**Lab sheet 04: Loops**

1. Write a program to print numbers from 1 to 10.
2. Write a program to calculate the sum of first 10 natural number.
3. Write a program that prompts the user to input a positive integer. It should then print the multiplication table of that number.
4. Write a program to find the factorial value of any number entered through the keyboard
5. Two numbers are entered through the keyboard. Write a program to find the value of one number raised to the power of another.

**Powers of 2**

Write a java program ***PowersOf2*.java** to read in an integer from the user and print out that many powers of 2, starting with 2^0.

For example, if the user enters 4, your program should print this:

Here are the first 4 powers of 2:

1

2

4

8

2. Modify the program so that instead of just printing the powers, you print which power each is, e.g.: Here are the first 4 powers of 2:

2^0 = 1

2^1 = 2

2^2 = 4

2^3 = 8

**Nested Loops**

Print the following patterns in java

1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

\*

\*A\*

\*A\*A\*

\*A\*A\*A\*

\*A\*A\*A\*A\*

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

\*\*\*\*

\*\*\*

\*\*

\*

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

55555

4444

333

22

1

\*\*\*\*\*

\*\*\*\*

\*\*\*

\*\*

\*

1

22

333

4444

55555

\*

\*\*

\*\*\*

\*\*\*\*

\*\*\*\*\*

1. Write a program that prompts the user to input an integer and then outputs the number with the digits reversed.

For example, if the input is 12345, the output should be 54321

1. Write a do-while loop that asks the user to enter two numbers. The numbers should be added and the sum displayed. The loop should ask the user whether he or she wishes to perform the operation again. If so, the loop should repeat; otherwise it should terminate.
2. Let’s say you are given a number, a, and you want to find its square root. One way to do that is to start with a rough guess about the answer, x0, and then improve the guess by using this formula:

x1 = (x0 + a/x0) / 2

For example, if we want to find the square root of 9, and we start with x0 = 6, then x1 = (6 + 9/6) / 2 = 3.75, which is closer. We can repeat the procedure, using x1 to calculate x2, and so on. In this case, x2 = 3.075 and x3 = 3.00091.

So the repetition converges quickly on the correct answer.