COMSATS University Islamabad
Department of Computer Science
Programming Fundamentals (CSC103) – BSCS-2A & 2B
LAB Assignment – 2 (CLO-3)

Due Date: November 14, 2021 (11:59 pm)

Total Marks: 5 x 5 = 25

Instructions

Answer to all questions must be submitted in MS Word.

Answer to all questions should begin on new page.

Assignment document must contain a title page showing LAB-Assignment-2, your name and registration number.

Assignment document must also contain JAVA source code along with output.

Solution to JAVA Programming problems must be created in separate .java file (for each question). For example, Question1.java

You must follow proper JAVA naming convention for identifiers and properly document your source code

Combine all your work in one folder. The folder must contain .JAVA source files and a .doc/.docx file.

Name of the Assignment document file should be your Registration Number. E.g. FA21BCS01.docx

Submit your work via MS Teams

Plagiarism: Plagiarism is not allowed. If found plagiarized, zero marks will be awarded in the assignment.

Question – 1:

Write a nested for loop that prints the following output:

```
                        1
                   1    2    1
              1    2    4    2    1
         1    2    4    8    4    2    1
    1    2    4    8   16    8    4    2    1
1    2    4    8   16   32   16    8    4    2    1
1    2    4    8   16   32   64   32   16    8    4    2    1
1    2    4    8   16   32   64  128   64   32   16    8    4    2    1
```

Question – 2:

Write a program that prompts the user to enter the year and first day of the year, and displays the first day of each month in the year. For example, if the user entered the year 2013, and 2 for Tuesday, January 1, 2013, your program should display the following output:

January 1, 2013 is Tuesday

...

December 1, 2013 is Sunday

Question – 3:

Write a function capitalize(lower_case_word) that takes the lower case word and returns the word with the first letter capitalized. Eg., System.out.println(capitalize("word")) should print the word **Word**.

Then, given a line of lowercase ASCII words (text separated by a single space), print it with the first letter of each word capitalized using the your own function capitalize().

Question – 4:

Write a method that displays an n-by-n matrix using the following header: public static void printMatrix(int n)
Each element is 0 or 1, which is generated randomly. Write a test program that prompts the user to enter n and displays an n-by-n matrix. Here is a sample run:

Enter n: 3
0 1 0
0 0 0
1 1 1

Question – 5:

The area of a pentagon can be computed using the following formula:

$$Area = \frac{5 \times s^2}{4 \times \tan\left(\dfrac{\pi}{5}\right)}$$

Write a method that returns the area of a pentagon using the following header:
public static double area(double side)
Write a main method that prompts the user to enter the side of a pentagon and displays its area

Sample Run

Enter the side: 5.5
The area of the pentagon is 52.04444136781625