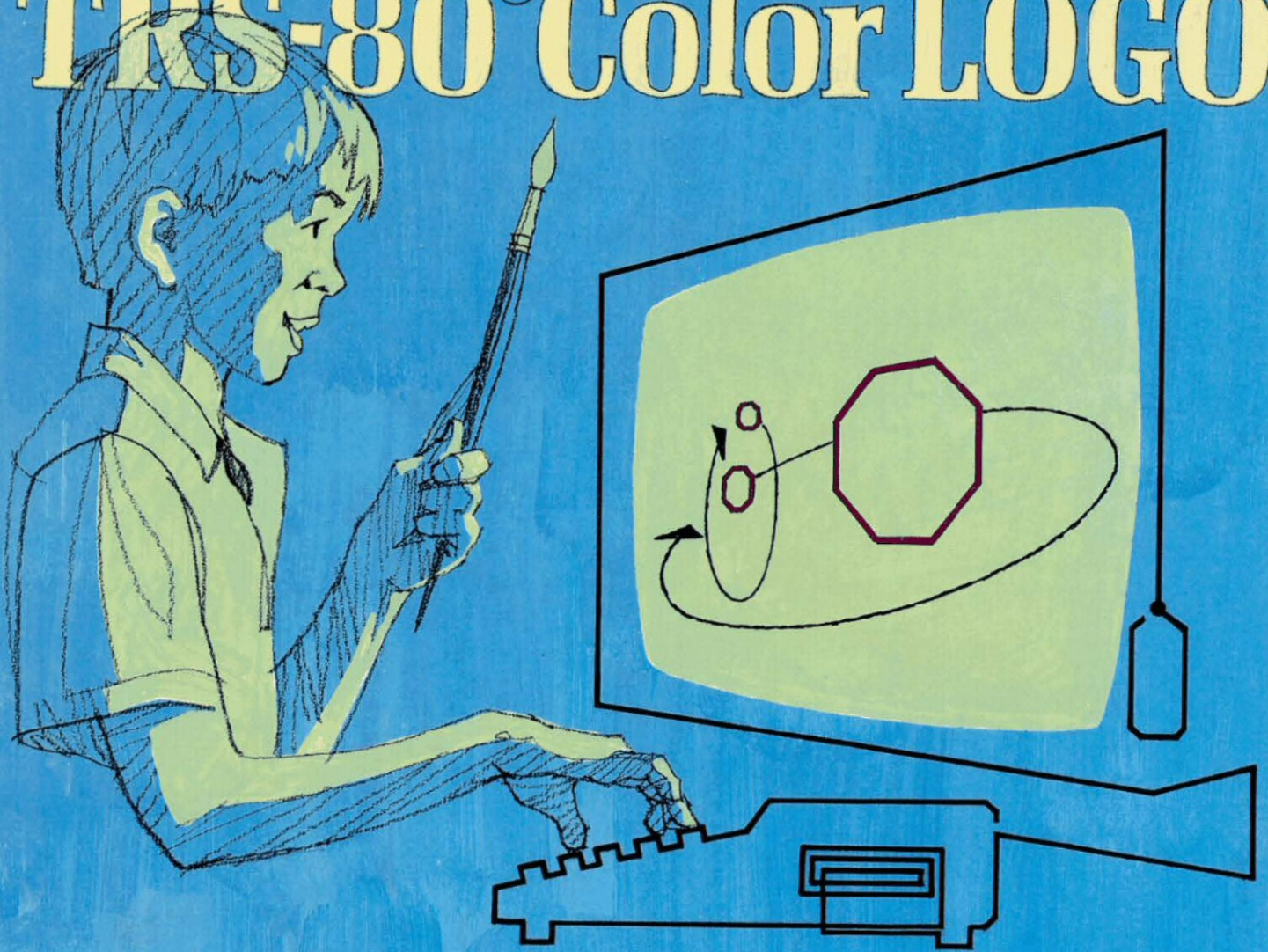


TRS-80[®] Color LOGO



Color LOGO Guide for Parents Book One

Cat. No. 26-2763



CONTENTS

Getting Started	1
Turtle Play	8
Hide and Find	11
If Your Fingers Stumble	12
Hyperspace Jumps	13
Telling the Turtle To Go Home	16
Turtle Turns.	18
Turtle Trails	24
Play Rooms	27
The RUN Room	28
The EDIT Room	30
EDIT Room Games	32
CLEARing the EDIT Room	36
Moving Up and Down	38
Inserting and Deleting	41
More Editing Keys	44
Playing With Procedures	47
REPEAT It Again, Please	49
Turning Turtle	50
Coloring the Screen	51
More Colors	52
RANDOM Flash	53
MAD-ARTIST	54
Tiny Turtle Exercises	56
Goodbye . . . For Now	58
APPENDIX A	59
Hooking Up Your Color Computer	
APPENDIX B	61
Connecting the Tape Recorder	
APPENDIX C	62
Connecting the Disk	
APPENDIX D	63
Saving and Loading Procedures on Tape	
APPENDIX E	65
Answers to Exercises	

TO PARENTS —

Welcome to the exciting world of Color LOGO — an easy-to-use computer language designed to help children and adults learn by exploration.

The LOGO language encourages hands-on experimentation. With LOGO, you learn by doing. You quickly discover that you can make LOGO pictures, color the screen, create and play games, and learn some things about giving instructions to a computer. To use LOGO, you don't have to have previous experience with computers or computer languages. All you need is a TRS-80 Color Computer, a television set, a copy of Color LOGO on either a floppy diskette or a cartridge, and this booklet.

We designed this booklet to help parents and children learn together. Current research indicates that a child's most important learning experiences result from interactions with a parent. Parents influence a child's development of thinking and learning skills, probably more than any other factor.

This booklet provides a parent with a rich resource of self-learning and self-discovery LOGO exercises and experiments. The booklet emphasizes fun, exploration, and parent-child dialogues. If you are a parent, we invite you either to work your way through the booklet and then offer to guide your children in their explorations or to learn as your children learn by going through the material with them.

Assist your children with the exercises that appear in the hands-on sections. Each exercise provides another opportunity to try the LOGO commands that are presented. In some cases, the children are asked to invent a game or solve a puzzle using the LOGO language elements. Help and guide them in these learning experiences.

Above all, enjoy this chance to introduce your children to a powerful and creative computer experience using the Color LOGO language.

GETTING STARTED

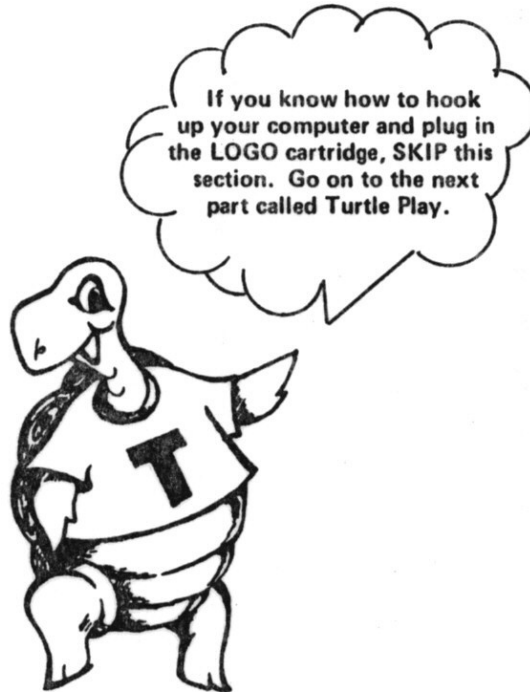
To use the Color LOGO language, you must have:

- ★ A 16K Color Computer.
- ★ A color television.
- ★ A Color LOGO Program Pak™ (requires 16K) or floppy diskette (requires 32K). If your copy of Color LOGO is on a diskette, you will also need a disk drive.

You might also have a cassette tape recorder on which you can save Color LOGO programs that you and your children create.

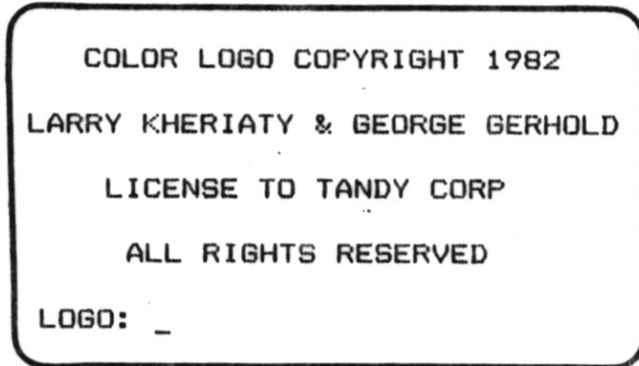
Look at the pictures that follow, and locate the set of computer components you have in your home. If you need additional help in putting your components together, look at these appendices:

- ★ Appendix A — Connecting Your Color Computer to Your Television
- ★ Appendix B — Connecting Your Cassette Recorder to Your Color Computer
- ★ Appendix C — Connecting Your Disk Drive to Your Color Computer



TURTLE PLAY

We assume that your TRS-80 Color Computer is hooked up and ready to use, and that your screen looks like this:



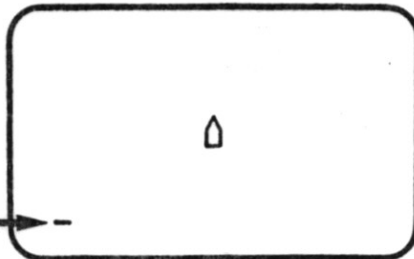
This screen shows the Color LOGO message with Larry's and George's names, along with the *prompt* (LOGO:) and the *cursor* (_).

Do you see Larry's and George's names? Good! Get ready to meet the Turtle!

Find this key on the keyboard and press it once.



Larry's and George's names disappear and you see:



This is called the cursor



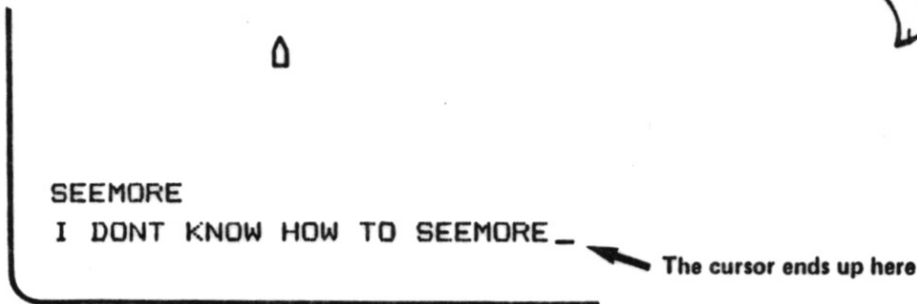
The symbol near the screen's center is the Color LOGO Turtle. You made the Turtle appear by pressing the R key on Color LOGO's title screen. Your screen now shows the Turtle and the cursor (_).



Who is that turtle?

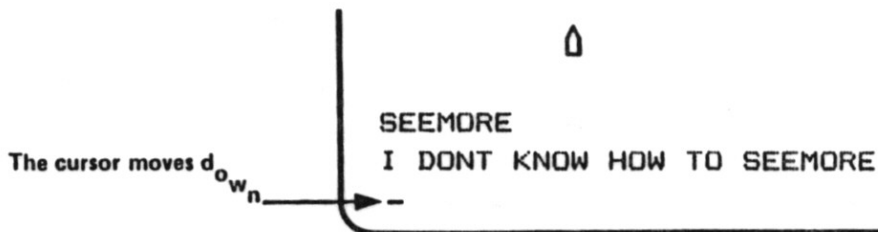


Now, type your name and press the ENTER key. Here is what happened when the wizard, Seemore, typed his name and pressed the ENTER key.

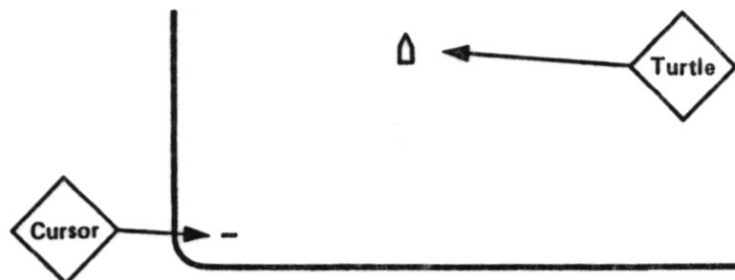


It seems that Color LOGO does not know what Seemore wants to do. If you typed your name, perhaps you also got the I DONT KNOW HOW TO message with your name at the end. Don't worry when you see this message. You will soon learn to type something that the computer does understand. In fact, try the following:

Press the ENTER key – the cursor moves down to the next line.



Now type **CLEAR** and press enter. When you type the word CLEAR and press the ENTER key, poof! Everything disappears except the Turtle and the cursor.



EXERCISE 1

- (1) The Color LOGO title screen appears below. On the title screen locate:

THE CURSOR
THE PROMPT
LARRY'S LAST NAME

```
COLOR LOGO COPYRIGHT 1982
LARRY KHERIATY & GEORGE GERHOLD
LICENSE TO TANDY CORP
ALL RIGHTS RESERVED
LOGO: _
```

- (2) From the title screen, what key do you press to make the turtle appear? _____

- (3) With the turtle on the screen, what happens when you type:

MUSTARD and press ENTER?

If the turtle is now on your screen, go ahead and type the word and press ENTER to see what happens.

- (4) To get the MUSTARD off your screen, what must you type? Before looking at the answer, try typing what you think will clear the screen.

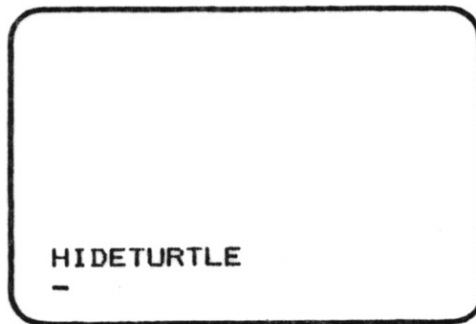
Hide AND Find

CLEAR the screen and let's talk to the turtle, Ms. Telli. (Remember: to CLEAR the screen, type the word CLEAR and press the ENTER key.)

How about a little hide and find? Type:

HIDETURTLE and press ENTER

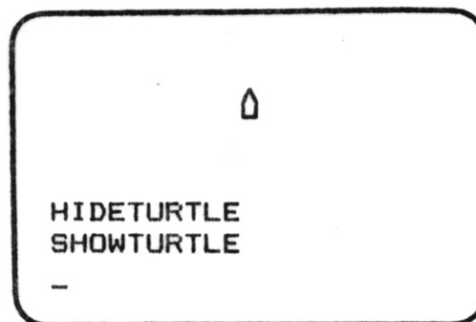
Telli, the turtle, disappears when you type this command!



How can we get Telli to reappear? "Easy," says Telli invisibly, "Type the word SHOWTURTLE and press the ENTER key." Try it. Type:

SHOWTURTLE and press ENTER

Telli reappears. Hello, Telli.



Telli says to save wear and tear on your fingers. She says to use the short forms of the hide and show turtle commands.

Use **H** **T** for **H** **I** **D** **E** **T** **U** **R** **T** **L** **E**

Use **S** **T** for **S** **H** **O** **W** **T** **U** **R** **T** **L** **E**

Now it is your turn. You use HT and ST to make the turtle disappear and reappear. To make the turtle invisible, type HT and press ENTER. To make the turtle visible, type ST and press ENTER.

Do this a few times and then move on to the next section.

IF YOUR FINGERS STUMBLE

If you accidentally press a key you did not want to press, and you have not yet hit the ENTER key, you can quickly fix the mistake. You can use the BACKSPACE key to erase anything you type on the screen.

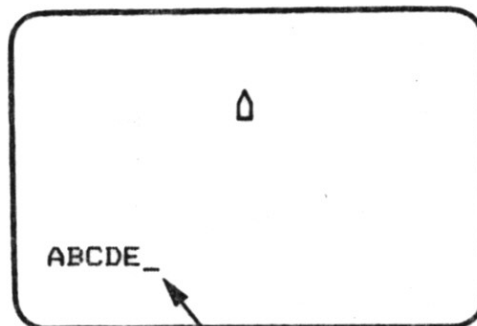
The BACKSPACE key 

Each time you press the BACKSPACE key, the cursor moves one space to the left, unless the cursor is already at the left margin. As the cursor moves backwards, your typed characters disappear from the screen.






Let's practice using the BACKSPACE key. CLEAR the screen so that you see only the turtle and the cursor.


Now type: ABCDE

Do not press ENTER. The screen looks like this:



Next, locate the BACKSPACE key (the small white key with the left pointing arrow). The BACKSPACE key is directly above the ENTER key. Press the BACKSPACE key several times and watch what happens on the screen.

DO THIS	YOU WILL SEE THIS
Press 	ABCD_
Press 	ABC_
Press 	AB_
Press 	A_
Press 	-

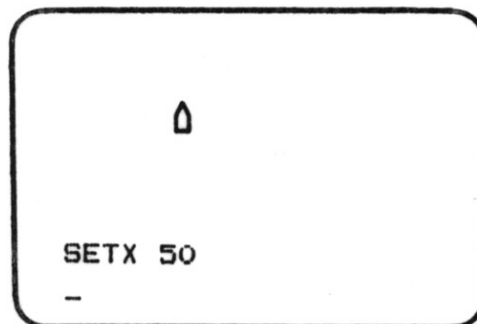
Each time you press  the cursor moves left and erases one character.

HYPERSPACE JUMPS

Telli can jump. She can jump through space to another place on the screen.

Type: CLEAR Press ENTER after each command.
 SETX 50
 ↑ ↑
 Space Type zero here

Telli jumps left, through space, to a place directly above the 50 in the SETX 50 command.



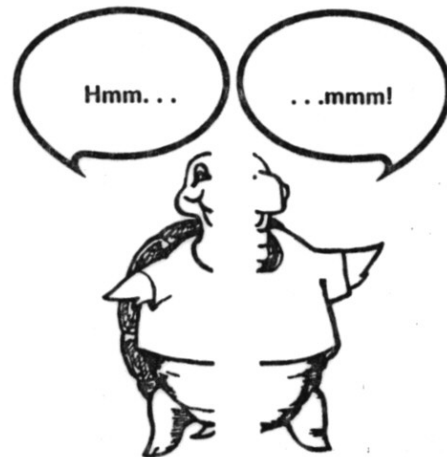
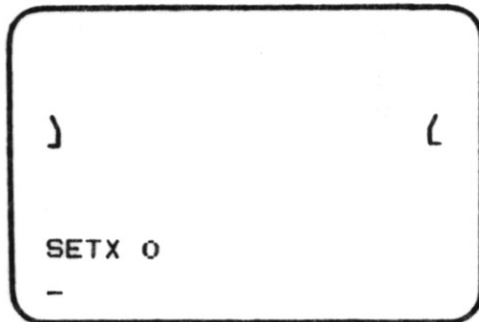
Try each of these SETX commands:

```
SETX 100  
SETX 250  
SETX 0
```

Press ENTER after each command.

↑
Leave a space after the X

Oops! The last SETX command gives Telli a split personality. Part of the turtle is on the left edge of the screen, and part is on the right edge.



After typing SETX and a SPACE, you can use any number from 0 through 255†. Several numbers, however, give Telli a split personality.



```
SETX 0  
SETX 254
```

```
SETX 1  
SETX 255
```

Try the SETX command with those numbers. Try also SETX 2, SETX 253, and other numbers in between 2 and 253. Watch Telli leap through space.

†If you use a number larger than 255, the computer will reduce it to a number in the range 0 to 255. For example, 256 becomes 0 and 257 becomes 1.

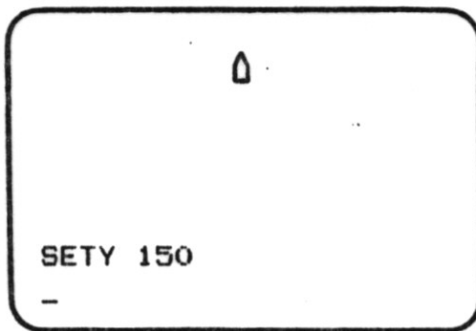
Telli can also jump up and down the screen. Use SETY instead of SETX.

Type: CLEAR
SETY 150
Space ↗

Press ENTER after each command.



Telli jumps up the screen.



Type: SETY 20

Telli jumps down the screen. Do some SETY commands on your own. What numbers cause Telli to split into pieces near the top and bottom of the screen? Hint: With the SETY command, you can use any number from 0 (bottom of screen) to 191 (top of screen).

EXERCISE 2

CLEAR the screen so that you see only the Telli and the cursor. Now, hide Telli.

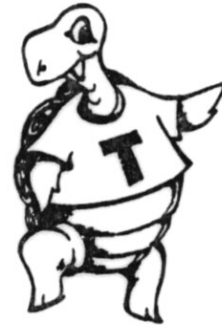
(Type HT and press ENTER.)



The rest of this exercise requires two persons to play a game and make up the rules for the game. The first player types a SETX or SETY command. The invisible turtle jumps to the new location on the screen. The second player points to the place on the screen where she or he believes Telli is hiding.

The first player types:

ST and presses ENTER.



Make up your own scoring rules for the game. Give the second player a point if he or she is pointing to Telli's location, based on the rules you create.

The second player now types:

HT and presses ENTER.

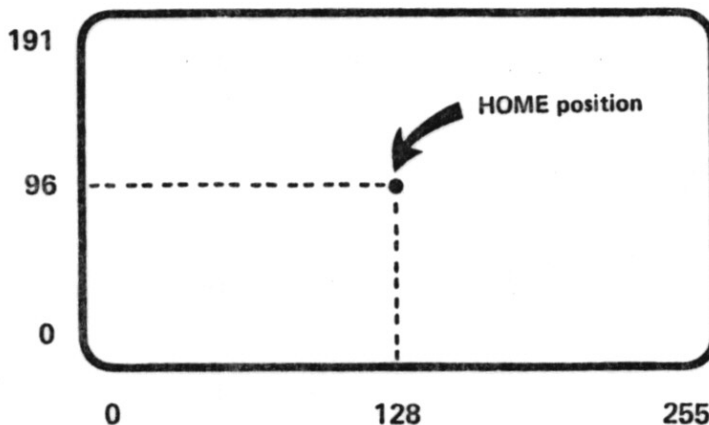
and a SETX or SETY command. The first player makes a guess of the turtle's location. The second player then makes Telli appear by typing:

ST and press ENTER.

Based on your set of rules, determine if the first player scored any points. Continue the game until you decide that a round of play is complete. Then, begin another round.

TELLING THE TURTLE TO GO HOME

No matter where Telli is on the screen, you can tell her to go HOME. HOME is near the center of the screen.

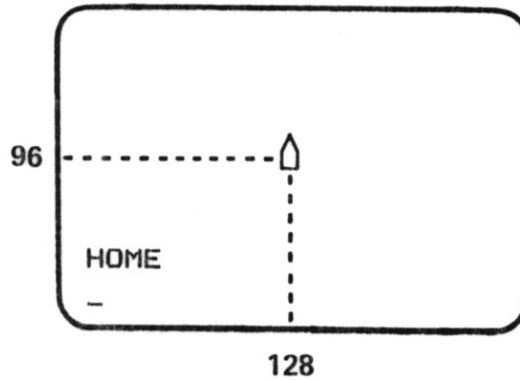
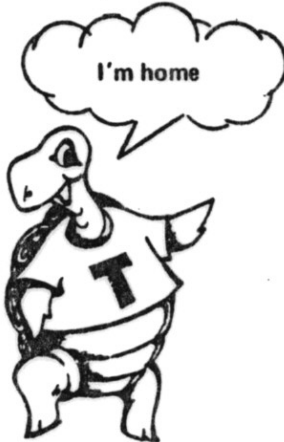


To make Telli go HOME, type:

HOME and press ENTER

Use the "O" key, directly above the "L" key. Don't type a zero (0) here.

Telli goes immediately to the center of the screen, turns her nose upwards, and waits for your next command.



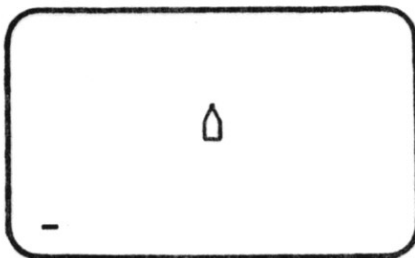
To see clearly how Telli jumps HOME, type these commands:

```
CLEAR
SETX 200
SETY 150
HOME
```

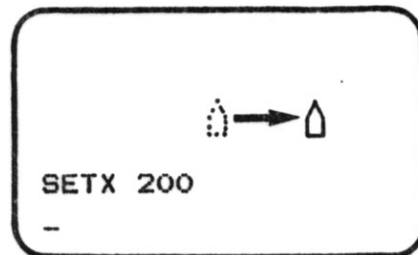
Don't forget to press ENTER after each command.

As you type each command, watch what happens. Here is what we saw when we did it.

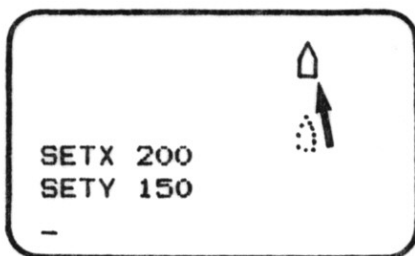
CLEAR



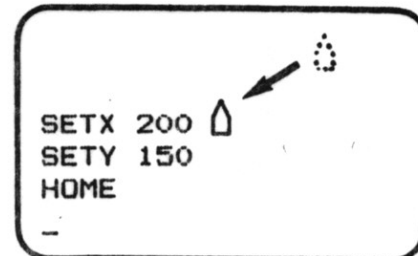
SETX 200



SETY 150



HOME



EXERCISE 3

When you type HOME, Color LOGO automatically gives another turtle command. Type:

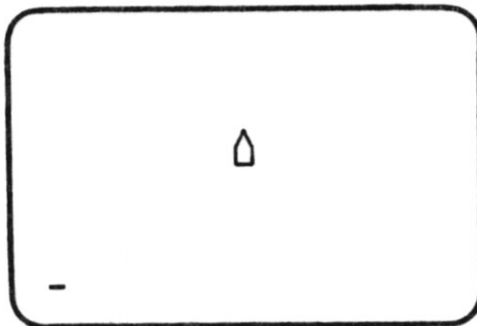
HT
HOME

What happens on the screen? Draw a picture of the screen after you issue each command. Guess what command is given automatically.

TURTLE TURNS

When you type CLEAR or HOME, Telli appears at the center of the screen. Her head points to the top of the screen.

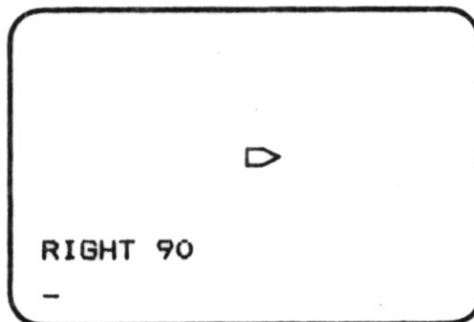
Type: CLEAR and press ENTER



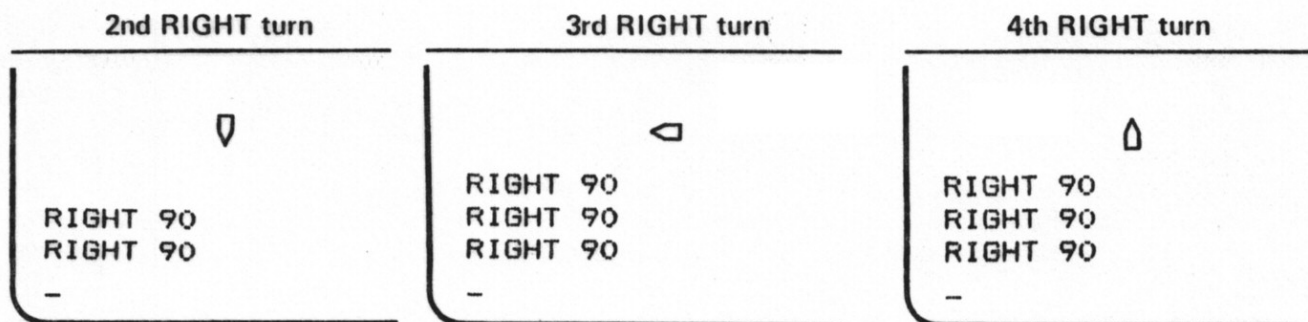
You can tell the turtle to turn to the RIGHT or to the LEFT. First, do some RIGHT turns.

Type: RIGHT 90 and press ENTER

↑
Space



Telli turns her head and points toward the right side of the screen. Make Telli turn right three more times.



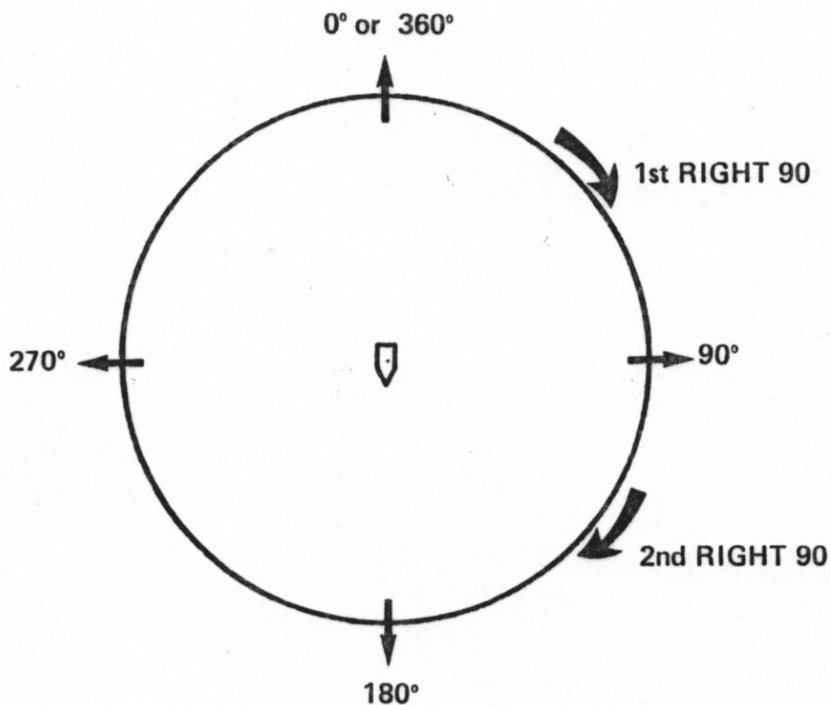
On the second RIGHT turn, Telli points down. After the third RIGHT turn, she points left. With the last RIGHT turn, she points back toward the top of the screen. Aha! She has made a full circle with all her turning.

You can only see "RIGHT 90" three times on the screen. The screen will only hold 3 lines of instructions. When you type the fourth line, the first line disappears.

Four RIGHT turns of 90 degrees add up to a circle of 360 degrees.

$$90 + 90 + 90 + 90 = 360$$

Telli always knows how much she has turned and where she is headed. When you tell her to turn RIGHT 90, she points to the right. If you then give her another RIGHT 90 command, she turns another 90 degrees or a total of 180 degrees from her original position.



If she continues turning in steps of 90, she ends up where she started. Notice that she always turns from where she is when you give the turn command.



1st turn



2nd turn



3rd turn



4th turn

(Each turn RIGHT 90)

Telli can also turn LEFT. Type these commands and watch how she turns. Press the ENTER key after you type each command.

→ Type: CLEAR



LEFT 90



LEFT 90



LEFT 90

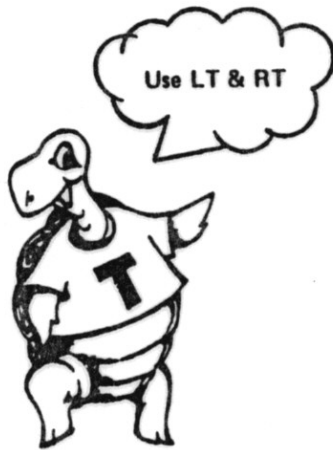


LEFT 90



Whether you use four RIGHT 90 or four LEFT 90 commands, Telli ends up in the same place. She turns a full circle with both sets of commands.

Telli reminds us that we can use short forms of the RIGHT and LEFT commands.

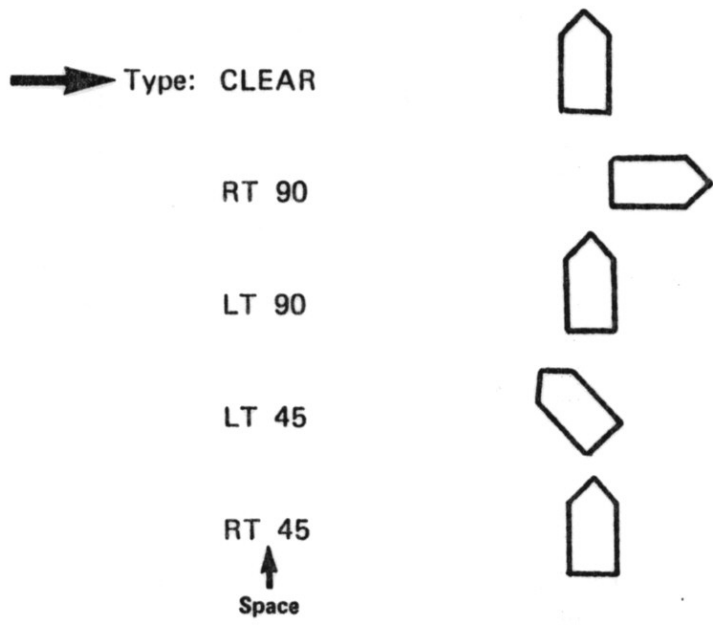


Use **L T** for **L E F T**

Use **R T** for **R I G H T**

EXPERIMENT! Try making LEFT and RIGHT turns using any numbers you want to use. Try LT 45 or RT 270 or anything you want.

REMEMBER: Press ENTER at the end of each command.



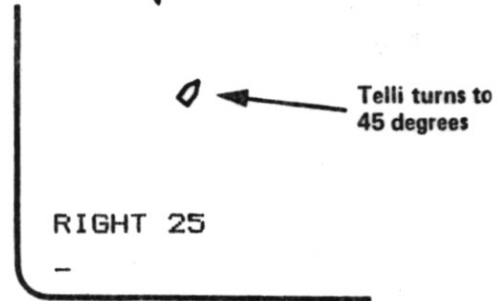
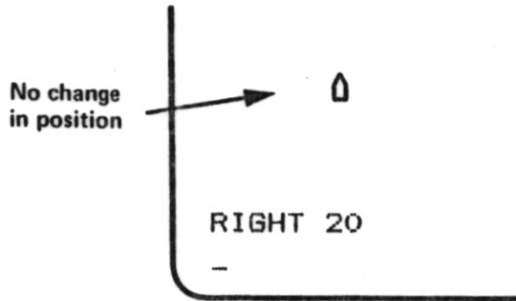
Where does Telli end up on the screen? Yes, she ends up pointing to the top of the screen – right back where she started.

What happens when you tell Telli to make these turns:

CLEAR RT 20 **OR** CLEAR RT 25

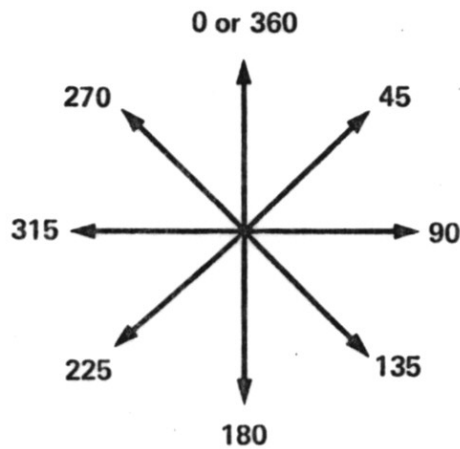


Try these two sets of commands and watch the screen.



On the screen, Telli's screen image turns only in steps of 45 degrees. She can point only in these eight directions.

Telli can only point in these directions on the screen



Telli always remembers exactly how much she has turned and where she is headed. She is just somewhat lazy. Her screen image turns only to the eight positions shown above.

IF YOU ARE A BEGINNER OR IF YOU DO NOT LIKE MATH – SKIP TO EXERCISE 4

Telli turns or doesn't turn her screen image based on a rule of how close she is to these headings:

0 45 90 135 180 225 270 315

If Telli is told to turn to

22 67 112 157 202 247 292 337

From the HOME position —
if you make Telli turn RIGHT
by these values . . .

she turns to these positions on the screen:

45 90 135 225 270 315 360

Telli points in these directions.

Have Telli turn to these values and see for yourself. Type HOME and a RIGHT turn of 22. Then, type HOME and a RIGHT turn 67. Then, do the same with the rest of the numbers (112, 157, and so on). Can you guess the rule that Telli uses to turn her screen image?

EXERCISE 4

Type the following commands:

CLEAR
RT 45

Telli points like this:



(1) What is the smallest LEFT turn that causes the turtle to point to the top of the screen? _____

BONUS EXERCISE. This part of Exercise 4 is a bit of a challenge. Skip over it if you don't feel like a challenge right now.

(2) If you type

HOME

LT ____ ← Put your answers here.

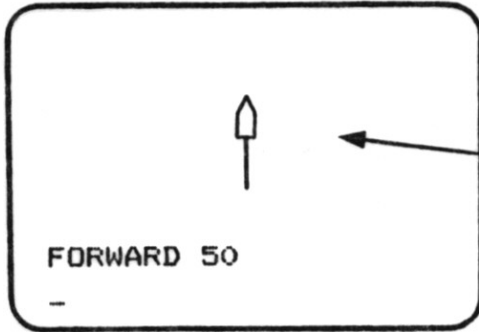
what are the smallest LEFT turn numbers that cause the turtle to point in these directions on the screen:

315 270 225 180 135 90 45 0?

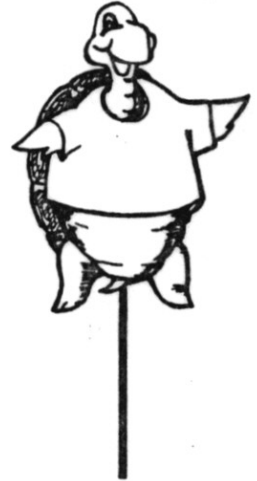
TURTLE TRAILS

Telli the turtle can leave a trail. Type these commands to see what she can do:

```
CLEAR  
FORWARD 50
```

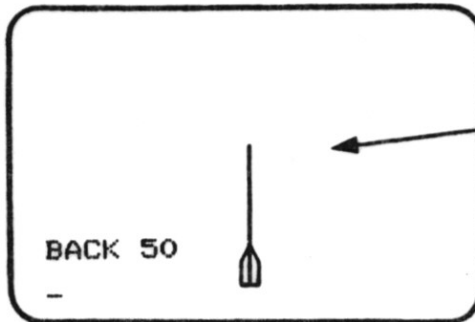


Telli makes a trail.

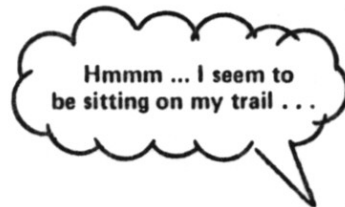


Telli moves up the screen and leaves a trail! Now, type:

```
CLEAR  
BACK 50
```



Telli backs up and draws a trail.



Telli leaves a trail as she backs down the screen. She says she bets that you have already guessed the shorthand for these two commands.



Use **F D** for **F O R W A R D**

Use **B K** for **B A C K**

Prove it! Type:

```
CLEAR  
FD 50  
BK 100
```

What does your screen show? How about trails in other directions? Try each of these sets of commands:

1.

```
CLEAR  
RT 90  
FD 50
```

2.

```
CLEAR  
LT 90  
FD 50
```

3.

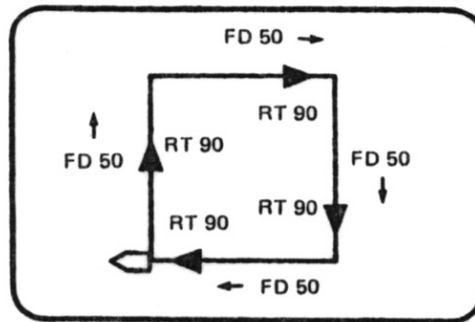
```
CLEAR  
RT 45  
FD 50
```

4.

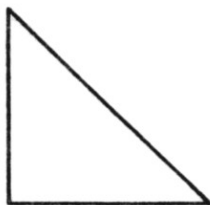
```
CLEAR  
LT 180  
FD 50
```

Of course, you can combine several move and turn commands to draw familiar shapes on the screen. This set of commands draws a square.

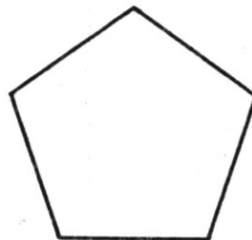
```
CLEAR  
FD 50  
RT 90  
FD 50  
RT 90  
FD 50  
RT 90  
FD 50
```



Type the commands and make Telli draw a square. How would you draw these shapes?



TRIANGLE



PENTAGON



STAR

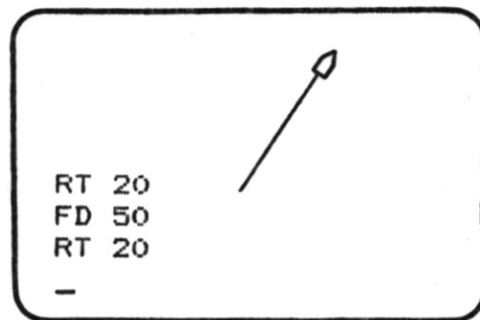
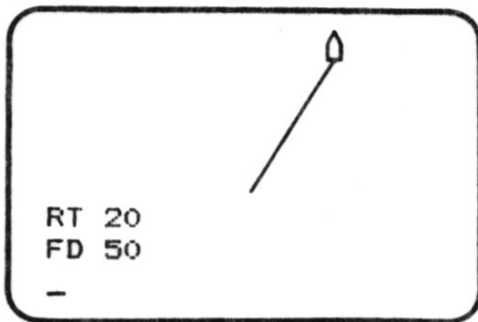
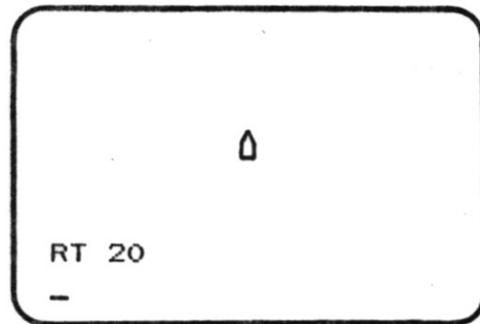
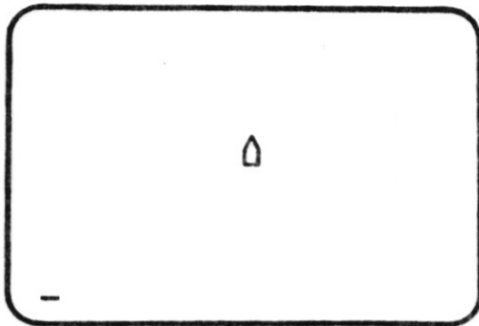
See if you can get the turtle to draw these shapes.

EXERCISE 5

Get a friend and play this two-person game. The second player looks away from the screen while the first player types, for example:

```
CLEAR  
RT 20  
FD 50  
RT 20
```

After each command, the screen shows:



The first player now presses the ENTER key several times, making the typed commands disappear from the screen. Hmmmm . . . which way is Telli really pointing?

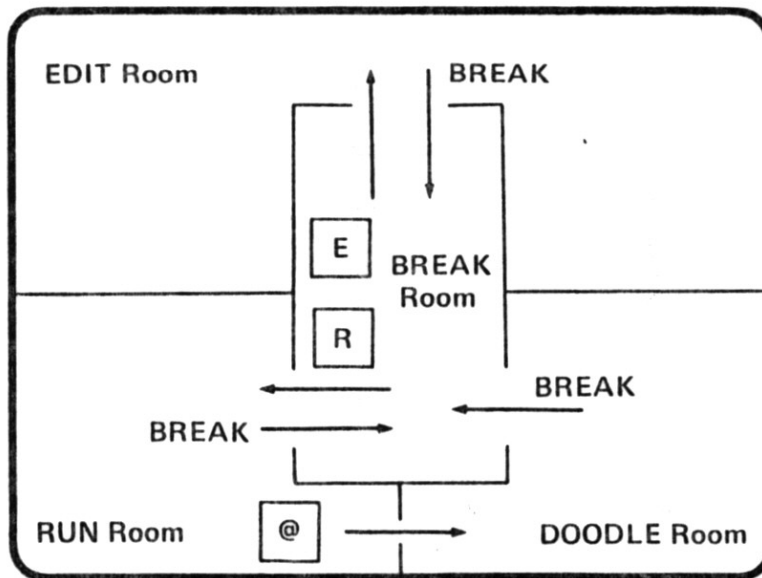
The second player's task is to get the Turtle back to the starting point with the fewest number of commands (Rule: only FD, BK, RT and LT commands can be used.)

Make up your own rules for scoring and for deciding when the turtle is back to the starting point. Vary the challenge of the game by using the HT command.

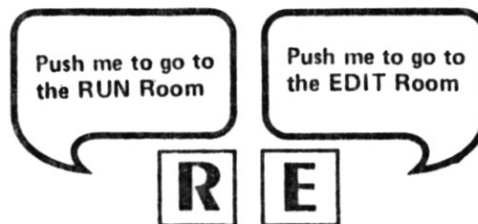
When the second player gets the turtle back to the starting point, he or she then gets a chance to move and turn the turtle. It is then the first player's turn to bring the turtle home. Enjoy this Turtle Trail game!

Play Rooms

Inside the house of Color LOGO, you will find four rooms. Here is a picture of the Color LOGO house and a floor plan of its rooms. You have already visited two of the rooms. Can you guess which two?

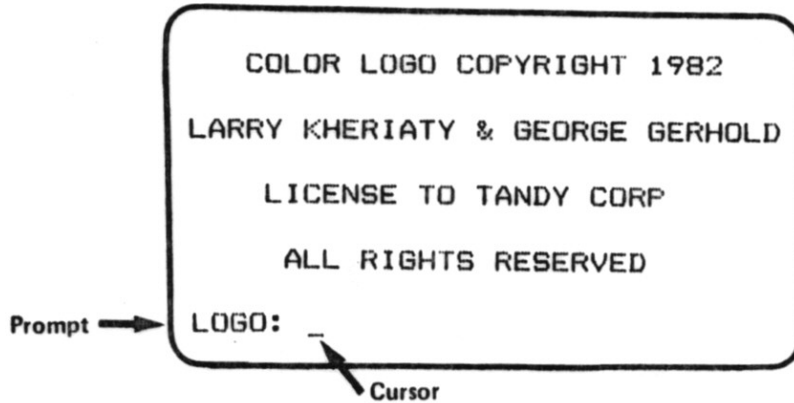


The BREAK room is the central room in the house. When you turn on the computer, you are placed in the BREAK room. You can leave this room by pressing either the R key or the E key.

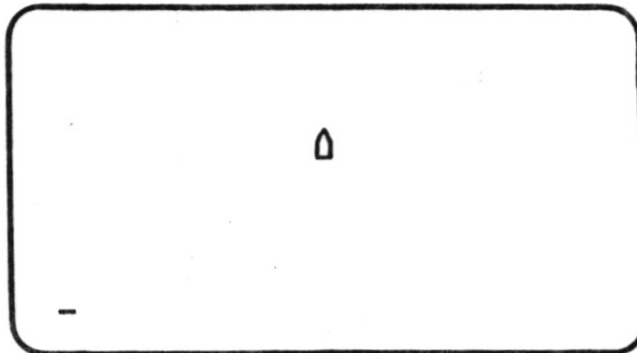


The RUN Room

When you first turn on the computer and load LOGO, your screen shows the Color LOGO title screen. At that point, you are in the BREAK room.

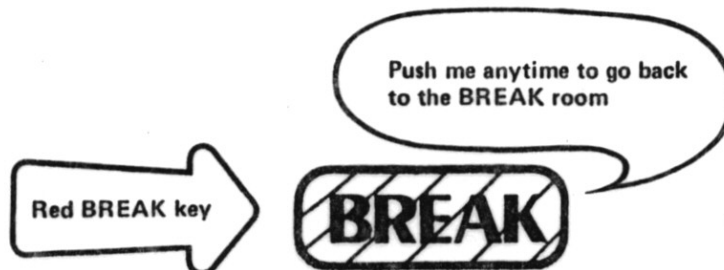


When you see the prompt (LOGO:) followed by the cursor (_), you are in the BREAK room. To get to the RUN room, you pressed the R key. The screen showed:

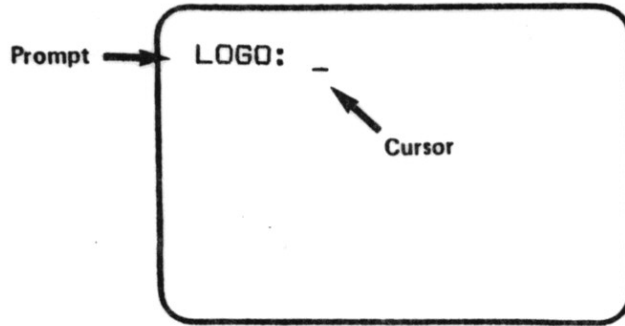


Hi, Tellii! Yes, you were in the RUN room in the last section of this booklet. You went there to play with the turtle. Hmm . . . how do you get back to the BREAK room? Look at the floor plan (page 27) again.

You can return to the BREAK room from any other part of the house by pressing the BREAK key.



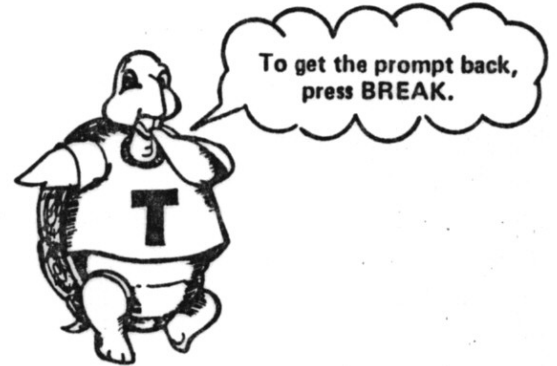
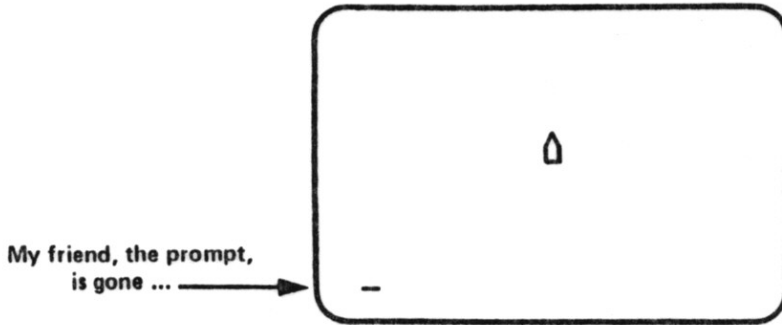
Press the red BREAK key. Your screen should show the BREAK room prompt and cursor.



What happened to Larry's and George's names? Their names only appear when you first load LOGO. Go back and forth between the BREAK and RUN rooms a few times. Press:

R then **BREAK** then **R** then **BREAK**

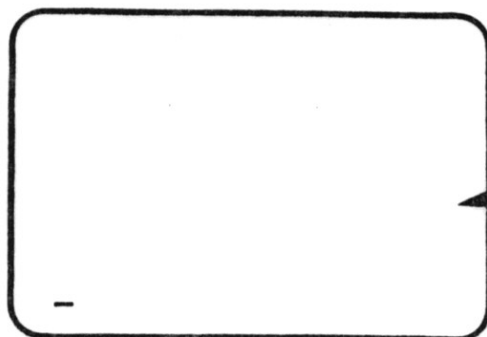
Each time you press R, Telli should appear along with the lonely cursor.



THE EDIT ROOM

Now, go and visit the EDIT room. Press the BREAK key first to make sure you are in the BREAK room. Now, press the E key. Your screen will show:

Now I'm really alone ...



Screen is empty except for the lonely cursor.

The cursor is really lonely here. Even Telli is gone. Well, that gives you a handy way to tell which room you are in. When you do not see Telli, you are usually in the EDIT room. Leave and enter the EDIT room a few times. Press:

BREAK then **E** then **BREAK** then **E** and so on ...

The BREAK room forms the central room of the house. If you keep pressing the BREAK key, you will always end up in the BREAK room.

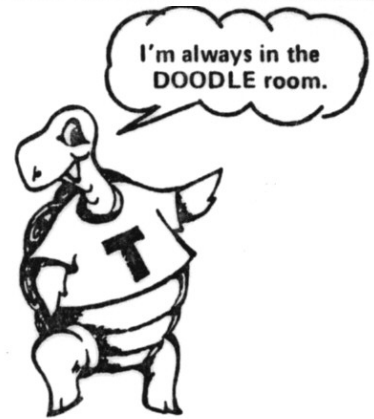
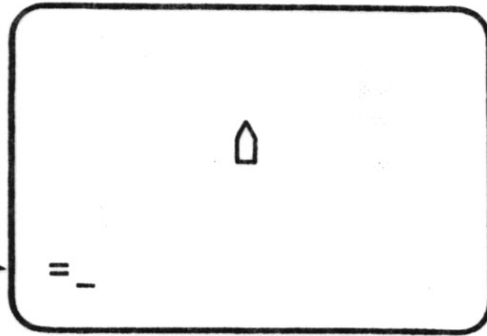
THE DOODLE ROOM

There is one room that can only be reached by going through the RUN room. This room is called the DOODLE room. To get there —

- Press BREAK to put yourself in the BREAK room
- Press R to move into the RUN room.
- Now press this key — **@**

The **@** key is between the P key and the back arrow (←) key. It looks a bit like a snail. When you press the @ key, you leave the RUN room and enter the DOODLE room. You can tell that you are in the DOODLE room by the appearance of the equal sign (=) in front of the cursor.

The equal sign (=) tells you that you are in the DOODLE room.



In our next booklet, we will show you how to play with Telli in the DOODLE room. For now, practice entering and leaving this room. Press BREAK to go back to the BREAK room. Then press:

R then **@** then **BREAK** then **R** then **@**

Keep going around and around among the three rooms.

EXERCISE 6

- (1) What keys do you press to put yourself in these rooms? Assume you start each move from the BREAK room.

Room	Keys to Press
RUN	
EDIT	
DOODLE	

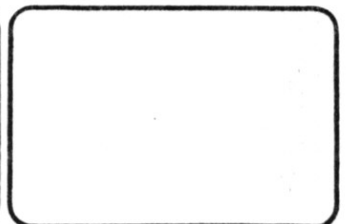
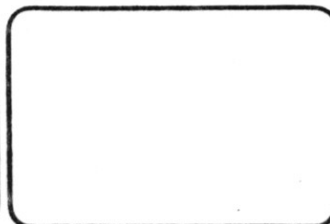
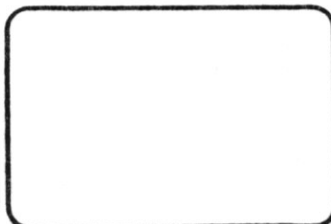
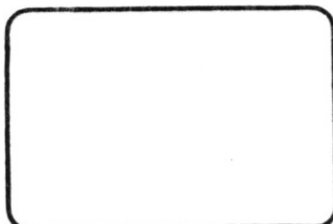
- (2) What key do you press to get back to the BREAK room from anyplace in the Color LOGO house?
- (3) Draw a picture of what the screen looks like in each room of the Color LOGO house.

BREAK

RUN

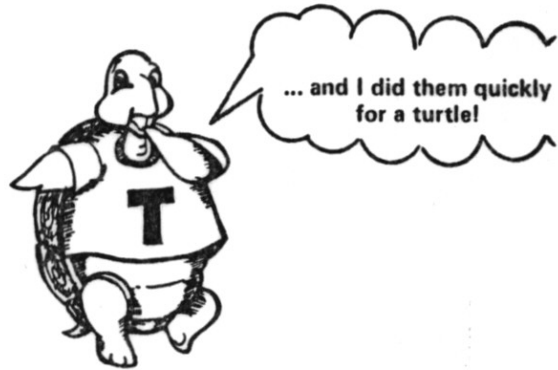
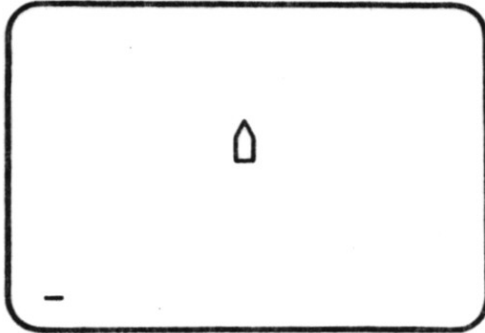
EDIT

DOODLE



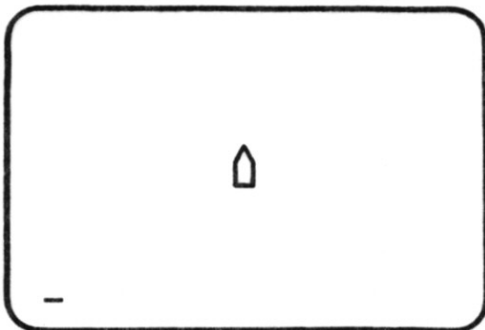
EDIT ROOM GAMES

The rooms in the Color LOGO house can be used for many activities. Back in the TURTLE PLAY section, you used a number of RUN room commands to get Telli to move about the screen and draw shapes. You typed the commands and Telli performed your requests immediately.



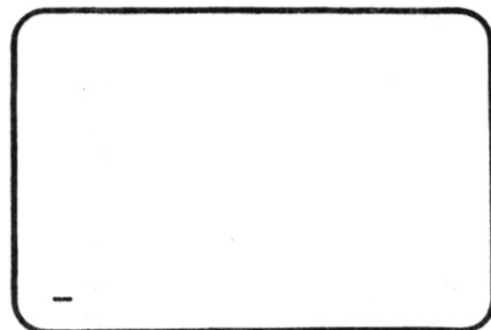
The EDIT room lets you type a bunch of commands into a single unit called a *procedure*. You can give the procedure a name. Later, you can go to the RUN room, type the procedure's name, and the turtle will perform all of the commands you put into the procedure. The computer remembers all the procedures you create in the EDIT room. They are stored in the computer's memory until you either turn off the computer or tell it to CLEAR its memory.

RUN



Your commands & procedures are performed in this room

EDIT



You type procedures for the computer to remember in this room.

In the EDIT room, you can also edit (change) any of the procedures you have typed. To edit, you'll use some of these keys from your keyboard:



Press the BREAK key to get into the BREAK room, and then press E to put yourself into the EDIT

To learn how to use the editing keys, let's play a few word games. The first game involves changing a CAT into a DOG. Impossible? Not at all. Lewis Carroll, the creator of *Alice In Wonderland*, called these word games DOUBLETS.

To begin, type the word CAT.

The cursor moves to the right as you type each letter. Now, locate and press this key:




The cursor moves left one place.

Press  again.

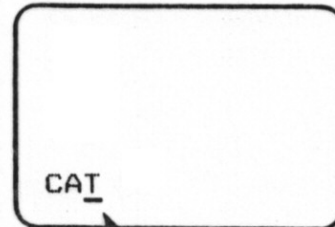
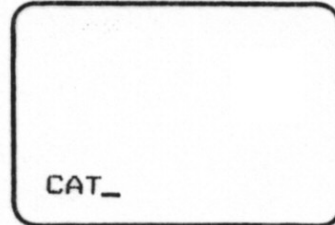
The cursor moves left another place.

Press  again.

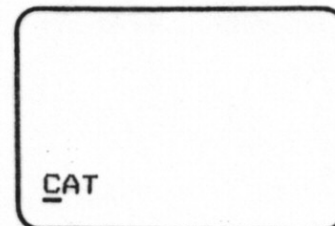
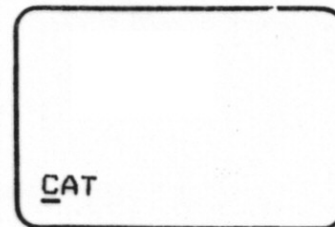
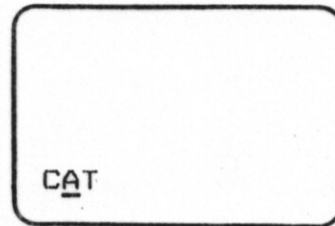
The cursor moves underneath the letter C.


Press  several more times.

The cursor does not move.



Here it is, beneath the letter T.

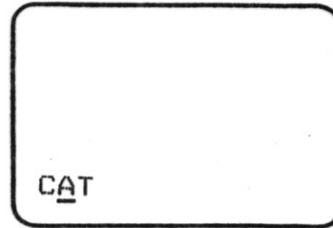


In the EDIT room, pressing the  key moves the cursor left one place unless the cursor is at the beginning of a line. In that case, the cursor does not move.

Now, locate and press this key:

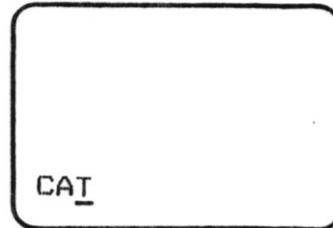



The cursor moves right one place.



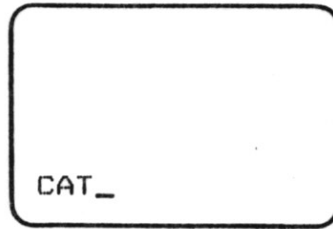
Press  again.

The cursor moves right one more place.



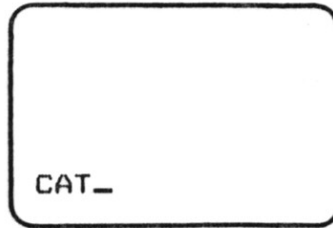
Press  again.


The cursor moves right past the letter T.



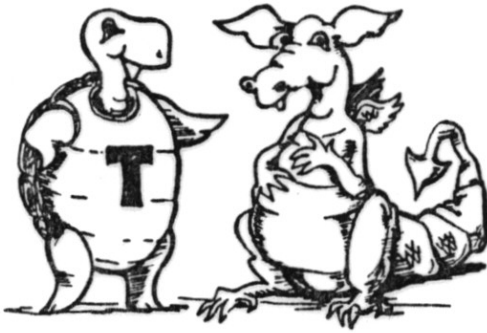
Press  several more times.

The cursor does not move.



In the EDIT room, pressing the  key moves the cursor right one place unless it is at the end of a line. In that case, the cursor does not move any more.

Now that you know how to move the cursor left and right, find a friend and ask them to help you change CAT to DOG. Here is how Telli and George Firedrake played the DOUBLET Game. You and your friend can pretend that one of you is Telli and the other is George. In DOUBLETS, you take turns replacing a new word from the word on the screen by changing only one letter at a time.



Telli goes first. She moves the cursor left two places, putting it underneath the letter A. She then presses the U key. (The person playing Telli should press these keys.) ↻

CUT

The cursor ends up below the letter T.

George agrees that CUT is a word. He moves the cursor left two places and presses the B key. (The person playing George should press these keys.)

BUT

Telli grins and moves the cursor one place to the right. She then presses the G key.

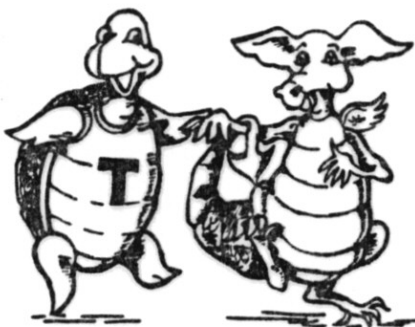
BUG

George scratches his scaled head. He thinks for a time, and then suddenly blows a puff of smoke, moves the cursor left two places, and presses the O key.

BOG

Telli flaps her flippers, moves the cursor left two places, and presses the D key.

DOG



They both cheer and begin to dance around the room. They have turned CAT into DOG!

Do you get the idea? Can you find a shorter way to go from CAT to DOG? Try other DOUBLETS on your own. Make the MICE go to the HOLE. See if you can get the BIRD to its NEST. You and your friend create your own DOUBLET challenges. Use the Color LOGO EDIT room to play the DOUBLET game.

EXERCISE 7

(1) In each case shown below, describe what happens when you press the keys.

Screen Shows	You Press	Describe What Happens
<u>C</u> AT	→	_____
CA <u>T</u>	←	_____
<u>C</u> AT	←	_____
CAT <u>_</u>	→	_____

(2) Use the EDIT room and cursor keys to solve these DOUBLETs.

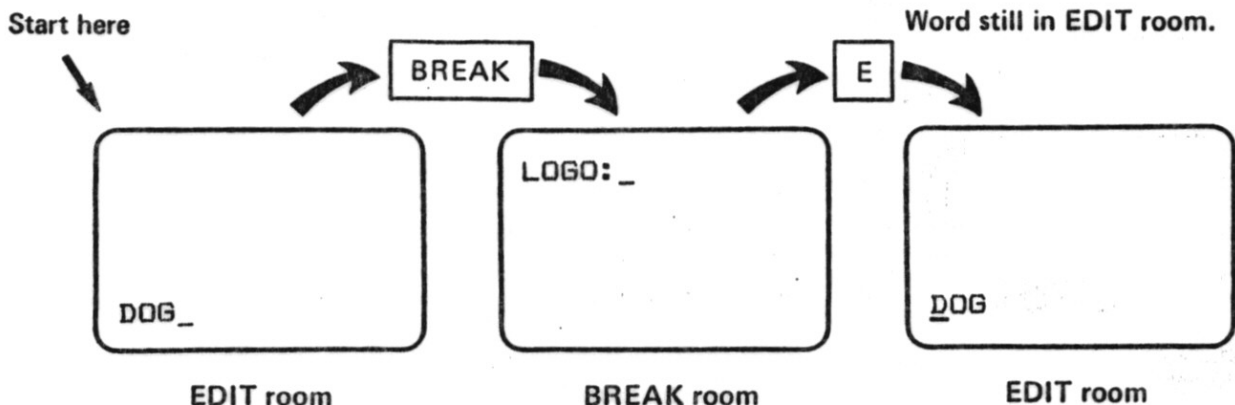
- Turn SAD into JOY.
- Make the WIND BLOW.
- Put the CROWS in the TREES.

CLEARING THE EDIT ROOM

The computer remembers everything you leave on the screen in the EDIT room. It stores the information in its memory until you turn off the computer or until you tell it to CLEAR its memory.

Let's see how this works. Get into the EDIT room (if you are not already in that part of the LOGO house). Put a word on the screen and then press the BREAK key to go to the BREAK room. Then, press the E key to return to the EDIT room. Whatever was on the screen when you left the EDIT room should be there when you return.

We had the word DOG on our screen when we made this check. Our screens looked like this:

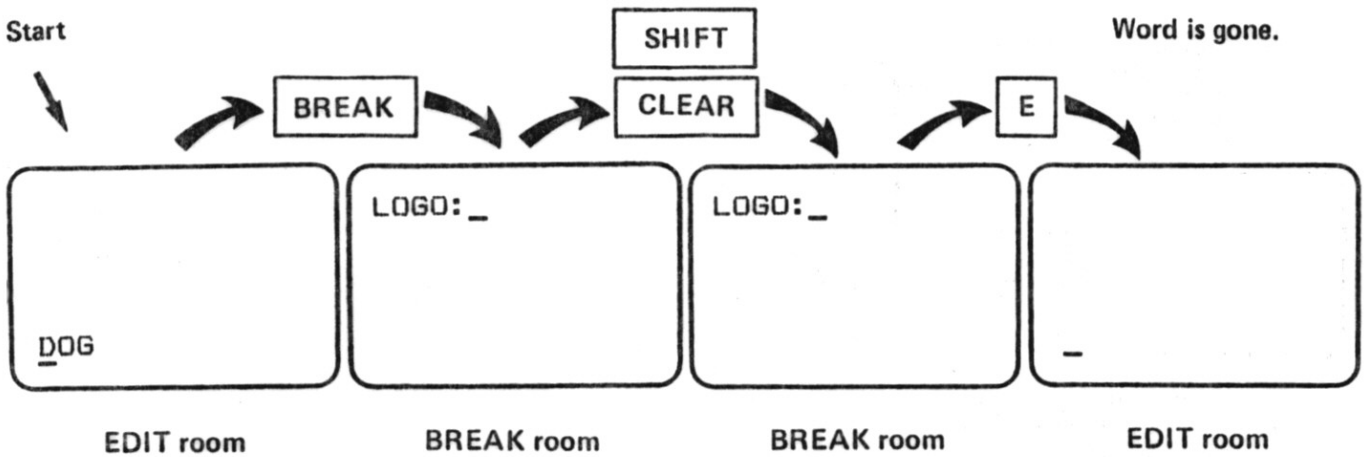


To tell the computer to erase its memory, go to the BREAK room, hold down the SHIFT key, and press the CLEAR key. When you return to the EDIT room, the screen will be empty. The word or words you had on the screen are gone.

To tell the computer to erase its memory, go to the BREAK room and then:

Hold down **SHIFT** and press **CLEAR**

Our screens looked like this when we told the computer to erase its memory:



WARNING! WARNING!

Telling the computer to CLEAR its memory causes everything you have typed to disappear. Be careful when you are in the BREAK room. Do not accidentally press the SHIFT and CLEAR keys at the same time unless you want the computer's memory erased.

Moving Up & Down

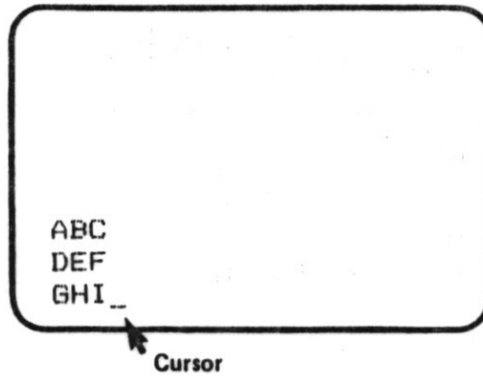
Clear the EDIT room:

- Press the BREAK key.
- Hold down the SHIFT key and press the CLEAR key.
- Press the E key.

Now type:

A	B	C	ENTER
D	E	F	ENTER
G	H	I	← Do not press ENTER here.

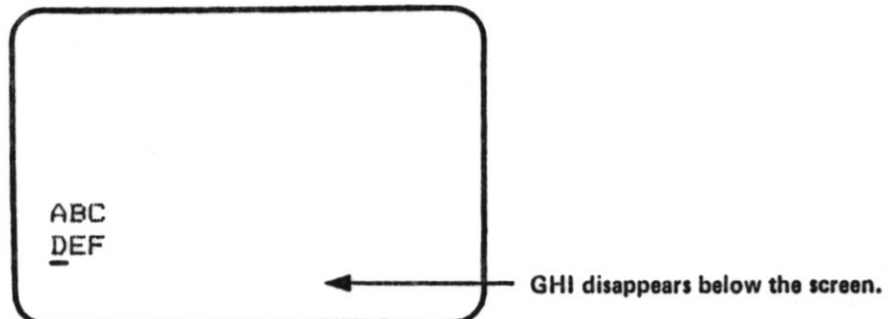
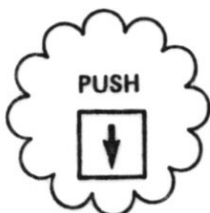
Your screen should show:



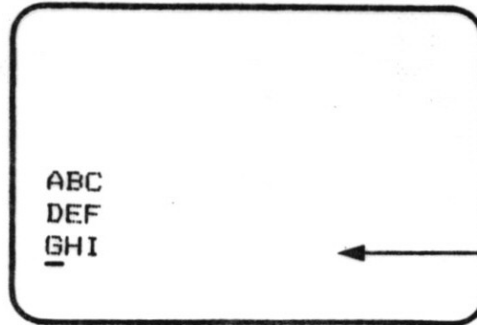
Locate the UP and DOWN arrow keys on the left side of the keyboard.



Press the DOWN arrow key once. The line with the letters GHI should disappear.





Where did it go? Press the UP arrow key once. The line with GHI should reappear.



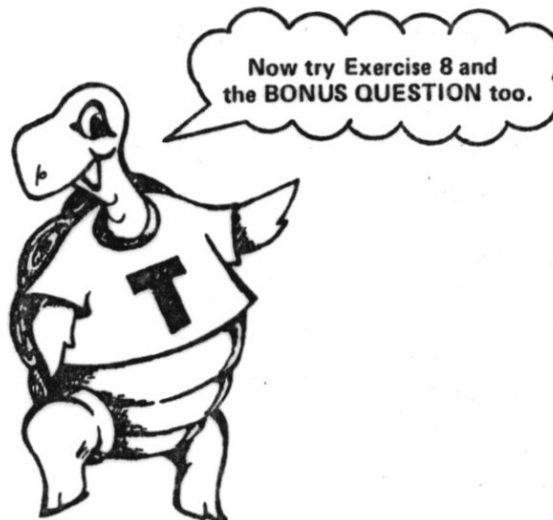
The line reappears.

The UP and DOWN arrow keys move all the lines on the screen up and down.

Pressing the DOWN arrow key () moves all the lines on the screen down, unless the cursor is on the top line. The bottom line always moves out of sight.

Pressing the UP arrow key () moves all the lines on the screen up, unless the cursor is on the last line. Any lines that moved off the bottom of the screen will reappear, one at a time. Any lines that are pushed to the top of the screen, will seem to disappear off the top.

Use the DOWN arrow key several times and push the lines DEF and GHI off the bottom of the screen. Use the UP arrow key to make those lines reappear.



EXERCISE 8

Clear the EDIT room and type three lines of three letters each. You can use any letters you want. Using all four of the cursor keys, move around in the square of letters. Working with a friend, take turns changing letters so that you make as many real words as you can out of the letters.

You might start with these letter squares:

```
ABC
DEF
GHI_
```

```
DRF
AOE
SCN_
```

```
JSE
QWL
KIH_
```

You can use any
letters to start.

See if you can make these or other word squares:

```
TEA
EAT
ARE
```

```
OWN
DOE
END
```

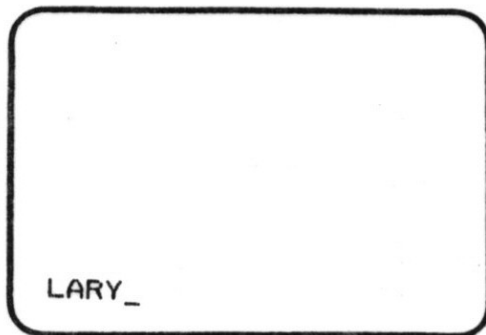
BONUS QUESTION: How many words appear in the two word squares shown above?
Look in all directions. Write all the words below.

INSERTING & DELETING


When you finish playing the word game in Exercise 8, CLEAR the EDIT room:

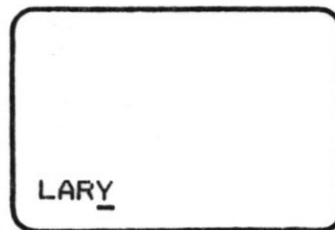
- Press the BREAK key.
- Hold down the SHIFT key and press the CLEAR key.
- Press the E key to return to the EDIT room.

With a cleared EDIT room, type: LARY Your screen will show: 

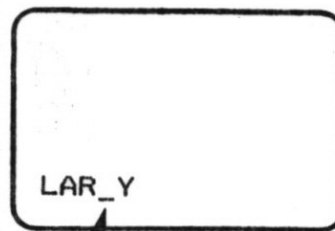


This word looks almost like Larry's name, except it is missing the second R. Let's put another R in the word.

Press the  key to move the cursor back one place.

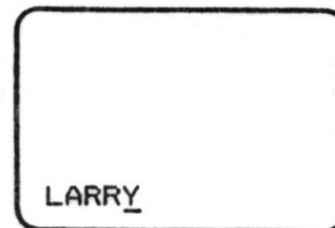



Now, hold down the SHIFT key and press  key.



A space appears.

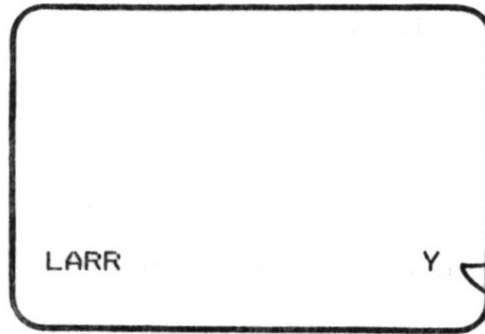
The last step caused an open space to appear in the word LARY. If you now press the R key, Larry's name will be spelled correctly.



Holding down the SHIFT key and pressing the  key inserts a space at the cursor location. Each time you insert a space, the rest of the line moves one space to the right until the line is filled.

Keep inserting spaces and watch the Y of LARRY move across the screen.

Hold SHIFT and keep pressing



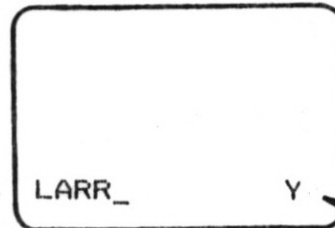
We seem to be drifting apart.

When the Y reaches the right side of the screen, you cannot insert any more spaces. Let's delete all those spaces.

Hold down the SHIFT key and press the



key.

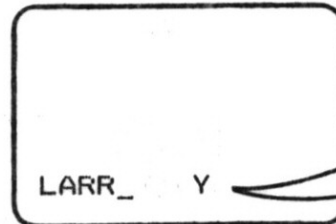


I'm moving back ...



Keep holding the SHIFT key down and keep pressing the




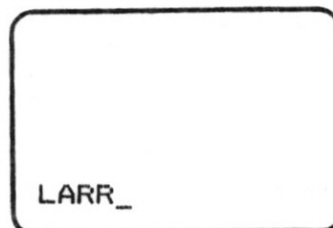
key.





I can see you now ...

A space disappears with each press of the  key. If you keep pressing the  key after all the spaces are deleted, what happens? Try it! Did the Y on Larry's name disappear?

The last press of  with the SHIFT held down deletes the Y.



Holding down the SHIFT key and pressing the  key deletes the character at the cursor's location. If the cursor is not in the first column and there is no character at the cursor's location or to the right of it, nothing happens. If the cursor is in the first column and you have deleted all the characters on the line, pressing the  key causes the next line to appear from the bottom of the screen.

Let's test the last part on how the delete works. Press ENTER. Your screen will show:


The cursor moves down to here ...

```
LARR
_
```


You press ENTER.

Now type George's name: GEORGE Your screen will show the following.

```
LARR
GEORGE_
```

Press the  key, and George's name disappears off the screen.

```
LARR
```

Hold down SHIFT and press  four times. LARR will be deleted.

Only the cursor shows.

```
_
```

Still holding SHIFT press  one more time.

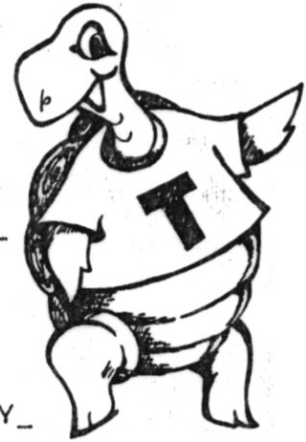
```
GEORGE
```

George's name appears from the bottom of the screen.

EXERCISE 9

Get with a friend and make up your own EDIT room games that use the insert and delete editing keys. For example, you might each take turns either inserting or deleting words to make up crazy sentences.



Player	Types	Screen Shows
1	SHELLS	SHELLS_
2	Backs up 6	_SHELLS
	Inserts spaces	- SHELLS
	CRYSTAL	CRYSTAL_SHELLS
1	Backs up 7	_CRYSTAL SHELLS
	Inserts spaces	- CRYSTAL SHELLS
	SINGING	SINGING_CRYSTAL SHELLS
2	Moves to end	SINGING CRYSTAL SHELLS_
	YODEL	SINGING CRYSTAL SHELLS YODEL_
1	Moves to start	_SINGING CRYSTAL SHELLS YODEL
	Deletes SINGING	_CRYSTAL SHELLS YODEL
	Moves to end	CRYSTAL SHELLS YODEL_
	JOYFULLY	CRYSTAL SHELLS YODEL JOYFULLY_



Go ahead and make up your own insert and delete games.

MORE EDITING KEYS


The EDIT room has three more editing controls that you may find useful.

- 1** Hold down SHIFT and press  to make everything in the EDIT room appear on the screen. Whatever you have typed into the computer's memory will move up and off the top of the screen.
- 2** Press the CLEAR key to clear the EDIT room screen except for the topmost line, which will appear at the bottom of the screen.
- 3** Hold down SHIFT and press  while in column one to insert a blank line into what has been typed. All other lines are moved down to make room for the new line. If you are not in column one, this action will cause the line you are on to split at the cursor's location.

Let's test these three features and have some fun at the same time. CLEAR the EDIT room. (You probably know how to do this on your own by now.)


With a cleared EDIT room, type the following lines:

```
SPACE SPACE * ENTER
SPACE * SPACE * ENTER
* SPACE SPACE SPACE * ENTER
```

To get the asterisk (*) hold
SHIFT and press 

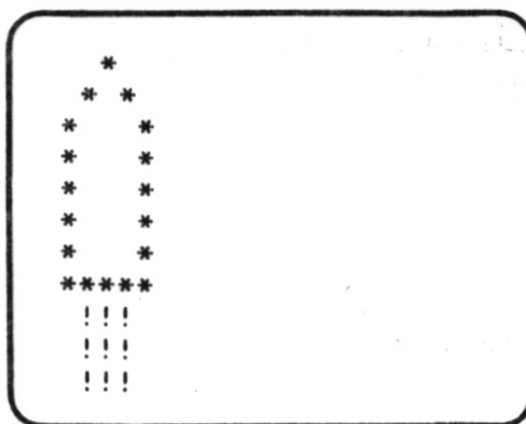
(repeat the last line 10 or 12 times)


```
* * * * * ENTER
SPACE ! ! ! ENTER
SPACE ! ! ! ENTER
SPACE ! ! ! ENTER
```

To get the exclamation (!)
hold SHIFT and press 

```
!
1
```

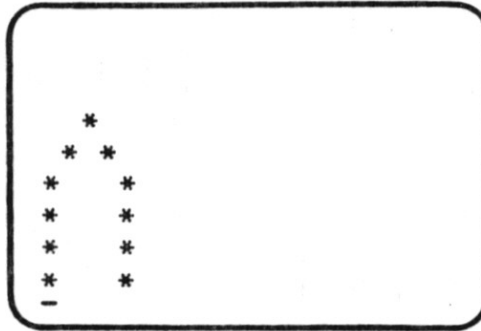
If all went well, you should have a rocket ship on your screen.



Press the CLEAR key. All except the nose of the rocket sinks out of sight. When only the nose shows, hold down the SHIFT key and press the  key. Blastoff! The rocket zooms out of the bottom of the screen.


Hide and launch the rocket several times. Then, move the rocket down the screen until you are near its middle.

Move rocket to a place near its middle.

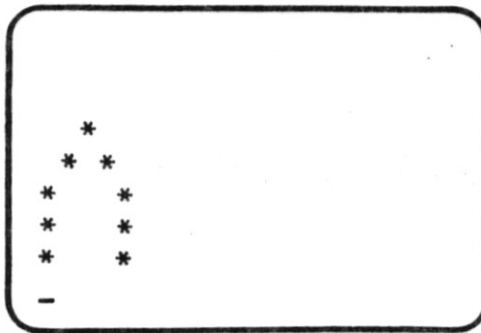


Move rocket down with



Hold down SHIFT and press the  key. The last line of the rocket's body disappears and a blank line now shows on the screen.

Hold SHIFT & press



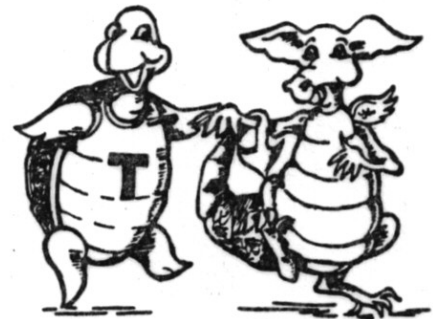
Type:




To get the asterisk (*) hold SHIFT and press




To get (&) hold SHIFT and press




Now press the CLEAR key. Only the rocket's nose will show. Launch the rocket again by holding SHIFT and pressing . The rocket appears with the letters across its middle. What do the letters mean? Why they stand for Telli and George, of course.

EXERCISE 10


Match up the editing keys with the editing actions described below.

(1) 


(6) SHIFT 

(2) 

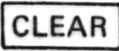
(7) SHIFT 

(3) 

(8) SHIFT 

(4) 

(9) SHIFT 

(5) 

(10) SHIFT 

Moves cursor one space left.

Moves all lines down one line.

Clears the computer's memory (BREAK room only).

Inserts spaces into a line.

Deletes characters from a line

Clears the EDIT room screen.

Moves cursor one space right.

Moves all lines up one line.

Splits a line or inserts a blank line.

Makes the EDIT room text move up the screen like a rocket.

PLAYING WITH PROCEDURES

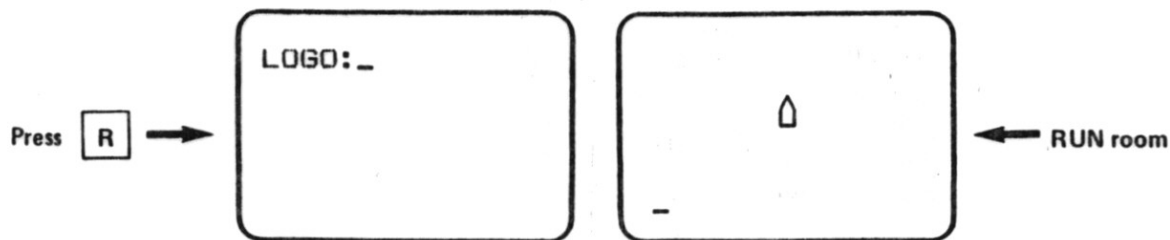
Go to the BREAK room and clear the computer's memory.

- Press the BREAK key.
- Hold down SHIFT and press CLEAR.
- Press E to go to the cleared EDIT room.

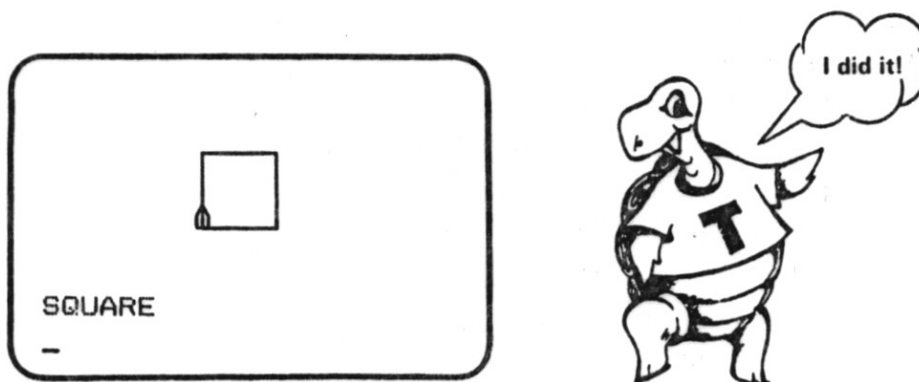
With a clear EDIT room, type the following. Don't forget to press ENTER after each line.

```
TO SQUARE
FD 35 RT 90
FD 35 RT 90
FD 35 RT 90
FD 35 RT 90
END
```


Press ENTER at the end of each line. When you have all the lines typed, press the BREAK key. You will go to the BREAK room. Then press R to go to the RUN room.



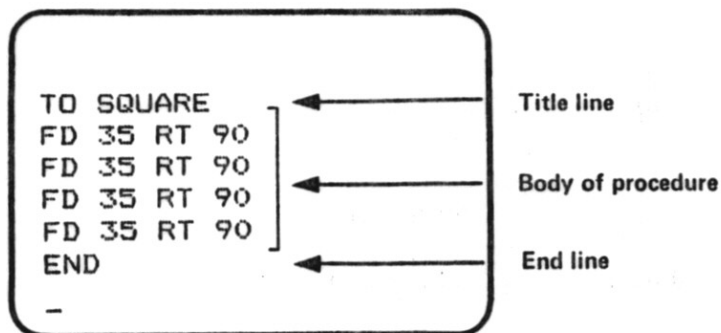
Now type: SQUARE and press ENTER. Did Telli draw a square on the screen?



The lines you typed in the EDIT room caused the square to appear. Let's go back to the EDIT room and look at those lines.

- Press BREAK
- Press E
- Hold down SHIFT and press 

The lines you typed will appear on the screen:



These lines form a *procedure* called SQUARE. When you typed the word SQUARE in the RUN room, the computer looked into the EDIT room, found the lines shown above, and told Telli to perform all of the commands in the procedure.

The first line of the procedure is called the *title line*. Title lines always begin with the word TO, followed by a space and the *name* of the procedure.

TO SQUARE ← Procedure's name

The name of a procedure must not contain any spaces and must not be the same as any of the long or short built-in Color LOGO words (for example: FD, FORWARD, HT, LEFT, RIGHT, etc.).

The last line in a procedure is called the *END line*. The END line is always at the end of the procedure.

END ← You will see me at the end.

When you type a procedure's name in the RUN room, the computer performs all the commands between the procedure's title line and its END line.

```
TO SQUARE
.
.
.
END
```

← Computer does everything between title and end line.

The set of commands between the title line and END is called the *body* of the procedure.

REPEAT IT AGAIN, PLEASE

In the EDIT room, you can use the Color LOGO word REPEAT to save wear and tear on your fingers. For example, the SQUARE procedure uses the same line four times:

```
TO SQUARE
FD 35 RT 90
FD 35 RT 90
FD 35 RT 90
FD 35 RT 90
END
```

You get the same result if SQUARE is defined in this way:

```
TO SQUARE
REPEAT 4(FD 35 RT 90)
END
```

Do this part 4 times.

Both versions of SQUARE create the same final figure on the screen.

Use your editing skills and change the SQUARE procedure in the EDIT room to the one shown above with the REPEAT command. When you make the changes, go to the RUN room and be sure you still get a square by typing SQUARE.


EXERCISE 11

Create procedures that draw:

- (1) A triangle with equal sides and equal angles. Call this procedure TRIANGLE.
(2) A five pointed star. Call this procedure STAR.



TURNING THE TURTLE

If you have cleared out the SQUARE procedure, type it into the EDIT room again. Hold down SHIF and press  to get past all the procedures in the EDIT room. Now type:

```
TO TURN  
REPEAT 30(SQUARE FD 3 RT 12)  
END
```


... 30 times

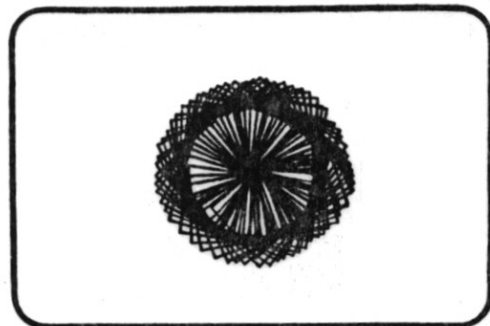
This new procedure, TURN, calls on the SQUARE procedure inside the REPEAT command line. Or the truly powerful features of Color LOGO is that you can define procedures and then use those pro inside other procedures.

Can you guess what TURN causes Telli to do? Go back to the BREAK room, then go to the RUN room and enter:

TURN

As long as both TURN and SQUARE are defined in the EDIT room, Telli draws a lovely pattern on

TURN calls on SQUARE 30 times. After a call on SQUARE, TURN moves the turtle forward three steps (FD 3) and makes a right turn of 12 degrees (RT 12). Another square is drawn at this new location. The turtle moves forward and right once again. Another square is drawn, and so on. Telli keeps drawing squares, moving forward, and turning right thirty times. The result is the lacy pattern on the screen.



Change the TURN procedure so that it uses the TRIANGLE or STAR procedure from Exercise 11 of SQUARE. Draw pictures of what appears on your screen when you turn TRIANGLE and STAF

COLORING THE SCREEN

Using simple procedures like SQUARE, TRIANGLE, STAR, and TURN, you can create wonderful patterns on the screen. Two additional Color LOGO commands will let you see your patterns in colors. The commands are:

BACKGROUND and PENCOLOR

The short forms of the commands are:

BG and PC

Get into the RUN room, and type each of the following lines:

BG 0
BG 1
BG 2
BG 3

Press ENTER at the end of each line.

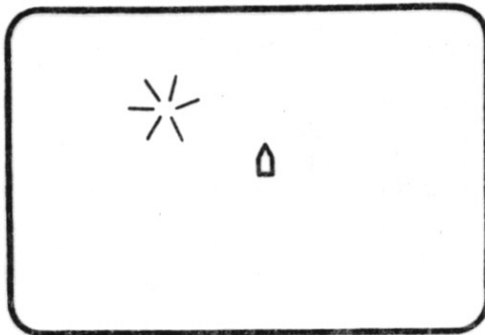
As you type each line and press ENTER, the screen should turn to a different color. Our screen shows the following colors:

BG 0 → Black
BG 1 → Dark Green
BG 2 → Orange
BG 3 → Lime Green

Your colors may be different, based on the kind of TV you have. Use the *color* and *tint* controls on your TV to get the colors *you* want. The color of Telli's pen can be set also. Type the following.

- Choose a background color (BG).
- Then give a PENCOLOR command (PC).
PC 0 is Black
PC 1 is Dark Green
PC 2 is Orange
PC 3 is Lime Green
- Then run the TURN procedure. You may use whatever version of TURN you have in the EDIT room.

If you choose a pencolor that is the same as the background, you will only see Telli flashing about the screen.



MORE COLORS

LOGO has more than four colors for you to use. In the RUN room, type:

COLORSET 1

When you press ENTER, the color border should change to a lighter color. If the background is any color other than BLACK, it should become brighter and, possibly, more intense. When you have typed COLORSET 1, the LOGO colors become:

BG 0	or	PC 0	Black
BG 1	or	PC 1	Green
BG 2	or	PC 2	Red
BG 3	or	PC 3	Light Green



To get back to the original colors, type:

COLORSET 0 ← When you start LOGO, you are in COLORSET 0.

Using COLORSET 1, explore setting different background colors and using different pen colors with the TURN procedure. You may need your sunglasses when you use certain combinations.

EXERCISE 12

Write down the colors you see on your TV for the two color settings shown below.

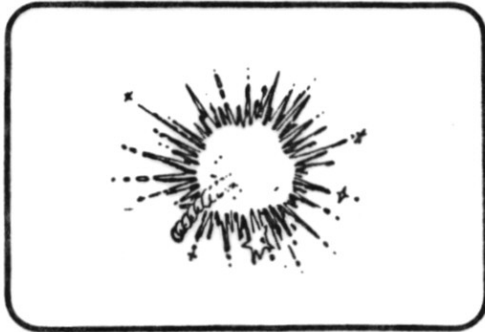
COLORSET 0	Color	COLORSET 1	Color
BG 0		BG 0	
BG 1		BG 1	
BG 2		BG 2	
BG 3		BG 3	

RANDOM FLASH

Let's let the computer show us all its different colors. Go to the EDIT room and type this procedure:

```
TO FLASH  
BG RANDOM 4  
FLASH  
END
```

After you type the procedure, go back to the RUN room and tell the computer to FLASH. Your screen should turn into a fireworks display..



FLASH contains two new Color LOGO ideas. You used a built-in Color LOGO word, RANDOM, to generate the background (BG) number. Each time you call RANDOM it produces a value from zero (0) up to the number that follows the word RANDOM, minus one.

RANDOM	Randomly generates
RANDOM 4	0, 1, 2, 3
RANDOM 5	0, 1, 2, 3, 4
RANDOM 2	0, 1
RANDOM 100	0, 1, . . . , 99
1+RANDOM 6	1, 2, 3, 4, 5, 6

The second new Color LOGO feature in FLASH is that FLASH *calls itself*. The last command in the procedure is a command to the computer, FLASH. The first time you type FLASH in the RUN room, the computer looks into the EDIT room and finds the FLASH procedure. It then begins to perform the commands within the body of the procedure.

- It colors the background a random color.
- It sees the word FLASH and calls upon the FLASH procedure.
- FLASH then colors the background a random color.
- FLASH is called again.
- And so on, until the computer runs out of memory.

Yes, if you go get a drink or a bite to eat and let the computer keep FLASHing, it will eventually display this message:

MY MEMORY IS TOO FULL

In procedures that keep calling on themselves, like FLASH, you must tell the computer when to stop or it will keep going until it fills its own memory.

Later, you will discover ways to tell the computer to stop. For now, you can either

- Let the memory get full and then press BREAK to get things back to normal, or
- Press BREAK while FLASH is flashing.

In either case, you end up in the BREAK room ready to do more with Color LOGO. All of your procedures are still in the EDIT room.

EXERCISE 13

(1) Write down the sets of random numbers produced by these RANDOM commands.

RANDOM 3	___ ___ ___
RANDOM 1	___
2 + RANDOM 5	___ ___ ___ ___ ___
1 + RANDOM 4	___ ___ ___ ___

- (2) Modify the FLASH procedure so that it randomly changes the color setting as well as the background colors. Hint: Use COLORSET and RANDOM together.
- (3) If you run the modified FLASH procedure of part (b), what happens if you let the procedure keep FLASHing?

MAD-ARTIST

Let's combine some of the procedures you have created and a few new features you have learned into a MAD-ARTIST procedure.

You may want to SAVE your procedures on tape or diskette before proceeding. You can then get them back into the computer later, without having to type everything again. Saving your procedures saves wear and tear on your fingers. Look at Appendix C to see how to SAVE your work.

You should already have the following procedures:

```
TO SQUARE          TO TURN
REPEAT 4(FD 35 RT 90) REPEAT 30(SQUARE FD 3 RT 12)
END                END
```

MAD-ARTIST will use these two procedures, add some RANDOM coloring, and RANDOM movements of the Turtle that do not leave tracks. To move the turtle without leaving tracks, the MAD-ARTIST uses two new LOGO commands:

```
PENUP      or      PU ← No tracks
PENDOWN    or      PD ← Tracks
```

These commands tell the turtle to lift its pen or put its pen back down. When the pen is up, Telli does not leave a trail.

Go to the EDIT room and type in the MAD-ARTIST procedure:

```
TO MAD-ARTIST
PU
FD RANDOM 100 } ← Pick up pen and move forward a random number of steps . . .
RT RANDOM 90  } then turn randomly right up to 90 degrees.
PD           ← Pen down
PC RANDOM 4 ← Random color
TURN
MAD-ARTIST ← Do it over and over
END
```

Type the procedure, go to the RUN room, and enter:

```
MAD-ARTIST
```

Telli will dance about the screen creating lacy patterns in many colors. Sometimes her pen color is the same as the background and she erases part of the patterns she has drawn. Let her draw until the computer's memory is full. She will create a beautiful, colorful picture on your TV screen.

EXERCISE 14

Modify the TURN procedure to use TRIANGLE or STAR from Exercise 11. Also, create other turtle drawing procedures of your own. Let the MAD-ARTIST fill your screen using the modified TURN procedures.

TINY TURTLE EXERCISES

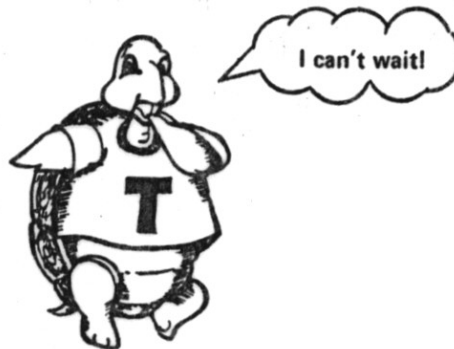
Time to try a number of things with procedures and the turtle – tiny turtle exercises. We do not mean that the turtle is tiny, but that the procedures are small and easy to type. Here goes!

REMEMBER: You must create the procedures in the EDIT room and then use them in the RUN room.

TURTLE SQUIGGLES

Go to the EDIT room and type:

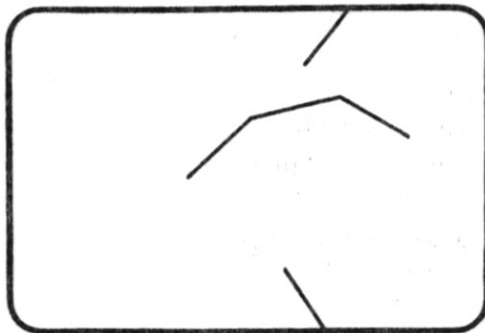
```
TO SQUIGGLE  
PC RANDOM 4  
FD RANDOM 100  
RT RANDOM 90  
SQUIGGLE  
END
```



Now, go to the RUN room and type:

```
SQUIGGLE
```

Telli begins to dart about the screen leaving jagged trails. She draws squiggly lines everywhere. You can let her keep drawing until the computer's memory gets full or until you press the BREAK key.



Here is a SQUIGGLE variation. In the RUN room type:

```
COLORSET 1  
SQUIGGLE
```

Telli now draws squiggly lines using the second color set. The final design should be more vividly colored.

SQUIGGLING IN THE DARK _____

Using the same SQUIGGLE procedure, go into the RUN room and type:

```
BG 0  
COLORSET 1  
SQUIGGLE
```

Telli fills the screen with a bright drawing. She paints the black screen with colorful squiggly lines.

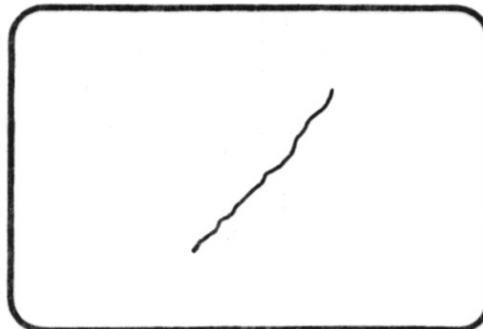
TURTLE LIGHTNING _____

A slight modification to SQUIGGLE stirs up a turtle thunderstorm complete with lightning bolts. Type:

```
TO LIGHTNING  
HT  
BG 0  
PC RANDOM 4  
FD RANDOM 100  
RT RANDOM 90  
LIGHTNING  
END
```



When you go to the RUN room and type LIGHTNING, a lightning bolt flashes on the screen.



EXERCISE 15

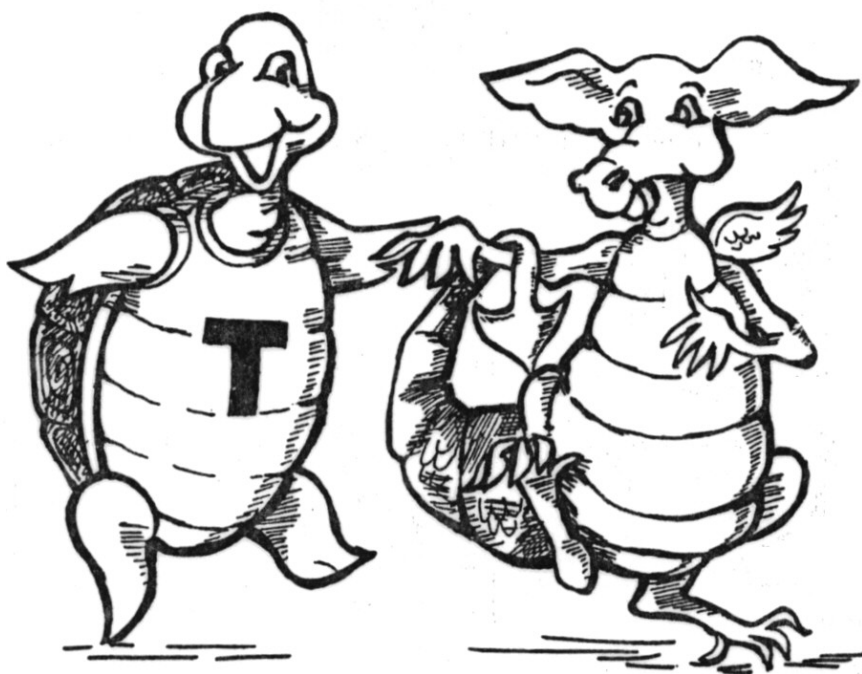
In LIGHTNING, what causes the turtle trail to flash on the screen and then disappear? The effect produced looks like lightning from a storm, but what causes it to happen?

We near the end of this fun-filled Color LOGO booklet. In this booklet, we could only begin to tell you about the many LOGO features. Your next step is for you to begin to explore LOGO on your own. Look through your Color LOGO User's Manual. Also, look for more of these small booklets at your Radio Shack store. There are teacher's booklets as well as the parent's guides. Each contains exercises and suggestions for using LOGO that will help you explore this exciting language.

Goodbye... For Now

We hope you have enjoyed this first exploration of Color LOGO. Look for other booklets in this series. Each booklet brings you more LOGO exercises, games, and fun experiments that you and a child can do together.

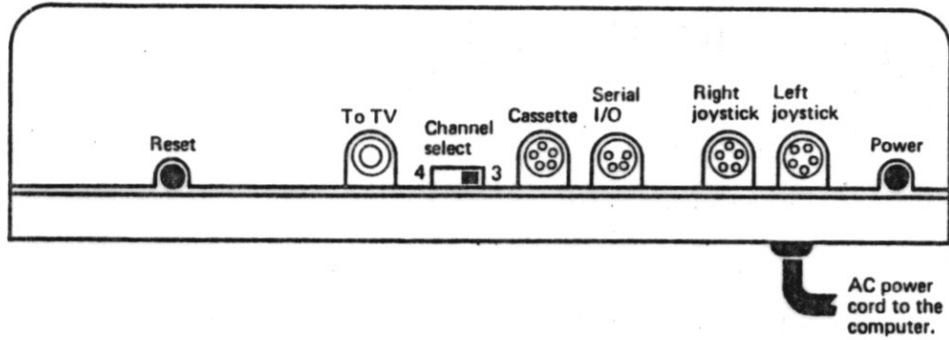
Telli and George say goodbye, for now. They know they will be seeing you again.



Appendix A

HOOKING UP YOUR COLOR COMPUTER

The back of your Color Computer looks like this:

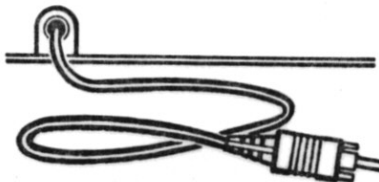


The AC power cord is permanently attached to the computer. Plug the power cord into a 110-volt outlet. Press the power button (right side when looking at the back) to turn the computer on. Press it again to turn it off.

The Color Computer sends signals to the TV through a cable that looks like this:



Before connecting it, turn the computer off. Then plug one end of the cable into the connector on the back of the computer marked "TO TV."



Appendix D

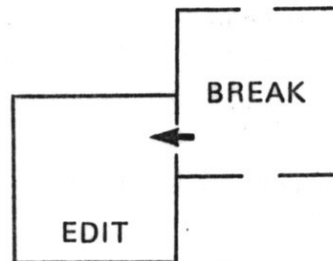
SAVING AND LOADING PROCEDURES ON TAPE

Although Color LOGO procedures are usually short, you will write many procedures that you will want to repeat at some later time. Children will want to show their creations to friends, brothers, and sisters. Procedures can be stored on cassette tape very easily.

All procedures in memory are stored as one module. Therefore, you should erase any unwanted procedures that are in memory before saving the procedures that you want to keep. To delete procedures, you must enter the EDIT mode and delete them character by character.

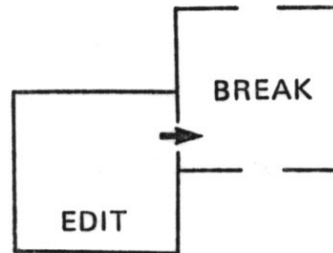
EDIT room to delete
undesired procedures

Press **E**

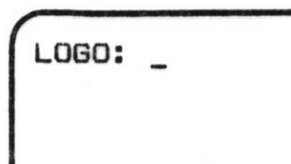


When you are ready to save the desired procedures on tape go to the BREAK room.

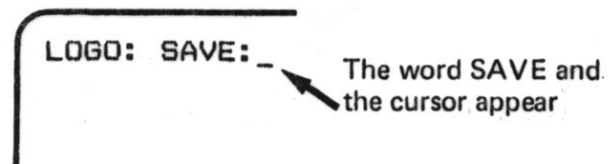
SAVE procedures in
the BREAK room



(1) Press BREAK



(2) Press **S** (for SAVE)



At this time, you should check to make sure the recorder is connected and turned on. The volume setting should be close to 5. The tape should be rewound to a blank area on the tape. Then press down the RECORD and PLAY buttons at the same time.

(3) Press **T** (for TAPE) and then ENTER (to start recording).

```
LOGO: SAVE:T
```

(4) When the recording is finished, the BREAK prompt will be displayed again.

```
LOGO: SAVE:T  
LOGO: _
```

If a number and a question mark appear after the T, then the procedures were not saved properly. Try again!!

Loading procedures from cassette is also very simple. You must again be in the BREAK room.

(1)

```
LOGO: _
```

The cassette should be rewound to the point on the tape where the procedures were recorded. The volume should be set close to 5 and the PLAY button pressed down.

(2) Press **L** (for LOAD).

```
LOGO: LOAD:_
```

(3) Press **T** (for TAPE) then press ENTER.

```
LOGO: LOAD:T
```

(4) When the LOAD has been completed, the BREAK prompt will be displayed again.

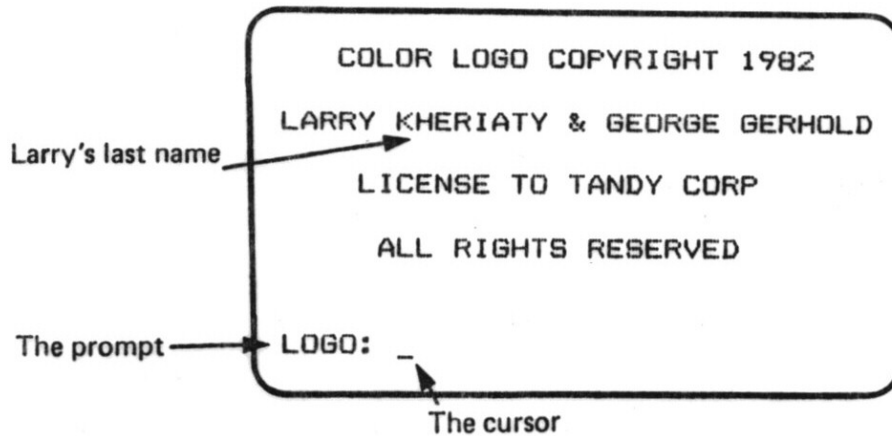
```
LOGO: LOAD:T  
LOGO: _
```

Appendix E

ANSWERS TO EXERCISES

EXERCISE 1

(1)



(2) To make the turtle appear, press the **R** key.

(3) LOGO responds with the message: I DONT KNOW HOW TO MUSTARD_

(4) With the message from part (3) on the screen, first press the ENTER key and then type:
CLEAR and then press ENTER

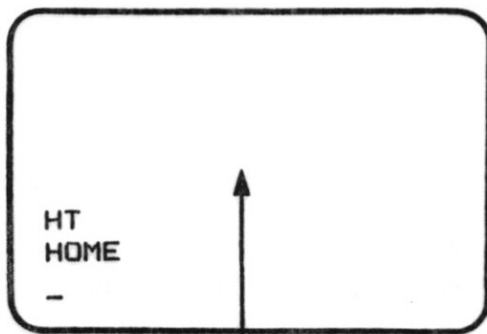
The screen will clear and the MUSTARD message will disappear.

EXERCISE 2

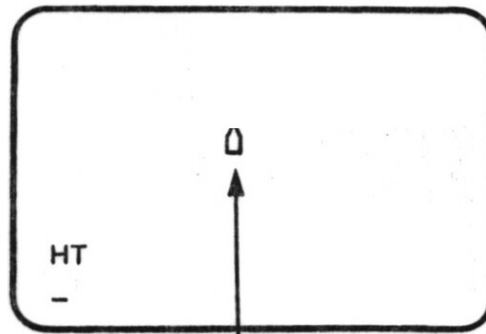
No answers to this exercise. You get to make up everything. You might like to use a piece of paper or poster board with a small cutout area as the "target" for scoring.

EXERCISE 3

When you type HOME, the turtle reappears on the screen. Typing HOME automatically tells Color LOGO to issue an ST (SHOWTURTLE) command.



Turtle gone



Turtle reappears

EXERCISE 4

(1) Telli points back to the top of the screen when you type:

LT 24
↑
space

23 doesn't move me.



For any number less than 24, Telli does not move.

(2) Part (1) of this exercise gives the clue you need to answer this part. Any LEFT turn that makes Telli's internal compass reading fall within 21 degrees of the listed compass headings will force Telli to turn to that heading. For example, a LEFT turn of 24 degrees from the HOME position makes Telli turn to a heading of 315 degrees. LEFT 24 puts Telli's internal compass within 21 degrees of 315.

$$\begin{array}{l} 360 - 24 = 326 \\ 315 + 21 = 326 \end{array} \Rightarrow \text{Same heading}$$

So, Telli turns to 315. For the headings shown, these LEFT turns make Telli point along those headings:

Headings:	315	270	225	180	135	90	45	0
Turn LEFT:	24	69	114	159	204	249	294	339

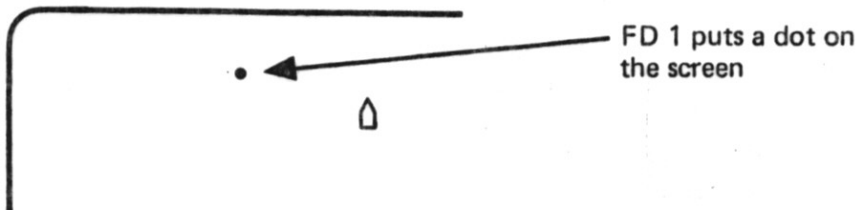
In the text right before Exercise 4, you saw how Telli behaved when she made RIGHT turns. Can you see a relationship between RIGHT and LEFT turns and where Telli ends up pointing on the screen?

EXERCISE 5

No answers for this exercise either! Again, here is a chance for you to create your own games, playing rules, and scoring methods. One interesting variation of this game might involve the use of the SETX and SETY commands. The first player might type:

```
CLEAR
FD 1
SETX 50
SETY 50
FD 1
SETX 200
```

and press the ENTER key several times. The screen would show:



The second player's task is to use FD, BK, RT, and LT commands to draw a line or lines through the points created by the FD commands. You can create your own scoring rules. Using the HT command adds some extra spice to this game variation. Also, the players can play 2-dot, 3-dot, 4-dot, or 5-dot variations.

A wonderful set of Connect-The-Turtle-Dot games! Enjoy the fun!


EXERCISE 6

- (1) To go to: Press
- | | |
|-------------|--|
| RUN room | <input type="text" value="R"/> |
| EDIT room | <input type="text" value="E"/> |
| DOODLE room | <input type="text" value="R"/> then <input type="text" value="@"/> |

- (2) To get to the BREAK room, you press the BREAK key.
- (3) In the BREAK room the screen looks like:


```

COLOR LOGO COPYRIGHT 1982
LARRY KHERIATY & GEORGE GERHOLD
LICENSE TO TANDY CORP
ALL RIGHTS RESERVED
LOGO: _
    
```


 First time

```

LOGO: _
    
```


 Later

In the other rooms, the screen looks like:

RUN

_

⏏

EDIT

_

DOODLE

= _

⏏

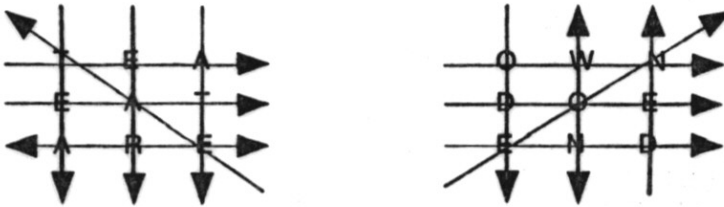
EXERCISE 7

- (1) The cursor moves under the A CAT
 The cursor moves under the C. CAT
 The cursor does not move. CAT
 The cursor does not move. CAT_
- (2) You can solve each of these DOUBLET puzzles in many ways. See how many different solutions you can create. Here are two quick solutions to turning SAD into JOY.
- SAD → SOD → SOY → JOY
- SAD → SAY → JAY → JOY Now, it is your turn!

EXERCISE 8

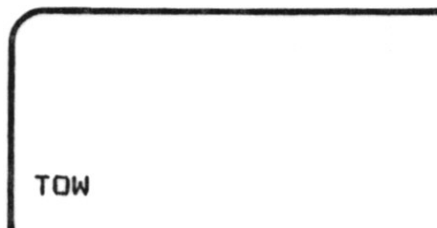
Like the last part of Exercise 7, there are many solutions to these word square puzzles. Get with a friend, and create as many answers as you can.

BONUS QUESTION: All the words in the word squares are shown with lines drawn through them. The arrow heads indicate the direction you must read the letters to see a word.



EXERCISE 9

Use your imagination (and all of the editing keys) to create other EDIT room word games. For example, have the first person put a word on the screen.



The next player can put a word on either end of TOW. If the word is added to the *front*, it must use the *first two letters* of TOW. If the word is added at the *end*, it must use the *last two letters*. Here are a couple of moves:

LOT TOW
LOT TOW WON

You can probably think of many more games. Try making up a few on your own.

EXERCISE 10

- | | |
|--|------|
| Moves cursor one space to the left. | (1) |
| Moves all lines down one line. | (4) |
| Clears the computer's memory. | (6) |
| (In BREAK room only) | |
| Inserts spaces into a line. | (8) |
| Deletes characters from a line. | (7) |
| Clears the EDIT room screen. | (5) |
| Moves cursor one space right. | (2) |
| Moves all lines up one line. | (3) |
| Splits a line or inserts a blank line. | (10) |
| Causes the EDIT room text to move up the screen like a rocket. | (9) |

EXERCISE 11

Here are two examples.

```
TO TRIANGLE
REPEAT 3(LT 120 FD 60)
END
```

```
TO STAR
REPEAT 5(FD 60 RT 145)
END
```

EXERCISE 12

The colors we see on our TV are shown below. Your colors may be slightly different.

COLORSET 0	COLOR	COLORSET 1	COLOR
BG 0	Black	BG 0	Black
BG 1	Dark Green	BG 1	Green
BG 2	Orange	BG 2	Red
BG 3	Lime	BG 3	Light Green

EXERCISE 13

(1) You Type	You See One of These Numbers
RANDOM 3	0 1 2
RANDOM 1	0
2 + RANDOM 5	2 3 4 5 6
1 + RANDOM 4	1 2 3 4

(2) TO FLASH
COLORSET RANDOM 2
BG RANDOM 4
FLASH
END



(3) If you let the computer FLASH long enough (and it will take some time), you will eventually get the message:

MY MEMORY IS FULL

EXERCISE 14

REMEMBER: You can create your own MAD-ARTIST procedures several ways. Here is what we did. We used TURNTRI and TURNSTAR from Exercise 11.

```
TO TURNTRI
REPEAT 30(TRIANGLE FD3 RT 12)
END
```

```
TO TURNSTAR
REPEAT 30(STAR FD 3 RT 12)
END
```

We created two new MAD-ARTIST procedures called TRIMAD and STARMAD.

```
TO TRIMAD
  PU
  FD RANDOM 100
  RT RANDOM 90
  PD
  PC RANDOM 4
  TURNTRI
  TRIMAD
  END
```

```
TO STARMAD
  PU
  FD RANDOM 100
  RT RANDOM 90
  PD
  PC RANDOM 4
  TURNTRI
  TRIMAD
  END
```

EXERCISE 15

The apparent flashing is caused by the BG 0 command. It resets the background color to black after each turtle move. The effect looks like lightning.

INDEX

- Answers to exercises, 65
- BACK (BK) command, 24
- BACKGROUND (BG) command, 51
- BACKSPACE key (←), 12
- BREAK key, 28
- BREAK room, 27
- Cassette recorder, 2, 61
- CLEAR command, 9
- Clearing the memory, 36
- Color LOGO, 1
- Color LOGO diskette, 1, 3
- Color LOGO Program Pak, 1, 2, 3
- COLORSET command, 52
- Colors, screen, 51, 52
- Cursor, 4, 8
- Cursor keys, 32
- Deleting a character, 41
- Disk drive, 62
- DOODLE room, 27, 30
- Doublets game, 33
- EDIT room, 27, 30
- EDIT room games, 32
- END command, 47, 49
- ENTER key, 9
- Error in typing, 12
- EXEC command, 7
- Exercise 1, 10
- Exercise 2, 15
- Exercise 3, 18
- Exercise 4, 23
- Exercise 5, 26
- Exercise 6, 31
- Exercise 7, 36
- Exercise 8, 40
- Exercise 9, 44
- Exercise 10, 47
- Exercise 11, 50
- Exercise 12, 52
- Exercise 13, 54
- Exercise 14, 55
- Exercise 15, 57
- Exercise answers, 65
- Firedrake, George, 54
- FLASH procedure, 53
- FORWARD (FD) command, 24
- Gerhold, George, 4
- HIDETURTLE (HT), 11
- HOME command, 16
- I DON'T KNOW HOW TO ..., 9
- Inserting a character, 41
- Kheriaty, Larry, 4
- LEFT (LT) command, 20
- LIGHTNING procedure, 57
- LOAD command, 64
- Loading a procedure, 63
- LOADM command, 6
- MAD-ARTIST procedure, 55
- MY MEMORY IS TOO FULL, 54
- PENCOLOR (PC) command, 51
- PENDOWN (PD) command, 55
- PENUP (PU) command, 55
- Power button, 59
- Procedures, 47, 49
- Program Pak, Color LOGO, 1, 2, 3
- Prompt, 4, 8
- RANDOM command, 53
- REPEAT command, 49
- RIGHT (RT) command, 18
- Rooms, 27
- RUN room, 27, 28
- SAVE command, 63
- Saving a procedure, 63
- Screen colors, 51, 52
- SETX command, 13
- SETY command, 15
- SHOWTURTLE (ST) command, 11
- SQUARE procedure, 48
- SQUIGGLE procedure, 56
- STARMAD procedure, 70
- Switchbox, 60
- Telli the turtle, 9
- TO command, 47, 49
- TRIMAD procedure, 70
- TURNSTAR procedure, 69
- TURNTR 1 procedure, 69
- TURN procedure, 50
- Turtle, 8
- TV cable, 59
- VHF terminals, 60