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## **Understanding—BASIC Programming for Remedial Students**

Curriculum Unit 81.06.09  
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### ***INTRODUCTION***

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My unit is appropriate for use with remedial students who need extra practice with their basic addition, subtraction, multiplication, and division facts. The computer programs will offer independent work which is challenging but rewarding.

The programs are motivational to facilitate learning because of the new experiences they will offer the student. The students will realize through working with the programs that it is not as difficult as it appears. After a short period of time the initial anxiety should diminish and confidence will be built.

For a student introduction I would explain that a computer is a machine that can do mathematical calculations for them. Also, I would discuss how the different programs they will be working with can help them learn. A few program terms they should become familiar with are "READ", "PRINT", "LET", "DATA", "GO TO", and "END". It would be a good idea to show the students pictures of the computer equipment before they were scheduled to visit the computer room. It is important to discuss why the students should be extremely careful with the equipment previous to the initial visit.

One of the ideas I incorporated into the unit was to make programs where the students can type their own addition, subtraction, multiplication, and division facts into the terminal to receive or give an answer. Using these types of programs the students can work on individual problem facts. I want each student who will be using the computers to have his own record keeping chart to show the improvement in performance. When a student gives a correct response to a program the program will give encouragement by giving a positive response such as "VERY GOOD". By individualizing the programs I hope to allow the students to progress at a comfortable rate.

At the conclusion of the unit I want the students to feel comfortable with the programs. I want to see competency with the basic facts. Hopefully some of the students will have a desire to pursue computers further and develop programs of their own. I also would like the students to understand some of the BASIC computer language.

## ***PROGRAMS***

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All of the programs I have included give an explanation of the program after the program is listed. I have explained what each new statement is as it came up in a program. A brief description of the vocabulary I used is:

REM—makes a remark about the program.

LET—is used when a formula is used in the program.

PRINT—prints the programs results.

READ—is used with a DATA statement to read values.

DATA—is the list of values used in the READ statement.

GO TO—changes the sequence order of a program.

IF—THEN—conditional statement that decides if the program will change.

END—stops the program.

INPUT—tells the computer that information is needed to be typed into the terminal for interaction with the program.

The following vocabulary are terms used to give the computer a command:

SCR—scratch, erases the program from the terminal.

ESC—escape, stops the program from running but it doesn't erase the program.

LIST—lists the program presently in use.

RUN—is the signal to start the computer running.

The following symbols are used:

\*—multiplication

/—division

+—addition

--subtraction

## ADDITION PROGRAMS

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program 1

```
100 REM FIND THE SUM OF THE TWO NUMBERS
```

```
200 LET A=9
```

```
300 LET B=6
```

```
400 LET C=A+B
```

```
500 PRINT A,B,C
```

```
600 END
```

Results:

```
9 6 15
```

### Explanation—program 1

Line 100 A “REM” statement is used to make a remark or comment about the program without affecting the program. It doesn’t matter how many “REM” statements are used in a program.

Line 200 This “LET” statement assigns the variables values.

300

Line 400 “LET” tells the computer the formula for the variables.

Line 500 “PRINT” tells the computer what to print on the terminal. The commas between the variables tell the computer how to space what is to be printed. A semicolon between the variables puts the printed material closer together.

Line 600 “END” tells the computer that the program is complete.

### program 2

```
10 REM FIND THE PERIMETERS OF RECTANGLES
```

```
20 PRINT "TYPE IN TWO NUMBERS SEPARATED BY COMMAS"
```

```
30 INPUT A,B
```

```
40 IF A=99 THEN 90
```

```
50 LET C = 2*A + 2*B
60 PRINT "SIDE", "SIDE", "PERIMETER"
70 PRINT A,B,C
80 GO TO 20
90 END
```

Results:

TYPE IN TWO NUMBERS SEPARATED BY COMMAS

```
SIDE SIDE PERIMETER
5   7   24
```

### **Explanation—program 2**

Line 20 "PRINT" with a message in quotation marks will print the message exactly as it is shown. Line 30 "INPUT" tells the computer that data has to be typed into the terminal before the program will continue.

Line 40 "IF" tells the computer if the value for A=99 then go to statement 90 which will stop the program. If A= any other value the program will continue.

Line 50 When writing a formula multiplication symbols need to be used, they can't be assumed.  $C = 2A + 2B$  will cause an error statement to appear.

Line 60 The commas that separate what is to be printed will allow for neat columns in the printed results. The words in quotation marks will be the headings for each column.

Line 80 "GO TO" tells the computer which line to continue the program on. This "GO TO" statement will allow the program to compute perimeters until the programmer is tired and types 99 into the terminal to end the program.

## ***SUBTRACTION PROGRAMS***

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### **program 1**

```
10 REM FIND THE ANSWER TO TEN SUBTRACTION PROBLEMS
```

```
20 LET I=1
30 READ A,B
40 LET C = A-B
50 PRINT A,B,C
60 LET I = I + 1
70 IF I <= 11 THEN 30
80 DATA 10,6,15,9,12,7,14,5,18,9
90 DATA 11,3,6,2,13,7,6,3,9,1
100 END
```

Results:

```
10 6 4
```

### **Explanation—program 1**

Line 20 This begins the counting for the ten problems.

Line 30 “READ” will read the numbers in the “DATA” by assigning values to the variables.

Line 60 Tells the computer to do the next problem.

Line 70 “IF” tells the computer that if under eleven problems have been done then continue.

Once ten problems are complete the program will end.

Line 80 “DATA” assigns values to the variables.

```
90
```

### **program 2**

```
10 REM SUBTRACT TO FIND THE DIFFERENCE
```

```
20 READ A,B
```

```
30 LET C = A - B
```

```
40 PRINT A,B
```

```
50 PRINT “WHAT IS THE DIFFERENCE?”
```

```
60 INPUT C1
61 PRINT C1
70 IF C1 = C THEN 90
80 PRINT "SORRY, TRY THE NEXT ONE"
84 PRINT
85 GO TO 20
90 PRINT "VERY GOOD"
99 PRINT
100 GO TO 20
110 DATA 16,9,12,4,10,5,8,6,15,7
120 END
```

Results:

```
16 9
WHAT IS THE DIFFERENCE?
7
VERY GOOD
12 4
WHAT IS THE DIFFERENCE?
9
SORRY, TRY THE NEXT ONE
```

Explanation—program 2

Line 70 If the answer that was typed into the terminal was correct then "VERY GOOD" would be printed. If the answer was incorrect "SORRY, TRY THE NEXT ONE" would be printed. Only one try is given to find the answer and then the next problem appears.

Line 84 "PRINT" with nothing after it will allow for a blank space in the results. I used it so the results would be easier to read.

## ***MULTIPLICATION PROGRAMS***

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### **program 1**

```
10 REM TO FIND THE SQUARE OF A NUMBER
20 PRINT "WHAT NUMBER DO YOU WANT TO SQUARE?"
30 INPUT R
40 LET S = R * R
50 PRINT R,S
60 GO TO 20
70 END
```

Results:

```
WHAT NUMBER DO YOU WANT TO SQUARE?
6 36
```

### **Explanation—program 1.**

Line 30 The student can type in any number that they want to be squared. They don't have to know the answer.

### **program 2**

```
10 REM STUDENT INPUTS MULT FACTS AND ANSWERS
15 PRINT " TYPE IN TWO MULT FACTS SEPARATED BY COMMAS"
20 INPUT A,B
30 LET C = A * B
40 PRINT "WHAT IS THE PRODUCT?"
50 INPUT C1
60 IF C1 = C THEN 90
70 PRINT "TRY AGAIN"
75 PRINT "YOUR NUMBERS ARE";
```

76 PRINT A;B

80 GO TO 40

90 PRINT "VERY GOOD"

100 GO TO 15

110 END

Results:

TYPE IN TWO MULT FACTS SEPARATED BY COMMAS

3,5

WHAT IS THE PRODUCT?

14

TRY AGAIN

YOUR NUMBERS ARE 3 5

15

VERY GOOD

### **Explanation—program 2**

Line 20 The student types in both the multiplication facts and 50 the answer.

Line 30 This line could easily be changed to test addition or any other skill.

Line 60 If the answer is incorrect the student gets to try again until the correct answer is given. Each time he tries the numbers are given to him again in case they are not remembered. If the answer is correct he can precede to the next problem of his choice.

Line 75 A semicolon at the end of a statement will cause the next "PRINT" statement to appear on the same line.



## ***DIVISION PROGRAMS***

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### **program 1**

```
100 REM DIVISION
200 PRINT "DIVIDEND", "DIVISOR", "QUOTIENT"
300 PRINT
400 READ A,B
500 IF A = 99 THEN 1000
550 LET C = A/B
600 PRINT A,B,C
700 GO TO 400
800 DATA 6,3,12,4,25,5,16,8
900 DATA 63,9,36,6,30,5,8,2
999 DATA 99,99
1000 END
```

Results:

```
    DIVIDEND DIVISOR QUOTIENT
6 3          2
```

### **Explanation—program 1**

Line 200 Teaches the student what the terms in division are called. The column print out also helps to define them.

Line 500 When A is being read in the data statement as 99 the program will automatically end.

### **program 2**

```
10 REM FIND THE MILES PER GALLON
20 PRINT "TYPE IN MILES AND GALLONS"
30 INPUT M,G
```

```
40 IF M = 99 THEN 90
50 LET P = M/G
60 PRINT "MILES="; M; "GALLONS="; G
70 PRINT "MPG="; P
80 GO TO 30
90 END
```

Results:

TYPE IN MILES AND GALLONS

```
MILES = 60 GALLONS = 2
MFG = 30
```

### **Explanation—program 2**

Line 60 A "PRINT" statement with the equal sign after it allows for the variable to have a label. I used a semicolon to keep the spacing close together.

Line 70 I used another "PRINT" statement so the answer to the formula would show below the numbers

## ***LESSON PLANS***

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I

Show the students a simple computer program and explain how it would work. Include in the explanation all of the vocabulary needed for a full understanding.

II

Take a small group of students to a computer center to use the terminals. Prepare programs for the students ahead of time to insure that the programs will meet the level of the students. Allow the students freedom to explore the programs.

III

Help the students write simple programs of their own to solve. A possible way is to make a flowchart first to show the details of the program.

## ACTIVITY SUGGESTIONS

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1. Take the students on field trips to show them the various ways computers are used in business.
2. Show the students how to draw flowcharts which will help the students see the steps a computer goes through.
3. Write programs from the flowcharts the students write.
4. Before giving a student the basic multiplication program on facts, test the student to find out the problem areas. Data can be controlled to focus in on the needs of an individual student.
5. Make a record keeping chart for all students who use a basic facts program so it will show everyone the improvement the computer helped to make.

### OBJECTIVES

The students will be able to:

1. describe simple BASIC terms such as: "REM", "LET", and "PRINT".
2. describe terms used to give the computer a command such as: "SCR", "ESC", and "LIST".
3. solve addition, subtraction, multiplication, and division problems on a computer.
4. identify the important items in a computer program.

## BIBLIOGRAPHY FOR TEACHERS AND STUDENTS

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Ahl, David H. *Computers In Mathematics : A Sourcebook of Ideas* . New Jersey: Creative Computing Press. 1979.

This book shows a more advanced display of different types of problems to work out on the computer.

Bennett, William Ralph, Jr. *Scientific and Engineering Problemsolving With the Computer*. New Jersey: Prentice- Hall. 1976.

A scientific approach is taken in this book. Many different types of problems are given in a concise manner.

Coan, James S. *Advanced Basic* . New Jersey: Hayden Book Company, Inc. 1977.

The topics are for people who are already familiar with the basic language and would like to pursue basics further. It shows how to use efficiency in programming and a few different techniques.

Corliss, William R. *Computers* . United States Atomic Energy Commission, Division of Technical Information.

A good pocketbook which describes history and how a computer works. It is a very informative book.

Kemeny, John G., and Kurtz, Thomas E. *Basic Programming*. New York: John Wiley and Sons, Inc. 1980.

Excellent introductory book to basic programming language. It explains what a computer is and how it is used.

Marateck, Samuel L. *BASIC* . New York: Academic Press, Inc. 1975.

Excellent book for people not familiar with the basic language. A very detailed description is given for each segment the reader is not familiar with. The book assumes that the reader has no previous knowledge of computers.

Rothman, Stanley and Mosmann, Charles. *Computers and Society* . Chicago: Science Research Associates, Inc. 1972.

Good history of the computer and its use in society today.

Spencer, Donald D. *A Guide to Teaching About Computers in Secondary Schools* . Florida: Abacus Computer Corp. 1973.

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