Bootstrap
Front-End Basics

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JavaScript

Dynamic Programming Language

- JavaScript is a dynamic programming language
  - Operations otherwise done at compile-time can be done at run-time
- It is possible to change the type of a variable or add new properties or methods to an object while the program is running
- In static programming languages, such changes are normally not possible

Data Types

- Seven data types that are primitives
  - **String** - used to represent textual data
  - **Number** - a numeric data type
  - **Boolean** - a logical data type
  - **Undefined** - automatically assigned to variables
  - **Null** - represents the **intentional absence** of any object value
  - **BigInt** - represent integers with **arbitrary precision**
  - **Symbol** - **unique** and **immutable** primitive value
- Data structures
  - **Array**
  - **Object**

Variable Values

- **let**, **const** and **var** are used to declare variables
  - **let** - for reassigning a variable
    ```
    let name = "George";
    name = "Pesho";
    ```
  - **const** - once assigned it cannot be modified
    ```
    const name = "George";
    name = "Pesho"; // TypeError
    ```
  - **var** - defines a variable in the lexical scope **regardless** of block scope
    ```
    var name = "George";
    name = "Pesho";
    ```

Dynamic Typing

- Variables in JavaScript are not directly associated with any particular value type
- Any variable can be assigned (and re-assigned) values of all types

```
let foo = 42;  // foo is now a number
foo = 'bar';   // foo is now a string
foo = true;    // foo is now a boolean
```

Comparison Operators

```
console.log(1 == '1');    // true
console.log(1 === '1');   // false
console.log(3 != '3');    // false
console.log(3 !== '3');   // true
console.log(5 < 5.5);     // true
console.log(5 <= 4);      // false
console.log(2 > 1.5);     // true
console.log(2 >= 2);      // true
console.log(5 ? 4 : 10); // 4
```

Operator	Notation in JS
EQUAL value	= =
EQUAL value and type	= = =
NOT EQUAL value	! =
NOT EQUAL value/type	! = =
Greater than	>
Greater than OR EQUAL	> =
LESS than	<
LESS than OR EQUAL	< =

Functions

- Function - named list of instructions (statements and expressions)
- Can take parameters and return result
  - Function names and parameters use camel case
  - The '{' stays on the same line

```
function printStars(count) {
    console.log("*".repeat(count));
}

printStars(10);
```

Declaring Functions

- Function declaration

```
function walk( ) {
    console.log("walking");
}
```

- Function expression

```
let walk = function ( ) {
    console.log("walking");
}
```

- Arrow functions

```
let walk = ( ) => {
    console.log("walking");
}
```

Parameters

- You can instantialize parameters with no value

```
function foo(a, b, c) {
    console.log(a);
    console.log(b);
    console.log(c);  // undefined
}
foo(1, 2);
```

- The unused parameters are ignored

```
function foo(a, b, c) {
    console.log(a);
    console.log(b);
    console.log(c);
}
foo(1, 2, 3, 5, 8);
```

Hoisting

- Variable and function declarations are put into memory during the compile phase, but stay exactly where you typed them in your code
- Only declarations are hoisted

```
console.log(num); // Returns undefined
var num;
num = 6;
```

Hoisting Variables

```
num = 6;
console.log(num); // Returns 6
var num;

num = 6;
console.log(num); // ReferenceError: num is not defined
let num;

console.log(num); // ReferenceError: num is not defined
num = 6;
```

Hoisting Functions

```
run( ); // running
function run( ) {
    console.log("running");
};

walk( ); // ReferenceError: walk is not defined
let walk = function( ) {
    console.log("walking");
}

console.log(walk); // undefined
walk( ); // TypeError: walk is not a function
var walk = function( ) {
```

```
    console.log("walking");
};
```

What is an Object?

- An object is a collection of fields, and a field is an association between a name (or key) and a value
- Objects are a reference data type
- You define (and create) a JavaScript object with an object literal:

```
let person = {
    firstName: "John",
    lastName: "Doe",
    age: 42
};
```

Variables Holding References

- The in-memory value of a reference type is the reference itself (a memory address)

```
let x = {name: 'John'};
let y = x;

y.name = "Pesho";
console.log(x.name); // Pesho
```

Object Properties

- A property of an object can be explained as a variable that is attached to the object
- Object properties are basically the same as ordinary JavaScript variables, except for the attachment to objects

Property Name	Property Value
firstName	John
lastName	Doe
age	42

Object Keys and Values

```
let course = { name: 'JS Core', hall: 'Open Source' };
let keys = Object.keys(course);
console.log(keys); // [ 'name', 'hall' ]
if (course.hasOwnProperty('name') {
    console.log(course.name); // JS Core
}

let values = Object.values(course);
console.log(values); // [ 'JS Core', 'Open Source' ]
if (values.includes('JS Core')) {
    console.log("Found 'JS Core' value");
}
```

For... in Loop

- for... in - iterates a specified variable over all the enumerable properties of an object

```
let obj = {a: 1, b: 2, c: 3};
for (const key in obj) {
```

```
    console.log( `obj.${key} = ${obj[key]}`);
}
// Output:
// "obj.a = 1"
// "obj.b = 2"
// "obj.c = 3"
```

For... of Loop

- The for.. of statement creates a loop iterating over iterable objects

```
let obj = { a: 1, b: 2, c: 3};
for (const key of Object.keys(obj)) {
    console.log( `obj.${key} = ${obj[key]}`);
}
// "obj.a = 1"
// "obj.b = 2"
// "obj.c = 3"

for (const val of Object.values(obj)) {
    console.log(val);
}
// 1
// 2
// 3
```

Bootstrap

What is a Responsive Design?

- Presentation layers that adjust according to the screen size of the different devices

Bootstrap

- World's most popular front-end component library
- Open source toolkit for developing with HTML, CSS and JS
- Works with
  - Responsive **grid system**
  - Extensive prebuilt **components**
  - Powerful plugins built on **jQuery**

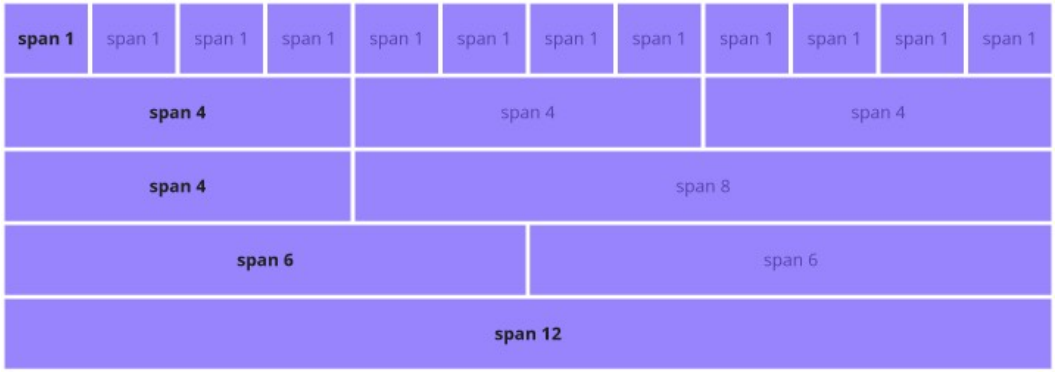
Include from a BootstrapCDN – JS

- Be sure to place jQuery and Popper first, as the Bootstrap code depends on them
  jQuery CDN, bootstrap CDN

```
<script src="https://code.jquery.com/jquery3.3.1.slim.min.js"></script>
<script src="https://cdnjs.cloudflare.com/ajax/libs/popper.js/1.14.7/umd/popper.min.js"></script>
<script src="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/js/bootstrap.min.js"></script>
```

Bootstrap Grid System

Build Layouts with Grid – Twelve Column System



Bootstrap Grid System Demo

index.html

```
<div class="container">
   <div class="row">
      <div class="col-xs m-3">Column one</div>
      <div class="col-xs m-3">Column two</div>
      <div class="col-xs m-3">Column three</div>
   </div>
</div>
```

Bootstrap Containers

- Rows must be placed in containers
  - .container has one fixed width for each screen size in bootstrap (xs, sm, md, lg)
  - .container-fluid expands to fill the available width

Column Classes

- Determines how many columns to use on different screen sizes

index.html

```
<div class="col-sm-8 col-lg-4">Column one</div>
<div class="col-sm-2 col-lg-4">Column two</div>
<div class="col-sm-2 col-lg-4">Column three</div>
```

  - **.col-xs**: width less than 768px
  - **.col-sm**: width between 768px and 992px
  - **.col-md**: width between 992px and 1200px
  - **.col-lg**: width over 1200px

Color

- Handful of color utility classes

index.html

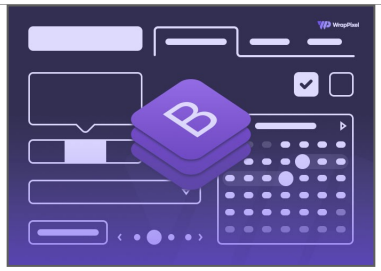
```
<p class="text-primary">.text-primary</p>
<p class="text-secondary">.text-secondary</p>
<p class="text-success">.text-success</p>
<p class="text-danger">.text-danger</p>
<p class="text-warning">.text-warning</p>
<p class="text-info">.text-info</p>
<p class="text-light bg-dark">.text-light</p>
<p class="text-dark">.text-dark</p>
<p class="text-muted">.text-muted</p>
<p class="text-white bg-dark">.text-white</p>
```

Background Color

- Easily set the background of an element to any contextual class

index.html

```
<p class="bg-primary text-white">.bg-primary</p>
<p class="bg-secondary text-white">.bg-secondary</p>
<p class="bg-success text-white">.bg-success</p>
<p class="bg-danger text-white">.bg-danger</p>
<p class="bg-warning text-dark">.bg-warning</p>
<p class="bg-info text-white">.bg-info</p>
<p class="bg-light text-dark">.bg-light</p>
<p class="bg-dark text-white">.bg-dark</p>
```



Bootstrap Components

Button Groups

- Custom button styles with support for multiple sizes, states, and more

index.html

```
<button type="button" class="btn btn-primary">Primary</button>
<button type="button" class="btn btn-secondary">Secondary</button>
<button type="button" class="btn btn-success">Success</button>
<button type="button" class="btn btn-danger">Danger</button>
. . .
Documentation: https://getbootstrap.com/docs/4.0/components/buttons
```

Alerts

- Provide contextual feedback message for typical user actions with the handful of flexible alert messages

index.html

```
<div class="alert alert-success alert-dismissable">
   <a class="close" data-dismiss="alert" aria-label="close">x</a>
   <strong>Success!</strong>
   This alert box could indicate a successful or positive action.
</div>
. . .
```

Nav and Navbar

- Require a wrapping .navbar
- Responsive by default
- Come with built-in support for a handful of sub-components
  - **.navbar-brand** for your company, product, or project name
  - **.navbar-nav** for a full-height and lightweight navigation
  - **.nav-item** for every item in navigation

See more at: https://getbootstrap.com/docs/4.0/components/navbar

Forms

- Form control styles, layout options and custom components for creating a wide variety of forms
- Use type attribute on all inputs to take advantage of newer input controls
  - Email verification
  - Number selection

See more at: https://getbootstrap.com/docs/4.0/components/forms

Tables

```
<table class="table">
   <thead class="thead-dark">
      <tr> <th scope="col">#</th>
           <th scope="col">First</th>
           <th scope="col">Last</th>
           <th scope="col">Handle</th> </tr>
   </thead>
   <tbody>
      <tr> <th scope="row">1</th>
           <td>Mark</td>
           <td>Otto</td>
           <td>@mdo</td> </tr>
      <tr> . . . </tr>
      <tr> . . . </tr>
   </tbody>
</table>
```

Jumbotron

- Lightweight, flexible component for showcasing hero unit style content

```
<div class="jumbotron">
    <h1 class="display-4">Hello, world!</h1>
    <p class="lead">This is a ...</p>
    <hr class="my-4"><p>It uses ...</p>
    <p class="lead">
        <a class="btn btn-primary btn-lg">Learn more</a>
    </p>
</div>
```

Summary

- JS is a dynamic programming language
- Functions in JS
- JS objects hold key-value pairs
- Bootstrap is the most popular front-end component library

```
NodeJS: This package has installed:
Node.js v18.14.1 to /usr/local/bin/node
pm v9.3.1 to /usr/local/bin/npm
Make sure that /usr/local/bin is in your SPATH.
```