Exercises: Arrays, Matrices, Multi-Dimensional Arrays

Problems for exercises and homework for the "JavaScript Fundamentals" course @ SoftUni.
Submit your solutions in the SoftUni judge system at https://judge.softuni.bg/Contests/313/.

1. Print an Array with a given Delimiter

Write a JS function that prints a given array.

The **input** comes as array of strings. The last element of the array is the delimiter.

The **output** is the same array, printed on the console, each element **separated** from the others by the **given delimiter**.

Examples

Input	Output
One Two Three Four Five -	One-Two-Three-Four-Five

Input	Output
How about no? I will not do it! _	How about no?_I_will_not_do_it!

Hints

- Let's start by extracting the delimiter from the input array:

```
function main(input) {
    let delimiter = input[input.length - 1];
}
```

- Now that we have the element, we need to delete it from the array, because we don't need it in the output. Thankfully, the Array in JavaScript has a **built-in function** for **removing the last element**, which is **Array.pop()**.

```
function main(input) {
    let delimiter = input[input.length - 1];
    input.pop();
}
```

- And last but not least, let's print each element of the array, separated with the next one by the delimiter:

```
let result = "";

for(let i = 0; i < input.length; i++) {
    if(i == 0) {
        result += input[i];
    } else {
        result += delimiter + input[i];
    }
}

console.log(result);
```

- The **result** variable holds our final string. The **if** check in the loop is necessary so that we don't **attach an unneeded delimiter** somewhere in the result string.

2. Print every N-th Element from an Array

Write a JS function that prints every element of an array, on a given step.

The **input** comes as array of strings. The last element is **N - the step**.

The **output** is every element on the **N-th** step **starting from the first one**. If the step is "**3**", you need to print the **1-st**, the **4-th**, the **7-th** … and so on, until you reach the end of the array. The elements must be printed each on a new line.

Examples

Input	Output
5 20 31 4 20 2	5 31 20

Input	Output
dsa asd test tset 2	dsa test

Input	Output
1 2 3 4 5 6	1

Hints

- Use what you've seen from the **previous problem** to **extract the last element** of the array.
- Create a **step** variable to hold the **given step** of the array. Then **print all the elements** with a **for** loop, **incrementing** the **loop variable** with the value of the **step** variable.

3. *Add and Remove Elements from Array

Write a JS function that **adds** and **removes** numbers **to / from** an array. You will receive a command which can either be "**add**" or "**remove**".

The **initial number** is **1**. Each input command should **increase that number**, regardless of what it is.

Upon receiving an "**add**" command you should add the current number to your array.
Upon receiving the "**remove**" command you should remove the last entered number, currently existent in the array.

The **input** comes as array of strings. Each element holds a **command**.

The **output** is the array itself, with each element printed on a new line. In case of an empty array, just print "**Empty**".

Examples

Input	Output
add add add add	1 2 3 4

Input	Output
add add remove add	1 4 5

Input	Output
remove remove remove	Empty

		add			

4. Rotate Array

Write a JS function that rotates an array. The array should be rotated to the right side, meaning that the last element should become the first, upon rotation.

The **input** comes as array of strings. The **last element** of the array is the amount of rotation you need to perform.

The **output** is the resulted array after the rotations. The elements should be printed on one line, separated by a **single space**.

Examples

Input	Output
1 2 3 4 2	3 4 1 2

Input	Output
Banana Orange Coconut Apple 15	Orange Coconut Apple Banana

Hints

- Check if there is a **built-in function** for inserting elements **at the start** of the array.

5. Extract an Non-decreasing Subsequence from an Array

Write a JS function that extracts only those numbers that **form a non-decreasing subsequence**. In other words, you start from the **first element** and continue to **the end** of the **given array of numbers**. Any number which is **LESS THAN** the **current biggest one** is **ignored**, alternatively if it's equal or higher than the **current biggest one** you set it as the **current biggest one** and you continue to the next number.

The **input** comes as array of strings. Each element will represent a number.

The **output** is the processed array after the filtration, which should be a non-decreasing subsequence. Each element should be printed on a new line.

Examples

Input	Output
1 3 8 4 10 12 3 2 24	1 3 8 10 12 24

Input	Output
1 2 3 4	1 2 3 4

Input	Output
20 3 2 15 6 1	20

Hints

- The **Array.filter()** built-in function might help you a lot with this problem.

6. Sort an Array by 2 Criteria

Write a JS function that orders a **given array of strings**, by **length** in **ascending order** as **primary criteria**, and by **alphabetical value** in **ascending order** as **second criteria**. The comparison should be **case-insensitive**.

The **input** comes as array of strings.

The **output** is the ordered array of strings.

Examples

Input	Output
alpha beta gamma	beta alpha gamma

Input	Output
Isacc Theodor Jack Harrison George	Jack Isacc George Theodor Harrison

Input	Output
test Deny omen Default	Deny omen test Default

Hints

- An array can be sorted by passing a comparing function to the **Array.sort()** function.
- Creating a comparing function by 2 criteria can be achieved by first comparing by the **main criteria**, if the 2 items are different (the result of the compare is not 0) - return the result as the result of the comparing function. If the two items are the same by the **main criteria** (the result of the compare is 0), we need to compare by the **second criteria** and the result of that comparison is the result of the comparing function.
- You can check more about **Array.sort()** here - https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/sort

Multidimensional Arrays

We will mainly work with 2-dimensional arrays. The concept is as simple as working with a simple 1-dimensional array. It is just an array of arrays.

7. Magic Matrices

Write a JS function that checks if a given matrix of numbers is magical. A matrix is magical if the **sums of the cells** of **every row** and **every column** are **equal**.

The **input** comes as array of strings. Each element represents a **string of numbers**, with **spaces** between them. Parse it into a **matrix of numbers**, so you can work with it. The input numbers will **always be positive**.

The **output** is a Boolean result indicating whether the matrix is magical or not.

Examples

Input	Output
['4 5 6', '6 5 4', '5 5 5']	true

Input	Output
['11 32 45', '21 0 1', '21 1 1']	false

Input	Output
['1 0 0', '0 0 1', '0 1 0']	true

8. *Spiral Matrix

Write a JS function that generates a **Spirally-filled** matrix with numbers, with given dimensions.

The **input** comes as array of strings. There will be exactly **one element**, containing the **dimensions of the matrix**, which will be **2 numbers** separated by a **space**.

The **output** is the matrix filled spirally starting from **1**. You need to print **every row on a new line**, with the cells **separated by a space**. Check the examples below.

Examples

Input	Output
5 5	1 2 3 4 5 16 17 18 19 6 15 24 25 20 7 14 23 22 21 8 13 12 11 10 9

Input	Output
3 3	1 2 3 8 9 4 7 6 5

9. *Diagonal Attack

Write a JS function that reads a given matrix of numbers, and checks if both **main diagonals have equal sum**. If they do, set every element that is **NOT** part of **the main diagonals** to that sum, alternatively just print the matrix unchanged.

The **input** comes as array of strings. Each element represents a **string of numbers**, with **spaces** between them. Parse it into a **matrix of numbers**, so you can work with it.

The **output** is either the new matrix, with all cells not belonging to a main diagonal changed to the diagonal sum or the original matrix, if the two diagonals have different sums. You need to print **every row on a new line**, with cells **separated by a space**. Check the examples below.

Examples

Input	Output
['5 3 12 3 1', '11 4 23 2 5', '101 12 3 21 10', '1 4 5 2 2', '5 22 33 11 1']	5 15 15 15 1 15 4 15 2 15 15 15 3 15 15 15 4 15 2 15 5 15 15 15 1

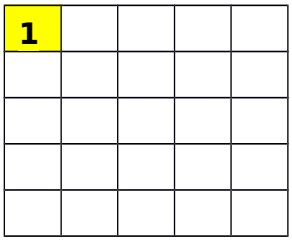
Input	Output
['1 1 1', '1 1 1' '1 1 0']	1 1 1 1 1 1 1 1 0

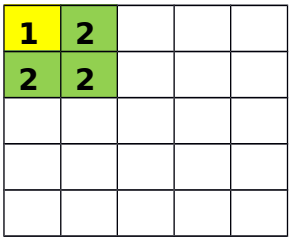
10. **Orbit

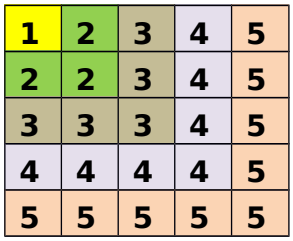
You will be given an empty rectangular space of cells. Then you will be given the position of a star. You need to build the orbits around it.

You will be given a coordinate of a cell, which will **always be inside the matrix**, on which you will put the value – **1**. Then you must set the values of the cells **directly surrounding that cell**, including the **diagonals**, **to 2**. After which you must set the values of the next surrounding cells to 3 and so on. Check the pictures for more info.

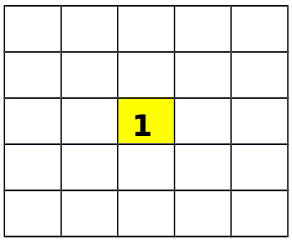
For example we are given a matrix which has 5 rows and 5 columns and the star is at coordinates – "**0 0**". Then the following should happen:

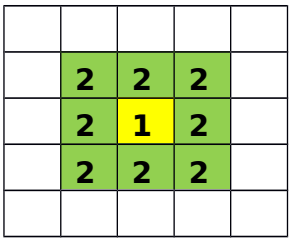


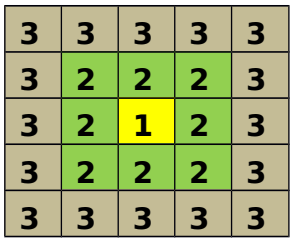




If the coordinates of the star are somewhere in the middle of the matrix for example – "**2 2**", then it should look like this:







The **input** comes as array of strings. The input will consist of exactly two elements. The **first** will contain **two numbers separated by a space** – which represent the **dimensions of the matrix**. The **second one** will contain two numbers separated by a space – which represent the **coordinates of the star**.

The **output** is the filled matrix, with the cells **separated by a space**, each **row on a new line**.

Examples

Input	Output
4 4 0 0	1 2 3 4 2 2 3 4 3 3 3 4 4 4 4 4

Input	Output
5 5 2 2	3 3 3 3 3 3 2 2 2 3 3 2 1 2 3 3 2 2 2 3 3 3 3 3 3

Input	Output
3 3 2 2	3 3 3 3 2 2 3 2 1

Hints

- Check if there is some **dependency** or **relation** between the **position of the numbers** and the **rows** and **columns** of those positions.