Tutorial 8

Exercise 1 - Factorials

Write a Java program that asks the user for a positive integer less than 15 and shows how to calculate its factorial and prints the result. If the user inputs an invalid number then print an error message and exit.

Example 1
```
Please input a positive integer less than 15: 6

6! = 6 * 5 * 4 * 3 * 2 * 1 = 720
```

Example 2
```
Please input a positive integer less than 15: 20

Invalid input
```

Exercise 2 – Loop control

What is the value of *counter* after executing the following code snippets? Note: *counter* is an integer that was initialized to zero before executing each snippet.

A. `for (int i=1; i < 10; i += 2) counter++;`

B. `while (counter <= 10) counter += 2;`

C. `do counter++; while (counter < 0);`

D.
```
for (int i=1; i < 10; i++) {

    if ((i % 2) == 0) continue;

    counter++;

}
```

E. ```
    while (counter < 10) {

        if ((counter % 2) == 0) break;

        counter++;

    }
    ```

F.  ```
    for ( int i=1; i != 10; i++) {

        counter++;

        i++;

    }
    ```

Exercise 3 – x^Y

Write and test a java program that reads two positive integers x and y (less than 15) and computes and displays x^y. x^y is simply x multiplied by itself y times.

Example:
```
Please enter two integers smaller than 15: 10 6

10^6 equals 1000000
```

Exercise 4 [Homework] – Numbers Diamond

Write a Java program that asks the user for a positive integer between 1 and 9 and prints a diamond of numbers as shown in the example.

Example
```
Please input an integer between 1 and 9: 5
```

```
                1

            1  2  1

         1  2  3  2  1

      1  2  3  4  3  2  1

   1  2  3  4  5  4  3  2  1

      1  2  3  4  3  2  1

         1  2  3  2  1

            1  2  1

                1
```