Introduction to HTML5

What This Course Will Cover

- The BASICS
  - Syntax and Semantics
  - Accessibility
  - Getting Started
    - Right down to How to Create a File

Week One

- Focus is on questions:
  - What happens when you type an address into a URL?
  - What types of tools you need to code (editors and browsers)?
  - What is HTML5?

Week Two

- A Little bit of theory and a lot of code
  - The DOM
  - Contextual tags and headings
  - Links, Images, and Lists
  - Tables
  - Multimedia

Week Three

- Putting it Together
  - Validating Your Code
    - Syntax
    - Accessibility
  - Domain name registration and web hosting

Final Project

- Create a syntactically valid website
- Must pass W3C validation
- Must pass WAVE accessibility review

Who is this class for?

- This class is for the complete beginner
- This class is for those who did NOT build a computer in their basement when they were 12 years old
- This class is for people with persistence

Who am I?

- PhD in Computer Science
- Two decades of teaching experience
- Emphasis on education
- Famous for running around classrooms while helping students debug

Workload and Evaluation

- Weekly videos
  - Lecture format – watch anywhere
  - Demo format – best watched while you type along
- Weekly readings
  - Free online textbook
  - Other online articles
- Weekly assessments
  - Quizzes
- Final project
  - Warning – it will be ugly!

Succeeding in this Class

- Create a community
  - In a perfect world you would code with a friend…so use the message boards.
- Work Smart!!
  - Never spend more than 20 minutes on a problem
- Look things up on your own!
- Practice, practice, practice!

Review

- This class is for beginners
- You will leave with the ability to write and understand HTML5 code – not as a web developer
- You will understand the importance of accessibility in technology

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The Evolution of HTML

What it is… and why we aren't starting at HTML 1.0

What is HTML?

- HTML stands for Hypertext Markup Language
- Markup languages use *tags* to annotate (or "mark-up") documents.
- In HTML the tags indicate where headings <h1>, images <img>, list items <li>, links <a>, line breaks
, and other components should be displayed.

.html Files

- When your computer opens a .html file, it knows to open it in an Internet browser (Chrome, Firefox, Safari, etc.)
- The browser can read this file and know how to display it on the screen.
- Screen readers and other assistive devices can also utilize the HTML tags to present the information is special ways.

HTML Files

- HTML is similar to English, so you can understand it even if you don't know much about it. (sample.html)

"Learning" HTML

- In the beginning you worry about *syntax*
  - What tags are there?
  - Did I remember to "end" my tag?
- Later, you will worry about *semantics*
  - Is there a tag that better conveys the meaning I am trying to get across?
  - If someone is searching my page can they find what they need and access it easily?

Early Years

- **HTML (1) was created in 1990 as a way to electronically connect documents via hyperlinks (hence a "web" of connections)**

Early Years

It is required that HTML be a common language between all platforms. This implies no device-specific markup, or anything which requires control over fonts or colors, for example.

Mosaic

- In 1993, Mosaic emerged as the first graphical browser.
- WWW proliferates at a 341,634% annual growth rate of service traffic
- Mosaic had challengers though in the form of Netscape (1994), Internet Explorer (1995) and others.

"Images caused a lot of angst among the early web community because we just went and decided this was a cool thing and decided to put them in…….. We're humans. That's more interesting to look at than a page of text. – Jon Mittelhauser,

The Browser Wars

- Browsers had proprietary tags
  - <marquee>...</marquee> (scrolling text)
  - <blink>...</blink> (blinking text).
- Other tags that went against the spirit of the original tenets of HTML were added, e.g. <font>, , and <bgcolor>
- Origination of "Best viewed on" messages.

Web Standards

- No one "runs" the Internet or the Web, some groups do take proactive roles:
  - Internet Engineering Task Force (IETF)
  - World Wide Web Consortium (W3C)
  - The Web Accessibility Initiative (WAI)

Evolution of Browsers

1990 – 1994	HTML was simple, content was primarily text-based
1993	Mosaic enters the scene with images and … BOOM!!!
1995 – 1999	Cross-browser compatibility falls apart
2000 – 2005	Browsers move toward separating content from style.
2005 – 2008	Using HTML files in coordination with CSS becomes new standard.

Evolution of HTML

1993	HTML 1.0 - Developed by Tim Berners-Lee to link document
1995	HTML 2.0 - Developed by Internet Engineering Task Force RFC to include stylized text and tables
1996	CSS 1
1997	HTML 3.2 – Developed by W3C and included browser specific features
1997	HTML 4.0 – A move back to normalizing the pages across platforms.
1998	CSS 2
1999	HTML 4.01 – Introduced different document types
2012	HTML 5 - Back to HTML plus multimedia and semantic tags

Where we are now

- HTML5 is a cooperation between W3C and the Web Hypertext Application Technology Working Group(WHATWG)
- Established Guidelines
  - New features should be based on HTML, CSS, the DOM, and JavaScript
  - Reduce the need for external plugins (e.g. Flash)
  - More markup to replace scripting
  - HTML5 should be device independent

Review

- Browsers translate HTML documents into viewable webpages
- HTML was intended to facilitate content types
- When designers want to do something new they write non-standard code to force browsers to do it
- New standards are written to handle new requirements and browsers adopt the new standards

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The Request/Response Cycle

Or, what happens when you type something into the address bar

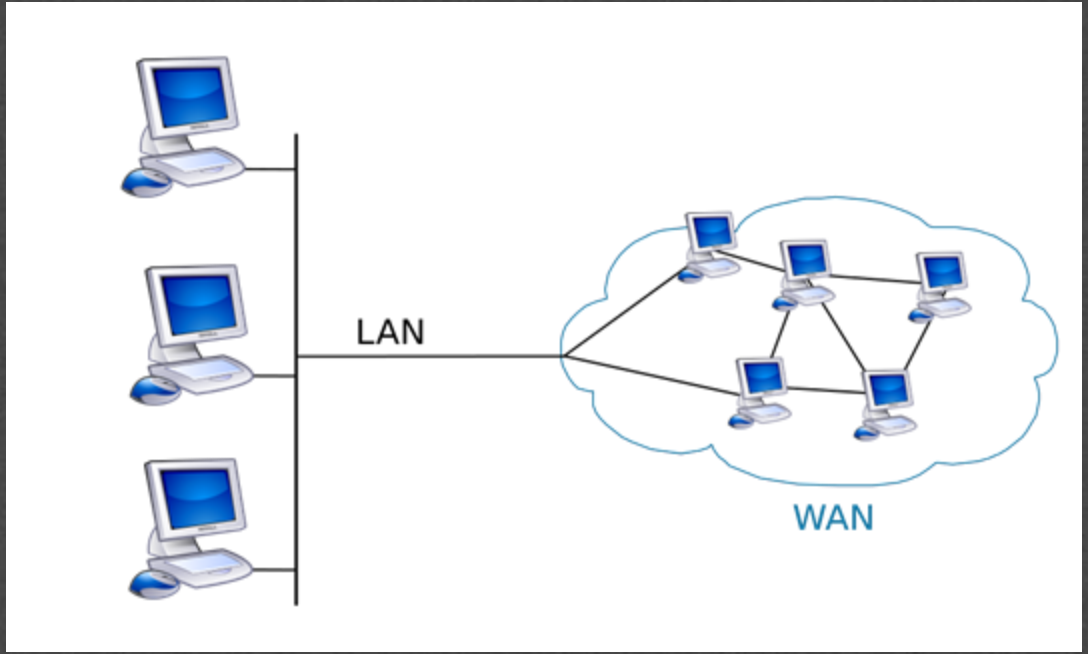
How Does This All Work?

http://si.umich.edu

- When you type an address into the URL bar, what happens?
- *Warning*: This lecture is heavy on the acronyms.

Networks

- The Internet
  - LAN
  - WAN



Client/Server Relationship

- Servers
  - Machines that hold shared resources
  - Always connected to the network

- Clients
  - Machines for personal use (laptops, phones, etc.)

Request/Response Cycle

- This is what happens when your computer (the client) requests a page and a server responds with the appropriate files.

Uniform Resource Locator

- URL – three parts:
  - protocol – how to connect
  - domain – the server*
  - (optional) document – the specific file needed
    - *Most pages are made up of multiple files*

Protocols

- HTTP – Hypertext Transfer Protocol
- HTTPS – Secure Hypertext Transfer Protocol
- FTP – File Transfer Protocol

Domain Names

- Identifies the entity you want to connect to
  - umich.edu, google.com, wikipedia.org
- Each has different top-level domain
  - Determined by Internet Corporation for Assigned Names and Numbers (ICAAN)
  - https://www.icann.org/resources/pages/tlds-2012-02-25-en

IP Addresses and the Domain Name Server (DNS)

- Internet Protocol Version 6 (IPv6) is the communication protocol that identifies computers on networks.
- Every computer has a unique IP address

  xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx

  where x can have 16 different values.
- Can represent over 300 trillion unique combinations (2^{128})!
- DNS looks up the domain and returns the IP address

The Domain Name Server (DNS)

- Luckily, you don't need to remember the IP address of a domain.

- The DNS will lookup the IP address based on the URL you type in.

Document

- URLs can specify a specific document
  - http://www.intro-webdesign.com/contact.html
  - http://www.intro-webdesign.com/Ashtabula/harbor.html
- If no document is specified, the default document is returned.
  - Convention is *index.html*

The Request

- Once the IP address is determined, the browser creates an HTTP request.

- Lots of hidden information in this request
  - header, cookies, form data, etc

The Response

- The server returns files, not “web pages”
  - It is up to the browser to decide what to do with those files

- If the server can’t fulfill the request it will send back files with error codes: 404, 500, etc.

What happens when you type "http://si.umich.edu/" into the address bar.

1. The browser look up the domain in the DNS
2. The DNS returns the IP address: 54.88.175.189

The Request/ Response Cycle is initiated

3. The browser sends an HTTP request to the server located at that address.
4. The server finds the requested file and sends it back as a response.
5. The browser takes the response and renders the HTML code as a nice graphical presentation, often repeating steps 3 – 4 as needed to request images and other supporting files.

Live Example

Review

- A URL has three parts.
- Request/Response cycle typically requires multiple rounds of communication between the client and server.

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Looking at Browsers

Your Options

Differing Browsers

- Different browsers have their pros and cons
- Most people have a preferred browser
- You need to test your site on multiple browsers.

Internet Explorer

- For a long time, one of the most popular browsers because it was preinstalled on Microsoft Windows.
- Platform-dependent - doesn't automatically work on a Mac.

Microsoft Edge

- In 2015 the new Windows 10 operating system included Microsoft Edge.
- Edge is meant to replace IE.

Safari

- The default browser on Mac devices is Safari.
- It also work on Windows.
- Free to download

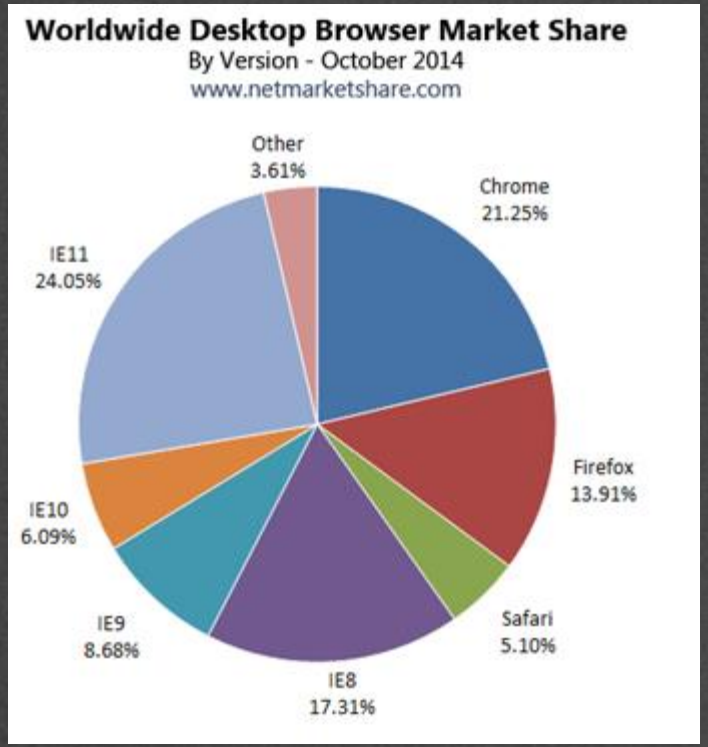
Google Chrome

- Freeware browser developed by Google
- First released in 2008, for Microsoft Windows, it was later ported to Linux, macOS, iOS and Android
  Greater security

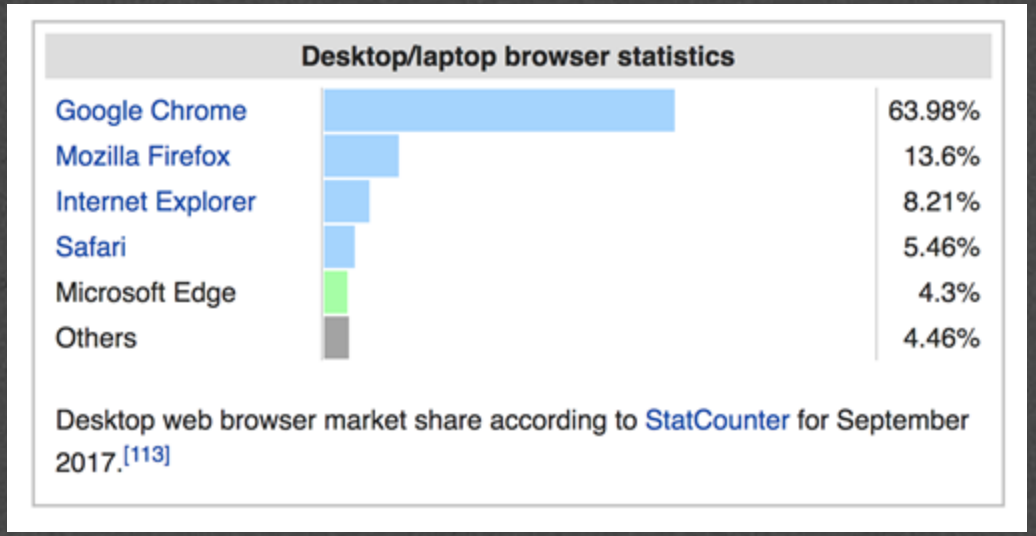
Firefox

- Free and open-source browser developed by Mozilla.
- Available for Windows, macOS, Linux, and BSD operating systems.

2014 Browser Usage



2017



Issues of Accessibility

- http://www.html5accessibility.com/ keeps a review of the accessibility of browsers.
- Browsers should have keyboard functionality, support HTML5 tags, and support features for assistive technology.

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http://www.html5accessibility.com/

Review

- Browsers can vary in how well they adhere to HTML5 standards
- Different versions of browsers need to be considered as well
- Test in a variety!!

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Editors: How to Use an Editor to Create an HTML File

Time to write some code

Creating and Editing Your Files

1. Decide how you will organize your files
2. Decide on a naming convention
    - dash-names, CamelCase
    - No spaces, Consistent capitalization
3. Decide on an editor
    - Windows (*Notepad*, Notepad++, Sublime, VS Code*)
    - Mac (*TextEdit*, TextWrangler, Sublime, VS Code*)

Getting Started

1. Open your editor
2. Select Save or Save As and name your file. You may need to create a new folder first
3. Add Doctype, head, and body tags
4. Save File (Ctrl-S or Command-S)
5. Open in browser

Troubleshooting

- My file opens in an editor instead of a browser.
  - Right click and select “Open With..”
- My browser shows my tags
  - Check that file extension is .html

Troubleshooting

- I changed my code, but my page looks the same.
  - Refresh your browser
  - Verify file name
- I get “weird” characters.
  - Try typing code in by hand, not copy-and-paste

Examples

- TextEdit
- Sublime
- VS Code
- Replit

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Editors: How to Use Replit

Writing code that you can share online

Online editors

1. Google Docs and Microsoft 365 are common ways to share documents.
2. Sharing code is a little different - especially when you want to share your webpage with someone.
3. Today we will use Replit

IDEs

1. IDEs are Integrated Development Environments, a fancy term for software that lets you write your code, run your code, share your code, .etc
2. Replit is an IDE for beginner programmers.
3. In this class I will switch between using Replit and Sublime and Visual Studio Code

Using Replit

Which editor should you use?

- If you want to work "locally" (no internet connection) then your built-in editor, Sublime, or VSCode are a good choice.

- If you have internet access and want to share your code, Replit may be a better choice.

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