# More Exercises: Arrays Advanced

Problems for exercises and homework for the ["Technology Fundamentals" course @ SoftUni](https://softuni.bg/courses/technology-fundamentals).

You can check your solutions in [Judge](https://judge.softuni.bg/Contests/1296/).

## Modify Numbers

You are given **an array with integers** separated by a single space. Write a program to **modify the array elements** after **processing a sequence of commands** "**swap**", "**multiply**", "**decrease**", "**increase**" or "**remove**" until you receive the command "**end**". The commands are as follows:

* "swap <index1> <index2>" - takes **two elements** and **swaps them**.
* "multiply <index1> <index2>" - takes **element at the 1st index** and **multiplies** it with the element at **2nd index**. Save the **product at the 1st index**.
* "decrease <number>" - **decreases** **all elements** in the array **with the number**.
* "increase <number>" - **increases all elements** in the array **with the number**.
* "remove <index>" - **remove** the element.

**Examples**

|  |  |
| --- | --- |
| **Input** | **Output** |
| 23 -2 321 87 42 90 -123  swap 1 3  swap 3 6  swap 1 0  multiply 1 2  multiply 2 1  decrease 1  end | 86, 7382, 2369942, -124, 41, 89, -3 |
| **Comments** | |
| 23 -2 321 87 42 90 -123 – initial values  swap 1(-2) and 3(87) -> 23 87 321 -2 42 90 -123  swap 3(-2) and 6(-123) -> 23 87 321 -123 42 90 -2  swap 1(87) and 0(23) -> 87 23 321 -123 42 90 -2  multiply 1(23) 2(321) = 7383 -> 87 7383 321 -123 42 290 -2  multiply 2(321) 1(7383) = 2369943 -> 87 7383 2369943 -123 42 90 -2  decrease – all – 1 -> 86 7383 2369942 -124 41 89 -3 | |

|  |  |
| --- | --- |
| **Input** | **Output** |
| 2 8 -5 88 -57 122 6 48223  increase 5  remove 2  remove 6  end | 7, 13, 93, -52, 127, 11 |

## Collection

Write a program that prints an array, modified by a given commands. Initially the array will be empty. Until you receive the command "Print", you'll receive a series of commands, each on a separate line in one of the following formats:

* Push - Inserts a new element in front of the array
* Add **–** Inserts a new element
* Pop – Removes the first element
* Enqueue – Removes the last element

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| Push 1  Add 12  Push 5  Pop  Add 3  Push 5  Enqueue  Print | 5 1 12 |
| Add 7  Push 3  Enqueue  Push 7  Add 8  Push 11  Pop  Enqueue  Print | 7 3 |

## Car Race

Write a program to calculate the **winner of a car race**. You will receive an **array of numbers**. Each element of the array represents the **time needed to pass through that step** (the index). There are going to be **two cars**. **One** of them **starts** from the **left side** and the **other one starts from the right** **side**. **The middle index of the array is the finish line**. (The **number of elements** of the array **will always be odd**). Calculate **the total time for each racer to reach the finish** (the **middle of the array**) and **print the winner with his total time**. (The **racer with less time**). If you have a **zero in the array**, you have to **reduce the time of the racer that reached it by 20%** (**from the time so far**).

Print the result in the following format:  
"The winner is {left/right} with total time: {total time}"

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| 29 13 9 0 13 0 21 0 14 82 12 | The winner is left with total time: 53.8 |
| **Comment** | |
| The time of the left racer is (29 + 13 + 9) \* 0.8 (because of the zero) + 13 = 53.8  The time of the right racer is (82 + 12 + 14) \* 0.8 + 21 = 107.4  The winner is the left racer, so we print it | |

## Drum Set

Gabsy is Orgolt's Final Revenge charming drummer. She has a drum set but the different drums have different origins – some she bought, some are gifts, so they are all with **different quality**. Every day she practices on each of them, so she does damage and reduces the drum`s quality. Sometimes a drum brakes, so she needs to buy new one. Help her keep her drum set organized.

You will receive Gabsy's **savings**, the money she can spend on new drums. Next you receive a **sequence** **of integers** which represent the **initial quality** of each drumin Gabsy's drum set.

Until you receive the command **"Hit it again, Gabsy!"**, you will be receiving integer: the **hit power** Gabsy applies **on each drum** while practicing. When the power is applied you should **decrease** the value of the drum's quality with the current power.

When a certain drum **reaches 0 quality**, it breaks. Then Gabsy should buy a replacement.She needs to buy the exact same model. Therefore, its quality will be **the same as the initial quality** of the broken drum. The price is calculated by the formula: {initialQuality} \* 3. Gabsy will always replace her broken drums **until the moment she can no longer afford it**. If she doesn't have enough money for a replacement, the broken drum is **removed** from the drum set.

When you receive the command **"Hit it again, Gabsy!"**,the program ends and you should print the current state of the drum set. On the second line you should print the **remaining money** in Gabsy's savings account.

### Input

* On the **first line** you receive the **savings** – a floating-point number;
* On the **second line** you recieve the **drum set**: **sequence** of **integers**, **separated** by **spaces**.
* Until you receive the command **"Hit it again, Gabsy!"** you will be receiving **integers** – the hit power Gabsy applies on each drum.

### Output

* On the first line you should print **each drum** in the drum set, **separated** by **space**.
* Then you must print the **money** that are left on the **second line** in the format "Gabsy has {money left}lv.", formatted with two digits after the decimal point.

### Constraints

* The **savings – floating-point number in the range [0.00, 10000.00]**
* The **quality of each drum in the drum set** – integer in the range **[1, 1000]**.
* The **hit** **power** will be in the **range [0, 1000]**
* Allowed working **time** / **memory**: **100ms** / **16MB**.

### Examples

|  |  |  |
| --- | --- | --- |
| **Input** | **Output** | **Comment** |
| 1000.00  58 65 33  11  12  18  10  Hit it again, Gabsy! | 7 14 23  Gabsy has 901.00lv. | DrumSet – 58 65 33.  Day 1: hit power applied = 11 => 47 54 22;  Day 2: hit power applied = 12 => 35 42 10;  Day 3: hit power applied = 18 => 17 24 -8;  The third drum breaks. But Gabsy has enough savings so she replaces it => 17 24 33;  Day 4: hit power applied = 10 => 7 14 23;  We print the current state of the drum set and what's left in Gabsy's bank account. |
| 154.00  55 111 3 5 8 50  2  50  8  23  1  Hit it again, Gabsy! | 27 2 4 7  Gabsy has 10.00lv. |  |

## Take/Skip Rope

Write a program, which reads a **string** and **skips** through it, extracting a **hidden message**. The algorithm you have to implement is as follows:

Let’s take the string "skipTest\_String044170" as an example.

Take every **digit** from the string and **store it** somewhere. After that, **remove** all the digits from the string. After this operation, you should have **two lists of items**: the **numbers list** and the **non-numbers list**:

* Numbers list: [0, 4, 4, 1, 7, 0]
* Non-numbers: [s, k, i, p, T, e, s, t, \_, S, t, r, i, n, g]

After that, take every digit in the **numbers list** and split it up into a **take list** and a **skip list**, depending on whether the digit is in an **even** or an **odd** index:

* Numbers list: [0, 4, 4, 1, 7, 0]
* Take list: [0, 4, 7]
* Skip list: [4, 1, 0]

Afterwards, **iterate** over both of the lists and **skip** {skipCount} characters from the **non-numbers list**, then **take** {takeCount} characters and store it in a **result string**. Note that the skipped characters are **summed up** as they go. The process would look like this on the aforementioned **non-numbers list**:

Example: "**skipTest\_String**"

1. Take **0** characters 🡺 Taken: "", skip **4** characters 🡺 Skipped: ""🡺 Result: ""
2. Take **4** characters🡺 Taken: "**Test**", skip **1** characters 🡺 Skipped: "**skip**" 🡺 Result: "**Test**"
3. Take **7** characters🡺 Taken: "**String**", skip **0** characters 🡺 Skipped: "" 🡺 Result: "**TestString**"

After that, just print the **result string** on the console.

### Input

The **encrypted** message as a **string**

### Output

The **decrypted** message as a **string**

### Constraints

* The count of digits in the input string will **always be even**.
* The encrypted message will contain any printable ASCII character.

### Examples

|  |  |
| --- | --- |
| **Input** | **Output** |
| T2exs15ti23ng1\_3cT1h3e0\_Roppe | TestingTheRope |
| O{1ne1T2021wf312o13Th111xreve!!@! | OneTwoThree!!! |
| this forbidden mess of an age rating 0127504740 | hidden message |

## Mixed up Lists

Write a program that **mixes up** **two lists** by some rules. You will receive **two lines of input**, each one being a **list of numbers**. The **rules** for mixing are:

* Start from the **beginning of the first** list and from the **ending of the second**
* **Add** element **from the first** and element **from the second**
* At the end there will always be a list in which there are **2 elements remaining**
* These elements will be the **range of the elements you need to print**
* **Loop through the result list** and take **only the elements that fulfill the condition**
* Print the elements **ordered in ascending** order and **separated by a space**

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| 1 5 23 64 2 3 34 54 12  43 23 12 31 54 51 92 | 23 23 31 34 43 51 |
| **Comment** | |
| After looping through the two of the arrays we get: 1 92 5 51 23 54 64 31 2 12 3 23 34 43  The constrains are 54 and 12 (so we take only the numbers between them): 51 23 31 23 34 43  We print the result sorted | |