**Exercises: Functional Programming**

This document defines the exercises for ["Java Advanced" course @ Software University](https://softuni.bg/modules/59/java-advanced). Please submit your solutions (source code) of all below described problems in [Judge](https://judge.softuni.bg/Contests/1514/Functional-Programming-Exercises).

* **Consumer Print**

Write a program that **reads** a collection of **strings**, separated by one or **more** whitespaces, from the console and then prints them onto the console. Each string should be printed on a new line. Use a **Consumer<T>**.

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| Peter George Alex | Peter  George  Alex |
| John Sam Sara | John  Sam  Sara |

* **Knights of Honor**

Write a program that **reads a collection of names** as strings from the console and then **appends** "**Sir**" in front of every name and prints it back onto the console. Use a **Consumer<T>**.

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| Peter George Alex Stan | Sir Peter  Sir George  Sir Alex  Sir Stan |
| Alex George Peter | Sir Alex  Sir George  Sir Peter |

* **Custom Min Function**

Write a simple program that **reads** a **set of numbers** from the console and finds the **smallest** of the **numbers** using a simple **Function<Integer[], Integer>**.

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 4 3 2 1 7 13 | 1 |
| 4 5 -2 3 -5 8 | -5 |

* **Applied Arithmetic**

On the first line, you are given a **list of numbers**. On the next lines you are passed different **commands** that you need to apply to all numbers in the list: "**add**" -> adds 1; "**multiply**" -> multiplies by 2; "**subtract**" -> subtracts 1; "**print**" -> prints all numbers on **a new line**. The input will end with an "**end**" command, after which you need to print the result.

**Examples**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| 1 2 3 4 5  add  add  print  end | 3 4 5 6 7 | 5 10  multiply  subtract  print  end | 9 19 |

* **Reverse and Exclude**

Write a program that **reverses** a collection and **removes** elements that are **divisible** by a given integer **n**.

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 2 3 4 5 6  2 | 5 3 1 |
| 20 10 40 30 60 50  3 | 50 40 10 20 |

* **Predicate for Names**

Write a **predicate**. Its goal is to **check** a name for its length and to return **true** if the length of the name is **less or equal** to the passed **integer**. You will be given an **integer** that represents the length you have to use. On the second line, you will be given a **string** array with some names. Print the names, passing the **condition** in the predicate.

**Examples**

|  |  |  |  |
| --- | --- | --- | --- |
| **Input** | **Output** | **Input** | **Output** |
| 4  Sara Sam George Mark John | Sara  Sam  Mark  John | 4  George Peter Zara Sara | Zara Sara |

* **Find the Smallest Element**

Write a program which is using a custom **function** (written by you) to find the **smallest** integer in a **sequence** of **integers**. The input could have more than one space. Your task is to **collect** the integers from the console, find the **smallest** **one** and print its **index** (if **more** than one such elements exist, print the index of the **rightmost** one).

**Hints**

* Use a **Function<List<Integer>, Integer>** or something similar.

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 2 3 0 4 5 6 | 3 |
| 123 10 11 3 | 3 |

* **Custom Comparator**

Write a custom **comparator** that **sorts** all even numbers before all **odd** ones in **ascending order**. Pass it to an **Arrays.sort()** function and print the result.

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 2 3 4 5 6 | 2 4 6 1 3 5 |
| -3 2 | 2 -3 |

* **List of Predicates**

Find all **numbers** in the range **1..N** that is **divisible** by the numbers of a given sequence. Use **predicates**.

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| 10  1 1 1 2 | 2 4 6 8 10 |
| 100  2 5 10 20 | 20 40 60 80 100 |