ITMD-461
CLASS 2
JANUARY 20, 2015

TONIGHT'S AGENDA

- Discuss the Software and Development Tools you use
- The browser is the platform
- Introduction to the technologies
- Intro to HTML
- Basic page demo
- Readings & Assignments

ITMD-461

SOFTWARE AND DEVELOPMENT TOOLS

COMMON SOFTWARE

Text Editor

- Notepad++ (win)
- Textpad (win)
- TextWrangler (mac)
- Sublime Text 2 (multi)
- Brackets (multi)
- Atom (mac)
- Many more…
- http://en.wikipedia.org/wiki/Comparison_of_text_editors

SFTP

- WinSCP (win)
- Filezilla (multi)
- Cyberduck (multi)
- Transmit (mac)
- Browser Extensions

SSH

- Terminal (multi)
- PuTTY (win)

BROWSER AND DEVELOPMENT TOOLS

For class, please use a modern developer friendly browser to develop and test your web pages. These browsers have built-in tools for development and extensions available to add additional features.

- **Mozilla Firefox (https://www.mozilla.org/)**
  - Current Release
  - Developer Edition (Formerly Aurora Channel)
- **Google Chrome (https://www.google.com/chrome)**
  - Current Release
  - Chrome Canary (Pre Beta Channel)
- **Apple Safari (Mac only)**
- **Microsoft IE (only most recent version ie11)**

BROWSER AND DEVELOPMENT TOOLS

Mozilla Firefox

- Can run stable release and developer version together
- Native Dev tools – inspector, debugger, and more
  - https://developer.mozilla.org/docs/Tools
- Firebug extension – inspector, debugger, and more
- Web developer toolbar extension

Google Chrome

- Can run stable release and canary version together
- Native Dev tools – inspector, debugger, and more
  - https://developer.chrome.com/devtools
- Free Code School course to learn Chrome Dev Tools
  - http://discover-devtools.codeschool.com/
- Firebug lite extension – if you really like firebug

BROWSER AND DEVELOPMENT TOOLS

Apple Safari

- **Native Dev tools – inspector, debugger, and more**
  - https://developer.apple.com/library/safari/documentation/AppleApplications/Conceptual/Safari_Developer_Guide/Introduction/Introduction.html
- **Must enable developer menu in preferences -> advanced**
- **Tools for inspecting pages on iPhone and iPad connected to the Mac via USB.**

Microsoft IE

- **Native Dev tools (F12) – inspector, debugger, and more**
  - http://msdn.microsoft.com/en-us/library/bg182326(v=vs.85).aspx
- **Recent version is much better than older ones**
- **Allows you to render page as it would look in older versions of IE with limits (no conditional comments, ie10+)**

ITMD-461

THE BROWSER IS THE PLATFORM

THE BROWSER IS THE PLATFORM

What is a browser?

THE BROWSER IS THE PLATFORM

Browsers are compiled programs written in one or more programming languages to a specific operating system, API, and computer architecture.

The browser is responsible for the following

- **Communicating with the computer's networking card to package up, send, and receive HTTP and other commands (remember HTTP stands for hyper text transfer protocol)**
- **Reading, parsing, and rendering HTML markup**
- **Reading, parsing, and rendering CSS styles**
- **Reading, parsing, and executing JavaScript code**
- **Providing the user with an interface to use the HTTP protocol and domain name services (DNS)**

THE BROWSER IS THE PLATFORM

The browser implements the following protocols and technologies

- **HTTP, HyperText Transfer Protocol**
- **HTTPS, Secure HyperText Transfer Protocol**
- **FTP, File Transfer Protocol**
- **DNS, Domain Name Service - Translates IP addresses to URLs (Uniform Resource Locator), also called URIs (Uniform Resource Identifier)**
- **The HTML (HyperText Markup Language) specification**
  - http://www.w3.org/TR/html5/
- **The JavaScript (ECMA-262 Script) specification**
  - http://www.ecma-international.org/publications/standards/Ecma-262.htm
- **The CSS (Cascading Style Sheet) specification**
  - http://www.w3.org/Style/CSS/specs.en.html

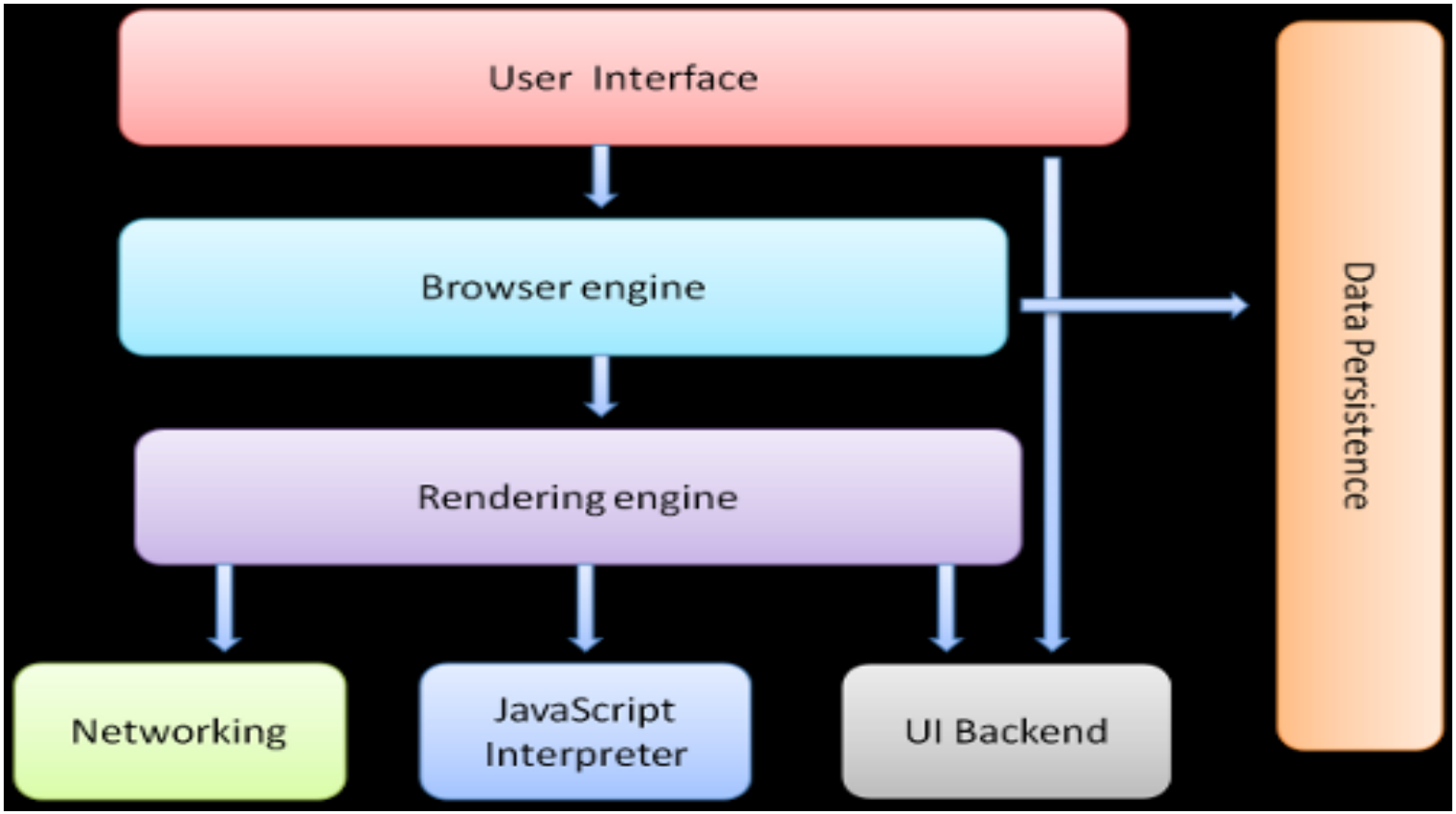
THE BROWSER COMPONENTS

In most cases, a modern browser is designed as a combination of multiple components.

- **The User Interface**
- **The Browser Engine**
- **The Rendering Engine**
- **Networking**
- **UI Backend**
- **JavaScript Interpreter**
- **Data Persistence**

http://www.html5rocks.com/en/tutorials/internals/howbrowserswork/

THE BROWSER COMPONENTS



http://www.html5rocks.com/en/tutorials/internals/howbrowserswork/

THE BROWSER COMPONENTS

- **The User Interface**
  - Address bar, back/forward buttons and all other parts of the browser display except the main content area.
- **The Browser Engine**
  - Controls the interaction of the UI and rendering engine
- **The Rendering (Layout) Engine**
  - Responsible for parsing and displaying the content
- **Networking**
  - Used for networking calls like HTTP. Uses a platform independent interface with a platform specific implementation underneath.

THE BROWSER COMPONENTS

- **UI Backend**
  - Used for drawing basic widgets like combo boxes and windows. This backend exposes a generic interface that is not platform specific. Underneath it uses operating system user interface methods.
- **JavaScript Interpreter**
  - Parses and Executes JavaScript
- **Data Storage**
  - A persistence layer. The browser needs to save various things to the system hard disk, some examples are cookies, cache items, bookmarks. HTML5 spec defines a 'Indexed Database' which is a lightweight database in the browser and 'Web Storage' which is a simple key value store.
  - http://www.html5rocks.com/en/features/storage

RENDERING/LAYOUT ENGINE

The rendering (layout) engine parses the marked up content (HTML) and formatting information (CSS) and displays it on the screen.

Each browser has a different rendering engine

- **Firefox – Gecko**
- **Safari – Webkit**
- **Chrome – Webkit (Version < 27, Blink (Version > 28)**
- **Internet Explorer – Trident**
- **Opera – Presto (Version < 15), Blink (Version > 15)**
- **Konqueror – KHTML**
  - Developed by KDE project. Webkit is a forked version.
- **http://en.wikipedia.org/wiki/List_of_layout_engines**

A description of browser parsing and rendering of content is available at this link.

- **http://www.html5rocks.com/en/tutorials/internals/howbrowserswork/**

JAVASCRIPT ENGINE

- **JavaScript engine parses, interprets, and executes JavaScript (or ECMAScript).**
- **There has been a race for who can develop the fastest JavaScript engine.**
- **New generation engines implement just-in-time compilation (JIT)**
  - Program code is stored in memory
  - Code can be compiled to native machine code just before it is executed
  - Provides high-speed execution of interpreted or byte code

JAVASCRIPT ENGINE

JavaScript Engines implementing JIT variations

- **Firefox – SpiderMonkey → IonMonkey and JägerMonkey compilers**
- **Chrome, node.js – V8**
- **Safari – SquirrelFish also known as Nitro**
- **Opera – Carakan (version 10.5 – 14), V8 (version 15+)**
- **IE >= 9 – Chakra**
  - Before IE 9 was just called JScript and was a component of the Trident rendering engine.
- **http://en.wikipedia.org/wiki/List_of_ECMAScript_engines**

ITMD-461

INTRODUCTION TO THE TECHNOLOGIES

INTRODUCTION TO THE TECHNOLOGIES

Meet the technologies

- **HTML**
- **CSS**
- **JavaScript (ECMAScript)**

These are called "client side technologies" and the browser is referred to as a client, also called a User Agent.

What about "Server Side" and "backend" code?

- **Can be almost any language including but not limited to: PHP, Ruby, Python, Java, C#, Visual Basic, C, C++, Perl, JavaScript, and more…**
- **http://en.wikipedia.org/wiki/Server-side_scripting**

HTML

- **HTML – HyperText Markup Language**
- **HTML was invented in the early 90s - see the "dive into html 5" on blackboard for more details – created by Tim Berners-Lee**
- **http://en.wikipedia.org/wiki/HTML**
- **HTML is the CONTENT layer of your webpage / website. HTML provides the STRUCTURE and SEMANTIC meaning of your content**
- **Your HTML is how Google, Google spiders, and other search bots, see your page, so make it good.**
- **We are on HTML version 5**
  - Published as a W3C recommendation in October 2014

HTML

Major Version History

- **HTML Tags – Informal CERN document with 18 tags, October 1991**
- **HTML 1.1 – First draft with a version number, November 1992**
- **HTML 2.0 – Published as IETF RFC 1866, November 1995**
- **HTML 3.2 – Published as W3C recommendation, January 1997**
- **HTML 4.0 – Published as W3C recommendation, December 1997 and reissued in April 1998 with minor edits**
- **HTML 4.1 – Published as W3C recommendation, December 1999**
- **HTML 5 – Published as W3C recommendation, October 2014**
- **XHTML 1.0 – Published as W3C recommendation, January 2000 and reviesed in April 2002**
- **XHTML 1.1 – Published as W3C recommendation, May 2001 and based on XHTML 1.0 Strict**
- **XHTML 2.0 – Was a working draft but abandoned in 2009 in favor of HTML5**

CSS

- CSS – Cascading Style Sheets
- http://en.wikipedia.org/wiki/Cascading_Style_Sheets
- CSS provides a mechanism to DECORATE your html tags.
- CSS is the PRESENTATION layer of your website / web page
- CSS allows you to make style rules to govern position, colors, fonts, images, and other visual formatting to your HTML tags
- CSS is directly integrated with HTML through the selectors you use to choose which elements to style
- Currently using CSS 2.1 and CSS 3

CSS

Version History

- **CSS 2 – Published as a recommendation May 1998**
- **CSS 2.1 – Published as a recommendation June 2011**
  - Single large specification
- **CSS 3 – Current standard being worked on**
  - Full specification is split up into modules
  - As many as fifty modules in working drafts
  - Started being worked on when CSS 2 was published
  - Earliest CSS 3 drafts were June 1999
  - Four modules published as official recommendations
    - Media Queries, Selectors Level 3, Namespaces, Color
- **http://www.w3.org/Style/CSS/specs**

JAVASCRIPT

JavaScript – ECMA compliant Object Oriented language

http://en.wikipedia.org/wiki/JavaScript

JavaScript or JS is the BEHAVIOR layer of your web page or website.

JavaScript is a programming language.

It is capable of the following

- **Moving things around the screen**
- **Manipulating HTML tags and CSS rules**
- **Implementing cool browser APIs like location and local storage.**
- **And much more...**

JAVASCRIPT

- Originally developed by Brendan Eich at Netscape
- Developed with code name Mocha, then officially called LiveScript in beta Netscape Navigator 2 in Sept 1995.
- Renamed JavaScript before final release of Netscape Navigator 2 (B3). Marketing ploy by Netscape to cash in on the popularity of the new language Java which was also included in Netscape 2.
- November 1996 – Netscape submitted JavaScript to Ecma International to be considered a standard.
- June 1997 – Ecma International published the ECMA-262 Specification in version 1.
- Current version of the ECMAScript standard is 5.1 and was published in June 2011
- Current version of JavaScript is 1.8.5 and is compliant with ECMAScript 5.0 and was published July 2010.

SERVERS

- **The server is just a powerful computer with a lot of processors and a lot of RAM**
- **The server listens for HTTP requests and serves responses to clients when requested**
- **To set up a server, we must have 3 things**
  - Static IP Address / constant internet connection
  - Domain Name mapped to the static IP address
  - Apache, IIS, or other web server software running and configured with the IP address and Domain name information

SERVER SIDE/ BACKEND CODE

- Backend technology allows you to use various programming languages on the server. Server side code is processed by code execution processes on the server, and may integrate with a database and the file system of the server.
- Server side code can react to HTTP GET requests, HTTP POST information as a result of a client filling out a form, or any of the other HTTP methods
- Server side code reacts to method requests, runs some code and talks to databases, and returns HTML, CSS, and JavaScript
- We do not discuss these technologies in detail in this class. Future classes will discuss these concepts.

ITMD-461

INTRO TO HTML

INTRO TO HTML

- HTML is a Markup Language, it is not a programming language
- HTML is PARSED
- HTML needs valid structure to be parsed accurately
- if you loose the formatting in Microsoft word doc it does not know how to display the page. If your markup is invalid the browser does not know how to display the page.
- HTML is used to structure content on a webpage and provide SEMANTIC meaning of your content

INTRO TO HTML

- **Files should end with .html extension, .htm is a common alternative but I suggest .html**
- **Do not use spaces in a file name or any special chars**
  - Common to use _ or – instead of space
- **Limit filename to letters, numbers, underscores, hyphens and periods.**
- **Filenames may be case-sensitive on some OS's**
- **Shorter filenames are better**
- **All lower case letters with hyphens separating words is a common convention**
- **The browser will ignore extra whitespace, line breaks, unrecognized markup and comments**

INTRO TO HTML

HTML is comprised of text and tags. Tags follow a specific pattern and must be formatted correctly.

HTML vs XHTML

- **Previous versions were HTML 4.01 and XHTML 1**
- **Now we will be using HTML5 influenced by some XHTML syntax**
  - All tags should be lowercase
  - All tags should be opened and closed properly
  - All attributes in tags should be properly quoted
  - All tags should be properly nested

ANATOMY OF AN HTML TAG

Google

- **The < is the OPENING angle bracket. The angle bracket tells the browser that markup is starting**
- **“a” is the ELEMENT. All HTML tags are comprised of elements and attributes.**
- **href="" is an ATTRIBUTE. HTML tags can have one or more attributes applied to them. Attributes follow name/value pair convention. href is the NAME, http://www.google.com is the VALUE**
- **“Google” is the TEXT NODE VALUE of the html tag, this is the text a user will see**
- ** is the CLOSING TAG. It repeats the element with a forward slash before it**

Do not use the typographic curly quotes “ ”, use straight " " quotes instead. Curly quotes will break your markup. Biggest culprit is not using a plain text editor or coping and pasting carelessly.

BASIC HTML PAGE SKELETON STRUCTURE

There are 4 main components to a proper HTML5 skeleton structure.

- **A doctype declaration – to let the browser know the mime type of this document**
- **A html root element**
- **A head section with information describing the page**
- **A body section for the part of the web page the user will see. This contains all the content.**

All pages should have this basic structure. All assignments should follow this structure.

Let's look at what that basic page structure looks like. Also on page 56 in the book.

HTML5 SKELETON PAGE STRUCTURE

```
<!DOCTYPE html>
<html>

    <head>
        <meta charset="utf-8">
        <title>Title Here</title>
    </head>

    <body>
    Page content here
    </body>

</html>
```

BASIC TAG OVERVIEW

The following tags are the most basic HTML tags and you should memorize them and their major attributes.

- **<h1>Head</h1> thru <h6>Head</h6>**
- **<img src="imagename.jpg" alt="" >**
- **contact us**
- ** Here is a paragraph **
- ** Here is a division or container **
- **This is a span in a sentence.**
- **Strong Importance**
- **Emphasized text**
- **
 or
**

BUILD A BASIC PAGE DEMO

BASIC PAGE DEMO

Let's go through the sample page in chapter 4.

ITMD-461

READINGS AND ASSIGNMENTS

READING & ASSIGNMENTS

Book

- **Read through chapter 6 for next week. You should already have read through chapter 4 per the syllabus.**
- **Start reading Chapter 1 (up to page 34) in "Dive into HTML 5" book I uploaded to blackboard.**

Online

- **Read each Wikipedia page on our core technologies**
- **HTML - http://en.wikipedia.org/wiki/HTML**
- **CSS - http://en.wikipedia.org/wiki/Cascading_Style_Sheets**
- **JavaScript - http://en.wikipedia.org/wiki/JavaScript**

Assignment

- **Lab 1. All details are posted in blackboard. Due Jan 30 by 11:59pm Chicago Time**