FLORIDA HIGH SCHOOLS COMPUTING COMPETITION '83

1.1 Write a program which, when given any positive decimal number, will round off the number to the nearest whole number and print the results on the screen.

1.2 Write a program which will ask for any five numbers and print out the numbers in descending order.

1.3 Write a program which will print out the factors of any given number which is entered.

1.4 Write a program which, when a name is inputted, will produce a "Happy Birthday Card" (a bordered message with the words Happy and Birthday, and the persons' name centered within the "card").
```
                ************
                *   HAPPY  *
                * BIRTHDAY *
                *  "Name"  *
                ************
```

1.5 Write a program which will print a question mark on the screen at different random locations approximately every five seconds.

1.6 Write a program so that when "A" is entered "B" appears on the screen; when "B" is entered "C" appears on the screen. Do this for each letter of the alphabet. A "Z" produces an "A".

1.7 Write a program which will print four distinct rectangles, one in each corner of the screen. Use graphics or a selected character.

1.8 Write a program which will count the number of "e"'s in an inputted sentence.

1.9 Write a program with the following DATA statement:
```
        DATA    JOHN,20,70,32
        DATA    BILL,71,40,30
        DATA    MARY,80,42,73
```
The user will input one of the names and the average of the three test scores will be printed.

1.10 Write a program which will ask for a four digit number and will reverse the digits of the number and print out the results.

2.1 Write a program to calculate the area of a regular hexagon, given the perimeter.

2.2 Write a program to convert a base 8 numeral (at most 4 digits) to a base 2 numeral.

2.3 Write a program to ask the operator for the price of several items. A -999 will terminate the input process. The computer will print the subtotal, tax (5%), and total.

2.4 Write a program to divide the screen into 4 approximately congruent rectangles and allow the operator to pick the character that forms the lines (i.e.; lines made of * or ?, etc.).

2.5 Write a program that will accept a list of numbers. A -999 will terminate the input process. The computer will print the greatest and least in the set.

2.6 Write a program that will accept a list of ten numbers. The computer will print the sum, mean, and median.

2.7 Write a program that will allow an operator to enter a sentence (No period). The computer will reverse the order of the words. Example:
```
          THIS IS BACKWARDS
          BACKWARDS IS THIS
```

2.8 Write a program that will convert cubic feet to cubic meters. (1 inch = 2.54 cm)

2.9 Write a program that, when given the equation Y = 2(X+5), will find the sum of the Y's when X has consecutive values from a to b. a and b will be single digit numbers entered by the operator.

2.10 Write a program that will print any keyboard character on the screen for 10 seconds, clear the screen, then print the same character twice (two side by side) for 10 seconds, clear the screen and repeat the process 10 times, each time adding one more character.

3.1 Write a program to convert a given number in a given base to any other given base. The bases may vary from 2 - 10.

    Sample run: NUMBER? 112
                  BASE? 3
                  CONVERT TO BASE? 4
                  ANSWER IS 32

3.2 Write a program to accept the coordinates of the vertices of a triangle as input. (Collinear points should not be accepted.) The computer will determine if the triangle is equilateral, isosceles, or scalene.

3.3 Write a game program in which the computer secretly and randomly selects one coordinate pair on a 10 X 10 grid. The player inputs a guess. If the guess is right, the game is over. Otherwise the computer gives hints to the player by displaying one of the following messages: UP, DOWN, RIGHT, LEFT, UP AND RIGHT, UP AND LEFT, DOWN AND RIGHT, DOWN AND LEFT.

3.4 Write a program to input two numbers, divide the first number by the second number, and carry the division to a given number of decimal places.

    Sample run: FIRST NUMBER? 2
                    SECOND NUMBER? 7
                    NUMBER OF DECIMAL PLACES?   20
                    QUOTIENT IS .28571428571428571428

3.5 The numbers 1 through 8 and a blank are randomly placed in a 3 X 3 array on the screen. For example:

                  5 8 3
                  4 1
                  6 2 7

Write a program so that when a key from 1 - 8 is pressed, the corresponding number on the screen slides horizontally or vertically to the adjacent blank location, the computer does nothing. (For example: in the above diagram, only the 3, 1, and 7 can be moved.) The user can repeat this process of sliding numbers.

3.6 Write a program that will store a list of spelling words. The program displays a menu with these options:

>   1. Add a word to the list
>   2. Delete a word from the list
>   3. Display the entire list

The program performs the above options.

3.7 Write a program to solve cryptorithms. The user inputs two 2-letter addends and a 3-letter sum. The program will generate a numeric solution if a solution is possible. Only the letters A, B, C, D, and E may be used in the input.

```
Sample run:       FIRST ADDEND?  AB
                  SECOND ADDEND? BC
                  SUM?   DDB

One solution is: A = 5
                 B = 6
                 C = 0
                 D = 1
```


3.8 There are nine lily pads in a row. A frog is sitting on the middle pad. The frog jumps one pad to the right or left with equal probability. Write a program that will collect data on the number of hops a frog takes to land on either one of the two lily pads on the ends.

A simple display should show sequence of jumps that the frog takes.

```
                     F
       -- -- -- -- -- -- -- -- --
```

The frog should repeat the task ten times and the number of hops each time should be displayed on the screen.

```
       10  15  8  4  10  11  17  18  32  6
```


3.9 Write a program in which a user types in a one-line sentence. On the line below the sentence, the cursor can be moved right and left using the R and L keys. If the user presses the space bar, the letter above the cursor is deleted and the rest of the sentence is shifted left.

```
For example:        THIS IS AN EXAMPLE
                       -
becomes:            THS IS AN EXAMPLE
                       -
```
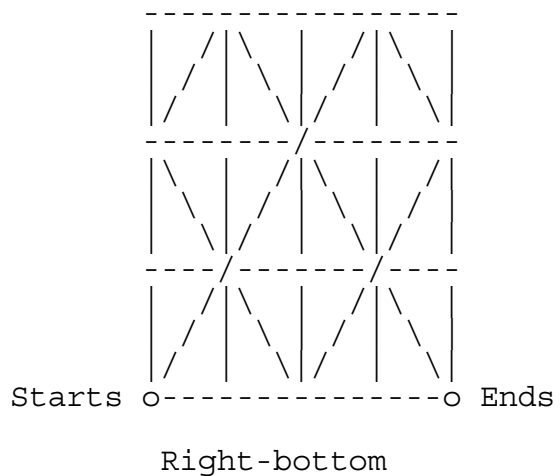
3.10 Write a program that will simulate the movement of a pool ball on a rectangular pool table. The width and length of the table can be any number from 1 to 20. The ball starts at the left hand bottom corner of the table and moves at a 45 degree angle. The ball continues to move until it drops into one of the corner pockets.

The program should display the movement of the ball and indicate which of the three pockets the ball enters. (top-left, top-right, bottom-right).

```
        -----------------          Horizontal = 4
        | /|\   | /|\   |          Vertical   = 3
        |/ | \  |/ | \  |
        |/ |  \ |/ |  \ |
        --------/--------
        |\ |   /|\ |   /|
        | \|  / | \|  / |
        |  \| /  |  \| /  |
        ----/-------/----
        | /|\   | /|\   |
        |/ | \  |/ | \  |
        |/ |  \ |/ |  \ |
  Starts o--------------o Ends

        Right-bottom
```