User Interaction: Introduction to Javascript

Asst. Professor Donald J. Patterson
INF 133 Fall 2010
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 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
<html>
  <head>
    <title>Step 1</title>
  </head>
  <body>
    Hello World
  </body>
</html>
```
• 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!"ements);
  </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
• 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.
• Javascripts can be put in the head and the body
• Multiple javascripts are fine
• To reuse javascript in multiple different webpages
  • store it in another file
  • load it externally

```javascript
function message()
{
    alert("This alert box was called from a remote library.");
}
```

```html
<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?
Assignment 2

1. Find some geo-data in XML or JSON format
   - http://api.flickr.com/services/feeds/geo/United+States/California/LosAngeles&format=json
2. Pick a library to use for development
   - jQuery?
3. Pick a way to avoid cross-domain security
   - php Proxy?
   - JSONP?
   - Yahoo Pipes?
4. Execute an AJAX request from within your webpage
Assignment 2

- Get a "Hello World" webpage running
- Find some geo-data in XML or JSON format
  - http://www.ics.uci.edu/~djp3/classes/2010_09_INF133/Assignments/Assignment02/Step1.html

- Pick a library to use for development
  - jQuery?
- Pick a way to avoid cross-domain security
  - php Proxy?
  - JSONP?
  - Yahoo Pipes?
- Execute an AJAX request from within your webpage
- Parse and insert the data into your web page
Assignment 2

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?
Assignment 2

1. Get a "Hello World" web page running
2. Find some geo-data in XML or JSON format

- http://api.flickr.com/services/feeds/geoplaces/United+States/California/Los+Angeles&format=json
- http://www.ics.uci.edu/~djp3/classes/2010_09_INF133/Assignments/Assignment02/Step1.html

Pick a library to use for development
- jQuery?

Pick a way to avoid cross-domain security
- PHP Proxy?
- JSONP?
- Yahoo Pipes?

Execute an AJAX request from within your webpage

Parse and insert the data into your web page

Monday, October 11, 2010
Assignment 2

Parse and insert the data into your web page
Assignment 2

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

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

jQuery?

php Proxy?

JSONP?

Yahoo Pipes?
Assignment 2

- 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
Assignment 2

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?

Monday, October 11, 2010
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/)
Assignment 2

- Get a "Hello World" web page running
- Find some geo-data in XML or JSON format
  - http://api.flickr.com/services/feeds/geo/United+States/California/Los+Angeles&format=json
  - http://www.ics.uci.edu/~djp3/classes/2010_09_INF133/Assignments/Assignment02/Step1.html
- Pick a library to use for development: jQuery?
- Pick a way to avoid cross-domain security: php Proxy? JSONP? Yahoo Pipes?
- Execute an AJAX request from within your webpage
- Parse and insert the data into your web page
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”
Assignment 2

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

XMLHttpRequest → http://mydomain.com/index.html

XMLHttpRequest → http://mydomain.com/data.xml ✓

XMLHttpRequest → http://mydomain.com/index.html

XMLHttpRequest → http://mydomain.com/data.json ✓

XMLHttpRequest → http://yourdomain.com/index.html

XMLHttpRequest → http://yourdomain.com/data.xml ✗

XMLHttpRequest → 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
  - Javascript thinks its coming from local server
    - `proxy.php` contains this code:

```
<?php
    $url = $_SERVER['QUERY_STRING'];
    $ch = curl_init($url);
    curl_exec($ch);
?>
```
Assignment 2

- 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
• 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
• Security issue
  • You are running server generated code on your machine
  • !
Assignment 2

- Solutions to the cross-domain security restriction
  - Yahoo! Pipes
    - A web based system that enables converting data from RSS to JSONP on the fly.
• More to come on Assignment 2