

# **Javascript**

## Review

# Motivation

**Why?**

**Web Page =  
HTML + CSS + Javascript**

# **Web Application Flow**

# History

- **1995**: Created by Brendan Eich
- **1997**: Standardized as ECMAScript
- **1999**: ECMAScript 3
- **2009**: ECMAScript 5
- **2016**: ECMAScript 6

# Today's Agenda

- Javascript on web pages
- Basic variables
- Conditionals
- Iteration
- Arrays
- Functions
- Objects

# Course's Agenda

- Javascript basics
- Advanced Javascript
- Manipulating web pages with the DOM
- Easier DOM with jQuery
- Transitions and Animations
- Talking to the server with AJAX



# **Javascript on web pages**

# **Demo**

Our first dynamic page

# The Script Tag

```
<html>
  <head>
    <script>
      // Inline javascript
    </script>

    <script src="external_javascript.js"></script>
  </head>
  <body>
    ...
  </body>
</html>
```

**Demo**

External scripts

# **Exercise**

Add a second external script that  
write's your name to the page

# **Interactive Javascript**

# Numbers

**What is 1/2 in Ruby?  
In Javascript?**



# **Numbers**

## Summary

# Strings

# Strings

```
"This is a string"
```

```
'So is this'
```

```
"This is \n on a new line"
```

```
"Quote's inside \"this string\""
```

# Combining Strings

- Combine strings by concatenation

"one" + "two"

'A' + ' ' + 'B'

'4' + 5

5 + '4'

- No interpolation in JS

**"abc".length**

**' '.length**

**"abc" [2]**

**"abc" [3]**

**"abc" [-1]**

`parseInt("123")`

`parseInt("123abc")`

`parseInt("abc")`

# Exercises

1. Create a string "Hello, [Your Name]!" by concatenating 3 strings
2. Compute the length of that string



# **Strings**

## Summary

# **Variables**

# Variables

```
var a;
```

```
a = 5;
```

```
var b = 'hello';
```

```
var mitchsAge = 31;
```

# Demo

Create two variables containing numbers and a third that contains their sum.

Use only 3 lines of code.

# Exercises

1. Create a variable that stores your first name.
2. Create a variable that stores your last name.
3. Create a variable that stores your full name by combining the above with a space between.

# **Variables**

## Summary

# Comments

# Comments

```
// This is a comment
```

```
/* This is a  
   multiline comment */
```



# **Exercise**

Add a comment to the top of the script describing what it does.

# Hot or Not?

1. `a = 5;`

2. `var my_string = 'hello world';`

3. `var myNumber = 3`

4. `# This is a comment`

5. `var name = "Mitch";`  
`name[1] = 'a';`

**I/O**

**console.log**

# Exercises

1. Change "Our First Dynamic Page" to write the following message to the console: "Hello, Mitch! In case you forgot, 3 x 4 is 12." Use variables for your name, a, b, and result.
2. Change your script to write this message to the console AND the document.
3. Add a comment to the top of the script describing what it does.

# Built-Ins

- **alert** to display a message
- **confirm** to check if the user wants to proceed
- **prompt** to ask a question

**null and undefined**

# Exercises

1. Change the script in our page to:
  - write a message to the **document**
  - write a message to the **console**
  - create an **alert** message
2. Change the script to **prompt the user for their name** and then **alert** "Hello, [name]!"



# Booleans

# Booleans

true false

> < == != <= >= && || !

# True or False?

- `2 > 1`
- `0.5 < 0`
- `true && false`
- `"abc" > "def"`
- `"c" == "c"`
- `"2" == 2`

**"2" == 2**

# True or False?

- `'abc'.length == 3`
- `5 * 2 != 10`
- `parseInt('123.5') > 123`
- `4 + '5' === 9`
- `"123"[3] == '3'`

# Conditionals

# Conditionals

```
if (condition) {  
    // action  
}
```

```
if (a) {  
    // ..  
} else if (b) {  
    // ...  
} else {  
    // ...  
}
```

# if is a statement, not an expression

// Not valid JS

```
var answer = if (a) {  
    2  
} else {  
    3  
};
```



# What happens?

```
var a = 5;
```

```
if (a > 3) {  
    console.log('big');  
} else {  
    console.log('small');  
}
```

# What's wrong?

```
var age = prompt("What's your age?");  
  
if age >= 50  
    console.log("You are so wise!")  
else  
    console.log("You are so youthful!");  
end
```

# **Exercise** Build a Safe

Build a safe to guard the secret number "714".

- Prompt the user to enter the password to our safe.
- If the password is correct (opensesame), alert the safe's secret number.
- Otherwise, alert a failure message.

# **Exercise** A friendly safe

Change your safe so that it asks the user if they want to enter the safe first.

```
"Welcome to super-safe! Are you sure you want to enter?"  
[cancel]  
"OK. Goodbye, then."
```

# **Exercise** Password Checker

Change our script so that it prompts the user to enter a password.

- If their name is longer than 12 characters, alert "Too long!".
- If their name is less than 8 characters, alert "Too short!".
- Otherwise, alert "Just right!".

# **Conditionals**

## Summary

# Iteration

# While Loop

```
while (condition) {  
    // body  
}
```



# **Example**

Use a while loop to log the numbers  
from 0 to 100 to the console.

# What's the result?

```
var i = 10;  
while (i > 5) {  
    i -= 1;  
}  
  
console.log(i * 2);
```

# What's the result?

```
var i = 0;
```

```
var x = 0;
```

```
while (i < 10) {  
    x += i;  
}
```

# Exercises

1. Use a while loop to log the EVEN numbers from 0 to 100 to the console.
2. Use a while loop to implement "bottles of beer rhyme".

"100 bottles of beer on the wall"

"100 bottles of beer"

"Take one down, pass it around, 99 bottles of beer on the wall"

# For Loop

```
for (initialize; condition; increment) {  
    // ...  
}
```

## **Exercise**

Implement the "bottles of beer rhyme"  
using a **for** loop.

**break**

# What's wrong?

```
for (i < 10; i += 1) {  
    console.log(i);  
}
```



# What's the result?

```
var result = 0;

for (var i = 5; i < 10; i += 1) {
    result += i;
    if (i % 3 == 0) {
        break;
    }
}

console.log(result);
```

# Exercises

1. Use a for loop to log the numbers from 100 down to 0 to the console
2. Use a for loop to determine the sum of the numbers from 0 to 99

# **Exercise** Number guessing game

1. Choose a number between 0 and 100
2. Prompt users to guess the number
3. Alert the user whether their guess is greater than or less than the number, or correct.
4. If their guess is wrong, repeat

# **Iteration**

## Summary

# Arrays

**.length**

**.push .pop**  
**.shift .unshift**  
**[]**

# What's the result?

```
var array = [1, 2, 3];
```

- `array.length` ?
- `array[2]` ?

```
array[0] = 5;  
array.push(4);
```

- `array[0]` ?



# Exercises

1. Create an array called `first`, containing the elements `"hello"`, `5`, and `'a'`
2. Change the 2nd element of `first` to `6`.
3. Create an array called `second`, containing the digits from `0` to `100`.
4. Compute the length of `second`.

# **Looping over an array**

# Exercises

1. Create an array containing 0, 5, 6, -12, and use a loop to compute the sum of its elements.
2. Create an array containing the words "apple", "dog", "computer", "cup", use a loop to log "[Word] has [length] characters." for each word.

**split and join**

# Exercises

1. Create a string "hello" and then use `split` to make an array of its characters.
2. Write a script that prompts for a sentence, and alerts how many words are in that sentence.
3. Make a string containing all the numbers from 0-99. (e.g "01234...")

# Functions

# Functions

```
// Define a function  
var doubleIt = function(a) {  
    console.log(a * 2);  
};
```

```
// Call a function  
doubleIt(5);
```

# What's wrong?

```
var function countCharacters() {  
    console.log(string.length + ' characters');  
};
```

```
countCharacters( '12345' );
```



# Return Values

```
var doubleIt = function(a) {  
    return a * 2;  
}
```

## **Demo**

Write a function that accepts a name, and returns the string "Hello, [name]!"

# Demo

Write a function "reverse" that accepts an array, and returns an array with the items in reverse order.

# Exercises

1. Write a function **insult** that takes a name, and logs an insult to the console (e.g. "Mitch, you dummy!")
2. Write a function **increment** that takes a number and adds 1 to it.
3. Write a function **doubleArray** that accepts an array of numbers and returns a array of those numbers doubled.

# **Functions**

## Summary

# Objects

# Objects

```
var myObject = {  
  a: 5,  
  b: 6,  
  c: 7  
};
```





**Demo**

Building a car

**What happens when you read a  
property that doesn't exist?**

# Exercises

1. Create an object "me" containing your name, age, and occupation.
2. Change your occupation to "javascript expert"
3. Add a "skills" property containing the array [ 'ruby' , 'rails' , 'javascript' ]

# **Object-ception**

Nested Objects

# What's the result?

```
var obj = {  
  a: [1, 2, 3],  
  b: { c: 6 }  
};
```

```
console.log(obj.a[2] + obj.b.c);
```

**Can you have a property with a  
space in it?**

# [ ] to the rescue

- For properties with spaces or other special characters
- For property names stored in variables

```
var car = {};  
car['year made'] = '2009';  
console.log(car['year made']);
```

// Or

```
var car = {  
  'year made': '2009'  
};
```

# What's wrong?

```
var obj = {  
  a: 5,  
  b: 6  
};  
  
console.log(obj[a] + obj[b]);
```



# Demo

Write a function that takes a string and returns an object containing the count of each character

# Exercises

1. Write a function that takes a user object with 'name' and 'age' properties, and logs the string "[name] is [age] years old."
2. Write a function that takes a sentence, and returns an object of all the words and their lengths.

```
wordLengths("Hello world"); => { "Hello": 5,  
  "world": 5 }
```

**delete**

# Looping over an object

```
for (var key in object) {  
    console.log("key " + key + ", value " + value);  
}
```

## **Demo**

Write a function that computes the number of properties an object has.

# Exercises

1. `console` is an object, figure out what properties it has.
2. Write a function `clone`, which takes an object and returns a clone of it.

**typeof**

# Cheatsheet

```
var number = 5;  
var string = "Hello";  
var array = [1, 2, 3];  
var object = {a: 1, b: 2};  
var func = function(x) { return x * x; }
```

```
if (object.a == 1) {  
    console.log("A is 1");  
}
```

```
for (var i = 0; i < array.length; i += 1) {  
    var value = func(array[i]);  
    console.log(value);  
}
```



# Next Time

- Higher-order functions
- Methods on objects
- Timing functions
- Working with the DOM
- underscore library

# Homework