JavaScript 101

Data: 9/27/2020

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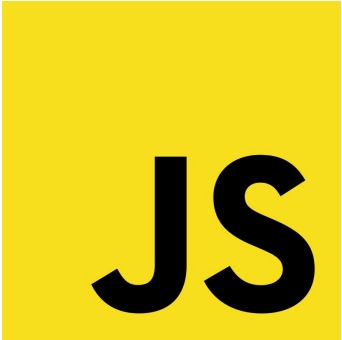
What is JavaScript?

- Interpreted programing language
- Statically typed
- Conforms to **ECMAScript** specification
- Runs on the client/browser as well as on server (Node.js)



Why Learn JavaScript?

- Programing language of the browser
- Can be used for both front-end (React) and back-end (Node.js)→ **full stack** applications
- Used in **mobile** development (React Native, Ionic)
- Used in **desktop** application development (Electron JS)

Directions

1. Create a folder on your computer called “**webdvt_workspace**” (if you missed out previous meetings).
2. Then create another folder (inside “webdvt_workspace”) called “**js-cheat-sheet**”.
3. Open up WebStorm (or any text editors of your choosing).
4. Inside Webstorm, open the folder “js-cheat-sheet”.
5. Right click on the folder on your left sidebar. Create an HTML file named “**index.html**”.
6. Create another file called “**main.js**”.

How to run JS?

1. Add <script src="NAME_OF_JS_FILE.js"></script> tag inside the <body> of your HTML document

```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>JavaScript Cheat Sheet</title>
</head>
<body>
    <h1>JS Cheat Sheet sd</h1>
    <p>Open developer tools and view the console to see the output of the Javascript code!</p>
    <script src="main.js "></script>
</body>
</html>
```

2. Open the HTML document in browser
3. Right-click on the page and select “inspect”
4. Go to the “console” tab
5. Refresh your web page
6. You should see the output from your JS code

Variables & Data Types

- Var, let, const
  - Var is the old standard for declaring variables
  - Let is the new standard
  - Const - value cannot be changed
- Data types
  - String
  - Number
  - Boolean
  - Null
  - Undefined
  - Object

```
// --- Primitive data types ---
// string, number, boolean, null, undefined
const name = 'John'; // string
const age = 27; // number
const isMarried = false; // boolean
const height = 5.6; // number
const x = null;
const y = undefined;
```

Var vs. let and const?

var vs. **let** vs. **const**

```
function order(x, y) {
    if (x > y) {
        let tmp = x;
        x = y;
        y = tmp;
    }
    console.log(tmp===x);
  // ReferenceError: tmp is not defined
    return [x, y];
}
```

let works similarly to var, but the variable it declares is block-scoped, it only exists within the current block. **var** is function-scoped.

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https://www.slideshare.net/francjohny/ecmascript-6-and-beyond

How should you declare variable in JS?

CONST vs LET vs VAR

ES6 Conventions:

1. Use `const` by default.
2. Use `let` if you have to rebind a variable.
3. Use `var` to signal untouched legacy code

Source: https://twitter.com/raganwald/status/564792624934961152

JS

https://codeburst.io/part-2-var-vs-const-vs-let-69ea73fe76c1?gi=97f4cf4650f9

JS Template Literal

Template literals are **string literals** allowing embedded expressions.

Template literals are enclosed by the **backtick** (` `) character instead of double or single quotes.

```
const name = 'John';
const age = 27;

// String concatenation
console.log("My name is " + name + " and I am " + age + " years old.");
// Template Literal: lets you to inject variables & logic directly into a string
console.log(`My name is ${name} and I am ${age} years old.`);
// Both logs: "My name is John and I am 27 years old."
```

Arrays

- Type of object
- Single variable used to store multiple elements
- Can store elements of different data types
- Elements are accessed by passing index

```
const fruits = ['apples', 'oranges', 'bananas', 'mangoes'];
```

Spread Operator with Array

```
const array1 = [🍎, 🍋, 🥑];
const array2 = [🥦, 🌽, 🌶];

const array3 = [...array1, ...array2];

// => [🍎, 🍋, 🥑, 🥦, 🌽, 🌶]
```

https://medium.com/openmindonline/js-monday-02-the-formidable-spread-operator-f2d9177350ca

Object Literals

- A set of key-value pairs that make up properties for an object (similar to dictionary in python)
- Key: value
- JSON (JavaScript Object Notation) is derived from Object Literals

```
let person = {
    firstName: 'John',
    lastName: 'Doe',
    age: 70,
    hobbies: ['hiking', 'drinking', 'science', 'inventing'],
    address: {
        street: '123 main st',
        city: 'Blacksburg',
        state: 'Virginia'
    }
};
```

JavaScript Object Literal

Object Literal Notation

```
// create a person object
var person = {};
person.firstName = "Joe";
person.lastName = "Jones";
person.address = {};
person.address.street = "123
    main";
person.address.zip = "12345";
person.address.state = "MO";
```

```
// same thing in object literal notation
var person = {
   firstName: "Joe",
   lastName: "Jones",
   address: {
      street: "123 main",
      zip: "12345",
      state: "MO"
   }
};
```

https://www.slideshare.net/MetaThis/javascript-literacy

JS Object Destructuring

```javascript
const developer = {
  name: "Mitch",
  age: 24,
  languages: {
    favorite: "Haskell",
    mostUsed: "JavaScript"
  }
};

const { name, age, languages: { favorite, mostUsed } } = developer;

const bio = `${name} is a ${age} years old developer.\n`
          + `He codes in ${mostUsed} but prefers ${favorite}`;

console.log(bio);

// => "Mitch is a 24 old developer.
//     He codes in JavaScript but prefers Haskell"
```

https://miro.medium.com/max/2720/1*mUcxSZsz3xwfKPrWR1yYEw.png

How to copy object properties?

→ Use Spread Operator!

```
// How to merge arrays or object literal?
const person1 = {
    firstName: 'John',
    lastName: 'Doe',
    age: 27
};

const job = {jobTitle: 'developer', company: 'companyX'};

const person1Merged = {...person1, ...job};
/* person1Merged = {
    firstName: 'John',
    lastName: 'Doe',
    age: 27,
    jobTitle: 'developer',
    company: 'companyX'
}; */
```

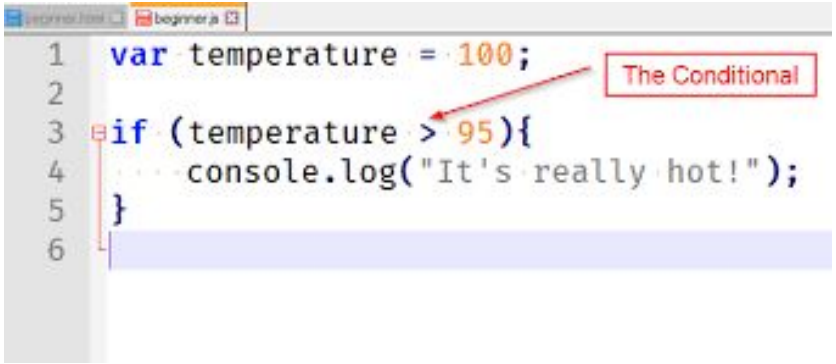
Object Destructuring & assigning new name

```
let john = {
    name: 'John',
    age: 40
}

const employee = john;

let { name: n, age: a } = employee;
// n = employee.name
// a = employee.age
```

https://learnwebtutorials.com/wp-content/uploads/2016/11/destructuring-objects.jpg

Conditionals

- If-else if-else
- Used for decision branching
- Equals in comparison context
  - Always use triple equals (===)
    - Compares data types of the left hand and right hand value



Loops

- Loops are common structures among programming languages
- Main types
  - For
  - For each
  - While
  - Do while
- Allows for repetitive actions and array traversal

```
// Array traversal
for (let i = 0; i < todos.length; i++) {
    console.log(todos[i].text);
}

for (let todo of todos) {
    console.log(todo.id);
}

// forEach
todos.forEach(function(todo :{...} ) {
    console.log(todo.text);
});
```

Array map

```
const users = [
    { firstName: 'John', lastName: 'Doe'},
    { firstName: 'Sarah', lastName: 'Smith'},
    { firstName: 'Sam', lastName: 'Williams'},
];

// Array map --> creates a new array by calling a function on each element in the input array.
const firstNames = users.map(function(user : {firstName: string, lastName: string} | ... ){ return user.firstName});

console.log({firstNames});
// firstNames = ['John', 'Sarah', 'Sam']
```

Functions

- Block of code that is essential for completing certain task
- Helps keep code clean and readable
- Makes code reusable

```
// 'function' syntax
function isEven(num) {
    return num % 2 === 0;
}

// modern ES6 arrow syntax
const isEven2 = (num) => {
    return num % 2 === 0;
};
```