# User Interaction: Introduction to Javascript

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- First things first
- Make sure you have a decent foundation in HTML
  - See the reading from Lecture 7
- Make sure you have a copy
  - of the Chrome browser
  - or Firefox with the Firebug plug in installed

- What is JavaScript?
  - JavaScript was designed to add interactivity to HTML pages
  - JavaScript is a scripting language
  - A scripting language is a lightweight programming language
  - JavaScript is usually embedded directly into HTML pages
  - JavaScript is an interpreted language (means that scripts execute without preliminary compilation)
  - Everyone can use JavaScript without purchasing a license
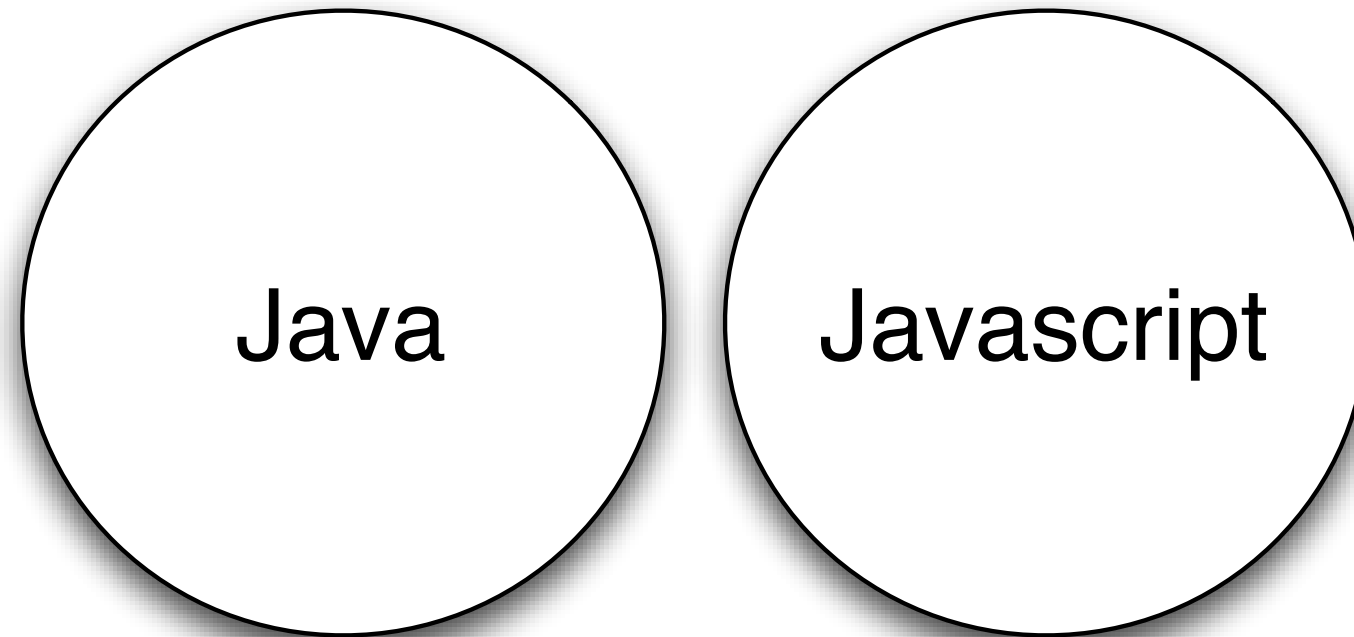
Java

Javascript

- Java and Javascript are not the same
  - They unfortunately share the same name
  - They are different in what they are designed to do
  - They are different in how they came to be
- Java is more powerful and complex

- JavaScript gives web designers a programming tool
  - Simple syntax
  - Supports putting "snippets" of code into web pages

- JavaScript can put dynamic text into an HTML page
  - A JavaScript statement like this:
    - document.write("<h1>" + name + "</h1>")
  - can write the content of a variable into a web page

- JavaScript can react to events
  - A JavaScript can be set to execute when something happens, like when a page has finished loading or when a user clicks on an HTML element

- JavaScript can read and write HTML elements
  - A JavaScript can read and change the content of an HTML element
- JavaScript can be used to validate data
  - A JavaScript can be used to validate form data before it is submitted to a server.

Javascript

- get a Hello World running
  - This eliminates errors related to your hosting provider and web set up
  - It ensures that you have resources necessary on a web host
  - Hopefully this was solved in Assignment 01

```
<html>
    <head>
        <title>Step 1</title>
    </head>
    <body>
        Hello World
    </body>
</html>
```

Javascript

- Let's put some Javascript in it
  - <script> tag
  - encloses javascript code that is run by the browser

```html
<html>
    <head>
        <title>Step 2</title>
    </head>
    <body>
        <script type="text/javascript">
            document.write("This is my first JavaScript!");
        </script>
    </body>
</html>
```

Javascript

```html
<html>
    <head>
        <title>Step 3</title>
    </head>
    <body>
        <script type="text/javascript">
            document.write("<font color=\"red\">This is my second JavaScript!</font>");
        </script>
    </body>
</html>
```

- document.write()
  - when this command is run
  - the parameter is inserted into the html document just like it was written there without any javascript

Javascript

- JavaScripts in a page will be executed immediately while the page loads into the browser.
- This is not always what we want.
  - Sometimes we want to execute a script when a page loads, or at a later event, such as when a user clicks a button. When this is the case we put the script inside a function.
- Scripts to be executed when they are called, or when an event is triggered, are placed in functions.
- Put your functions in the head section, this way they are all in one place, and they do not interfere with page content.

Javascript

```html
<html>
    <head>
        <script type="text/javascript">
            function message()
            {
                alert("This alert box was called with the onload event");
            }
        </script>
    </head>

    <body onload="message()">
        Hello World!
    </body>
</html>
```

- Javascripts can be put in the head and the body
- Multiple javascripts are fine

Javascript

- To reuse javascript in multiple different webpages
  - store it in another file
  - load it externally

```
function message()
{
    alert("This alert box was called from a remote library.");
}
```
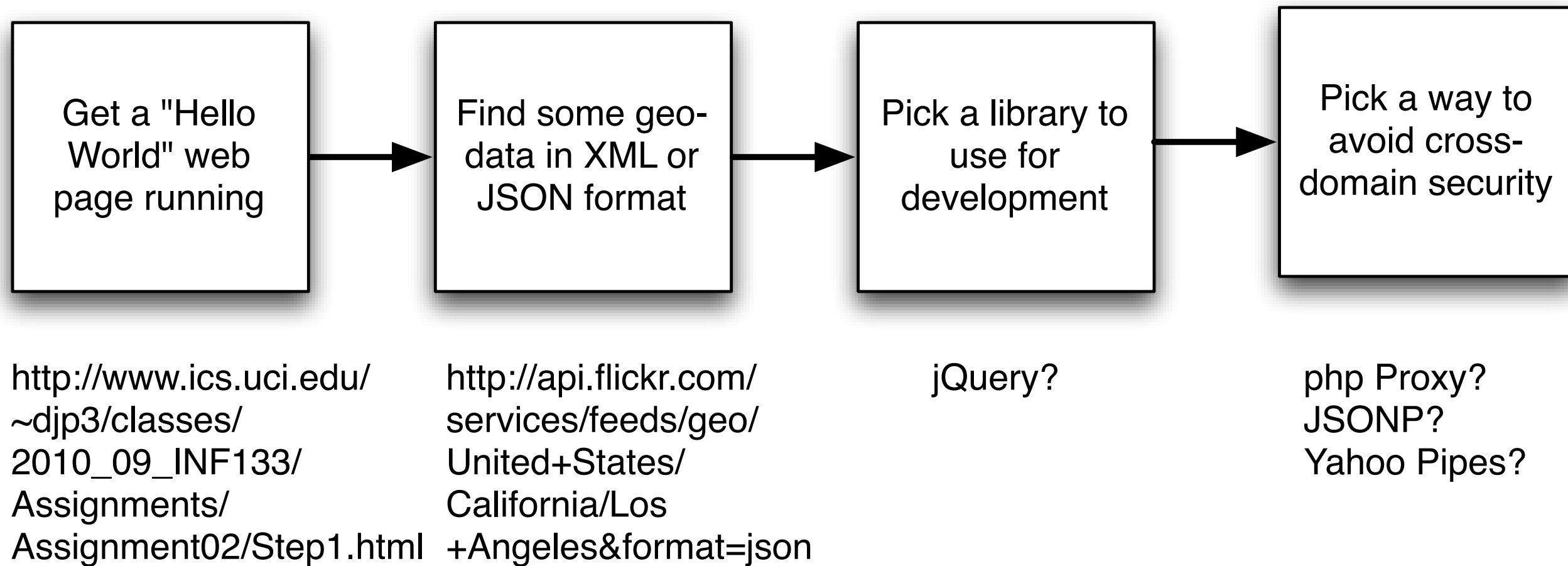
```
<html>
    <head>
        <script type="text/javascript" src="Step5.js"></script>
    </head>

    <body onload="message()">
        Hello World!
    </body>
</html>
```

Assignment 2

- The goal is a web page
  - which has issued an AJAX request
  - parsed the data
  - and displayed it in a new way

Assignment 2

Get a "Hello World" web page running → Find some geo-data in XML or JSON format → Pick a library to use for development → Pick a way to avoid cross-domain security

http://www.ics.uci.edu/~djp3/classes/2010_09_INF133/Assignments/Assignment02/Step1.html

http://api.flickr.com/services/feeds/geo/United+States/California/Los+Angeles&format=json

jQuery?

php Proxy?
JSONP?
Yahoo Pipes?

Find some geo-data in XML or JSON format

Pick a library to use for development

Pick a way to avoid cross-domain security

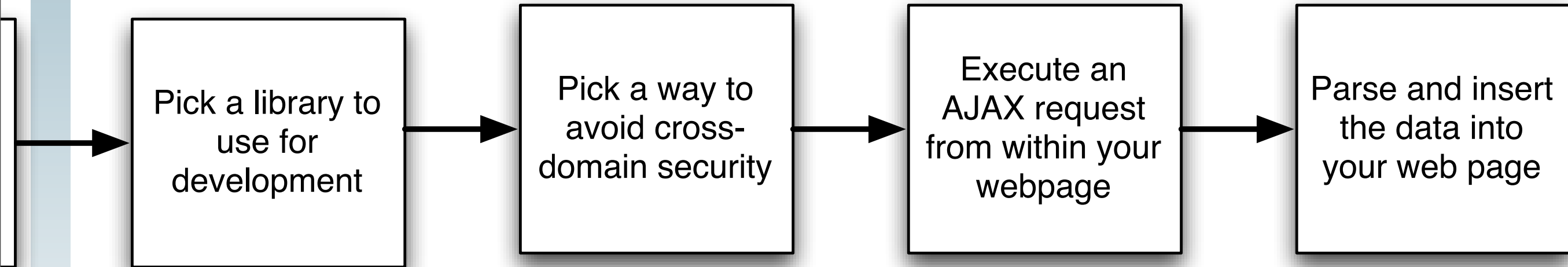Execute an AJAX request from within your webpage

i.edu/

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ep1.html

http://api.flickr.com/
services/feeds/geo/
United+States/
California/Los
+Angeles&format=json

jQuery?

php Proxy?
JSONP?
Yahoo Pipes?

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t=json

Pick a library to use for development	→	Pick a way to avoid cross-domain security	→	Execute an AJAX request from within your webpage	→	Parse and insert the data into your web page

jQuery?

php Proxy?
JSONP?
Yahoo Pipes?

Pick a way to avoid cross-domain security

Execute an AJAX request from within your webpage

Parse and insert the data into your web page
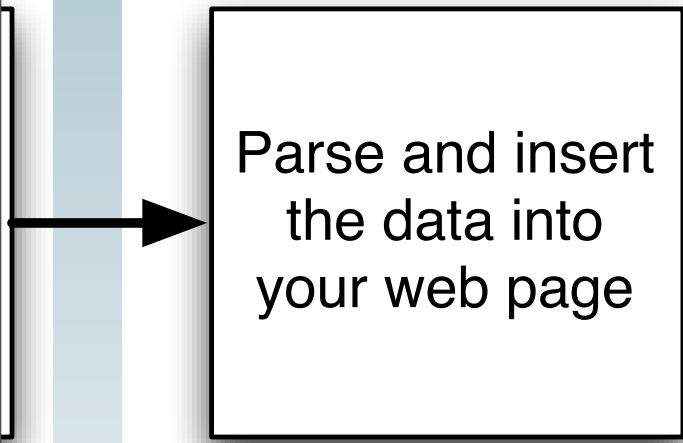
php Proxy?
JSONP?
Yahoo Pipes?

Execute an AJAX request from within your webpage

Parse and insert the data into your web page
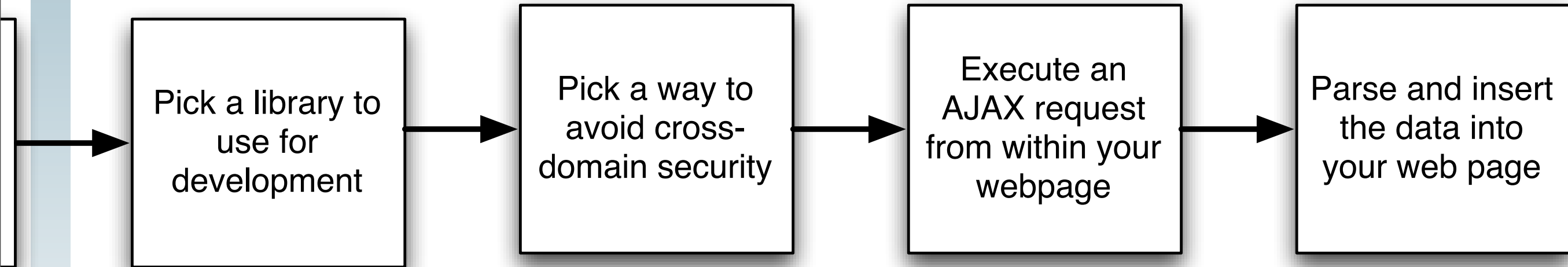
Parse and insert the data into your web page

Find some geo-data in XML or JSON format → Pick a library to use for development → Pick a way to avoid cross-domain security → Execute an AJAX request from within your webpage

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ep1.html

http://api.flickr.com/
services/feeds/geo/
United+States/
California/Los
+Angeles&format=json

jQuery?

php Proxy?
JSONP?
Yahoo Pipes?

- Find some geo-data in XML or JSON format
  - (Hint: RSS is a specific type of XML)
- What is geo-data?
  - Anything that relates data to a spot on the earth
  - Data with a latitude and longitude
  - Data with an address
  - Data with a zip code
  - Data with a county
- For example:
  - Photos taken in Los Angeles
  - http://www.flickr.com/places/United+States/California/Los+Angeles

m/

eo/

Pick a library to use for development

→

Pick a way to avoid cross-domain security

→

Execute an AJAX request from within your webpage

→

Parse and insert the data into your web page

t=json

jQuery?

php Proxy?
JSONP?
Yahoo Pipes?

Assignment 2

- Pick a library for development
  - jQuery (http://jquery.com)
  - Prototype (http://www.prototypejs.org/)
  - ExtJS (http://www.sencha.com/)
  - YUI (http://developer.yahoo.com/yui/)
  - MooTools (http://mootools.net/) - very compact, much smaller than the others
  - Dojo (http://dojotoolkit.org/)

Pick a way to avoid cross-domain security

Execute an AJAX request from within your webpage

Parse and insert the data into your web page
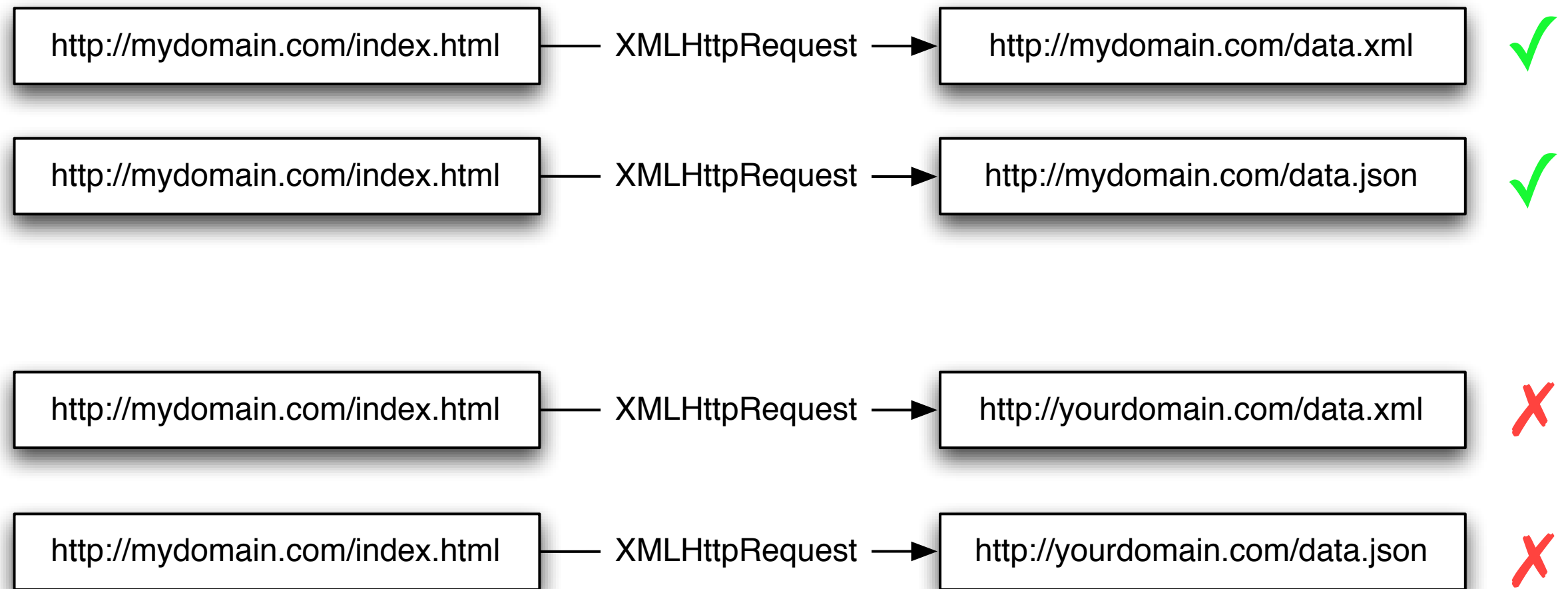
php Proxy?
JSONP?
Yahoo Pipes?

- At a high-level requesting data asynchronously requires:
  - The location of where you want to get the data from
    - (for us these are the 5 geo-feeds)
  - Because we aren't waiting
    - what function to call when the data is ready
    - the call back function
  - The native function call to do this is called
    - "XMLHttpRequest"

- One problem:
    - Javascript does not allow you to make an XMLHttpRequest from an external domain
    - XMLHttpRequest is the javascript function which retrieves data asynchronously
        - Not just XML, but any data
    - For security reasons it was restricted

Assignment 2

http://mydomain.com/index.html	— XMLHttpRequest →	http://mydomain.com/data.xml	✓
http://mydomain.com/index.html	— XMLHttpRequest →	http://mydomain.com/data.json	✓
http://mydomain.com/index.html	— XMLHttpRequest →	http://yourdomain.com/data.xml	✗
http://mydomain.com/index.html	— XMLHttpRequest →	http://yourdomain.com/data.json	✗

Assignment 2

- Solutions to the cross-domain security restriction
  - Run a "proxy"
    - a php proxy
    - You request
      - http://mydomain.com/proxy.php?http://yourdomain.com/data.xml
  - Javascript thinks its coming from local server
    - proxy.php contains this code:

```php
<?php
  $url = $_SERVER['QUERY_STRING'];
  $ch = curl_init($url);
  curl_exec($ch);
?>
```

- Solutions to the cross-domain security restriction
  - Use JSONP
    - Requires server support
      - Yahoo APIs support this
    - Leverages Javascript loophole
      - XMLHttpRequests are restricted
      - Remote Javascript is not

Assignment 2

- JSONP adds a <script src=> element to your web page with the external URL as the src target

- Getting JSON looks like this:
    - Request: http://yourdomain.com/data.json
    - Return: {"hello":"world"}

- Getting JSONP looks like this:
    - Request http://yourdomain.com/data.jsonp?callback=myCallback
    - Return: myCallback("{\"hello\":\"world\"}")

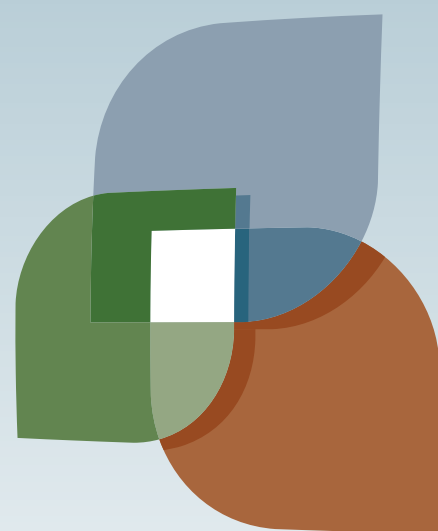- Your webpage writes a function called myCallback to deal with the data

Assignment 2

- Security issue
  - You are running server generated code on your machine
  - !

- Solutions to the cross-domain security restriction
  - Yahoo! Pipes
    - A web based system that enables converting data from RSS to JSONP on the fly.

Assignment 2

- More to come on Assignment 2

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