# Lab: Arrays and Nested Arrays

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# Arrays

## Even Position Element

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

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

The **output** is printed on the console. Collect all elements in a string, separated by space.

### Examples

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Input** | **Output** |  | **Input** | **Output** |
| ['20', '30', '40', '50', '60'] | 20 40 60 | ['5', '10'] | 5 |

## Last K Numbers Sequence

You are given two integers **n** and **k**. Write a JS function that generates and **return** 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 the **return** value of your function and should be an **array of numbers**.

### 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.

## Sum First Last

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

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

The **output** is the **return** value of your function and should be a **number**.

### Example

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

## Negative / Positive Numbers

Write a JS function that processes the elements in an array one by one and produces a new array. If the current element is a **negative** number you must add it to the **front** of the array (**as** the **first element** of the array). Otherwise, if the current element is a **positive** number (**or 0**), you must add it to the **end** of the array (as the **last element** of the array).

The **input** comes as an **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 |

### Hints

* Write a function that receives an array as an argument.
* Declare variable named result that will keep the array.



* You can use **for** loop to go around the items one by one.
* If the current element is a **negative number,** you can use the **unshift** method to add the number at the **beginning** of the array.
* Otherwise, if the current element is a **positive** number (**or 0**), use a **push** method to add the number to the **end** of the array.
* Print on the console, each element of the array on a new line.

## Smallest Two Numbers

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

The **input** comes as an **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 |

## Bigger Half

You are given an array of numbers. Write a JS function that **sorts** the array in **ascending order** and returns a new array, containing only the **second half** of the input. If there is an odd number of elements in the input, always take the bigger half. For example, if the input array contains 4 elements, the output should be 2, and if the input is 5 – the output is 3.

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

The **output** is the **return** value of the function and should be an **array of numbers**.

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| [4, 7, 2, 5] | [5, 7] |
| [3, 19, 14, 7, 2, 19, 6] | [7, 14, 19, 19] |

## Piece of Pie

Write a function that receives **three parameters** – an **array** of pie flavors as **strings,** two target flavors as **strings**. The result of the function should be a **new array**, containing a section of the original array, **starting** at the first flavor parameter, and **ending** at (and **including**) the second flavor parameter.

The **input** comes as **three arguments**:

* An **array of strings**, representing pie flavors
* **Two more strings**, representing the start and end of the section, respectively

The **output** is the **return** value of the function and should be an **array of strings**.

### Example

|  |  |
| --- | --- |
| **Input** | **Output** |
| ['Pumpkin Pie',  'Key Lime Pie',  'Cherry Pie',  'Lemon Meringue Pie',  'Sugar Cream Pie'],  'Key Lime Pie',  'Lemon Meringue Pie' | ['Key Lime Pie',  'Cherry Pie',  'Lemon Meringue Pie'] |
| ['Apple Crisp',  'Mississippi Mud Pie',  'Pot Pie',  'Steak and Cheese Pie',  'Butter Chicken Pie',  'Smoked Fish Pie'],  'Pot Pie',  'Smoked Fish Pie' | ['Pot Pie',  'Steak and Cheese Pie',  'Butter Chicken Pie',  'Smoked Fish Pie'] |

## Process Odd Positions

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

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

The **output** is the **return** 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 |

# Nested Arrays

## Biggest Element

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

The **input** comes as an **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 **arrays**, each array holding numbers. Write a function that finds the sum at the main and the secondary diagonals.

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

The **output** is the **return** value of your 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', 'yo'],  ['well', 'done', 'yo', '6'],  ['not', 'done', '5', '5']] | 4 |