What are web databases?
What are web databases?

Amazon? craigslist? Wikipedia?
Slashdot? SILS website? Web banking?
Jcpenney.com? Inls760 web site?

ACM DL? engadget? nytimes.com?
UNC Library website? Any website you can think of? Census bureau site?

Ibiblio? Google?
Course Information

• Instructor: Dr. Robert Capra
• Office: Manning 210
• Email: r<lastname> at unc dot edu
• Prerequisites: INLS 572 or equivalent, INLS 623 and programming experience
• Optional textbooks:
  – PHP and MySQL Web Development, by Luke Welling and Laura Thomson
Course Objectives

• Solidify understanding of web protocols and standards: HTTP, HTML, CSS, CGI.

• Gain practical experience implementing Web databases using: 1) “LAMP” (Linux, Apache, MySQL, and PHP) environment, and 2) ASP.

• Learn techniques for dealing with security, user authentication, web transactions, session management, and keyword search.

• Work with Javascript and DOM client-side technologies in a web database context.

• Introduce Ruby on Rails and understand how it supports rapid development.

• Learn about emerging Web database technologies and trends.

• Develop the ability to critically assess and review program code for Web databases.
Hardware and Software

• Main development environment:
  – “LAMP” (Linux, Apache, MySQL, and PHP)

• Although you will have access to these through your SILS computer accounts, you are encouraged to install and configure a LAMP environment on your own computer.

• Do NOT un-install your current operating system – you can run LAMP in a "virtual machine" so that it will not interfere with your existing operating system.
HTTP Protocol

• Hypertext Transfer Protocol
• Client-server ➔ request / response
  – TCP/IP, default port 80
• Connectionless and stateless
  – After request/response, connection is dropped
  – No state kept between requests
    • Exceptions for “keep-alive” and HTTP 1.1 persistent connections
• Extensible data types
  – MIME types (i.e. text/plain, text/html)

Notes from: <http://www.serverwatch.com/tutorials/article.php/10825_1354871_2>
Universal Resource Identifiers (URIs)

- http://www.w3.org/Addressing/URL/uri-spec.html
- Location – URL
- Name – URN
- Protocol :// Server / Path / Object
- Protocols include
  - http, ftp, mailto, news, file
HTTP transaction

[rcapra@ruby]$ telnet www.ils.unc.edu 80
Trying 152.2.81.1...
Connected to ruby.ils.unc.edu (152.2.81.1).
Escape character is '^]'.
GET /courses/2008_spring/inls760_001/lect1/foo.html HTTP/1.1
Accept: text/plain, text/html
Host: www.ils.unc.edu

HTTP/1.1 200 OK
Date: Tue, 15 Jan 2008 18:47:49 GMT
Server: Apache/2.0.52 (Red Hat)
Last-Modified: Tue, 15 Jan 2008 18:46:48 GMT
Content-Length: 118
Content-Type: text/html; charset=ISO-8859-1

<html>
  <head>
    <title>Test</title>
  </head>
  <body>
    <h1>Test</h1>
    Here is some text.
  </body>
</html>
HTTP Requests

• GET
  – Commonly used to retrieve a document

• HEAD
  – Returns all headers, but no entity-body

• POST
  – Commonly used to upload data to the server
    • e.g. forms
HTML

• Authoritative resource: W3C specifications
  – HTML 4.01
    • http://www.w3.org/TR/html4/
  – XHTML 1.0
    • http://www.w3.org/TR/xhtml1/
HTML – Inline Styles

<html>
<head>
    <title>Test</title>
</head>
<body bgcolor=silver>
<table border="1" style="text-align: left; width: 100%;">
    <tbody>
        <tr>
            <td style="text-align: center; background-color: blue;">
                Working with HTML<br>
            </td>
        </tr>
        <tr>
            <td style="background-color: green;">
                <h3 align=center>is fun!!!</h3>
            </td>
        </tr>
    </tbody>
</table>
</body>
</html>

lect1/inlinestyle.html
Working with HTML

is fun!!!
<html>
<head>
  <title>Test</title>
  <link rel="stylesheet" type="text/css" href="example.css" />
</head>
<body>
<table>
  <tbody>
    <tr>
      <td class="firstrow">
        Working with HTML<br>
      </td>
    </tr>
    <tr>
      <td class="secondrow">
        <h3>is fun!!!</h3>
      </td>
    </tr>
  </tbody>
</table>
</body>
</html>
Cascading Style Sheets (CSS)

body {
    background: silver;
}

table {
    border: 2px solid black;
    text-align: left;
    width: 100%;
}

td.firstrow {
    text-align: center;
    background: blue;
}

td.secondrow {
    background: green;
}

h3 {
    text-align: center;
}

CSS resources:
http://www.w3.org/Style/CSS/
http://www.w3schools.com/css/css_intro.asp
<html>
<body>
<h1>Test Form</h1>
<form method="post" action="http://www.ils.unc.edu/courses/2008_spring/inls760_001/lect1/form1.php">
First name:  <input name="firstname" maxlength="20" size="20">
<br>
Last name:  <input name="lastname" maxlength="20" size="20">
<br>
Password:  <input name="password" type="password"
            maxlength="20" size="20">
<br>
<input type="submit" value="Submit">
<input type="reset" value="Clear form">
</form>
</body>
</html>
Test Form

First name: robert
Last name: capra
Password: **********

Submit  Clear form
CGI POST

POST /courses/2010_spring/inls760_001/lect1/form1.php HTTP/1.0
Accept: */*
Content-type: application/x-www-form-urlencoded
Content-length: 49

firstname=robert&lastname=capra&password=12345678

This entity-body is then sent to the form1.php script.

Note: For telnet example, type in by hand
CGI Response

HTTP/1.1 200 OK
Date: Tue, 12 Jan 2010 22:22:13 GMT
Server: Apache/2.2.3 (Red Hat)
X-Powered-By: PHP/5.1.6
Content-Length: 61
Connection: close
Content-Type: text/html; charset=ISO-8859-1

Firstname = robert<br>Lastname = capra<br>Password = 12345678
URL-encoded data

Another way to send data to the server is to include it as part of a URL (only good for small amounts of data)

firstname=robert&lastname=capra&password=12345678

Content-type: application/x-www-form-urlencoded
Using GET

<html>
<body>
<h1>Test Form</h1>
<form method="get" action="http://www.ils.unc.edu/courses/2010_spring/inls760_001/lect1/form2.php">
    First name: <input name="firstname" maxlength="20" size="20">
    <br>
    Last name:  <input name="lastname" maxlength="20" size="20">
    <br>
    Password:  <input name="password" type="password"
               maxlength="20" size="20">
    <br>
    <input type="submit" value="Submit">
    <input type="reset" value="Clear form">
</form>
</body>
</html>
CGI GET

GET /courses/2010_spring/inls760_001/lect1/form2.php?
firstname=robert&lastname=capra&password=12345678
HTTP/1.0
Referer: http://www.ils.unc.edu/courses/2010_spring/
inls760_001/lect1/form2.html
User-Agent: Mozilla/1.1N (X11; I; SunOS 5.3 sun4m)
Accept: */*
Accept: image/gif
Accept: image/x-xbitmap
Accept: image/jpeg