

CSCI335: Software Engineering via Web Applications

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Objectives

- Course overview
- Overview of web
- Introduction to HTML

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Survey of Your Web Experience

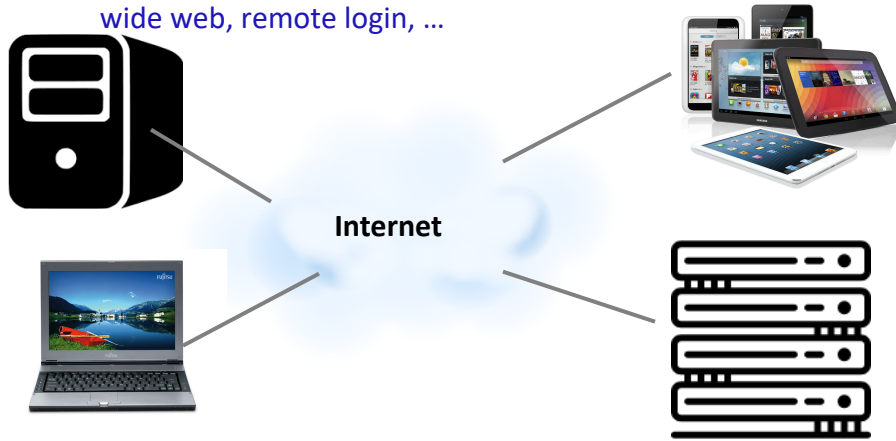
- Uses the WWW?
 - For what?
- Wrote Web pages?
 - Using what tools?
- Wrote JavaScript?
- Wrote Web applications?

Discussion: What are web applications?

- Give examples of *static* web pages vs web *applications*

The Internet

- Connection of computer networks using the Internet Protocol (IP)
 - Allows network applications, e.g., email, file transfer, world wide web, remote login, ...



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Creation of the World Wide Web

- Result of confluence of
 - Fast computers
 - Internet
 - Hypertext theory, e.g., links to other text
- Inventor: Tim Berners-Lee, a physicist
 - **Vision:** make all information available to all people at all times
 - 1989 at CERN



Web's historic logo
designed by
Robert Cailliau
(Belgian CSist)



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Creation of the World Wide Web

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Web's historic logo
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Tim Berners-Lee ✓
@timberners_lee

Follow

This is for everyone #london2012 #oneweb #openingceremony
@webfoundation @w3c

5:08 PM - 27 Jul 2012

10,174 2,534



Evolution of WWW

- ftp/email ...
- to gopher ...
- to simple html pages ...
- to web sites ...
- to dynamic html ...
- to web commerce ...
- to social media, desktop-like applications, ...

Most Popular Web Sites

- Guesses?

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Most Popular Web Sites

Site ↕	Domain ↕	Alexa top 50 global sites (As of January 17, 2019) ^[3] ↕	SimilarWeb top 50 sites (As of December 2018) ^[4] ↕	Type ↕	Principal country ↕
Google	google.com	1 (→)	1 (→)	Internet services and products	U.S.
YouTube	youtube.com	2 (→)	2 (▲1)	Video sharing	U.S.
Facebook	facebook.com	3 (→)	3 (▼1)	Social networking	U.S.
Baidu	baidu.com	4 (→)	4 (▲11)	Search engine	China
Wikipedia	wikipedia.org	5 (→)	5 (→)	Encyclopedia	U.S.
Tencent QQ	qq.com	6 (▲2)	18 (▲20)	Portal	China
Taobao	taobao.com	7 (▲4)	48 (▲3)	Online shopping	China
Tmall	tmall.com	8 (▲14)	51 (▲31)	Online shopping	China
Yahoo!	yahoo.com	9 (▼2)	6 (▼2)	Portal and media	U.S.
Amazon	amazon.com	10 (▼2)	11 (▲10)	E-commerce and cloud computing	U.S.
Twitter	twitter.com	11 (▲3)	7 (▼1)	Social networking	U.S.

Alexa: 3-month average of page views, unique site users

SimilarWeb: page views, panel, ISPs

https://en.wikipedia.org/wiki/List_of_most_popular_websites

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Most Popular Web Sites

From April 2016

Site	Domain	Alexa top 100 websites (As of March 23, 2016) ^[3]	SimilarWeb top 100 websites (As of April 4, 2016) ^[4]	Type	Principal country
Google	google.com	1	2	Search engine	U.S.
YouTube	youtube.com	2	3	Video sharing	U.S.
Facebook	facebook.com	3	1	Social network	U.S.
Baidu	baidu.com	4	16	Search engine	China
Yahoo!	yahoo.com	5	5	Portal and media	U.S.
Amazon	amazon.com	6	14	E-commerce and cloud computing	U.S.
Wikipedia	wikipedia.org	7	9	Encyclopedia	U.S.
Tencent QQ	qq.com	8	42	Portal	China
Google India	google.co.in	9	17	Search engine	India
Twitter	twitter.com	10	11	Social network	U.S.

Alexa: 3-month average of page views, unique site users

SimilarWeb: page views, panel, ISPs

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Most Popular Web Sites

	Rank in Feb 2008	Rank in April 2010	Rank in April 2013	Rank in April 2016
Google	1	2	1	1
Facebook	9	1	2	2
Yahoo! (mail)	2	3	3	5
MySpace	3	6	??	??
YouTube	10	5	4	3
eBay	6	12	8	24
Wikipedia	13	16	5	7

Not quite a fair comparison – different sites/metrics used over time

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What This Course is About

- Web applications
 - Distributed computing
 - Web application technologies (server and client)
 - How to develop high-quality Web applications → full-stack development
 - Software tools
- Software engineering
 - Large development project
 - More software, collaboration tools
 - Emulate real-world experience with actual client
- Life-skills
 - Reading, writing, discussion, presentation

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My Responsibilities

- Prepare useful, interesting knowledge
- Come to class prepared, on time
- Interesting, relevant, and challenging assignments
- Prompt feedback on assignments

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Your Responsibilities

- Come to class prepared, on time
- Turn in assignments on time
 - Don't get behind when we only have 4 weeks!
- When you're having trouble
 - Look for help on the Web
 - Find, adapt solutions
 - Give credit to where you found solution, if novel enough
 - Ask me for help
- Learn, absorb, synthesize
 - Extra Credit: take it to the next level

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Approach to Learning


- Information: comes from lectures
- Knowledge: comes from readings and assignments
- *Wisdom*: comes from experience

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Evolution of WWW

- ftp/email ...
- to gopher ...
- to simple html pages ...  Where we're starting
- to web sites ...
- to dynamic html ...
- to web commerce...
- to social media, desktop-like applications, ...

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The World's First Web Page

World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#) .

[What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#) , etc.

[Help](#)

on the browser you are using

[Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,[X11 Viola](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) , [Mail robot](#) , [Library](#) .)

[Technical](#)

Details of protocols, formats, program internals etc

[Bibliography](#)

Paper documentation on W3 and references.

[People](#)

A list of some people involved in the project.

[History](#)

A summary of the history of the project.

[How can I help ?](#)

If you would like to support the web..

[Getting code](#)

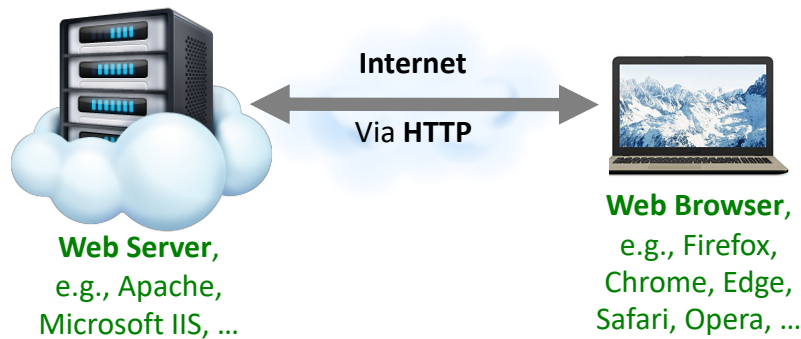
Getting the code by [anonymous FTP](#) , etc.

The Page: <http://info.cern.ch/hypertext/WWW/TheProject.html>

A Story: <http://www.businessinsider.com/the-worlds-first-web-page-is-back-online-2013-4>

World Wide Web

- Built on top of the Internet
- Web browsers and Web servers
- Communicate using HTTP (Over IP/TCP)



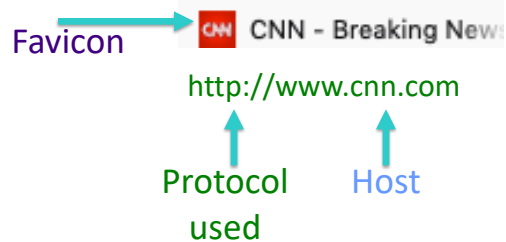
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How Does The Browser Get a Page?

- In Web browser, enter a URL
 - URL: Uniform Resource Locator



- May not have explicitly typed in "http"
 - Default protocol
 - Other protocols: https, ftp

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How Does The Browser Get a Page?

- Look up Host's IP Address using DNS
 - Need to be able to “find” host on the Internet
 - Routing through Internet is by IP address
- Domain Name System (DNS)
 - Set of servers that map **domain name** to **IP Address(es)** and vice versa

`www.wlu.edu` ←→ `184.154.210.209`
- Unix commands **host** and **nslookup** can lookup this information

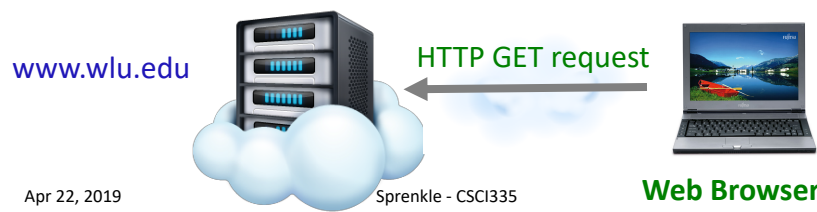
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How Does The Browser Get a Page?

- Browser now makes the request using HTTP
 - HTTP: HyperText Transfer Protocol
- Common Types of HTTP Requests:
 - GET: download a page
 - POST: download a page
 - HEAD: just get the “header” for a page
- For our example, browser makes request **GET** /



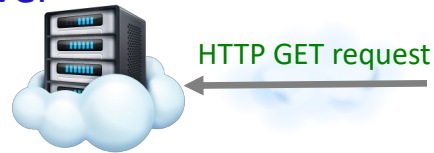
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Web Browser

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How Does the Web Server Serve a Web Page?



- Receives request for a resource on TCP port 80
- Looks for the resource in the Web Document directory
 - Not all files on a Web server are meant for others to see
 - Specific directory holds these files
- If the file is found, server sends an HTTP 200 response with the requested document
 - Otherwise, sends appropriate error response



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Ports in Brief

- A **port** is an endpoint of communication
- It's a software abstraction of a physical space through which a client and a server can send messages
 - Think of it like a *mailbox*
 - Servers listen on a port and respond to client requests
- Well-known/Dedicated port: below 1024
 - 80 is for HTTP
 - 443 is for HTTPS

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How Does the Browser Get a Page?

- Receives response from server
- Displays file in appropriate format

LIVE UPDATES: Measles outbreak | TRENDING: Chaplain hero | Notre Dame damage | Ozarks death | ICE deportat

How France's elite are helping fix Notre Dame



See the charred inside of Notre Dame Cathedral

- In pictures: Fire engulfs Notre Dame Cathedral
- Opinion: Notre Dame will rebuild. I will too
- Why the world loves Paris so much

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Ev **CNN** US | World | Politics | Business | Opinion | Health | Entertainment | Style | Travel |

LIVE UPDATES: Measles outbreak | TRENDING: Chaplain hero | Notre Dame damage | Ozarks

BREAKING NEWS X
Autopsy on Prince is concluded, medical examiner's office says, but it could be weeks before results are complete.

2016: **CNN** U.S. | World | Politics | Money | Opinion | Health | Entertainment | Style | Travel | Sports | Video | Live TV | U.S. Edition | menu

Top stories
7 shot 'execution-style' in Ohio 1h
Charges dropped in '57 murder 44m

How did he die?

2013: **CNN** SET EDITION: U.S. | INTERNATIONAL | MÉXICO | ARABIC
TV: CNN | CNNI | CNN en Español | HLN
Home TV & Video CNN Trends U.S. World Politics Justice Entertainm

2010: EDITION: U.S. | INTERNATIONAL **CNN**
Home Video NewsPulse U.S. World Politics Justice Entertainment Tech Health Living

2008: **CNN.com** Web: CNN News CNN Videos
HOME WORLD U.S. POLITICS CRIME ENTERTAINMENT HEALTH TECH TRAVEL LIVING B
Hot Topics » Air Travel » Olympic Games » Reader Comments » Fundamentalist Latter Day Saints » more top

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The Process Without GUI

```
sprengle@perl:~$ telnet www.cs.wlu.edu 80
Trying 137.113.118.203...
Connected to www.cs.wlu.edu.
Escape character is '^]'.
GET /
<html>
<head>
<meta http-equiv="REFRESH"
content="0;url=http://www.wlu.edu/computer-
science">
</head>
<BODY>
<!--You should be redirected to the correct page
in a few seconds.-->
</BODY>
</HTML>
Connection closed by foreign host.
```

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Common HTTP Status Codes



Code	Meaning
200	OK: Request succeeded
3xx	Redirection (temporary or permanent)
403	Error : No permission
404	Error : File not found
500	Internal server error

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The Process Without GUI

```
$ telnet www.wlu.edu 80
Trying 184.154.210.209...
Connected to www.wlu.edu.
Escape character is '^]'.
GET /

HTTP/1.1 301 Moved Permanently
Connection: close
Content-Type: text/html
X-Frame-Options: SAMEORIGIN
X-XSS-Protection: 1; mode=block
X-Content-Type-Options: nosniff
Location: https://10.250.250.209

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.0
Transitional//EN">
<HTML><HEAD>
<TITLE>301 Moved Permanently </TITLE>
</HEAD><BODY>
<H1>The Document has moved</H1></BODY></HTML>
```

More on URLs

- URL: **U**niform **R**esource **L**ocator
- Specifies the location of a resource
- Format: **<protocol>**://**<host>**/**<path>**

➤ Examples:

<http://www.cs.wlu.edu/~sprenkle/cs335/>

<http://www.cs.wlu.edu/~sprenkle/cs335/schedule.php>

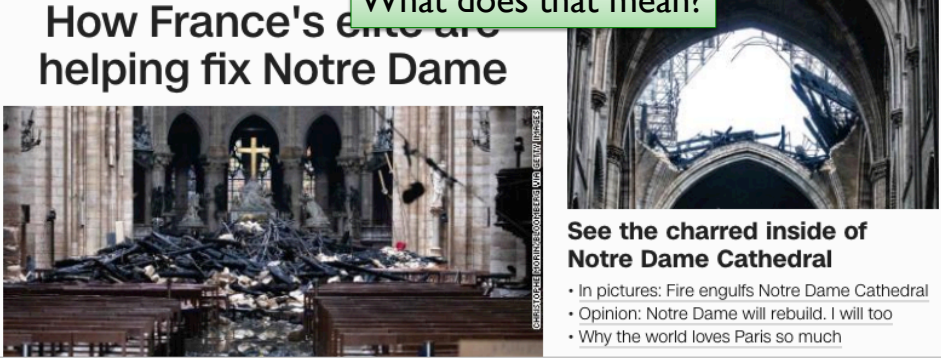
How Does Browser Get a Page?

- Receives response from server
- Displays file in **appropriate format**

LIVE UPDATES: Measles outbreak | TRENDING: Cheatin' here | Notre Dame damage | Ozarks death | ICE deportat

How France's elite are helping fix Notre Dame

What does that mean?



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HTML: HYPERTEXT MARKUP LANGUAGE

HTML: HyperText Markup Language

- Describes the **content** and **structure** of information on a web page
 - Not the same as the **presentation** (appearance on screen)
- **Markup** document with **elements**
- Written in plain text

HTML: An Evolving Standard

- Previous versions of HTML
 - “Loose” on standards for how to write/render HTML
 - Benefit: allows for authoring “imperfect” HTML that still renders okay
 - Limitations:
 - Page can look different in different browsers (e.g., mobile devices)
 - Lack of Multimedia, graphical content
 - Lack of semantic information

HTML5



- Current standard
- Goals
 - Support multimedia (Web 2.0 applications)
 - Better definitions for markup
 - Consistent support by browsers
 - Including mobile devices

What does this all mean?

- We're going to write in HTML5
 - Current stable version
 - Tendency towards the XHTML syntax
 - Relatively easy, especially with right tools
 - Less ambiguous documents
 - Can be validated

Element Syntax

- An **element** is made up of **tags** and **content**
 - Syntax: `<tag>content</tag>`
 - Example: `<p>This is a paragraph</p>`
- If an element contains no content, open and close a tag together:
 - Syntax: `<tag/>`
 - Example: `<hr/>`
- Most whitespace is insignificant in HTML
 - It gets ignored or collapsed into a single space

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HTML Tags

- Some tags can contain additional information called **attributes**
 - Syntax: `<tag attribute="value" attribute="value"> content </tag>`
 - Example: `Next page`
- Tags without content:
 - Syntax: `<tag attribute="value" attribute="value"/>`
 - Example: ``

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Structure of an HTML Page

- The **header** describes the page
- The **body** contains the page's contents
- An HTML page is saved into a file with a name ending in extension **.html**

```
<html>  
  
<head>  
information about  
the page  
</head>  
  
<body>  
page contents  
</body>  
  
</html>
```

Structure of an HTML5 Page

```
<!DOCTYPE html> ← Says we're using HTML5  
<html>  
<head>  
information about the page  
</head>  
<body>  
page contents  
</body>  
</html>
```

Adding a Title to a Page

- **title** elements go inside of the **head** element
- Displayed in the web browser's title bar and the bookmark text

```
<title>CSCI335: Web Applications</title>
```

This text is the title

- Displayed in search engine results pages

Block-level vs. Inline Elements

Two different types of elements

Block-level Elements

- Contain an entire large region of text
- Examples: paragraphs, lists, table cells
- Browser displays a margin of vertical whitespace between block-level elements for separation

Inline Elements

- Affect a small amount of text
- Must be *nested* inside of a block-level element
- Examples: bold text, code fragments, images
- Browser allows many inline elements to appear on the same line or within the same block-level element

<p> : Paragraph Tag (block-level)

```
<p>I have a dream that one day this  
nation will rise up  
and live out the true meaning of its  
creed:  
    "We hold these truths to be self-  
evident: that all men are created  
equal."</p>
```

- Browser collapses whitespace:

```
I have a dream that one day this nation will rise up and live  
out the true meaning of its creed: "We hold these truths to  
be self-evident: that all men are created equal."
```

Headings: <h1>, <h2>, ... <h6>

- Headings separate major areas of the page
 - *Block-level*

```
<h1>Famous American Speeches</h1>  
<h2>Civil Rights Leaders</h2>  
<h3>Martin Luther King, Jr.</h3>
```

Famous American Speeches

Civil Rights Leaders

Martin Luther King, Jr.

Headings: <h1>, <h2>, ... <h6>

- Headings separate major areas of the page
 - *Block-level*
- Presentation:
 - 1, 2, and 3 use font sizes that are larger than the default font size
 - 4 uses the default size
 - 5 and 6 use smaller font sizes

Hypertext Links/Anchors: <a>

- Basis of Web
- Links to other pages or parts of a page
- **href** attribute specifies the destination URL
- Are *inline* elements
 - Must be placed inside a block-level element, such as <p> or <h1>

```
<p>Martin Luther King gave his most famous  
<a  
href="http://www.americanrhetoric.com/speeches/mlkihave  
adream.htm">speech</a> in 1963.</p>
```

Martin Luther King gave his most famous [speech](http://www.americanrhetoric.com/speeches/mlkihaveadream.htm) in 1963.

More on Anchors: <a>

- href URLs can be
 - *Relative*: another page within this Web site
 - Just the resource path
 - Easier to maintain than absolute paths
 - *Absolute*: full URL

```
<p>Today's <a href="lab0.php">lab</a>.</p>  
<p><a href="http://www.w3schools.com/tags">  
HTML Help</a></p>
```

Today's [lab](#).
[HTML Help](#)

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Making links

- “[Click here](#)” is intrusive—the control interferes with the content
- [Press the blue text](#) is even worse
- A link traversal should be ancillary
- Good approaches:
 - Highlight glossary terms
 - Embed the links in footnotes
 - Who uses this approach a lot?
 - Allow the anchor to fit into the rest of the document naturally

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Optional Anchor Attributes

Attribute	Meaning	Value
target	Where to open the target URL	_self = default, this window/frame _blank → new window _top → full window _parent → parent frame
title	Text to display in a tool tip	The tool tip text
id (preferred) or name	Names an anchor. Use to create a bookmark in a document.	The name Example in Wiki: CS335 Resources

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Nesting Tags

- Tags must be correctly nested
 - A closing tag must *match the most recently opened tag*
- Browser may render it correctly anyway, but maybe not
- Bad HTML:

```
<p><a href="00-intro.pdf">Lecture</p>
<p>
  This text also links to Lecture</a>
</p>
```

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Line Break: `
`

- Forces a line break in the middle of a block-level element (*inline*)

Close with `/>`
immediately

```
<p>Today's <a href="lab0.html">lab</a><br/>
The lab is due Monday night.
</p>
<p>Tuesday's lab coming soon...</p>
```

Larger gap
between paragraphs

Today's [lab](#).
The lab is due Monday night.
Tuesday's lab coming soon...

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Horizontal Rule: `<hr/>`

- A horizontal line to separate sections of a page visually (*block-level*)

```
<p>First paragraph</p>
<hr/>
<p>Second paragraph</p>
```

First paragraph

Second paragraph

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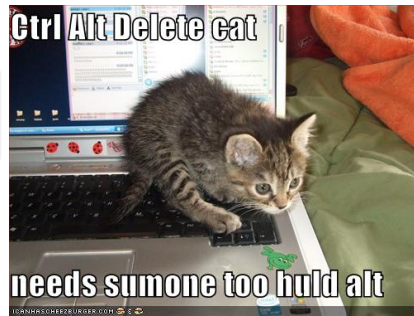
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Images: ``

- Inline element
- Inserts a graphical image into the page
 - `src` attribute specifies image URL
 - XHTML and accessibility requires an `alt` attribute that describes the image

```
<p></p>
```

`alt`: Used by search engines, screen readers, browser if image can't be displayed



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Images as Links

- Nest inside an `<a>` tag
- `title` attribute for tool tip

```
<p><a href="http://icanhas.cheezburger.com"></a></p>
```



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Practice

- You want your page to look like:

Favorite LOL Cats



Filename: beware_of_dog.jpg Filename: the_ring.jpg

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Comments <!-- -->

- Document your HTML file
- Comment out text

```
<!-- Lab Web Page, By Sara Sprenkle -->  
<p> Lab is due <!-- tomorrow --> today. </p>
```

Lab is due today.

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Three Types of Lists

- Unordered Lists ``
- Ordered Lists ``
- Definition Lists `<dl>`

Unordered List: ``, ``

- `ul` represents a bulleted list (block-level)
- `li` represents a single item within the list (block-level)

```
<ul>  
  <li>6-cylinder engine</li>  
  <li>Cruise control</li>  
  <li>Automatic locks</li>  
</ul>
```

- 6-cylinder engine
- Cruise control
- Automatic locks

Nested Unordered Lists

- a list can contain other lists

```
<ul>
  <li>Standard Features:
    <ul>
      <li>4-cylinder engine</li>
      <li>CD player</li>
    </ul>
  </li>
  <li>Optional Features:
    <ul>
      <li>Cruise control</li>
      <li>Automatic locks</li>
    </ul>
  </li>
</ul>
```

- Standard Features:
 - 4-cylinder engine
 - CD player
- Optional Features:
 - Cruise control
 - Automatic locks

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Ordered List

- **ol** represents an ordered (by default, numbered) list of items (block-level)

```
<p>Underpants Gnomes' Three-Phase Business Plan</p>
<ol>
  <li>Collect underpants</li>
  <li>?</li>
  <li>Profit</li>
</ol>
```

Underpants Gnomes' Three-Phase Business Plan

1. Collect underpants
2. ?
3. Profit

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Common Error: Not Closing a List

```
<p>Underpants Gnomes' Three-Phase Business Plan</p>
<ol>
  <li>Collect underpants</li>
  <li>?</li>
  <li>Profit</li>
<p>More information
```

Underpants Gnomes' Three-Phase Business Plan

1. Collect underpants
2. ?
3. Profit

More information

Everything after list is also indented.

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Definition List: <dl>, <dt>, <dd>

- **dl** represents a list of definitions of terms (block-level)
- **dt** represents each term
- **dd** represents the term's definition

```
<dl>
  <dt>&lt;d1&gt;</dt>
  <dd>represents a list of definitions of terms</dd>
</dl>
```

```
<dl>
  represents a list of definitions of terms
```

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HTML Character Entities

- A way of representing any Unicode character within a web page

Character(s)	Entity
< >	< >
“ ” &	"e; &
™ ©	™ ©
π δ Δ	π δ Δ
é è ñ	é è ñ

→ How would you display & on a web page?

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Phrase Elements: ``, ``, `<code>`

- **em**: emphasized text, usually rendered in italic
- **strong**: strongly emphasized text, usually rendered in bold
- **code**: a short section of computer code, usually rendered in a fixed-width font

```
<p>The <code>ul</code> and <code>ol</code> tags make lists.</p>
<p>HTML is <em>really</em>, <strong>REALLY</strong> fun!</p>
```

The ul and ol tags make lists.
HTML is *really*, **REALLY** fun!

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Phrase Elements: `<sub>`, `<sup>`

- **sub**: subscript characters
- **sup**: superscript characters

```
<p>x <sub>2</sub><sup>3</sup>  
+ y <sub>1</sub><sup>2</sup>  
</p>
```

$$x_2^3 + y_1^2$$

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Bad HTML

```
<p>This is <strong>the <em>best</strong>  
time </em> to invest!</p>
```

- What is wrong?
- How did the author want this to display?
- How can we write it correctly?

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Bad HTML

```
<p>This is <strong>the <em>best</strong>  
time </em> to invest!</p>
```

- What is wrong?
 - Open/close tags aren't matching
- How did the user want this to display?

This is **the *best*** time to invest!
- How can we write it correctly?

```
<p>This is <strong>the <em>best</em>  
</strong> <em>time</em> to invest!</p>
```

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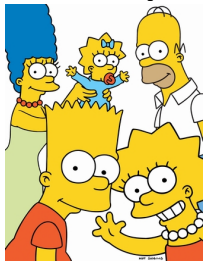
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Practice Problem

- We want the page to look like:

The Simpsons Fun Facts



- Longest-running scripted series
- Started on [The Tracy Ullman Show](#)

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Preformatted Text: `<pre>`

- A large block of code text in a fixed-width font (block-level)
- **pre** blocks are displayed with exactly the whitespace and line breaks given between the tags

```
<pre>
    public static void main(String[] argv) {
        System.out.println("Hello, world");
    }
</pre>
```

```
public static void main(String[] argv) {
    System.out.println("Hello, world");
}
```

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Preformatted Text: `<pre>`

- A large block of code text in a fixed-width font (block-level)
- **pre** blocks are displayed with exactly the whitespace and line breaks given between the tags

```
<pre>
    public static void main(String[] argv) {
        System.out.println("Hello, world");
    }
</pre>
```

How would it look if we had
instead enclosed it in **code** tags?

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Tags for Quotations

- `<q>`: a short, *inline* quotation
 - Typically displayed with quotation marks, italics

```
<p>Quothe the Raven <q>Nevermore.</q></p>
```

```
Quothe the Raven, "Nevermore."
```

- `<blockquote>`: a lengthy, *block-level* quote

```
<p>Lincoln, in his Gettysburg Address:</p>  
<blockquote><p>Four score and seven years  
ago, our fathers ...</p></blockquote>
```

```
Lincoln, in his Gettysburg Address:  
Four score and seven years ago, our fathers ...
```

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Tables `<table>`

- Used to layout tables
 - Sometimes used for layout but better techniques (like CSS), which we'll cover later
- Matrix of rows and columns
- **Cell** is an intersection of row and column
 - Contains almost any document element, e.g., text, headings, images, tables, ...
- Table caption: `<caption>`
 - Inside of a `<table>` element
 - Defines the title that precedes a table

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Table Row: `<tr>`, Label: `<th>`,
Data: `<td>`

- `tr`: defines a row in the table
- `th`: defines a row or column's label (heading)
- `td`: defines a table's data cell

```
<table border="2">
  <caption>Baseball
  Statistics</caption>
  <tr>
    <th>Name</th>
    <th>Batting Average</th>
  </tr>
  <tr>
    <td>Cal Ripken, Jr.</td>
    <td>.276</td>
  </tr>
</table>
```

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Table Row: `<tr>`, Label: `<th>`,
Data: `<td>`

```
<table border="2">
  <caption>Baseball
  Statistics</caption>
  <tr>
    <th>Name</th>
    <th>Batting Average</th>
  </tr>
  <tr>
    <td>Cal Ripken, Jr.</td>
    <td>.276</td>
  </tr>
</table>
```

Baseball Statistics	
Name	Batting Average
Cal Ripken, Jr.	.276

Notice formatting

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rowspan, colspan Attributes

- Some columns need to span multiple columns
 - Similarly with rows
- Use the **colspan** attribute to specify how many columns to span
 - Use in **<th>** or **<td>** tags

```
<tr>  
  <td></td>  
  <th colspan="3">Career Statistics</th>  
</tr>
```

An empty data cell

Spans 3 columns

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Table Sections

- Can separate the table into three parts: header, body, and footer
 - Denoted with **thead**, **tbody**, and **tfoot**
 - Useful for presentation (Tues)
- Header includes column labels
- Body includes table data, including row labels
 - If multiple body sections, browser marks with thicker horizontal lines
- Footer sometimes includes column labels again and totals for columns

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W3C HTML Validator

<http://validator.w3.org>

- Checks your HTML code to make sure it meets the HTML specifications
- More picky than the Web browser, which may render malformed HTML correctly

Web Page Metadata: `<meta>`

- Represents information about your page
 - For Web browser, search engine, etc.
- Placed into a page's **head** element
- Not displayed in the page itself
- **meta** tags have
 - **content** attribute and
 - **name** or **http-equiv** (for HTTP headers) attribute

```
<meta name="description"
      content="HTML help page" />
<meta http-equiv="Content-Type"
      content="text/html; charset=UTF-8"/>
```

Web Page Metadata: <meta>

- Describe the page

```
<head>
<meta name="author" content="author's name"/>
<meta name="revised" content="web page version
and/or last-modified date" />
<meta name="generator" content="software used
to create the page"/>
</head>
```

Web Page Metadata: <meta>

- Suggestions to search engines about how to index your page
- Search engine may choose to ignore them

```
<head>
<meta name="description"
content="for search engine" />
<meta name="keywords" content="words to
associate with your page, comma-delimited" />
</head>
```


Web Page Metadata: <meta>

- Aid browser or Web server

```
<head>
<meta http-equiv="refresh" content="how
often to refresh the page in seconds" />
<meta http-equiv="Content-Type"
content="what type of document this is (may
include internationalization info such as
character encoding)" />
</head>
```

- Can also use refresh tag to redirect, e.g.,
`content="5;url=http://www.cs.wlu.edu"`

When would refresh tags be useful?

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Favorites Icon (favicon)

- **link** tag - placed in **head** element

- Can specify an icon for a web page
- Icon is placed in browser title bar and bookmark/favorite
- **Syntax:**

```
<link rel="shortcut icon" type="MIME type"
href="filename" />
```

- Default type is **ico**

- More you can do here with App icons (for Apple, Android, ...)

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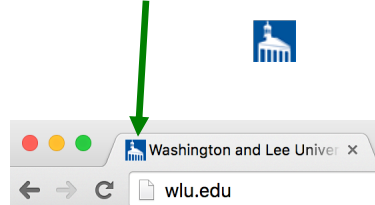
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Favicon Example: W&L Web Site

```
<link rel="shortcut icon"  
href="assets/images/favicon.ico"/>
```

16x16 pixel image



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Internet Media (“MIME”) Types

- **Multipurpose Internet Mail Extensions**
 - Classifications of data that travel over the internet
 - Originally developed for email
- Used to tell the browser the form (**type**) of a file returned by the server
- Type specifications
 - Form: **type/subtype**

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Internet Media (“MIME”) Types

- **Multipurpose Internet Mail Extensions**
 - Sometimes used to specify something’s type when including resources on a page
- Form: **type/subtype**

MIME Type	File Extension
text/html	.html
text/plain	.txt
image/gif	.gif
image/jpeg	.jpg
video/quicktime	.mov

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Presentation of Web Pages

- Talked mostly about structure and content of HTML pages
- Want presentation to be separate
 - Don’t encode style into the HTML page itself
 - Easier to apply different styles to a set of web pages or a whole web site

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Cascading Style Sheets (CSS)

- Describe the appearance, layout, and presentation of information on a web page
 - As opposed to HTML, which describes the content, structure of the page
- Describe **how** information is to be displayed, not what is being displayed
- Can be embedded in HTML document or placed into separate **.CSS** file
 - Advantage of separate **.CSS** file: one style sheet can be shared across many HTML documents

More Tuesday

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Attaching a CSS File: `<link>`

- `link` appears in `head` element
- Can link to multiple style sheet files
- Syntax:

```
<link rel="stylesheet" type="text/css" href="filename"/>
```

- Example from W&L site:

```
<link rel="stylesheet" type="text/css" href="http://www.wlu.edu/prebuilt/assets/css/global.css" media="only screen" />
```

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Rules vs Conventions

Rules

- Absolutes that cannot be violated
- The browser will enforce rules
 - If you forget to add an ending tag for bold ``, then all of the text following the opening `` tag will appear bold.
- Modern browsers often attempt to fix sloppy HTML by predicting and fixing *some* violations of rules
 - This is NOT an excuse to write poor, incorrect HTML
 - Some browsers or future versions of them may not be so forgiving

Conventions

- Suggested ways of writing code by consensus
- The browser doesn't care about conventions
- The end user viewing your site doesn't care or realize there were conventions followed
- Purely for others who may revise or build upon your code
 - Clear organization
 - Consistent style
 - Highly readable

My First Web Page

- Circa 1995
<http://www.cs.wlu.edu/~sprenkle/personal/China.html>

Outline for the Course

- Static Web Pages
 - HTML5, Presentation (CSS)
- Usability
- Dynamic Web Pages, Applications
 - Server-side (Servlets, JSPs, ...)
- Testing Web Applications
- JDBC
- Other Java frameworks/tools
- Java Script, AJAX
- JSTL
- Security

Project
Development



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Planning for the Semester

- Today: typical of semester
 - Part lecture, part discussion, part lab
- Tomorrow
 - CSS
 - Group Projects Introduction

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Wikis

- Collaborative web sites
- Content generated by registered users or anyone
- Goal: easy development of content
 - Update content using a browser
- Our course Wiki:
 - <http://cswiki.wlu.edu/dokuwiki/doku.php/courses/cs335/home>
 - Powered by Dokuwiki, a PHP-based Web application

Lab 0

- Intro to the wiki
- Create web pages in HTML5
 - Some things you need to have
 - Feel free to be creative and do other things

TODO

- Lab 0
- Explore Course Web Site
 - Particular attention to the schedule, examples
 - Read over the project page on the course web site
- Read about how Google search works
 - Write summary in Sakai forum by Wednesday midnight
- Read on what images can use
 - Write summary in Sakai forum by Wednesday at midnight