

Hand-out

Arrays

Leerjaar 2 | Periode 1

1. Introduction

In this chapter we are going to work with arrays. Arrays are often a tricky subject because it always takes a while to understand them. In this handout we explain the Array in its general form, i.e. so that you can also use another language. For example, you don't have associative arrays in Javascript, for this you use a List object. The List object is used in this handout not discussed yet as this is quite a complex topic.

2. What are Arrays

An array consists of one or more columns with variables of the same type. You indicate a row with square brackets []. An array is basically a collection or collection of data.

0	1	2	3	4	5	6	7	8	9
22	56	100	5	70	86	23	9	90	15

The top row is the position of the array and the bottom row is the value.
NOTE: Arrays always start counting at 0, so index 1 is 0.

3. How to make an Array

An array comes in three types:

1. Indexed Arrays
2. Associative Arrays
3. Multidimensional Arrays

In the top example you see an indexed array, the position of the array is indicated by an integer. We call this the index of the array element.

Creating an indexed array is easy:

```
1
2  const cars = ["Saab", "Volvo", "BMW"];
3
```

In an associative array we also use an index, but here we use not an **integer** but a **string** to indicate which array element we want to pick up. Hence associative, because we can later associate with a name or denominator.

id	name	age	gender	color	food
22	"Boy"	36	"male"	"blue"	"wafels"

NOTE : We don't necessarily have an array directly with the contents of the elements to define, we can also reserve empty space per element, we do this as follow :

```
1
2  const someArray = [];
3
```

4. Data types

As you saw above, we can create an array of integers using the data type `int` plus adding square brackets `[]`. Which means, create an array of integers. And this is also possible with all other types, for example:

```
1  const intArray = [22, 56, 23, 78, 700, 376, 28, 20];
2  const strArray = ["one", "two", "three", 'four'];
3  const blnArray = [true, true, false, 0, 1];
4  const chrArray = ['a', 'A', 'B', 'x', 'y'];
```

5. Iterating through an Array

An array is useful because it contains a collection of elements, and here we then also walk through it via a loop. We say "for any" element in the array,... do something...".

```
1  const intArray = [22, 56, 23, 78, 700, 376, 28, 20];
2
3  for(var i = 0; i < intArray.length; i++)
4  {
5      console.log(intArray[i]);
6  }
7
```

6. Sorting and Reversing an Array

With arrays you have the option to sort them as well as change the order in reverse, like this:

```
1  const fruits = ["Banana", "Orange", "Apple", "Mango"];
2  fruits.sort();
3  fruits.reverse();
```

Other options on the Array include:

```
5  // other array options include:
6  fruits.shift();
7  fruits.concat();
8  fruits.flat();
9  fruits.join();
10 fruits.push();
11 fruits.unshift();
12 fruits.length();
13 fruits.pop();
14 //etc...
```

You can look up the remainder of functions on a Array online:

https://www.w3schools.com/jsref/jsref_obj_array.asp

7. Multidimensional Arrays

Multidimensional arrays are arrays that live inside of an array, like this:

```
1  const multiDimensionalArray = [
2    [0, 1, 2, 3, 4],
3    ['a', 'b', 'c', 'd'],
4    ["one", "two", 'three', 'four']
5  ];
```

8. Demo

In this part we are going to make a demo together. You are meant to join and this way get a grip on the subject step by step, make notes in your notebook or in your notepad where necessary. When you're ready you can start on the final assignment yourself.

9. Assignment

Create a program that lists all the names (front and back) of your classmates on the screen with the corresponding index number.

The program requirements are:

- The names must be in an array.
- The loop in which you show the array on the screen must be a for loop.
- Sort the names in alphabetical order using the Sort() method.

Extra points can be earned if you:

- Put the number of students in the class at the bottom of your result on the screen, For example, "There are x students in this class". Just don't go in and hard code, this must come from a variable which you determine yourself. However, only one is approved for this.

When you have finished this assignment, raise your hand and you will review your work with the teacher. Good luck!

Students

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This class has 13 students!