

Spatial Data Capture and Analysis

Interactive Visualisation 2: JavaScript



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Real-time data visualisation

Recap

Example a HTML Document

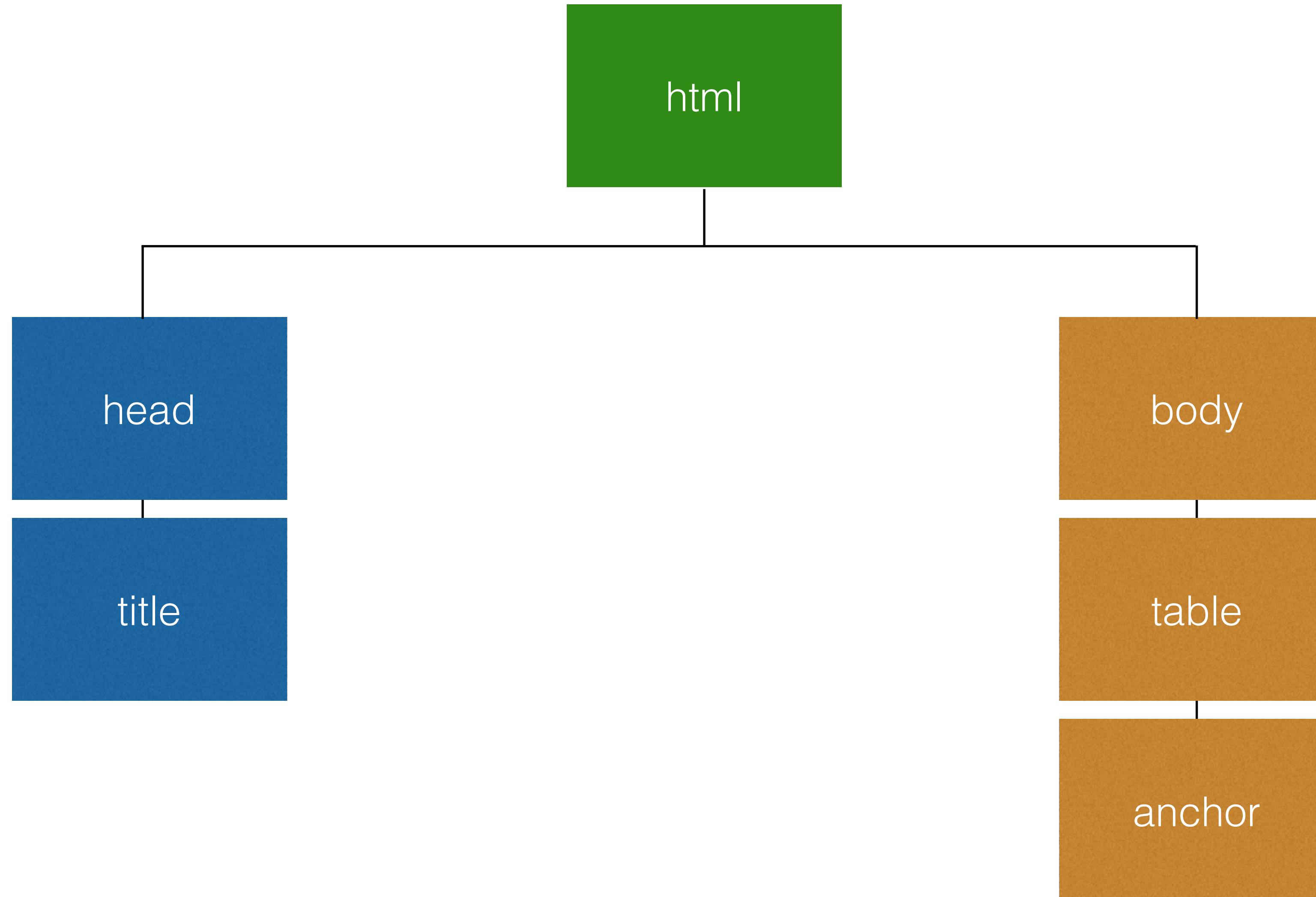
```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
  "http://www.w3.org/TR/html4/loose.dtd">
<html>
  <head>
    <meta http-equiv="Content-type" content="text/html; charset=utf-8">
    <title>Test Page</title>
  </head>

  <body>
    <table border="0" cellspacing="5" cellpadding="5">
      <tr><th>Header</th></tr>
      <tr><td>Data</td></tr>
    </table>

    <a href="/css/master%20set.css">Hello World</a>
  </body>
</html>
```

Recap

Example DOM Tree of previous HTML



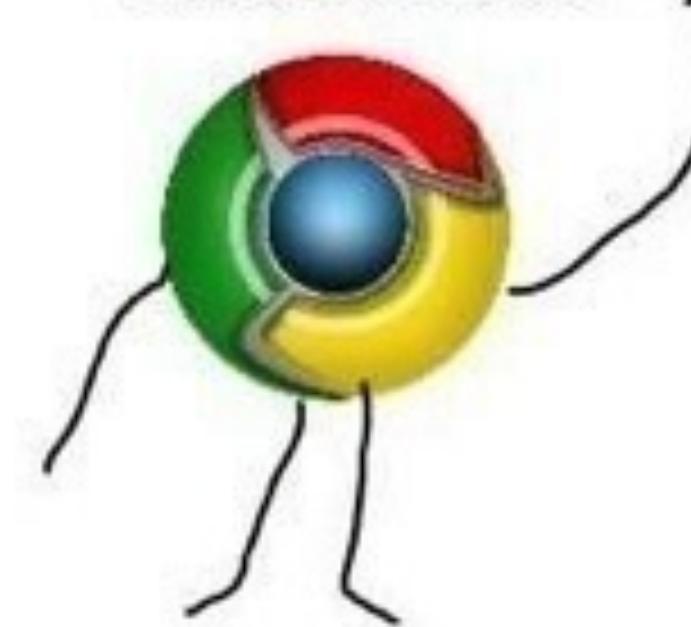
What is JavaScript

Client side coding

- Built by Netscape in 1995 to enable browsers to run sandboxed code.
- Birth of the Interactive Web.
- Different implementations due to different browsers.
- Modern day JavaScript is Standardised
- Web 2.0 heavily relies on JavaScript

Code runs client side and is executed by the browser separate from other Applications.

what are we?!

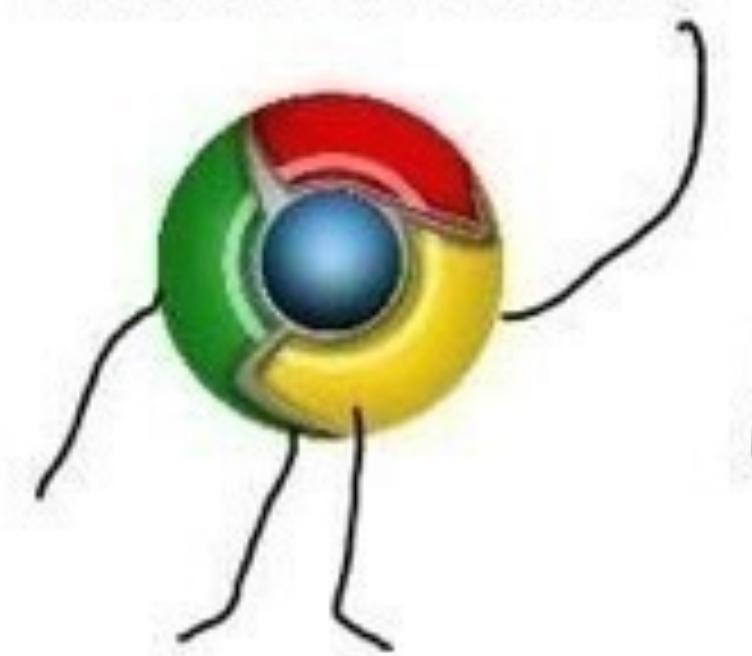


browsers!



browsers

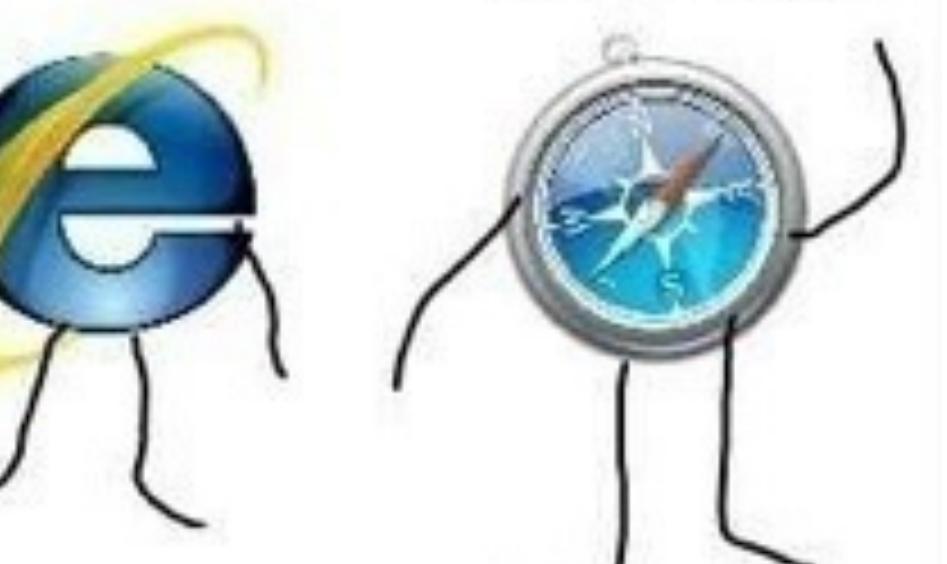
what do we want?!



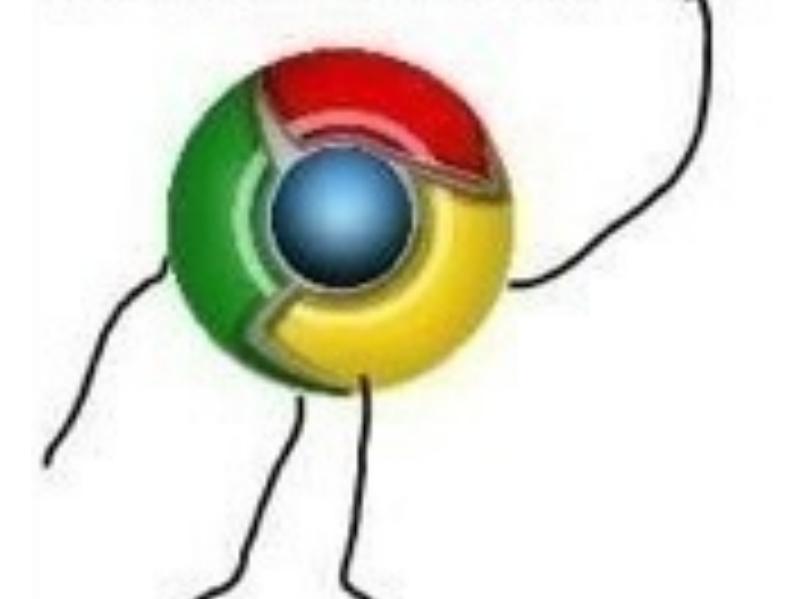
fast internet!



fast internet!



when do we want it?!



browsers!



What is JavaScript

Internal vs External code

```
<script type="text/javascript">
    alert("Hello, world");
</script>
```

Internal code is called in between script tags

What is JavaScript

Internal vs External code

```
<script type='text/javascript' src='http://code.jquery.com/jquery-1.10.2.min.js?ver=1.10.2'></script>
<script type="text/javascript" src="https://maps.googleapis.com/maps/api/js"> </script>
<script type='text/javascript' src='http://arshaw.com/xdate/downloads/0.8/xdate.js'></script>
```

External code is references as links directly to JavaScript

What is JavaScript

Internal vs External code

.....

```
<script src="//code.jquery.com/jquery-1.10.2.min.js"></script>
<script src="//maxcdn.bootstrapcdn.com/bootstrap/3.2.0/js/bootstrap.min.js"></script>
<script src="./js/ripples.min.js"></script>
<script src="./js/material.min.js"></script>
<script src="http://d3js.org/d3.v3.min.js"></script>
<script>
    var fb = new Firebase("https://cloudmetrics.firebaseio.com/");
    var firstLoad = 1;
    var platform = "MacOS";
</script>
</body>
</html>
```

Both can appear together for development purposes but is poor style

Javascript Basics

Types, Language and Features

- Asynchronous Language
- Dynamic Typing or Loosely typed
- Easy Syntax – Everything is an object
- Lots of Libraries available to enable features
- **Event Driven**
- Most Importantly:

JavaScript is not Java

JavaScript Basics

What every good web developer should know

Javascript Basics

Variables and Maths

```
var foo = 5;  
var apples = 10;  
var pears = 20;  
var title = "Learning JavaScript is fun";
```

Variables have to prefixed with keyword var
Lines end with semi-colons.

Javascript Basics

Comments

```
// I am a comment - I don't run  
var imAVariable = "I do run";
```

Comments are represented by // for single lines

Javascript Basics

Variables and Maths

```
var foo = 5;  
var apples = 10;  
var pears = 20;  
var title = "Learning JavaScript is fun";
```

```
var total = apples + pears;  
var number = 10/3;  
var whatAmI = 10/0;
```

All basic operators are valid (e.g. + - * = ^)

Javascript Basics

Outputting variables and Debugging

```
var foo = 5;  
var apples = 10;  
var pears = 20;  
var title = "Learning JavaScript is fun";
```

```
var total = apples + pears;  
console.log(total);
```

Writes out values to the JavaScript Console

Javascript Basics

Strings

```
var title = "Learning JavaScript is fun";  
var end = "Go forth and learn";
```

```
title + end  
title.replace("fun", "boring");  
title.replace("fun", "boring").trim();
```

Functions can be applied to any object. Use reference to find out all functions available to an object

Javascript Basics

More Advanced String Concatenation

```
var url = "www.google.com";
var endPoint = "maps";

console.log("http://" + url + "/" + endPoint + "/page" + "/" + 5 + ".html");
```

Result: http://www.google.com/maps/page/5.html

Javascript Basics

Equality and if statements

```
if(true){  
    console.log("This is true");  
}else{  
    console.log("This is not true");  
}
```

Let's Play Game of Truth

| | | | |
|--------------|-------|----------------------|-------|
| 10 >= 5 | true | "a" == 'a' | true |
| 100 < 10 | false | "A" === a | false |
| 10 === (6+4) | true | "10" == (6+4) | true |
| 10 != 5 | true | Infinity == Infinity | true |
| "" == 0 | true | | |

Javascript Basics

Loops

```
var i = 1;  
for(var k=1; k<=10; k++){  
    console.log(i);  
    i = i + 1;  
}  
// What is i?
```

For Loop

```
var i = 1;  
while (i < 10) {  
    console.log(i);  
    i = i + 1;  
}  
// What is i?
```

While Loop

Javascript Basics

Functions

```
imAFunction();
doSomething(variable);
```

```
function addMe(a, b){
    return(a+b);
}
```

```
var result = addMe(3,2);
```

Functions return values and used for clean code

Javascript Basics

Arrays

```
var emptyArray = [];
```

```
var shoppingList = ['Milk', 'Bread', 'Beans'];
```

```
shoppingList.length;  
shoppingList.push('Cheese');  
shoppingList.sort();
```

Arrays store objects and each item can have any type

Javascript Basics

Objects

```
var jedi = {  
    name: "Yoda",  
    age: 899,  
    talk: function () { console.log("may the force be with you"); }  
};
```

```
jedi.name;  
jedi.age;  
jedi.talk();
```

Objects are collections of variables

Javascript Basics

Scope

```
var a = 10;  
  
function add2(a){  
    var b = 2;  
    return (a+b);  
}  
  
var c = a + b;
```

What is c?

Javascript Basics

Scope

```
var a = 10;  
var b = 3;
```



Global Scope

```
function add2(a){  
    var b = 2;  
    return (a+b);  
}
```



Local Scope

```
add2(4);  
var c = a + b;
```

What is c now?

JavaScript for the Web

Libraries and Sharing Data between applications

Making JavaScript Easier

Using Libraries to help us code

```
<script type='text/javascript' src='http://code.jquery.com/jquery-1.10.2.min.js?ver=1.10.2'></script>
```

jQuery is a library that exposes extra functions to make life easier

Learning jQuery

What does it do?

```
$("#title").html("Hello World");
$("a").css("color", "red");
$(".section").hide();
$(".menuItems").hide();
```

jQuery works with Selectors - it selects things and you can edit them

Learning jQuery

What does it do?

```
$("#title").html("Hello World");
$("a").css("color", "red");
$(".section").hide();
$(".menuItems").hide();
```

jQuery works with Selectors - it selects things and you can edit them

<http://api.jquery.com/>

Learning jQuery

Waiting until the page is ready.

```
$(document).ready(function() {  
    doSomething();  
});
```

Learning jQuery

Functions to make things easier

```
var shoppingList = ['Milk', 'Bread', 'Beans'];

for(var i=0; i < shoppingList.length; i++){
    console.log(shoppingList[i]);
}
```

Standard For Loop, to walk over an array

<http://api.jquery.com/>

Learning jQuery

Functions to make things easier

```
var shoppingList = ['Milk', 'Bread', 'Beans'];

$.each(shoppingList, function(key,value){
    console.log(value);
});
```

jQuery.each command - Easy Loops
<http://api.jquery.com/>

More JavaScript

Timing

```
var timeout = setTimeout(function(){
    getData(map.getCenter().lat(), map.getCenter().lng());
}, 500);
```

```
var interval = setInterval(function(){
    getData(map.getCenter().lat(), map.getCenter().lng());
}, 10 * 1000);
```

```
// Stop the Timer
clearInterval(interval);
```

Two main timing functions - time is in milliseconds

Learning jQuery

Functions to make things easier

```
$("#title").html("Hello World");
```

jQuery.html command will write contents into the DOM

<http://api.jquery.com/>

Learning jQuery

Functions to make things interesting

```
$("button").click(function(){
    var div=$("div");
    div.animate({height: '300px', opacity: '0.4'}, "slow");
    div.animate({width: '300px', opacity: '0.8'}, "slow");
    div.animate({height: '100px', opacity: '0.4'}, "slow");
    div.animate({width: '100px', opacity: '0.8'}, "slow");
});
```

jQuery.animate can chain events to make your site amazing

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_animation

Sharing Data

How to share data between your apps and with other people

What's an API

Application programming interface



Application

Send Data

Pass some variables via a URL



Get the Data back

Server send results back



Server

<http://dev.spatialdatacapture.org:8870/data/:lat/:lon/:radius>

<http://dev.spatialdatacapture.org:8870/data/51.514756/-0.104345/50>

Remote JavaScript

JSON

```
string = '{ "name": "Yoda", "age": 894, "lightsaber" : { "color": "green" } }';  
  
item = JSON.parse(string);  
console.log(item.name);
```

JSON is JavaScript Notation that lets us share objects over the web
String version of an object

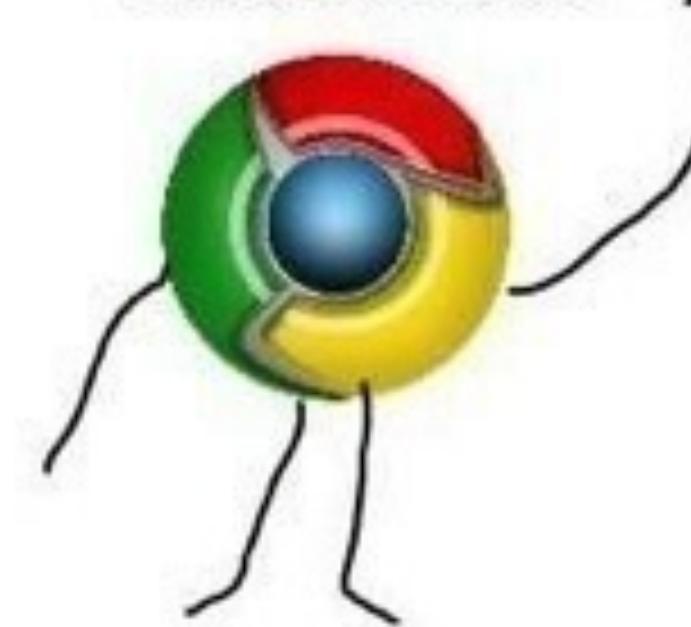
Asynchronous Coding

Things to watch for

```
var dataArray = [];
$.getJSON("http://dev.spatialdatacapture.org:8870/data/51.514756/-0.104345/50", function(data) {
  console.log(data);
  console.log("Hello");
  dataArray = data;
});
console.log("World");
```

Warning: JavaScript may execute code at different times

what are we?!

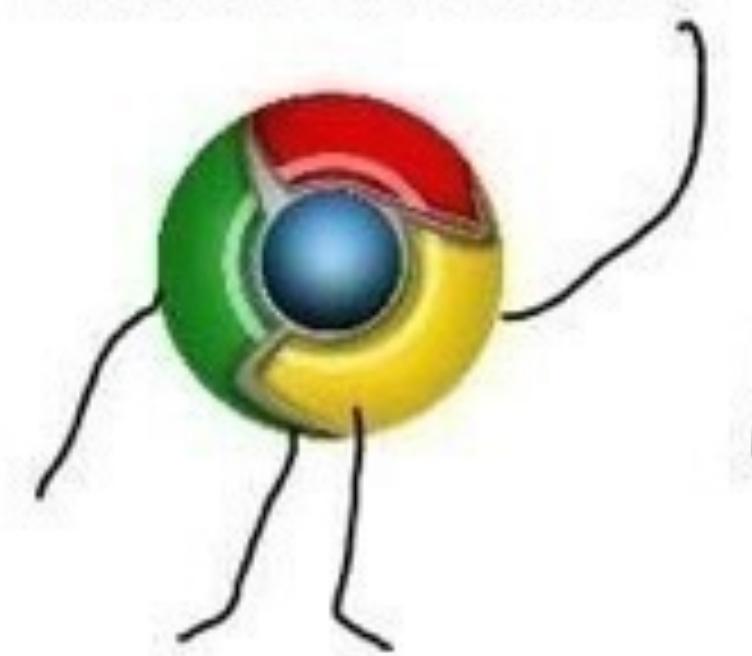


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browsers

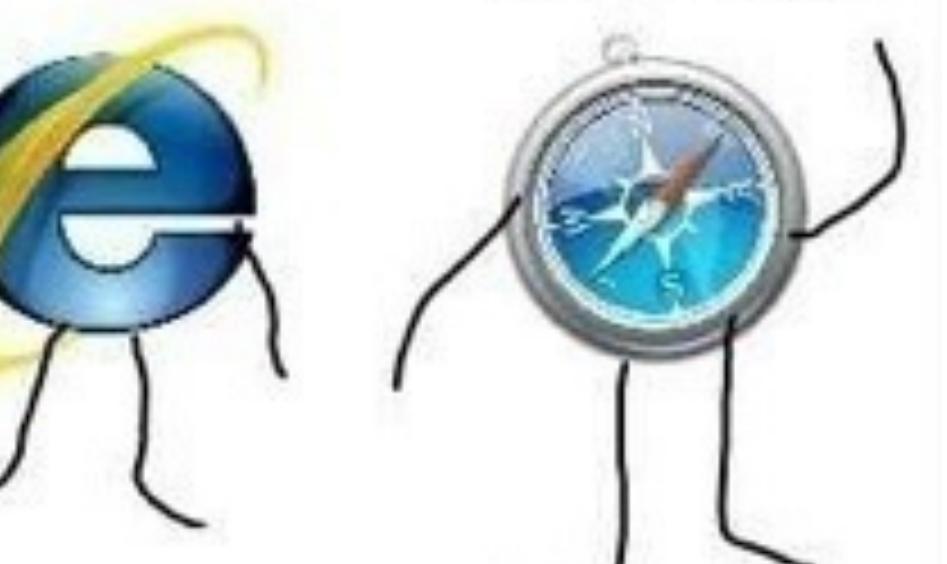
what do we want?!



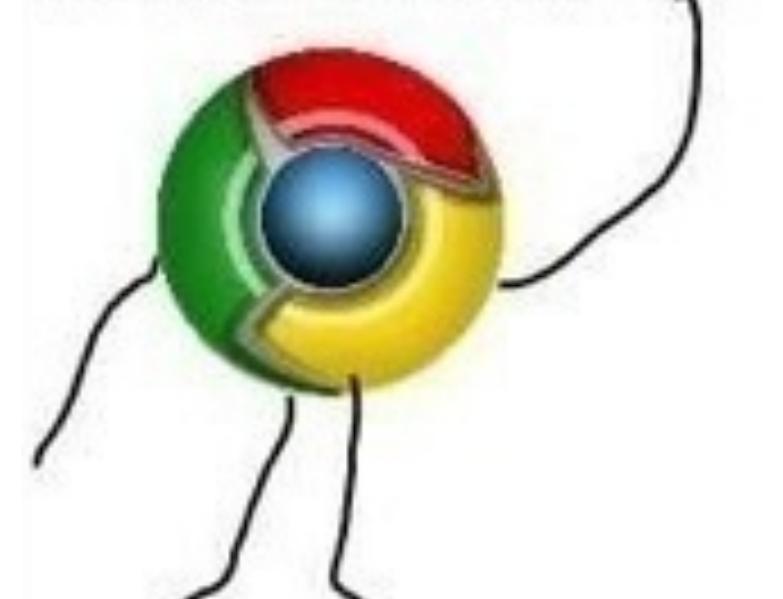
fast internet!



fast internet!



when do we want it?!



browsers!



Workshop: Week 8

Making your static website, interactive

- Build an Interactive Viewer for Flickr Photos
 - Load Interactive Google Map
 - Get some data from an API
 - Draw markers on the map and make them clickable
- JavaScript Skills
 - Experiment with Developer Tools
 - Learn simple commands and libraries to make JavaScript easier
 - Debugging your CSS on different browsers

Next Week

Building Server Side API's and linking front end visuals to the server side code

9

Server Side Coding: Node.JS

Learn how to build an API and Interface the Database with
the Web Browser.

Questions?

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@frogo

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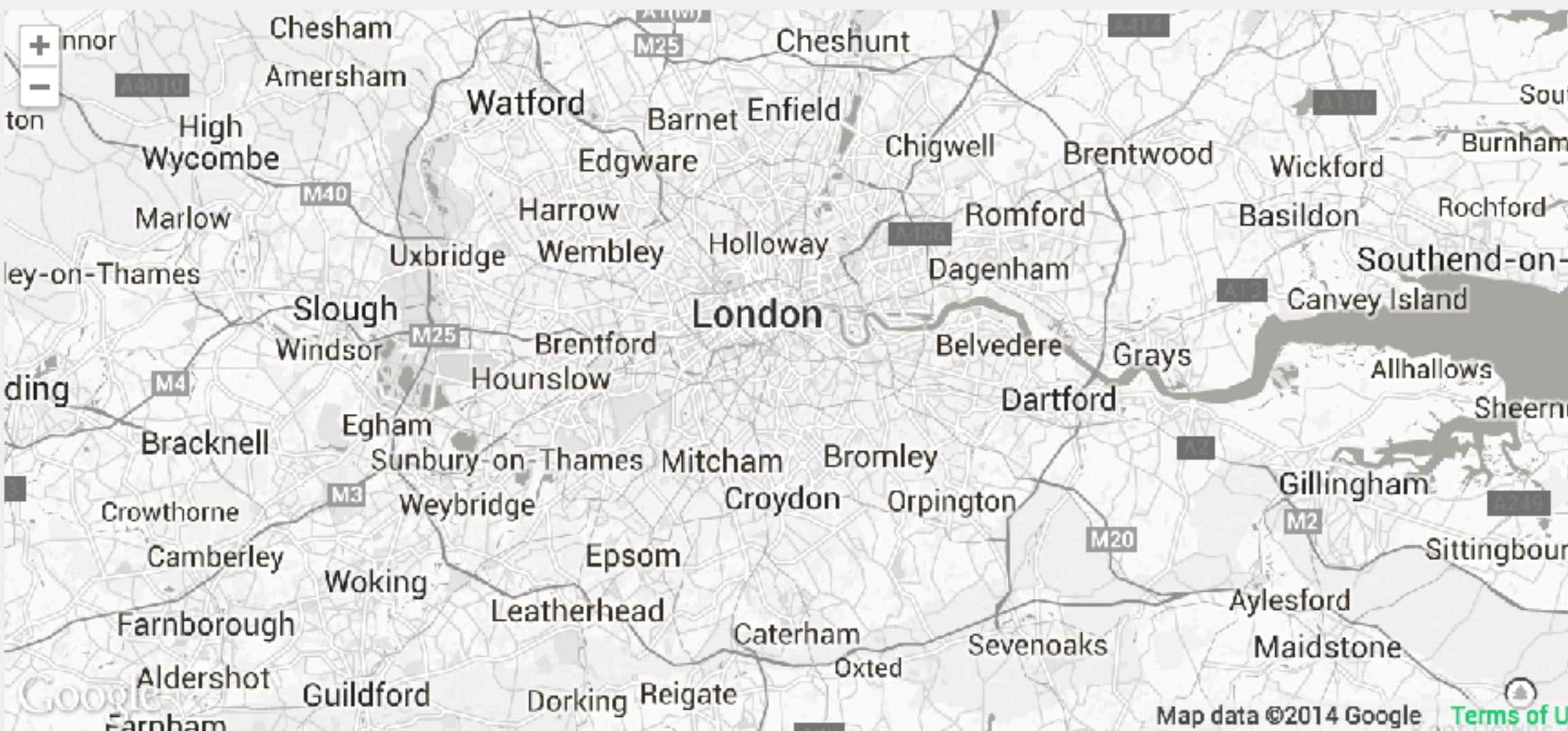
casa

St. George's
Bermuda

Google Maps Styling Libraries

Make your maps beautiful

Sort by:

[Popular](#)[Recent](#)

Subtle Grayscale

[Paulo Ávila](#) on October 30, 2013

A nice, simple grayscale version of the map with color extremes that are never too harsh on the eyes. Originally created for <http://barvinssurvins.fr/situer>.

[More info...](#)

[light](#) [greyscale](#)



Pale Dawn

[Adam Krogh](#) on October 24, 2013

Inspired by CloudMade's style of the same name. Use of subdued colours results in an excellent style for sites with a pastel colour scheme.

[More info...](#)



Feature:
Element:
Visibility:
HEX Color:

- water
- landscape
- landscape.man_made
- landscape.natural
- road
- road.highway
- road.arterial
- road.local
- poi
- poi.park
- poi.business
- poi.attraction
- poi.medical
- poi.school
- poi.government
- poi.place_of_worship
- administrative
- administrative.country
- administrative.land_parcel
- administrative.locality
- administrative.neighborhood
- administrative.province
- transit

