# Java Basics – Algorithms

The goal of this lab is to practice **creation of algorithms**. Your task is to write your interpretation of the algorithm (without rewriting the entire code).

## Problem 3. Insertion Sort

Write a sorting algorithm of type **Insertion sort**. It should iterate through a list of integers and sort them. The way insertion sort algorithm works is:

* Mark the first element as sorted.
* Remove the current element from the list.
* Start iterating to the left to find which position is suitable for the current element. A suitable position is considered a place where the element to the left is no longer bigger than the current element.

More information about the insertion sorting algorithm could be found [here](http://visualgo.net/sorting.html).

After you get the expected output, uncomment the comments in the pseudo code to see how long does it take for your algorithm to execute. Test it with a lot of elements to see the difference.

### Output

You should print out the sorted list in the format described below.

### Constraints

* The input list will hold integers in the range [−2147483648 … 2147483647].
* The size of the list could be [10…50000].
* There could be elements in the list that hold the same values.
* **You are forbidden to use .sort() methods**

### Tests

|  |  |
| --- | --- |
| **Input** | **Expected Output** |
| [22, 37, 39, 89, 38, 21, 34, 61, 67, 73, 70, 29, 34, 84, 76, 87, 9, 56, 61, 61, 74, 52, 93, 74, 47, 13, 6, 82, 32, 43, 40, 68, 88, 67, 40, 34, 88, 53, 2, 82, 74, 44, 4, 96, 3, 43, 98, 68, 24, 90, 52, 97, 93, 61, 73, 71, 97, 8, 57, 57, 81, 93, 92, 8, 93, 77, 94, 56, 48, 60, 12, 1, 11, 21, 45, 78, 80, 51, 9, 33, 49, 47, 98, 0, 62, 83, 93, 40, 38, 29, 76, 6, 35, 68, 90, 36, 0, 55, 95, 72, 15, 3, 2, 85, 31, 17, 10, 32, 78, 35, 44, 25, 7, 80, 16, 12, 12, 9, 42, 68, 0, 77, 68, 62, 8, 72, 22, 20, 80, 96, 17, 72, 24, 62, 19, 89, 93, 49, 46, 45, 39, 80, 56, 16, 59, 17, 39, 74, 90, 19, 0, 12, 69, 5, 55, 36, 76, 61, 29, 64, 77, 9, 60, 57, 84, 16, 34, 1, 71, 59, 97, 25, 42, 25, 63, 27, 53, 37, 57, 78, 26, 36, 98, 14, 61, 17, 90, 37, 57, 41, 89, 45, 60, 25, 70, 56, 77, 7, 77, 62] | [0, 0, 0, 0, 1, 1, 2, 2, 3, 3, 4, 5, 6, 6, 7, 7, 8, 8, 8, 9, 9, 9, 9, 10, 11, 12, 12, 12, 12, 13, 14, 15, 16, 16, 16, 17, 17, 17, 17, 19, 19, 20, 21, 21, 22, 22, 24, 24, 25, 25, 25, 25, 26, 27, 29, 29, 29, 31, 32, 32, 33, 34, 34, 34, 34, 35, 35, 36, 36, 36, 37, 37, 37, 38, 38, 39, 39, 39, 40, 40, 40, 41, 42, 42, 43, 43, 44, 44, 45, 45, 45, 46, 47, 47, 48, 49, 49, 51, 52, 52, 53, 53, 55, 55, 56, 56, 56, 56, 57, 57, 57, 57, 57, 59, 59, 60, 60, 60, 61, 61, 61, 61, 61, 61, 62, 62, 62, 62, 63, 64, 67, 67, 68, 68, 68, 68, 68, 69, 70, 70, 71, 71, 72, 72, 72, 73, 73, 74, 74, 74, 74, 76, 76, 76, 77, 77, 77, 77, 77, 78, 78, 78, 80, 80, 80, 80, 81, 82, 82, 83, 84, 84, 85, 87, 88, 88, 89, 89, 89, 90, 90, 90, 90, 92, 93, 93, 93, 93, 93, 93, 94, 95, 96, 96, 97, 97, 97, 98, 98, 98] |