# Lab: Arrays and Matrices

Problems for in-class lab for the ["JavaScript Advanced" course @ SoftUni](https://softuni.bg/courses/js-advanced). Submit your solutions in the SoftUni judge system at <https://judge.softuni.bg/Contests/1797/Lab-Arrays>.

## Sum First Last

Write a function that calculates and prints the sum of the first and the last elements in an array.

The **input** comes **as array of string elements** holding numbers.

The **output** is the return value of your function.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| ['20', '30', '40'] | 60 | ['5', '10'] | 15 |

## Even Position Element

Write a function that finds the elements at even positions in an array.

The **input** comes as **array of string** elements.

The **output** is the return value of your function. Collect all elements in a string, separated by space.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| ['20', '30', '40'] | 20 40 | ['5', '10'] | 5 |

## Negative / Positive Numbers

Write a JS function that processes the elements in an array one by one and produces a new array. **Prepend** each **negative** element at the front of the result and **append** each **positive** (or 0) element at the end of the result.

The **input** comes as **array of number elements**.

The **output** is printed on the console, each element on a new line.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| [7, -2, 8, 9] | -2  7  8  9 | [3, -2, 0, -1] | -1  -2  3  0 |

## Last K Numbers Sequence

You are given two integers **n** and **k**. Write a JS function that generates and prints the following sequence:

* The first element is 1
* Every following element equals the **sum** of the previous **k** elements
* The length of the sequence is **n** elements

The **input** comes as **two number arguments**. The first element represents the number **n**, and the second – the number **k**.

The **output** is printed on the console on a single line, separated by space.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| 6, 3 | 1 1 2 4 7 13 | 8, 2 | 1 1 2 3 5 8 13 21 |

#### Explanation

The 2nd element (1) is the sum of the 3 elements before it, but there is only 1, so we take that. The third element is the sum of the first 2 (1 and 1) and the 4th – the sum of 1, 1 and 2. The 5th element is the sum of the 2nd, 3rd and 4th (1, 2 and 4) and so on.

## Process Odd Numbers

You are given an array of numbers. Write a JS function that prints the elements at odd positions from the array, doubled and in reverse order.

The **input** comes as **array of number elements**.

The **output** is printed on the console on a single line, separated by space.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| [10, 15, 20, 25] | 50 30 | [3, 0, 10, 4, 7, 3] | 6 8 0 |

## Smallest Two Numbers

Write a function that prints the two smallest elements from an array of numbers.

The **input** comes as **array of number elements**.

The **output** is printed on the console on a single line, separated by space.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| [30, 15, 50, 5] | 5 15 | [3, 0, 10, 4, 7, 3] | 0 3 |

## Biggest Element

Write a function that finds the biggest element inside a matrix.

The **input** comes as **array of arrays**, containing number elements (2D matrix of numbers).

The **output** is the return value of your function. Find the biggest element and return it.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| [[20, 50, 10],  [8, 33, 145]] | 145 | [[3, 5, 7, 12],  [-1, 4, 33, 2],  [8, 3, 0, 4]] | 33 |

## Diagonal Sums

A square matrix of numbers comes as an array of strings, each string holding numbers (space separated). Write a function that finds the sum at the main and at the secondary diagonals.

The **input** comes as **array of arrays**, containing number elements (2D matrix of numbers).

The **output** is printed on the console, on a single line separated by space. First print the sum at the main diagonal, then the sum at the secondary diagonal.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| [[20, 40],  [10, 60]] | 80 50 | [[3, 5, 17],  [-1, 7, 14],  [1, -8, 89]] | 99 25 |

## Equal Neighbors

Write a function that finds the number of equal neighbor pairs inside a matrix of variable size and type (numbers or strings).

The **input** comes as **array of arrays**, containing string elements (2D matrix of strings).

The **output** is return value of you function. Save the number of equal pairs you find and return it.

### Example

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| [['2', '3', '4', '7', '0'],  ['4', '0', '5', '3', '4'],  ['2', '3', '5', '4', '2'],  ['9', '8', '7', '5', '4']] | 1 | [['test', 'yes', 'yo', 'ho'],  ['well', 'done', 'yo', '6'],  ['not', 'done', 'yet', '5']] | 2 |

## Spiral Matrix

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

The **input** comes as **2 numbers** that represent the **dimension of the matrix**.

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** |  | **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 |  | 3, 3 | 1 2 3  8 9 4  7 6 5 |