Announcements

- Due dates extended!
  - Labs 2 and 3 due Monday 10pm
  - Continuation of Networking postponed until Monday

Networking, URLs, and Pathnames

Internet and WWW

Servers serve

- Servers store and serve resources:
  - Emails—gmail
  - Files—dante and homer
  - Web pages—vergil and ovid
  - Printing
  - Databases—available to other computers on the network

Servers

- One computer can serve many things
  - Windows Vista have server software built in to share
  - Files, printers, over LAN
  - Other server software
  - Windows Server 2008

Servers

- One computer serves many things—files, printing, email, and database…
- One dedicated computer serves one thing
  - One computer serves files
  - One computer serves Web pages
  - One computer serves email

Server

- Servers fit into racks
Servers

- Empty rack

Server farm

Domain Name System

- Translates domain name to IP address
- Every domain name has to be unique
- Network Solutions maintains the list
  - Private company
  - Central database is the whois directory
  - Several dozen registrars work with Network Solutions to add names to the list

DNS

- Network Solutions tracks top-level domains
- Any huge company with hundreds of thousands of IP addresses and host names wants to maintain its own domain name server for their domain.
- Countries probably want to administrate their top-level domain

The DNS process

- Solution:
  - distributed database
  - Huge companies own their own DNS servers and they are in charge of maintaining them
    - Microsoft can change the database for its domain whenever it wants to because it owns its domain name servers.
    - Every domain has a domain name server somewhere that handles its requests. A person maintains the records in that DNS.
- You click link, sending HTTP request to Web browser for our course Web site.
- Browser contacts its name server and says, "I need for you to convert a domain name to an IP address for me."
- The name server may already know the IP address for our web site if another request to resolve it came in recently (name servers cache IP addresses to speed things up).
DNS Process (continued)

- If not cached
  - Name server contacts first listed root name servers. The root servers know the IP address for all of the name servers that handle the top-level domains. Your name server would ask the root for our courses.washington.edu name, and the root would say (assuming no caching), "I don’t know the IP address for that, but here’s the IP address for the EDU name server."
  - If unknown, it contacts the next root server

Client/Server Interaction

For Web pages, the client requests a page, the server returns it
- Two separate transmissions

Internet

- Internet is all the wires, routers, gateways, servers—all using TCP/IP to transfer packets
- Many different protocols use the Internet
  - ftp, smtp, chat, IM, Skype, VoIP, http

World Wide Web

World Wide Web is the collection of servers & the Web pages they store and serve
- Server—the Web site computer
- Client—the surfer’s browser
- www—the traditional Web server name
- Any name is OK
- Often multiple server names map to the same site: MoMA.org and www.MoMA.org

HTTP

- HyperText Transfer Protocol
  - Understands how to interpret URLs
    - Uniform Resource Locators
  - Divides URL into server and pathname

http://faculty.washington.edu/daclem/fitt100/sp09/index.html
HTTP

PROTOCOL

SERVER

1. Domain: edu

2. Subdomain: washington

3. Server: faculty

PATHNAME
HTTP

PATHNAME

SERVER

1. Domain: edu
2. Subdomain: washington
3. Server: faculty

PROTOCOL

http://faculty.washington.edu/daclem/fit100/sp09/index.html

PATHNAME

SERVER

4. Account: daclem
5. Folder: fit100/sp09
6. File: index.html

PROTOCOL

http://faculty.washington.edu/daclem/fit100/sp09/index.html

HTML

• Validating
• Paths for images and links
Demonstration

After building a web page, we find it is wrong.

Houston, we have a problem.

Paths

- Two types of paths
  - Relative
    - To folder where this HTML page is located
  - Absolute
    - Complete URL

http

- http = HyperText Transfer Protocol
- https = Secure http
- Starts every link and every Web address
- Sends pages across the Internet to Web servers

Debugging Demo

Intended page

Paths

- Relative path
  - src="huskyTeam.jpg"
- Absolute path
  - href="http://courses.washington.edu/filt100/u09/images/huskyTeam.jpg"

http
Hypertext links

- A Web page is a collection of hypertext links, or links
- Links allow you to jump to another page clear across the Web

The Language of Web Pages

- HTML = HyperText Markup Language
- The language that Web browsers understand

HTML tags

The content with HTML tagging

```html
<h1>My first Web page!</h1>
<p>A new paragraph…</p>
```

The Web page displayed in a Web browser

My first Web page!
A new paragraph...

HTML structures the content

- Tags structure the page
- Formerly, they also formatted the content; now, that's done by CSS

Basic HTML page structure

All HTML files use the same structure:

```html
<html>
<head>
<title>Name of Page Goes Here</title>
</head>
<body>
</body>
</html>
```

Paired tags

Tags are paired—opening and closing tags

```html
<html>
<head>
<title>Name of Page Goes Here</title>
</head>
<body>
</body>
</html>
```
Nested tags

Other tags "nest" inside the `<html>` tags:

```html
<html>
<head>
<title>Name of Page Goes Here</title>
</head>
<body>
</body>
</html>
```

Basic HTML Structure

An HTML file is divided into head and body sections.

```html
<html>
<head>
<title>Name of Page Goes Here</title>
</head>
<body>
</body>
</html>
```

Basic HTML Structure

The `<head>` contains metadata.

```html
<html>
<head>
<title>Name of Page Goes Here</title>
<other metadata goes here>
</head>
<body>
</body>
</html>
```

The Header section

The head contains metadata.

```html
<html>
<head>
<title>Name of Page Goes Here</title>
<other metadata goes here>
</head>
<body>
</body>
</html>
```

The Body section

The body contains the page content—everything that shows on the Web page.

```html
<html>
<head>
<title>Name of Page Goes Here</title>
</head>
<body>
</body>
</html>
```

Areas that are off limits

The body contains the page content—everything that shows on the Web page.

```html
<html>
<head>
<title>Name of Page Goes Here</title>
</head>
<body>
No content here
</body>
</html>
```
Areas that are off limits

The body contains the page content—everything that shows on the Web page.

```html
<html>
<head>
<title>Page Name Goes Here</title>
</head>
<body>
Body content goes here
</body>
</html>
```

No content here

Nesting Rules—by tag

<table>
<thead>
<tr>
<th>Not Allowed Inside Other Tags</th>
<th>May Nest Inside These Exceptions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>h1, h2, h3, h4, h5, h6</td>
<td>div, form, blockquote, li, td, th</td>
</tr>
<tr>
<td>dl, ul, ol</td>
<td></td>
</tr>
<tr>
<td>br</td>
<td></td>
</tr>
<tr>
<td>table</td>
<td></td>
</tr>
</tbody>
</table>

Tags that Must Nest Inside Others

| br                          | None                            |
| img                         |                                  |
| span                        |                                  |

Nesting Rules—Specific Tags

<table>
<thead>
<tr>
<th>Inner Tag</th>
<th>Specific Outer Tag</th>
</tr>
</thead>
<tbody>
<tr>
<td>td or th</td>
<td>tr</td>
</tr>
<tr>
<td>br</td>
<td>thead or tbody</td>
</tr>
<tr>
<td>HEAD or body</td>
<td>table</td>
</tr>
<tr>
<td>tr</td>
<td>thead or tbody</td>
</tr>
<tr>
<td>td or ul</td>
<td></td>
</tr>
</tbody>
</table>

Input, button, textarea, select | form

Error Messages—Tag Order

**Error Message:** Nesting error: tag2 must be closed before closing tag1

Invalid code

```html
<tag1><tag2>content</tag1></tag2>
```

Valid code

```html
<tag1><tag2>content</tag2></tag1>
```

**Simile:**

```html
<FedEx><bubbleWrap>Present</bubbleWrap></FedEx>
```

Error Messages—Alternate Fix

**Error Message:** Nesting error: tag2 must be closed before closing tag1

Invalid code

```html
<tag1><tag2>content</tag1></tag2>
```

```html
<tag1>
<tag2>content</tag2>
</tag1>
```

Valid code

```html
<tag1><tag2>content</tag1></tag2>
```
Tag Location Rules

- All tags
  - Must be nested inside head or body
  - Cannot be outside head or body or html
  - Cannot be between head and body

Error Messages—Tag Location

- Error Message: The tag <sometag> is not allowed within: html
  - Invalid code
    <html>
    <head></head>
    <sometag>Neither tags nor content can go here</sometag>
    <body></body>
    <html>
  - And the long page is done.
  - Valid code
    <html>
    <head>Metadata tags must go here</head>
    <body>Content tags must go here</body>
    <html>

Error Messages—No DOCTYPE

- Error Message: No DOCTYPE found!
  - Invalid code
    <html>
  - Valid code
    <?xml version="1.0" encoding="UTF-8"?>
    <!DOCTYPE html
    PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
    "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
    <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">

Error Messages—Image Tags

- Error Message: There is no scr attribute for: img
  - Missing alt tag
  - Missing closing img tag
  - Invalid code
    <img scr="kitten.jpg" />
  - Valid code
    <img src="kitten.jpg" alt="young spokespurrrrrson" />

Other image problems

- Kitten.jpg ≠ Kitten.JPG ≠ Kitten.png
- Puppy.png ≠ Puppy.jpg.png
  - Set your computer to show extensions!
    - Folder options > View tab > Uncheck "Hide extensions…"

Quiz topics

- TCP/IP
- LAN, WAN, GUI
- HTTP
- HTML
- URL
- Dante
- White space
- Internet
- WWW
- Server