

# Tutorial 8

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## 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