

Web Developer

Programmazione - Javascript e Typescript

Docente: Shadi Lahham

Arrays

Basic data structures

Shadi Lahham - Web development

Arrays

Array data type

An array is a type of data-type that holds an ordered list of values, of any type:

```
// Let arrayName = [element0, element1, ...];  
const rainbowColors = ['Red', 'Orange', 'Yellow', 'Green', 'Blue', 'Indigo', 'Violet'];  
let raceWinners = [33, 72, 64];  
let myFavoriteThings = ['Broccoli', 60481, 'Love Actually'];
```

The `length` property reports the size of the array:

```
console.log(rainbowColors.length);
```

Array access

You can access items with "bracket notation". The index starts at 0.

```
let arrayItem = arrayName[indexNum];  
const rainbowColors = ['Red', 'Orange', 'Yellow', 'Green', 'Blue', 'Indigo', 'Violet'];  
let firstColor = rainbowColors[0];  
let lastColor = rainbowColors[6];
```

Changing arrays

You can also use bracket notation to change the item in an array:

```
let myFavoriteThings = ['Broccoli', 60481, 'Love Actually'];  
myFavoriteThings[0] = 'Celery Root';
```

Or to add to an array:

```
myFavoriteThings[4] = 'Playgrounds';
```

You can also use the push method:

```
myFavoriteThings.push('Dancing');
```

Creating a new array

```
let points = new Array();           // Bad
let points = [];                     // Good
```

Why?

1. `new Array()` is slower
2. `new Array()` is not consistent

```
let points = [10];                  // an array with a single element of the value 10
let points = new Array(10);         // an array with 10 empty elements
```

// these have the same result

```
let points = [2, 10];
let points = new Array(2, 10);
```

Loops with arrays and strings

Use a for loop to easily process each item in an array:

```
const rainbowColors = ['Red', 'Orange', 'Yellow', 'Green', 'Blue', 'Indigo', 'Violet'];
for (let i = 0; i < rainbowColors.length; i++) {
  console.log(rainbowColors[i]);
}
```

You can do the same for a string:

```
const rainbowColorsLetters = 'ROYGBIV';
for (let i = 0; i < rainbowColorsLetters.length; i++) {
  console.log(rainbowColorsLetters[i]); // using [] is confusing; use charAt()
}
```


Most used array methods

push()

adds one or more elements to the end of an array and returns the new length of the array

pop()

removes the last element from an array and returns that element

shift()

removes the first element from an array and returns that element

unshift()

adds one or more elements to the beginning of an array and returns the new length of the array

Most used array methods

[splice\(\)](#)

modifies array by removing, replacing, or adding elements

[slice\(\)](#)

returns a portion of an array as a new array, from start to end (excluding end)

[join\(\)](#)

joins all elements of an array into a string, optionally separated by a specified separator string

[concat\(\)](#)

Returns a new array with elements from the original array joined with additional array(s) or value(s)

Most used array methods

[sort\(\)](#)

sorts the elements of an array in place and returns the sorted array

[find\(\)](#)

Returns the first element that satisfies the testing function, or undefined if not found

[indexOf\(\)](#)

returns the first index at which a given element can be found in the array, or -1 if it is not present

[includes\(\)](#)

checks if an array contains a specific value, returning true or false

Important to learn them all

[JavaScript Array Reference | W3Schools](#)

[Array methods | MDN](#)

Array references

[JavaScript Arrays](#)

[JavaScript Array Reference](#)

[MDN - JavaScript Array Reference](#)

Read carefully. You will need some array methods for the exercises

Your turn

1.Top choice

Create an array to hold your top choices (colors, pets, books, whatever).

For each choice, log to the screen a string like: "My #1 choice is blue."

Bonus: Change it to add the correct number suffix, e.g. "My **1st** choice, "My **2nd** choice", "My **3rd** choice", "My **4th** choice", etc.

2. Word Guesser

You will be implementing a game similar to hangman:

[Hangman \(game\)](#)

[PlayHangman.com - Play Hangman Game](#)

Instructions on next slides.

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2. Word Guesser

- Create two arrays:
 - one for the letters of the word (e.g. 'C', 'A', 'T')
 - Another for the current guessed letters (start with '_', '_', '_' and add the correct letters to it).
- Write a function called `guessLetter` that should:
 - Take one argument, a letter.
 - Have a maximum number of guesses (e.g. 6)
 - Check if the letter is in the word array.
 - If the letter matches, add it in the correct position of the guessed array.
 - Show the user the current guessed letters.
 - Tell the user if they guessed a correct letter.
 - Tell the user how many guesses remain.
 - Tell the user if they won or lost the game.

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2. Word Guesser

Call your function to make guesses:

```
guessLetter('G');  
guessLetter('I');  
guessLetter('O');  
guessLetter('A');  
guessLetter('T');
```

- **Bonus**
 - Add a random reward for correct guesses and subtract a random amount for failed guesses.
 - Show the user the total reward (positive or negative).
 - Draw a hangman image to the console log after each guess.
 - Add a function that generates the letters to guess randomly.
 - Add a function that chooses the initial word to guess from an array of words.

3.Cut me up

- In the exercise folder create a .txt or .doc or .md file in which you explain the difference between the following array methods:
 - slice(), splice()
 - Explain the differences in terms of parameters and behavior
 - Provide code examples to prove your point

Bonus

4.Abracadabra

- Code 3 *different* solutions to change the 4th letter in the following string "Abracadabra" into an "X"
- Each solution should be in a separate folder.
 - Name them solution-1, solution-2, etc.
- Also include a doc file in which you explain what 3 ways you used
- **Bonus:** There are many ways to replace a character in a string. Code other solutions than the above 3

References

[JavaScript Arrays](#)

[JavaScript Array Reference](#)

[MDN - Array - JavaScript](#)