# 05. Associative Containers and STL Algorithms – Homework Exercises

Write C++ code for solving the tasks on the following pages.

Code should compile under the C++03 or the C++11 standard.

Please submit a single.cpp file for each task.

.cpp files for the tasks should be named with the task number followed by what you feel describes the exercise in a few words.

E.g. a good name for task 2 of this homework would be:  
2.odd-occurrences.cpp

Don’t worry about the name too much, just make sure the number and the file extension are correct.

# Task 1 - Count Real Numbers

Read a **list of real numbers** and **print them in ascending order** along with their **number of occurrences**.

### Examples

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |  | **Input** | **Output** |
| 8 2.5 2.5 8 2.5 | 2.5 -> 3  8 -> 2 | 1.5 5 1.5 3 | 1.5 -> 2  3 -> 1  5 -> 1 | -2 0.33 0.33 2 | -2 -> 1  0.33 -> 2  2 -> 1 |

# Task 2 – Odd Occurrences

Write a program that extracts from a given sequence of words all elements that appear in it an **odd number of times** (case-insensitive).

* Words are given in a single line, space separated.
* Print the result elements in lowercase, in their order of appearance.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Java C# PHP PHP JAVA C java | java, c#, c |
| 3 5 5 hi pi HO Hi 5 ho 3 hi pi | 5, hi |
| a a A SQL xx a xx a A a XX c | a, sql, xx, c |

# Task 3 – Largest 3

Read a **list of real numbers** and **print largest 3 of them**. If less than 3 numbers exit, print all of them.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| 10 30 15 20 50 5 | 50 30 20 | 20 30 | 30 20 |

# Task 4 – Short Words

Read a **text**, extract its **words** (separated by spaces) find all **short words** (less than 5 characters) and print them **alphabetically**, in **lowercase**, separate by a single comma and a single space

* Use case-insensitive matching.
* Remove duplicated words.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| In SoftUni you can study Java C# PHP and JavaScript JAVA and c# developers graduate in 2-3 years Go in | 2-3, and, c#, can, go, in, java, php, you |

# Task 5 – Sort Numbers

Read a **list of decimal numbers** and **sort** them in increasing order. Print the output as shown in the examples below.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 8 2 7 3 | 2 <= 3 <= 7 <= 8 |
| 2 4 -9 | -9 <= 2 <= 4 |

# Task 6 – Squares

Read a **list of integers** and **extract all square numbers** from it and print them in **descending order**. A **square number** is an integer which is the square of any integer. For example, 1, 4, 9, 16 are square numbers.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 3 16 4 5 6 8 9 | 16 9 4 |
| 1 9 4 16 8 25 49 16 | 49 25 16 16 9 4 1 |

# Task 7 - Miners

You are given a sequence of strings, each on a new line. Every odd line on the console is representing a resource (e.g. Gold, Silver, Copper, and so on), and every even – quantity. Your task is to collect the resources and print them each on a new line.

**Print the resources and their quantities in format:**

**{resource} –> {quantity}**

The quantities inputs will be in the range [1 … 2 000]

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| Gold  155  Silver  10  Copper  17  stop | Gold -> 155  Silver -> 10  Copper -> 17 |  | gold  155  silver  10  copper  17  gold  15  stop | gold -> 170  silver -> 10  copper -> 17 |