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Web Engineering Front-end Pt. 3

6. JavaScript: Objects and Arrays

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6.1 Objects

What are objects?

JavaScript is an object-oriented programming language, which means almost everything in JS is an object.

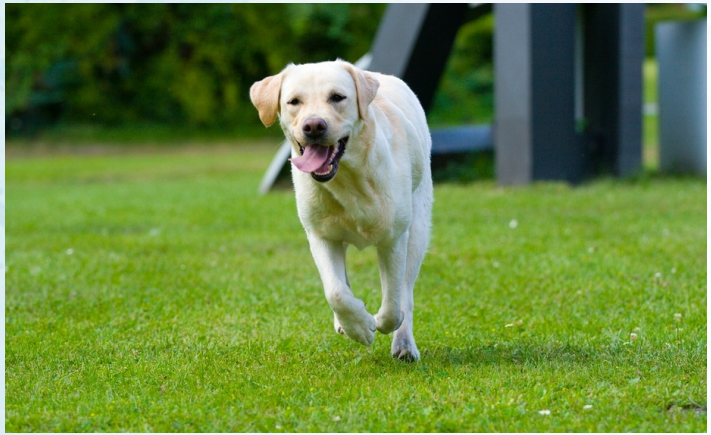
e.g. Strings, numbers, Booleans can all be objects.

What are objects?

Objects are made out of **properties** and **methods**.

Note: We will cover methods in a later topic.

Dog object



Properties:

- name: Marley
- gender: Male
- age: 2
- breed: Labrador retriever

Object properties

Object properties are made of (key: pair) values.

e.g.

name: “Marley”

Object literal

The first and easiest way to create objects is to use an object literal, where you create and define the object in one statement.

Object literal example

```
var dog = {
  name: “Marley”,
  gender: “Male”,
  age: 2,
  breed: “Labrador retriever”
};
```

new keyword

You can also use the new keyword and Object() method to create an empty object, then fill the object with variables.

new keyword example

```
var dog = new Object();
dog.name = “Marley”;
dog.gender = “Male”;
dog.age = 2;
dog.breed = “Labrador retriever”;
```

Object literal vs new keyword

Both methods do the exact same thing. For performance and readability, use the object literal method.

Practice: Objects

Try creating some objects with properties based on some real-life “things”.

e.g.

Animals, cars, locations…

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6.2 Using Objects

Accessing object properties

object.property

or

object[“property”]

Accessing object properties

```
dog.gender; // “Male”

or

dog[“gender”]; // “Male”
```

Accessing object properties

To view the entire object, simply call the name of the object.

e.g.

```
dog; // {name: "Marley", gender: "Male", age: 2, breed:
"Labrador retriever"}
```

Modifying object properties

Object properties are mutable, which means they can be changed.

Modifying object properties

```
dog.name; // “Marley”

dog.name = “Rex”;

dog.name; // “Rex”
```

Removing object properties

Use the delete keyword to remove a property from an object.

e.g.

```
delete dog.breed;

dog; // {name: "Marley", gender: "Male“, age: 2}
```

Practice: Using objects

Spend some time practicing accessing object properties, adding properties, and deleting properties on the objects you created in the previous exercise.

6.3 Arrays

What are arrays?

Arrays are a special kind of object. They can be used to store multiple values into a single variable.

Why use arrays?

```
var student1 = “Chris”;
var student2 = “Kim”;
var student3 = “Ben”;
var student4 = “Matt”;
```

Why use arrays?

var students = [“Chris”, “Kim”, “Ben”, “Matt”]

Which is more efficient?

Arrays can be useful when you want to store a list of similar items

Arrays vs Objects

Arrays: [ ]

Objects: { }

Objects are filled with key: pair values, while arrays just contain values.

Note: typeof(students); // “Object”

Array literals

Similar to objects, the easiest way to create an array is using an array literal.

Array literals syntax

```
var arrayName = [item1, item2, ...];
or
var arrayName = [
  item1,
  item 2 ...
];
```

new keyword

You can use the new keyword to create arrays, but again it is not recommended.

```
var arrayName = new Array(item1, item2);
```

Practice: Arrays

Spend some time creating arrays. Try thinking of values that would make sense to put together into a single variable.

6.4 Using Arrays

Accessing array elements

Array elements are accessed using their index number.

e.g.

students[2]; // “Ben”

Accessing array elements

Remember when we counted the characters in a string?

Array indexes also start with 0.

Accessing array elements

```
students[0]; // “Chris”

students[1]; // “Kim”

students[2]; // “Ben”

students[3]; // “Matt”
```

.length

Use the .length property the return the number of elements in an array.

e.g.

```
students.length; // 4
```

.push()

The .push() method adds a new element to the end of the array.

.push()

```
students.push(“Tom”);

students; // [“Chris”, “Kim”, “Ben”, “Matt”, “Tom”]
```

Modifying array elements

Changing elements in arrays is just like changing properties in objects.

```
students[1] = 20

students[3] = false

students; // [“Chris”, 20, “Ben”, false]
```

Deleting array elements

Using the delete keyword will change the value of the element to undefined. It won't actually remove the element from the array.

Deleting array elements

```
delete students[0];

students; // [empty, “Kim”, “Ben”, “Matt”]

typeof(students[0]); // undefined
```

.pop()

The .pop() method removes the last element of an array.

.pop()

```
students.pop();

students; // [“Chris”, “Kim”, “Ben”]
```

.shift()

The .shift() method removes the first element of an array and shifts the other elements to a lower index.

.shift()

```
students.shift();

students; // [“Kim”, “Ben”, “Matt”]
```

.splice()

The .splice() method can be used to add new elements into the middle of an array.

.splice() syntax

array.splice(x, y, item1, item2, ...)

x: The position where new elements should be added

y: How many elements should be removed

item1, item2, ...: The new elements to be added

.splice() syntax

```
students.splice(1, 3, “Tom”, “Tim”, “Brad”);

students; // [“Chris”, “Tom”, “Tim”, “Brad”)
```

Practice: Using Arrays

Spend some time practicing accessing and modifying array elements using what you just learned on the arrays you created in the previous exercise.

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The End

Reference 1: tutorialspoint JavaScript – Objects Overview

https://www.tutorialspoint.com/javascript/javascript_objects.htm

Reference 2: W3 Schools JavaScript Tutorial https://www.w3schools.com/js/default.asp

Reference 3: Labrador (Slide 6) https://www.flickr.com/photos/23807781@N06/3798577491