CSE20 : Lab #12 – Nested Structures

Overview

This week we are going to put together what we have learned in the course and try to get more practice using nested structures. Every construct we have learned: conditionals, loops and arrays can be used inside one another to make complicated structures.

Loop Related Statements (Chapter 4.6):

Break Statement:

Makes the loop ends completely

Continue Statement:

Skips the rest of the current iteration of the loop
Goes to the next iteration

You can review the chapter 4.7 on how to use these statements. They should come in handy when implementing parts of this lab.

Fibonacci:

Fibonacci sequence consists of numbers that are the sum of the previous two numbers. Starting from the position 0, we get the sequence.

Position	0	1	2	3	4	5	6	7	8
Fib Num	0	1	1	2	3	5	8	13	21

So for position 6, it takes value of position 5 and 4 together to add them up. So this method would return 8 by doing 3+5.

(Reading) Chapter 5.4

- Answer Activity 5.4.1

Getting started

After starting Eclipse, create a new project called Lab 12. Import ChooseFunc.java and MinMaxReverse.java.

(Exercise) Fill-in ChooseFunc.java

Program asks the user to choose from 4 functions it is able to perform.

- If the function number is not 1-4 then it prints out an error *once*
- It asks the max number to calculate up to
- If user wants to enter the inputs (func and max) then redo those steps
- Print out the array's content if the user chooses
    - One line per index and the value
- It should quit if the user choose to end the program

Of course the program does not work correctly so fill-in the required code and make it work according to the specifications above. One sample run is included below to see how the loops should behave.

Sample Output:

```
This program supports 4 functions of a max number:
      1. SumAll
      2. SumSquare
      3. Factorial
      4. Fibonacci
Please choose the function you want:5
Please enter the max number: 5
Error: Do not know 5
Do you wish to repeat inputs? (1 for yes): 1
Please choose the function you want:1
Please enter the max number: 5
Do you wish to repeat inputs? (1 for yes): 0
Do you wish to print out all the results? (1 for yes): 1
Result of the array:
      Index Value
      0     0
      1     1
      2     3
      3     6
      4     10
      5     15
Do you wish to end the program? (1 for yes): 1
```

(Exercise) Fill-in –MinMaxReverse.java

This program finds the minimum number and its index, the maximum number and its index in the array given (*arr*). Then it puts the contents of *arr* in reverse order into *rev_arr*. For example the first entry of *arr* will correspond to the last entry of *rev_arr*. Code is already written to print out the results of both arrays and their corresponding entries. The values in them should match once you have completed the proper code.

Sample Output:

```
Min number is -3000 found at index 2
Max number is 50000 found at index 7

Printing out both array contents and they should be the same
Arr[0]=1           same as     Rev_Arr[12]=1
Arr[1]=2           same as     Rev_Arr[11]=2
Arr[2]=-3000       same as     Rev_Arr[10]=-3000
Arr[3]=4           same as     Rev_Arr[9]=4
Arr[4]=5           same as     Rev_Arr[8]=5
Arr[5]=-100        same as     Rev_Arr[7]=-100
Arr[6]=3           same as     Rev_Arr[6]=3
Arr[7]=50000       same as     Rev_Arr[5]=50000
Arr[8]=700         same as     Rev_Arr[4]=700
Arr[9]=2           same as     Rev_Arr[3]=2
Arr[10]=4          same as     Rev_Arr[2]=4
Arr[11]=6          same as     Rev_Arr[1]=6
Arr[12]=8000       same as     Rev_Arr[0]=8000
```

(Assessment) Logic Check

1) resArr in ChooseFunc.java

   a) Why is it of *long* type (instead of *int*)?

   b) Why is it declared with *[max+2]* spaces?

2) Give an alternative Expression to while(true) in ChooseFunc.java to implement the same function where it keeps looping until the user chooses to end.

3) *min* and *max* variables in MinMaxReverse.java

   a) Why is min initialized to the biggest positive int (Integer.MAX_VALUE)?

   b) Why is max initialized to the smallest negative int (Integer.MIN_VALUE)?

What to hand in

When you are done with this lab assignment, you are ready to submit your work. Make sure you have done the following ***before*** you press Submit:

- Include answers to Activity 5.4.1
- Include answers to Assessment questions
- Attach filled in ChooseFunc.java and MinMaxReverse.java
- List of Collaborators