

Homework Answers Chapter 2

p.75 – 1, 3, 5, 8, 13, 16, 17, 21, p.77 - 1

p. 75 #1

a.

Get values for b and h

Set the value of the area to $(b * h / 2)$

Print the value of area

Stop

b. (let's assume that the interest rate is entered as a decimal number – 10% is entered as .1)

Get values for B and I

Set value of interest to $(B * I)$

Set value of B to $(\text{interest} + B)$

Print the value of interest and B

Stop

c.

Get values of M and S (average speed)

Set value of time to (M / S)

Print the value of time

Stop

p. 75 #3

Get values for Exam1, Exam2, Exam3 and Final

Set value of average to $(\text{Exam1} + \text{Exam2} + \text{Exam3} + 2 * \text{Final}) / 5$

Print the value of average

Stop

p. 75 #5

a.

If $(y = 0)$ then

Print "Unable to perform the division"

Else

Set value of temp to x / y

Print the value of temp

b.

If (radius > 1 OR radius = 1) then

Set value of area to $(3.14159265358979323846... * \text{radius} * \text{radius})$

Set value of circumference to $(2 * 3.14159265358979323846... * \text{radius})$

Else

Set value of circumference to $(2 * 3.14159265358979323846... * \text{radius})$

p. 75 #8

Set the value of i to 1

Set the value of total to 0

While (i < 14 or i = 14) do step 1 through step 3

Step 1: get a value for score

Step 2: set the value of total to (total + score)

Step 3: set the value of i to (i + 1)

Get a value for final

Set value of average to $(\text{total} + \text{final} + \text{final}) / 16$

Print the value of average

Stop

p. 75 #13

1 Get values for NAME, $N_1...N_{10000}$ and $T_1...T_{10000}$

2 Set the value of i to 1 and set the value of count to 0

3 While (i <= 10000) do steps 4 through 7

4 if NAME is equal to the ith name on the list N_i then

5 print the telephone number of person, T_i

6 set the value of count to (count + 1)

7 add 1 to the value of i

8 if (count = 0) then

print the message "Sorry, this name is not in the directory"

9 Else

print "A total of " count "occurrences were located"

10 stop

p. 76 #16

a. While (i > n) do

The first entry in the list of numbers will always be reported as the largest.

b. While (i < n) do

The last number in the list of numbers will never get consideration as the largest.

c. While ($i = n$) do

If the value of n happens to be 2 then the while loop will be executed 1 time – otherwise the while loop will not be executed.

p. 76 #17

a. If $A_i = \text{largest so far then...}$

In this case, the largest will always be reported as the value found in the first place in the list. The value of largest will only be changed if a value in the list is the same as the first value – therefore largest will always be the first value.

b. If $A_i < \text{largest so far then...}$

In this case, the smallest value is found.

Using the correct relational operation is essential to properly control loops and if statements. Often an incorrect relational operation will lead to a “runtime” error in a program.

p. 76 #21

Caesar cipher: each letter is replaced by the k th letter ahead of it in the alphabet

Input:

1. string of letters ending with \$ (delimiter)
2. value of k

Output:

1. encoded text

1. Enter the message string:
 - a. set value of n to 0
 - b. enter a value for letter
 - c. While (letter is not \$) do steps d through f
 - d. set the value of $M(n)$ to letter
 - e. add 1 to n
 - f. enter a value for letter

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2     enter the value of k
3     set value of i to 0
3     While (i < n) do steps 4 through 7
4         if the (numeric value of M(i) + k) is greater than 26 then
5             display the letter associated with the numeric value (numeric value
              of M(i) + k - 26)
6             otherwise display the letter found at (numeric value of M(i) + k)
7             add 1 to i
10    stop

```

p. 77 #1

Input:

1. starting point for the search
2. a step size
3. accuracy desired
4. function (this can also be built into the algorithm. In other words, not entered)

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1     Enter input values:
      a.     enter a value for start
      b.     enter a value for step
      c.     enter a value for accuracy
      d.     enter a value for f (the function)
2     set value of x to start
3     while (the absolute value of size is greater than accuracy) do steps 4 through 7
4         set value of before to x
5         while (f(before) * f(x) is greater than 0) do step 6
6             add size to x
7             multiple size by -.1
8     display (before + x)/2

```

Python code

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def f(x):
    return x + 2

start = 40
size = -3
accur = .000000001
x = start
while abs(size) > accur:
    before = x

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while f(before) * f(x) > 0:  
    x = x + size  
    size = size * -.1  
  
print (before + x)/2
```