Lecture 2 – HTML & CSS

Web Application Development

January 15, 2015

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Outline for Today

- Course Administration
- Static Web
- HTML
- CSS

Lecture Schedule – 1st Half

(subject to change)

#1 Intro

#2 HTML & CSS

#3 JavaScript

#4 Bootstrap

#5 HTTP & Django

#6 Django Models

#7 Cookies & Sessions

#8 Transactions

#9 Django Templates

#10 Images

#11 AJAX

#12 jQuery

#13 Databases

#14 Cloud Deployment

#15 SSL

#16 Project Proposals

Wait List Status

- I was able to let a few people into 15-637
  - I even let in extra people assuming at least 10% of you will drop!
- I have been unable to keep up with all the e-mail requests to get into the course
- If you didn’t get into this course
  - You can try to take it next year
  - You may “sit in” on the course this semester
  - If you want access to the Piazza – you can self-signup
  - If you want video access – sign up after class
    - We will process these access requests tomorrow

Course Piazza is Up

- Course Staff
  - TA Office Hours
- Q&A Discussion Board
- Syllabus
- Slides from Lectures
- Links to Lecture Videos
  - Note: Authentication for videos is via Blackboard & CMU SSO
  - You will need to sign up for video access
- Homework Assignments

Copyright Violations

- You can take copies of course materials for personal use
  - This applies especially to the slides
  - This applies to the course examples if they are so marked
  - This should also apply to the videos
    - But we don’t make it easy for you to copy them
    - We also tell you not to copy the videos

Video Recordings

- We’re making videos of the class
- I’ve been notified that there are rules and restrictions
  - I’ve been advised to warn you about the videos

Video Warnings

- Videos of lectures are prepared by CMU using Panopto software. These videos are for use by students enrolled in the course and are not to be copied or made available to others.
- As the class is over-subscribed, I will give access, upon request, to CMU students not enrolled in the class, but you are not to copy the videos or make them available to others.
- If you ask questions in class they will likely be captured on video. If you do not feel comfortable having your questions recorded, please talk to the instructor about other arrangements.
- No student may record or tape any classroom activity without the express written consent of the instructor

Outline for Today

✓ Course Administration

→ Static Web

HTML

CSS

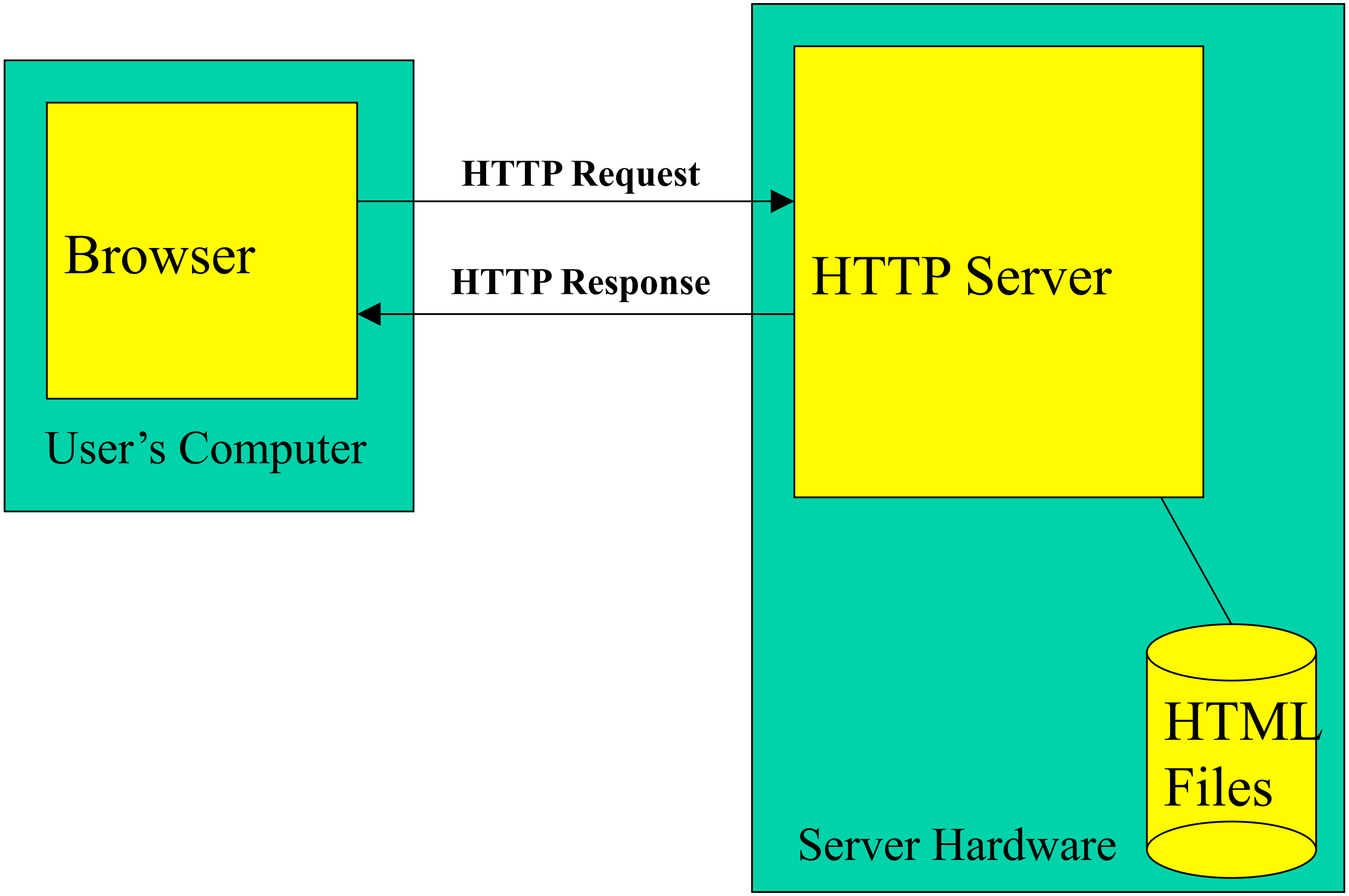
The Static Web

- Publishing of information via the Internet
  - It’s like printing a newspaper or a book
  - Each “edition” is fixed
- This is incredibly useful
  - When you search Google, Alta Vista, etc, you’re basically searching the static content on the web
    - (The static content can describe/lead to dynamic stuff)

The Dynamic Web

- To evolve from the static to the dynamic web requires:
  - Generating HTML with scripts/programs
    - We’ll focus on the Django Framework
  - Accessing and updating data
    - We will discuss issues related to file I/O & relational DB
  - Handling concurrency control
    - We will discuss threads, synchronization & transactions

The Static Web



URLs – It's the Web Address

- URL – Universal Resource Locator
  - Specifies the location of the resource
  - Examples:

    http://www.jeffeppinger.com/jle/index.html

    http://www.jeffeppinger.com:80/jle/index.html
- In general: URI – Universal Resource Identifier
  - Identifies the resource
  - Recognizes it's not necessarily correlated to a location
- You can access local files:
  - Examples:

    file:///Users/jle/cmu/wad2015/HtmlDemos/index.html

How Many Websites Are There?

a) More than One?

b) More than One Thousand?

c) More than One Million?

d) More than Ten Million?

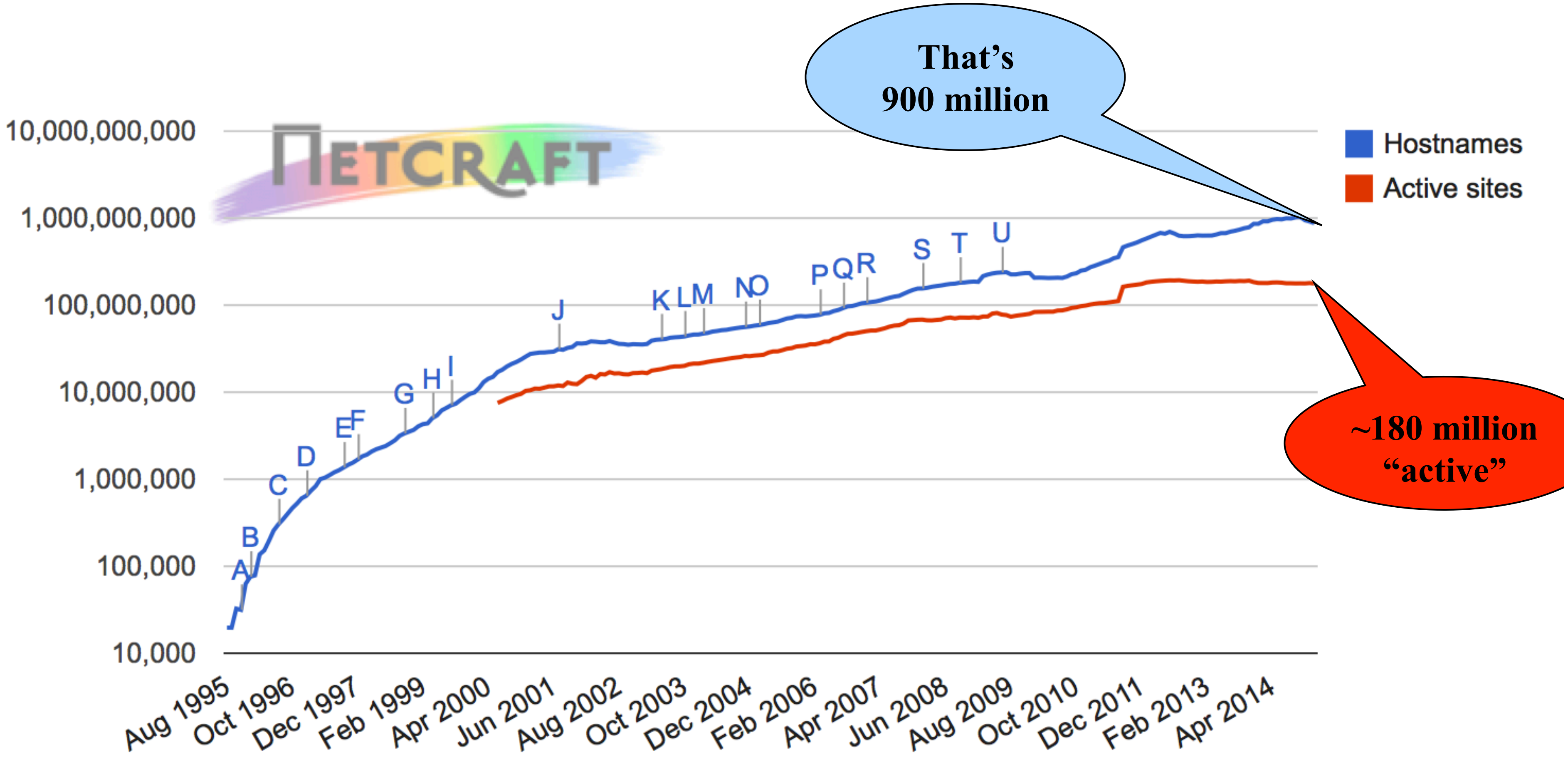
e) More than One Hundred Million?

f) More than One Billion?

g) More than Ten Billion?

h) ….

Count of Host Names

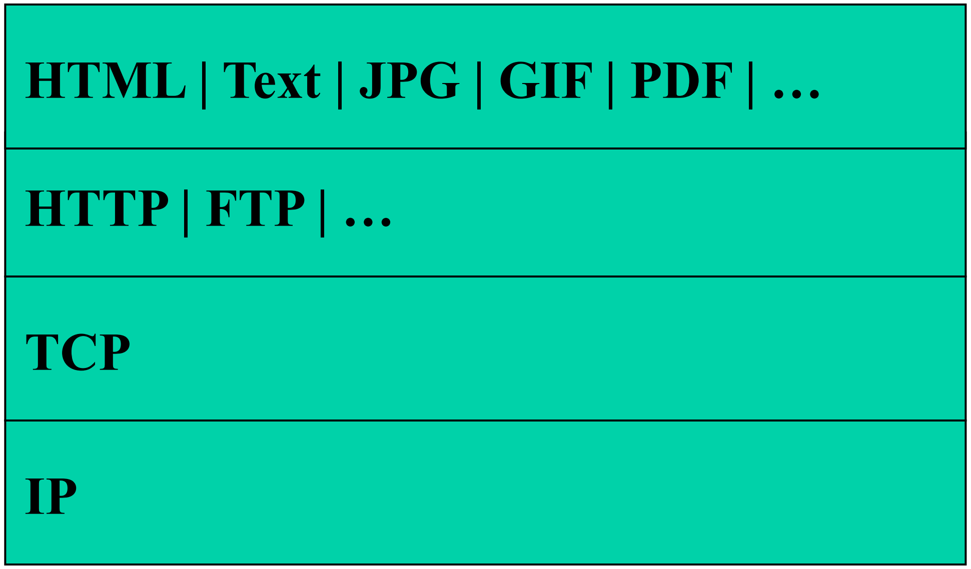


That's 900 million

~180 million "active"

Source: Netcraft LTD (http://news.netcraft.com/archives/web_server_survey.html)

The Connection



HTML | Text | JPG | GIF | PDF | …

HTTP | FTP | …

TCP

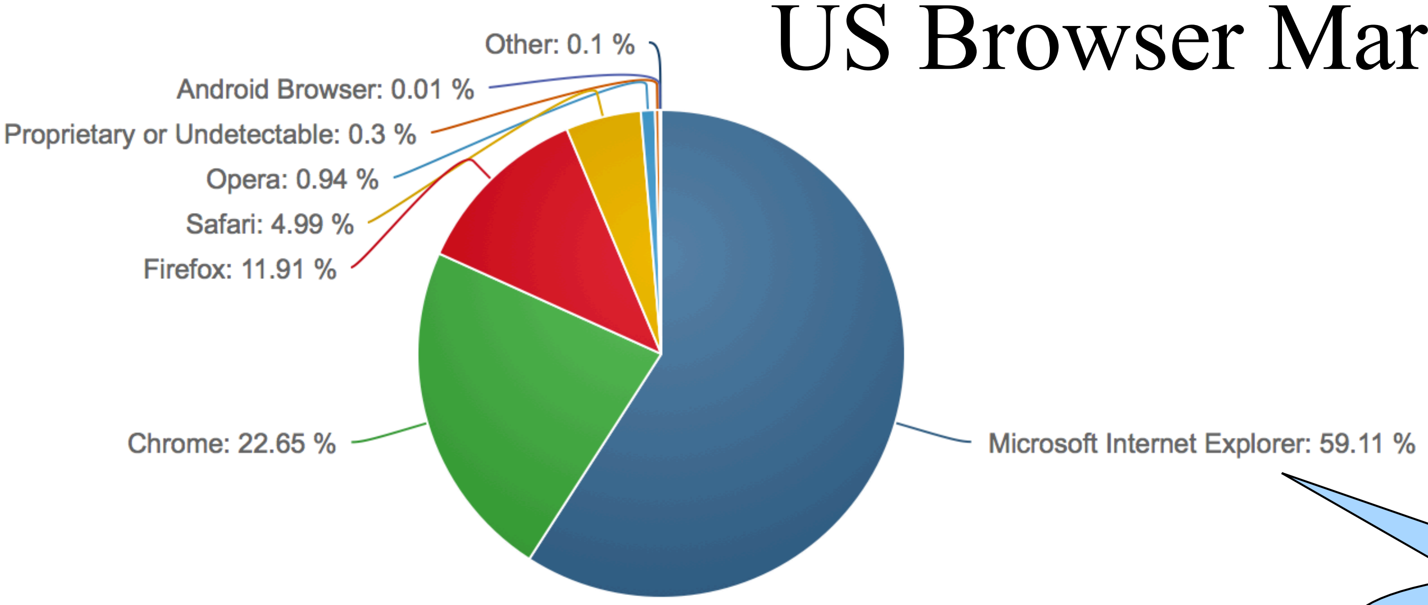
IP

The Browser

- Protocol management
  - HTTP
  - FTP
  - Security additions
- HTML rendering engine
- Caching
- Support for JavaScript, Java Applets
- OS interface or integration

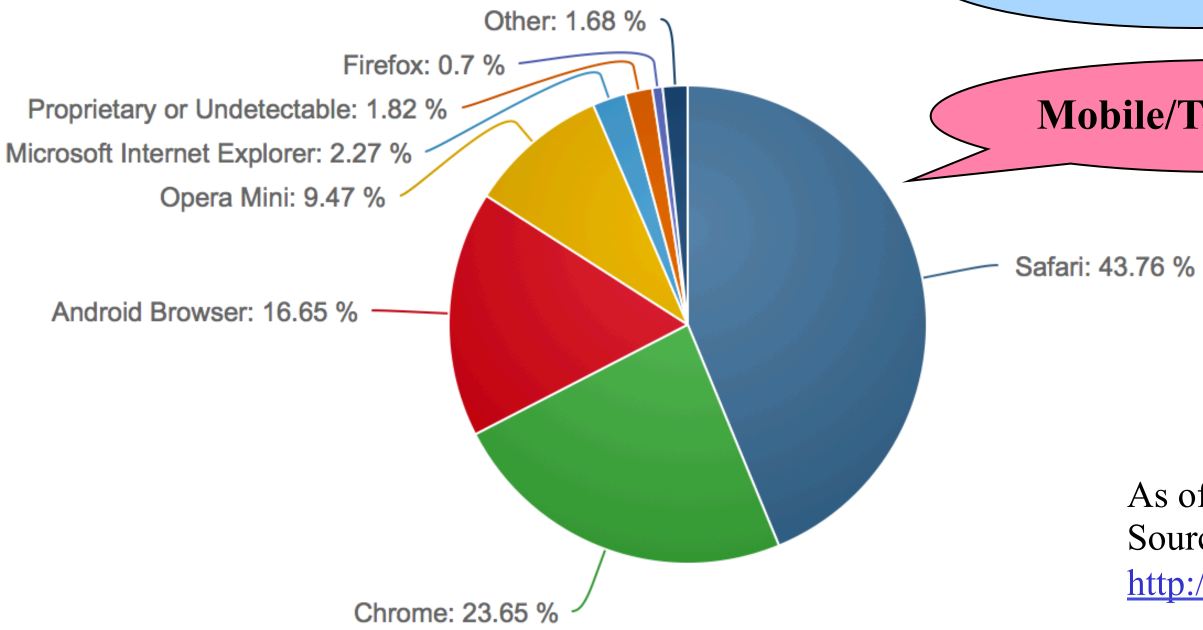
What’s the hardest part?

US Browser Market Share



Desktop (83%)

Mobile/Tablet (16%)



As of Dec 2014
Source: HitsLinks
http://hitslinks.com

US Browser Market Trend

Desktop

							% Browser Usage =>	92%	89%	86%	83%
	Dec-04	Dec-05	Dec-06	Dec-07	Dec-08	Dec-09	Dec-10	Dec-11	Dec-12	Dec-13	Dec-14
IE	90%	85%	80%	76%	68%	63%	57%	52%	55%	59%	59%
Chrome					1%	5%	10%	19%	18%	16%	23%
Firefox	5%	10%	14%	17%	21%	25%	23%	22%	20%	18%	12%
Safari	2%	3%	4%	6%	8%	4%	6%	5%	5%	6%	5%
Other	3%	2%	2%	2%	2%	4%	4%	2%	2%	2%	1%

	% Browser Usage =>	8%	11%	13%	16%
		Dec-11	Dec-12	Dec-13	Dec-14
Mobile Tablet	Safari	53%	61%	55%	44%
	Chrome		1%	10%	24%
	Android	16%	22%	25%	17%
	Opera	22%	11%	4%	9%
	IE		1%	2%	2%
	Other	9%	4%	4%	4%

Source: Hits Links:
http://hitslink.com

Outline for Today

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✓ Static Web

→ HTML

CSS

HTML -- Hyper-Text Markup Language

A device independent way to represent documents

- Specifies the formatting of document
  - e.g., titles, paragraphs, fonts, colors, lists, tables
- Hyperlinks permit references to other documents
- References objects to be inserted into document
  - e.g., images, applets, frames
- Forms allow user input
  - e.g., Text Fields, Buttons, Menus
  - Action causes new HTTP request to specified URI

Not a Course on HTML and UI

- We’re only going to cover a few tags and rules
- You can use tools to generate nice HTML
- The browsers are ***quite*** forgiving about missing/mismatched tags
- The HTML in this class will very simple
  - For the most part, I’ll explain the tags as we go
  - You can use web resources to learn about them
  - You can see what other websites are doing
- You should run your HTML through a validator

Terminology

- Document contains “markup” and “content”
- Markup
  - Tags starting and ending with angle brackets
    - E.g., **`<p>`**
  - Character entities starting with ampersand and ending with semicolon
    - E.g., **`&lt; &gt; &quot; &amp;`**
- Content
  - Everything else (arguably)

Terminology (cont)

- Elements
  - A start and end tag and the content in between
    - Tags should be paired: start and end
    - A slash is used to denote and the end tag
      - E.g., **`<p>Content</p>`**
    - A tag's content is between it's start tag and end tag
    - An empty element (with no content) can be written using one tag with a slash at the end
      - E.g., **`<hr/>`** or **`<br/>`** or **`<input type="text"/>`**
- Attributes
  - Name/value pairs specified in a tag (but not an end tag)
    - E.g., **`<img src="leader.jpg"/>`**

Sample Example of HTML (simple.html)

```
<html>
<hEAd><title>Simple Example</title></head>
<body>
<font size="+2">
<p>Our leader:<br><image src="leader.jpg"></p>
<p>For a more complex example click
   <a href="complex.html">here</a>.</p>
<p><form action="hello.html" method=GET>
   Name: <input type=text name=name>
   <input type=submit>
   </form></p>
</font>
<p>&copy; 2002 - <b>Jeffrey L. Eppinger</b>, Carnegie
  Mellon University</p>
</body></html>
```

Things to Notice About (Bad) HTML

- Matching “on” & “off” tags: **`<b>`** & **`</b>`**
- Tags should be lower case
  - But old HTML didn’t check this
- You can adjust a large number of things:
  - Font, size, color, bold/italics
- **`&tags;`** for special characters
- Hyperlinks let you can reference other pages!
- Images can be included!
- Forms let you submit parameters!
- Often closing tags are left out…not right, but works

Other Examples

```
complex.html
hello.html
index.html
```

Magic Decoder…for today

`<html>`	starts the file
`<title>`	specifies title in the title bar
`<body>`	delineates the body of the page
`<p>`	delineates a paragraph
`<br/>`	line break
`<table>`	delineates a table
`<tr>`	table row
`<td>`	table data
`<ul>`	unordered list
`<li>`	list item
`<form>`	delineates a form used to enter and send data
`<input>`	specifies a data element in a form
`<a>`	specifies an anchor (typically a hyperlink using **`href`**)
	example: **`<a href="http://www.…">Click here</a>`**
`<div>`	delineates a division…use to format blocks and attach a style
`<span>`	attach a style, but do not otherwise break the current block

Tools Can Edit HTML

- Dreamweaver
- MS Office!

Criticism of (old) HTML

- Mixes the structure of the document with the formatting

XML Documents

- Goal: only structure, no formatting

```
<entries>
    <entry>
        <first-name>Jeffrey</first-name>
        <last-name>Eppinger</last-name>
    </entry>
    <entry>
        <first-name>Barack</first-name>
        <last-name>Obama</last-name>
    </entry>
</entries>
```

- Easy to parse

Significant Developments in HTML

- Standardization: HTML 4 & XML & XHTML & HTML5
- Cascading Style Sheets (CSS)
  - To separate the presentation (style) from content
  - Inline, document-level, external
- Document Object Model (DOM)
  - An object model for an HTML document
- JavaScript
  - Browser-based scripting language
- AJAX
  - Allows asynchronous HTTP calls

HTML 5: The Next Version

- Video playback support
- Drag-and-drop
- Removal of support for deprecated elements!
- Just became a “complete” standard on 10/28/2014
- Browsers support most of it now
- We’re in the process of finishing HTML 5.1

HTML 5 Vision

- Cross device compatible
- No need for Flash, Silverlight or Java (in browser)
- All apps will be developed in
  - HTML 5
  - CSS
  - Javascript

HTML5

Declare the document type at the top of your HTML files

<!doctype html>

Use a validator to check to your HTML, e.g.:

validator.w3.org

The validator will require you to provide the character encoding:

```
<meta http-equiv="Content-Type" content="text/html;charset=utf-8" >
```

HTML5 Features

- More predefined elements:
  - <article>
  - <figure>
  - <section>
  - <time>
- New input types:
  - color, email, month
- Graphics
  - <canvas>
- Media Elements
  - <audio>
  - <video>

Outline for Today

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✓ HTML

→ CSS

Goal of CSS

- Separate document structure from formatting
- Document structure is in XML, XHTML, etc
- The formatting is specified in CSS

Cascading Style Sheets (CSS)

- Use “style” to specify/override formatting options of HTML elements
- For example, you can modify formatting of
  - Fonts: color, size, bold/italic, fixed-width, etc
  - Anchors/hrefs: color, underline
  - Tables: borders, padding, background color
  - Hover

CSS

- Name/value pairs
  - Format: `<name>: <value>;`

Where to Declare CSS Styles

- Inline: use style attribute in HTML tags:
  - Example: **`<td style="font-size: large;">`**
  - Modifies one tag
- Document-level in the HTML header
- File-level in a CSS file, referenced in the header

CSS Selectors

- At doc-level & file-level:
  - Format: **`<selector> { name: value; … }`**
- Selector options:
  - Element
    - Example: **`li { font-weight: bold; }`**
    - Affects: **`<li> Goals </li>`**
  - Class
    - Example: **`.title { font-weight: bold; }`**
    - Affects: **`<p class="title"> Goals </p>`**
  - ID
    - Example: **`#title { font-weight: bold; }`**
    - Affects: **`<div id="title"> Goals </p>`**
    - Note: you're only allowed to use ID once per document

Web Resources

- Google most any HTML or CSS
  - w3schools.com
- jsfiddle.net

<div> and <span> tags

- Sometimes you just want to change the style of the content, but you don't otherwise have a tag
  - Use a <div> or a <span> tag
  - The <div> tag breaks lines
  - The <span> tag is "in" the current text line
  - The do nothing, but allow you to specify CSS

Example

http://jeffeppinger.com

w3schools.com “Try It Yourself”

CSS Resources

- Google generally
- Also: http://www.w3schools.com/css
- HTML editing tools such as Eclipse

Where to Read More

- HTML Tutorial: http://www.w3schools.com/html
- HTML Reference: http://www.w3schools.com/tags
- HTML Specs: http://www.w3.org
- HTTP Spec: http://www.ietf.org/rfc/rfc2616.txt
- Lots of Books
  - HTML & XHTML (O'Reilly)
  - Cascading Style Sheets (O'Reilly)
- Google & Wikipedia

Homework #1

- Now posted on Piazza
- Due on Monday (1/19)
  - Last penalty-free late day is Wednesday (1/21)

GitHub

- We will give you each private Github repositories
- We'll send you details tomorrow
- We are also preparing a Git "quick-start" guide
  - It should also be available tomorrow

TA Office Hours

- Office Hours held in WEH 5120
- Sunday
  - 6:00 pm (Divya)
  - 8:00 pm (Shannon)
- Monday
  - 4:30 pm (Karin)
  - 6:00 pm (Jason)

Next Week

- JavaScript & Bootstrap
  - Neither of these are permitted for HW#1