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# JavaScript

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JavaScript, is a lightweight interpreted or just-in-time compiled programming language with first-class functions. While it is most well-known as the scripting language for Web pages, many non-browser environments also use it, such as Node.js, Apache CouchDB and Adobe Acrobat.

## 1 Simplistic JavaScript 1

### 1.1 Command-line based programming

A simple project:

```
$bash: touch {index.html,script.js,style.css}
$bash: tree
----- index.html
----- script.js
----- style.css
```

Include the script (**javascript**) and the page styling script (**cascading stylesheet**) files into the *index.html*.

```
<!DOCTYPE>
<html>
  <head>
    <script src="path/*.js"></script>
    <link rel="stylesheet"
      href="path/*.css">
  </head>
  <body>
    <div>
      <header></header>
    </div>
    <div><!-- body --></div>
    <div>
      <footer></footer>
    </div>
  </body>
</html>
```

Add some simple HTML markup code and launch a live-server of the code.

```
<!DOCTYPE>
<html>
  <head>
    <script src="script.js"></script>
    <link rel="stylesheet"
      href="style.css">
  </head>
  <body>
    <div id="header">
      <h1>Welcome to
        JavaScript</h1>
    </div>
  </body>
</html>
```

Launch the command-line (Terminal)

```
$bash: live-server
```

A terminal window showing the output of the live-server command. It indicates that the server is running at http://127.0.0.1:8080 and lists the files being served: index.html, script.js, and style.css.

Figure 1: Live-server

## 1.2 Plunker

Or create an account on [Plunker](#). Plunker sets up your working environment for you.

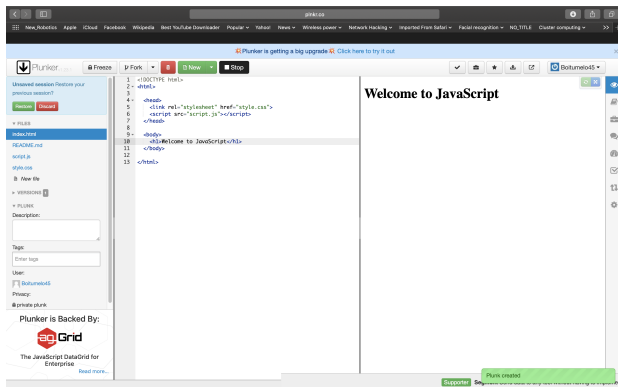


Figure 2: Plunker

## 1.3 Electron

Watch this video [Electron](#).

```
# Clone the Quick Start repository
$ git clone
  https://github.com/electron/electron-quick-start

# Go into the repository
$ cd electron-quick-start

# Install the dependencies and run
$ npm install && npm start
```

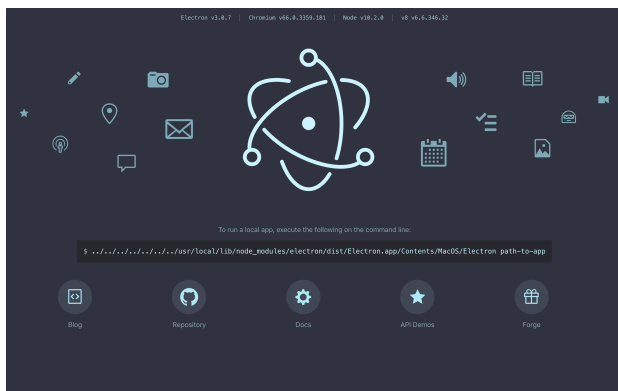


Figure 3: Electron

```
$bash: mkdir Electron1; cd Electron1; npm init
1 {
2   "name": "electron1",
3   "version": "1.0.0",
4   "description": "First App",
5   "main": "index.js",
6   "scripts": {
7     "test": "echo \"Error: no test
  specified\" && exit 1"
8 },
```

```
9   "keywords": [
10    "Electron"
11  ],
12  "author": "Boitumelo Phetla",
13  "license": "ISC"
14 }
```

At this point, you'll need to install electron itself. The recommended way of doing so is to install it as a development dependency in your app, which allows you to work on multiple apps with different Electron versions. To do so, run the following command from your app's directory:

```
$bash: npm install --save-dev electron
$bash: tree -L 1
```

```
.
|_____node_modules
|_____package-lock.json
|_____package.json
```

1 directory, 2 files

All APIs and features found in Electron are accessible through the electron module, which can be required like any other Node.js module:

```
const electron = require('electron')
```

To avoid any huddles, try this simple example.

```
# Clone the repository
$ git clone
  https://github.com/electron/electron-quick-start
# Go into the repository
$ cd electron-quick-start
# Install dependencies
$ npm install
# Run the app
$ npm start
```

## 1.4 Meteor

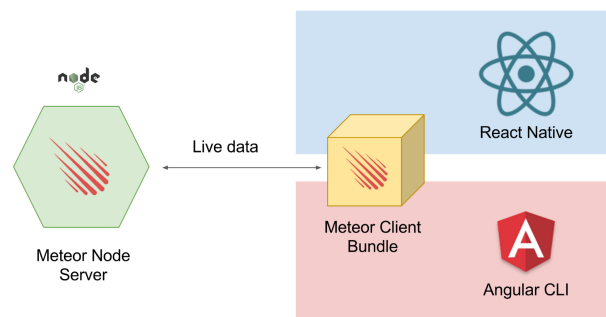


Figure 4: Meteor

To create the app, open your terminal and type:

```
$bash: meteor create simple-todos
```

output:

Created a new Meteor app in 'simple-todos'.

To run your new app:

```
cd simple-todos
meteor
```

If you are new to Meteor, try some of the learning resources here:

<https://www.meteor.com/tutorials>

To start with a different app template, try one of the following:

```
meteor create --bare # to create an empty app
meteor create --minimal # to create an app
                        with as few Meteor packages as possible
meteor create --full # to create a more
                        complete scaffolded app
```

## 1.5 Coding in JavaScript

### 1.5.1 Variables

```
"use strict";
//let is accessible in the code block where it
//is used
let firstName = "John Doe"; //camelCasing
console.log(firstName);

/*Output*/
$bash: node let.js
John Doe
```

### 1.5.2 Global variable, function, Operators

```
"use strict";

//A = P(1 + rt)
let r = 10.5, t = 5, p = 200;

var A = (r,t,p) => {
  return p*(1 + (r/100)*t);
}

let interest = A(r,t,p);
console.log("R200 (interest in 5 years at at
            interest rate of 10.5% = R" + interest +
            "-00)");
```

### 1.5.3 Simple function

```
"use strict";

//A = P(1 + rt)
let r = 10.5, t = 5, p = 200;
```

```
//function definition (without using arrow
//function)
var A = function(r,t,p){
  return p*(1 + (r/100)*t);
}

console.log(A(r,t,p));
```

### 1.5.4 Variables and block code

```
"use strict";

array = [1,2,3,4,5];
var count = 0;
let counter = 0;

for(let i = 0; i < array.length; i++){
  count += array[i];
  counter += i;
  if(count > 5){
    var num1 = count*5; //accessible
                        //outside this code block
    let num2 = num1*5; //only accessible
                      //within this code block
    console.log("num1: ", num1, ', ', 'num2:
                ', num2);
  }
  //console.log("xnum1: ", num1, ', ', 'xnum2:
                ', num2);
  try{
    console.log("xnum1: ", num1, ', ',
                'xnum2: ', num2);
  }catch{
    console.log('xnum1: ', num1); //<--
    //accessing num1
    console.log('xnum2: ', 'This will not
    print because it is not
    accessible'); //<-- can't access num2
  }
}

console.log('count: ', count, ', ', 'counter:
            ', counter); //<-- both count and counter
                        //are accessible because they are in the same
                        //code block

/*Output*/
xnum1: undefined
xnum2: This will not print because it is not
       accessible
xnum1: undefined
xnum2: This will not print because it is not
       accessible
num1: 30 , num2: 150
xnum1: 30
xnum2: This will not print because it is not
       accessible
num1: 50 , num2: 250
xnum1: 50
xnum2: This will not print because it is not
       accessible
```

```
num1: 75 , num2: 375
xnum1: 75
xnum2: This will not print because it is not
        accessible
count: 15 , counter: 10
```

---

### 1.5.5 Type of primitive data

---

```
"use strict";

let b = false;
let array = [1,2,3,'hello', 3.02, b];

var typeOfData = (array) =>{
  array.forEach((element) =>{
    console.log(element, 'is a ',
      typeof(element));
  })
}

typeOfData(array);

/*Output*/

1 'is a ' 'number'
2 'is a ' 'number'
3 'is a ' 'number'
hello is a string
3.02 'is a ' 'number'
false 'is a ' 'boolean'
```

---

### 1.5.6 Undefined and Null

---

```
"use strict";

let anUndefinedVariable; //not initialized
let empty = null; //is empty (nothing)

console.log(anUndefinedVariable, empty);
console.log(typeof(anUndefinedVariable),
  typeof(empty));

/*Output*/

undefined null
undefined object
```

---

### 1.5.7 Data containers

#### Array

---

```
"use strict";

/*
  We use arrays to contain multiple variables
  values instead of declaring a thousand of
  them.
*/
```

---

```
let array = ["John", "Doe", 34, "X", "USA",
  "Nevada", "Porsche 911", ["soccer",
  "volleyball", "chess"], ["python", "nim",
  "c", "java", "julia", "objective C", "SQL",
  "GraphQL", "JavaScript", "HTML5", "CSS3",
  "jQuery", "Machine Learning",
  "Bash"], "MIT", "In a relationship",
  ["Bali", "Singapore", "Hong Kong",
  "Thailand", "Mozambique", "Swaziland",
  "South Africa", "Lombark"], ["Electrical",
  "Computer"]];

array.forEach((element)=>{console.log(element)});

/*Output*/

John
Doe
34
X
USA
Nevada
Porsche 911
[ 'soccer', 'volleyball', 'chess' ]
[ 'python',
  'nim',
  'c',
  'java',
  'julia',
  'objective C',
  'SQL',
  'GraphQL',
  'JavaScript',
  'HTML5',
  'CSS3',
  'jQuery',
  'Machine Learning',
  'Bash' ]
MIT
In a relationship
[ 'Bali',
  'Singapore',
  'Hong Kong',
  'Thailand',
  'Mozambique',
  'Swaziland',
  'South Africa',
  'Lombark' ]
[ 'Electrical', 'Computer' ]
```

---

Add values into an empty array

---

```
"use strict";

/*
  We use arrays to contain multiple variables
  values instead of declaring a thousand of
  them.
*/

let array = ["John", "Doe", 34, "X", "USA",
  "Nevada", "Porsche 911"];
let results = [] //empty array
```

---

```

/*
  add elements into array
  array.push(value)
*/

for(let i = 0; i < array.length; i++){
  results.push(array[i]);
}

console.log("Length of results[]: ",
  results.length);
console.log(results);

/*Output*/
Length of results[]: 7
[ 'John', 'Doe', 34, 'X', 'USA', 'Nevada',
  'Porsche 911' ]

```

---

Removing elements from an array

---

```

"use strict";

let array = ["John", "Doe", 34, "X", "USA",
  "Nevada", "Porsche 911"];
/*
  remove elements from an array
  array.pop(); //removes last value
*/
while(array.length > 0){
  array.pop();
}

console.log("Length of array: ", array.length);
console.log(array);

/*Output*/
Length of array: 0
[]

```

---

Removing the first elements by shifting the array.

---

```

"use strict";

let array = ["John", "Doe", 34, "X", "USA",
  "Nevada", "Porsche 911"];
array.shift(); //shifts the array

console.log(array);

/*Output*/

[ 'Doe', 34, 'X', 'USA', 'Nevada', 'Porsche 911'
  ]

```

---

Deleting elements from an array.

---

```

"use strict";

let array = ["cobol", "c#", ".NET", "Python"];

/*
  delete the first three elements of the array
*/

```

```

let languages_depricated = array.splice(0,3);
console.log(array, languages_depricated);

```

```

/*Output*/
[ 'Python' ] [ 'cobol', 'c#', '.NET' ]

```

---

Deleting elements from an array and mutating it.

---

```

"use strict";

let array = ["cobol", "c#", ".NET", "Python"];

/*
  delete the first three elements of the array
  and mutating the array
  using splice()

  splice(0,3) - means:
  delete element from index 0 and delete 3 items
  if array = [1,2,3,4]
  splice(0,3)
    performs:
        [2,3,4] - 1 : delete[1]
        [3,4] - 2 : delete[2]
        [4] - 3 : delete[3]
        all at index 0
    returns new array = [4]
*/

let deleted = array.splice(0,3, "Java", "C",
  "Nim", "Objective C", "Swing");
console.log(array, deleted);

/*Output*/
[ 'Java', 'C', 'Nim', 'Objective C', 'Swing',
  'Python' ] [ 'cobol', 'c#', '.NET' ]

```

---

Some of Array methods you can use.

**forEach()** This method can help you to loop over array's items.

```

const arr = [1, 2, 3, 4, 5, 6];

arr.forEach(item => {
  console.log(item); // output: 1 2 3 4 5 6
});

```

**includes()** This method check if array includes the item passed in the method.

```

const arr = [1, 2, 3, 4, 5, 6];

arr.includes(2); // output: true
arr.includes(7); // output: false

```

**filter()** This method create new array with only elements passed condition inside the provided function.

```

const arr = [1, 2, 3, 4, 5, 6];

// item(s) greater than 3

```

---

```
const filtered = arr.filter(num => num > 3);
console.log(filtered); // output: [4, 5, 6]

console.log(arr); // output: [1, 2, 3, 4, 5, 6]
```

---

**map()** This method create new array by calling the provided function in every element. The reduce() method applies a function against an accumulator and each element in the array (from left to right) to reduce it to a single value - MDN

---

```
const arr = [1, 2, 3, 4, 5, 6];

// add one to every element
const oneAdded = arr.map(num => num + 1);
console.log(oneAdded); // output [2, 3, 4, 5, 6, 7]

console.log(arr); // output: [1, 2, 3, 4, 5, 6]
```

---

**reduce()** This method check if at least one of array's item passed the condition. If passed, it return 'true' otherwise 'false'.

---

```
const arr = [1, 2, 3, 4, 5, 6];

const sum = arr.reduce((total, value) => total + value, 0);
console.log(sum); // 21
```

---

**some()** This method check if at least one of array's item passed the condition. If passed, it return 'true' otherwise 'false'.

---

```
const arr = [1, 2, 3, 4, 5, 6];

// at least one element is greater than 4?
const largeNum = arr.some(num => num > 4);
console.log(largeNum); // output: true

// at least one element is less than or equal to 0?
const smallNum = arr.some(num => num <= 0);
console.log(smallNum); // output: false
```

---

**every()** This method check if all array's item passed the condition. If passed, it return 'true' otherwise 'false'.

---

```
const arr = [1, 2, 3, 4, 5, 6];

// all elements are greater than 4
const greaterFour = arr.every(num => num > 4);
console.log(greaterFour); // output: false

// all elements are less than 10
const lessTen = arr.every(num => num < 10);
console.log(lessTen); // output: true
```

---

**sort()** This method used to arrange/sort array's item either ascending or descending order.

---

```
const arr = [1, 2, 3, 4, 5, 6];
const alpha = ['e', 'a', 'c', 'u', 'y'];

// sort in descending order
descOrder = arr.sort((a, b) => a > b ? -1 : 1);
console.log(descOrder); // output: [6, 5, 4, 3, 2, 1]

// sort in ascending order
ascOrder = alpha.sort((a, b) => a > b ? 1 : -1);
console.log(ascOrder); // output: ['a', 'c', 'e', 'u', 'y']
```

---

**Array.from()** This change all thing that are array-like or iterable into true array especially when working with DOM, so that you can use other array methods like reduce, map, filter and so on.

code 1

---

```
const name = 'frugence';
const nameArray = Array.from(name);

console.log(name); // output: frugence
console.log(nameArray); // output: ['f', 'r', 'u', 'g', 'e', 'n', 'c', 'e']
```

---

code 2

---

```
// I assume that you have created unordered
// list of items in our html file.

const lis = document.querySelectorAll('li');
const lisArray = Array.from(document.querySelectorAll('li'));

// is true array?
console.log(Array.isArray(lis)); // output: false
console.log(Array.isArray(lisArray)); // output: true
```

---

**Array.of()** This create array from every arguments passed into it.

---

```
const nums = Array.of(1, 2, 3, 4, 5, 6);
console.log(nums); // output: [1, 2, 3, 4, 5, 6]
```

---

## Dictionary

---

```
"use strict";

let data = {

  "first name": "John",
  "last name" : "Doe",
  "age"       : 34,
  "company"   : "X",
  "country"   : "USA",
  "State"     : "Nevada",
  "car"       : "Porsche 911",
  "hobby"     : ["soccer", "volleyball",
    "chess"],
  "polyglot"  : ["python", "nim", "c", "java",
    "julia", "objective C", "SQL",
    "GraphQL", "JavaScript", "HTML5",
    "CSS3", "jQuery", "Machine Learning",
    "Bash"],
  "university": "MIT",
  "status"    : "in a relationship",
  "travels"   : ["Bali", "Singapore", "Hong
    Kong", "Thailand", "Mozambique",
    "Swaziland", "South Africa", "Lombark"],
  "Degrees"   : ["Electrical", "Computer"]

}

console.log(data);
```

```
/*Output*/

{ 'first name': 'John',
  'last name': 'Doe',
  age: 34,
  company: 'X',
  country: 'USA',
  State: 'Nevada',
  car: 'Porsche 911',
  hobby: [ 'soccer', 'volleyball', 'chess' ],
  polyglot:
    [ 'python',
      'nim',
      'c',
      'java',
      'julia',
      'objective C',
      'SQL',
      'GraphQL',
      'JavaScript',
      'HTML5',
      'CSS3',
      'jQuery',
      'Machine Learning',
      'Bash' ],
  university: 'MIT',
  status: 'in a relationship',
  travels:
    [ 'Bali',
      'Singapore',
```

```
'Hong Kong',
'Thailand',
'Mozambique',
'Swaziland',
'South Africa',
'Lombark' ],
Degrees: [ 'Electrical', 'Computer' ] }
```

---

## 1.5.8 Blackjack project (PluralSight)

---

```
/*
  Blackjack game of cards
*/

let card1 = "Ace of Spades", card2 = "Ten of
  hearts";
let cards = [card1, card2];

console.log("Welcome to Blackjack");
console.log("You are dealt: ");
cards.forEach((element) => {
  console.log("\t" + element);
})

/*Output*/
Welcome to Blackjack
You are dealt:
    Ace of Spades
    Ten of hearts
```

---

### For loops, Arrays

---

```
/*
  Blackjack game of cards
*/

let suits = ["Heart", "Clubs", "Diamonds",
  "Spades"];
let values = ["Ace", "King", "Queen", "Jack",
  "Ten", "Nine", "Eight", "Seven", "Six",
  "Five", "Four", "Three", "Two"];

let deck = []

for(let suitIdx = 0; suitIdx < suits.length;
  suitIdx++){
  for(let valueIdx = 0; valueIdx <
    values.length; valueIdx++){
    deck.push(values[valueIdx] + ' of ' +
      suits[suitIdx]);
  }
}

console.log(deck);

/*Output*/
....
'Four of Spades',
'Three of Spades',
'Two of Spades' ]
```

---