



Coding with

JS

05

Collections

Collections with Arrays

An array is an ordered collection of *values*, where each *value* is identified by an *index* (starting from 0). You can create an array using square brackets `[]` and separate the values with commas.



```
let numbers = [1, 2, 3, 4, 5]
```

In this example, we have an array called `numbers` with five elements. You can access individual elements in the array using their index:



```
alert(numbers[0]) // outputs 1  
alert(numbers[1]) // outputs 2
```

You can also modify the values in an array:



```
numbers[2] = 10  
// The array now becomes [1, 2, 10, 4, 5]
```

Arrays in JavaScript have several built-in methods for adding, removing, and manipulating elements, such as `push()`, `splice()`, and many others.

Collections with Objects

An object is an unordered collection of *key-value pairs*, where each *value* is identified by a unique key (also called a *property*). You can create an object using curly braces { } and define key-value pairs with a colon : and separate multiple pairs with commas.

```
let student = {  
  name: "Jane Doe",  
  age: 15,  
  year: 11,  
}
```

In this example, we have an object called `student` with three *properties*: `name`, `age`, and `year`. You can access the *values* in an object using the dot notation:

```
alert(student.name) // "Jane Doe"  
alert(student.age)  // 15
```

You can also modify the values in an object:

```
student.age = 16  
// The student object now has the age property  
// set to 16. Happy birthday.
```



Future Job

```
let jobs = [
  'astronaut',
  'firefighter',
  'police officer',
  'space doctor',
]

function getJob() {
  let index = 0

  alert('Your future job will be' + jobs[0])
}
```

Predict

Read the code carefully. When you're ready, write what you predict it will do.

What do you think the code will do?

Run

Run the code, and say whether your prediction was right or not, and note any differences.

Did it do what you predicted?



Differences

Investigate

1. What type of bracket does an array use?

2. Why does the `jobs` array go over several lines?

3. How many items are in the `jobs` array?

4. Each item in the array has a number called an *index* representing its position. Indexes start at 0. What is the index of the `'astronaut'` item?

5. What is the index of the `'space doctor'` item?

Modify

1. Add two more professions to the `jobs` array.
2. Change the `alert` so that it outputs “space doctor”.
3. Change the `alert` so that instead of using a number, it uses the `index` variable.
4. Change the `index` variable so that it asks the user for a number between 0 and 5, so it will output the job at that index.
5. Change the `index` variable so that instead of asking for a number, it generates a random number, so it will output a random job.

You can get a random number with:

```
Math.floor(Math.random() * 5)
```



Subject List

Subject List is an array of the subjects you take at school. You can imagine it would be used when tracking your grades, timetable, etc. This project introduces how to add to an array and how to delete from an array.

```
let subjects = [
  'English',
  'Digital Technology',
]

function showSubjects() {
  alert(subjects)
}

function addSubject() {
  let newSubject = 'Maths'

  // add a new item to the end of the subjects array
  subjects.push(newSubject)
}

function removeSubject() {
  let index = 0

  // remove 1 item at the index position of the subjects array
  subjects.splice(index, 1)
}
```

Predict

Read the code carefully. When you're ready, write what you predict it will do.

What do you think the `addSubject()` function will do?

What do you think the `removeSubject()` function will do?

Run

Run the code, and say whether your prediction was right or not, and note any differences.

Did it do what you predicted?



Differences

Investigate

1. How many functions are written here? How many functions are used?

2. What does the 1 in the brackets after `splice` do? *Look it up online if you aren't sure.*

Modify

Collections (arrays)

- Add two more subjects to the array.

Input/Output (`prompt` and `alert`)

- Change the program so that it will ask the user what subject they want to add to the array.
- Change the program so that it will ask the user which *index* they want to delete from the array.

Iteration (`while`)

- Add a loop so that the user can add as many subjects as they want until they say 'stop'.

Selection (`if`)

- Add a check to make sure the index they're trying to delete is valid.

Remember: arrays' indexes always start at zero.

You can find the length of the array using this code:

```
let arrayLength = arrayName.length
```



Number Search

Number Search is an array of numbers that the computer knows. You could imagine it would be your NSN number or bank account. It can be used to check if the number someone enters is valid or not.

```
let numberArray = [
  1,
  100,
  1000,
  10000,
  1234567890
]

function numberSearch() {
  let searchTarget = 1
  let searchResult = false

  for (let currentNumber of numberArray) {
    if (currentNumber == searchTarget) {
      searchResult = true
    }
  }

  alert(searchTarget + ' found: ' + searchResult)
}
```

Modify

Collections

- Add three more numbers to the array.

Input/Output (`prompt` and `alert`)

- Change the program so that it will ask the user what number they want to search the array for.

Selection (`if`)

- Add a check that will output a success message if the number was found, and a failure message if it wasn't found.

Blind Drawing

Take turns with a partner. Start with them drawing a picture in their booklet on your back so that you can feel their pen. Draw here what you think they're drawing on your back as they're doing it. Then swap.

What they drew on my back:

My drawing on their back:



Subject Details

```
let subject = {
  name: 'DigiTech',
  room: 'Room 9',
  students: 150,
}

function showSubject() {
  alert(subject.name)
}

function changeSubject() {
  let newName = 'Typing Skills'

  subject.name = newName
}
```

Predict

Read the code carefully. When you're ready, write what you predict it will do.

What do you think the `changeSubject()` function will do?

Run

Run the code, and say whether your prediction was right or not, and note any differences.

Did it do what you predicted?



Differences

Investigate

1. What type of bracket does an object use?

2. What will the `showSubject()` function show after you've clicked the `changeSubject()` function?

3. Why is the `150` after `students` in a different colour?

Modify

1. Add a `teacher` key with the *value* 'Random middle-aged man' to the `subject` object.
2. Change the `alert` so that it outputs the subject name and room.
3. Write a new function called `changeTeacher()` that asks the user for the name of the new teacher and updates the `subject` object.