Lab 8

for Loop

Name-Surname.....Student No.....Section (LAB).....

Lab instruction

1. Open VS code or JAVA IDE in your computer.
2. Create a new java class name MultiplicationTable.java, then write the following code.

```java
public class MultiplicationTable {
        /** Main method */
        public static void main(String[] args) {
          // Display the table heading
          System.out.println("           Multiplication Table");

          // Display the number title
          System.out.print("    ");
          for (int j = 1; j <= 9; j++)
           System.out.print("   " + j);

         System.out.println("\n----------------------------------------");

        // Print table body
         for (int i = 1; i <= 9; i++) {
           System.out.print(i + " | ");
           for (int j = 1; j <= 9; j++) {
             // Display the product and align properly
             System.out.printf("%4d", i * j);
           }
           System.out.println();
         }
       }
     }
```

3. Compile and run program. See the output of the program.
4. Modify the program to generate output follow the picture.

```
      9   8   7   6   5   4   3   2   1
-------------------------------------
9 |  81  72  63  54  45  36  27  18   9
8 |  72  64  56  48  40  32  24  16   8
7 |  63  56  49  42  35  28  21  14   7
6 |  54  48  42  36  30  24  18  12   6
5 |  45  40  35  30  25  20  15  10   5
4 |  36  32  28  24  20  16  12   8   4
3 |  27  24  21  18  15  12   9   6   3
2 |  18  16  14  12  10   8   6   4   2
1 |   9   8   7   6   5   4   3   2   1
```

**********CHECK POINT #1**********

5. Factorial calculator, Develop a java program to calculate the factorial of a given number. The program can accept the number from user and show the result to the user.

Example:

$$10! = 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 3628800$$

In general, we can write the formula for finding factorial as

$$n! = (n) \times (n-1) \times (n-2) \times (n-3) \times \ldots \times 1$$

**********CHECK POINT #2**********

6. Display Pyramid number, Write java program by using the nested loop to display the pyramid number in 7 rows and number inside pyramid are power by 2 (Math.pow(x,y)) following the example 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
```

**********CHECK POINT #3**********

7. Hexadecimals are often used in computer systems programming (https://en.wikipedia.org/wiki/Hexadecimal). How do you convert a decimal number to a hexadecimal number? To convert a decimal number *d* to a hexadecimal number is to find the hexadecimal digits h_n, h_{n-1}, h_{n-2}, ... , h_2, h_1, and h_0 such that

$$d = h_n \times 16^n + h_{n-1} \times 16^{n-1} + h_{n-2} \times 16^{n-2} + \ldots + h_2 \times 16^2 + h_1 \times 16^1 + h_0 \times 16^0$$

These hexadecimal digits can be found by successively dividing *d* by 16 until the quotient is 0. The remainders are h_0, h_1, h_2, ... , h_{n-2}, h_{n-1}, and h_n. Use the for loop to receive the decimal number and convert to the hexadecimal by using the for loop. [Do not use Integer.toHexString(int) in the program]

**********CHECK POINT #4**********

----------End of Lab----------