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AUTHOR	Gawronski, Jane Donnelly
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ABSTRACT

A series of three booklets provides elementary and secondary students who are participating in the Southeast Alternatives Program run by Special School District Number 1 in Minneapolis with some fundamental information about computers and their use. The first volume offers some general background on computers and describes the use of the teletype machine, including details about timesharing and the keyboard. The second manual presents an introduction to BASIC, describing it as a combination of English and algebra. The concepts of statements and programs are developed, PRINT and END statements are discussed, and rules for the use of these statements are given. The last volume provides additional information about the BASIC programing language. Computer storage is introduced and LET, IF-THEN, and GO TO statements are treated, bringing the student to the point at which he is able to begin developing programs and working with the computer. (PB)

MINNEAPOLIS PUBLIC SCHOOLS

Special School District No. 1

Minneapolis, Minnesota 55413

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COMPUTER ASSISTED LEARNING

BOOK 1

THE TELETYPE

written by
Jane Donnelly Gawronski, Ph.D.

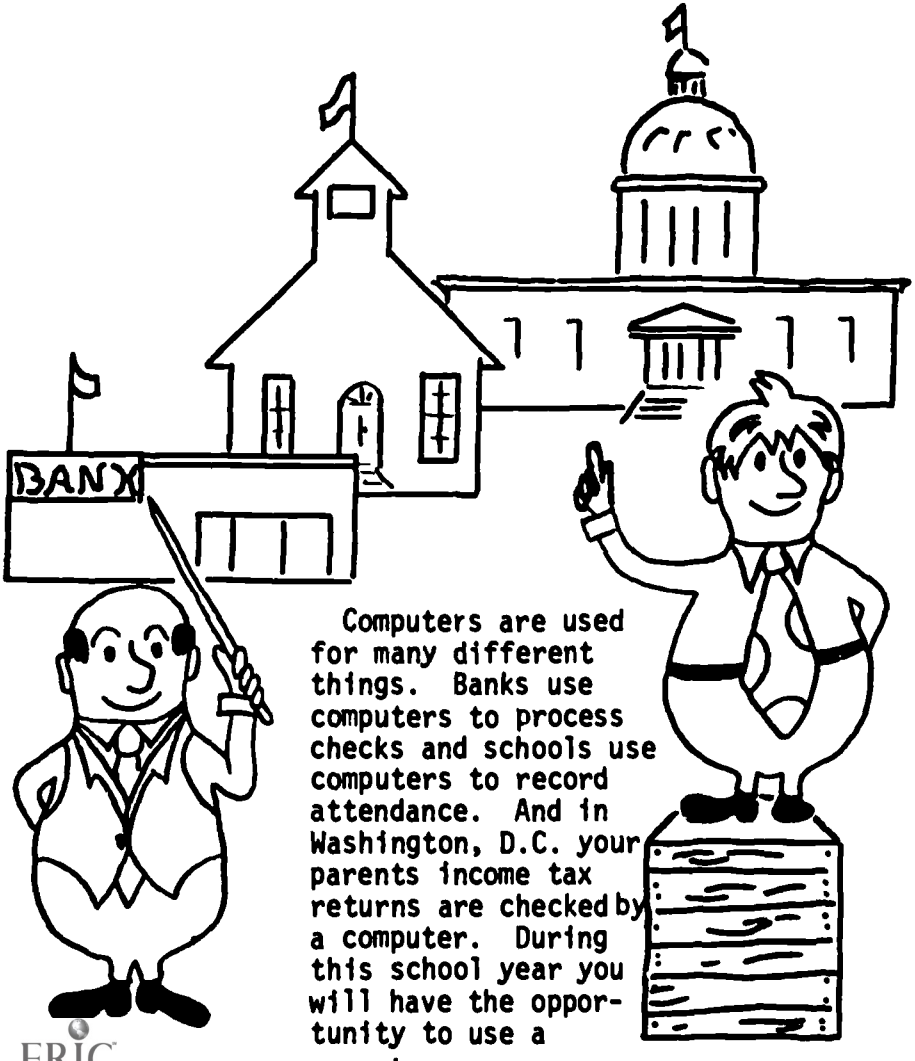
illustrated by
John Hendrickson

A PRODUCT OF THE

SOUTHEAST ALTERNATIVES PROGRAM

THE TELETYPE

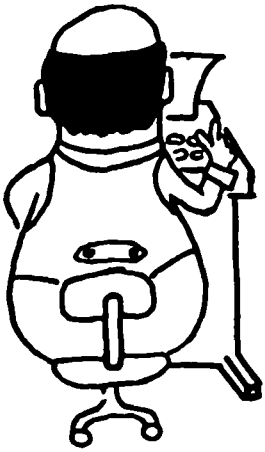
Computers may seem complicated, confusing and difficult to operate. Have you ever stopped to think how you work a computer? If you read the following instructions carefully, you may discover how exciting and fascinating computers can be.



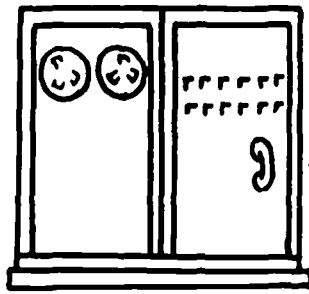
Computers are used for many different things. Banks use computers to process checks and schools use computers to record attendance. And in Washington, D.C. your parents income tax returns are checked by a computer. During this school year you will have the opportunity to use a computer.

A computer is a machine that does at least three things. A computer:

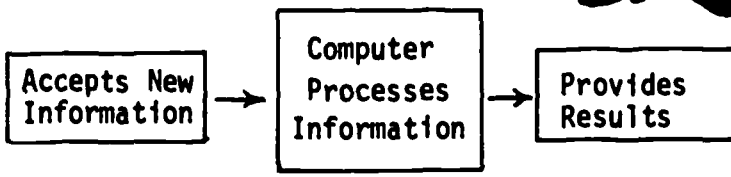
1. Accepts new information



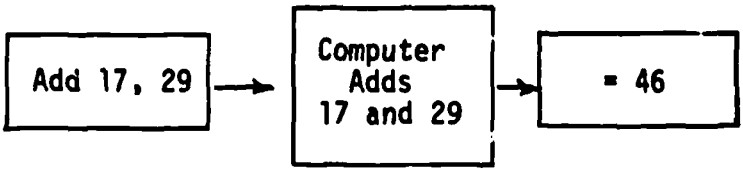
2. Processes this information



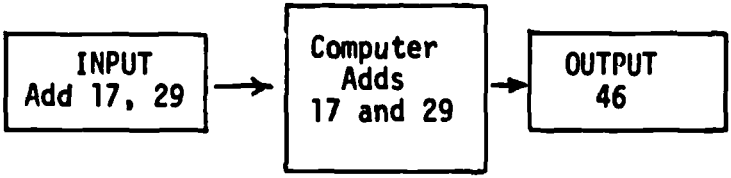
3. Provides Results



For example, you might give the computer the information: Add, 17, 29. The computer processes these three pieces of information and provides the result, 46.

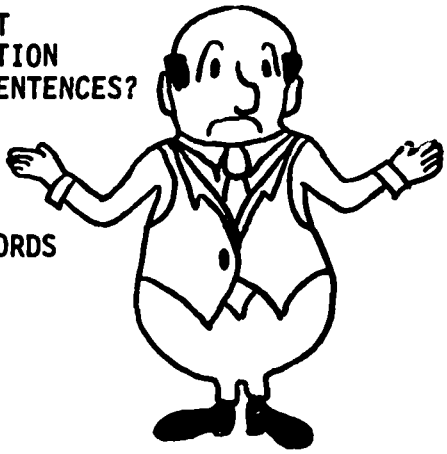


The information that the computer accepts is called INPUT and the result the computer provides is called OUTPUT.

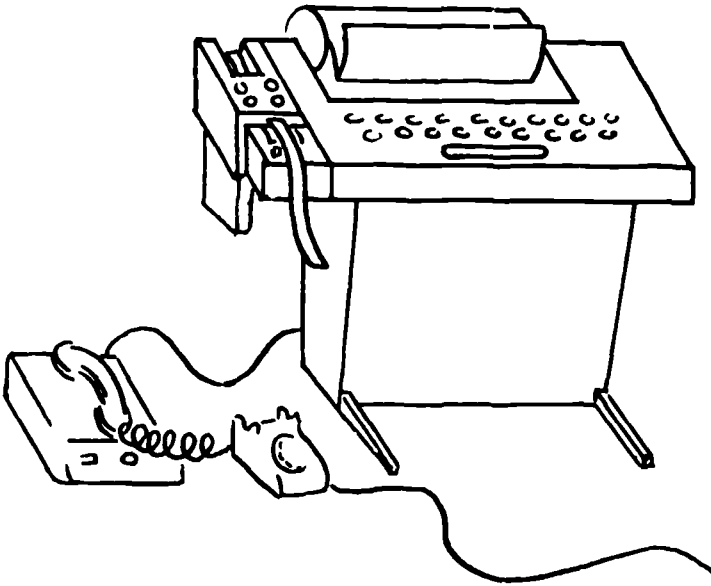


1. WHAT WOULD BE THE INPUT PORTION AND THE OUTPUT PORTION FOR EACH OF THESE NUMBER SENTENCES?
   a. 13 + 7 = 20
   b. 9 x 13 = 117
   c. 48 - 25 = 23

2. WHAT ARE THE TWO NEW WORDS YOU HAVE LEARNED?

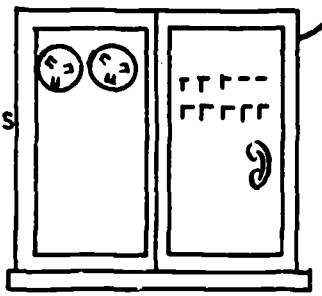


The input portion of the machine consists of a typewriter and a paper tape-reading device.



The machine is called a teletype. A teletype is a special typewriter connected to the computer by a telephone line.

The computer you will use is located at the Minneapolis Board of Education Building, but the teletype is located in your school.



This computer can handle many teletypes at the same time. This means that different people can use the computer at the same time. This way of using a computer is called TIME SHARING.

TIME SHARING is a method of computer programming which allows many persons to have access to a single computer at the same time. The computer processes the requests of these people so quickly that it seems to each person that he is the only one using the computer.

3. WHAT IS THE MACHINE CALLED THAT IS USED TO INPUT INFORMATION TO THE COMPUTER?

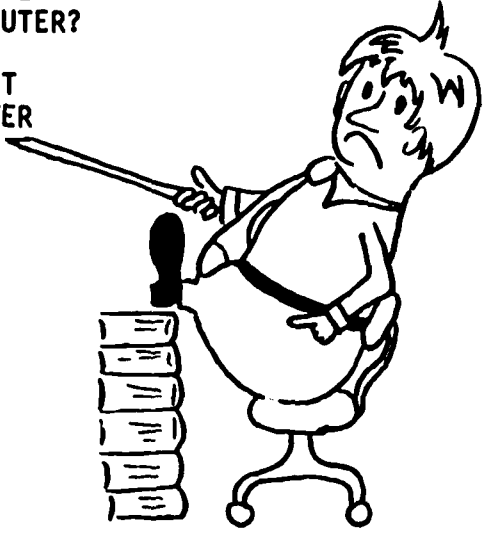
4. WHERE IS THE COMPUTER YOU WILL USE?

5. WHERE IS THE TELETYPE YOU WILL USE?

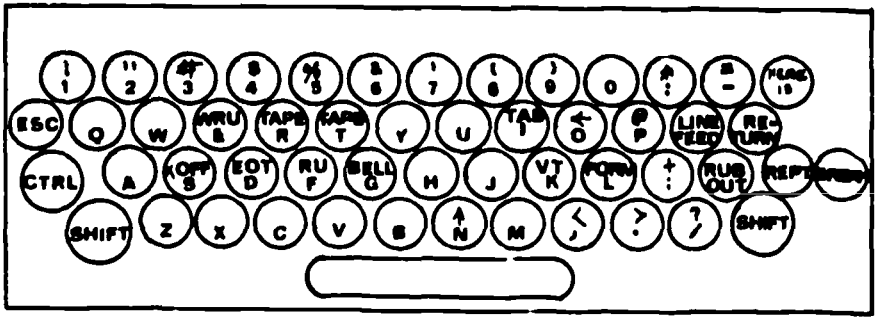
6. HOW IS THE TELETYPE CONNECTED TO THE COMPUTER?

7. CAN MANY DIFFERENT PEOPLE USE THE COMPUTER AT THE SAME TIME?

8. WHAT IS IT CALLED WHEN MANY DIFFERENT PEOPLE CAN USE THE COMPUTER AT THE SAME TIME?



The following picture represents the key board of the typewriter of the teletype you will be using. It is similar to a regular electric typewriter but it is not exactly the same.



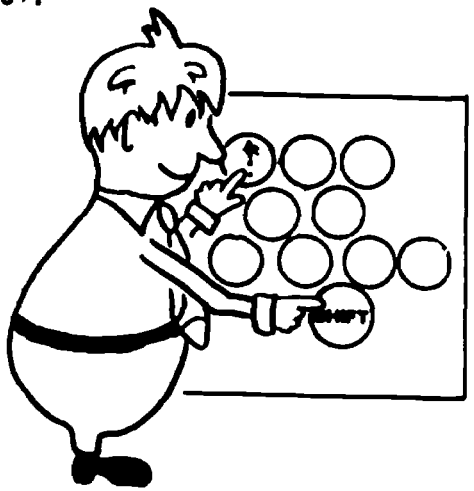
All of the letters are capital letters on this key board. The oval bar at the bottom is the space bar. The symbols + and - are used for addition and subtraction, the symbol * is used for multiplication, and the symbol / is used for division. For example, if you wanted to type 5 times 3 it would be 5*3 and 7 times 8 would be 7*8. For division 12 divided by 3 would be 12/3 and 24 divided by 2 would be 24/2.

9. HOW WOULD YOU TYPE EACH OF THESE MATHEMATICAL EXPRESSIONS SO THE COMPUTER WILL UNDERSTAND THE INFORMATION?

a. $5\overline{)30}$
b. 7 x 9
c. 28 ÷ 7
d. 4 times 10

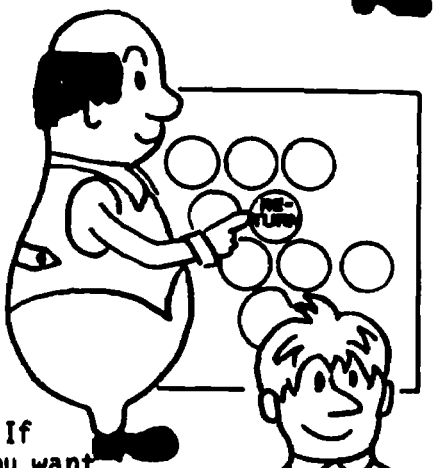
When there are two symbols on one typewriter key, press a shift key and the key itself to print the top symbol.

To type the * you must hold a SHIFT KEY down and type the key marked (*). To type / just type the key marked (/).



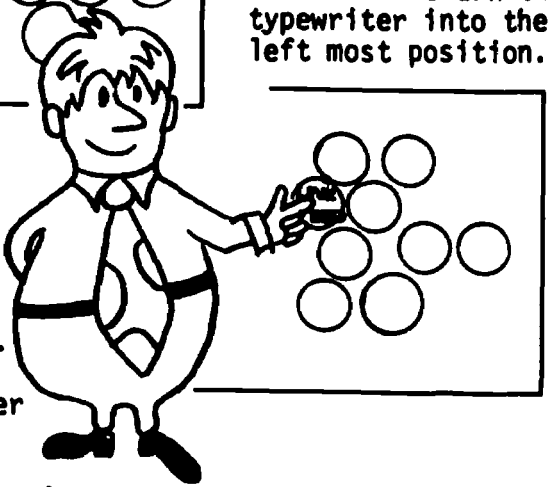
This key board also has a key marked (RE-TURN).

When you finish typing a line you must type this return key. This will return the typewriter into the left most position.

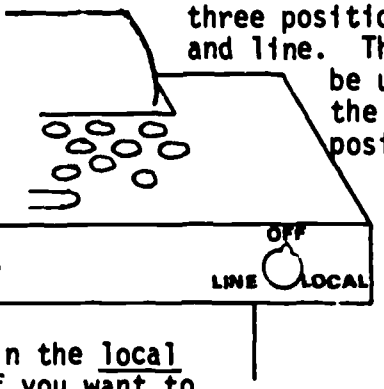


If you want to type another line you should also type the key marked (LINE FEED).

This will move the roll of paper one line to print typing over the line you just typed.

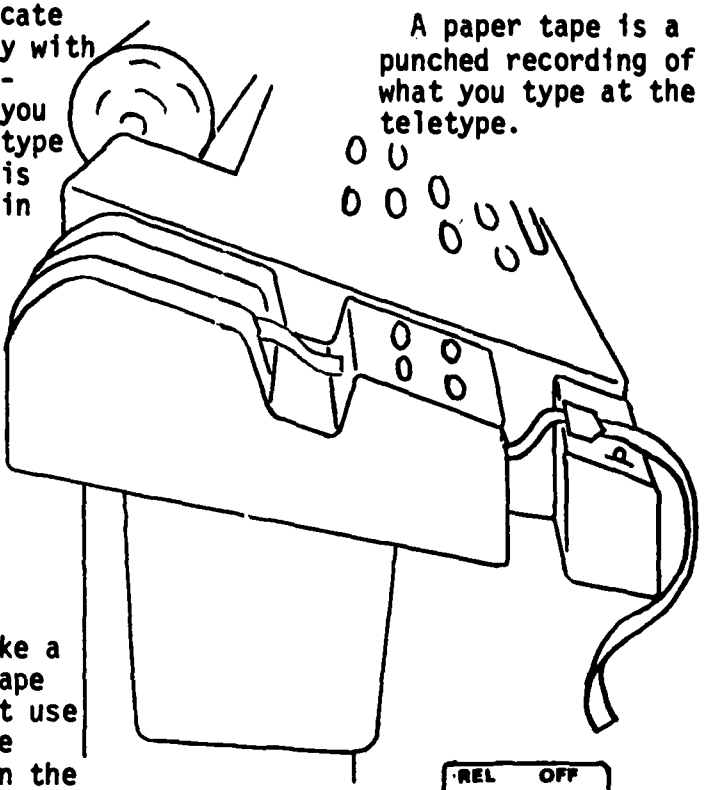


To use the teletype you must first turn it on with the switch located to your right. This switch has three positions: off, local and line. The teletype may be used in either the LOCAL or LINE position.

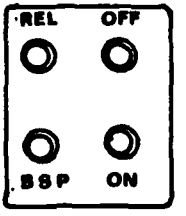


If you want to make a paper tape, you should type with this switch in the local position. If you want to communicate directly with the computer, you should type with this switch in the on line position.

A paper tape is a punched recording of what you type at the teletype.

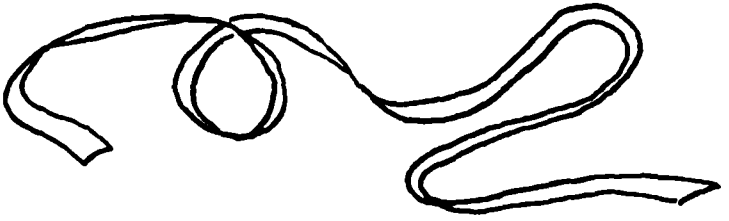


To make a paper tape you must use the tape punch on the left of the teletype. There are four buttons.



ush down the ON button to make aper tape.

The first keys you should type are the keys marked RUB OUT and REPT (for repeat). Hold both of these keys down until about 1 inch of paper tape has been typed. The RUB OUT key punches holes in every column of the paper tape and the REPT key continues this.



If you make a mistake typing, you may correct it by typing the shift key and the key marked ← .

Type this key as many spaces as it takes to "erase" your mistake. For example: If you typed PRINX you can correct this by PRINX ←T. The one backward arrow "erases" the X and the T is read in its place. If you typed PRIXY, you could correct by typing PRIXY ← ← NT. This statement would be read as PRINT.

10. HOW WOULD YOU CORRECT EACH OF THE FOLLOWING:

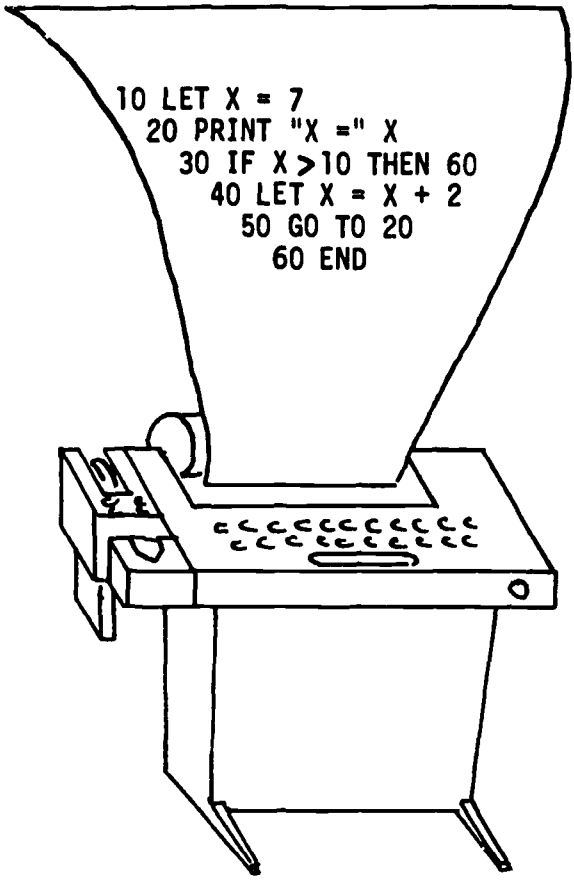
a. PRINZ
b. PRXYT
c. PRINN

You are now ready to begin typing your PROGRAM. The PROGRAM is the set of information or instructions that you want to give to the computer. This set of instructions must be written in a language the computer can understand.

There are many types of languages. English is the language we use to communicate with people. The language you will learn to communicate with the computer is a combination of English and algebra. This language is called BASIC.

11. WHAT IS A PROGRAM?

12. WHAT IS THE LANGUAGE YOU WILL USE TO COMMUNICATE WITH THE COMPUTER?



Do you understand the language in this program? You will learn how to write a program in this BASIC language in the next booklet.

INDEX

ANSWERS

1.

Input	Output
a. 13 + 7	20
b. 9 x 13	117
c. 48 - 25	23

2. Input, output

3. The teletype is used to input information to the computer.

4. The computer is in the Board of Education Building.

5. The teletype is in your school.

6. The teletype is connected to the computer by the telephone line.

7. Yes.

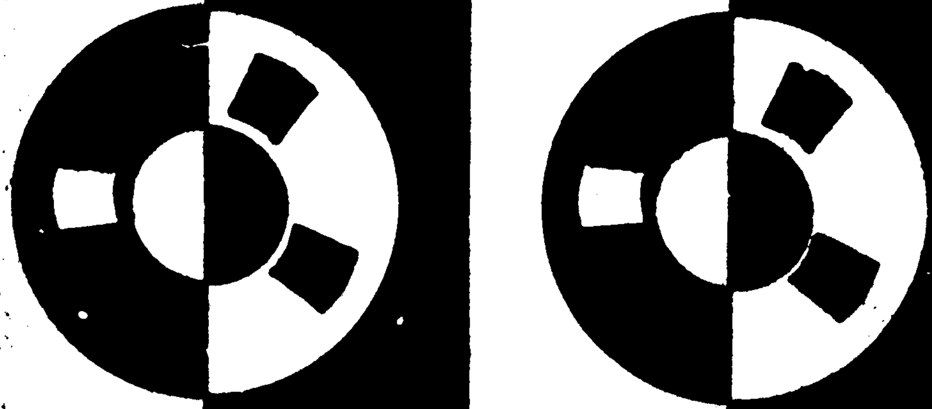
8. Time sharing

9. a. 30/5
   b. 7*9
   c. 28/7
   d. 4*10

10. a. PRINZ ← T
    b. PRXYT ← ← ← INT
    c. PRINN ← T

11. A program is a set of instructions given to the computer.

12. We will use the BASIC language to communicate with the computer.



COMPUTER ASSISTED LEARNING

BOOK [illegible]

BASIC

MINNEAPOLIS PUBLIC SCHOOLS

Special School District No. 1

Minneapolis, Minnesota 55413

An Equal Opportunity Employer

ISC - PUBLICATIONS 1972

COMPUTER ASSISTED LEARNING

BOOK 2

BASIC 1

written by
Jane Donnelly Gawronski, Ph.D.

illustrated by
John Hendrickson

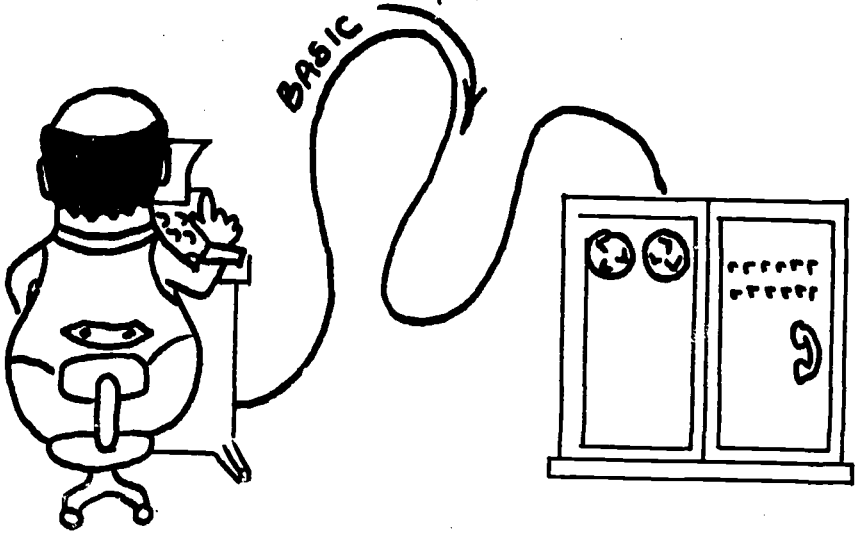
A PRODUCT OF THE

SOUTHEAST ALTERNATIVES PROGRAM

BASIC 1

In Book 1 you learned how to use the teletype terminal which is used to send messages to the computer. The computer then sends messages to the teletype for us to read.

In this book you will learn how to write the instructions for the computer.



The computer will accept only certain instructions which must have exact wording and spelling. The special language we will use to give instructions to the computer is called BASIC which is a combination of English and algebra. We will send messages to the computer in this BASIC language.

1. WHAT IS THE NAME OF THE LANGUAGE WE WILL USE TO · ''UNICATE WITH THE COMPL ER?

2. WHAT DO WE USE TO SEND MESSAGES TO THE CO''PUTER?

The set of instructions we send the computer is called a PROGRAM. This PROGRAM must be written in the BASIC language.

3. WHAT IS THE SET OF INSTRUCTIONS WE SEND THE COMPUTER CALLED?

Each instruction to the computer is called a statement. All of the statements make up a program. One of the rules of the BASIC language is that every statement must be numbered. These numbers are called STATEMENT NUMBERS and must be whole numbers. The computer will use the statements in the order of these STATEMENT NUMBERS from smallest to largest.

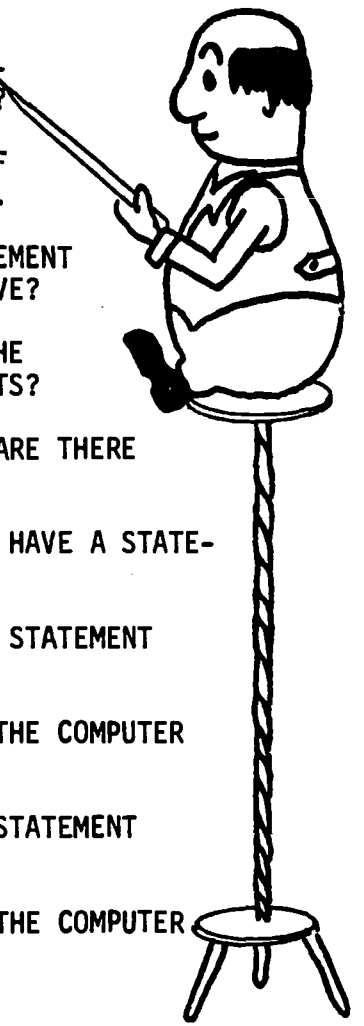
```
10 PRINT  5 + 9

20 PRINT  7 - 3

30 PRINT  8 + 15

40 END
```

Every statement in the above program is numbered. There are 4 statements and the statement numbers 10, 20, 30, 40 were used. The computer will first perform the instruction in the statement with the smallest statement number, then go to the statement with the next higher statement number until it finally comes to the statement with the highest statement number.

In this program the first statement the computer would perform is 10 PRINT 5 + 9 because 10 is the smallest statement number in this program. The last statement the computer would perform is 40 END because 40 is the largest statement number in this program.

The following statements are another example of a program in the BASIC language:

```
10 PRINT  15 + 23
20 END
```



4. WHAT IS EACH INSTRUCTION IN A PROGRAM CALLED?

5. A PROGRAM IS A SET OF _____TO THE COMPUTER.

6. WHAT MUST EVERY STATEMENT IN THE BASIC LANGUAGE HAVE?

7. IN WHAT ORDER DOES THE COMPUTER DO THE STATEMENTS?

8. HOW MANY STATEMENTS ARE THERE IN THE ABOVE PROGRAM?

9. DOES EVERY STATEMENT HAVE A STATEMENT NUMBER?

10. WHAT IS THE SMALLEST STATEMENT NUMBER?

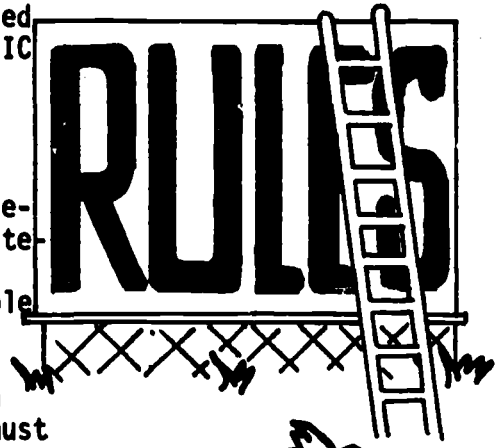
11. WHAT STATEMENT WILL THE COMPUTER DO FIRST?

12. WHAT IS THE LARGEST STATEMENT NUMBER IN THIS PROGRAM?

13. WHAT STATEMENT WILL THE COMPUTER DO LAST?

Another rule of the BASIC language says that every program must have an END instruction. This rule also says that the END statement in a program must always have the largest statement number of the program.

You have now learned two rules of the BASIC language.



These rules are:

1. Every BASIC statement must have a statement number and this number must be a whole number.

2. Every program in the BASIC language must have an END statement and this END statement must have the largest statement number used in the program.

In the program

```
10 PRINT 15 + 23
20 END
```

the largest statement number was 20 and this was the END statement.

14. WHAT KIND OF A STATEMENT MUST EVERY PROGRAM HAVE?

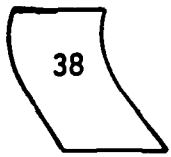
15. WHAT KIND OF STATEMENT ALWAYS HAS THE LARGEST STATEMENT NUMBER IN A BASIC PROGRAM?

Another example of a statement in the BASIC language is the PRINT statement. In the last program the PRINT statement tells the computer first to figure out what the answer to 15 + 23 would be and then print the result. The answer that the computer gives is called the OUTPUT. The output for this program would be:

INPUT

```
10 PRINT 15 + 23
20 END
```

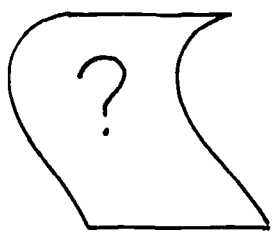
OUTPUT



Here is another example of a BASIC program.

```
10 PRINT 25 + 17
20 PRINT 18 - 13
30 END
```

OUTPUT?



16. WHAT IS THE LARGEST STATEMENT NUMBER IN THIS PROGRAM?

17. WHAT STATEMENT WOULD THE COMPUTER DO FIRST? LAST?

18. IN WHAT ORDER WILL THE COMPUTER DO THE STATEMENTS?

The computer uses a new line of output for every PRINT statement in a program.

When there are two PRINT statements in a program, there will be two lines of OUTPUT.

PROGRAM

```
10 PRINT 25 + 17
20 PRINT 18 - 13
30 END
```

OUTPUT

```
42
5
```

Here is a different way to tell the computer to solve these problems:

```
10 PRINT 25 + 17, 18 - 13
20 END
```

In this new program there is just one PRINT statement so there will be just one line of OUTPUT.

The comma in the PRINT statement tells the computer to continue along that same line to do another problem.

PROGRAM

```
10 PRINT 25 + 17, 18 - 13
20 END
```

OUTPUT

```
42    5
```

Let's compare these programs and their output.

PROGRAM	OUTPUT
10 PRINT 25 + 17 20 PRINT 18 - 13 30 END	42 5
10 PRINT 25 + 17, 18 - 13 20 END	42 5

19. WRITE THE OUTPUT FOR EACH OF THESE PROGRAMS.

```
10 PRINT 5 - 1, 7 + 8
20 PRINT 9 + 9
30 END
```

```
10 PRINT 8 + 3 + 15
20 PRINT 15 - 1
30 END
```

To tell the computer to add, we use +, to subtract we use -, to multiply we use * instead of X, and to divide we use / instead of ÷.

20. WHAT SYMBOL DOES THE COMPUTER USE FOR:

ADDITION, SUBTRACTION,
MULTIPLICATION, DIVISION

Look at the following program and the output.

PROGRAM

```
10 PRINT 6 + 2, 6 - 2, 6 * 2, 6 / 2
20 END
```

OUTPUT

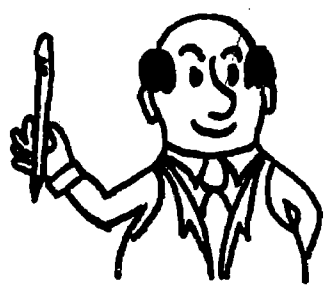
8 4 12 3

21. WHAT OPERATION DID 6*2 TELL THE COMPUTER TO DO?

22. WHAT OPERATION DID 6/2 TELL THE COMPUTER TO DO?

23. WRITE THE OUTPUT FOR THIS PROGRAM:

```
10 PRINT 5 + 2, 5 * 2
20 PRINT 8 / 2, 8 - 2
30 PRINT 9 * 3, 9 + 3
40 END
```



The PRINT statement is also used to tell the computer to copy. We can do this by using quotation marks. The quotation marks instruct the computer to begin and stop copying. For example:

```
10 PRINT "I AM LEARNING BASIC"
20 END
```

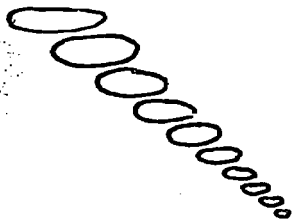
PROGRAM	OUTPUT
10 PRINT "I AM LEARNING BASIC" 20 END	I AM LEARNING BASIC

Here is another example:

```
10 PRINT "5 + 3"
20 PRINT "5 + 3  ="5 + 3
30 END
```

PROGRAM	OUTPUT
10 PRINT "5 + 3"	5 + 3
20 PRINT "5 + 3 = "5 + 3	5 + 3 = 8
30 END	

Remember quotation marks tell the computer to copy and no quotation marks tells the computer to do the operation and then print the result.



24. WHAT WOULD BE THE OUTPUT FOR THIS PROGRAM?

```
10 PRINT "THIS IS IT"
20 PRINT "18 / 2 =" 18 / 2
30 PRINT "I LIKE SCHOOL"
40 END
```

25. CORRECT THE MISTAKES IN THIS PROGRAM: HINT, EVERY STATEMENT HAS A MISTAKE.

```
10 PRINT "THIS IS MY FIRST PROGRAM
20 PRINT 5 x 6
30 PRINT 8 % 2, 8 - 2, 8 + 2
40 WRITE "I LIKE PROGRAMMING"
50 STOP
```

26. DO YOU REMEMBER:

THE SET OF STATEMENTS YOU GIVE THE COMPUTER IS CALLED A_____.

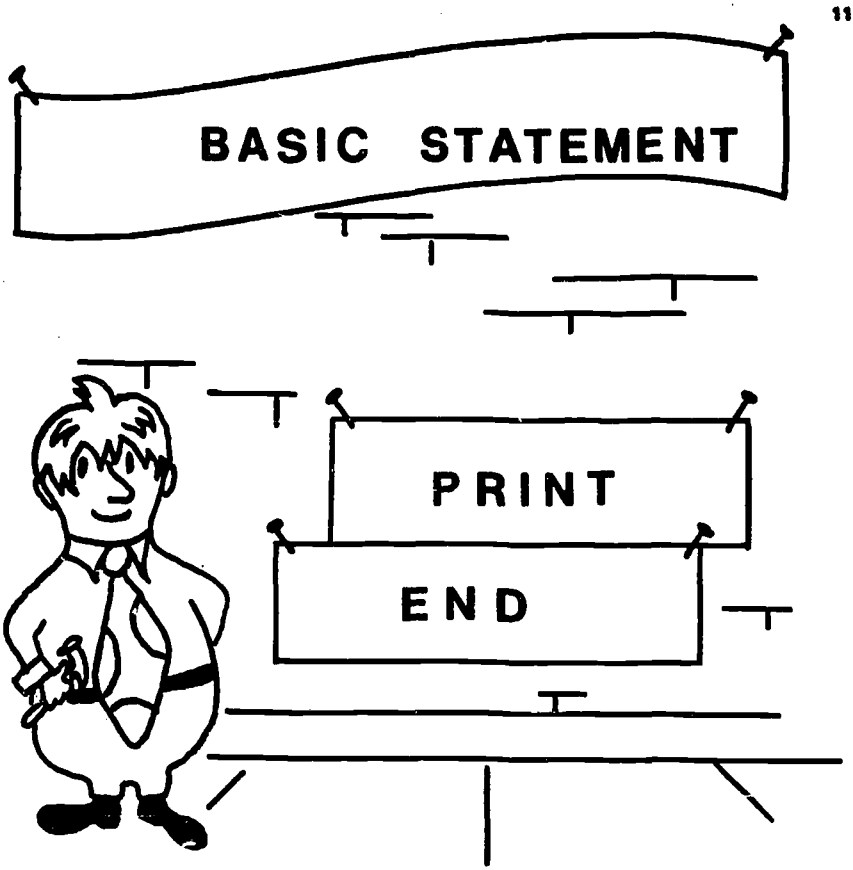
EVERY STATEMENT MUST HAVE A_____ _____.

THE PROGRAMMING LANGUAGE YOU ARE LEARNING IS CALLED_____.

WHAT KIND OF NUMBERS ARE STATEMENT NUMBERS?

WHAT ARE THE TWO BASIC STATEMENTS YOU HAVE LEARNED?

WHAT STATEMENT MUST ALWAYS HAVE THE HIGHEST STATEMENT NUMBER?



If you were able to do these problems then you are ready to go to the next book. You have already learned how to use the PRINT and END statements in the BASIC language.

In the next book you will learn how to use some other BASIC statements.

INDEX

ANSWERS

1. We use the BASIC language to communicate with the computer.

2. We use the teletype terminal to send messages to the computer.

3. The set of instructions we send the computer is called a program.

4. Each instruction in a program is called a statement.

5. A program is a set of instructions to the computer.

6. Every statement in the BASIC language must have a statement number.

7. The computer executes the statements in the order of the statement numbers from smallest to largest.

8. There are two statements.

9. Yes.

10. The smallest statement number is 10.

11. The computer will do 10 PRINT 15 + 23 first.

12. The largest statement number is 20.

13. The computer will do 20 END last.

14. Every program in the BASIC language must have an END statement.

15. The END statement always has the largest statement number.

16. The largest statement number is 30.

17. The computer would do 10 PRINT 25 + 17 first and 30 END last.

18. The computer will do 10 PRINT 25 + 17 first, 20 PRINT 18 - 13 next and 30 END last.

19.

4 15 26

18 14

20. The computer uses the following symbols:

Addition +
Subtraction -
Multiplication *
Division /

21. 6 * 2 tells the computer to multiply 6 times 2.

22. 6/2 tells the computer to divide 6 by 2.

23.

7 10

4 6

27 12

24.

THIS IS IT

18/2 = 9

I LIKE SCHOOL

25.
```
10 PRINT "THIS IS MY FIRST PROGRAM"
20 PRINT 5*6
30 PRINT 8/2, 8 - 2, 8 + 2
40 PRINT "I LIKE PROGRAMMING"
50 END
```

26. The set of statements given to the computer is called a program.

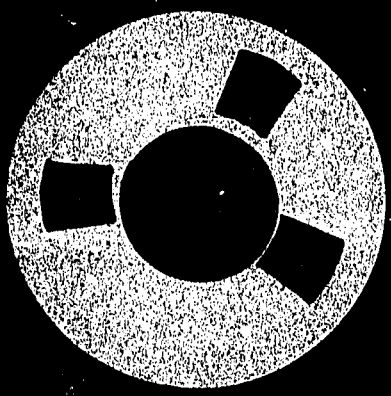
Every statement must have a statement number.

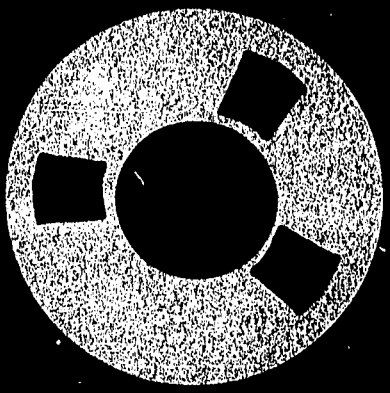
The programming language you are learning is called BASIC.

Statement numbers are whole numbers.

You have learned the PRINT statement and the END statement.

The END statement must always have the highest statement number.





COMPUTER ASSISTED LEARNING

BOOK 3

BASIC 2

written by
Jane Donelly Gawronski, Ph.D.

Illustrated by
John Hendrickson

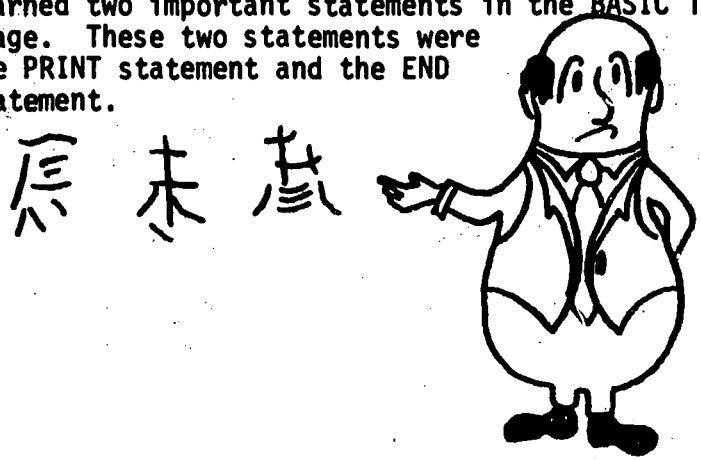
A PRODUCT OF THE

SOUTHEAST ALTERNATIVES PROGRAM

BASIC 2

There are many types of languages and these languages take many different forms. The language you have been using to communicate with the computer is called the BASIC language. It is a combination of English and algebra.

In the Computer Assisted Learning Book 2 you have learned two important statements in the BASIC language. These two statements were the PRINT statement and the END statement.



DO YOU REMEMBER HOW THESE STATEMENTS ARE USED?

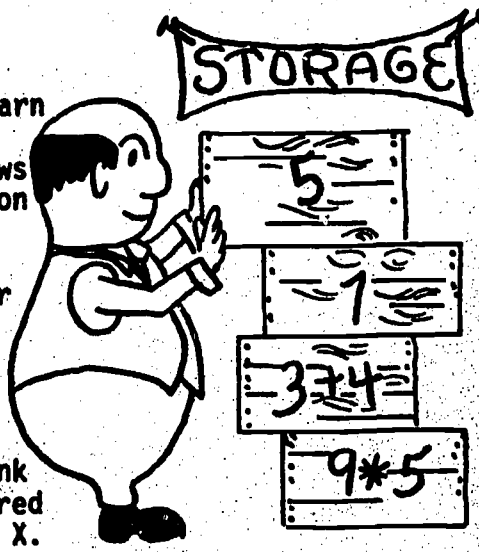
1. WHAT WOULD BE THE OUTPUT FOR THIS PROGRAM?

```
10 PRINT "I AM LEARNING BASIC."
20 PRINT 12*3, 12-3, 12+3, 12/3
30 END
```

One of the new BASIC statements you will learn is the LET statement. The LET statement allows you to store information in the computer. This storage location has many memory boxes. For example, the BASIC statement

10 LET X = 5

tells the computer to store a 5. We can think of this 5 as being stored in a memory box called X.



Memory Box X before statement 10

Memory Box X after statement 10

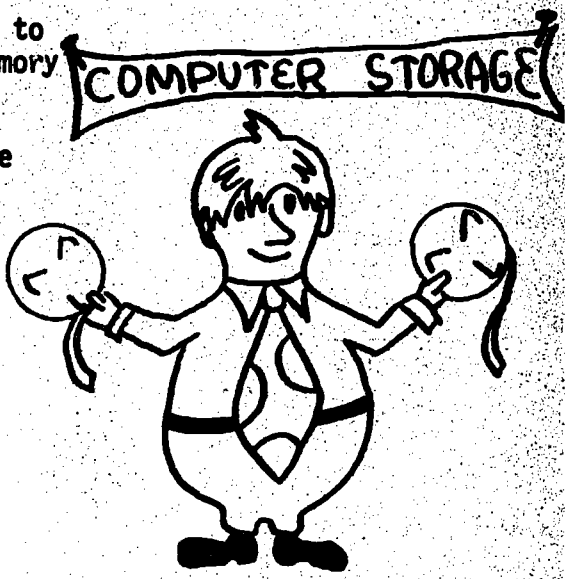
The BASIC statement

15 LET Y = 13

tells the computer to store a 13 in a memory box called Y.

Memory Box Y before statement 15

Memory Box Y after statement 15



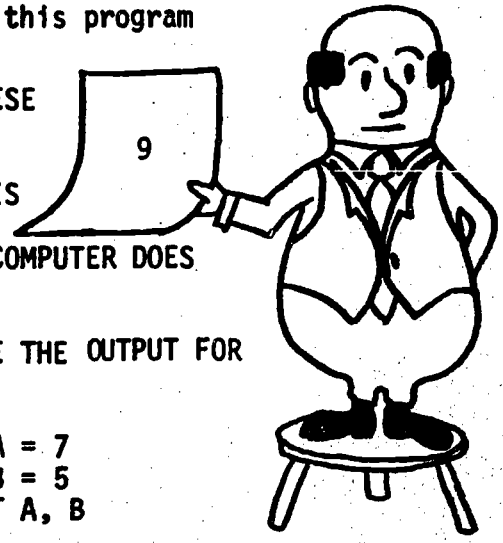
Here is an example of a program that uses the LET statement:

```
10 LET X = 9

20 PRINT X

30 END
```

Let's figure out what this program tells the computer to do.

STATEMENT	WHAT THE COMPUTER DOES
10 LET X = 9	This tells the computer to store a 9 in a memory box called X.
20 PRINT X	This tells the computer to print the number stored in memory box X.
30 END	This tells the computer that this is the end of the program.

The output for this program would be:



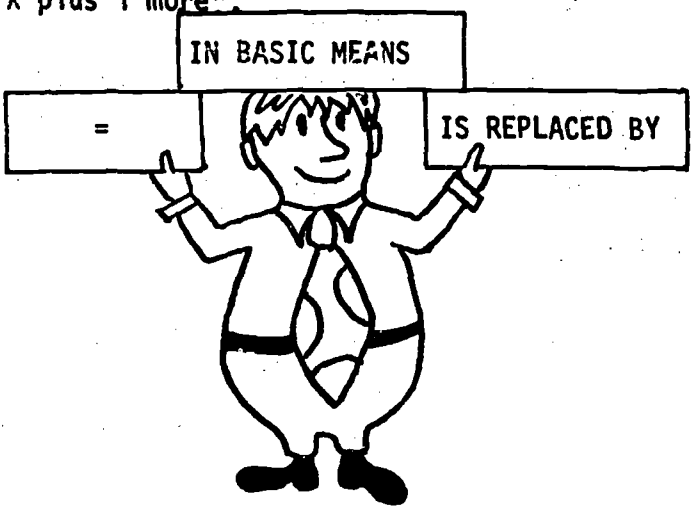
TRY TO ANSWER THESE QUESTIONS.

2. WHAT NUMBER IS STORED IN MEMORY BOX X AFTER THE COMPUTER DOES STATEMENT 10?

3. WHAT WOULD BE THE OUTPUT FOR THIS PROGRAM?

```
 5 LET A = 7
10 LET B = 5
20 PRINT A, B
30 END
```

We can use the LET statement LET X = X + 1 to write a program to print the digits 0, 1, 2, 3. The equals sign in the instruction LET X = X + 1 does not have the same meaning as it does in mathematics. The symbol = in the LET statement in the BASIC language means "is replaced by". The statement LET X = X + 1 really means "let the contents in the memory box called X be replaced by the value of X plus 1 more".




```
10 LET X = 0
20 PRINT X
30 LET X = X + 1
40 PRINT X
50 LET X = X + 1
60 PRINT X
70 LET X = X + 1
80 PRINT X
90 END
```

Let's figure out what the output would be for this program.

STATEMENT	WHAT THE COMPUTER DOES	CONTENTS OF X
10 LET X = 0	Stores a 0 in a memory box called X	[0] X
20 PRINT X	Prints the number stored in memory box X	
30 LET X = X + 1	Tells the computer to increase the number in box X by 1	[1] X
40 PRINT X	Prints the number <u>now</u> stored in memory box X	
50 LET X = X + 1	Tells the computer to increase the number in box X by 1	[2] X
60 PRINT X	Prints the number <u>now</u> stored in memory box X	
70 LET X = X + 1	Tells the computer to increase the number in box X by 1	[ ] X

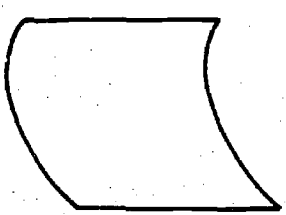
4. WHAT WOULD BE THE CONTENTS OF BOX X AFTER STATEMENT 70?

80 PRINT X	Prints the number <u>now</u> stored in memory box X
90 END	Tells the computer that this is the end of the program

5. HOW MANY PRINT STATEMENTS ARE THERE IN THE ABOVE PROGRAM?

6. HOW MANY LINES OF OUTPUT WILL THERE BE?

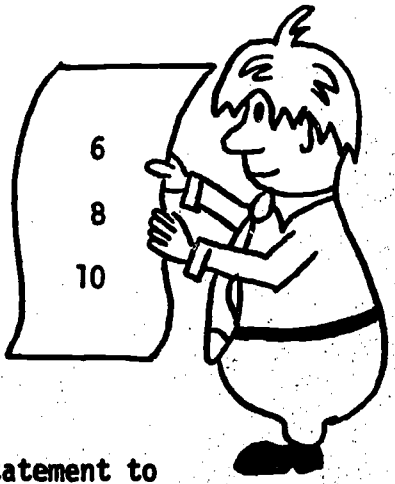
7. WRITE THE OUTPUT FOR THE ABOVE PROGRAM.



The next program was written to print the digits 6, 8, 10. Some of the information has been left out.

8. COMPLETE THIS PROGRAM.

```
10 LET X = 6

20 PRINT -----

30 LET X = X + 2

40 PRINT X

50 LET X =   -----

60

70
```

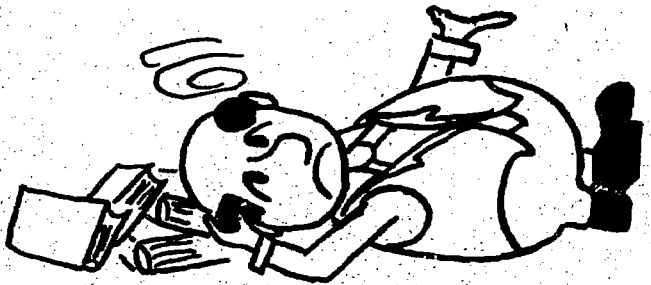


We have used the LET statement to write a program that will print out a sequence of digits. This method will work but would get very tiring if we wanted to print a long sequence of digits. Can you imagine how long this program would have to be to print the numbers from 1 to 1000?

Fortunately there are other BASIC statements to help us out. We will use two BASIC statements: the IF.....THEN.....statement and the GO TO..... statement.

The next program uses the IF △ THEN □ and the GO TO.....statements to print the digits 0, 1, 2, 3.

STATEMENT	WHAT THE COMPUTER DOES	CONTENTS OF X
10 LET X = 0	Stores a 0 in a memory box called X	0 X
20 PRINT X	Prints the number stored in memory box X	
30 LET X = X + 1	Increases the number in box X by 1	1 X
40 IF X>3 THEN 60	If X > 3 is true then statement 60 is the next statement.	
	If X > 3 is not true the statement	

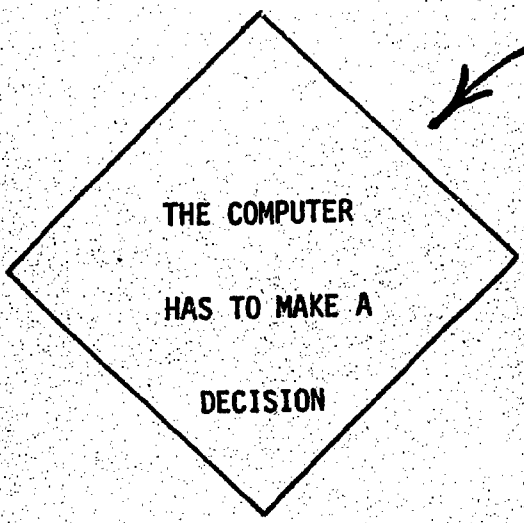


50 GO TO 20	with the next highest statement is read
60 END	Sends the computer back to statement 20

Statement 10 LET X = 0 tells the computer to store a zero in the memory box named X. And statement 20 PRINT X instructs the computer to print the contents of memory box X.

9. WHAT WOULD THE OUTPUT LOOK LIKE AT THIS POINT?

Now statement 30 LET X = X + 1 increases the contents of memory box X by one. Since 0 + 1 = 1, 1 is now stored in memory box X. And statement 40 IF X > 3 THEN 60 is a new BASIC statement. This is called the IF △ THEN □ statement. In this particular IF △ THEN □ statement we are asking the computer if X > 3.



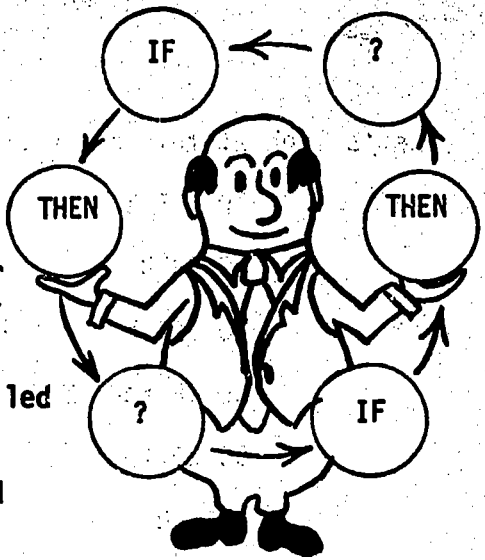
If X > 3 is a true statement then the computer will go to the statement numbered 60. Since the statement numbered 60 is an END statement this would end the program. If X > 3 is not true then the computer will go to the statement with the next higher statement number.

10. SINCE X = 1, is X > 3 A TRUE OR FALSE STATEMENT AT THIS POINT?

The IF △ THEN □ statement was number 40 and the next higher statement is numbered 50. Since X > 3 is not true at this point the computer will read statement 50 next. This statement 50 GO TO 20 tells the computer to go to the statement numbered 20. When X > 3 is not true the computer will always go to the statement 50.

11. TO WHAT STATEMENT DOES STATEMENT 50 SEND THE COMPUTER?

20 PRINT X instructs the computer to print the present value of X. The computer then goes to statement 30 and then to statement 40 again. This is called a LOOP because the computer does some statements over and over again.



Whenever the computer receives an instruction of the form IF △ THEN ▭ it checks to see if △ is true or false. If △ is true, then the computer is sent to statement number ▭. If △ is false, then the computer continues to the statement with the next higher statement number.

12. WHEN THE EXPRESSION △ IS TRUE, WHAT DOES THE COMPUTER DO?

13. WHEN THE EXPRESSION △ IS NOT TRUE, WHAT DOES THE COMPUTER DO?

Let's look at this new program again.

```
10 LET X = 0
20 PRINT X
30 LET X = X + 1
40 IF X>3 THEN 60
50 GO TO 20
60 END
```

14. WRITE A NEW STATEMENT 40 SO THE COMPUTER WILL PRINT THE NUMBERS 1 TO 100.

15. CHANGE THIS PROGRAM SO IT WILL PRINT ONLY THE ODD NUMBERS FROM 1 TO 100.

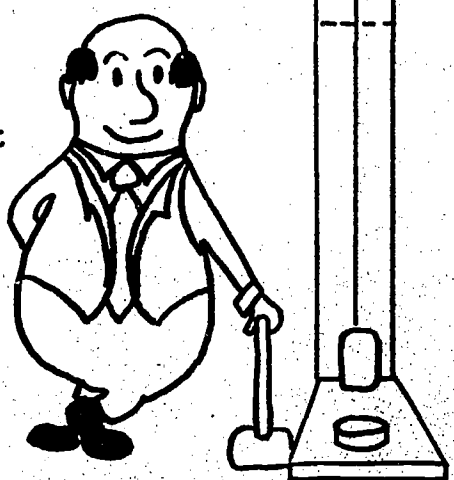
16. WRITE THE OUTPUT FOR THIS PROGRAM.

```
10 LET A = 10
20 LET B = 9
30 IF A + B<20 THEN 60
40 PRINT "NO"
50 GO TO 100
60 PRINT "YES"
100 END
```

17. WRITE THE OUTPUT FOR THIS PROGRAM:

```
 10 LET X = 7
 20 LET Y = X + 3
 30 IF Y>10 THEN 50
 40 GO TO 70
 50 PRINT "Y IS GREATER THAN 10"
 60 GO TO 100
 70 PRINT "Y IS NOT GREATER THAN 10"
100 END
```

18. WRITE A PROGRAM TO PRINT THE EVEN NUMBERS BETWEEN 9 AND 29. WHEN YOU WRITE THIS PROGRAM SHOW IT TO YOUR TEACHER TO CHECK.



If it is correct you are now ready to make a paper tape and use the computer. See your teacher for the special identification number you should use.

INDEX

ANSWERS

1. I AM LEARNING BASIC

   36 9 15 4

2. The number 9 is stored in memory box X after the computer does statement 10.

3. 7 5

4. The contents of box X after statement 70 would be 3.

5. There are four PRINT statements.

6. There will be four lines of output.

7.
```
0
1
2
3
```

8.
```
10 LET X = 6
20 PRINT X
30 LET X = X + 2
40 PRINT X
50 LET X = X + 2
60 PRINT X
70 END
```

9. 0

10. Since X = 1, X > 3 is a false statement.

11. Statement 50 sends the computer to statement 20.

12. When the expression △ is true, the computer goes to the statement □.

13. When the expression △ is not true, the computer continues to the statement with the

next higher statement number.

14. 40 IF X>100 THEN 60.

15.
```
10 LET X = 1
20 PRINT X
30 LET X = X + 2
40 IF X>100 THEN 60
50 GO TO 20
60 END
```

16. YES

17. Y IS NOT GREATER THAN 10

18.
```
10 LET X = 10
20 PRINT X
30 LET X = X + 2
40 IF X>28 THEN 60
50 GO TO 20
60 END
```