Creative Programming
for Young Minds

Volume I

Developed at Eastern Illinois University

CREATIVE
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Creative Programming
for Young Minds

by Leonard Storm

CREATIVE PROGRAMMING FOR YOUNG MINDS VOLUME 1

TABLE OF CONTENTS

POWER UP (How to turn your computer on)

1. Find the ON/OFF switch on the TV. Then, switch on the TV. (If

    it doesn't come on, check to see that it is plugged into an outlet.)

2. Find the ON/OFF switch on the front of the computer's keyboard.

    Use your thumb to slide the switch to the right. The red POWER

    light should come on. (If the POWER light doesn't come on, check

    to see that the keyboard is plugged into an electrical outlet.)

3. When the POWER light does come on, you will hear a bleep from the

    TV and see:

                         TEXAS INSTRUMENTS

                          HOME COMPUTER

                    READY-PRESS ANY KEY TO BEGIN

    Do just as the screen says. Push one of the keys on the keyboard.

4. Now, the TV screen will show a list of choices. It will say:

            PRESS

              1 FOR TI BASIC
              2 FOR EQUATION CALCULATOR

    This time, push the 1 key so you can learn how to talk to the computer.

5. In the lower corner of the TV screen, you will see a small blinking

    square. It is called a cursor. The cursor shows you exactly where

   the next key that you press will show up on the screen.

    Now you are ready to program. (Programming means telling the computer

    what to do.)

POWER DOWN (How to turn your computer off)

1. Slide the computer's ON/OFF switch to the left. The red POWER light
    will go out.

2. Turn off the TV.

    NOTE: When the computer is turned off, it "forgets" what you have
    told it.

LESSON # 1: PRINT
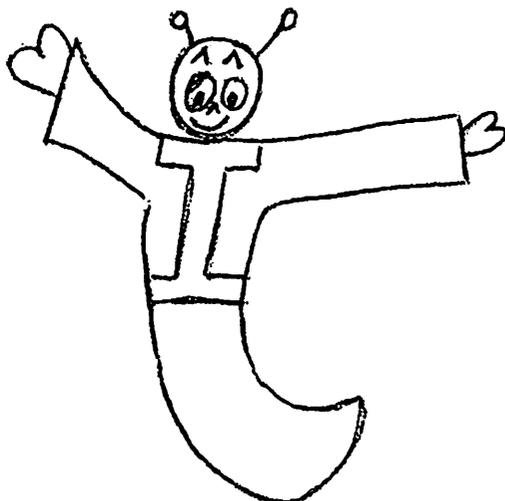
HI! I'M TEX THE INCHWORM. IN THIS
BOOK, I WILL BE TELLING YOU HOW TO
TALK TO YOUR TI COMPUTER. TALKING
TO THE COMPUTER, OR TELLING IT WHAT
TO DO, IS CALLED PROGRAMMING. YOU
ARE GOING TO LEARN HOW TO PROGRAM
THE COMPUTER.

ARE YOU READY? LET'S GO!

Does the TV screen say TI BASIC READY?

If it does, you are ready to start programming in a computer language

called Basic.

If the screen doesn't say TI BASIC READY, first do the POWER UP steps

given on the first page of this book. Then, start programming.

STARTING TO PROGRAM:

Find the N key on the computer keyboard. Press it. See what happens on

the TV screen? The N is printed on the TV screen.

Next, find the E key. Press it. NE should now appear on the TV screen.

Now find the W key and press it. The word NEW should now be on the

screen.

Press the orange ENTER key at the lower right hand side of the keyboard.

If you did everything correctly, the word NEW will disappear from the

screen. Only TI BASIC READY will remain.
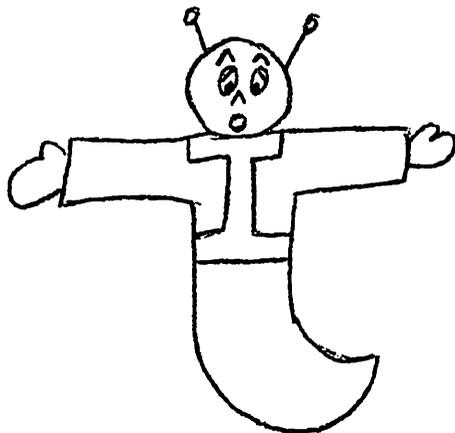
WHEN THE NEW COMMAND IS USED IT TELLS
THE COMPUTER TO FORGET ABOUT ANY OLD
COMPUTER PROGRAMS YOU HAVE GIVEN IT.
ALWAYS USE THE NEW COMMAND WHEN YOU
ARE READY TO START A NEW PROGRAM.
THE ENTER KEY IS A VERY SPECIAL KEY.
WHEN IT IS PRESSED, THE COMPUTER
KNOWS THAT YOU HAVE ANOTHER COMMAND
READY FOR THE COMPUTER.

Try the NEW command again by typing NEW, and then pressing the ENTER key.

But what happens if you press the wrong key? Don't worry, the computer

won't blow up!

Try this. Type NEY instead of NEW. Now press ENTER to tell the computer

that its next instruction is ready. See what happens? The computer

says:

<p style="text-align:center">INCORRECT STATEMENT</p>

The computer doesn't know the word NEY. NEY is an incorrect statement.

Now try this. Type the letters N, E, W, T, O, N. See where the cursor

is? It is at the place where the next letter would go, after the last N.

FCTN

Find the orange SHIFT key. It will help you erase the letters T, O, N from the screen. The SHIFT key tells the computer to use the upper symbol on a key.

Find the S key. On the top of the S, you will find the ← symbol. The ← can be used to move the cursor on the screen.

Push down the orange SHIFT key with one hand and keep it down.

While the SHIFT key. is still down, press the ← key.

Now release the ← key.

Finally, release the SHIFT key.

NOTE: The cursor is now over the N. The cursor has been moved one space to the left.

Use the shift key and the ← key to move the cursor to the T. Do it.

Now press the long black space bar at the bottom of the keyboard. Your TV screen should look like this:

   NEW ON

Press the space bar two more times.
Now the screen looks like this:

                              NEW

Press ENTER to enter the NEW command into the computer.
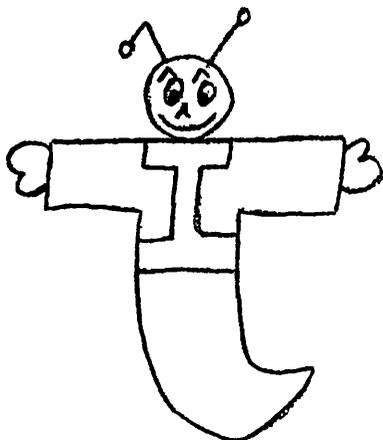
TO REVIEW: THE ← KEY CAN BE USED
TO MOVE THE CURSOR BACKWARDS TO A
WRONG LETTER. THEN JUST TYPE IN THE
CORRECT LETTER (OR SPACE).

THE <u>SHIFT</u> KEY MUST ALWAYS BE USED
WHEN YOU WANT TO TYPE THE UPPER
SYMBOL ON A KEY.

For practice, type in the letters N, E, and X.

Now use the ← key to change the X to a W.

Now, what do you press to make the computer do the NEW command? Press it.

Since you have cleared the computer's memory with the NEW command, it's
about time to give the computer an honest to goodness program.

Type the following program lines. Be sure to type the lines exactly
as they are. Use the space bar to put spaces in the right places. Also,
remember to push the ENTER key after every program line. This tells the
computer that you are done with one program line and are ready for another.

```
Type:    10  PRINT "TEX IS CUTE!"    (ENTER)
         20  STOP                    (ENTER)
```

If you make a mistake use the ← key to correct it.

If the computer says: INCORRECT STATEMENT, just re-type the line with
the error corrected.

Now type in the letters R, U, N and press ENTER.

See what happens?

Type RUN again and press ENTER.

Terrific! Isn't it?

Whenever you type RUN and press ENTER, the computer runs the program.

Try running the program a few more times.
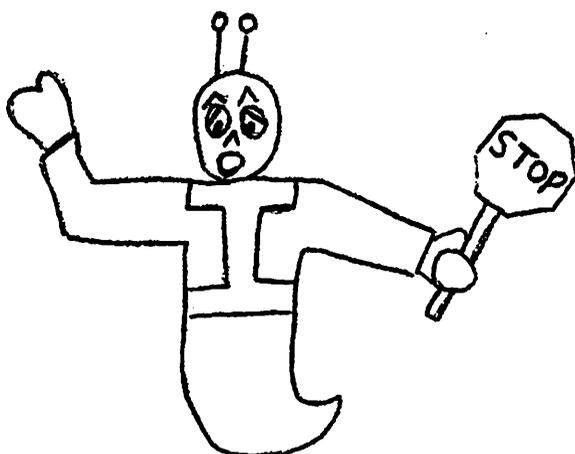
THE LINE NUMBERED 10 IS A PRINT STATE-
MENT. IT TELLS THE COMPUTER TO PRINT
EVERYTHING BETWEEN THE QUOTATION MARKS
("   ").

THE LINE NUMBERED 20 TELLS THE COMPUTER
TO WHOA! (STOP).

Now type LIST and press ENTER.

The LIST command tells the computer to list the program.

Can you get the computer to LIST the program a few more times? Try it!

Next type:

        5 PRINT "TEX IS ORNERY, BUT"

Remember to push ENTER.

Make the computer LIST the program on the TV screen.

See where the computer puts the 5 statement. It puts the 5 statement before the 10 statement. The computer will always put the lower numbered statements before the higher numbered statements.

Make the computer RUN the new program.

The TV screen should say:

> TEX IS ORNERY, BUT
> TEX IS CUTE!

The computer did the number 5 PRINT statement before it did the number 10 PRINT statement.

Now type the following PRINT statement, but put whatever you want between the quotation marks.

Type: 11 PRINT "   "   (ENTER
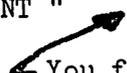
                  You fill in this space.

Make the computer list the program.

The computer will do the program statements in the following order:

> 5: first
> 10: second
> 11: third
> 20: fourth

Run the program to check out the computer's order of doing things.

Now it's your turn, Partner.

Write a PRINT statement that the computer will do <u>before</u> the number 5 statement. Write your statement on the line below.

_____

Now type it into the computer. (ENTER)

List the program.

Run the program.

Did it work?

If it didn't work, keep at it until you get all the bugs (errors) out.

Try again!

By now the TV screen is getting a little cluttered. It's time to learn how to erase the screen.

Type this:

        1 CALL CLEAR   (ENTER)

Then list the program.

Is everything OK?

If so, run the new program.

See what happens to the screen?
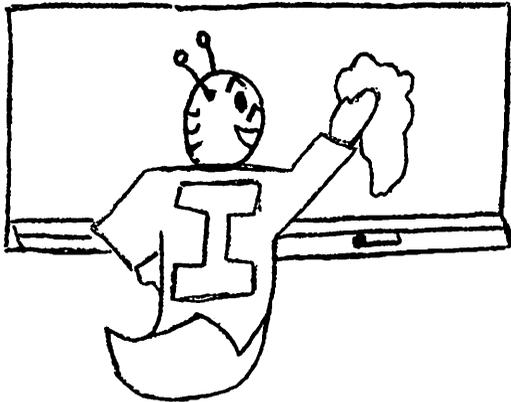
THE CALL CLEAR STATEMENT TELLS THE COMPUTER TO ERASE (OR CLEAR) THE TV MONITOR.

Now let's try an experiment to see what the computer will do.

Type: 5

Then press ENTER.

The computer didn't complain!

Well, let's see if anything has happened to the program.

List the program.

Has anything happened to the program? Yes!   Statement 5 is gone !

Type 11 and press ENTER.

Look at the program again to see if any new changes have occured.

(List it!)

Run the program.

Now you know a quick way to get rid of program lines.   Just type the line number without any statement. Try to get rid of the line that you wrote earlier. Do it!

List the program again.

Now let's change statement 10.

Type:

10 PRINT "I'M A MAD SCIENTIST!"

List the program to see the change, then run it.

A statement is easily changed (or erased) just by typing another line
with the same number as the old statement.

Hey! How about an action-packed program?!

You are about to type in a new program so what should you type in to
clear the computer's memory?

Type it in and ENTER it.   (NEW)

Now put the following program into your computer. Then run and list it
a few times until you are positive you know how the program works. Don't
forget to press ENTER after each line....

```
10 CALL CLEAR
20 PRINT "  * "
30 PRINT " *** "
40 PRINT "*****"
50 PRINT "  * "
60 PRINT "  * "
70 PRINT "  * "
80 PRINT "  * "
```

Good work! You've made the computer print the picture of an arrow on
the screen. Also, note that the computer stops after the highest line
number even without a STOP statement.

Now let's put action into the program.

Enter the following program lines; then, re-run the program.

```
90 PRINT
100 PRINT
110 PRINT
120 PRINT
130 PRINT
140 PRINT
150 PRINT
```

See the arrow move? The added PRINT statements print blank lines which cause everything to move up from the bottom of the screen. (The upward motion of the lines is called scrolling.)

Now add some more blank lines so that the arrow moves completely off the screen. Then, run the program as many times as you wish.
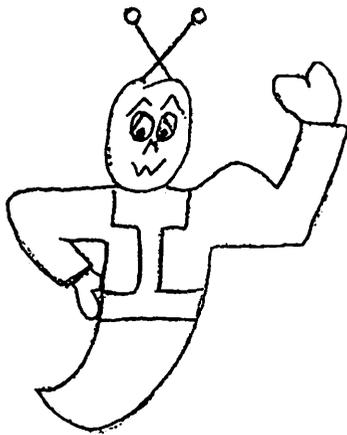
WOW, PARTNER! YOU'VE LEARNED A LOT ABOUT PROGRAMMING ALREADY. NOW LET'S EXERCISE A FEW OF THOSE NEW-FOUND SKILLS. IF YOU HAVE TROUBLE WITH ONE OF THE FOLLOWING EXERCISES, JUST TAKE YOUR TIME AND THINK IT OUT. DON'T GIVE UP. ABOVE ALL, HAVE FUN! (P.S. DON'T FORGET WHEN TO USE NEW AND ENTER.)

EXERCISE 1-1

Put this program into your computer.

```
10 CALL CLEAR
20 PRINT " BBB"
30 PRINT "AAAAA"
40 PRINT "LLLLL"
50 PRINT " LLL"
```

Run the program a few times.

List the program.

Notice how the letters B, A, L, L have been used to make a ball-shaped object.

Now add some statements that will cause the ball to move up the screen.

Run and list the program.

EXERCISE 1-2

Put this new program into the computer's memory.

```
10 CALL CLEAR
20 PRINT "Z"
30 PRINT " I"
40 PRINT "  G"
50 PRINT "   Z"
60 PRINT "  A"
70 PRINT "G"
```

Run the program.

Notice that to print letters farther to the right you have to put extra spaces _inside_ the quotation marks.

Next, change the program so that a blank line will separate each of the letters in the ZIGZAG message as shown below:

```
Z

 I

  G

 Z

A

G
```

Write the added program lines below:

_____

_____

_____

Run the program to make sure that it works.

EXERCISE 1-3

Program your computer to display the following:

COMPUTER

RELATED

ENRICHMENT

AND

TECHNOLOGICALLY

INSPIRED

VIABLE

EDUCATION

(Notice how the first letter of each word spells CREATIVE.)

Begin your program with a call clear statement.

You may use blank PRINT lines if you wish. Be CREATIVE! Experiment with your program.

EXERCISE 1-4

Now write a program that will print out the following information on the
TV screen.

> your name
>
> your age
>
> your street address
>
> your city, state, and zip code

My program startes out like this (but you don't need to copy it.):

> 100 PRINT "TEX"   (name)
>
> 200 PRINT "2"   (age)

Notice: Inchworms are smart for their age!

After you get your program running correctly, add some more program lines
to explain the information shown on the screen.

My new program lines could be:

```
50 PRINT "MY NAME IS:"
100 PRINT "MY AGE IS:"
        ETC.
```

After you get your program written, try running it. Correct any bugs that
you may find.

Now put a CALL CLEAR statement at the beginning of your program and put
blank PRINT statements between each line.

Run your program again and correct any bugs.

Put a CALL CLEAR statement at the end of your program and run the program
again.

Notice that the words printed by your program don't stay on the screen very long. What happened?

First, the computer cleared the screen.

Then, it printed the information you told it to.

Finally, it cleared the screen again.

All of this happens very rapidly which doesn't give you much time to read the TV screen.

Now get rid of the last CALL CLEAR statement. Do you remember how?

Next, put a STOP statement in the middle of your program somewhere.
Can you guess what will happen when you run the program again? Try it and see.

EXERCISE 1-5

Here is a puzzle.

Use pencil and paper to figure out what the following program will print on the screen.

Then type the program into the computer and run it to check your answer. If you were wrong, find out why?

```
207 PRINT " XXXX "
192 PRINT "X    X"
150 PRINT " ʌ  ʌ "
191 PRINT "  OO  "
160 PRINT " O  O "
170 PRINT "  II  "
100 CALL CLEAR
```

EXERCISE 1-6

Use the PRINT command to write a program that will produce your very

own computer figure. Use CALL CLEAR at the beginning of your program.

Write your program lines on the lines below.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

EXERCISE 1-7   YOUR NAME_____

Let's see how much you remember.

Match up words and meanings by placing the letter of the correct meaning

on the blank space beside the correct word.

_____ PRINT   A. Moves the cursor to the left.

_____ CALL CLEAR   B. Erases the computer's memory.

_____ LIST   C. Oops! You've made a statement error!

_____ STOP   D. Prints a blank space on the screen.

_____ "   "   E. The computer language you are learning.

_____ RUN   F. These go around what you want printed.

_____ SPACE BAR   G. Tells the computer to write all your
                                   program lines.

_____ ←   H. Telling the computer what to do.

_____ SHIFT   I. Tells the computer to do the list
                                   of things you've given it to do.
_____ INCORRECT STATEMENT
                                J. Tells the computer to write every
_____ ENTER   thing between two quotation marks.

_____ NEW   K. Tells the computer to cease running.

_____ programming   L. Causes the upper character on a key
                                   to be printed.
_____ BASIC
                                M. Tells the computer to accept another
                                   command or program line.

                                N. Erases the screen.

When you are finidhed, sign your name at the top and turn this page in

to your instructor.

LESSON #2: GOTO

You have learned (so far) that the computer will do lower numbered

program statements before higher numbered ones. It would be great

if you could sometimes change this order. One command that will change

the order of doing things is the GOTO command.

Type the following:

```
10 PRINT "HELP! I'M STUCK!"
11 PRINT "1"
12 PRINT "2"
13 PRINT "3"
```


Run the program.

See, it does just what you thought it would.

Now, add another line statement:

```
20 GOTO 10
```

Run the program again.

Well,I'll be a black-eyed, rootin',tootin' .....

The computer really is stuck!

Tex to the rescue!

Push down the SHIFT key and hold it down while you press the C key. (When

the program stops, you may stop pressing SHIFT C.)

Notice: The computer has left us a message.

            BREAKPOINT AT   (some number)

This message tells you which line statement the computer would have

done next if you hadn't stopped the program. You can get the program to

continue by typing CONTINUE.

Type CONTINUE and press ENTER.

Use SHIFT C to stop the program again.

Now type CON and press ENTER. The computer accepts CON or CONTINUE.
From now on use CON, it's shorter.

Question: If you pressed SHIFT C and got this message from the computer:

BREAKPOINT AT 11,

and then you started the program using CON (ENTER), what would be the

next thing the computer puts on the screen?

To check your answer, try starting and stopping your program until you get

the message: BREAKPOINT AT 11. Then, try CON (ENTER) and note what

is printed first.

Question: Now suppose you pressed SHIFT C and got the message:
BREAKPOINT AT 11. Then, you typed in RUN (ENTER). What would be the

next line which the computer prints on the TV monitor?

Check your answer by using CON and SHIFT C to start and stop the program

until you get the message: BREAKPOINT AT 11. THen, type RUN instead

of CON and see what the computer first prints out on the screen. Do it!

So you see RUN starts the program all over again and CON makes the

computer continue where it last stopped.

But back to the main point:
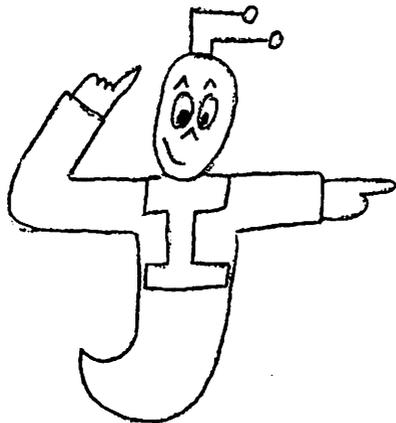
THE GOTO COMMAND TELLS THE COMPUTER TO GO TO A CERTAIN LINE IN THE PROGRAM. IT'S WRITTEN LIKE THIS: GOTO (line number). LINE NUMBER IS THE NUMBER OF THE LINE YOU WANT THE COMPUTER TO DO NEXT.

Note: GOTO may be written as one word, all run together, OR it may be written as two separate words: GO TO.

The program which you have just run is one example of a program containing an infinite loop. An infinite loop is a group of program statements which the computer repeats over and over endlessly unless you, the programmer, break the loop.

Now, try this program. It also contains an infinite loop.

```
 5 CALL CLEAR
10 PRINT "...0..."
15 PRINT ".....0."
20 PRINT "......0"
25 PRINT "......0"
30 PRINT ".....0."
35 PRINT "...0..."
40 PRINT ".0....."
45 PRINT "0......"
50 PRINT "0......"
55 PRINT ".0....."
60 GOTO 10
```

If you start getting sea-sick, just press SHIFT C.

Type in this new short program and run it.

```
 50 CALL CLEAR
100 CALL SCREEN(7)
200 PRINT "HOW ABOUT A CHANGE OF SCREEN?"
```

Did you see the brief change in screen color? It didn't last very long!

Add a GOTO statement to the program to form an infinite loop. Write

your program statement on the line below.

_____

Run the program. The screen now stays RED.

Getting jittery? Use SHIFT C to stop the program.

Erase the GOTO statement that you wrote and replace it with the following

statement:

```
300 GOTO 300
```

Then, re-run the program.

Notice that this GOTO statement loops back to itself. The program turns

the screen red. Then, it prints out the message. And finally, it performs

the GOTO loop over and over endlessly. But this time only the 300

statement is repeated.

EXERCISE 2-1

Remember the moving arrow program on pages 11 and 12. You surely remember the time it took to type in all of those PRINT blank statements! Well your mission now is to rewrite that program using only one PRINT blank statement and a GOTO statement. Keep program statements 10 through 90 the same as before and add one GOTO statement that will cause a blank line to be printed over and over.

Write your new program statement on the line below.

Now run your program. When it is working correctly, the arrow should move just like it did before.

Next, change the GOTO statement so that the computer prints out the arrow,a blank line, another arrow, a blank line, and so on.

The new GOTO statement is:

Run the program to see that it works correctly. (Note: This last GOTO statement should not be GOTO 10.)

Now, replace the GOTO statement with this one:

          100 GOTO 10

Run the program. Try to understand why it works as it does.

EXERCISE 2-2

Here is another puzzle! Try to figure out what message the following

program will print. Then, check your answer by running the program.

```
 10 GOTO 100
 20 PRINT "LOVES"
 30 GOTO 90
 40 PRINT "HIS"
 50 PRINT "TI"
 60 GOTO 160
 70 PRINT "TO"
 80 GOTO 140
 90 GOTO 70
100 CALL CLEAR
110 PRINT "TEX"
120 GOTO 20
130 END
140 PRINT "PROGRAM"
150 GOTO 40
160 PRINT "HOME"
170 PRINT "COMPUTER"
180 GOTO 130
190 PRINT "TRICKY"
200 GOTO 130
```
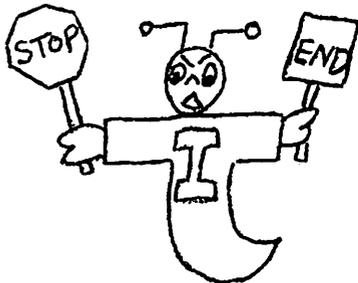

STOP AND END DO THE SAME THING.

THEY CAUSE A PROGRAM TO STOP RUNNING.

THE COMPUTER AWAITS YOUR NEXT COMMAND.

EXERCISE 2-3

Now it's your turn. Fill in each blank below with the proper word so
that the following message is printed:

            PETER

            PIPER

            PICKED

            A

            PECK

            OF

            PICKLED

            PEPPERS

Finally, try the program out by running it on the computer. Don't give
up until you get the program to run correctly.

```
 10 GOTO 50
 20 PRINT "_____"
 30 PRINT "_____"
 40 GOTO 120
 50 CALL CLEAR
 60 GOTO 100
 70 PRINT "_____"
 80 PRINT "_____"
 90 GOTO 140
100 PRINT "_____"
110 GOTO 20
120 PRINT "_____"
130 GOTO 170
140 PRINT "_____"
150 GOTO 190
160 END
170 PRINT "_____"
180 GOTO 70
190 GOTO 160
```

EXERCISE 2-4

You've done so well that it's about time to let you write a program all
by yourself. Try to create your own GOTO puzzle, something like the one
in EXERCISE 2-2.

First, think of some catchy phrase and then "hide" the words in the
proper order in your GOTO program.

Write your program below and then test it by running it on the computer.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

LESSON #3: RUN AND LIST (CONTINUED)

In this lesson, you are going to learn some more about the RUNNING

and LISTING capabilities of your TI 99/4 home computer.

Type in the following program and run it. Don't worry about the parts

that you don't understand yet. You will study those soon.

```
 1 CALL CLEAR
 2 CALL SCREEN(4)
 3 PRINT "4 = LIGHT GREEN"
 4 PRINT
 5 FOR I=1 TO 500
 6 NEXT I
 7 CALL SCREEN(5)
 8 PRINT "5 = DARK BLUE"
 9 PRINT
10 FOR I=1 TO 500
11 NEXT I
12 CALL SCREEN(7)
13 PRINT "7 = DARK RED"
14 PRINT
15 FOR I=1 TO 500
16 NEXT I
17 CALL SCREEN(11)
18 PRINT "11 = DARK YELLOW"
19 PRINT
20 FOR I=1 TO 500
21 NEXT I
22 CALL SCREEN(16)
23 PRINT "16 = WHITE"
24 PRINT
25 PRINT
26 PRINT
27 PRINT
28 FOR I=1 TO 500
29 NEXT I
30 GOTO 2
```

Lines 10 and 11: } These statements cause a time delay.

(Keep this program. We'll use it on page 32.)
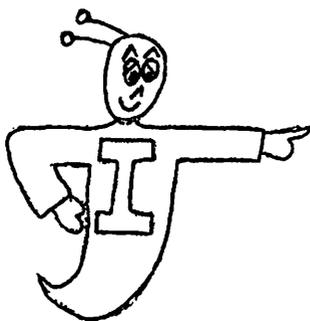
THE CALL SCREEN COMMAND CAN BE USED TO CHANGE THE TV SCREEN'S COLOR. A NUMBER FROM 1 TO 16 TELLS THE COMPUTER WHICH COLOR TO DISPLAY. FOR EXAMPLE: CALL SCREEN(7) TURNS THE SCREEN DARK RED.

The CALL SCREEN color codes are listed below:

VALUE	COLOR
1	Tramsparent
2	Black
3	Medium Green
4	Light Green
5	Dark Blue
6	Light Blue
7	Dark Red
8	Cyan
9	Medium Red
10	Light Red
11	Dark Yellow
12	Light Yellow
13	Dark Green
14	Magenta
15	Gray
16	White

After you get the program to run correctly, stop it using SHIFT C.

Now list the program using LIST. Notice that the whole program will not fit on the screen at once. The first few program statements have disappeared off the top of the screen. But suppose those were the lines that you wanted to study carefully.

Try this. Type and ENTER the following command.

LIST 1-10

The above command causes only the line numbers from 1 to 10 to be printed on the screen. Now, you can easily study the beginning statements without having to list the whole program. This is quite helpful for very long programs.

Now, try:

LIST 25-

This kind of LIST command causes all the statements from 25 on to be printed.

Try out this command on the computer.

LIST 13

This causes the computer to print:

13 PRINT "7 = DARK RED"

To summarize:

Command	Lines Printed
LIST	All program lines
LIST x	Line number x only
LIST x-y	All lines between x and y including x and y
LIST x-	Line x and all lines higher
LIST -x	Lines up to and including x

Try to figure out what the following commands would do. Then type the command into the computer to check your guess.

Fill in the blanks with the <u>line numbers</u> of the program statements displayed. If the computer gives an error message, write that on the blank. (One blank has been filled in as an example.)

LINES PRINTED OR ERROR STATEMENT

LIST -3	_____
LIST 1-3	<u>1, 2, 3</u>_____
LIST 28-	_____
LIST 28-30	_____
LIST 40	_____
LIST 51	_____
LIST 28-40	_____
LIST 3	_____
LIST 0	_____

```
LIST 32766        _____

LIST 32767        _____

LIST 32768        _____

LIST 3.9          _____
```

Now, run the program again. Watch for the order of the colors being

displayed. First, light green is displayed. Then, dark blue, then dark

red, and so on.

Stop the program.   (SHIFT C)

Now enter this command:

RUN 17

TERRIFIC! You can even tell the computer to start at a different place

in the program. This time the computer started with line number 17.

It turned the screen dark yellow.

Try starting the program several times using the RUN command with different

line numbers.

Now, suppose that you had forgotten to put in several program lines, say

between program lines 6 and 7. How could you put them in? There is no

room.

Usually, programmers label their program statements by tens : 10, 20, 30

and so on. This leaves room to insert additional program lines.

But never fear. Tex to the rescue!

Enter this command into the computer:

RESEQUENCE 10,5

Now list the program using:

LIST -100

Notice that the program has been automatically re-numbered! That saves

a lot of time!

Now, your extra program lines could be put in.

Enter these additional lines:

```
36 PRINT "EXTRA"
37 PRINT "STATEMENTS"
```

Now list program lines up to 100 using:

LIST -100

Room has been made for these extra statements.

Now do this.

LIST   (Enter)

Look at the last line. The GOTO statement used to be:

GOTO 2

But now it is:

GOTO 15

The RESEQUENCE command automatically changes GOTO statements so that

they still loop back to the same place in a program, even though it has

been re-numbered. In this example, the GOTO statement still loops back

to the CALL SCREEN (4) statement.

Run the program again to see the changes you have made in the program.
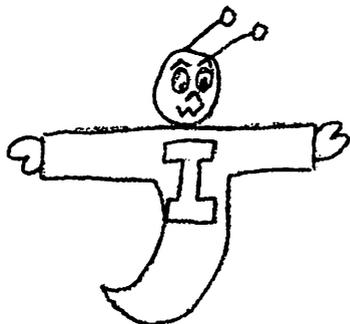
THE RESEQUENCE COMMAND RE-NUMBERS PROGRAM LINES. FOR INSTANCE, RESEQUENCE 100, 20 WOULD NUMBER THE FIRST PROGRAM LINE 100, THE SECOND 120, THE THIRD 140, AND SO ON, INCREASING EACH LINE NUMBER BY 20.

The computer will also accept the following shortened from of RESEQUENCE:

    RES

Enter the following command:

    RES 100, 20

Now list the program using:

    LIST -200

The first line is numbered _____.

Each line number is _____ greater than the one before it.

Now try:

    RES 50

List the program to find out the first line number and the difference between one line number and the next.

First line number: _____

Step size:_____ (difference between one line number and
                                  the next)

Now try:

RES ,30

First line number: _____

Step size: _____

If only one number is given in a RES command, that number will be the the first line number. The step size will automatically be 10.

EXAMPLE: RES 50 gives the fillowing line numbers: 50, 60, 70, 80, 90...

EXAMPLE: RES 101 gives the following line numbers: 101, 111, 121, 131...

If only the second number is given, it will be the step size. The first program line will automatically be 100.

EXAMPLE: RES ,30 gives the following line numbers: 100, 130, 160, 190...

EXAMPLE: RES ,50 gives the following line numbers: 100, 150, 200, 250...

Try several different RES commands on the program already in memory.
Each time, list the program. Try to understand what the RES command has done in each case.

When you finish, tell your TI computer bye by entering:

BYE

The BYE command causes the computer's memory to be erased.

The BYE command also causes the computer to go out of the programming mode.

To verify that computer memory has been erased, get back to TI BASIC

and try listing the program currently in memory.

What message do you get?

_____

What message do you get if you try to RUN when no program is stored in

memory?

_____

EXERCISE 3-1

Fill in the following blanks.

1. What command could you use to turn the TV screen to magenta?

   _____

2. What command would one use to list the statement numbered 60 in a

   program? _____

3. What command would list all the program statements from 60 onward?

   _____

4. What command would list all the program statements up to and including

   60? _____

5. The command _____ will cause a program to

   begin running at the first statement, no matter what the first

   statement is numbered.

6. What command would cause a program to start running at line statement

   120?_____

7. What command would cause the following statement numbers to occur

   in a program? 40, 47, 54, 61 and so on. _____

8. What command can you use to tell the computer that you are ready to

   quit programming? _____

EXERCISE 3-2

Can you find 10 statement errors in the following program? Write down
descriptions of the errors in the blanks. NOTE: O is a letter; Ø is a zero.

  5 CALL CLEAR   _____

1Ø CALL SCREEN(17)   _____

15 PRIINT "HELLO!"   _____

2Ø GOT O 3Ø   _____

25 HALT   _____

3Ø CALL PRINT "GOODBYE!" _____

31 PRINT   _____

35 GOTO 71   _____

4Ø RUN   _____

45 GOTO 25   _____

7Ø PRINT "I'M LATE! I'M LATE! I'M LATE!" _____

75 SCREEN(7)   _____

8Ø PRINT "....SAID THE WHITE RABBIT. _____

90 GOTO 45   _____

You can check your answers by trying to enter and run the faulty program.
It should print out:

        HELLO!
        GOODBYE!

        I'M LATE! I'M LATE! I'M LATE!
        ....SAID THE WHITE RABBIT.

LESSON #4: LOADING PROGRAMS

You have had some experience, now, in writing <u>short</u> programs. But

suppose that you had written a long program, say, 1000 statements long.

It would take you a long time to enter this program into the computer's

memory. If you had to enter this long program every time you wanted to

run it, you might soon give up programming altogether!

Fortunately, programs may be saved (or recorded) on cassette tape. Then,

a program can be easily loaded into the computer's memory in a short

amount of time.

In this lesson, you will learn how to load a program which has already

been stored on cassette tape. The program is a game which you may play.

Get the first game tape. Your teacher can show you where it is.

Now just follow the directions on the next few pages. Have fun!

HOW TO LOAD A PROGRAM STORED ON TAPE

1. Open the door to the cassette recorder by pushing the EJECT button.

2. Put the cassette tape into the recorder with the program side up.
   BE CAREFUL! THE TAPE WILL ONLY GO IN ONE WAY. BE GENTLE! DON'T
   FORCE THE TAPE.

3. Close the door to the cassette recorder.

4. ENTER the following command:

        OLD CS1

5. Your computer will now guide you through the remaining steps.
   It will say:

            *REWIND CASSETTE TAPE CS1
            THEN PRESS ENTER

Do what the computer asks:

Rewind the tape on cassette recorder number 1 (CS1) by pressing the

rewind button. When the tape is completely re-wound, press the recorder

stop button. Then press ENTER.

6. When you press ENTER in Step 5, the computer will say:

            *PRESS CASSETTE PLAY CS1
            THEN PRESS ENTER

Do it! (Press the play button on the recorder and then press enter on

the computer keyboard.)

7. As the tape begins to play, the computer will display the message:

*READING

This means that the computer is reading the program and storing it in memory. You should also be able to hear a garbled sound as the recorder plays the information.

8. If the program has been read correctly, the following messages will be printed on the screen:

*DATA OK
*PRESS CASSETTE STOP CS1
*THEN PRESS ENTER

Do as the messages say. (Press the cassette recorder STOP button and then press ENTER.)

9. Press the EJECT button on the cassette recorder and carefully remove the cassette.

10. Close the door of the cassette recorder and put the tape back where you got it.
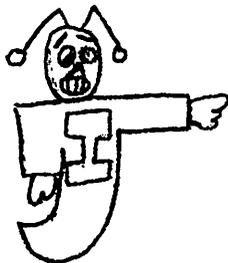
DON'T PUT A TAPE NEAR:

HOT THINGS

ELECTRICITY OR MAGNETS

FOOD OR WATER

THESE MAY RUIN THE TAPE.

IF YOU GET AN ERROR MESSAGE

Try again, making sure that you have done everything right. If it still
doesn't work, ask your teacher to help you.

HINTS:

If the program does not load correctly, you will get an error message.

Press E to EXIT from the loading procedure.

Then press cassette stop and press ENTER.

You may now repeat the loading procedure, starting with step 4.

If the program still does not load correctly, check the following:

1. Is the cable connecting the recorder and the computer loose.

   If so, push in the loose connector.

   NOTE,

   The red wire goes to the microphone jack.(MIC)

   The black wire goes into the remote jack. (REMOTE)

   The white wire goes into the earphone jack. (MONITOR)

   The other end of the connector plugs into the computer on the

   back right-hand-side.

2. The cassette recorder volume control should be set around 8.

3. Neither the recorder nor the computer should be sitting on

   a metal surface.

4. The recorder should be 2 feet or more away from the television

   set.

5. If none of the above changes work, maybe the cassette tape is

   bad. Try to load the program on a different cassette tape.

VOLUME I REVIEW QUIZ   NAME _____

Fill in the blank with the correct word(s). If you get stuck, turn back

to the correct page (shown in parenthesis) and review.

1. _____   A small blinking square which indicates

                             where the next letter of your command or

                             statement will go (1)

2. _____   Telling the computer what to do (1)

3. _____   The computer language you are learning (3)

4. _____   Causes the computer to erase its memory, but

                             the computer stays in the TI BASIC mode (4)

5. _____   Lets the computer know that a command or

                             statement has been completed (4)

6. _____   A misspelled word in a statement would cause

                             the computer to print this message (4)

7. _____   Causes the upper symbol on a key to be

                             printed (5)

8. _____   Can be used to move the cursor to the left (5)

9. _____   Can be used to write a blank line on the screen

                             (12)

10. _____   Causes the computer to display the program

                             stored in memory (7)

11. _____   Causes the computer to follow the instructions

                             stored in its memory (7)

12. _____   Erases the TV screen (10)

13._____   The upward motion of lines on the TV screen

(12)

14. _____   A program statement which causes a program

to cease running (7)

15. _____   These go around a message that you want

displayed on the TV screen (7)

16. _____   Tells the computer which program statement

to do next. Allows statements to be executed

out of the usual order. (22)

17. _____   A way to stop a program before it comes to

a STOP or END statement (22)

18._____   Causes a computer to begin running where it

left off at a break rather than at the beginning

of the program (23)

19. _____   A group of program lines which the computer

repeats over and over (24)

20. _____   An example of a one statement infinite loop (25)

21. _____   Causes a program to start running at statement

170 rather than at the lowest numbered state-

ment (34)

22. _____   Changes the screen color to medium red (31)

23. _____   Displays all program lines between 25 and

230 (including 25 and 230) (30)

24. _____   Re-numbers the line statements of a program:

200, 220, 240, 260, ... (36)

25. _____   The command which is used to start loading

a cassette tape program (42)

26. _____   Causes computer memory to be erased and causes

the computer to exit from the TI BASIC mode

(37)

PROJECT RED 1

Using your knowledge of the PRINT command, create a
program that will produce a picture of a house on the screen.

PROJECT RED 2

WRITE A PROGRAM THAT USES MOST OF THE COMMANDS YOU HAVE
LEARNED. WHEN THE PROGRAM WORKS, COPY IT BELOW.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

PROJECT RED 3

LOAD A GAME TAPE. LIST THE TAPE SO THAT YOU CAN SEE THE COMMANDS. NOTICE HOW MANY YOU ALREADY KNOW.

PLAY THE GAME.

PROJECT RED 4

CREATE A DRAGON WITH PRINT COMMANDS THAT WILL FIT ON
YOUR SCREEN. COPY YOUR PROGRAM BELOW (OR ON THE BACK) AND
SEND IT TO THE ADDRESS BELOW. IF YOU ENCLOSE A STAMPED,
SELF-ADDRESSED ENVELOPE, WE WILL SEND YOU A PROGRAMMER I CARD,
WITH YOUR NAME ON IT, TO SHOW THAT YOU ARE A LEVEL I PROGRAMMER.

PLEASE PRINT YOUR NAME_____