# More Exercises: Arrays and Methods

Problems for exercises and homework for the [“Programming Fundamentals” course @ SoftUni](https://softuni.bg/courses/programming-fundamentals).

## Array Statistics

Write a program which receives array of **integers** (**space-separated**) and prints the **minimum** and **maximum** **number**, the **sum** of the elements and the **average** value.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| 2 3 4 5 6 1 | Min = 1  Max = 6  Sum = 21  Average = 3.5 | -1 200 124123 -400 -124214 | Min = -124214  Max = 124123  Sum = -292  Average = -58.4 |

## Manipulate Array

You will receive an **array** of **strings** and you have to execute some **command** upon it. You can receive **three** types of **commands**:

* Reverse– **reverse** the array
* Distinct – **delete** all non-unique elements from the array
* Replace {index} {string} – **replace** the element at the given **index** with the **string**, which will be given to you

### Input

* On the **first** **line**, you will receive the **string array**
* On the **second** **line**, you will receive **n** – the number of **lines**, which will **follow**
* On the next **n lines** – you will receive **commands**

### Output

At the end print the array in the following format:

{1st element}, {2nd element}, {3rd element} … {nth element}

### Constraints

* For **separator** will be used only **single whitespace**
* **n** will be **integer** in the interval **[1…100]**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| **one one one two three four five**  **3**  Distinct  Reverse  Replace 2 Hello | five, four, Hello, two, one |
| **Input** | **Output** |
| **Alpha Bravo Charlie Delta Echo Foxtrot**  **6**  Distinct  Reverse  Replace 1 Charlie  Distinct  Reverse  Replace 2 Charlie | Alpha, Bravo, Charlie, Charlie, Foxtrot |

## Safe Manipulation

Now we need to make our program safer and more user-friendly. Make the program print “**Invalid input!”** if we try to replace an element at a **non-existent** index or an **invalid** command is written on the console. Also make the program work **until** the command “**END**” is given as an **input**.

### Input

* On the **first** **line**, you will receive the **string array**
* On the next **lines until** youreceive **“END”** – you will receive **commands**

### Output

At the end, print the array in the following format:

{1st element}, {2nd element}, {3rd element} … {nth element}

### Constraints

* Only a **single whitespace** will be used for the **separator**.
* **n** will be an **integer** in the interval **[1…100]**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| **one one one two three four five**  Distinct  Reverse  Replace 7 Hello  Replace -5 Hello  Replace 0 Hello  END | Invalid input!  Invalid input!  Hello, four, three, two, one |
| **Input** | **Output** |
| **Alpha Bravo Charlie Delta Echo Foxtrot**  Distinct  Reverse  Replace 0 Charlie  Reverse  Replace 1 Charlie  Distinct  Replace 4 Charlie  END | Invalid input!  Invalid input!  Alpha, Charlie, Delta, Echo |

## Grab and Go

Write a program, which receives an **array** of **integers** and an **integer** as input. Find the **last** occurrence of the **integer** in the given array and **print** the **sum** of all elements **before** the **number**.

**Example**: if we receive the array **10 20 30 40 20 30 40** and we receive on the **next line** the integer **20** we have to print the **sum** the elements **10 20 30 40**, which is **100**.

If no such **number** exists in the **array** – print “No occurrences were found!”.

### Input

* On the **first** **line**, you will receive the **integer array**
* On the next **line,** you will receive the **number**, which you have to search

### Output

If such number **exists** in the array – just print the **sum**.

Otherwise, print “No occurrences were found!”

### Constraints

* Only a **single whitespace** will be used for the **separator**.
* **The number** will be **integer** in the interval **[-2147483648…2147483647]**

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 3 5 7 12 2 3 5 12  3 | 30 |

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 2 3 4 5 6 7 8 9 10  20 | No occurrences were found! |

## Pizza Ingredients

You manage your own pizza restaurant and you are in charge of the orders. Your pizza is made only from **ingredients**, which have a specific **length**.

On the **first** line, you will receive an **array of strings** with the possible **ingredients**. On the **next** **line**, you will receive an **integer**, which represents the **maximum length** of the **strings**, which we will used in the recipe.

Your recipe should **not** use more than **10 ingredients**. If you collect **10** ingredients **stop** the program and **print** the result.

### Input

* On the **first** **line**, you will receive the **ingredients**
* On the **second** **line,** you will receive the **searched length.**

### Output

**Every** time you find a **matching** **ingredient** print:

Adding {name of the ingredient}.

Print the **answer** in the following format:

Made pizza with total of {count of the ingredients} ingredients.

The ingredients are: {1st ingredient}, {2nd ingredient}, … {nth ingredient}.

### Constraints

* Only a **single whitespace** will be used for the **separator**.
* **The array** will be with **at most** **100** elements long.
* **Each ingredient** will be **at most** **50** characters long.
* **The maximum length** will be in the interval **[1…50]**
* You will receive at least **one** **valid** ingredient

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| cheese flour tomato bread olives salami pepperoni  6 | Adding cheese.  Adding tomato.  Adding olives.  Adding salami.  Made pizza with total of 4 ingredients.  The ingredients are: cheese, tomato, olives, salami. |

|  |  |
| --- | --- |
| **Input** | **Output** |
| cheese flour tomato bread olives salami pepperoni  9 | Adding pepperoni.  Made pizza with total of 1 ingredients.  The ingredients are: pepperoni. |

## Heists

You are the main accountant for a group of bandits, whose main line of work is robbing banks and stores. Your job is to calculate the **score** from the heist, **calculating** the **price** of the **loot** and taking the **expenses** into account.

On the **first** line, you will receive an array with **two** elements. The first element represents the **price** of the **jewels** and the **second** – the price of the **gold**.

On each of the next lines, you will receive input in the format “**{loot} {heist expenses}**” until you receive the command “**Jail Time**”. The **loot** will be a string containing **random** **characters**. The **jewels** will be represented with the character “**%**” and the **gold** – with the character “**$**”. If you find **either** from the **symbols** it means you have found one of the **goodies**.

Upon receiving “**Jail Time**”you have to calculate the **total** **earnings** and the **total expenses** from the **heists**. If the total **earnings** are **more** or **equal** to the total **expenses** print: “**Heists will continue. Total earnings: {money earned}.**”.Otherwise print: “**Have to find another job. Lost: {money lost}.**”.

### Input

* On the **first** **line**, you will receive an array of integers with two elements.
  + **The first element** is the price of the **jewels**.
  + **The second** **element** is the price of the **gold**.
* **Each** of the next lines will contain **information** in the following format “**{loot}** **{heist expenses}**”
  + The **loot** will be a string of random characters.
  + The **heist expenses** will be an **integer** number.
* **The last line** of the input will always be “**Jail Time**” – signaling the **end** of the input.

### Output

The output should consist of only one line:

* If the total earnings are **more or equal** to the expenses print:“Heists will continue. Total earnings: {money earned}.”
* **Alternatively, if the expenses are more than the total earnings print:**“Have to find another job. Lost: {money lost}.”

### Constraints

* Only a **single whitespace** will be used for the **separator**.
* **The array** will have **at most** **100** elements.
* You will receive **at most** **20** heists.
* You will receive **at least** **one** **valid** **loot** item.
* The **heist expenses** will be in the interval **[1…2147483647]**.
* The **gold** and **jewel** prices will be **integers** in the interval **[1…2147483647]**.

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comments** |
| 10 20  ASDA% 50  DaS@!%$$ 10  $$ 10  Jail Time | Heists will continue. Total earnings: 30. | We have price of the **jewels** of **10** and price of the **gold** of **20**. In the first heist, we found **one** jewel (total earnings of **10**), but the **expenses** are **50**.  2nd heist -> **2** gold and **1** jewel -> **total earnings** = **50 + 10** (from the **previous** heist) and **expenses** of **10 + 50** (from **previous** heist)  3rd heist -> **2** gold -> total earnings = **100**; total expenses: **10** + **60** = **70**.  **Total**: 100 (**total earnings**) – 70 (**total expenses**) = **30** |

|  |  |
| --- | --- |
| **Input** | **Output** |
| 2000 10000  ASDAs 500000  %ASD$ 1000000  $S$&\*\_ASD 1000  AF#^&\*LP 20000  $ 100000000  Jail Time | Have to find another job. Lost: 101479000. |

## Hints

* In C#, you can treat strings like **arrays of chars** and loop through every single element
* In Java, you can take the length of the string, using String.length() and access the characters, using String.charAt(index)

## Inventory Matcher

You will be given **three** arrays on **different** **lines**. The **first** one will contain **strings**, which will represent the **name** of **products**. **Second** one will contain **longs** and will represent the **quantities** of the products. The **third** one will contain **double** and represents the **price** of the **product**.

After which, you will be given **names of products** on **new lines**, **until** you receive the command “done”. For each given product name print:

{name of the product} costs: {price}; Available quantity: {quantity}

**The names, prices** and **quantities** of the products are in the **same indices** in the 3 arrays.

### Input

* On the **first** **line**, you will receive an array of **strings**, which represent the **names** of the products.
* On the **second** **line,** you will receive an array of **longs**, which represent the **quantities** of the products.
* On the **third** **line,** you will receive an array of **decimals**, which represent the **prices** of the products.

### Constraints

* The **three** arrays will **always** have the **same** length.
* You will **always** receive **existing** products.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| **Bread Juice Fruits Lemons**  **10 50 20 30**  **2.34 1.23 3.42 1.50**  Bread  Juice  done | Bread costs: 2.34; Available quantity: 10  Juice costs: 1.23; Available quantity: 50 |
| **Oranges Apples Nuts**  **1500 5000000 2000000000**  **2.3412 1.23 3.4250**  Nuts  done | Nuts costs: 3.4250; Available quantity: 2000000000 |

### Hints

* In C#, you can find the index of an element in an array with Array.IndexOf(array, element)
* In Java, the simplest way to find the index of the element (without external libraries) will be to loop through the array

## \* Upgraded Matcher

For this task, you can use your solution from Inventory Matcher. You will again receive **3** **arrays** – one with **strings**, one with **longs** and one with **decimals**. Again, the **price** and **quantity** correspond to a **name**, which is located on **same** **index** as the name.

This time **only** the **arrays** containing the **names** and the array containing the **prices** will have the **same** **length**. If in the **quantities** array there is **no** **index**, which **corresponds** to the **name**, you should assume the quantity is **0**.

On top of that the products, which you receive after the arrays will contain **not** **only** a string for the **name**, but also a **long**, which is the **quantity** that must be **ordered**.

If you have **enough** **quantity**, calculate the total price by **multiplying** the ordered quantity **times** the **price** and **print it** in the following format:

{quantity ordered} x {product name} costs {total price of the order}

Format the price to the **2nd** **decimal place**. Do not forget to **decrease** the **quantity** of the product.

If you do **not** have **enough** **quantities** print:

We do not have enough {product name}

### Input

* On the **first** **line**, you will receive array of **strings**, which represent the **names** of the products.
* On the **second** **line,** you will receive array of **longs**, which represent the **quantities** of the products.
* On the **third** **line,** you will receive array of **decimals**, which represent the **prices** of the products.

### Constraints

* The **name** and **price arrays** will **always** have the **same** length.
* You will **always** receive **existing** products

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| **Bread Juice Fruits Lemons Beer**  **10 50 20 30**  **2.34 1.23 3.42 1.50 3.00**  Bread 10  Juice 5  Beer 20  done | Bread x 10 costs 23.40  Juice x 5 costs 6.15  We do not have enough Beer |
| **Tomatoes Onions Lemons**  **10000 2000**  **5.40 3.20 2.20**  Tomatoes 5000  Tomatoes 5000  Tomatoes 1  done | Tomatoes x 5000 costs 27000.00  Tomatoes x 5000 costs 27000.00  We do not have enough Tomatoes |

## \* Jump Around

You will receive an **integer** **array** from the console. You **start** from the **beginning** of the array and try to **move** **right** by a **step**, equal to the **value** at position **0**. If that is **possible** you should **collect** the **value** from the **index** on which you landed, and try to move to the **right** by **its** **value**, if that is **not** possible – try to move to the **left**. If that is also **not** possible **stop** the program and print the **sum** of the collected **values**. Example:

Example: We have the array [**3 7 12 2 10]**. We **start** from **3** and move **3 indices** to **2**. We have to move **2 indices**, but we **can’t** **move** to the **right**, so we move to the **left** to **7**. From there we **cannot** move **anywhere** and we **stop** the program and we print the sum of the collected cells: **3 + 2 + 7 =** **12**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 3 | 7 | 12 | 2 | 10 |

### Input

The input consists of **single** line, which will be an **array** of **integers**.

### Constraints

* The array will have at most **50** elements
* The elements in the array will be in the interval **[1…50]**

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| 10 50 7 30 8 5 | 10 |  | 2 3 5 7 5 4 8 4 | 18 |