C2;BM116,48;D10R24U10L2
4":PAINT(128,50),2,2:DRAW"C3;BM1
20,48;U4;B;R4;D4;B;R4;U4;B;R4;D4
;B;R4;U4"
128 DRAW"C2;BM120,44;H2E2U2D2F2G
2;B;R4;H2E2U2D2F2G2;B;R4;H2E2U2D
2F2G2;B;R4;H2E2U2D2F2G2;B;R4;H2E
2U2D2F2G2"
129 SCREEN1,0:FORX=1TO460*2:NEXT
X:T=0
130 T=T+1:N$="V31T4L803C":P=160:
GOSUB150:N$="L803C":GOSUB150:N$=
"L402B":P=152:GOSUB150:N$="L402G
":P=136:GOSUB150:N$="L402A":P=14
4:GOSUB150:N$="L4.02G":P=136:GOS
UB150:IF T=3 THEN 135
131 N$="L8.02D":P=112:GOSUB150:N
$="L802D":GOSUB150:N$="L402E":P=
120:GOSUB150:N$="L402D":P=112:GO
SUB150:N$="L402G":P=136:GOSUB150
:N$="L4.02F+":P=132:GOSUB150:N$=
"L8.02D":P=112:GOSUB150:N$="L802
D":GOSUB150
132 N$="L402E":P=120:GOSUB150:N$
="L402D":P=112:GOSUB150:N$="L402
A":P=144:GOSUB150:N$="L4.02G":P=
136:GOSUB150:N$="L802D":P=112:GO
SUB150:N$="L802D":GOSUB150:N$="L
403D":P=168:GOSUB150:N$="L402B":
P=152:GOSUB150
133 N$="L402G":P=136:GOSUB150:N$
="L402F+":P=132:GOSUB150:N$="L40
2E":P=120:GOSUB150
134 GOTO 130
135 PAINT(128,48),1,4:GOTO9
136 ' AULD LANG SYNE
137 FORX=20TO37:Y=RND(3)
138 CIRCLE(128,48),11,2:CIRCLE(1
28,48),9,3:CIRCLE(128,48),7,2
139 SCREEN1,0:FORX=1TO460*2:NEXT
X:T=0
140 N$="V31T4L402C":P=104:GOSUB1
50:N$="L4.02F":P=128:GOSUB150:N$
="L802E":P=120:GOSUB150:N$="L402
F":P=128:GOSUB150:N$="L402A":P=1
44:GOSUB150:N$="L4.02G":P=136:GO
SUB150:N$="L802F":P=128:GOSUB150
:N$="L402G":P=136:GOSUB150
141 N$="L402A":P=144:GOSUB150:N$
="L802F":P=128:GOSUB150:N$="L4.0
2F":GOSUB150:N$="L402A":P=144:GO
SUB150:N$="L403C":P=160:GOSUB150
:N$="L2.03D":P=168:GOSUB150
142 T=T+1:N$="L403D":P=168:GOSUB
150:N$="L4.03C":P=160:GOSUB150:N
$="L802A":P=144:GOSUB150:N$="L40
2A":GOSUB150:N$="L402F":P=128:GO
SUB150:N$="L4.02G":P=136:GOSUB15
0:N$="L802F":P=128:GOSUB150:N$="
L402G":P=136:GOSUB150
143 N$="L402A":P=144:GOSUB150:N$
="L4.02F":GOSUB150:N$="L802D":P=
112:GOSUB150:N$="L402D":GOSUB150
:N$="L402C":P=104:GOSUB150:N$="L
2.02F":P=128:GOSUB150
```

```
144 IF T=2 THEN148
145 N$="L403D":P=168:GOSUB150:N$
    ="L4.03C":P=160:GOSUB150:N$="L80
    2A":P=144:GOSUB150:N$="L4.02A":G
    OSUB150:N$="L802F":P=128:GOSUB15
    0:N$="L4.02G":P=136:GOSUB150:N$=
    "L802F":P=128:GOSUB150:N$="L402G
    ":P=136:GOSUB150:N$="L403D":P=16
    8:GOSUB150
146 N$="L4.03C":P=160:GOSUB150:N
    $="L802A":P=144:GOSUB150:N$="L4.
    02A":GOSUB150:N$="L803C":P=160:G
    OSUB150:N$="L2.03D":P=168:GOSUB1
    50
147 GOTO142
148 PAINT(128,48),1,4
149 GOTO9
150 'PLAY SONG
151 GET(118,78)-(122,84),V,G
152 IF RIGHT$(N$,1)="+" THEN154
153 PUT(P-2,97)-(P+2,102),V,PSET
    :POKE65494,0:PLAY N$:POKE65495,0
    :PUT(P-2,97)-(P+2,102),V,PRESET:
    GOTO155
154 PUT(P-2,89)-(P+2,94),V,PSET:
    POKE65494,0:PLAY N$:POKE65495,0:
    PUT(P-2,89)-(P+2,94),V,PRESET
155 RETURN
156 DRAW"C3;BM111,38;R6D4L6U4D8;
    B;R9;U8D8R5;B;R4;U8R6D3L6R6D5;B;
    R8;U3H5F5E4U1"
157 DRAW"BM119,58;U8F3E4D8;B;R4;
    R6L6U5R4L4U3R6"
158 CLS:PRINT@75,"MANUAL MODE";:
    PRINT@107,"-----------";
159 PRINT@291,"HIT <!> TO SCALE
    KEYBOARD";
160 PRINT@161,"36 PIANO KEYS= FI
    RST NINE KEYS";:PRINT@194,"OF EA
    CH ROW ON YOUR KEYBOARD";:PRINT@
    228,"(#1 IS THE LOWEST NOTE)";
161 PRINT@323,"HIT <*> TO RETURN
     TO MENU";
162 PRINT@450,"**HIT ANY KEY TO
    CONTINUE**" ;
163 C$=INKEY$
164 IF C$=""THEN163
165 SCREEN1,0
166 DATA 02C,48,02C+,52,02D,56,0
    2D+,60,02E,64,02F,72,02F+,76,02G
    ,80,02G+,84,02A,88,02A+,92,02B,9
    6
167 DATA 03C,104,03C+,108,03D,11
    2,03D+,116,03E,120,03F,128,03F+,
    132,03G,136,03G+,140,03A,144,03A
    +,148,03B,152
168 DATA 04C,160,04C+,164,04D,16
    8,04D+,172,04E,176,04F,184,04F+,
    188,04G,192,04G+,196,04A,200,04A
+,204,04B,208
169 SCREEN1,0
170 E$=INKEY$
171 IFE$=""THEN170
172 IFE$="!"THEN213
173 IFE$="1"THEN N=1
174 IFE$="2"THEN N=3
175 IFE$="3"THEN N=5
176 IFE$="4"THEN N=7
177 IFE$="5"THEN N=9
178 IFE$="6"THEN N=11
179 IFE$="7"THEN N=13
180 IFE$="8"THEN N=15
181 IFE$="9"THEN N=17
182 IFE$="Q"THEN N=19
183 IFE$="W"THEN N=21
184 IFE$="E"THEN N=23
185 IFE$="R"THEN N=25
186 IFE$="T"THEN N=27
187 IFE$="Y"THEN N=29
188 IFE$="U"THEN N=31
189 IFE$="I"THEN N=33
190 IFE$="O"THEN N=35
191 IFE$="A"THEN N=37
192 IFE$="S"THEN N=39
193 IFE$="D"THEN N=41
194 IFE$="F"THEN N=43
195 IFE$="G"THEN N=45
196 IFE$="H"THEN N=47
197 IFE$="J"THEN N=49
198 IFE$="K"THEN N=51
199 IFE$="L"THEN N=53
200 IFE$="Z"THEN N=55
201 IFE$="X"THEN N=57
202 IFE$="C"THEN N=59
203 IFE$="V"THEN N=61
204 IFE$="B"THEN N=63
205 IFE$="N"THEN N=65
206 IFE$="M"THEN N=67
207 IFE$=","THEN N=69
208 IFE$="."THEN N=71
209 IFE$="*"THEN 211
210 GOTO212
211 PAINT(126,47),1,4:PAINT(128,
    50),1,4:GOTO9
212 GOTO218
213 N=-1
214 N=N+2:FORX=1TON:READN$:NEXTX
    :READP
215 PLAY"V31T6L6"
216 GOSUB150:RESTORE
217 IF N=71THEN224ELSE214
218 FORX=1TON
219 READN$
220 NEXTX
221 PLAY"V31T4L4"
222 READP
223 GOSUB150
224 RESTORE:GOTO170
```

ROBOT

RICHARD KOTTKE

The robots are coming, we are told, and we may as well be prepared for them—on the homefront and in the workplace.

What we will do with them at home is the big question, of course. Besides carrying out the garbage and washing the dishes, chores that most of us abhor, it might be difficult to justify the use of one on a cost-effective basis.

While you are rationalizing about why you need one, you can be practicing with this robot Simulation. Your CoCo robot can pick up one of five different objects (there are 10 of each) and put it anywhere on the screen. It also can move five different joints into a variety of shapes and locations. Additional features include a programming language, tape saves and loads, and a manual control mode.

Type in the main program, *ROBO-SIM* and *CSAVE* it without running the program. Next, type in the assembly language program, *ROBOML*, using an assembler and save it. If you do not have an assembler, you should type in the program, *ML/LOAD*. Run it and *CSAVEM* the machine language with the numbers that are indicated.

Now comes the tricky part: The machine language code will be tacked on the end of the BASIC program so that everything is together in one loading. Ready? Load the *ROBO-SIM* program and type in *?PEEK(27)*256+PEEK (28)*. Write down the result, which is the memory location for the end of the BASIC program. For example, assume the number is 15000 (in each case replace 15000 with your own result). Now, if you used an assembler to enter the machine language program, type in *CLOADM "ROBOML", 65536-(32000-15000)*.

When the machine language program is loaded, add 40 to your program's end
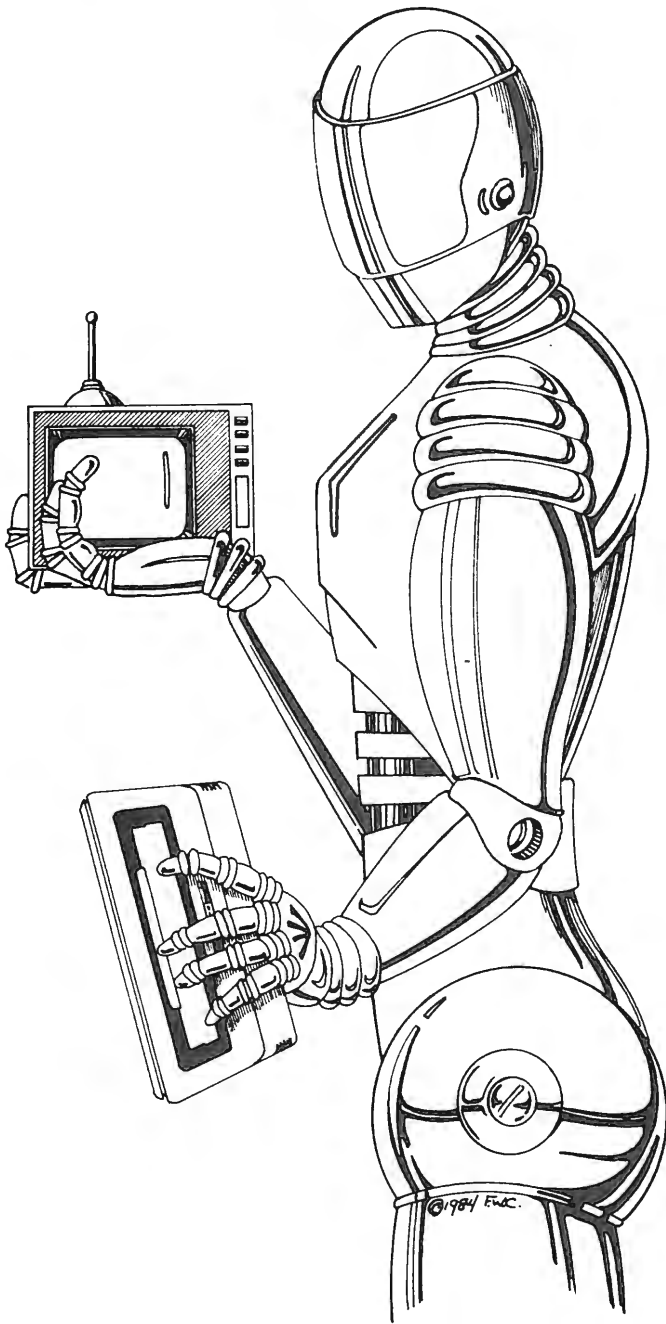
(Richard Kottke, a native of Crivitz, Wis., is a student at the University of
Wisconsin-Madison under a Naval ROTC scholarship. He is majoring in
electrical engineering.)

address. In the example we would add together 15,000 + 40 = 15,040. This will be the new program end address. To change the end address, type in *POKE27, INT(15040/256):POKE28,15040-256*INT(15040/256)"*. *CSAVE* the program, *CLOAD* it, and *RUN* it. If you have followed the instructions, it should run.

The start up message should appear and an inquiry as to which control mode you prefer. For now, choose 'P'. You will be in the program mode, which is a cross between BASIC and LOGO languages. Commands in the intermediate mode are:

LIST—To show the current procedure; you may pause by pressing SHIFT '@' or abort by simply typing '@'.

RUN — Begins execution of a procedure.

RUNln — Begins execution at the specified line number. Robot arm will be in position as if preceeding lines had been executed, and may cause a delay before execution.

TRON — Causes the screen to be updated only after each command is finished. Program executes faster, but may cause a jerky appearance.

TROFF — Cancels *TRON*.

NEW — Restarts procedure.

CONT — Resumes execution after a *STOP*.

SAVE — Saves procedure on tape.

LOAD — Loads procedure from tape.

In the deferred mode (while you are programming), the commands are: S1:nn—moves entire arm horizontally; S2:nn—extends or retracts bottom part of arm; J1:nn—swings first joint (the one nearest the top); J2:nn—swings second joint.

LATCH — Picks up an object (if close enough).

UNLATCH — Releases the object.

STOP — Pause.

END — Stops execution permanently.

All lines must have one instruction apiece.

To check the program, type in the following lines:

1 S1:60
2 J3:45
3 J2:-45
4 J1:45
5 END

When you have entered this procedure, *RUN* it. There will be a short pause before execution begins. The arm should move, and then bend in a few places. If it doesn't, you made a miscue in entering the program. You may fix it now. If you want to see a better demonstration, enter the sample program and *RUN* it.

If you want to control the robot manually, there is the 'K' option at start up. Here you directly control the robot with the first row on the keyboard. Controls are: '1'— S1:LEFT; '2'— 2-S1:RIGHT; '3'— J1:LEFT; '4'— J1:RIGHT; '5'— J2:LEFT; '6' — J2:RIGHT; '7.' — S2:EXTEND; '8' — S2:RETRACT; '9' — J3:LEFT; '0' — J3:RIGHT; ':'— LATCH; '—'— UNLATCH.

One final note on debugging: After a *STOP*, you may enter new lines and then

execute them with a *CONT* command. If the lines you added end with a *STOP,* you may do it again, thereby saving yourself the trouble of repeating the entire procedure.

Yes, it's complicated, but if you're going to be able to communicate with robots in the onrushing future, now's the time to begin. Remember, you're the boss!

Operation Principles

While you are typing in the program, you will notice that there are some complex mathematical formulas included. The display technique uses three *PMODE4* screens. The first, *PMODE4,1,* contains circles, triangles, boxes, etc., and rarely changes. The second, *PMODE4,5,* contains the robot arm, which is updated constantly. When it is UNLATCHED, it is replaced onto the object screen. In other words, the first screen is in the background (fairly motionless) and the second screen is in the foreground (moving constantly).

To achieve smooth animation, the first two screens are combined and copied onto a third screen, residing in high RAM. Since this is all done in machine language, it is very quick and smooth. The programming language is really a compiler, which causes a delay before actual execution, but speeds things up later.

LISTING 1

```
10 GOTO570
15 POKE65494,0:CLS:PRINT"COLOR R
OBASTIC":PRINT" (C) 1983":PRINT"R
ICHARD KOTTKE":PRINT:PRINT:LINEI
NPUT" (K)EYBOARD OR (P)ROGRAM CON
TROL?"|KP$:IFKP$="K"THENK=1ELSEI
FKP$="P"THENK=0ELSE15
20 DATA"S1:",1,"J1:",2,"J2:",3,"
S2:",4,"J3:",5,"LAT",6,"UNL",7,"
STO",9,"END",8,**,00
25 POKE65495,0:ML=PEEK(27)*256+P
EEK(28)-100:PI=3.14159927:PE=PI/
180:PO=180/PI:PU=1.5708
30 DIMHH(20,0),VV(20,0),OB(49,1)
,C2(7,0),B2(17,0),TR(8,0),CL(18,
0),CR(7,0),LN$(201),CN(200),CM(2
00),BX(15,0):PMODE4,1:PCLS:CIRCL
E(105,105),5:GET(100,100)-(110,1
10),CR,G:LINE(0,0)-(20,8),PSET,B
F:GET(0,0)-(20,8),BX,G
35 PMODE3,1:COLOR2:LINE(99,108)-
(111,112),PSET,BF:PMODE4,1:DRAW"
BM105,112;D5R5L10D1R10D1L1U1L9D1
R1U1":GET(98,100)-(112,120),CL,G
40 PCLS:CIRCLE(40,40),5:PAINT(40
,40),1,1:PMODE3,1:COLOR2:LINE(52
,52)-(66,68),PSET,BF:PMODE4,1:DR
AW"BM100,98;R7H7G7R7":PAINT(100,
95),1,1
45 GET(32,32)-(48,48),C2,G:GET(5
0,50)-(70,70),B2,G:GET(90,90)-(1
10,100),TR,G
50 LINE(130,130)-(170,135),PSET,
BF:GET(128,128)-(172,138),HH,G:L
INE(180,180)-(185,140),PSET,BF:G
ET(178,138)-(188,182),VV,G
55 IFK=1THEN485
60 SW=1:POKE65494,0:LINEINPUTA$:
POKE65495,0
65 IFLEFT$(A$,3)="RUN"ANDLEN(A$)
>3THENSS=0:SL=VAL(RIGHT$(A$,LEN(
A$)-3)):MM=0:GOTO110
70 A=INSTR(A$," "):LN=VAL(LEFT$(
A$,A)):IFA=0THEN85
75 LN$(LN)=RIGHT$(A$,LEN(A$)-A)
80 IFLN$(LN)<>"END"THEN60ELSEA$=
"LIST"
85 IFA$="TRON"THENCT=1:GOTO60ELS
EIFA$="TROFF"THENCT=0:GOTO60ELSE
IFA$="LIST"THENGOTO100ELSEIFA$="
RUN"THENMM=0:GOTO110ELSEIFA$="LO
AD"THENGOTO375ELSEIFA$="SAVE"THE
NGOTO385ELSEIFA$="NEW"THENRUNELS
EIFA$="CONT"THEN95
90 SOUND100,1:PRINT"*** ERR":GOT
060
95 MM=NN:GOTO110
100 FORX=0TO200:IFLN$(X)=""THENN
```

```
EXTELSEIFINKEY$="@"THEN60ELSEPRI
NTX;LN$(X):NEXT
105 GOTO60
110 IFCT=1THENSS=0:SL=100
115 NN=0:C=0:FORX=0TO200:IFX=SL
THENSL=C
120 IFLN$(X)=""THENNEXT:GOTO150
125 CM$=LEFT$(LN$(X),3):VL=VAL(R
IGHT$(LN$(X),LEN(LN$(X))-3))
130 RESTORE
135 READCC$,CC:IFCC$="**"THENSOU
ND100,1:PRINT"*** ERR IN";X:GOTO
60ELSEIFCC$<>CM$THEN135
140 CN(C)=CC:CM(C)=VL:C=C+1:IFCC
=9THENNN=C
145 NEXT
150 PMODE4,1:SCREEN1,1:PMODE4,5:
PCLS:EXECML+14:GOSUB470:POKE&HFF
C6,0:POKE&HFFC8,0:POKE&HFFCF,0:P
OKE&HFFD1,0:POKE&HFFCB,0:FORZ=MM
 TO200:IFZ=SL THENSS=1
155 IFCN(Z)=0THENNEXT:GOTO175
160 IFCT=1THENFF=SS:SS=1:GOSUB41
5:SS=FF
165 CV=CM(Z):ONCN(Z)GOSUB180,210
,235,255,270,285,340,410
170 NEXT
175 IFINKEY$=""THEN175ELSESCREEN
0:GOTO60
180 IFABS(CV)=1THEN205ELSEFORX=0
TOABS(CV)STEP2:AD=SGN(CV)*2:TP=T
P+AD:IFTP<=100ORTP>=244THENTP=TP-
AD
185 X1=TP:X2=X2+AD:IFX2<100ORX2>2
44THENX2=X2-AD:GOTO200
190 X3=X3+AD:IFX3<100ORX3>244THEN
X3=X3-AD:GOTO200
195 X4=X4+AD:IFX4<100ORX4>244THEN
X4=X4-AD:GOTO200
200 GOSUB415:NEXT
205 IFX-2<>ABS(CV)THENAD=SGN(CV)
:TP=TP+AD:X1=X1+AD:X2=X2+AD:X3=X
3+AD:X4=X4+AD:GOSUB415:RETURNELS
ERETURN
210 A=X2:B=Y2:GOSUB395:S1=DS:D1=
DG:A=X3:B=Y3:GOSUB395:S2=DS:D2=D
G:A=X4:B=Y4:GOSUB395:S3=DS:D3=DG
215 FORB=1TOABS(CV):AD=SGN(CV):G
OSUB415:D1=D1+AD:IFD1<190ORD1>35
0THENRETURN
220 D2=D2+AD:IFD2<190ORD2>350THE
NRETURN
225 D3=D3+AD:IFD3<190ORD3>350THE
NRETURN
230 R1=D1*PE:X2=X1+(COS(R1)*S1):
Y2=(-SIN(R1)*S1)+Y1:R2=D2*PE:X3=
X1+(COS(R2)*S2):Y3=(-SIN(R2)*S2)
+Y1:R3=D3*PE:X4=X1+(COS(R3)*S3):
Y4=(-SIN(R3)*S3)+Y1:NEXT:RETURN
```
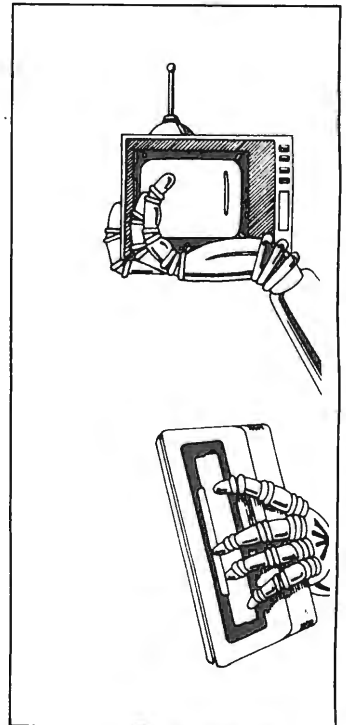
```
235 A=X3:B=Y3:GOSUB400:S1=DS:D1=
DG:A=X4:B=Y4:GOSUB400:S2=DS:D2=D
G
240 FORB=1TOABS(CV)STEP2:AD=SGN(
CV)*2:GOSUB415:D1=D1+AD:IFD1<190
ORD1>350THENRETURN
245 D2=D2+AD:IFD2<190ORD2>350THE
NRETURN
250 R1=D1*PE:X3=X2+(COS(R1)*S1):
Y3=(-SIN(R1)*S1)+Y2:R2=D2*PE:X4=
X2+(COS(R2)*S2):Y4=(-SIN(R2)*S2)
+Y2:NEXT:RETURN
255 A=X3:B=Y3:GOSUB400:S1=DS:D1=
DG
260 FORB=1TOABS(CV):AD=SGN(CV):G
OSUB415:S1=S1+AD:OX=X3:OY=Y3
265 R1=D1*PE:X3=X2+(COS(R1)*S1):
Y3=(-SIN(R1)*S1)+Y2:X4=X4-(OX-X3
):Y4=Y4-(OY-Y3):NEXT:RETURN
270 S1=SQR((X3-X4)*(X3-X4)+(Y3-Y
4)*(Y3-Y4)):X=(X3-X4)/S1:D1=-ATN
(X/SQR(-X*X+1))+1.5708:D1=D1*PO+
180
275 FORB=1TOABS(CV)STEP3:AD=SGN(
CV)*3:GOSUB415:D1=D1+AD:IFD1<190
ORD1>350THENRETURN
280 R1=D1*PI/180:X4=X3+(COS(R1)*
S1):Y4=(-SIN(R1)*S1)+Y3:NEXT:RET
URN
285 AA=SS:SS=3:GOSUB415:FORG=0TO
9:IFPPOINT(OB(G,0),OB(G,1)-7)=5T
HENBG=G ELSENEXT
290 FORG=10TO19:IFPPOINT(OB(G,0)
,OB(G,1)-11)=5THENBG=G ELSENEXT
295 FORG=20TO29:IFPPOINT(OB(G,0)
,OB(G,1)-6)=5THENBG=G ELSENEXT
300 FORG=30TO39:IFPPOINT(OB(G,0)
,OB(G,1)-24)=5THENBG=G ELSENEXT
305 FORG=40TO49:IFPPOINT(OB(G,0)
,OB(G,1)-7)=5THENBG=G ELSENEXT
310 PMODE4,1:PCLS:FORG=0TO9:IFBG
<>G THENPUT(OB(G,0)-8,OB(G,1)-8)
-(OB(G,0)+8,OB(G,1)+8),C2,OR:NEX
TELSENEXT
315 FORG=10TO19:IFBG<>G THENPUT(
OB(G,0)-10,OB(G,1)-10)-(OB(G,0)+
10,OB(G,1)+10),B2,OR:NEXTELSENEX
T
320 FORG=20TO29:IFBG<>G THENPUT(
OB(G,0)-10,OB(G,1)-5)-(OB(G,0)+1
0,OB(G,1)+5),TR,OR:NEXTELSENEXT
325 FORG=30TO39:IFBG<>G THENPUT(
OB(G,0)-5,OB(G,1)-22)-(OB(G,0)+5
,OB(G,1)+22),VV,OR:NEXTELSENEXT
330 FORG=40TO49:IFBG<>G THENPUT(
OB(G,0)-22,OB(G,1)-5)-(OB(G,0)+2
2,OB(G,1)+5),HH,OR:NEXTELSENEXT
335 PMODE4,5:IFBG=-1ANDAA=0THENS
S=0:RETURNELSEIFAA=1THENSS=1:RET
```

```
URNELSESS=2:RETURN
340 BG=-1:PMODE4,1:PCLS
345 FORG=0TO9:PUT(OB(G,0)-8,OB(G
,1)-8)-(OB(G,0)+8,OB(G,1)+8),C2,
OR:NEXT
350 FORG=10TO19:PUT(OB(G,0)-10,O
B(G,1)-10)-(OB(G,0)+10,OB(G,1)+1
0),B2,OR:NEXT
355 FORG=20TO29:PUT(OB(G,0)-10,O
B(G,1)-5)-(OB(G,0)+10,OB(G,1)+5)
,TR,OR:NEXT
360 FORG=30TO39:PUT(OB(G,0)-5,OB
(G,1)-22)-(OB(G,0)+5,OB(G,1)+22)
,VV,OR:NEXT
365 FORG=40TO49:PUT(OB(G,0)-22,O
B(G,1)-5)-(OB(G,0)+22,OB(G,1)+5)
,HH,OR:NEXT
370 PMODE4,5:IFSS=1THENRETURNELS
ESS=0:RETURN
375 POKE65494,0:OPEN"I",#-1,"ROB
OPROG"
380 FORX=0TO199:INPUT#-1,LN$(X):
NEXT:CLOSE:GOTO60
385 POKE65494,0:OPEN"O",#-1,"ROB
OPROG"
390 FORX=0TO200:PRINT#-1,LN$(X):
NEXT:CLOSE:GOTO60
395 DS=SQR((X1-A)*(X1-A)+(Y1-B)*
(Y1-B)):X=(X1-A)/DS:DG=-ATN(X/SQ
R(-X*X+1))+PU:DG=DG*PO+180:RETUR
N
400 DS=SQR((X2-A)*(X2-A)+(Y2-B)*
(Y2-B)):X=(X2-A)/DS:DG=-ATN(X/SQ
R(-X*X+1))+PU:DG=DG*PO+180:RETUR
N
405 GOTO405
410 RETURN
415 IFSS=0THENRETURNELSEIFSS=2TH
EN435ELSEEXECML:PUT(X1-5,Y1-5)-(
X1+5,Y1+5),CR,PSET:PUT(X2-5,Y2-5
)-(X2+5,Y2+5),CR,PSET:PUT(X3-5,Y
3-5)-(X3+5,Y3+5),CR,PSET:PUT(X4-
7,Y4-5)-(X4+7,Y4+15),CL,PSET
420 PUT(TP-10,0)-(TP+10,8),BX,PS
ET:LINE(X1,Y1)-(X2,Y2),PSET:LINE
-(X3,Y3),PSET:LINE-(X4,Y4),PSET
425 IFBG=-1ANDSS=3THENRETURN
430 IFBG=-1ANDSS=1THENEXECML+14:
RETURN
435 ONINT(BG)/10+1 GOTO440,445,4
50,455,460
440 OB(BG,0)=X4:OB(BG,1)=Y4+22:P
UT(OB(BG,0)-8,OB(BG,1)-8)-(OB(BG
,0)+8,OB(BG,1)+8),C2,OR:GOTO465
445 OB(BG,0)=X4:OB(BG,1)=Y4+24:P
UT(OB(BG,0)-10,OB(BG,1)-10)-(OB(
BG,0)+10,OB(BG,1)+10),B2,OR:GOTO
465
450 OB(BG,0)=X4:OB(BG,1)=Y4+19:P
```

165
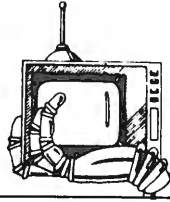
```
UT(OB(BG,Ø)-1Ø,OB(BG,1)-5)-(OB(B
G,Ø)+1Ø,OB(BG,1)+5),TR,OR:GOTO46
5
455 OB(BG,Ø)=X4:OB(BG,1)=Y4+36:P
UT(OB(BG,Ø)-5,OB(BG,1)-22)-(OB(B
G,Ø)+5,OB(BG,1)+22),VV,OR:GOTO46
5
460 OB(BG,Ø)=X4:OB(BG,1)=Y4+18:P
UT(OB(BG,Ø)-22,OB(BG,1)-5)-(OB(B
G,Ø)+22,OB(BG,1)+5),HH,OR
465 IFSS<>2THENEXECML+14:RETURNE
LSERETURN
470 IFMM<>ØTHENRETURNELSEPMODE4,
1:PCLS:BG=-1:OD=9Ø:D1=27Ø:TP=2Ø:
X1=2Ø:Y1=1Ø:X2=2Ø:Y2=48:X3=2Ø:Y3
=1ØØ:X4=2Ø:Y4=138
475 FORG=ØTO39:OB(G,Ø)=(INT(G/1Ø
)+1)*1Ø+1Ø:OB(G,1)=18Ø:NEXT:FORG
=4ØTO49:OB(G,Ø)=7Ø:OB(G,1)=185:N
EXT:GOSUB34Ø
48Ø PMODE4,5:RETURN
485 SS=1:PMODE4,1:PCLS:SCREEN1:P
MODE4,5:PCLS:EXECML+14:GOSUB47Ø:
POKE&HFFC6,Ø:POKE&HFFC8,Ø:POKE&H
FFCF,Ø:POKE&HFFD1,Ø:POKE&HFFCB,Ø
:GOSUB415
49Ø A$=INKEY$:IFA$=""THENA$=B$EL
SEB$=A$
495 IFA$<"-"ORA$>":"THEN49Ø
5ØØ A=ASC(B$):A=A-44:ONA GOSUB51
Ø,5Ø5,5Ø5,515,52Ø,525,53Ø,535,54
Ø,545,55Ø,555,56Ø,565:GOTO49Ø
5Ø5 CLEAR:K=1:GOTO2Ø
51Ø GOSUB34Ø:RETURN
515 CV=3:GOSUB27Ø:RETURN
52Ø CV=-1:GOSUB18Ø:RETURN
525 CV=1:GOSUB18Ø:RETURN
53Ø CV=-1:GOSUB21Ø:RETURN
535 CV=1:GOSUB21Ø:RETURN
54Ø CV=-2:GOSUB235:RETURN
545 CV=2:GOSUB235:RETURN
55Ø CV=1:GOSUB255:RETURN
555 CV=-1:GOSUB255:RETURN
56Ø CV=-3:GOSUB27Ø:RETURN
565 GOSUB285:RETURN
57Ø PCLEAR8:CLEAR8ØØ,&H67FF:GOTO
15
```
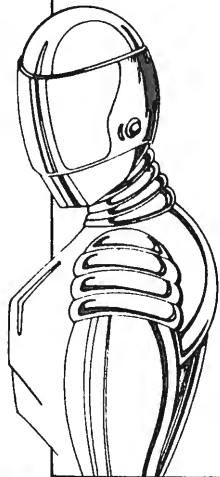
LISTING 2

```
                    00240 *THE FIRST SUBROUTINE IS
                    00250 *A M/L PCLS PROCEDURE
                    00260 *THAT CUTS TIME FOR A
                    00270 *PCLS IN HALF
                    00280 *
                    00290 *
0000 8E  1E00       00300 PCLS   LDX    #$1E00   START OF PAGE #5
0003 CC  0000       00310        LDD    #0       PUT 0 IN D
0006 ED  81         00320 LOOP   STD    ,X++     PUT D IN CURRENT LOCATION
0008 8C  3600       00330        CMPX   #$3600   ARE WE DONE??
000B 25  F9         00340        BLO    LOOP     NO, SO GO AGAIN
000D 39             00350        RTS             YES, SO RETURN TO BASIC
                    00360 *
                    00370 *
                    00380 *THE SECOND SUBROUTINE WILL
                    00390 *DO A 'PCOPY' WITH AN OR.
                    00400 *THE FIRST PMODE4 SCREEN
                    00410 *IS 'ORED' WITH THE SECOND
                    00420 *AND THE RESULT IS STORED
                    00430 *IN A THIRD PMODE4 SCREEN,
                    00440 *WHICH BEGINS AT HEX 6800
                    00450 *
                    00460 *
000E 8E  1E00       00470 START2 LDX    #$1E00   PUT START OF SCREEN#2 IN X
0011 108E 6800      00480        LDY    #$6800   PUT START OF SCREEN#3 IN Y
0015 CE  0600       00490        LDU    #$0600   PUT START OF SCREEN#1 IN U
0018 EC  81         00500 LOOP2  LDD    ,X++     PUT A BYTE OF SCREEN#2 INTO D
001A AA  C0         00510        ORA    ,U+      OR D WITH A BYTE OF SCREEN#1
001C EA  C0         00520        ORB    ,U+      OR D WITH A BYTE OF SCREEN#1
001E ED  A1         00530        STD    ,Y++     PUT THE RESULT ON SCREEN#3
0020 8C  3600       00540        CMPX   #$3600   ARE WE DONE??
0023 25  F3         00550        BLO    LOOP2    NO, SO GO AGAIN
0025 39             00560        RTS             YES, SO RETURN TO BASIC
          0000      00570        END
```

LISTING 3

```
10 CLS:PRINT"LOADING M/L CODE NO
W":PRINT:PRINT:PRINT:PRINT:PRINT
:PRINT
20 CLEAR200,31999
30 FORX=32000TO32037
40 READA$:PO=VAL("&H"+A$)
50 C=C+13+PO:POKEX,PO
60 NEXT
70 IFC<>4503THENPRINT"DATA ERROR
!! CHECK LINES 90-100":STOP
80 PRINT"CSAVEM"CHR$(34)"ROBOML"
CHR$(34)", 32000, 32040, 350":EN
D
90 DATA8E,1E,00,CE,00,00,ED,81,8
C,36,00,25,F9,39,8E,1E,00,10,8E
100 DATA68,00,CE,06,00,EC,81,AA,
C0,EA,C0,ED,A1,8C,36,00,25,F3,39
```

167
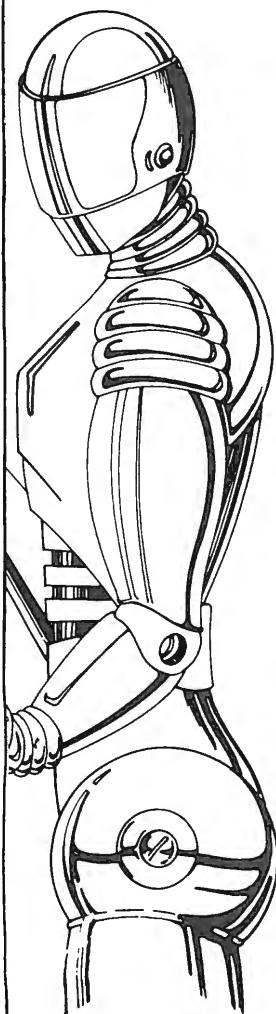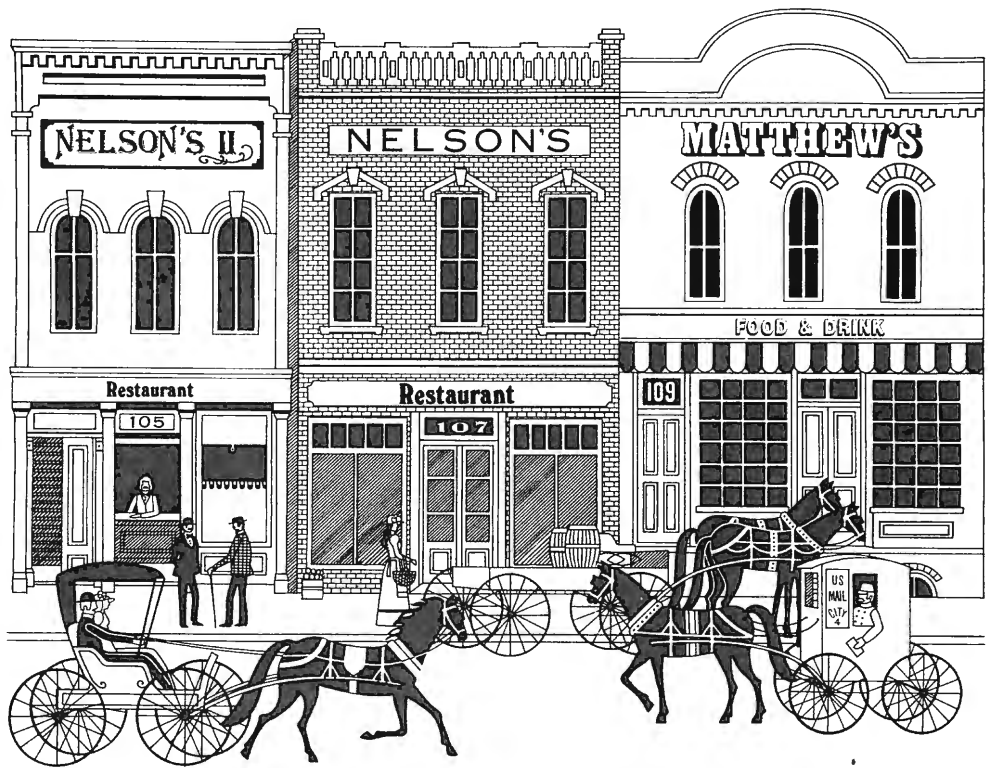
(David Mann is a senior at Cicero-North Syracuse High School in North Syracuse, N.Y., where he is ranked third in his class. He has been programming for three years and is currently writing programs for two county school systems.)

RESTAURANT

DAVID MANN

Here's your opportunity to see what you can do with the family restaurant after all those years of washing dishes, waiting tables, handling those tedious minute details and running errands.

You have just been bequeathed the ownership of the business and are expected not only to carry on the family tradition but to transform it into one of the biggest restaurant chains in the country.

Remember all the complaining you did while scrubbing those greasy pots and pans? Those meager tips? Dumping the contents of trays into patrons' laps? You always said you would have it made if you ever became the boss.

You will learn quickly, however, that those were the good old days when you have to make the decisions about hiring and firing, security systems, advertising and marketing, the purchasing of food and equipment, selecting the menu, acquiring new properties, and maintaining salary levels.

As you begin you have only the one restaurant, five employees, one security system, and $2,500 in cash.

Throughout the simulation you will constantly make judgements about how much food to buy and how many employees you need. The customers will be upset if there isn't enough food or if there is not a sufficient number of employees to serve them. You may assume that each customer will eat one pound of food per meal. The only meal served is dinner and you are open seven days a week. Drinks are free, thanks to an arrangement with a distributor.

The volume of people visiting your business is based largely on the prices you

charge for food, the amount you spend on commercials, and the number of businesses located near you.

Obviously, you want to be located in a heavily commercialized area, which makes it convenient for people to frequent your establishment. However, in this simulation the businesses located near you are restaurants with the potential of eating into your profits. To force them to leave, simply buy another restaurant. This will lower your overall food costs since you can buy greater quantities at cheaper rates than your competitors. It also means that you will need more employees and more advertising.

Two of the least desirable aspects of your job are the security measures and sophisticated tracking systems required to maintain your assets. They are a necessary evil these days, so don't ignore them.

Keeping your employees happy is also important and becomes more difficult as your business grows. To keep them, you must pay decent wages. If you don't, they will leave. And you really don't want to get stuck with washing the dishes and waiting on tables again, do you?

You own the business, of course, but your eventual rating, ranging from busboy, assistant manager, manager, to vice-president or president, depends upon how well you manage your assets.

```
100 ' RESTAURANT
110 ' BY DAVID MANN
115 POKE 65495,0
120 CLEAR 500:GOSUB 3040
121 CLS
125 INPUT"DO YOU WANT INSTRUCTIO
NS";QQ$:IFLEFT$(QQ$,1)="Y" THEN
GOSUB10000
130 GOSUB2350
140 GOSUB 350
150 TM=2500:NR=1:LV=1:NW=5:NS=1
160 GOSUB 1350
170 GOSUB 480
180 GOSUB 990
190 GOSUB 2450
200 IFAS=0THEN220
210 GOSUB2220
220 GOSUB 2000:TF=SK+FB
230 GOSUB 550
240 GOSUB 2660
250 GOSUB 690
260 GOSUB 860
270 GOSUB 930
280 GOSUB 2710
290 GOSUB 2290
300 TM=TM-(NW*(CP*200))'EMP.PAY
310 GOSUB 2540
320 GOSUB 2770
330 GOSUB 2840
335 TW=TW+1
340 GOTO 170

350 '
360 ' INPUT LEVEL OF PLAY
370 '
380 CLS
390 PRINT:PRINT:PRINT" LEVELS OF
 PLAY:":PRINT
400 PRINT" (1)....CORPORATION"
410 PRINT" (2)....PARTNERSHIP"
420 PRINT" (3)....ENTREPRENEUR"
430 PRINT:INPUT"LEVEL (1-3) ";D
440 D=INT(D):IFD<1ORD>3THEN350
450 INPUT"WHAT IS THE NAME OF YO
UR         RESTAURANT (8 LETTERS
MAX.)     ";NR$
460 IF LEN(NR$)>8 THEN NR$=LEFT$
(NR$,8)
470 RETURN
480 '
490 ' CALC. PRICE FOOD & COMM.
500 '
510 PF=RND(50)+200+(D*(RND(20)+2
0))
520 PF=PF/100
530 PC=RND(3)*100+D*12
540 RETURN
550 '
560 ' CHECK IF WAITERS LEAVE
570 '
580 WL=0
590 IFCP=1THEN IF RND(2)=RND(2)
THEN WL=RND(NW)
```

```
600 IFCP=2THEN IF RND(2)=RND(2)
THEN WL=RND(INT(NW-(NW/4)))
610 IF NW=0 THEN 640
620 IF RND(20)=RND(20) THEN WL=W
L+RND(INT(WL/10))
630 IF NW-WL=0 THEN IF RND(10)=R
ND(10) THEN WL=NW-(NW-1)
640 WL=INT(WL)
650 NW=NW-WL
660 NW=INT(NW)
670 IF NW<0 THEN NW=0
680 RETURN
690 '
700 ' FIND # PEOPLE THAT CAME
710 '
720 NL(1)=0:NL=0:NL(2)=0
730 NP=(RND(50)+400)-((400)*(CF/
30))
740 NP=NP+(40-(D*10))
750 NP=NP+(AC*(RND(10)+20))
760 NP=NP-(BN*(NP*.1))
765 IF CF>100-RND(10) THEN NP=0
770 NP=INT(NP):NP=NP*NR
780 IF NP>NW*140 THEN NL(1)=NP-(
NW*140):NP=NP-NL(1)
790 IF NP>NR*(2000+RND(500)) THE
N NL(2)=NP-(NR*1987):NP=NP-NL(2)
800 IF NP>TF THEN NL=NP-TF:NP=NP
-NL
810 NL=NL+NL(1)+NL(2)
820 NP=INT(NP):NL=INT(NL)
830 IF NP<0 THEN NP=0
840 IF NP<NL THEN NL=NP
850 RETURN
860 '
870 ' FIND AMOUNT SURPLUS
880 '
890 AS=TF-NP
900 AS=INT(AS)
910 IF AS<0 THEN AS=0
920 RETURN
930 '
940 ' FIND AMOUNT EARNED
950 '
960 AE=NP*CF
970 TM=TM+AE
980 RETURN
990 '
1000 ' CHANGE WAGES # OF ITEMS
1010 '
1020 CLS
1030 PRINTTAB(16-(LEN(NR$)/2));N
R$
1040 PRINT:PRINT
1050 PRINT"(1)....HIRE MORE EMPL
OYEES"
1060 PRINT"(2)....CHANGE PAY OF
EMPLOYEES"
1070 PRINT"(3)....BUY MORE RESTA
URANTS"
1080 PRINT"(4)....BUY MORE SECUR
ITY SYSTEMS";
1090 PRINT"(5)....FIRE EMPLOYEES
"
1095 PRINT"(6)....SELL RESTAURAN
TS"
1100 PRINT:PRINT"HIT <ENTER> TO
CONTINUE"
1110 PRINT:INPUT"CHOICE";C
1120 IF C=0 THEN RETURN
1130 C=INT(C):IFC>6THEN 990
1140 ON C GOSUB 1260,1350,1470,1
580,1190,1700
1150 GOTO990
1160 '
1170 ' FIRE PEOPLE
1180 '
1190 CLS:PRINT:PRINT"THERE ARE"N
R;NR$" RESTAURANTS":PRINTNR$" EM
PLOYEES "NW" PEOPLE"
1200 PRINT:INPUT"HOW MANY PEOPLE
 DO YOU WISH TO  FIRE";NE
1210 NE=INT(NE):IFNE<0THEN1190
1220 IFNE>NW THEN1190
1230 NW=NW-NE
1240 RETURN
1260 '
1270 ' HIRE MORE EMPLOYEES
1280 '
1290 CLS
1300 PRINT:PRINTNR$" HAS "NR" RE
STAURANTS NOW"
1310 PRINT:PRINTNR$" HAS "NW" EM
PLOYEES NOW":PRINT:INPUT"HOW MAN
Y MORE EMPLOYEES DO YOU  WISH TO
 HIRE";NE
1320 NE=INT(NE):IFNE<0THEN1260
1330 NW=NW+NE
1340 RETURN
1350 '
1360 ' CHANGE PAY OF EMPLOYEES
1370 '
1380 CLS
1390 PRINT:PRINTNR$" CURRENTLY P
AYS THEIR":PRINT"EMPLOYEES $"CP*
200" A WEEK"
1400 PRINT:PRINT"WAGE"
1410 PRINT" (1)... $200 A WEEK (
VERY LOW)"
1420 PRINT" (2)... $400 A WEEK (
MODERATE)"
1430 PRINT" (3)... $600 A WEEK (
HIGH)"
1440 PRINT:INPUT" CHOICE (1-3)";
CP
1450 CP=INT(CP):IF CP<1 OR CP>3T
HEN1350
1460 RETURN
```

```
1470 '
1480 ' BUY RESTAURANTS
1490 '
1500 CLS:PRINT
1510 PRINTNR$" NOW HAS "NR" REST
AURANTS":PRINTNR$" HAS $"TM:PRIN
T:PRINT"EACH NEW RESTAURANT WILL
  COST    $"D*12000
1520 PRINT:INPUT"HOW MANY DO YOU
  WISH TO BUY";NA
1530 NA=INT(NA):IFNA<0THEN1470
1540 IFNA*D*12000>TM THEN CLS:PR
INT" YOU DON'T HAVE ENOUGH MONEY
!!":FORZZ=1TO400:NEXT:GOTO1500
1550 TM=TM-(NA*D*12000)
1560 NR=NR+NA
1570 RETURN
1580 '
1590 ' BUY SECURITY SYSTEMS
1600 '
1610 CLS:PRINTNR$" HAS "NR" REST
AURANTS":PRINTNR$" HAS $"TM
1620 PRINT:PRINT"EACH SECURITY S
YSTEM COSTS $250"
1630 PRINT:PRINTNR$" HAS"NS"SECU
RITY SYSTEMS"
1640 PRINT:INPUT"HOW MANY DO YOU
  WISH TO BUY";NA
1650 NA=INT(NA):IFNA<0THEN1580
1660 IF NA*250>TM THENCLS8:PRINT
@256,"YOU DON'T HAVE THAT KINDA
DOUGH";:FORZZ=1TO430:NEXT:GOTO15
80
1670 NS=NS+NA
1680 TM=TM-(NA*250)
1690 RETURN
1700 '
1701 ' SELL RESTAURANTS
1702 '
1703 CLS
1710 GOSUB 2910
1720 PRINT:PRINT"YOU MAY SELL A
RESTAURANT FOR    $"(D*12000)/2:P
RINT:INPUT"HOW MANY DO YOU WISH
TO SELL";NA:IF NA>NR-1 THEN 1700
 ELSE NR=NR-NA:TM=TM+(NA*(D*1200
0)/2)
1730 RETURN
2000 '
2010 ' PRINT OUT PRICES OF STUFF
2020 ' AND BUY FOOD,COMMERCIALS
2030 '
2040 CLS
2050 PRINT@0,"AMOUNT MONEY     #
 RESTAURANTS";:PRINT@32,STRING$(1
2,255);:PRINT@48,STRING$(13,255)
;
2060 PRINT@64,"";:PRINTUSINGF$;T
M;:PRINT@84,NR;
2070 PRINT@128,"      FOOD     CO
MMERCIAL":PRINT@160," ----------
-  ----------"
2080 PRINT@188,"";:PRINTUSING"$$
#########.##";PF,PC
2090 PRINT@416,"";:INPUT"HOW MAN
Y LBS. OF FOOD DO YOU     WISH TO
  BUY";FB
2100 IF FB<0 THEN 2090
2110 IF FB*PF>TM THEN PRINT@384,
"YOU DON'T HAVE ENOUGH MONEY";:G
OTO2090
2120 TM=TM-(FB*PF)
2130 PRINT@64,"";:PRINTUSINGF$;T
M;
```



```
2140 PRINT@448,"":PRINT@384,"":P
RINT@416,"";:INPUT"HOW MANY COMM
ERCIALS DO YOU WANT";AC
2150 AC=INT(AC):IFAC<0THEN2140
2160 IFAC*PC>TM THEN PRINT@384,"
YOU DON'T HAVE ENOUGH MONEY";:FO
RZZ=1TO800:NEXT:GOTO2140
2170 TM=TM-(AC*PC)
2180 PRINT@64,"";:PRINTUSINGF$;T
M;
2190 PRINT@384,"":PRINT@416,"";:
INPUT"HOW MUCH DO YOU WANT TO CH
ARGE   PER MEAL";CF
2200 IFCF<0THEN2190
2210 RETURN
2220 '
2230 ' SAVE SURPLUS
2240 '
2250 CLS:PRINT"YOU HAVE "AS" LBS
. OF SURPLUS FOOD"
2260 INPUT"HOW MUCH SURPLUS DO Y
OU WISH TO KEEP";SK
2270 IFSK>AS THEN PRINT"YOU DON'
T HAVE THAT MUCH":GOTO2220
2280 RETURN
2290 '
2300 ' CHECK IF LEVEL GOES UP
2310 '
2320 IF(NR/LV)/D>10-RND(4) THEN
LV=LV+1:CLSRND(8):PRINT@35,"CONG
RATULATIONS!!!";:PRINT@100,"YOU'
```

```
VE BEEN PROMOTED TO";:PRINT@224+
16-(LEN(LV$(LV))/2),LV$(LV);:FOR
ZZ=1TO2400:NEXT
2330 IF LV=5 THEN 2940
2340 RETURN
2350 '
2360 ' INITIALIZE VARIABLES
2370 '
2380 LV$(1)="STOCKBOY"
2390 LV$(2)="ASSISTANT MANAGER"
2400 LV$(3)="MANAGER"
2410 LV$(4)="VICE PRESIDENT"
2420 LV$(5)="PRESIDENT"
2430 F$="**$########.##"
2440 RETURN
2450 '
2460 ' CHECK IF STORE BROKEN INT
O
2470 '
2480 FT=0:MT=0
2490 IF NR+RND(3)>NS THEN IF RND
(3)=RND(2) THEN FT=RND(TF/2):MT=
INT(RND(TM/2))
2500 FT=INT(FT)
2510 TF=TF-FT
2520 TM=TM-MT
2530 RETURN
2540 '
2550 ' PRINT STATUS
2560 '
2570 CLS
2580 PRINTLV$(LV)
2590 PRINTNP+NL" PEOPLE CAME":PR
INTNL" PEOPLE LEFT"
2600 IF BN>0 THEN PRINT"THERE AR
E "BN" RESTAURANTS NEAR  YOU"
2610 PRINTWL" EMPLOYEES LEFT"
2620 PRINT"YOU HAVE "NW" EMPLOYE
ES":
2630 PRINT"YOU EARNED ";:PRINTUS
ING F$;AE:IF FT>0 THEN PRINT:PRI
NT"YOU HAD "FT" LBS. OF FOOD":PR
INT"STOLEN AND ";:PRINTUSINGF$;M
T;:PRINT" STOLEN"
2640 PRINT:INPUT"HIT <ENTER> TO
CONTINUE";ZZ$
2650 RETURN
2660 '
2670 ' CHECK IF BUSINESS NEAR
2680 '
2690 IF TM>2500 AND RND(10)=RND(
4) THEN BN=BN+1:BM=TM:BM(1)=NR
2700 RETURN
2710 '
2720 ' CHECK IF BUSINESS LEAVES
2730 '
2740 IF BN=0 THEN RETURN
2750 IF TM>BM+5000 AND NR>BM(1)+
RND(5) THEN BN=BN-1
2760 RETURN
2770 '
2780 ' CHECK FOR BANKRUPTCY
2790 '
2800 NA=0
2810 IFTM<0 THEN NR=NR-1:CLS7:NA
=(ABS(TM)/2500):NA=ABS(INT(NA)):
NR=NR-NA:TM=2500:PRINT@260,"YOU
WENT BANKRUPT!!!";:FORZZ=1TO1000
:NEXT:IF NW>4*NR THEN NW=4*NR
2820 IF NR<1 THEN GOTO 3000 ELSE
 IF NA>0 THEN NA=0:CLS:PRINT:PRI
NT:GOSUB2910:FORZZ=1TO3000:NEXT
2830 RETURN
2840 '
2850 ' CHECK FOR TOO MUCH SURPLS
2860 '
2870 IF SK>FB THEN IF RND(5)=RND
(2) THEN CLS2:NA=INT(RND(NR))::P
RINT@256,"HEALTH INSPECTOR CLOSE
D DOWN   "NA" OF YOUR STORES DUE
 TO FOOD  POISONING";:FORZZ=1TO1
500:NEXT:NR=NR-NA:IF NW>4*NR THE
N NW=4*NR+RND(NW-(4*NR))
2880 IF NR=0 THEN 3000
2890 RETURN
2900 '
2910 PRINT"THERE ARE "NR;NR$:PRI
NT"RESTAURANTS":PRINT"YOU EMPLOY
 "NW" PEOPLE"
2920 PRINT"YOU HAVE "NS" SECURIT
Y SYSTEMS":PRINT NR$" HAS $"TM
2930 RETURN
2940 '
2950 ' WIN
2960 '
2970 CLSRND(8):PRINT"      CONGR
ATULATIONS!!!":PRINT"YOU ARE PRE
SIDENT OF "NR$
2980 GOSUB 2910
2985 PRINT"YOU RAN "NR$" FOR"TW"
 WEEKS"
2990 FORZZ=1TO5000:NEXT:PRINT:IN
PUT"DO YOU WANT TO PLAY AGAIN";Q
Q$:IFLEFT$(QQ$,1)="Y"THENRUNELSE
END
3000 '
3010 ' LOSE
3020 '
3030 CLS8:PRINT@290,"YOU LOST EV
ERYTHING";:FORZZ=1TO1000:NEXT:PR
INT:INPUT"DO YOU WANT TO PLAY AG
AIN";QQ$:IFLEFT$(QQ$,1)="Y"THENR
UNELSEEND
3040 PMODE3,1:PCLS
3050 FT=1
3060 DATA 44,91,44,97,47,112,50,
115,53,124,54,130,55,139,54,145,
53,151,50,154,48,160,47,169,47,1
```

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```
75,50,184,53,190                          3200 READ X,Y
3070 DATA 56,190,53,184,52,155,5          3210 LINE -(X,Y),PSET
3,169,55,160,56,157,86,157,89,16          3220 NEXT
5,86,168,91,169,92,175,92,181,91          3230 FT=0:GOTO3150
,190,94,190,98,181                        3240 FT=2:GOTO3150
3080 DATA 99,175,98,169,91,169,8          3250 PAINT(80,154),8,8
6,168,91,160,92,155,58,155,56,15          3260 PAINT(50,110),6,8:PAINT(50,
2,58,148,92,148,58,148,59,139,58          175),6,8:PAINT(95,175),6,8
,130,56,118,53,109,48,100,44,91           3270 PAINT(186,150),8,8:PAINT(20
3090 DATA 92,155,92,148,89,130,1          0,130),6,8:PAINT(200,154),6,8:PA
70,130,168,145,167,154,168,160,1          INT(160,175),6,8
71,166,164,168,159,168,155,169,1          3280 PAINT(125,145),7,8
46,168,140,169,142,175,140,181,1          3290 PMODE 4,1:SCREEN1,1
34,190                                    3300 DRAW"BM135,130M135,115M134,
3100 DATA 140,190,146,181,149,17          112M133,109M132,106M132,100M129,
5,151,169,146,168,140,169,134,17          100M129,106M128,109M127,112M126,
1,128,169,122,171,116,169,115,17          115M126,130"
5,117,181,123,190,116,190,110,18          3310 C$="R7L4U6M+5,-3;L9M+5,+3;D
1                                         6"
3110 DATA 107,175,107,172,116,16          3320 DRAW"BM140,129"+C$:DRAW"BM1
9,107,172,98,169,91,169                   15,129"+C$
3120 DATA 159,168,158,175,158,18          3330 FOR ZZ=1 TO3000:NEXT
1,161,190,164,190,162,181,162,17          3340 RETURN
5,164,168,171,166,168,160,173,15          10000 '
4,197,154,201,160,204,169,203,17          10001 ' INSTRUCTIONS
5                                         10002 '
3130 DATA 201,184,200,190,203,19          10010 CLS:PRINT"          RESTAURA
0,206,184,208,175,210,169,208,16          NT"
0,203,154,201,151,201,145,202,13          10020 PRINT:PRINT" YOUR FATHER J
9,203,130,204,124,206,115,209,10          UST DIED AND LEFT YOU THE FAMILY
6,214,97                                   BUSINESS. YOUR    JOB IS TO RUN
3140 DATA 214,91,206,100,203,109          THE RESTAURANT HE LEFT YOU AND T
,200,118,199,130,197,139,197,145          URN IT IN TO ONE   OF THE BIGGEST
,199,149,197,152,167,152,168,145           RESTAURANT CHAINSIN THE COUNTRY
,197,145                                  . ALL THE"
3150 READ X,Y                             10030 PRINT"PRESSURES OF THE JOB
3160 READ K,L:LINE(X,Y)-(K,L),PS           WILL BE ON YOU, HIRING,FIRING,B
ET                                        UYING,      SELLING,AND GOING BA
3170 FOR CO=1 TO 45                       NKRUPT!!
3180 IF FT=0 AND CO=36 THEN 3240          10035 GOSUB 20000
3190 IF FT=2 AND CO=42 THEN 3250          10036 CLS:PRINT"         RESTAUR
```

```
ANT":PRINT
10040 PRINT:PRINT" WHEN YOU FIRS
T BEGIN YOU WILL   BE SUPPLIED WI
TH THE RESTAURANT YOUR FATHER LE
FT. YOU WILL ALSO BE GIVEN FIVE
EMPLOYEES, ONE      SECURITY SYSTE
M, AND $2,500. THEFIRST SCREEN T
HAT APPEARS         PROMPTS YOU TO
 INPUT A SALARY    FOR YOUR ";
10050 PRINT"EMPLOYEES. THE MORE
YOUPAY THEM THE LESS CHANCE THER
E   IS OF THEM LEAVING."
10060 GOSUB 20000
10070 PRINT"  THE NEXT SCREEN TH
AT APPEARS   IS THE MOST IMPORTAN
T. YOU WILL HAVE TO BUY FOOD AND
 COMMERCIALS. IN THE UPPER LEFT
HAND CORNER OF THE SCREEN THE AM
OUNT OF      MONEY YOU HAVE IS DI
SPLAYED. IN THE";
10080 PRINT" UPPER RIGHT HAND CO
RNER OF  THE SCREEN THE NUMBER O
F        RESTAURANTS YOU HAVE IS
         DISPLAYED. BELOW THE AM
OUNT OF  MONEY YOU HAVE THE PRIC
E PER LB.OF FOOD IS SHOWN. NEXT
TO THE    PRICE OF FOOD IS THE PR
ICE OF     COMMERCIALS."
10090 GOSUB 20000
10100 PRINT"          RESTAURANT":P
RINT:PRINT" IT IS ASSUMED THAT E
ACH          CUSTOMER WILL EAT A L
B. OF FOOD.DRINKS ARE SUPPLIED F
REE BY THE DISTRIBUTER. YOU ARE
FIRST        ASKED HOW MUCH FOOD Y
OU WANT.     AFTER THIS YOU ARE AS
KED HOW ·    MANY";
10110 PRINT" COMMERCIALS YOU WAN
T TO BUYAND HOW MUCH YOU WANT TO
 CHARGE PER MEAL. KEEP IN MIND T
HE ONLY MEAL YOU SERVE IS DINNER
 AND YOUARE OPEN SEVEN DAYS A WE
EK"
10120 GOSUB 20000
10130 PRINT:PRINT"AFTER YOU INPU
T ALL THE DATA A  NEW SCREEN WIL
L BE DISPLAYED.   THIS SCREEN CO
NTAINS ALL THE      RESULTS OF THE
 DECISIONS YOU      MADE ON THE PR
EVIOUS SCREEN. THENUMBER OF PEOP
LE THAT COME TO   THE RESTAURANT
 IS BASED ON THE"
10140 PRINT"PRICE OF FOOD, # OF
COMMERCIALS,AND HOW MANY BUSINES
SES THAT ARENEAR YOU. IF THERE A
REN'T ANY    BUSINESSES NEAR YOU
THE SCREEN    WON'T SHOW THE NUMBE
R OF          BUSINESSES NEAR YOU.
"
10150 GOSUB 20000
10160 PRINT"PEOPLE WILL LEAVE IF
 THERE ISN'TENOUGH FOOD FOR THEM
 OR IF THEREISN'T ENOUGH ROOM FO
R THEM IN    THE RESTAURANTS OR I
F THERE       ISN'T ENOUGH EMPLOYE
ES TO SERVE THEM. A BUSINESS MAY
 MOVE IN AT ANY TIME. TO FORCE A
 BUSINESS TO";
10170 PRINT"LEAVE YOU SHOULD BUY
 AT LEAST    ONE MORE RESTAURANT.
 EMPLOYEES   LEAVE DUE TO LOW PAY
. TO KEEP    MORE EMPLOYEES PAY T
HEM MORE.    IF EMPLOYEES QUIT TH
ERE MAY NOT BE ENOUGH LEFT TO SE
RVE THE      PEOPLE SO SOME PEOPL
E MAY LEAVE"
10180 GOSUB 20000
10190 PRINT" THE AMOUNT OF MONEY
 YOU EARNED  BEFORE PAYING SALAR
IES IS SHOWN AT THE BOTTOM OF TH
E SCREEN.    AT THE TOP OF THE S
CREEN THE    LEVEL YOU ARE AT IS
 DISPLAYED.  WHEN YOU BEGIN YOU
ARE STOCKBOY";
10200 PRINT" THERE ARE FIVE LEVE
LS, THE      HIGHEST BEING PRESI
DENT. WHEN   YOU BECOME PRESIDEN
T YOU WIN.   TO GO UP A LEVEL YO
U MUST BUY   MORE RESTAURANTS. T
HE HIGHER    THE DIFFICULTY LEVE
L THE MORE   RESTAURANTS YOU NEE
D BEFORE     GOING UP A LEVEL."
10210 GOSUB 20000
10220 PRINT"IF YOU DON'T HAVE EN
OUGH        SECURITY SYSTEMS YOU
R STORE MAY BE ROBBED OF FOOD AN
D MONEY. IF YOU GO BANKRUPT YOU
MAY LOSE A  FEW STORES. AFTER GO
ING BANKRUPTYOU WILL BE GIVEN $2
500 AND SOMEEMPLOYEES."
10225 GOSUB 20000
10230 PRINT"  IF YOU BUY MORE FO
OD THAN THE PEOPLE EAT YOU WILL
BE LEFT WITHSURPLUS. YOU MAY KEE
P SOME OF    THIS IF YOU WANT. IT
 WILL BE     ADDED TO THE AMOUNT
OF FOOD YOU BUY. IF YOU KEEP TO
MUCH SURPLUSAND DON'T BUY ENOUGH
 A STORE MAYBE CLOSED ";
10240 PRINT"DOWN DUE TO FOOD POI
SONING."
10250 PRINT"THE NEXT SCREEN PRES
ENTS YOU     WITH A MENU OF CHOIC
ES. ALL OF   THE CHOICES ARE SELF
 EXPLANATORY"
10260 PRINT"GOOD LUCK!!!!"
20000 PRINT:LINEINPUT"HIT <ENTER
> TO CONTINUE";QQ$:CLS:RETURN
```

STOCKBROKER

SCOTT SLOMIANY

Ever wonder why those elderly, well-to-do chaps seem to hang around brokerage offices all day, watching the prices go up and down? You would, too, if you had most of your dough invested in the stock market.

Sure they could plug into the Dow Jones News Service via CoCo, but these guys have been so busy reading the stock quotations over the years that they really don't know how much more time they could be spending at home. Maybe it has something to do with the companionship, the idle chatter about what the latest rumor will be that affects the day's averages, or maybe it's just a habit they're unable to shake.

Could it be that they're keeping an eye on the attractive women stockbrokers that the liberation movement so kindly provided? Surely these guys are all business. Some day in the near future, they will probably be joined by their wives. Or maybe the wives just want them out of the house and these guys have nowhere else to go?

At any rate, it's nice if you have the money to play the stock market. Thanks to CoCo, you too can play, with as much money as you want to spend. Let's join these chaps and see what it is that keeps them mesmerized day after day.

You and up to 10 of your friends can participate. Two or three is probably more realistic. Simply indicate the number when you see the prompt. Next you should enter the amount of money each player has to start with; $10,000 is a nice, round number.

Ten stocks will be displayed, along with the the current price and the latest trend — (U)p, (D)own, (S)ame, or (S)plit — or whether (B)ankruptcy has occurred. Players' turns will be listed at the top of the screen.

(Scott Slomiany is a senior at Downers Grove South High School in Downers Grove, Ill., where he plays soccer and is in the school band. He plans to go into a career in either the computer or entertainment field.)

You will be asked if you want to (B)uy, (S)ell, (W)ait, or ask for (I)nformation. Just type in the key letter and press ENTER. If you want to buy or sell, you will be asked for a number from one to 10, which you select before pressing ENTER. You will then indicate the number of shares that you wish to buy, followed again by ENTER. You can only buy or sell in lots of 10, so make sure that you start the game with plenty of money. After the transaction, you will be updated on your total assets (or liabilities). Then press (W)ait to end your turn.

After each turn, there will be a noticeable change in the price of one major stock (up to $30 per share), accompanied by an explanation of why the stock price changed so rapidly.

When a stock price goes over $150, that stock splits and the price is cut in half. Naturally this doubles the number of shares you own.

You also will collect "yields," which are dividends for owning that stock, varying from company to company. Potato Computers, for example, has a 2% yield. For every 10 shares you own, your total would be increased by $20.

Typical stock yields: Potato Computers, 2 percent; Loser Games, 1 percent; Stiff Lumber, 3 percent; Faulty Bookcovers, 2 percent; Lotsa Bookcovers, 2 percent; Lotsa Moola Oil, none; Dumps Chemical, 5 percent; Dogmeat Burgers, 1 percent; Has-Been Talent, 3 percent; Shifty Eye Realtors, 4 percent; and Flopbusters Movies, none.

At the game's conclusion, all of the stock is sold by the computer(which determines when the game ends) and the final results are shown.

Have fun, but be careful: Hanging around quoteboards can be addictive.


```
10 CLEAR
20 CLS
30 CLEAR200,16352
40 FOR R=16352TO16380:READP:POKE
R,P:NEXT R
50 DEFUSR0=16352
60 DATA 189,179,237,31,152,142,4
,0,16,142
70 DATA 4,31,237,137,1,224,237,1
64,49,168
80 DATA 32,237,129,140,4,32,38,2
40,57
90 X=USR(36)
100 GOSUB180
110 PRINT@170,"THE BROKER";
120 PRINT@227,"A STOCK MARKET SI
MULATION";
130 PLAY A$
140 PRINT@270,"BY";
150 PRINT@296,"SCOTT SLOMIANY";
160 PLAY A$
170 GOTO190
180 A$="T2V3102L4FL16FP200FP200F
P200L4FO3FCO2FP30L4FL16FP200FP20
0FP200L4FO3L16AP8L8GL2G":RETURN
190 X=USR(36)
200 CLEAR:CLS:PRINT"        ";:INP
UT"HOW MANY TURNS";TN
210 GOSUB180
220 FOR QG=1TO29:READ QK:NEXT
230 TU=0
240 DIM QW$(20),QS(20),QW(20)
250 PLAY"L1T2504C"
260 PRINT:PRINT"        ";
270 INPUT"HOW MANY PLAYING";PL
280 FOR ZX=1TOPL:PRINT"
PLAYER"ZX:INPUT"    ENTER YOUR
ACCOUNT";M(ZX):PLAY"C":NEXT
290 X$=STRING$(30," ")
300 CLS
```

```
310 FORY= 1TO10:READ P(Y),N$(Y),
P1(Y),P2(Y)
320 PLAY"O1T255L255V31C"
330 NEXT:GOTO450
340 GOTO450
350 DATA 64,1.POTATO COMPUTERS,8
9,95
360 DATA 96,2.LOSER GAMES INC.,1
21,127
370 DATA 128,3.STIFF LUMBER CO.,
153,159
380 DATA160,4.FAULTY BOOK COVERS
,185,191
390 DATA192,5.LOTSA MOOLA OIL CO
.,217,223
400 DATA224,6.DUMPS CHEMICAL CO.
,249,255
410 DATA256,7.DOGMEAT BURGERS CO
.,281,287
420 DATA288,8.HAS-BEEN TALENT AG
N.,313,319
430 DATA320,9.SHIFTY EYE REALTOR
S,345,351
440 DATA352,10.FLOPBUSTER MOVIES
,377,383
450 '
460 FOR Y=1TO18:READ QW$(Y),QW(Y
),QS(Y):NEXT:FOR Y=1TO18:QW(Y)=-
QW(Y):NEXT
470 DATA COMPUTER FACTORY BLOWS
UP,-25,1,NEW COMPUTER PRODUCED,1
5,1
480 DATA NEW GAME COMPANY FORMED
,-15,2,NEW POPULAR GAME MADE,25,
```



```
2
490 DATA LUMBER FOREST BURNS DOW
N,-30,3,WOOD NEEDED FOR BRIDGES,
13,3
500 DATA OIL WELL EXPLODES!!,-50
,5,NEW OIL FOUND!!,25,5
510 DATA LETHAL CHEMICAL DEVELOP
ED,-15,6,NEW 'WONDER' CHEMICAL M
ADE,15,6
520 DATA SQUID MEAT FOUND IN BUR
GERS,-25,7,BROILING BEAT FRYING,
15,7
530 DATA TALENT AGENCY SUED!!,-3
0,8,TALENT AGENCY FINDS NEW STAR
,25,8,REALTORS AQUIRE SWAMP,-15,
9,REALTORS SELL SWAMP TO FOOL,20
,9
540 DATA NEW FILM BOMBS AT BOX O
FFICE,-35,10,NEW FILM WINS 19 OS
CARS,40,10
550 FOR E=1TO10:C(E)=100:D(E)=10
0:NEXT
560 CLS
570 GOSUB870
580 PRINT"COMPANY NAME   TURN:"TU
:PRINT@26,"$$$":PRINTSTRING$(32,
"*")
590 TU=TU+1:IF TU=TN+1 THEN GOTO
1330
600 FOR T=1TO10:PRINT@P(T),N$(T)
:PRINT@P1(T),C(T)
610 IF D(T)<1THEN I$(T)="B":C(T)
=0:D(T)=0:IF B$(T)=0THENPLAY"V31
T4L2FL1C":B$(T)=1:GOTO660
611 IF I$(T)="B"THEN660
620 IF D(T)>C(T) THENI$(T)="U"
630 IF D(T)<C(T)THEN I$(T)="D"
640 IF D(T)=C(T)THENI$(T)="N"
650 IF D(T)>149THEN D(T)=INT(D(T
)/2):S(T)=1
660 C(T)=D(T):PRINT@P1(T),C(T)
670 IF S(T)=1THEN I$(T)="S":PLAY
"O4T8L8CDEL1T4F":S(T)=0:IF I$(T)
="S"THEN I(T)=1ELSE I(T)=0
680 IF I$(T)="S"THEN FOR HI=1TOP
L:M1(HI,T)=M1(HI,T)*2:NEXT
690 PRINT@P2(T),I$(T)
700 PLAY"O2T255L255C"
710 NEXT
720 FOR ZX=1TOPL
730 GOSUB1300:PLAY"O4L30T1G":PRI
NT@386,Q$:PRINT"PLAYER";ZX
740 INPUT"(B)UY,<W>AIT,(S)ELL,<I
>NFO";C$
750 IF C$="I"THEN1450
760 IF C$="W"THEN780
770 IF C$="B"THEN1010ELSE IF C$=
"S"THEN1160ELSE730
780 M(ZX)=M(ZX)+M1(ZX,1)*20
```
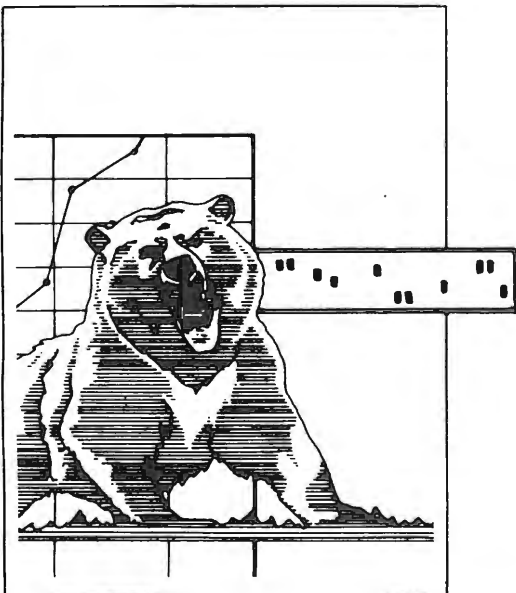
```
790 M(ZX)=M(ZX)+M1(ZX,2)*10
800 M(ZX)=M(ZX)+M1(ZX,3)*30
810 M(ZX)=M(ZX)+M1(ZX,4)*20
820 M(ZX)=M(ZX)+M1(ZX,6)*50
830 M(ZX)=M(ZX)+M1(ZX,7)*10
840 M(ZX)=M(ZX)+M1(ZX,8)*30
850 M(ZX)=M(ZX)+M1(ZX,9)*40
860 NEXT:GOTO560
870 FOR T=1TO10:IF C(T)=0THEN970
880 X=RND(20)-10:D(T)=C(T)+X
890 IF T=2THEN D(T)=D(T)+3
900 IF T=3OR T=4OR T=5THEN D(T)=
D(T)+1
910 IF T=6THEN D(T)=D(T)-3
920 IF T=7THEN D(T)=D(T)+4
930 IF T=8THEN D(T)=D(T)+2
940 IF T=9THEN D(T)=D(T)-2
950 IF T=10OR T=1THEN D(T)=D(T)+
RND(6)-3
960 IF D(T)<1THEN D(T)=0:C(T)=0
965 IF D(T)<1THEN C(T)=0
970 NEXT
980 GOSUB1560
990 D(QT)=D(QT)-QM
1000 RETURN
1010 GOSUB1300:PRINT@384,"SO,YOU
 WANT TO BUY SOME STOCK.":INPUT"
WHICH(1-10)";S
1020 VE=0:GOSUB1310:IF VE=1THEN1
010
1030 VE=0
1040 SOUND175,5
1050 GOSUB1300
1060 PRINT@384,"STOCK"S"IS $"C(S
)"PER SHARE.YOU    CAN BUY IN MU
LTIPLES OF 10.":INPUT"HOW MANY";
A
1070 TT=A*C(S)
1080 IF M(ZX)-TT<0 THENGOSUB1300
:PRINT@384,"YOU ONLY HAVE $"M(ZX
)"TO SPEND":GOTO1280
1090 M(ZX)=M(ZX)-TT
1100 MO=A/10
1110 M1(ZX,S)=M1(ZX,S)+MO
1120 PLAY"O3T4L4GA#L8GL2C"
1130 GOSUB1300
1140 PRINT@384,"YOU JUST BOUGHT"
A"SHRS.":PRINT"OF STOCK"S"FOR $"
TT".
1150 INPUT"PRESS ENTER";Q:GOTO12
90
1160 GOSUB1300:PRINT@384,"SO,YOU
 WANT TO DUMP SOME STOCK.":INPUT
"WHICH(1-10)";S
1170 GOSUB1300:GOSUB1310:IF VE=1
THEN1160ELSE VE=0
1180 IF M1(ZX,S)<1THENPRINT@384,
"YOU DON'T HAVE THAT STOCK":GOTO
1280
```

```
1190 SOUND 175,5
1200 PRINT@384,"STOCK"S"IS $"C(S
)"PER SHARE.YOU  CAN SELL IN SET
S OF TENS.":INPUT"HOW MANY";A
1210 IF M1(ZX,S)*10<A THEN GOSUB
1300:PRINT@384,"YOU ONLY HAVE"M1
(ZX,S)*10"SHARES":GOTO1280
1220 TT=A*C(S)
1230 M(ZX)=M(ZX)+TT
1240 GOSUB1300
1250 MO=A/10:M1(ZX,S)=M1(ZX,S)-M
O
1260 PLAY"O2T3L8EF#G#L3AO3L4EL2E
"
1270 PRINT@384,"YOU JUST SOLD"A"
SHRS.":PRINT"OF STOCK"S"FOR $"TT
".
1280 INPUT"PRESS ENTER";Q:GOSUB1
300:GOTO1290
1290 GOTO730
1300 PRINT@384,X$:PRINTX$:PRINTX
$:RETURN
1310 IF S<0OR S>10THEN VE=1
1320 RETURN
1330 CLS:FOR ZX=1TOPL
1340 FOR TR=1TO10
1350 M(ZX)=M(ZX)+(M1(ZX,TR)*10)*
C(TR)
1360 NEXT TR
1370 PRINT"PLAYER"ZX".YOU HAVE $
";M(ZX)
1380 NEXTZX
1390 INPUT"DO YOU WANT TO PLAY A
GAIN,IF SO,ENTER 'Y'";I$
1400 IF I$="Y"THEN 10
1410 CLS(0):PRINT@192,"  I HOPE
YOU HAD FUN PLAYING
THE BROKER."
1420 PLAY"T9L8.CDEL4GP30GP30L2C"
1430 GOTO1430
1440 PRINT"I HAVE SOLD ALL YOUR
STOCK.THIS IS YOUR NEW ACCOUNT."
1450 CLS:PRINT"PLAYER #"ZX
1460 PRINT"YOU HAVE $";M(ZX)
1470 PRINT"YOU HAVE STOCK IN:"
1480 FOR YE=1TO10
1490 PRINT"STOCK #"YE,M1(ZX,YE)*
10:NEXT
1500 INPUT"PRESS ENTER";Q
1510 CLS:PRINT"COMPANY NAME   TUR
N:"TU:PRINT@26,"$$$":PRINTSTRING
$(32,"*")
1520 FOR T=1TO10:PRINT@P(T),N$(T
):PRINT@P1(T),C(T)
1530 I(T)=0
1540 PRINT@P2(T),I$(T)
1550 NEXT:GOTO730
1560 Q=RND(18):Q$=QW$(Q):QM=QW(Q
):QT=QS(Q):RETURN
```

180
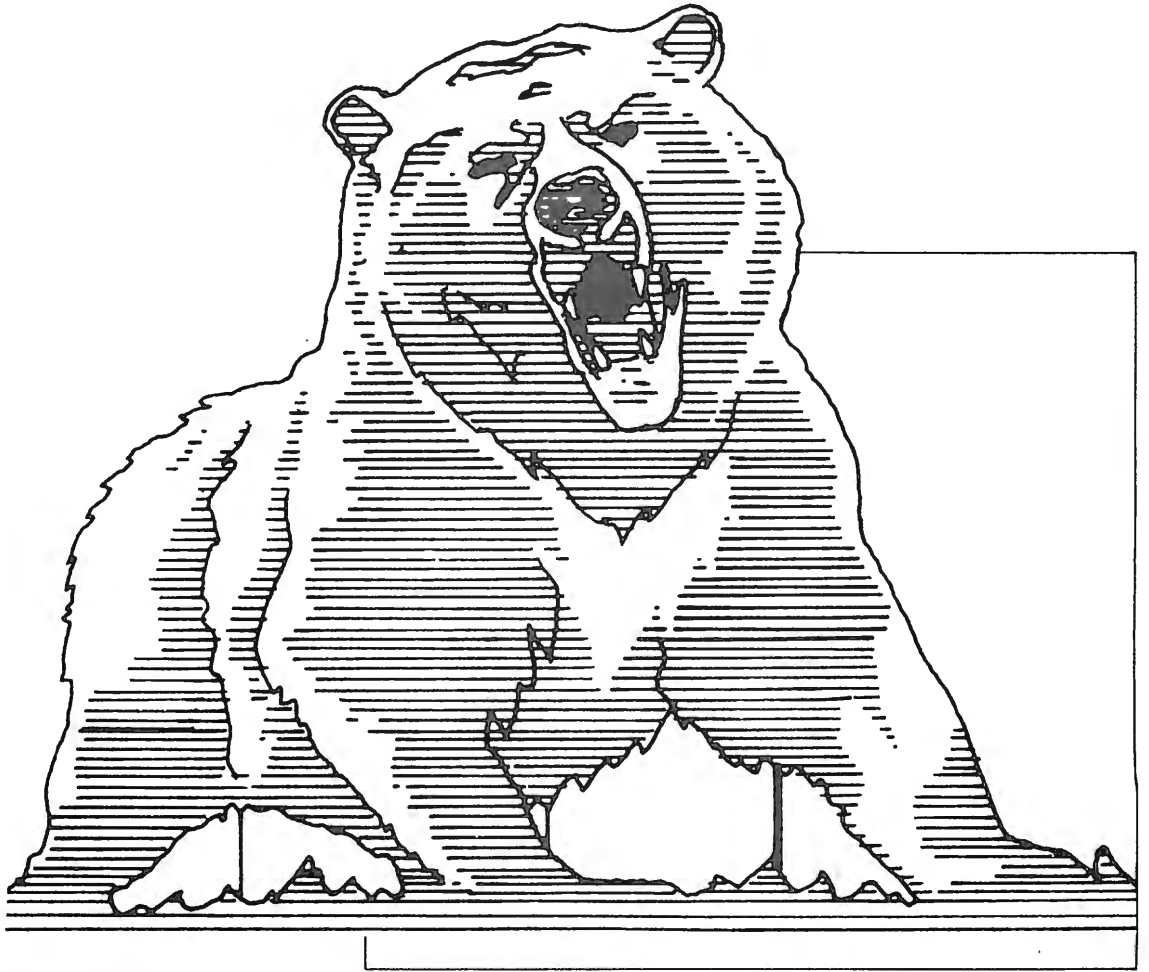
MOWER

JIM ROHMAN

After the long, hard winter, you've had a lot of things to do around the house getting ready for the summer — cleaning out the garage, tilling the garden and setting out the tomato plants, getting the begonias in the window boxes and clearing the swimming pool of debris.

Meanwhile, the most noticeable aspect of your property — the lawn — has gone to seed. You've procrastinated doing the job, dreading the possibility of emptying the grass catcher a dozen times and the inevitable trimming that prolongs the ordeal of cutting the grass.

If you really enjoy tinkering around in the yard — like you tell your friends at the office — then mowing the lawn should be very rewarding. Think of the therapeutic effect and the sense of accomplishment upon restoring the lawn to its peak condition.

Haul out the lawnmower and let's get started.

You will need two joysticks for the simulation. The left joystick controls the speed of the lawnmower; push the toggle switch forward to slow down, pull it back to speed things up. The right joystick controls your direction.

The object is to get all of the grass mowed before you run out of gas. It is advisable to use a medium speed. If you go too fast, you're going to be sorry.

You can mow in a rectangular pattern, diagonally, horizontally, or however you prefer. Just make sure not to miss any spots and to keep your eye on the gas gauge.

Upon loading the simulation, type 'F' to fill the gas tank. Hit 'E' when you have completed the chore.

Don't expect any special rewards. You are merely mowing the lawn and your satisfaction will be that a job was well done. Think of how much the neighbors will appreciate your overdue efforts.

(Jim Rohman is 13 years old and lives in Portland, Maine. He has been working with the CoCo for two years and been helped along by the local Radio Shack computer department manager.)

```
1 OF=1
100 SCREEN0,1
110 PMODE3,1:PCLS1
120 COLOR3,3:LINE(10,35)-(245,19
9),PSET,B
130 COLOR4,4:LINE(10,10)-(245,20
),PSET,B
140 PAINT(50,150),3,3
145 FOR X=10+2 TO 245 STEP24.5:C
OLOR 4,4:LINE(X,20)-(X,25),PSET:
NEXTX
147 FOR X=10+12.25+2 TO 245 STEP
 24.5:COLOR 4,4:LINE(X,20)-(X,23
),PSET:NEXTX
148 SCREEN1,1
149 I$=INKEY$:IF I$="" THEN 149
150 FOR X=10 TO 245:COLOR4,4:LIN
E(X,10)-(X,20),PSET:NEXTX:X=0
160 X=16:Y=41
165 IUIU=235
170 FOR XXX=243 TO 12 STEP-1:COL
OR1,1:LINE(XXX,11)-(XXX,19),PSET
195 I$=INKEY$:IF I$="E" THEN END
220 HH=JOYSTK(3)
245 MOV=1
270 IF HH<2 THEN FUU=1:MOV=0
295 IF HH>2 AND HH<20 THEN FUU=1
320 IF HH>20 AND HH<40 THEN FUU=
5
345 IF HH>40 THEN FUU=10
350 IF MOV=0 THEN FUU=0
370 H=JOYSTK(0):V=JOYSTK(1)
395 IF H<21 THEN MOVE=1
420 IF V<21 THEN MOVE=2
445 IF H>42 THEN MOVE=3
470 IF V>42 THEN MOVE=4
495 GOSUB520:GOTO 745
520 IF MOVE=1 THEN X=X-FUU
545 IF MOVE=2 THEN Y=Y-FUU
570 IF MOVE=3 THEN X=X+FUU
595 IF MOVE=4 THEN Y=Y+FUU
620 IF X<10 THEN X=10
645 IF X>245 THEN X=245
670 IF Y<35 THEN Y=35
695 IF Y>199 THEN Y=199
720 RETURN
745 '
770 PI=0:COLOR4,4:GOSUB795:GOTO
870
795 LINE(X-4,Y-4)-(X+4,Y+4),PSET
,B
820 IF PI=1 THEN PAINT(X,Y),2,2
845 RETURN
870 PI=1:COLOR 2,2:GOSUB795
890 IF IUIU<5 THEN 1000
895 IO=IO+FUU:IF IO>50 THEN IO=0
:IUIU=IUIU-1:NEXTXXX
920 IF IUIU=<0 THEN 1000
940 GOTO 195
1000 CLS:PRINT"OUT OF GAS":FOR D
LAY=1 TO 2100:NEXT DLAY:SCREEN1,
1
1010 I$=INKEY$:IF I$="" THEN 101
0
```
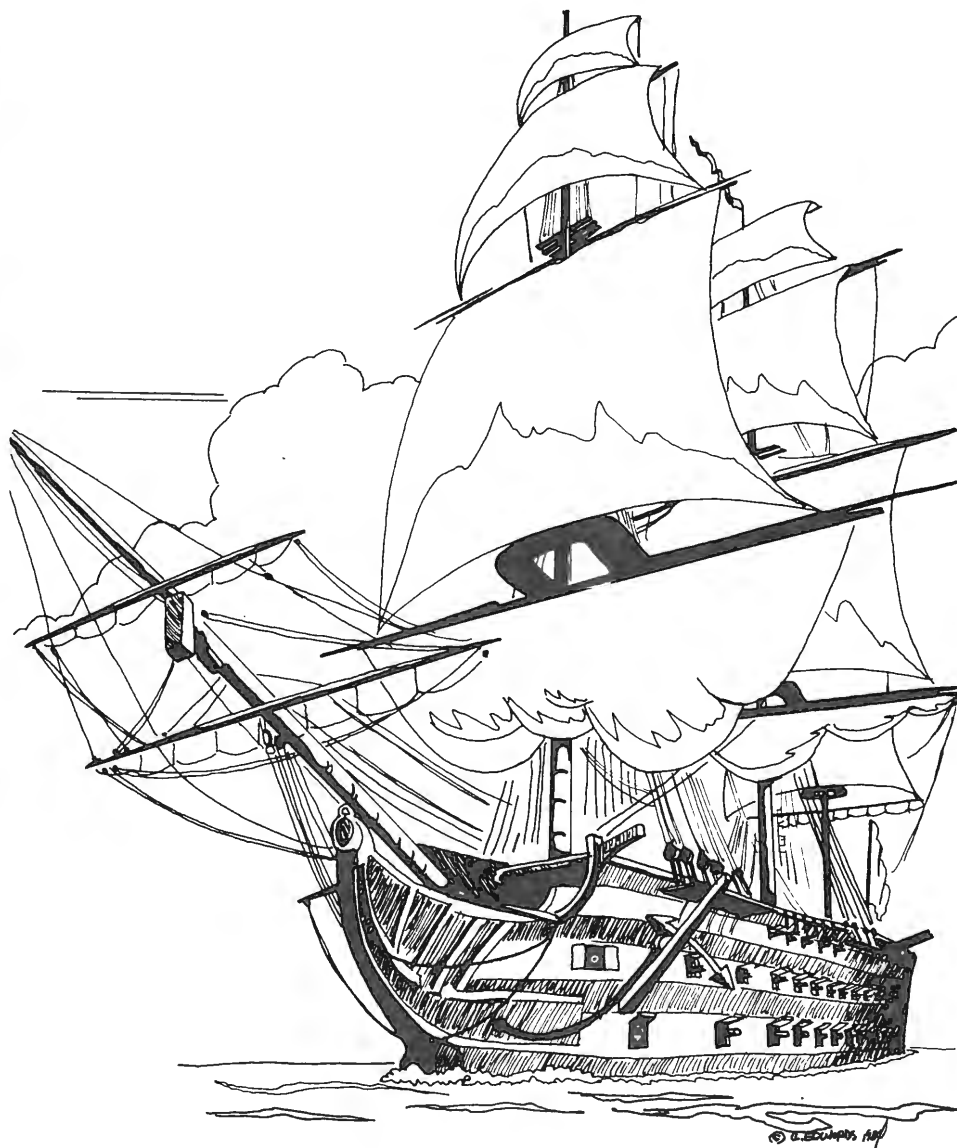
(*Mr. Brown, college student, has owned a CoCo for the last two years. This is his first major program. He can be contacted on Compuserve at 73016, 411.*)

SHIP O'LINE

RICHARD BROWN

Reminders of the Age of Sail (1680 to 1870) conjure up visions of power and adventure, of pirates swinging across the decks of merchant ships with knives between their teeth and braces of pistols under their belts.

In addition to the swashbuckling buccaneers, the period witnessed some of the most famous naval battles in history. The confrontation between the *U.S.S. Constitution* and the British frigate *Guerrier*, for example, almost decided the War of 1812.

The ships of this period were wooden-hulled craft, having one to four masts and a varying number of sails. They were manned by crews numbering from 100 to 1,200 men and weighing from 300 to 2,700 tons.

Every warship had two groups of cannons, mounted on the port (left) side and the starboard (right) side, which were referred to as broadsides. The cannons varied in size and capability. They used more than just the standard "ball shot" you see in the movies. Three types of shells were used, although the ball shot was indeed the most popular explosive.

They also employed the "chain shot," consisting of two halves of a ball shot shell linked by a bar or chain. Most of the time, this weapon was used to destroy the sails of the enemy. The captain losing all of his sails was at his opponent's mercy. The "grape shot" consisted of a cluster of golf ball-size shells that exploded in midair or on contact. It was considered an anti-personnel weapon.

Maneuvering was a key part of naval combat. By raising and lowering the number of sails, and by turning the rudder, a ship could adjust its speed and move into firing position. If one could maneuver the ship so that a broadside was at a 90-degree angle

to the enemy's bow or stern, a devastating attack could be launched without fear of retaliation. Since a shell traveled the entire length of the ship, it did great damage.

The first shot, usually called the "initial broadside," did more damage because of the time and care taken to load the guns before a battle. During actual conflict, there was not as much time to load and aim as carefully. So captains usually held their first shot until a good position presented itself.

Ships naturally varied in size, from small sloops to huge battleships that fought in a line from stern to bow; hence the name "Ship O' Line."

Once a battle appeared hopeless, the losing captain would order his vessel's flag to be taken down, signaling surrender. This was called "striking the colors." The defeated crew would be locked in the hold of the ship and a small crew from the winning ship would be sent aboard to sail the captured ship to a friendly port.

The Simulation begins with a brief title screen and then displays the main menu. Selecting '1' will take you to another menu of predesigned scenarios. Simply press the selection and answer the prompts for the names of the captains. Hitting the ENTER key will start the battle.

Selecting '2' on the main menu will prompt you for the filename you wish to load. Disk owners may want to add a *DIR* command. Tape users must change the *WRITE#s* to *PRINT#s*. Once loaded, press ENTER to begin.

Item '3' will ask for the filename of the scenario just as the previous option did. Once entered, the scenario is saved and you are returned to the main menu. Using the QUIT command allows you to save a scenario in progress.

Item '4' is used when you wish to enter a scenario yourself. Enter the appropriate information after each prompt (e.g., ship name, crew number, tonnage, etc.). This information can be the result of your imagination or obtained from history books. The only real danger is the gun entries. The computer can store up to four different sets of cannons by their quantity and their shot weight in pounds. The shell weight must be one of those listed in Table 2 or it will not register later in the Simulation.

Item '5' will close all open files as a precaution.

Once all the data about the ships has been entered, indicate the starting position and direction. There are eight possible headings for a ship as shown in Figure 1. The direction is the heading, or front, of the ship. Players alternate in giving orders.

The status screen displays the captain, the ship, wind direction and speed, damage high and low, and other useful information. Players will need to decide beforehand if the information is confidential (in other words, an opponent may have to turn his head while status is shown).

The wind plays a very important role and is used to move and to outmaneuver your opposition. Wind speed determines the distance moved by a ship. If headed into the wind, she won't move quickly. If the wind is broadside, she will travel at a good clip.

Victory is declared when you have either killed the opposition's crew, destroyed 90 percent of his hull, have boarded his ship, or have driven the enemy out of the battle area.

SPECIAL INSTRUCTIONS

Battle Commands:

This is a very sophisticated Simulation involving many combinations of commands. Please read the directions carefully.

Located at the bottom of the status screen is the prompt "Move Captain?" and a flashing cursor. This is the command line. Typing either an immediate command or a compound command, ENTER will cause that command to be executed and usually ends your turn.

Possible immediate commands are: QUIT — takes you to the main menu; STRIKE — ends the battle with a victory for your opponent; MAP — shows the strategic display; ENTER — displays the tactical map. All of the immediate commands must be entered on a line by themselves.

Compound commands consist of single- or multiple-letter instructions. For example, the command "M1 LC F4 P APH F3" means "Set helm to ¼ speed, load cannons with chain shot, forward $^4/_{7}$ths of a full move, turn to port, aim and fire port guns high, and move the last $^3/_{7}$ths of the turn." A maximum of 10 instructions per command is recommended. Spaces between individual commands are optional.

Individual commands:

(A)im. Fires a broadside at the end of movement. Parameters specify (P)ort or (S)tarboard guns and (H)igh (sails) or (L)ow (hull) aiming point. Example: "APL" is Aim Port Low.

(B)oarding. If ships are grappled, this sends the total number of men of the parameter to the other ship as a boarding party. Example: "B110" sends a 110-man boarding party.

(F)orward. Moves a ship forward a fraction of a full move. Example: "F3 LB P F5" is forward $^3/_{8}$ths (total of 3 + 5 = 8), loads ball shot, port turn, forward $^5/_{8}$ths. An 'F' with no parameter is interpreted as an "F1."

(G)rapple. If both ships are within three squares of each other and heading in the same or opposite directions at approximately the same speed, a grappling attempt can be made. If successful, both ships will stop and boarding parties will be sent.

(L)oad. Loads cannons with (C)hain, (B)all, or (G)rape shot. After firing, cannons are automatically relocated with the same shot as the previous load. Example: "LB" is load with ball shot.

(M)aneuver. Sets ship's helm parameters. The fraction specified is multiplied by

the full-move potential to find the actual move distance. Example: "M3" sets the helm to ¾ of a full potential move.

(N)o Sail. Stops the ship, greatly reducing high damage.

(P)ort Turn. Turns the ship one compass point to the port side. Only two turns are possible per cycle.

(R)epair. Allows repairing of 10 percent of the high damage to a ship.

(S)tarboard Turn. Turns the ship one compass point to the starboard side.

(C)ut Grapples. Has a 35 percent chance of cutting any grapples to the ship. Once cut, the two ships may move as they wish. Grappled ships cannot move.

The enemy should be within 45 degrees of a direct 90-degree shot before firing a broadside. Damage is assessed by multiplying the number of hits. This is determined as low damage against the ship's tonnage and as high damage against the sails. You will lose a mast when you incur 33 percent damage. When all masts are gone, the (R)epair command will not work.

A boarding screen is displayed if the ships are grappled telling the results of your last turn and your opponent's last attack. This screen will not be displayed unless grappling is successful.

```
10 REM***************************
20 REM*      SHIP O' LINE       *
30 REM*           BY            *
40 REM*     R. BROWN, 1983      *
50 REM*          FOR            *
60 REM*    RAINBOW SIMULATION   *
70 REM*         CONTEST         *
80 REM*          (32K)          *
90 REM***************************
100 PCLEAR4:CLEAR800:DIMS(2,11),
N$(2),GR(2,11),GF(6),CR(8,6),X(2
),Y(2),FY(2),CT(2),SA(2),C$(2),C
S(2),CC(2),F(2):R=RND(-TIMER)
110 MA$(0)="NU7BD2":MA$(1)="NU7B
M+3,-3":MA$(2)="NU7BR3":MA$(3)="
NU7BM+3,3":MA$(4)="NU7BU2":MA$(5
)=MA$(1):MA$(6)=MA$(2):MA$(7)=MA
$(3)120 SH$(0)="BR2U4H2NU3G2D9F1
R2E1U5"
130 SH$(1)="NG4E4U2NE3L2G8D2R2E4
"
140 SH$(2)="R5E2NR3L15D1R2D1R7BL
2"
150 SH$(3)="NF4H4U2R2F8D2NF3L2H4
"
160 SH$(4)="BR2U5H1L2G1D9F2ND3E2
U4BL2BD2"
170 SH$(5)="NE4G4L2NG3U2E8R2D2G4
"
180 SH$(6)="L5H2NL3R15D1L2D1L7"
190 SH$(7)="NF4H4U2NH3R2F8D2L2H4
"
200 FORX=1TO8:FORY=1TO6:READCR(X
,Y):NEXTY,X
210 DATA1,1,1,2,2,0,1,1,1,2,2,0,
1,1,2,0,0,0,2,2,1,0,0,0,1,2,0,0,
0,0,2,1,0,0,0,0,1,0,0,0,0,0,0,0,
0,0,0,0
220 GOSUB1120'TITLE SCREEN ROUTI
NE
230 L$=STRING$(32,128):WS=4:WD=R
ND(8)-1:M(1)=RND(4):M(2)=RND(4):
FY(1)=-1:FY(2)=-1:L(1)=2:L(2)=2
240 RESTORE:CLS0:PRINT"          SH
IP O' LINE MENU
250 FORX=1TO48:READA$:NEXT:FORX=
```

```
1TO6:READGF(X):NEXT'CREW EXPERTI
SE LEVELS
260 DATA 2.5,3.5,2,4,3,4.5
270 FORX=1TO11:READGR(1,X):NEXT:
FORX=1TO8:READGR(2,X):NEXT
280 DATA21,20,20,19,18,18,18,17,
16,14,13,12,11,11,11,10,10,9,6
290 PRINTSTRING$(32,128)
300 PRINT" 1. RUN A PREDESIGNED
SCENARIO"," 2. LOAD GAME",," 3.
SAVE GAME",," 4. DESIGN A SCENAR
IO"," 5. END PROGRAM":PRINT:PRIN
T
310 A$=INKEY$:IF A$=""THEN310ELS
ESE=VAL(A$):IFSE<1ORSE>5 THEN 31
0
320 ON SE GOSUB340,750,610,930,1
110
330 GOTO240
340 CLS0:PRINT"       PREDESIGNED
SCENARIOS
350 PRINTL$
360 PRINT" 1. VICTORIOUS V. RIVO
LI"," 2. CONSTITUTION V. GUERRIE
R"," 3. CONSTITUTION V. JAVA"," 4
. SHANNON V. CHESAPEAKE"," 5. RE
TURN TO MAIN MENU":PRINT
370 A$=INKEY$:IFA$=""THEN370 ELS
E SE=VAL(A$):IF SE<1 OR SE>5 THE
N370
380 CLS
390 IFSE=5THEN240
400 RESTORE:FORX=1TO73:READT:NEX
T:T=0'GET RID OF DATA
410 FORX=1TO SE:FORS=1TO2:READN$
(S):FORY=1TO11:READS(S,Y):NEXTY,
S,X
420 FORX=1TO2
430 PRINT"WHO IS THE CAPTAIN OF
THE ":PRINTN$(X);:INPUTC$(X):IFC
$(X)=""THEN430
440 NEXT
450 CLS0:PRINTN$(1)" V. "N$(2):P
RINTL$:ONSE GOSUB500,530,590,560
460 X(1)=110:Y(1)=100:X(2)=RND(2
00):Y(2)=121:D(1)=2:D(2)=6:MA(1)
=3:MA(2)=3
470 FORQ=1TO2:CC(Q)=S(Q,3):CT(Q)
=S(Q,1):NEXTQ
480 GOSUB3190
490 GOTO1330
500 PRINT"THIS BATTLE OCCURED AS
  THEN NEW FRENCH 74 RIVOLI LEFT
VENICE ON A CRUISE TO POLA AND W
AS INTER- CEPTED BY THE BRITSH 7
4 VICTOR- IOUS. THE RIVOLI PUT U
P A STOUT RESISTANCE BUT WAS BEA
TEN AFTER LOSING NEARLY HALF ITS
 CREW. "
510 PRINT:PRINT@480-32,"";:INPUT
" <ENTER> TO CONTINUE";A$
520 RETURN
530 PRINT"THE BATTLE BETWEEN THE
 CONSTI-  TUTION AND THE GUERRIE
R IS PROB-ABLY ONE OF THE BEST K
NOWN OF   THE WAR OF 1812.  HULL
, CAPTAIN OF THE CONSTITUTION LE
AD HIS    SHIP TO VICTORY OVER O
NE OF HIS MAJESTY'S BEST FRIGATE
S, AND IN THE PROCESS";
540 PRINT" SUFFERED ONLY SLIGHTD
AMAGE"
550 GOTO510
560 PRINT"THIS BATTLE CAME ABOUT
 AS THE    AMERICAN FRIGATE CHESA
PEKE ANS- WERED A CHALLENGE FROM
 THE SUP-  ERIORLY TRAINED AND DR
ILLED     ENGLISH SHIP, THE SHAN
NON.      AFTER TEN MINUTES OF F
IGHTING    THE AMERICAN CREW,";
570 PRINT" WHO HAD JUST JOINED W
ITH THE SHIP, WERE         DEFEATED
."
580 GOTO510
590 PRINT"THE ACTION BETWEEN THE
 HMS JAVA AND THE USS CONSTITUTI
ON SOLIDI-FIED THE UNITED STATES
 AS AN UP AND COMING NAVAL POWER
. AGAIN, AS WITH THE HMS GUERRI
ER THE AM-ERICANS QUICKLY DESTRO
YED THEIR OPPONENT."
600 GOTO510
610 CLS:PRINT"SAVE GAME"
620 LINEINPUT"FILENAME TO SAVE B
Y?";F$:IFF$=""THEN240
630 INPUT"DEVICE 1=DISK -1=TAPE"
;DV:IFABS(DV)<>1THEN630
640 F$=LEFT$(F$,8):IFDV=1THENF$=
F$+"/SOL"
650 OPEN"O",DV,F$
660 WRITE#DV,X,GRAPPLED,WS,WD
670 FORX=1TO2
680 WRITE#DV,X(X),Y(X),D(X),FY(X
),N(X),N$(X),C$(X),L(X),CC(X),CS
(X),CT(X)
690 FORY=1TO11
700 WRITE#DV,S(X,Y)
710 NEXTY,X
720 CLOSE#DV
730 IF FLAG THENFLAG=0:RETURN
740 PRINTF$" SAVED":PRINT"HIT <E
NTER> TO CONTINUE":GOSUB3320:GOT
O240
750 CLS:PRINT"LOAD OLD GAME"
760 LINEINPUT"FILE NAME OF GAME?
";F$:IFF$=""THEN240ELSEF$=LEFT$(
F$,8)
770 INPUT"DEVICE 1=DISK -1=TAPE"
```

```
;DV: IF ABS(DV)<>1THEN770              =D
780 IF DV=1THENF$=F$+"/SOL"            1070 NEXTY
790 OPEN"I",DV,F$                      1080 INPUT"WOULD YOU LIKE TO SAV
800 INPUT#DV,X1,GRAPPLED,WS,WD         E THE SCENARIO BEFORE YOU RUN IT
810 FORX=1TO2                          (Y/N)";Y$:IFY$="N"THEN470
820 INPUT#DV,X(X),Y(X),D(X),FY(X       1090 FLAG=1:FORA=1TO2:CC(A)=S(A,
),N(X),N$(X),C$(X),L(X),CC(X),CS       3):CT(A)=S(A,1):GOSUB610:GOTO470
(X),CT(X)                              1100 RETURN
830 FORY=1TO11                         1110 CLS:END
840 INPUT#DV,S(X,Y)                    1120 PMODE4,1:SCREEN1,1
850 NEXTY,X                            1130 PCLS
860 CLOSE#DV                           1140 DRAW"BM50,50"
870 PRINTF$" LOADED"                   1150 DRAW"F2R4E2U4H2L4H2U4E2R4F2
880 PRINT"HIT <ENTER> TO START T       BU1
HE GAME":GOSUB3320:GOSUB3190:MA(       1160 DRAW"BR10U1D16U8L6NU8ND8
1)=3:MA(2)=3                           1170 DRAW"BR12NU8D8
890 IFX1=1THEN GOTO1330                1180 DRAW"BR6U16R4F2D3G2L4
900 FORX=2TO2                          1190 DRAW"BR25BU8R1D4
910 GOTO1340                           1200 DRAW"BM+8,0BU4R4F2D12G2L4H2
920 RETURN                             U12E2
930 CLS:PRINT"DESIGN SCENARIO"         1210 DRAW"BM+26,0D16R6
940 FORY=1TO2                          1220 DRAW"BM+08,0U16BM+06,0
950 CLS:PRINT"NAME OF SHIP #"Y;:       1230 DRAW"ND16F6D4F6U16
INPUTN$(Y):IFN$(Y)=""THEN950           1240 DRAW"BM+6,0NR8D8NR6D8R8
960 PRINT"WHAT IS THE TONNAGE OF       1250 IFTR=0THENTR=1:DRAW"BM51,51
 THE "N$(Y);:INPUTS:IFS<1000RS>2       ":GOTO1150
500THENPRINT"OUT OF RANGE":GOTO9       1260 DRAW"BM-140,+50ND3L4D18R4U4
60ELSES(Y,1)=S                         M+60,5U8R25U6R3D6R17F8R9F8D6L6L69U
970 PRINT"NATION OF THE ":PRINTN       14BM-60,-2BU14D2M+60,-3R70F8R4D3
$(Y)": 1=BRITAIN 2=FRANCE 3=UNIT       L4G8L6
ED STATES 4=RUSSIA 5=DENMARK/SWE       1270 PSET(150,100)
DEN 6=SPANISH AND OTHERS.";:INPU       1280 CIRCLE(115,140),8,,.9:CIRCL
TS:IFS<1ORS>6THEN970ELSES(Y,2)=S       E(170,140),8,,.9
980 PRINT"HOW MANY CREWMEN AND O       1290 PAINT(150,110),5,5
FFICERS ABOARD THE "N$(Y)" ";:IN       1300 LINE(2,147)-(253,189),PSET,
PUTS:IFS<500RS>1200THENPRINT"OUT       BF
 OF RANGE":GOTO980ELSES(Y,3)=S         1310 FORX=1TO600:NEXT
990 FORT=4TO10STEP2                    1320 RETURN
1000 PRINT"HOW MANY GUNS IN SET        1330 FORX=1TO2:IFX=2THENTM=TM+1
#"T/2-1;:INPUTG:IFG<0ORG>150THEN       1340 GOSUB2250'DRAWSHIP
PRINT"OUT OF RANGE":GOTO1000ELSE       1350 GOSUB3320
S(Y,T)=G                               1360 SOUND22,5:CLSRND(8):PRINT@1
1010 PRINT"WHAT IS THE SHOT WEIG       92+LEN(C$(X))/2+3,"CAPTAIN "C$(X
HT OF THE GUNS";:INPUTG:IFG<-680       );:FORZ=1TO 700:NEXT
RG>48THENPRINT"OUT OF RANGE":GOT       1370 GOSUB1490'BOARDER ROUTINE
O1010ELSES(Y,T+1)=G                    1380 GOSUB2470'SHOW STATS
1020 NEXTT                             1390 GOSUB2580'GET MOVE
1030 INPUT"HOW MANY MASTS (1-3)"       1400 NEXT:CLS3:PRINT@200,"WORKIN
;M:IF M<1 OR M>3 THEN1030 ELSE M       G...";
A(Y)=M                                 1410 FORX=1TO2
1040 INPUT"WHAT IS THE CAPTAIN'S       1420 GOSUB2630'PARSE MOVE
 NAME";C$(Y):IFC$(Y)=""THEN1040        1430 IF Y(X)=Y(2+(X=2)) AND X(X)
1050 INPUT"STARTING POSITION FOR       =X(2+(X=2))THENY(X)=Y(X)-1:X(X)=
 YOUR SHIP (X,Y) RANGE:1-255";S,       X(X)-1'COLLISION
G:IFS<1ORS>2550RG<1ORG>191THENPR       1440 GOSUB1690'FIRE WEAPONS
INT"OFF THE MAP":GOTO1050ELSEX(Y       1450 IF SU(2+(X=2)) THEN2970
)=S:Y(Y)=G                             1460 GOSUB1670'CHANGE WIND SPEED
1060 INPUT"DIRECTION OF SHIP (0-        AND DIRECTION
7)";D:IFD<0ORD>7THEN1060ELSED(Y)       1470 NEXT
```

```
1480 GOTO1330
1490 C=2+(X=2):IF NOT GRAPPLED T
     HEN RETURN
1500 CLS0:PRINTN$(X):PRINTL$:PRI
     NT"CAPTAIN "C$(X)","¡:PRINT" YOU
      HAVE"B(X)"MEN ABOARD THE ":PRIN
     TN$(C)
1510 PRINTUSING"DURING YOUR ENEM
     Y'S LAST ATTACK YOU LOST ### MEN
      TO HIS ###."¡B2,B1
1520 B1=INT((RND(B(X))/8.5)*(3/G
     F(S(X,2)))):B2=INT((RND(B(C))/8.
     5)*(3/GF(S(X,2))))
1530 IFB(X)-B2<0THENB2=B(X):B(X)
     =0ELSEB(X)=B(X)-B2
1540 IFB(C)-B1<0THENB1=B(C):B(C)
     =0ELSEB(C)=B(C)-B1
1550 PRINTUSING"YOUR TROOPS HAVE
      KILLED   ###    ENEMY SAILORS WI
     TH A LOSS OF ### TO YOURSELF."¡B
     1,B2
1560 IF CC(C)<=10THEN SU(C)=-1:G
     OTO2970
1570 PRINT"HIT ENTER TO CONTINUE
     ":GOSUB3320:RETURN
1580 'WIND
1590 A1=D(X):A2=A1-1:A3=A1+1:IFA
     2=-1THENA2=7
1600 IFA3=8THENA3=0
1610 IFA1=WD ORA2=WD ORA3=WD THE
     NSS(X)=SS(X)*1.5:RETURN
1620 IFA2-2<>WD ORA2+2<>WD THENS
     S(X)=SS(X)*.5
1630 RETURN
1640 R=RND(100):IFR<25THENWD=WD-
     1ELSEIFR>75THENWD=WD+1
1650 IFWD>7THENWD=0ELSEIFWD<0THE
     NWD=7
1660 RETURN
1670 R=RND(100):IFR<30 THEN WS=W
     S+1ELSEIFR>60THENWS=WS-1
1680 IF WS<1THENWS=1ELSEIFWS>8TH
     ENWS=8
1690 XX=X:MM=2+(XX=2):C=CC(XX)'F
     IRE ROUTINE
1700 IF F(XX)=0THENRETURN
1710 X2=X(MM)-X(XX):Y2=Y(MM)-Y(X
     X):DI=SQR((X(XX)-X(MM))^2+(Y(XX)
     -Y(MM))^2)
1720 GOSUB3080'ANGLE ROUTINE
1730 D=D(XX):A2=0*(D=0)-45*(D=1)
     -0*(D=2)-315*(D=3)-270*(D=4)-225
     *(D=5)-180*(D=6)-135*(D=7)
1740 AA=AA+A2
1750 IFAA<0THENAA=AA+360ELSEIFAA
     >360THENAA=AA-360
1760 IFF(XX)<0 AND(AA>60 OR AA<1
     20) THEN1790
1770 IFF(XX)>0 AND(AA>240 OR AA<
```
```
300)THEN1790
1780 RETURN
1790 Q$="423632241812090806040 3"
     :Q1$="6842363224181206":F=ABS(F(
     XX))
1800 Q3=0:FORQ=4TO10STEP2
1810 IFS(XX,Q+1)<0THENFORQ2=1TO7
     STEP2:V=VAL(MID$(Q1$,Q2,2))*-1:I
     FS(XX,Q+1)=V THENR=(Q2+1)/2:Q2=7
      ELSENEXT
1820 IFS(XX,Q+1)>0THENFORQ2=1TO2
     1STEP2:V=VAL(MID$(Q$,Q2,2)):IFS(
     XX,Q+1)=V THENR=(Q2+1)/2:Q2=21EL
     SENEXT
1830 IFS(XX,Q)<0THENIFGR(2,R)<DI
      THENNEXT:RETURN
1840 IFS(XX,Q)>0AND GR(1,R)<DI T
     HENNEXT:RETURN
1850 Q1=INT(DI/2+.5):IFQ1>7THENQ
     1=7ELSEIFQ1=0THENQ1=1
1860 IFF(XX)<0THENS=1ELSES=2
1870 IF F=2THENQ1=Q1+1
1880 RR=CR(Q1,RND(6))
1890 FORZ=1TOG(S,XX,Q/2+1)
1900 G=ABS(S(XX,Q+1))
1910 IF DI<2THEN G=G*2
1920 IFFY(XX)THENFY(XX)=0:G=G*3/
     2
1930 ONRR  GOSUB1950,2000
1940 NEXTQ:RETURN
1950 IFN(MM) THENG=G/3'LIGHT SAI
     L
1960 IFL(XX)=1THENG=G*3/2
1970 CS(MM)=CS(MM)-INT(G)/(DI/5)
1980 A1=INT((CS(MM)/SA(MM))*100)
     :IFA1<66THENMA(MM)=2ELSEIFA1<33T
     HENMA(MM)=1ELSEIFA1<10THENMA(MM)
     =0:CS(MM)=0
1990 RETURN
2000 A1=INT(G/4):G=G*1.5
2010 IFL(XX)=3THENCC(MM)=CC(MM)-
     A1:CT(MM)=CT(MM)-G/3ELSEIFL(XX)=
     2THENCC(MM)=CC(MM)-A1/2:CT(MM)=C
     T(MM)-G ELSEIFL(XX)=1THENCC(MM)=
     CC(MM)-A1/3:CT(MM)=CT(MM)-G/4
2020 IF B(MM)+CC(MM)<S(MM,3)/10
     THEN SU(MM)=-1ELSEIFCT(MM)<S(MM,
     1)/10THENSU(MM)=-1
2030 IFCT(MM)=0THENSU(MM)=-1:SU=
     -1:GOTO2970
2040 RETURN
2050 Q=VAL(L1$):IFQ>4THENQ=4
2060 M(X)=Q:RETURN
2070 M(X)=M(X)-1:IFM(X)<0THENM(X
     )=0
2080 N(X)=-1:RETURN
2090 Q=INSTR("CBG",L1$):L(X)=Q:K
     K=KK+1:IFL(X)=0THENL(X)=2
2100 RETURN
```

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```
2110 IFL1$="P"THENF(X)=-1ELSEF(X
)=1' AIM ROUTINE
2120 IFL2$="H"THENF(X)=F(X)*2ELS
EF(X)=F(X)*3
2130 KK=KK+2:RETURN
2140 A1=ABS(VAL(MID$(M$(X),KK+1)
)):IFA1>CC(X)THENA1=INT(CC(X)*.9
)' BOARDER ROUTINE
2150 'A1=NO. BOARDERS A2=OLD NO.
BOARDERS, RETURNS B(X)AS NEW NO.
 OF BOARDERS
2160 IF NOT GRAPPLED THEN RETURN
2170 A2=B(X):B(X)=A1:CC(X)=CC(X)
-A1+A2:KK=KK+LEN(STR$(S))-1:RETU
RN
2180 IFCS(X)<SA(X) THENCS(X)=CS(
X)+10:IFCS(X)>SA(X)THENCS(X)=SA(
X)
2190 RETURN
2200 C=2+(X=2):IF ABS(SS(X)-SS(C
```
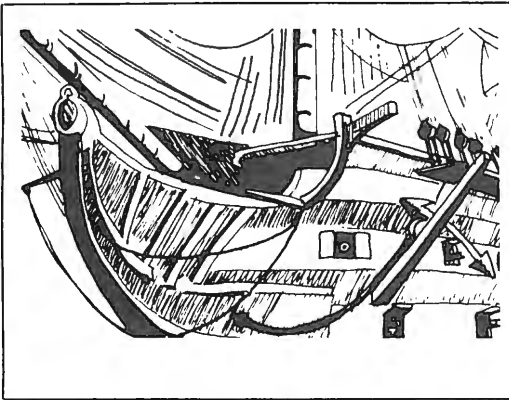


```
))>5THENRETURN
2210 IF RND(100)>35THENRETURN
2220 IFABS(Y(X)-Y(C))>4OR ABS(X(
X)-X(C))>6THENRETURN
2230 M(X)=0:M(C)=0:GRAPPLED=-1:R
ETURN
2240 IF RND(100)<40THENGRAPPLED=
0:RETURNELSERETURN
2250 PCLS1
2260 PMODE4,1:SCREEN1,1:COLOR0
2270 PCLS1
2280 D=D(X):XX=25:YY=19:V=X:GOSU
B2320
2290 C=2+(X=2):X1=X(X)-X(C):Y1=Y
(X)-Y(C):XX=25+X1:YY=19+Y1
2300 IFXX<10RXX>50ORYY<10RYY>38T
HENRETURN
2310 V=C:D=D(C):GOSUB2320:RETURN
2320 XX=XX*5:YY=YY*5*192/256
2330 X$=STR$(XX)+","+STR$(INT(YY
))
2340 DRAW"BM"+X$+SH$(D)
2350 OND+1 GOSUB2390,2410,2420,2
430,2400,2440,2450,2460
2360 IFMA(V)=0THEN2380
2370 FORT=1TO MA(V):DRAWMA$(D):N
EXT
2380 RETURN
2390 DRAW"BM-2,0":RETURN
2400 DRAW"BM+0,0":RETURN
2410 DRAW"BM-4,2":RETURN
2420 DRAW"BM-3,-2":RETURN
2430 DRAW"BM-3,-5":RETURN
2440 DRAW"BM-4,+2":RETURN
2450 DRAW"BM-3,-2":RETURN
2460 DRAW"BM-1,-3":RETURN
2470 CLS:PRINTN$(X):PRINTL$;:PRI
NT" CAPTAIN: ";C$(X):PRINT" WIND
 SPEED:"WS,"DIRECTION:"WD
2480 PRINTUSING" LOW DMGE:###%
HIGH DMGE:###%";100-INT((CT(X)/S
(X,1))*100),100-INT((CS(X)/SA(X)
)*100)
2490 PRINTUSING" NO MASTS:# X:##
# Y:### D:#";MA(X),X(X),Y(X),D(X
):PRINTUSING" SPEED:#/4 HELM, TO
T SAIL:####";M(X),INT(SA(X))
2500 IFGRAPPLED THENPRINT@36,"GR
APPLED";ELSEPRINT@38,"NOT GRAPPL
ED";
2510 PRINT@224,"";
2520 PRINTUSING" CREW:### BRDERS
:### KILLED:###";CC(X),B(X),S(X,
3)-CC(X)-B(X)
2530 A$=MID$("CHAIN BALLGRAPE",(
L(X)-1)*5+1,5)+"SHOT"
2540 PRINT"    GUNS(SHELL:"A$")"
:PRINT"    PORT"," STARBOARD":FO
RT=1TO4:FORK=1TO2:PRINTG(K,X,T)*
GF(S(X,2))"X"ABS(S(X,T*2+3));
2550 IFSGN(S(X,T*2+3))=-1THENPRI
NT"#C",ELSEPRINT"#",
2560 NEXTK,T
2570 RETURN
2580 INPUT"MOVE CAPTAIN";M$(X):P
$=M$(X):IFM$(X)="QUIT"THEN240'RE
TURN TO MAIN MENU
2590 IFM$(X)=""THENGOSUB2250:GOS
UB3320:GOSUB2470:GOTO2580
2600 IFM$(X)="STRIKE"THENSU(X)=-
1:GOTO2970
2610 IFM$(X)="MAP"THENGOSUB3330:
GOSUB2470:GOTO2580
2620 GOSUB2870:RETURN
2630 'PARSE MOVE
2640 E=0:T=0:F(X)=0:FORKK=1TO LE
N(M$(X)):LL$=MID$(M$(X),KK,1):L1
$=MID$(M$(X),KK+1,1):L2$=MID$(M$
(X),KK+2,1)
2650 ONINSTR("FPSALRGXBNM",LL$)+
1GOSUB2960,2690,2830,2850,2110,2
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090,2180,2200,2240,2140,2070,205          3010 PRINT"CASUALTIES"
0                                         3020 PRINTL$;
2660 IFW<>0THENT=T+1:IFT=10THENR           3030 FORX=1TO2
ETURN                                     3040 PRINT"ABOARD THE "N$(X)":"I
2670 NEXT                                 NT(S(X,3)-CC(X))
2680 RETURN                               3050 NEXT
2690 IFL1$>"0"AND L1$<="9"THENP1           3060 PRINT" HIT ANY KEY TO RETUR
=VAL(L1$)ELSEP1=1                         N TO THE      MAIN MENU"
2700 SS(X)=(WS*S(X,1))/200*(M(X)           3070 GOSUB3320:GOTO240
/4)*-1                                     3080 IFX2=0THENX2=1E-1
2710 GOSUB1580                             3090 IFY2=0THENY2=1E-1
2720 PP=INT(P1/P(X)*SS(X))                 3100 H=SQR(X2^2+Y2^2)
2730 OND(X)+1GOSUB2750,2760,2770           3110 S=(X2+Y2+H)/2
,2780,2790,2800,2810,2820,2830            3120 R=SQR((S-Y2)*(S-X2)*(S-H)/S
2740 IFX(X)<0OR X(X)>255 OR Y(X)          )
<0OR Y(X)>191THENSU(K)=-1:GOTO29           3130 AA=2*ATN(R/(S-Y2))
70ELSERETURN                               3140 AA=AA*180/3.1416
2750 Y(X)=Y(X)-PP:RETURN                   3150 IFX2<0AND Y2>0THENAA=ABS(AA
2760 X(X)=X(X)+PP:Y(X)=Y(X)-PP:R          )
ETURN                                     3160 IFX2<0AND Y2<0THEN AA=360-A
2770 X(X)=X(X)+PP:RETURN                  A
2780 X(X)=X(X)+PP:Y(X)=Y(X)+PP:R           3170 IF Y2<0AND X2>0THENAA=360-A
ETURN                                     A
2790 Y(X)=Y(X)+PP:RETURN                   3180 RETURN
2800 X(X)=X(X)-PP:Y(X)=Y(X)+PP:R           3190 FORX=1TO2
ETURN                                     3200 FORY=4TO10STEP2
2810 X(X)=X(X)-PP:RETURN                   3210 IFS(X,Y)/2<>INT(S(X,Y)/2)TH
2820 X(X)=X(X)-PP:Y(X)=Y(X)-PP:R          ENE=1ELSEE=0
ETURN                                     3220 G(1,X,Y/2-1)=(S(X,Y)-E)/2:G
2830 E=E+1:IFE=3THENT=T-1:RETURN          (2,X,Y/2-1)=(S(X,Y)-E)/2
ELSEIFD(X)=0THEND(X)=7ELSED(X)=D           3230 G(2,X,Y/2-1)=(G(2,X,Y/2-1)+
(X)-1                                     E)/GF(S(X,2)):G(1,X,Y/2-1)=(G(1,
2840 RETURN                               X,Y/2-1))/GF(S(X,2))
2850 E=E+1:IFE=3THENT=T-1:RETURN           3240 NEXTY
ELSEIFD(X)=7THEND(X)=0ELSED(X)=D           3250 SA(X)=S(X,1)/20*9*3:CS(X)=S
(X)+1                                     A(X)
2860 RETURN                               3260 NEXTX
2870 T=0                                   3270 RETURN
2880 P=LEN(P$):FOR X1=1TO P                3280 DATAHMS VICTORIOUS,1724,1,5
2890 F$=MID$(P$,X1,1):IFF$<>"F"T          06,28,32,30,18,18,-32,6,-18,RIVO
HEN2930ELSEF=X1                           LI,1804,2,810,28,36,30,24,12,8,8
2900 IFMID$(P$,F+1,1)>"9"OR F+1>          ,-36
P THENT=T+1:GOTO2930                       3290 DATAUSS CONSTITUTION,1576,3
2910 IFMID$(P$,F+1)<"1"THENT=T+1          ,456,30,24,22,-32,0,0,0,0,HMS GU
:GOTO2930                                 ERRIER,1338,1,272,30,18,16,-32,2
2920 T=T+VAL(MID$(P$,F+1,1))              ,12,2,9
2930 NEXT                                  3300 DATAUSS CONSTITUTION,1576,3
2940 P(X)=T                               ,485,30,24,20,-32,0,0,0,0,HMS JA
2950 RETURN                               VA,1340,1,426,28,18,18,-32,2,12,
2960 W=0:RETURN                           1,-24
2970 CLS:PRINT"SIMULATION COMPLE           3310 DATAHMS SHANNON,1066,1,330,
TE":PRINTL$                               28,18,4,9,16,-32,0,0,USS CHESAPE
2980 IFSU(1)=-1THENX=1ELSEX=2             KE,1135,3,386,29,18,20,-32,0,0,0
2990 T=INT(TM/4):T1=(TM-T*4)*15:          ,0
IFSU=-1THENPRINT"THE "N$(X)" SUN           3320 IFINKEY$=""THEN3320ELSERETU
K IN";ELSEPRINT"THE "N$(X)" STRU          RN
CK HER COLORS IN"                          3330 SCREEN1,1:PCLS5:PSET(X(X),Y
3000 PRINTT"HOURS AND"T1"MINUTES          (X)):C=2+(X=2):PSET(X(C),Y(C))
"                                         3340 GOSUB3320:RETURN
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