

# Web Design

## CSIS-180



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**DEPARTMENT OF COMPUTER SCIENCE**

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**SPRING 2017**

# Today's Class



- Reset
- Chapters two & three
- [thefuntheory.com](http://thefuntheory.com)
- Homework –
  - Lab #1 PreLab (due evening before your lab)
  - Watch the [History of the Internet](#) Movie
  - Read Chapter 4

# Labs



The screenshot shows a course management system interface. On the left is a navigation menu for 'Web Design - 07 - Spring 2017' with options: Home Page, Syllabus, Assignments, Lecture Materials, and Lab Materials. The main area is titled 'Lab Materials' and has sub-sections 'Build Content' and 'Assessments'. A yellow folder icon is next to the text 'Lab 1 (prelab and inlab)'.

## Lab 1 (prelab and inlab) ▾

Build Content ▾

Assessments ▾

Tools ▾



**Lab 1 (prelab and inlab)**



**Pre-lab 1 Quiz**

Complete this quiz before your lab session



**In Lab Deliverables**

# Chapter Two

## How the Web Works



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# Server vs. Browser



## Web Server

Computer systems, which processes requests via HTTP (hypertext transfer protocol), the basic network protocol used to distribute information on the World Wide Web.

Can refer to the entire system, or specifically to the software that accepts and supervises the HTTP requests.

## Web Browser

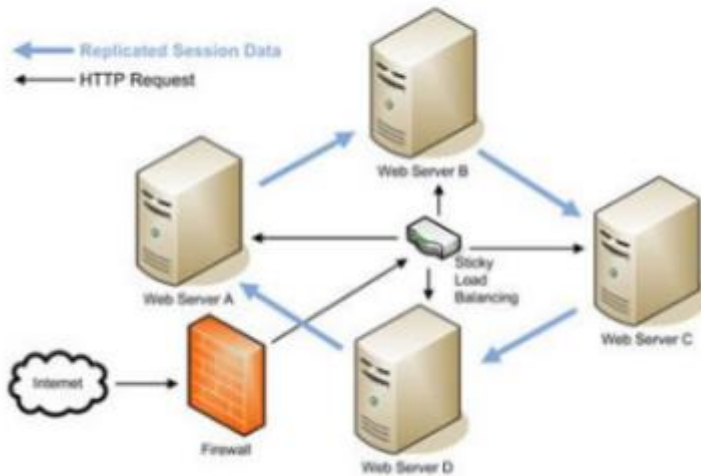
Is a software application for retrieving, presenting and traversing information resources on the World Wide Web.

An information resources is identified by a Uniform Resource Identifier (URI/URL) that may be a web page, image, video or other piece of content.

# Server vs. Browser

## Web Server

## Web Browser



VS



# Server vs. Browser



## Web Server

- Responds to http requests
  - Sends web pages
- Processes requests
  - Create dynamic pages
  - Run web applications
  - Fetch data from Databases
  - Store session data

## Web Browser

- Makes http requests
  - Asks for web pages
- Renders web pages
  - Converts HTML, CSS and JavaScript into displayed document.
- Remembers browsing history, preferences and cookies



## Browser

## Server

- 1 Type in a URL or click on a link in the browser.

http://www.jenskitchensite.com

- 2 The browser sends an HTTP request.

HTTP request

### Server Contents



index.html



foods.gif



spoon.gif



kitchen.css

- 3 The server looks for the file and responds with an HTTP response.



index.html

HTTP response

"I see that you requested a directory, so I'm sending you the default file, index.html. Here you go."

### Oops, no file

If the file is not on the server, it returns an error message.



- 4 The browser parses the document. If it has images, style sheets, and scripts, the browser contacts the server again for each resource.

foods.gif



spoon.gif

kitchen.css



- 5 The page is assembled in the browser window.



# Web Page Addresses (URLs)



## Uniform Resource Locator

The location of the URI (Uniform Resource Identifier)

### The parts of a URL

A complete URL is generally made up of three components: the protocol, the site name, and the absolute path to the document or resource, as shown in Figure 2-1.

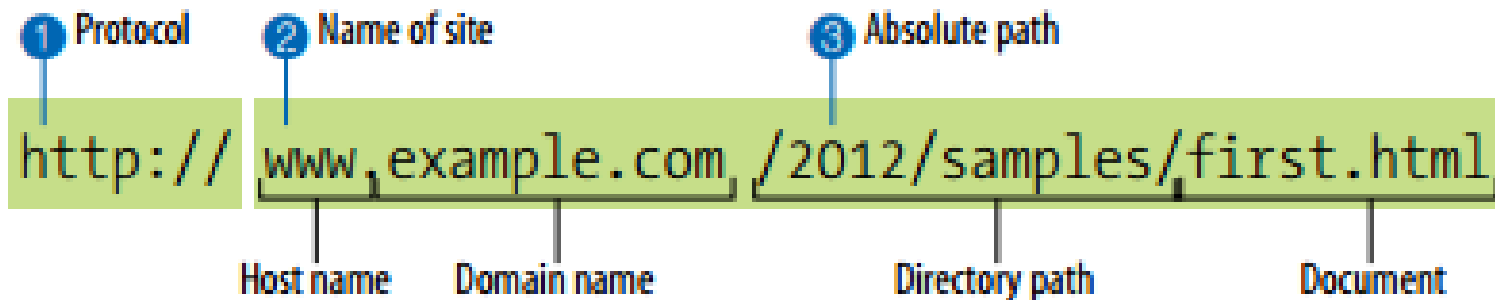


Figure 2-1. The parts of a URL.

# Default files

## Default files

Obviously, not every URL you see is so lengthy. Many addresses do not include a filename, but simply point to a directory, like these:

```
http://www.oreilly.com  
http://www.jendesign.com/resume/
```

When a server receives a request for a directory name rather than a specific file, it looks in that directory for a default document, typically named *index.html*. So when someone types the above URLs into his browser, what he'll actually see is this:

```
http://www.oreilly.com/index.html  
http://www.jendesign.com/resume/index.html
```

# URLs/URIs can be complex



- [http://en.wikipedia.org/wiki/URI\\_scheme](http://en.wikipedia.org/wiki/URI_scheme)

# Server vs. Browser

## Web Server

- Current market leaders:

- Apache  
<http://httpd.apache.org/>
- Microsoft's IIS  
Internet Information Services
- Nginx  
<http://wiki.nginx.org/>
- GWS  
Google's Web Server



## Web Browser

- Current market leaders:

- Google's Chrome  
Preferred by Web Developers
- Firefox  
The legacy of Netscape
- Apple's Safari  
Leading in mobile browsing
- Microsoft's Internet Explorer  
Still around



# Browser Wars



## Early Business Model:

- Give your web browser to users for free
- Sell your web server to companies \$\$\$
- Web pages will work best if your server and browser are both used.
- If more people use your browser, more companies will want to buy your server.



# Browser Wars



## Rough Timeline:

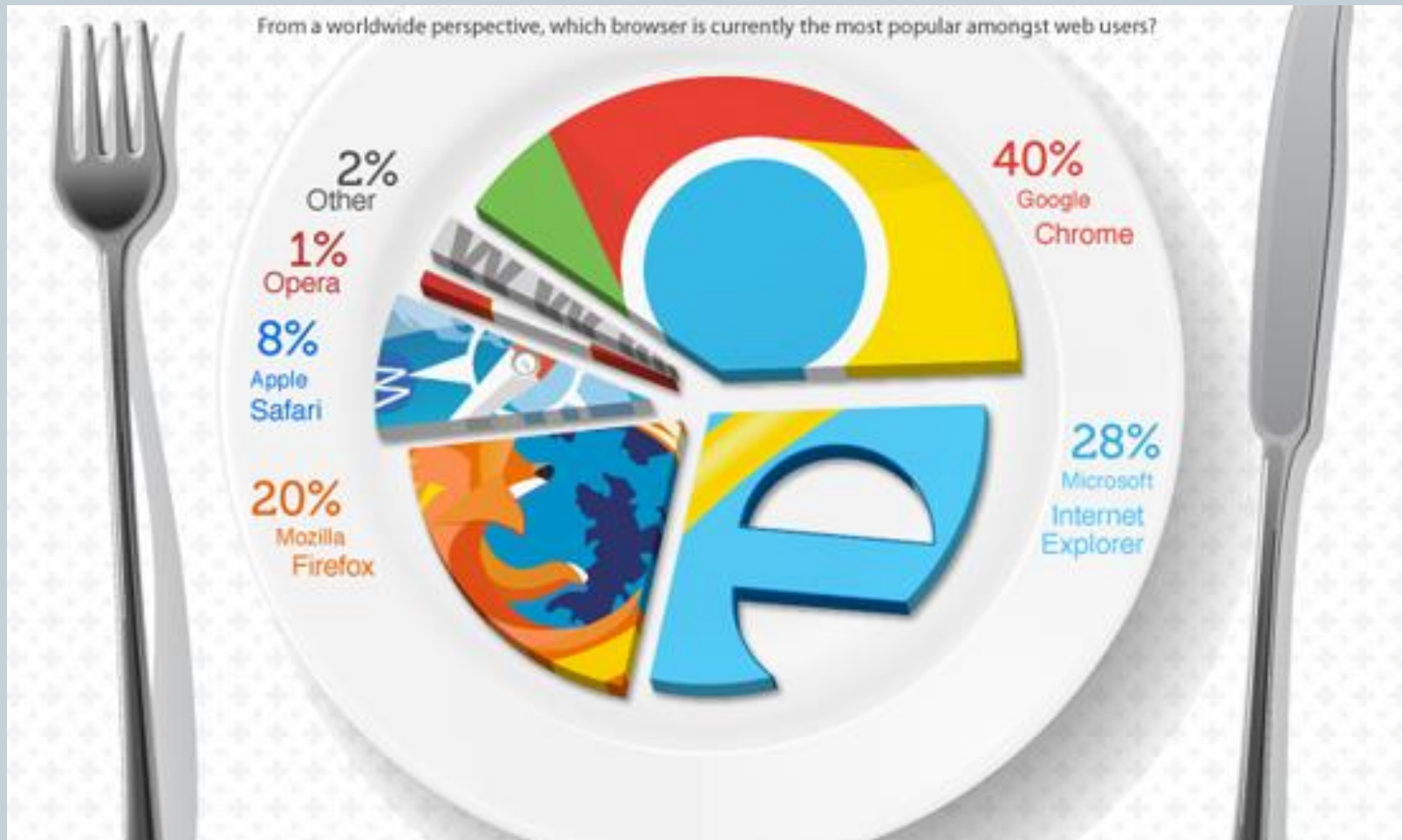
- In 1995-1998 Netscape dominated early market 90%
- In 2001 Microsoft wiped Netscape out of existence. 92% market share
- In 2008, Firefox was the only browser seriously challenging Internet Explorer (IE)
- In 2012, IE was finally overtaken by Google Chrome
- Today, Apple's Safari is the leader in the mobile browser market. Chrome is not far behind.



# Web Browser Wars



From a worldwide perspective, which browser is currently the most popular amongst web users?



# Development: Backend vs. Frontend

## Backend:

What happens on the Web Server

- Processing Data
- Database Programming
- Content Management Systems
- Server-side Scripting
  - PHP, ASP, Ruby, JSP
- Sometimes **JavaScript**

## Frontend:

What you see on the Web Browser

- Graphic design
- Image production
- Interface design
- User experience
- **HTML** markup
- **CSS** styles
- Sometimes **JavaScript**



# Multimedia



Unlike other documents, web pages have many layers capable of combining almost any form of media

- **Text & Images**

- obviously

- **Audio**

- Embedded players and files (mp3)

- **Video**

- Embedded players and fields (mp4)

- **Animation**

- Flash-driven, JavaScript, jQuery, and CSS-based

- **Interaction**

- Embedded Programs & Application
- “Interaction” is a form of media. Very different than passively viewed video.

# Never know how sites we create will be viewed



- **We don't know:**
  - which browser will be used?
  - desktop computer or mobile device?
  - how large is the browser window?
  - what fonts are installed?
  - whether JavaScript is enabled?
  - speed of Internet connection?
  - if pages being read by screen reader?
- **Designers need to resist the urge to make assumptions about any of the above**

# Mobile Browsers



- Sometime soon, most WWW views will be using a browser on a mobile device.
- Screen size and low bandwidth change everything.
  - Optimizing graphics is important as is responsive web page layouts.

# How do we handle this diversity?



## **Standardize WWW**

- **World Wide Web Consortium (W3C)**
  - Sets the standards for HTML, CSS, and JavaScript
  - All browsers should(must) follow these standards
  
- **Web Hypertext Application Technology Working Group (WHATWG)**
  - Lead by Apple, Google, and Mozilla Firefox
  - Established because the W3C is moving too slowly to adopt new technology

# HTML5



- The new standard adopted by almost all browsers
  - Will soon be adopted by W3C (slowly)
- “Living Standard” / Progressive Enhancement
  - There may be no HTML6 ever
- Supports web applications
  - HTML5 Canvas + JavaScript

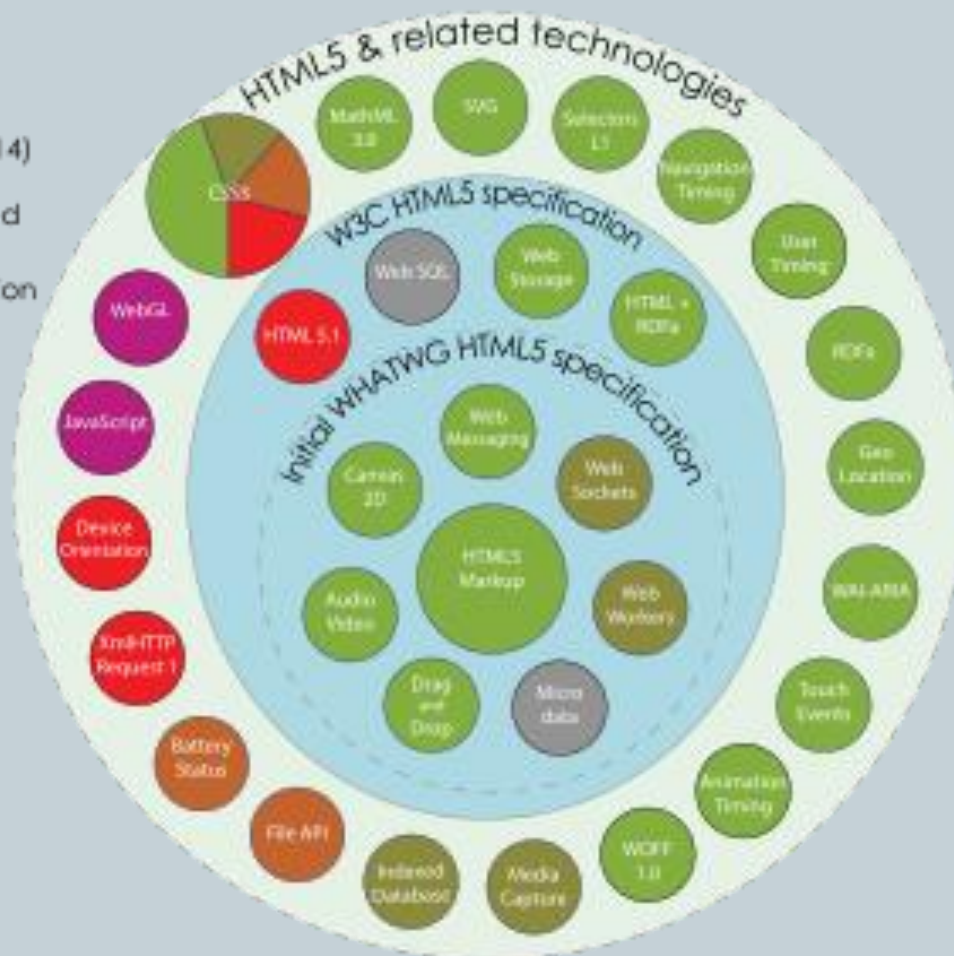
# Progressive Enhancement



## HTML5

Taxonomy & Status (October 2014)

- Recommendation/Proposed
- Candidate Recommendation
- Last Call
- Working Draft
- Non-W3C Specifications
- Deprecated or inactive



# Responsive Web Design



- Strategy for providing custom layouts to devices based on size of browser window



# Accessibility



- Need to consider:
  - Vision impairment
  - Mobility impairment
  - Auditory impairment
  - Cognitive impairment



- All sites benefit from these considerations, but government sites require adherence (508 compliance)



# Cultural Considerations



- **Need to consider:**
  - Cultural Meanings of Color and Color Symbolism
  - Use of Metaphors
  - Mental Models
  - Masculinity Verses Femininity
  - Power Distance (social hierarchies)
  - Internal Information Display

# Site Performance



- **Mainly speed**
  - Optimize images so they are smallest size possible without sacrificing quality
  - Minimize HTML and CSS code
  - Keep JavaScript to a minimum
  - Other things that we will not cover in this class
- **Why is this important?**
  - Google has now added site speed to its search algorithm

# Quick Introduction to HTML markup language



Browser window consists of four separate files: an HTML text document, a style sheet and two images. Tags in the HTML source document give the browser instructions for how the text is structured and where the images should be placed.

## *index.html*

```
<!DOCTYPE html>
<html>
<head>
<title>Jen's Kitchen</title>
<link rel="stylesheet" href="kitchen.css" type="text/css" >
</head>

<body>
<h1> Jen's Kitchen</h1>

<p>If you love to read about <strong>cooking and eating</strong>, would like to find out about
some of the best restaurants in the world, or just want a few choice recipes to add to your
collection, <em>this is the site for you!</em></p>

<p> Your pal, Jen at Jen's Kitchen</p>
<hr>
<p><small>Copyright 2011, Jennifer Robbins</small></p>
</body>
</html>
```

# Quick Introduction to HTML markup language



browser window consists of four separate files: an HTML text document, a style sheet and two images. Tags in the HTML source document give the browser instructions for how the text is structured and where the images should be placed.

## *kitchen.css*

```
body { font: normal 1em Verdana; margin: 1em 10%; }
h1 { font: italic 3em Georgia; color: rgb(23, 109, 109); margin: 1em 0 1em; }
img { margin: 0 20px 0 0; }
h1 img { margin-bottom: -20px; }
small { color: #666666; }
```

*foods.gif*



*spoon.gif*



# Chapter Three

## Big Concepts



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# Internet vs. WWW



## Internet

- **Physical Hardware Layer**
  - WiFi Routers
  - Ethernet Switches
  - Cable Modems
- **Key Technologies**
  - TCP/IP Protocol
  - Packet Switching

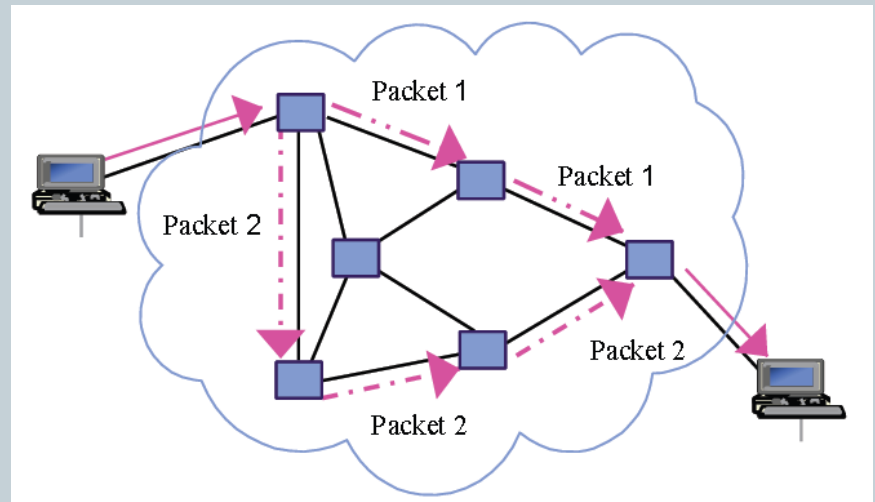
## World Wide Web

- **Widely-available Content Layer of Internet**
  - Web servers
  - Email
  - File sharing (FTP)
- **Key Technologies**
  - HTTP Protocol
  - URLs

# Key Internet Concepts

- **TCP/IP:**  
Transmission Control /  
Internet Protocol
  - Network of Networks concept
- **Packet Switching** is when data is broken into small packets that can be independently routed.
- **Packet Switching** means cargo can travel in small chunks to easily move through bottlenecks via different paths.

- Think of the **Internet** as earth's network of highways and ports (sea and air)
- **TCP/IP** establishes standards for roads and ports so people can get everywhere seamlessly.



# Key WWW Concepts



- **HTTP:**

## Hypertext Transfer Protocol

- Rules for making requests and responding to requests.

- **URI:**

## Uniform Resource Identifier

- Unique identifier for finding stuff on the WWW; Includes: **URL** (Location) and **URN** (Unique Name at Location)

- Think of the WWW as everything that can be publicly accessed from the world's highways, airport and sea ports.
- Think of **HTTP** as the standard language used to ask for directions.
- Think of **URLs** as street addresses and **URNs** as IDs for objects at particular addresses.



# Internet is bigger than WWW



- The Internet's protocol (TCP/IP) can support many sub-protocols, some that are proprietary (private/secret).
- Examples:
  - Many peer-to-peer files sharing systems
  - Specialized client-server systems (early banking systems)
  - Content so deeply embedded in systems that it's very hard to find (Deep Web)
  - Content requiring access via secret non-standard browsers (Darknet)

# Quick detour about Deep Web



Put simply, it is the part of the Internet that is hidden from view.

4%  
OF WWW  
CONTENT



## • SURFACE WEB

Also known as the 'Visible Web', it is content that can be found using search engines such as Google or Yahoo. It is under constant surveillance by the government.

96%  
OF WWW  
CONTENT



## • DEEP WEB

Also known as the 'Invisible Web', it is the content that cannot be indexed by search engines. And it is hard to keep track of.

The Deep Web is estimated to be **500X** the size of the Surface Web.

# But, the WWW matters more



- The HTTP protocol standardizes requests so any web browser can access any web server.
- URLs (WWW layer) makes finding and remember servers much easier than numeric IP addresses (Internet layer)
- The WWW is all about accessibility via open, widely adopted standards.
  - It's the largest, most expandable information system ever built.

[thefuntheory.com](http://thefuntheory.com)



# Homework



- Homework –
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Have a good week  
Labs start next week