CS175: Programming in Java 2016/17
LAB Questions - SET 3 10 March 2017

Note: All questions should be tested (compile and run). You can use command window or Java IDE. Create a different classname for each question. If using IDE, then all classes should be in the same Project. Name of classes can be for example: `Lab3Qtnx.java` where x can be 1, 2,3, ….

Question 1

Write a program which will display the first N odd numbers (1, 3, 5, …) where 1≤N≤20. That means, if N=4 then numbers 1 3 5 7 should be displayed. Numbers should be separated from each other using a single space. N should be declared and **initiated with** a value. If N is outside the range, display the message `value of N=… specified is outside the range` and then quit the program. Test your program with (a) N=5 (b) N=8 (c) N=20 (d) N=25. Utilize (i) do..while (ii) while structure.

Question 2

Re-answer question 1, but now display the first N even numbers

Question 3

Re-answer question 1 above but now display the numbers (***maximum of six numbers per line***) and also the average and product of the numbers displayed. Format of display is as follows:

Odd numbers are:
x x x x x x // where x stand for actual numbers
x x x x x x
… … … … … …
Product= ….
Average = … //average should be displayed using 4 decimal places

Question 4

Given the following pseudocode:

```
1.  START
2.  input Y          // where Y>=2
3.  A=0, B=1
4.  display A,B     // display A then comma then B
5.  C=A+B
6.  display C
7.  A=B
8.  B=C
9.  if C<Y goto 5
10. STOP
```

Above algorithm generates what is called **Fibonacci series**.

(a) Draw the flowchart for above pseudocode

(b) Write a program to implement above pseudocode. **Note**: Numbers should be separated from each other by a comma and should be displayed in a single line. Test your program with (i) Y=5 (ii) Y=21 (iii) Y=55. ***Make sure you don't utilize goto in your program***.

Question 5

Write a program which assigns an integer variable **month** a value in the range of 1 to 12 and another integer variable **year** a value in the range of 1981 to 2017 and then display the month name and numbers of days in that month. If the two values are outside the range display any error message of your choice and exit the program. If correct values are entered, display the results. Take care of the

month February depending whether you have `leap` year or not. Utilize the switch structure somewhere in your program. Test your program with (a) month=2, year =2008 (b) month=11, year=1999 (c) month=13 year= 2008 (d) month=6 year=2007 (e) month=2 year=2017.

Sample output is for month=6 and year=2007

```
Month number is:     6
Year is:             2007
Month name is :      June
Number of days is:     30
```

Question 6

Write a program which assign values to double variables `num1, num2, num3,` and `num4` and in turn calculate and display the maximum, minimum and average values. Test your program with:

(a) num1=34.67, num2=-23.45, num3=78.99 , num4=79.12
(b) num1=34.67, num2=23.45, num3=-78.99 , num4=-79.12

Display format should be:

```
Numbers entered (num1, num2, num3, num4) are: …., …., ……, ……
Maximum value= ........
Minimum value = ........
Average value = ........   // average should displayed to 4 dec. places
```

Question 7

Using `for` loop(s), write a program that displays a N times" multiplication table where N is assigned a value in the code and 1≤N≤12. For example, when N=7 then the output should look like this. Make sure your table is neat tabulated using %d and %s format specifiers.

```
7 x 1 =7
7 x 2 =14
……
7 x 12 =84
```

Question 8

A program which will display the factorial of a positive number N has to be developed, where N is an integer and 0≤N≤X.

(a) If the answer has to be stored as **integer**, theoretically, what is allowable range of X? Give a reason to support your answer.
(b) If the answer has to be stored as **long**, theoretically, what is allowable range of X? Give a reason to support your answer.
(c) Write a program which will find and display a factorial of a number stored in variable N using your answer of part (b) above (you have to assign a value to N in your program). If N is outside the range (exceeds value of X stated above) display error message and exit the program. Format of display for N=6 should be:
6! = 720.

Test your program for (a) N=0 (b) N=13 (c) N=20 (d) N=22

Question 9

Write a program which displays the first **N** even numbers in **descending** order in the same line. Numbers should be separated by comma. You have to assign a positive value of N where 1≤N≤15 in your program. Test your program with (a) N=4 (b) N=12 (c) N=15.

Hint: *Arithmetic Progression.*

== END ==