Introduction to JavaScript

Functions

JavaScript Functions

A JavaScript function is a block of code designed to perform a particular task.

A JavaScript function is executed when "something" invokes it (calls it).

Inside the function, the arguments are used as local variables.

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functionName(parameter1, parameter2, parameter3) {
    code to be executed
}
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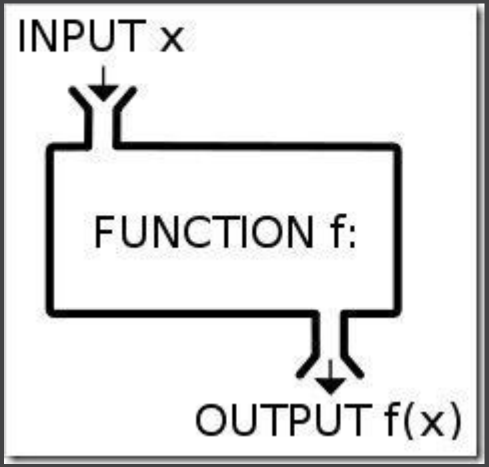
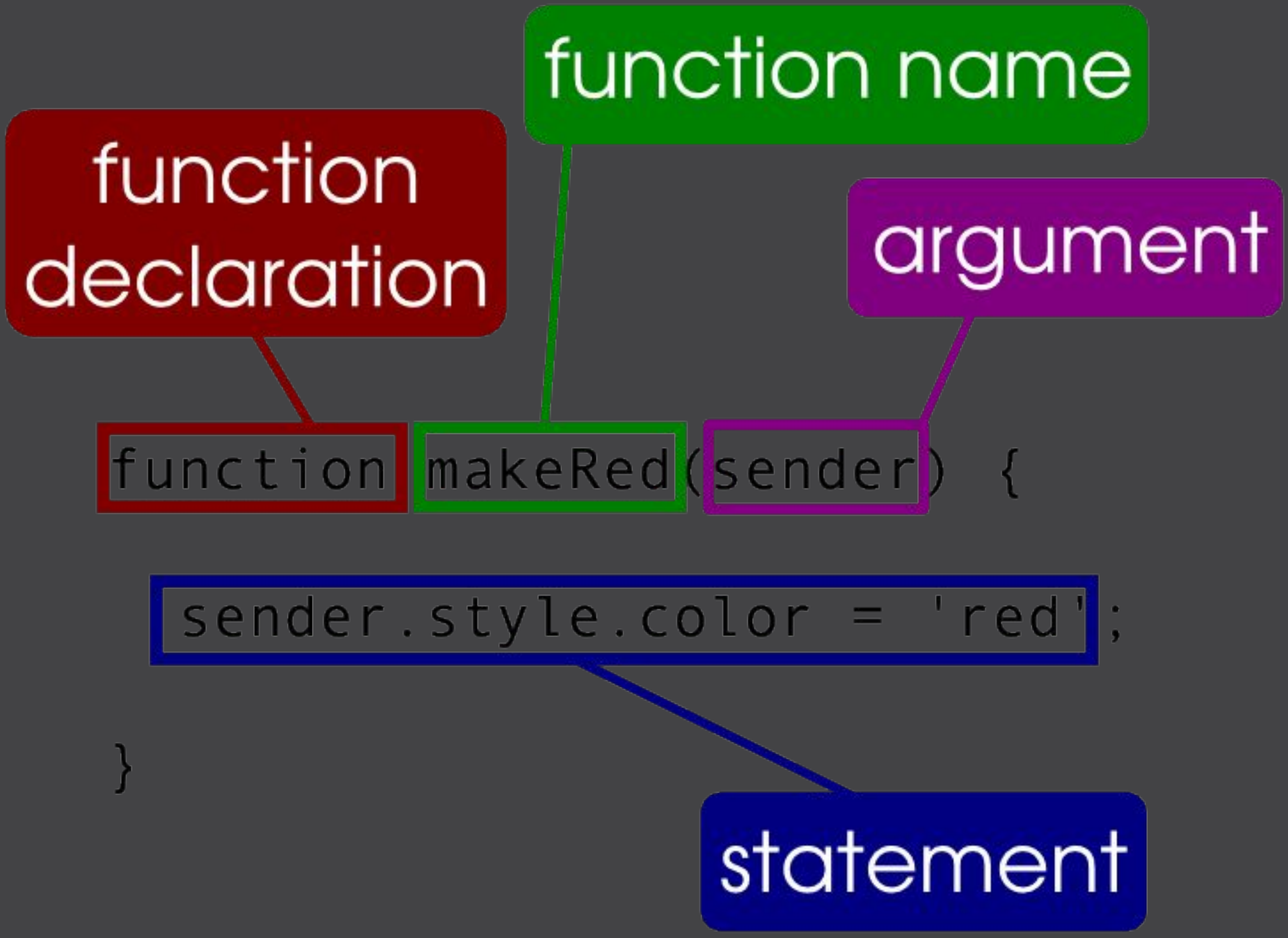


```
function myFunction(p1, p2) {
    return p1 * p2;
}

var x = myFunction(5, 10);
console.log(x);
```

Functions



```
function makeRed(sender) {
  sender.style.color = 'red';
}
```

Functions

Invocation:

- When an event occurs (when a user clicks a button)
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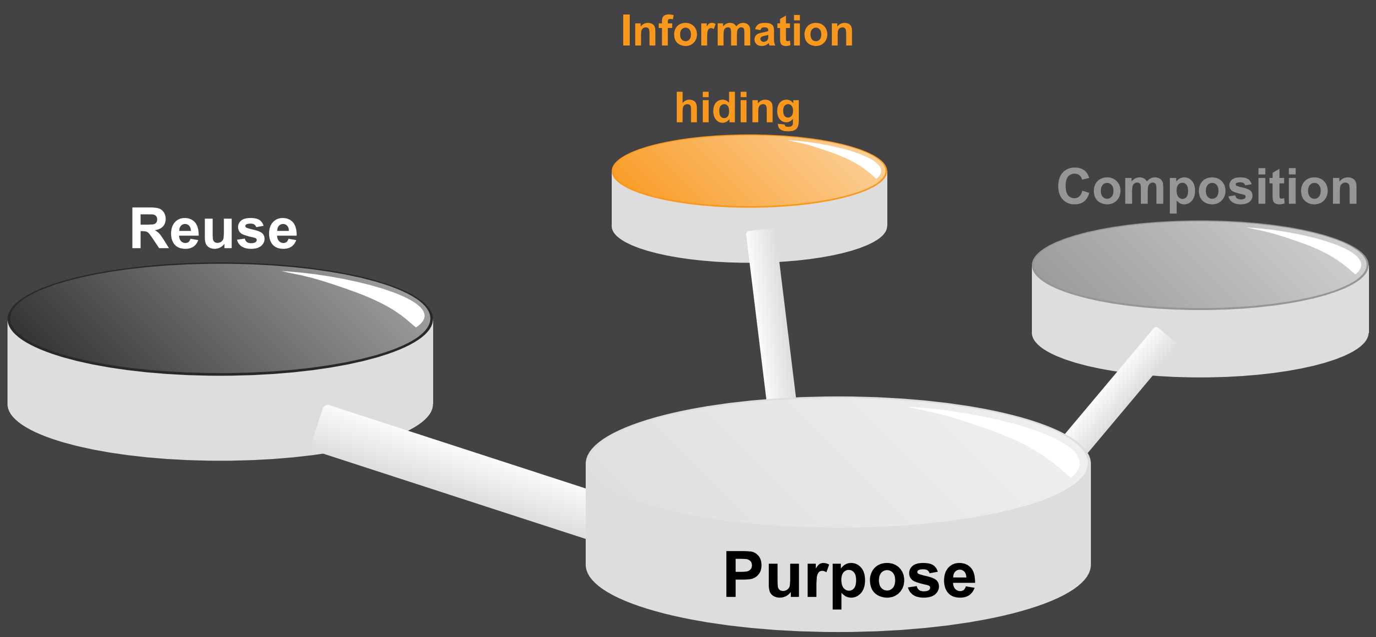
Return:

When JavaScript reaches a **return statement**, the function will stop executing.

The return value is "returned" back to the "caller".

Function Purpose



Function Purpose

Function Definition

JavaScript functions are **defined** with the **function** keyword.

You can use a function **declaration** or a function **expression**.

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var x = function (a, b) {return a * b};
```

After a function expression has been stored in a variable, the variable can be used as a function:

```
var z = x(4, 3);
```

The function above is actually an **anonymous function** (a function without a name).

Function Definition

The Function() Constructor:

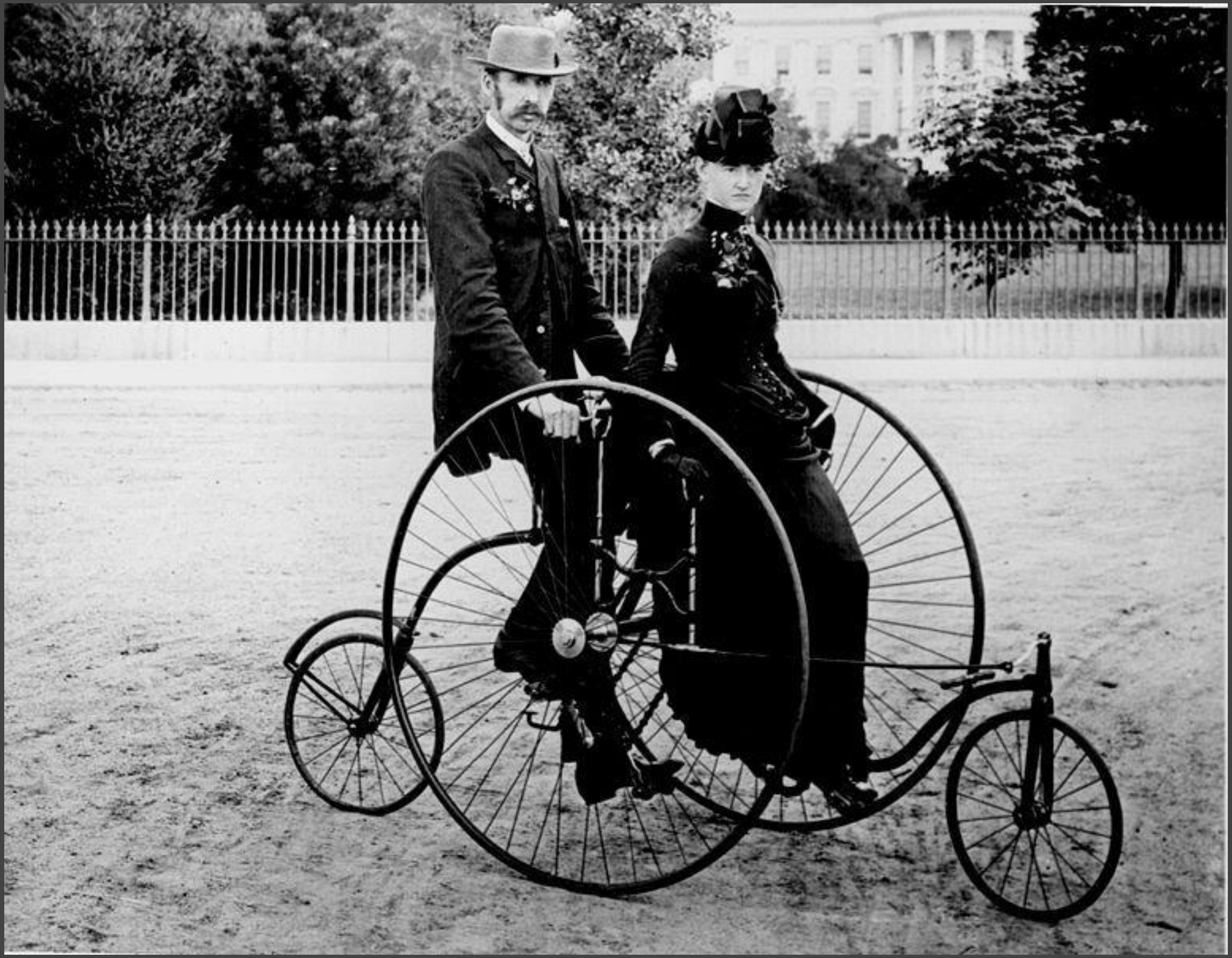
```
var myFunction = new Function("a", "b", "return a * b");

// the same

var myFunction = function (a, b) {return a * b};
```

Function Definition

The Function() Constructor: Anti-pattern



Function Definition

Try:

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// v 1.1
function foo (a, b) {
   return a * b;
}
var z = foo (4, 3);
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function foo (a, b) {
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```
// v 1.3
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// v 1.4
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```

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WTF?

Hoisting

Hoisting is JavaScript's default behavior of moving **declarations** to the top of the current scope.

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x = 5; // Assign 5 to x

elem = document.getElementById("demo");

elem.innerHTML = x;

var x; // Declare x
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JavaScript only hoists declarations, not initializations.

```
var x = 5; // Initialize x

elem = document.getElementById("demo");

elem.innerHTML = x + " " + y;

var y = 7; // Initialize y
```

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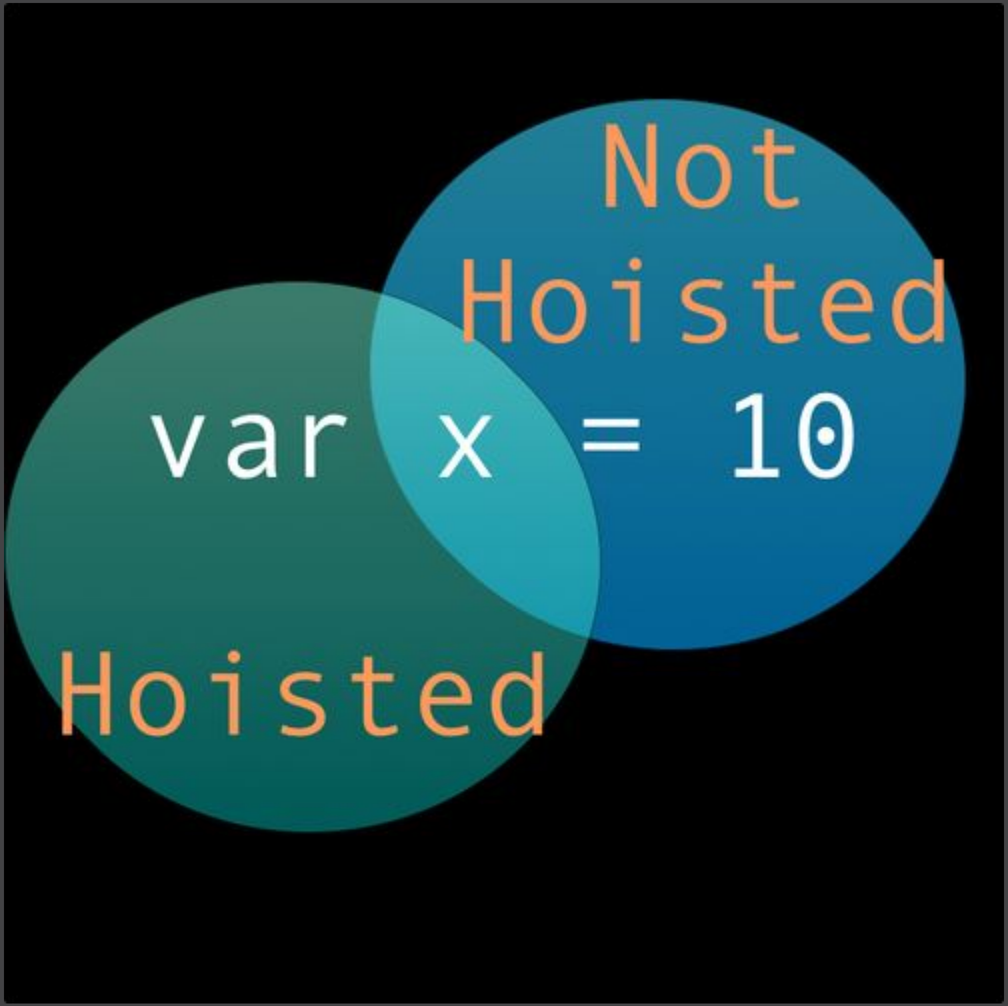
To avoid bugs, always declare all variables at the beginning of every scope!!!

Hoisting



Self-Invoking Functions

You have to add parentheses around the function to indicate that it is a function expression:

```
(function () {
   console.log("Hello!!");       // I will invoke myself
})();
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WHAT FOR:

- precompute
- create scope

Function Parameters

Function **parameters** are the **names** listed in the function definition.

Function **arguments** are the real **values** passed to (and received by) the function.

```
functionName(parameter1, parameter2, parameter3) {
   code to be executed
}
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```
functionName(parameter1, parameter2, parameter3) {
  code to be executed
}
```

Parameter Rules:

- JavaScript function definitions do not specify data types for parameters.
- JavaScript functions do not perform type checking on the passed arguments.
- JavaScript functions do not check the number of arguments received.

Function Parameters

If a function is called with **missing arguments** (less than declared), the missing values are set to:

undefined

Assign a default value to the parameter:

```
function myFunction(x, y) {
    y = y || 0;
    console.log(x, y);
}
```

Function Parameters

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Assign a default value to the parameter:

```
function myFunction(x, y) {
    y = y || 0;
    console.log(x, y)
}
```

If a function is called with **too many arguments** (more than declared), these arguments cannot be referred, because they don't have a name. They can only be reached in the **arguments object**.

Arguments Object

The argument object contains an array of the arguments used when the function was called (invoked).

```
x = sumAll(1, 123, 500, 115, 44, 88);

function sumAll() {
   var i, sum = 0;
   for (i = 0; i < arguments.length; i++) {
       sum += arguments[i] ;
   }
   return sum;
}
```

Arguments Object

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       sum += arguments[i] ;
   }
   return sum;
}
```

Arguments is not really an array. It is an array-like object. arguments has a length property, but it lacks all of the array methods.

Function Invocation

Invoking a function suspends the execution of the current function, passing control and parameters to the new function. In addition to the declared parameters, every function receives two additional parameters: this and arguments.

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In JavaScript, the thing called **this**, is the object that "owns" the current code.

*Note that **this** is not a variable. It is a keyword.

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Invoking a function suspends the execution of the current function, passing control and parameters to the new function. In addition to the declared parameters, every function receives two additional parameters: this and arguments.

In JavaScript, the thing called **this**, is the object that "owns" the current code.

*Note that **this** is not a variable. It is a keyword.

When a function is called without an owner object, the value of **this** becomes the global object.

Invoking a Function as a Method

When a function is stored as a property of an object, we call it a **method**.

The binding of this to the object happens at invocation time. This very late binding makes functions that use this highly reusable.

```
var myObject = {
    firstName:"Bilbo",
    lastName: "Baggins",
    fullName: function () {
        return this.firstName + " " + this.lastName;
    },
    getContex: function () {
        return this;
    }
}
myObject.fullName();
myObject.getContex();
```

Invoking a Function as a Function

The function does not belong to any object. In a browser the page object is the browser window.

The function automatically becomes a window function.

```
function myFunction(a, b) {
    return a * b;
}
myFunction(10, 2);              // myFunction(10, 2) will return 20

window.myFunction(10, 2);       // window.myFunction(10, 2) will also
return 20
```

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return 20



function myFunction() {

    return this;

}

myFunction();                   // Will return the window object
```

Invoking a Function as a Function

!!! A method cannot employ an inner function to help it to work with object's properties because the inner function does not share the method's access to the object as its this is bound to the wrong value.

```
var add = function (a, b) {
   return a + b;
};

var myObject = {
   value: 10
}

myObject.double = function () {
   var helper = function () {
       this.value = add(this.value, this.value);
   };

   helper();     // Invoke helper as a function.
};

// Invoke double as a method.

myObject.double();
console.log(myObject.value);
```

Invoking a Function as a Function

Fortunately, there is an easy workaround.

```
var add = function (a, b) {
   return a + b;
};

var myObject = {
   value: 10
}

myObject.double = function () {
   var that = this;

   var helper = function () {
       that.value = add(that.value, that.value);
   };

   helper();     // Invoke helper as a function.
};

// Invoke double as a method.

myObject.double();
console.log(myObject.value);
```

Invoking a Function with a Function Constructor

If a function invocation is preceded with the **new** keyword, it is a constructor invocation.
It looks like you create a new function, but since JavaScript functions are objects you actually create a new object:

```
// This is a function constructor:
function myFunction(arg1, arg2) {
   this.firstName = arg1;
   this.lastName  = arg2;
}

// This creates a new object
var x = new myFunction("Bilbo","Baggins");
x.firstName;
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The new prefix also changes the behavior of the return statement.

Invoking a Function with a Function Method

In JavaScript, functions are objects. JavaScript functions have properties and methods. **call()** and **apply()** are predefined JavaScript function methods. Both methods can be used to invoke a function, and both methods must have the owner object as first parameter. The only difference is that call() takes the function arguments separately, and apply() takes the function arguments in an array.

```
var array = [3, 4];
var sum = add.apply(null, array);
```

Invoking a Function with a Function Method

```
// Create a constructor function called Quo.It makes an object with a status property.
var Quo = function (string) {
   this.status = string;
};

// Give all instances of Quo a public method called get_status.
Quo.prototype.get_status = function (  ) {
   return this.status;
};

// Make an instance of Quo.
var myQuo = new Quo("confused");
console.log(myQuo.get_status());  // confused
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// Make an instance of Quo.
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console.log(myQuo.get_status());  // confused


// Make an object with a status member.
var statusObject = {
   status: 'OK'
};

// statusObject does not inherit from Quo.prototype, but we can invoke the get_status
method on statusObject even though statusObject does not have a get_status method.

var status = Quo.prototype.get_status.apply(statusObject);
// status is 'OK'
```

Good night, folks!