Announcements

- Second program will be up Friday AM, due Tuesday 4/29 at 10pm
- Late program: I will re-open the homework submission site; late deadline 10pm Friday. 10% off.
- Swap lecture and discussion again – so:
  - Tomorrow at 12, lecture
  - Friday at 10, discussion

Last class

- CSS to make Web pages look nice
- Float elements add flexibility
- Sometimes that’s not enough – stylesheets for different devices

```html
<head>
  <link rel="stylesheet" type="text/css" href="theme.css" />
  <link rel="stylesheet" type="text/css" href="print.css" media="print" />
</head>
```

Now - Server side

- Web programming involves a lot of programs that write HTML files
- Most of these are on servers
- …although Javascript in browsers also often modifies existing HTML
- Today we’ll start thinking about the server.
- We’ll get back to the browser and Javascript later

Your friend the server

- There are lots of Web server software systems.
- Most (a slim majority) use an open-source software stack

LAMP stack

- Linux – operating system.
- MySQL – one of many choices of possible database, not all of which begin with M. Optional, but very common.
- Python (or Perl, or PHP, or…) – a language in which to write programs that produce Web pages, often using the database.
Server responds to queries

- Request URL through browser
  - http means use the http protocol
  - pc110.cs.ucdavis.edu will be our server
  - I am number 10002; Jesse is number 10003
  - The rest of this is a path to specific Web page

On the server

- Apache (the server) is always running, waiting for requests.
- It knows a start directory (Unix for folder) for each of us.
- Mine is /var/www/amenta/

```
[amenta@pol10 amenta]$ cd /var/www/amenta
[amenta@pol10 amenta]$ ls
hello.php hw2 mysite.tar treeWebPage
hello.wsgi mysite testphp.php wsgi-scripts
[amenta@pol10 amenta]$ cd treeWebPage
[amenta@pol10 treeWebPage]$ ls
cypress.html italian.jpg monterey.jpg trees.css
```

HTTP

- Hypertext transfer protocol
- Browser requests the URL
- Server responds with the Web page itself
- Headers attached to request and response

A request

```
GET /treeWebPage/cypress.html HTTP/1.1
Host: pc110.cs.ucdavis.edu:8080
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.7; rv:28.0) Gecko/20100101 Firefox/28.0
Accept: text/html,application/xhtml+xml,application/xml;q=0.9,*/*;q=0.8
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate

Date: Wed, 16 Apr 2014 00:36:57 GMT
Server: Apache/2.4.7 (Fedora) OpenSSL/1.0.1e-fips PHP/5.5.9 mod_wsgi/3.4 Python/2.7.5 mod_perl/2.0.8-dev Perl/v5.16.3
Connection: Keep-Alive
Etag: "411-4f71da840f75"
```

A response

```
HTTP/1.1 304 Not Modified
Date: Wed, 16 Apr 2014 00:36:57 GMT
Server: Apache/2.4.7 (Fedora) OpenSSL/1.0.1e-fips PHP/5.5.9 mod_wsgi/3.4 Python/2.7.5 mod_perl/2.0.8-dev Perl/v5.16.3
Connection: Keep-Alive
Keep-Alive: timeout=5, max=100
Etag: "411-4f71da840f75"
```

The dreaded 404

```
HTTP/1.1 404 Not Found
Date: Fri, 01 May 2014 00:39:49 GMT
Server: Apache/2.4.7 (Fedora) OpenSSL/1.0.1e-fips PHP/5.5.9 mod_wsgi/3.4 Python/2.7.5 mod_perl/2.0.8-dev Perl/v5.16.3
Connection: Keep-Alive
Content-Type: text/html; charset=UTF-8

The requested URL/ruha.html was not found on this server.
```
Another request...

GET /treeWebPage/trees.css HTTP/1.1
Host: pc110.cs.ucdavis.edu:10002
User-Agent: Mozilla/5.0 (Macintosh; Intel Mac OS X 10.7; rv:28.0) Gecko/20100101
Firefox/28.0
Accept: text/css, */*;q=0.1
Accept-Language: en-US,en;q=0.5
Accept-Encoding: gzip, deflate
DNT: 1
Cookie: __qco=P0-470366187-1390593179496;

Our next project

- Receipts!
- Count daily steps
- Upload to database
- With ID code, save date

Dynamic page interacts

- Initial request
- When you hit submit

Things we need to learn

- How did the Web page come up with that new URL?
  - ...HTML forms
- How did the Web app on the Server come up with Web pages showing the new data?
  - ...There’s a Python program generating Web pages on the server. It connects to Apache through an API called wsgi (the Web Server Gateway Interface).