ECS 89

4/16

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

```
<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

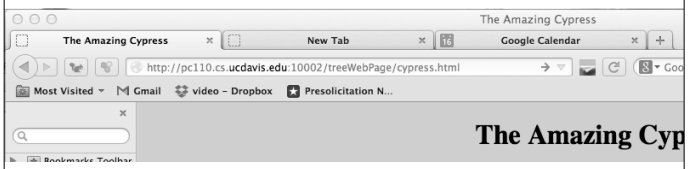
- There are lots of Web server software systems.
- Most (a slim majority) use an open-source software stack

LAMP stack

- Linux – operating system.
- Apache – Web server. Partner of the browser. Gets requests, sends Web pages, over internet.
- 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@pc110 amenta]$ cd /var/www/amenta
[amenta@pc110 amenta]$ ls
hello.php   hw2     mysite.tar   treeWebPage
hello.wsgi  mysite  testphp.php  wsgi-scripts
[amenta@pc110 amenta]$ cd treeWebPage
[amenta@pc110 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

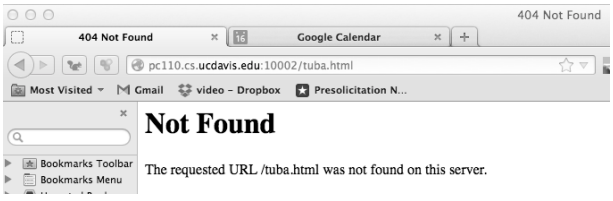
A request

```
GET /treeWebPage/cypress.html HTTP/1.1
Host: pc110.cs.ucdavis.edu:10002
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
DNT: 1
Cookie: __qca=P0-470366187-1390593179496; WT_FPC=id=ec9b90ab-84f4-417c-bc60-
db46a26becaf:lv=1394895977763:ss=1394895977763; MYUCDAVIS_LANDING_IMAGE=24;
_ga=GA1.2.1010374346.1390778836; PORTALTHEME=standard%5F0%2C1;
__utma=224820510.1010374346.1390778836.1395956240.1396215641.2;
__utmz=224820510.1396215641.2.2.utmcsr=directory.ucdavis.edu|utmccn=(referral)|
utmcmd=referral|utmcct=/PeopleSearch.htm; csrftoken=Sn29Lz6aon1qIFunpcZoOx8WNWCziZuR
Connection: keep-alive
If-Modified-Since: Wed, 16 Apr 2014 00:06:00 GMT
If-None-Match: "411-4f71dae840f75"
```

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: "411-4f71dae840f75"
```

The dreaded 404



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
Referer: http://pc110.cs.ucdavis.edu:10002/
treeWebPage/cypress.html
Cookie: __qca=P0-470366187-1390593179496;
```

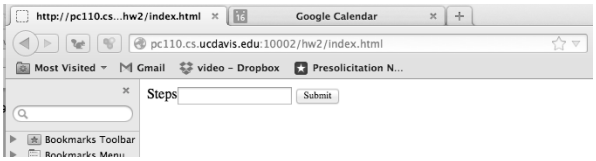
Our next project

- Receipts!

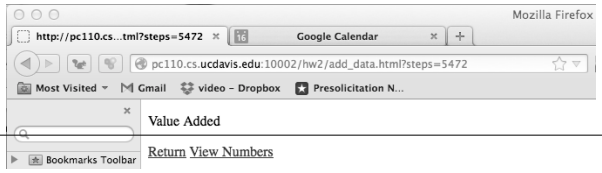
- Count daily steps
- Upload to database
- With ID code, save date

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).