CSS & JavaScript

- CSS Injection
- CSS Selector
- Responsive Design
- JS Introduction
- JS Injection
- JS Operator
- JS Function
- JS Method
- JS Datatype

CSS Injection

- Inline
- Internal
- External(commonly used)

CSS Injection

```
<!DOCTYPE html>
<html>

  <head>
    <link rel="stylesheet" href="style.css">
    <style> .orange { color: orange; font-size: 35px}</style>
  </head>

  <body>
    <p style="color:red; font-size:35px">Hello Red World!</p>
    <p class="orange">Hello Orange World!</p>
    <p class="blue">Hello Blue World!</p>
  </body>

</html>
```

CSS Selector

Elements Selector:

```
p { color: red}
```

Class Selector:

```
.blue { color: blue }
```

ID Selector

```
#orange { color: orange }
```

Responsive Web Design

- Responsive Web design (RWD) is a Web design approach aimed at crafting sites to provide an optimal viewing experience—easy reading and navigation with a minimum of resizing, panning, and scrolling—across a wide range of devices.

- CSS library: Bootstrap
- Media Query

Media Query

```
@media only screen and (max-width: 600px) {
    body {
        background-color: lightblue;
    }
}
```

The @media Rule

Resize the browser window. When the width of this document is 600 pixels or less, the background-color is "lightblue", otherwise it is "yellow".

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Resize the browser window. When the width of this document is 600 pixels or less, the background-color is "lightblue", otherwise it is "yellow".

JavaScript Introduction

What is JS?

- JavaScript is what is called a Client-side Scripting Language. That means that it is a computer programming language that runs inside an Internet browser.

What is JS used for?

- Most of the dynamic behavior you see on a web page is thanks to JavaScript, which augments a browser's default controls and behaviors.

JS Injection

- Internal
- External(commonly used)

```
<!DOCTYPE html>
<html>

  <head>
    <script>
      function Alert () {
        alert("Hello World!");
      }
    </script>
  </head>

  <body>
    <button style="margin:50px 0" onclick="Alert()">click me!</button>
  </body>

</html>
```

<script src="script.js"><script>

JS Operator

Assign operators

Name	Shorthand operator	Meaning
Assignment	x = y	x = y
Addition assignment	x += y	x = x + y
Subtraction assignment	x -= y	x = x - y
Multiplication assignment	x *= y	x = x * y
Division assignment	x /= y	x = x / y
Remainder assignment	x %= y	x = x % y
Exponentiation assignment	x **= y	x = x ** y
Left shift assignment	x <<= y	x = x << y
Right shift assignment	x >>= y	x = x >> y
Unsigned right shift assignment	x >>>= y	x = x >>> y
Bitwise AND assignment	x &= y	x = x & y
Bitwise XOR assignment	x ^= y	x = x ^ y
Bitwise OR assignment	x |= y	x = x | y

JS Operator

Comparison Operators

Operator	Description	Examples returning true
Equal (==)	Returns true if the operands are equal.	3 == var1"3" == var1 3 == '3'
Not equal (!=)	Returns true if the operands are not equal.	var1 != 4 var2 != "3"
Strict equal (===)	Returns true if the operands are equal and of the same type.	3 === var1
Strict not equal (!==)	Returns true if the operands are of the same type but not equal, or are of different type.	var1 !== "3" 3 !== '3'
Greater than (>)	Returns true if the left operand is greater than the right operand.	var2 > var1 "12" > 2
Greater than or equal(>=)	Returns true if the left operand is greater than or equal to the right operand.	var2 >= var1 var1 >= 3
Less than (<)	Returns true if the left operand is less than the right operand.	var1 < var2 "2" < 12
Less than or equal(<=)	Returns true if the left operand is less than or equal to the right operand.	var1 <= var2 var2 <= 5

JS Operator

Arithmetic operators

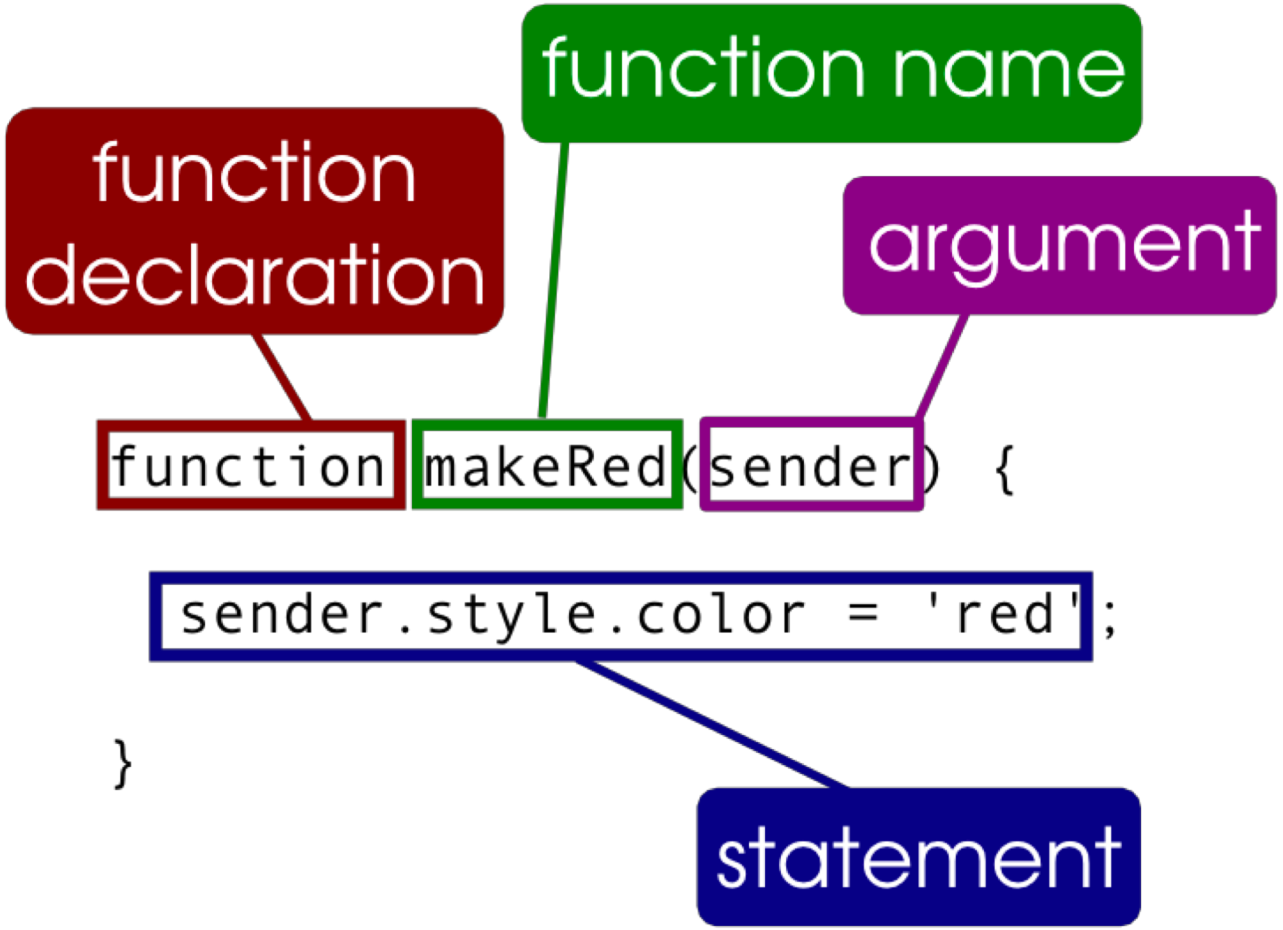
Operator	Description	Example
Remainder (%)	Binary operator. Returns the integer remainder of dividing the two operands.	12 % 5 returns 2.
Increment(++)	Unary operator. Adds one to its operand. If used as a prefix operator (++x), returns the value of its operand after adding one; if used as a postfix operator (x++), returns the value of its operand before adding one.	If x is 3, then ++x sets x to 4 and returns 4, whereas x++ returns 3 and, only then, sets x to 4.
Decrement (--)	Unary operator. Subtracts one from its operand. The return value is analogous to that for the increment operator.	If x is 3, then --x sets x to 2 and returns 2, whereas x-- returns 3 and, only then, sets x to 2.
Unary negation (-)	Unary operator. Returns the negation of its operand.	If x is 3, then -x returns -3.
Unary plus (+)	Unary operator. Attempts to convert the operand to a number, if it is not already.	+"3" returns 3. +true returns 1.
Exponentiation operator (**)	Calculates the base to the exponent power, that is, baseexponent	2 ** 3 returns 8. 10 ** -1 returns 0.1.

JS Operator

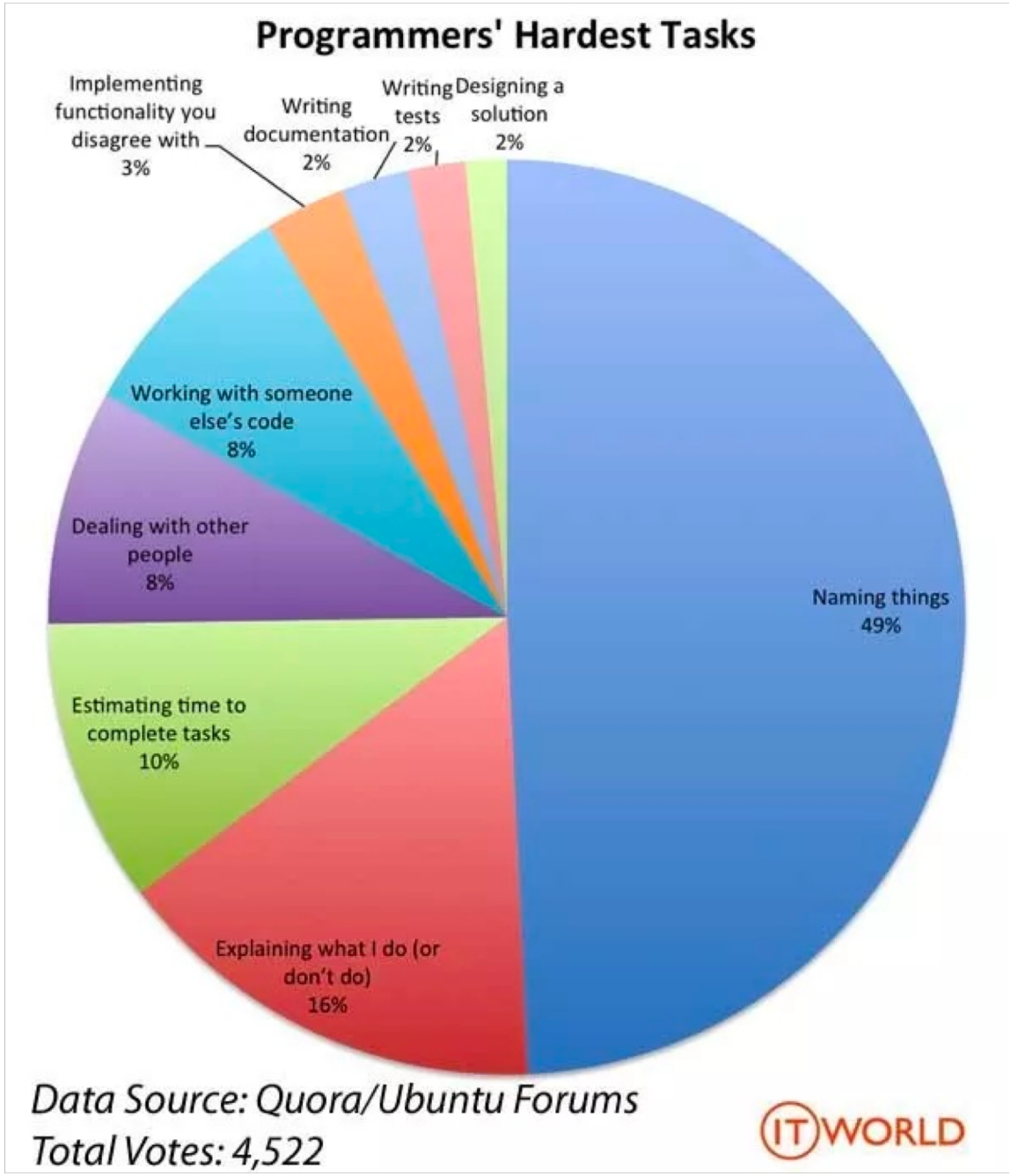
Logic Operators

Operator	Usage	Description
Logical AND(&&)	expr1 && expr2	Returns expr1 if it can be converted to false; otherwise, returns expr2. Thus, when used with Boolean values, && returns true if both operands are true; otherwise, returns false.
Logical OR (||)	expr1 || expr2	Returns expr1 if it can be converted to true; otherwise, returns expr2. Thus, when used with Boolean values, || returns true if either operand is true; if both are false, returns false.
Logical NOT (!)	!expr	Returns false if its single operand that can be converted to true; otherwise, returns true.

JS Function


function name
function declaration
argument
function makeRed(sender) {
sender.style.color = 'red';
}
statement

Naming Convention:



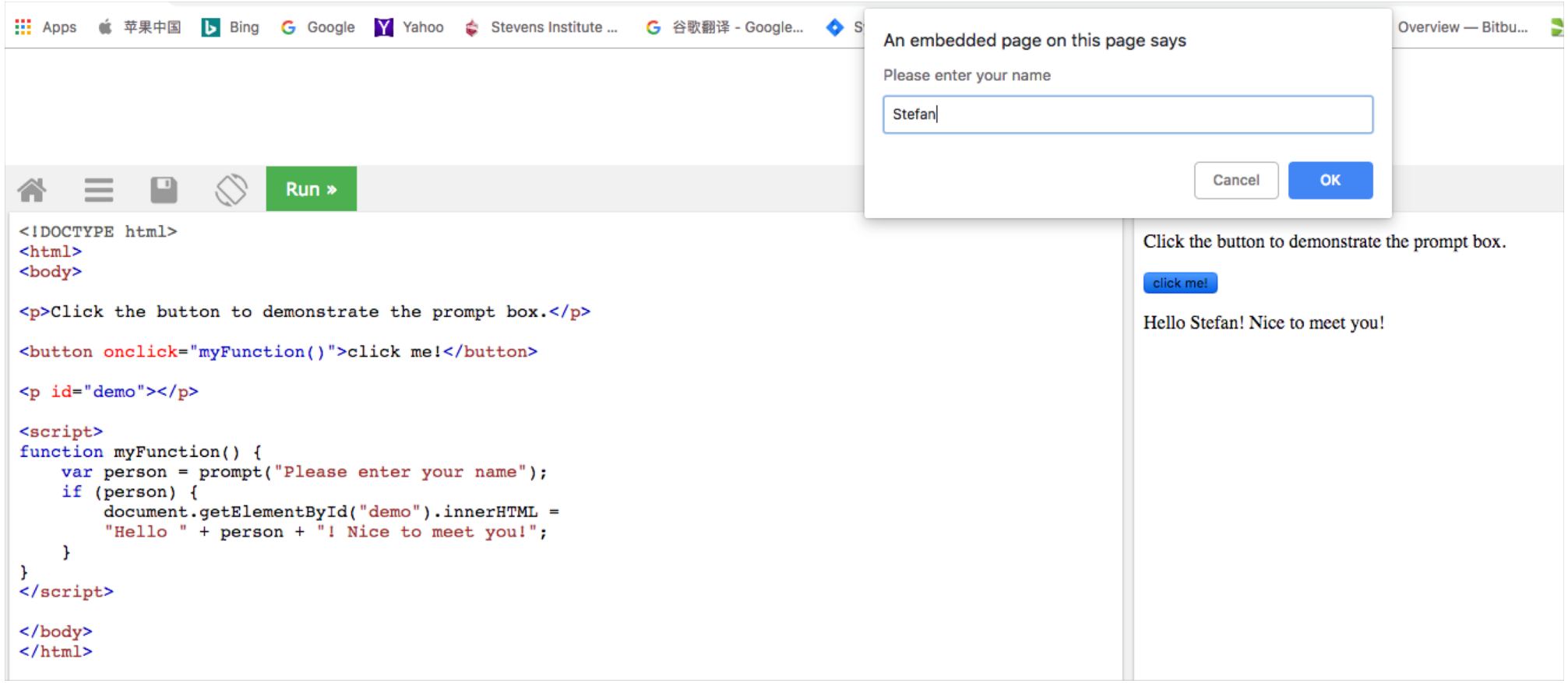
Console.log

- *console.log* is a quick expression used to print content to the debugger.
- It is a very useful tool to use during development and debugging

```
var quick = "Fox";
var slow = "Turtle";
var numbers = 121;

// The console.log() method is used to display data in the browser's console.
// We can log strings, variables, and even equations.
console.log("Teacher");
console.log(quick);
console.log(slow);
console.log(numbers + 15);
```

Prompt, Alert and Confirm



Conditional Statements

Very often when you write code, you want to perform different actions for different decisions.

You can use conditional statements in your code to do this.

In JavaScript we have the following conditional statements:

- Use ***if*** to specify a block of code to be executed, if a specified condition is true
- Use ***else*** to specify a block of code to be executed, if the same condition is false
- Use ***else if*** to specify a new condition to test, if the first condition is false
- Use ***switch*** to specify many alternative blocks of code to be executed

If/Else Statements

The *if statement* executes a statement if a specified condition is *truthy*. If the condition is *falt*, another statement can be executed.

```
// If the user likes sushi (confirmSushi === true), we run the following block of code.
if (confirmSushi) {
  alert("You like " + sushiType + "!");
}
// If the user likes ginger tea (confirmGingerTea === true), we run the following block of code.
else if (confirmGingerTea) {
  alert("You like ginger tea!!");
}
// If neither of the previous condition were true, we run the following block of code.
else {
  document.write("You don't like sushi or ginger tea.");
}
```

Switch Statements

expression

An expression whose result is matched against each case clause.

case valueN Optional

A case clause used to match against expression. If the expression matches the specified valueN, the statements inside the case clause are executed until either the end of the *switch* statement or a *break*.

default Optional

A default clause; if provided, this clause is executed if the value of expression doesn't match any of the case clauses.

```
var expr = 'Papayas';
switch (expr) {
  case 'Oranges':
    console.log('Oranges are $0.59 a pound.');
    break;
  case 'Mangoes':
  case 'Papayas':
    console.log('Mangoes and papayas are $2.79 a pound.');
    // expected output: "Mangoes and papayas are $2.79 a pound."
    break;
  default:
    console.log('Sorry, we are out of ' + expr + '.');
}
```

Loops

- There are several ways to execute a statement or block of statements repeatedly. In general, repetitive execution is called *looping*. It is typically controlled by a test of some variable, the value of which is changed each time the loop is executed. JavaScript supports many types of loops: **for** loops, **for...in** loops, **while** loops, **do...while** loops, and **switch** loops.

For Loop

For Loop: The **for statement** creates a loop that consists of three optional expressions, enclosed in parentheses and separated by semicolons, followed by a statement to be executed in the loop.

for ([initialization]; [condition]; [final-expression])
statement

For In Loop: The for...in statement iterates over all non-Symbol, enumerable properties of an object.

```
var str = "";

for (var i = 0; i < 9; i++) {
  str = str + i;
}

console.log(str);
// expected output: "012345678"
```

```
var string1 = "";
var object1 = {a: 1, b: 2, c: 3};

for (var property1 in object1) {
  string1 = string1 + object1[property1];
}

console.log(string1);
// expected output: "123"
```

While Loop

While Loop: The **while statement** creates a loop that executes a specified statement as long as the test condition evaluates to true. The condition is evaluated before executing the statement.

Do While Loop: The do...while statement creates a loop that executes a specified statement until the test condition evaluates to false. The condition is evaluated after executing the statement, resulting in the specified statement executing at least once.

```
var n = 0;

while (n < 3) {
  n++;
}

console.log(n);
// expected output: 3
```

```
var result = "";
var i = 0;

do {
  i = i + 1;
  result = result + i;
} while (i < 5);

console.log(result);
// expected result: "12345"
```

Function Declaration vs. Expressions

```
//Function Declaration
function add(num1, num2){
    return num1 + num2;
}

//Function Expressions
var add=function (num1, num2){
    return num1 + num2;
};
```

```
//Function Declaration are Hoisted
var result = add(5,5);
function add(num1, num2){
    return num1 + num2;
}

//error!
var result = add(5,5);
var add=function (num1, num2){
    return num1 + num2;
};
```

The this object

- Every scope in JavaScript has a *this* object that represents the calling object for the function.
- When a function is called while attached to an object, the value of *this* is equal to that object by default.

```
var person = {
    name: "Nicholas",
    sayName: function() {
        console.log(this.name);
    }
};

person.sayName();       // outputs "Nicholas"
```

this Example

```
function sayNameForAll() {
    console.log(this.name);
}

var person1 = {
    name: "Nicholas",
    sayName: sayNameForAll
};

var person2 = {
    name: "Greg",
    sayName: sayNameForAll
};

var name = "Michael";

person1.sayName();      // outputs "Nicholas"
person2.sayName();      // outputs "Greg"

sayNameForAll();        // outputs "Michael"
```

Changing *this*

1

Call()

2

Apply()

3

Bind()

JS Method

- When a property value in an object is a function, the property is considered to be a method.

```
var person = {
    name: "Nicholas",
    sayName: function() {
        console.log(person.name);
    }
};

person.sayName();       // outputs "Nicholas"
```

JS built in methods

Name	Description
toString()	Returns the string representation of the original data type
concat()	Combines the text of two strings and returns a new string.
indexOf()	Returns the index of the first occurrence of the specified value, or -1 if not found.
push()	Adds one or more elements to the end of an array and returns the new length of the array.
splice()	Adds and/or removes elements from an array.
map()	Creates a new array with the results of calling a provided function on every element in this array.
round()	Returns the value of a number rounded to the nearest integer.

The *call()* Method

```
function sayNameForAll(label) {
    console.log(label + ":" + this.name);
}

var person1 = {
    name: "Nicholas"
};

var person2 = {
    name: "Greg"
};

var name = "Michael";

sayNameForAll.call(this, "global");         // outputs "global:Michael"
sayNameForAll.call(person1, "person1");     // outputs "person1:Nicholas"
sayNameForAll.call(person2, "person2");     // outputs "person2:Greg"
```

The *apply()* Method

- The *apply()* method works exactly the same as *call()* except that it accepts only two parameters: the value for this and an array or array-like object of parameters to pass to the function.

```
function sayNameForAll(label) {
    console.log(label + ":" + this.name);
}

var person1 = {
    name: "Nicholas"
};

var person2 = {
    name: "Greg"
};

var name = "Michael";

sayNameForAll.apply(this, ["global"]);      // outputs "global:Michael"
sayNameForAll.apply(person1, ["person1"]);  // outputs "person1:Nicholas"
sayNameForAll.apply(person2, ["person2"]);  // outputs "person2:Greg"
```

The *bind()* Method

- The first argument to bind() is the *this* value for the new function.
- All other arguments represent named parameters that should be permanently set in the new function.

```
function sayNameForAll(label) {
    console.log(label + ":" + this.name);
}

var person1 = {
    name: "Nicholas"
};

var person2 = {
    name: "Greg"
};

// create a function just for person1
var sayNameForPerson1 = sayNameForAll.bind(person1);
sayNameForPerson1("person1");       // outputs "person1:Nicholas"

// create a function just for person2
var sayNameForPerson2 = sayNameForAll.bind(person2, "person2");
sayNameForPerson2();                // outputs "person2:Greg"

// attaching a method to an object doesn't change 'this'
person2.sayName = sayNameForPerson1;
person2.sayName("person2");         // outputs "person2:Nicholas"
```

JS Datatype

Primitive:

- String
- Boolean
- Null
- Number
- Undefined

Reference:

- Object

Null vs Undefined

Undefined means a variable has been declared but has not yet been assigned a value. On the other hand, *null* is an assignment value. It can be assigned to a variable as a representation of no value.

Also, undefined and null are two distinct types: undefined is a type itself (undefined) while null is an object.

Unassigned variables are initialized by JavaScript with a default value of undefined. JavaScript never sets a value to null. That must be done programmatically.

Null VS Undefined

```
console.log("5" == 5);                  // true
console.log("5" === 5);                 //false


console.log(undefined == null);    //true
console.log(undefined === null);   //false
```

Primitive VS Reference

Primitive values uses its own storage space, changes on one does not reflected on another

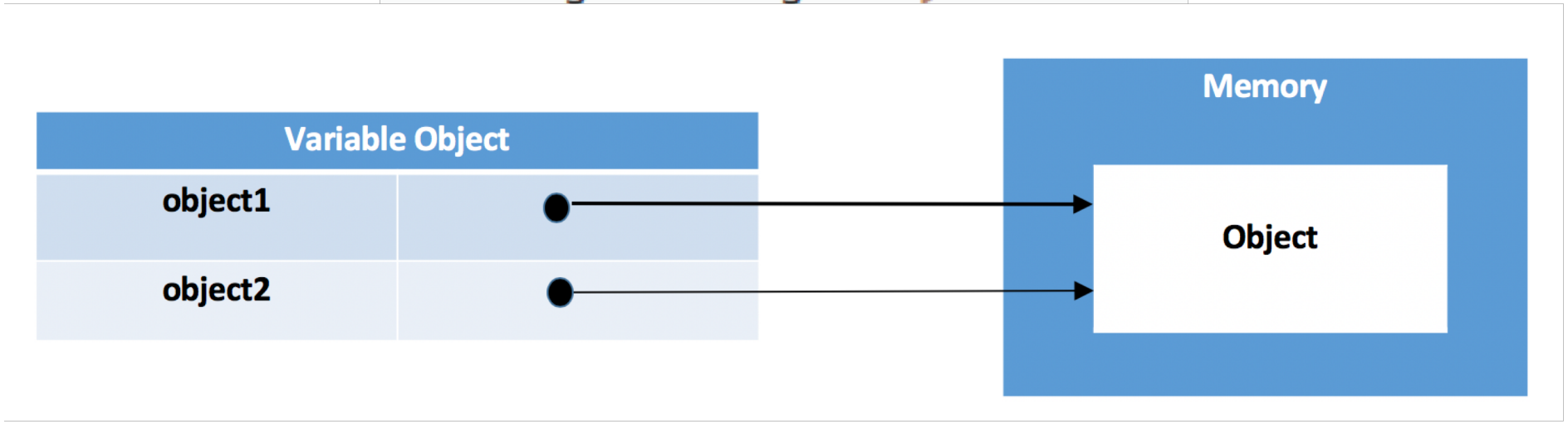
Reference values are objects that are stored in the heap . Reference value stored in the variable location is a pointer to a location in memory where the object is stored

Creating Objects

- Using *new* operator with a *constructor*

var object = new Object();

```
var object1=new Object();
var object2=object1;
```



Understanding Objects

objects in JavaScript are dynamic, meaning that they can change at any point during code execution.

Defining Properties:

- Using the Object constructor and using an object literal
- When a property is first added to an object, JavaScript uses an internal method called *[[Put]]* on the object. The *[[Put]]* method creates a spot in the object to store the property
- When a new value is assigned to an existing property, a separate operation called *[[Set]]* takes place.

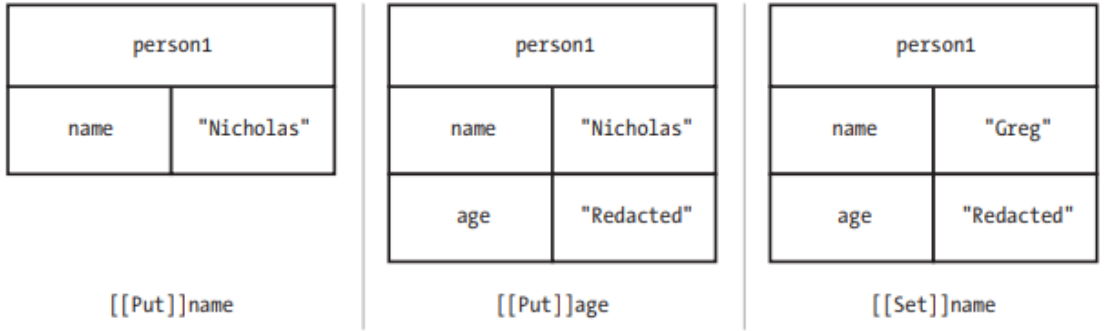
Add and Set Property

```
var person1 = {
    name: "Nicholas"
};

var person2 = new Object();
person2.name = "Nicholas";

person1.age = "Redacted";
person2.age = "Redacted";

person1.name = "Greg";
person2.name = "Michael";
```

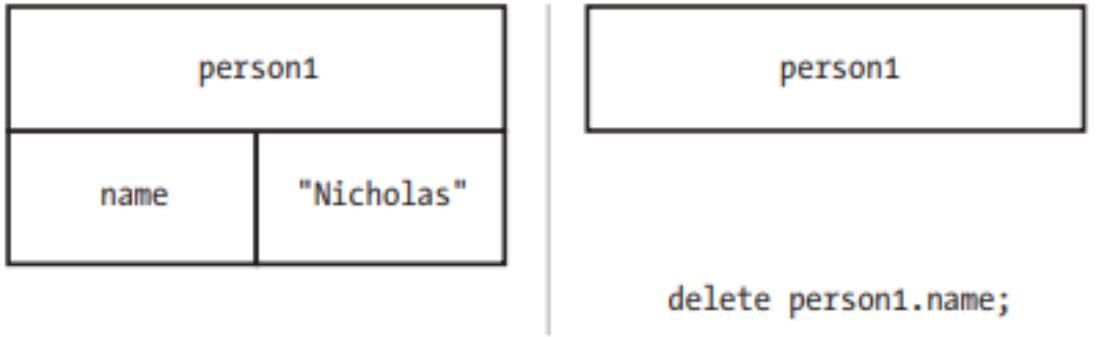


Removing Properties

```
var person1 = {
    name: "Nicholas"
};

console.log("name" in person1);     // true

delete person1.name;                // true - not output
console.log("name" in person1);     // false
console.log(person1.name);          // undefined
```



Detecting Properties: Using *in* Operator

- The *in* operator looks for a property with a given name in a specific object and returns *true* if it finds it.

```
console.log("name" in person1);     // true
console.log("age" in person1);      // true
console.log("title" in person1);    // false
```

- The existence of a method can also be checked in the same way:

```
var person1 = {
    name: "Nicholas",
    sayName: function() {
        console.log(this.name);
    }
};

console.log("sayName" in person1);  // true
```

hasOwnProperty()

- In some cases, however, you might want to check for the existence of a property only if it is an own property. The *in* operator checks for both own properties and prototype properties.
- The *toString()* method, however, is a prototype property that is present on all objects. The *in* operator returns true for *toString()*, but *hasOwnProperty()* returns false

```
var person1 = {
    name: "Nicholas",
    sayName: function() {
        console.log(this.name);
    }
};

console.log("name" in person1);                 // true
console.log(person1.hasOwnProperty("name"));    // true

console.log("toString" in person1);             // true
console.log(person1.hasOwnProperty("toString")); // false
```

Enumeration

- By default, all properties that you add to an object are *enumerable*, which means that you can iterate over them using a *for-in* loop.
- *Enumerable* properties have their internal *[[Enumerable]]* attributes set to *true*.

```
var property;

for (property in object) {
    console.log("Name: " + property);
    console.log("Value: " + object[property]);
}
```

- Each time through the for-in loop, the property variable is filled with the next enumerable property on the object until all such properties have been used.

Object.keys() method

- The *Object.keys()* method returns an array of a given object's property *names*, in the same order as we get with a normal loop.

```
const object1 = {
  a: 'somestring',
  b: 42,
  c: false
};

console.log(Object.keys(object1));
// expected output: Array ["a", "b", "c"]
```

- There is a difference between the *enumerable* properties returned in a *for-in* loop and the ones returned by *Object.keys().* The *for-in* loop also enumerates *prototype* properties, while *Object.keys()* returns only own (*instance*) properties.

Exercise

- Create an HTML page that performs the following operation:
    1. Welcomes the user to the page using alert
    2. Ask the User to enter his/her name using prompt
    3. Using a Confirm, ask the user if he/she like Soccer
    4. Display the User name and his/her interest in Soccer on the page loaded and on the console
- Write a JavaScript for loop that will iterate from 0 to 15. For each iteration, it will check if the current number is odd or even, and display a message to the screen.

    Sample Output :
    "0 is even"
    "1 is odd"
    "2 is even"

- Create a function sum() that accepts any number of parameters and adds them together by iterating over the values in arguments with a while loop.

- Write a JavaScript program to delete the rollno property from the following object. Also print the object before and after deleting the property.

  Sample object:
  ```
  var student = {
  name : "David Rayy",
  sclass : "VI",
  rollno : 12 };
  ```

- Display the length of the object (count of properties using Enumeration and Object.keys)

- Write a JavaScript program to sort an array of JavaScript objects.

Sample Object :

```
var library = [
{ title: 'The Road Ahead', author: 'Bill Gates', libraryID: 1254 },
{ title: 'Walter Isaacson', author: 'Steve Jobs', libraryID: 4264 },
 { title: 'Mockingjay: The Final Book of The Hunger Games', author: 'Suzanne Collins', libraryID: 3245 }];
```

Expected Output:

```
[
{ author: "Walter Isaacson", libraryID: 4264, title: "Steve Jobs" },
{ author: "Suzanne Collins", libraryID: 3245, title: "Mockingjay: The Final Book of The Hunger Games" },
{ author: "The Road Ahead", libraryID: 1254, title: "Bill Gates" }]
```


Any Query?