

Advanced Javascript

Course's Agenda

- ~~Javascript Basics~~
- **Advanced Javascript**
- **Introduction to the DOM**
- Easier DOM with jQuery
- Transitions and Animations
- Talking to the server with AJAX

Today's Agenda

- Review Basics
- Methods
- Higher-order functions
- Timing functions
- Underscore.js
- What we missed
- Introduction to the DOM

Review Basics

Game

Cheat Sheets

- Mitch's Cheat sheet
- MDN Cheat Sheet
<http://goo.gl/89Taee>
- LearnXinY Cheat Sheet
<http://goo.gl/R1yXeo>

Variables

```
var aString = "John";
```

```
var aNumber = 29;
```

```
var anArray = [1, 2, 3, 4];
```

```
var anObject = {a: 1, b: 2, c: 3};
```

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

If-Else

```
if (age > 51) {  
    console.log("Old!");  
} else {  
    console.log("Young!");  
}
```


While Loop

```
while (i < 100) {  
    console.log(i);  
    i += 1;  
}
```

For Loop

```
for (var i=0; i < 100; i+=1) {  
    console.log(i);  
}
```

Objects

```
var me = {  
  name: 'Mitch',  
  emotion: 'Excited!'  
};  
  
me.language = 'english';
```

Functions

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

```
doubleIt(5);
```

Review Exercises

1. Write a function that takes any number, but always returns 0.
2. Write a function that takes a user object with 'name' and 'age' properties, and logs the string "[name] is [age] years old."
3. 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 }
```

Demo

Write a function `chooseTeams` that takes a list of players and a number of teams, and forms random teams.

typeof

Methods

Demo

Exercise

Add a stop method to your car that logs
"screeetch!" to the console.

this

Demo

Exercise

Change "stop" to have the following output:

"Screeeeetch!!" if speed is "fast"

"RRrch." if speed is "medium"

"sh" if speed is "slow"

"Yikes, I don't know how fast I'm going!!!" if speed is anything else.

Stretch: If the speed is a number, output "Screetch!!" with that number of "e"s.

Higher-order Functions

Exercise

Write a function `call` which takes a number and a function as parameters, and returns the result of calling the function on the number.

```
var doubleIt = function (x) {  
    return 2 * x;  
};  
call(5, doubleIt); // => 10
```

Stretch Make `call` take a third parameter, the number of times to call the function (e.g. `call(5, doubleIt, 2) == 20`)

Anonymous Functions

// Long...

```
var doubleIt = function (x) {  
    return 2 * x;  
};  
call(5, doubleIt);
```

// Short...

```
call(5, function (x) {  
    return 2 * x;  
});
```


Exercise

Write a function map which takes an array and a function as parameters, and returns an array where each item is the item in the original array with the function applied to it.

```
var addOne = function (x) {  
  return x + 1;  
};  
map([1, 2, 3], addOne); // [2, 3, 4]
```

Stretch: The second parameter is an array of functions, apply all the functions one-by-one to the items in the array.

Exercise

Use your map function to produce an array of squares of:

`[1, 2, 3, 4, 5, 6, 7, 8, 9]`

Stretch: Use map to produce an array of the number of characters of each string in the following array:

`['hello', 'data', 'eat cheese', 'walking']`

for-each method

```
[1, 2, 3].forEach(function(i) {  
    console.log(i);  
});
```

Demo

Timing Functions

setTimeout

Run some code later

```
setTimeout(function() {  
    // code to run...  
}, milliseconds);
```

Demo

Exercise

Change your page script to write to the page "Loading..." and then, 3 seconds later, "Hello, World!"

Stretch: Make your page display "Ready...", then "Set...", then "Go!", one second after another.

What will happen?

```
var x = function () {  
    console.log( '.' );  
    setTimeout(x, 1000);  
};  
  
x();
```

setInterval

Repeatedly run some code every N milliseconds

```
setInterval(function() {  
    // code to run...  
}, milliseconds);
```

Demo

Exercise

Make a counter using `setInterval`. Count from 1 up, every second.

Stretch: Create two counters, one for even numbers and one for odd. Run them at the same time.

What will happen?

```
setInterval(function() {  
    setInterval(function() {  
        document.write( '.' );  
    }, 1000);  
}, 1000);
```

clearInterval

Demo

```
var interval = setInterval(function () {  
    console.log( '.' );  
}, 1000);  
  
clearInterval(interval);
```

Exercise

Use `setInterval` to log '.' to the screen every 1 second. Stop after 10 seconds have passed.

(Hint: Use `setTimeout` to stop things after 10 seconds)

Stretch: Build a blast-off countdown using `setInterval`.

10 9 8 7 6 5 4 3 2 1 Blast Off!

Underscore.js

- Library of useful functions missing from Javascript
- <http://underscorejs.org/>

Demo

Advanced Topics

Scope

this, apply, call

What we missed

Creating objects with new

```
var Person = function(name) {  
    this.name = name;  
}
```

```
var person = new Person( 'Mitch' );
```

function declarations

```
function doubleIt(x) {  
    return 2 * x;  
}
```

```
doubleIt(5);
```


Introduction to the

DOM

**The DOM is an API
for your web page**

But what is the DOM? **for serious**

A collection of Javascript objects that represent the HTML document of the current page.

DOM objects contain methods for querying and manipulating web pages, and saying what should happen when the user makes certain actions.

e.g. "When the user clicks this button, make all the links red."

What can you do with the DOM?

1. Make changes to the HTML after the page has loaded
2. Respond to a users actions (events)
3. Any combination of 1 and 2

Real World Examples

- <http://mealime.com>
- <http://next.mitchcrowe.com>
- harmonikit <https://dry-inlet-2631.herokuapp.com>

It all starts with window

- window is the global object and default receiver
- "global" functions and objects are actually properties of window
- <https://developer.mozilla.org/en-US/docs/Web/API/Window>

An HTML Document

```
<html>
  <head>
    <script>...</script>
    ...
  </head>
  <body>
    <h1>Title</h1>
    <a id='link' href="http://www.google.com">Link</a>
  </body>
</html>
```

*"The Document Object
Model represents an
HTML document as a tree
of Javascript objects"*

DOM Basics

Demo

What *you need* to know

- All the basics (if, for, function, ...)
- Create a function that accepts another functions as an argument.
- Create an anonymous function as an argument to a function.
- How to use setTimeout and setInterval

1. Write a function that takes one parameter, a person's age. If the person is older than 50, return 'old'. Otherwise, return 'young'.
2. Write a function `forEach` that takes two parameters, an array and a function. It should call the function on each item in the array.
3. Write a function called `sayLater` that takes one parameter, a string. It should log the string to the console 5 seconds later.
4. [Stretch] Research how to loop over an object. Use this to count the number of properties that the `window` object has.

Homework

Next Time

Mastering the DOM with jQuery