

Web Systems

Lecture on HTML and XHTML, Web Browsers, and Web Servers

References:

- * Fundamentals of Web Development," 2nd, 2018 ed., by Randy Connolly and Richard Hoar, from Pearson
- *Chapter 2 of the Book: Programming the World Wide Web, 8th ed, by Robert W. Sebesta, from Pearson
- *Internet & World Wide Web How to Program, 5th ed, by Paul Deitel, et. al., From Pearson
- *Webmaster in a Nutshell, by Stephen Spainbour & Robert Eckstein, from O'Reilly
- *E-Book on Building Web Applications with HTML, 2012, by Paul I. Lin, http://www.etcs.ipfw.edu/~lin/CECourses/2_HTML/CE_02WebHhtmlindex.html

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Topics

- Introduction to HTML Documents
- Versions of HTML
- HTML5 Standards
- Topics on Web Browsers and Web Servers
- A Basic Web Site - Design

HTML Documents

■ HTML

- A structured language defines syntax and placement of WWW document for Web browsers.
- The HTML syntax contains definitions of tags and attributes that allows the separation of the presentation and structure of a document.
- It enables the creation of machine independent WWW documents.

■ References of HTML standards

- **HTML 5 W3C Recommendation, Oct. 28, 2014,**
<http://www.w3.org/TR/html5/>

Web Pages - HTML Documents

- A **Web page** normally includes text (content of the page) that mixed with "markup" tags for describing its structure, appearance, and function of the content.
- The HTML (**HyperText Markup Language**) language is a document-layout and hyperlink-specification language for encoding Web pages or documents, which may include text, image, and other supported media.

Web Pages - HTML Documents

- A **HTML web page** may include the following information
 - **Text** of its document with appropriate layout settings such as front, color, alignment, numbered and bulleted lists, etc; any **hypertext links** to other documents, images, and other media; tables and user feedback form
 - Embedded **client-side scripts** such as JavaScript
 - Embedded **images and media**
 - Embedded **other objects** such as Java Applet program, ActiveX, audio, video, and VRML objects
 - Embedded video, audio, and other formats via Plug Ins

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Evolution of HTML Specifications

- HTML 2.0 was published as IETF RFC 1866 in 1995, <https://tools.ietf.org/html/rfc1866>
- HTML 3.2 was published as a W3C Recommendation in 1997, <http://www.w3.org/MarkUp/Wilbur/>
- HTML 4.01 was approved by W3C in 1999, <http://www.w3.org/TR/REC-html40/>
- XHTML 1.0 was approved by W3C in early 2000 for replacing HTML 4.01, <http://www.w3.org/TR/xhtml1/>
- HTML 5 W3C Recommendation, Oct. 28, 2014, <http://www.w3.org/TR/html5/>
- HTML 5.1 was published as a W3C recommendation, in Nov. 1, 2016, <http://www.w3.org/TR/html51/>
- HTML 5.2, Dec. 14, 2017, <http://www.w3.org/TR/html52/>

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HTML5 Semantics, Structure and APIs

- **HTML 5** – A vocabulary and associated APIs for HTML and XHTML
- **Documents** elements are defined by tags
 - **Opening tag**: `<name_of_the_tag>`
Document Contents
 - **Closing tag**: `</name_of_the_tag>`
 - **Comments**: `<!-- -->`
- **Elements**
 - Content Models
 - Global Attributes

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HTML5 Semantics, Structure and APIs

- HTML 5, <http://www.w3.org/TR/html5/>
- The Elements of HTML
 - The **root** element: `<html>` `</html>`
 - Document **Metadata**: `<head>`, `<title>`, `<base>`, `<link>`, `<meta>`, `<style>`
 - **Sections**: `<body>`, `<article>`, `<section>`, `<nav>`, `<aside>`, `<h1>`, `<h2>`, `<h3>`, `<h4>`, `<h5>`, `<h6>`, `<header>`, `<footer>`, `<address>`

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HTML5 Semantics, Structure and APIs

- HTML 5, <http://www.w3.org/TR/html5/>
- The Elements of HTML (continue)
 - **Grouping** content: <p>, <hr>, <pre>, <blockquote>, , , , <dl>, <dt>, <dd>, <figure>, <figcaption>, <div>, <main>
 - **Text-Level Semantics**: <a>, , , <small>, <s>, <cite>, <q>, <dfn>, <abbr>, <data>, <time>, <code>, <var>, <samp>, <kbd>, <sub>, <sup>, <i>, , <u>, <mark>, <ruby>, <rb>, <rt>, <rtc>, <rp>, <dbi>, <bdo>, ,
, <wbr>

HTML5 Semantics, Structure and APIs

- HTML 5, <http://www.w3.org/html/wg/drafts/html/CR/>
- The Elements of HTML (continue)
 - **Edits**: <ins>,
 - **Embedded contents**: , <iframe>, <embed>, <object>, <param>, <video>, <audio>, <source>, <track>, <map>, <area>
 - **Links**: <a>, <alternate>, <author>, <bookmark>, <help>, <icon>, <license>, <nofollow>, <noreferrer>, <prefetch>, <search>, <stylesheet>, <tag>, <next>, <prev>

HTML5 Semantics, Structure and APIs

- HTML 5, <http://www.w3.org/TR/html5/>
- The Elements of HTML (continue)
 - **Tabular Data:** <table>, <caption>, <colgroup>, <col>, <tbody>, <thead>, <tfoot>, <tr>, <td>, <th>
 - **Forms:** <form>, <label>, <input>, <type>, <button>, <select>, <datalist>, <optgroup>, <option>, <textarea>, <keygen>, <output>, <progress>, <meter>, <fieldset>, <legend>, ...
 - **Scripting:** <script>, <noscript>, <template>, <canvas>

HTML5 Semantics, Structure and APIs

- HTML 5, <http://www.w3.org/TR/html5/>
- The INPUT Elements within the FORM Element
 - Text (type = text)
 - Telephone (type=tel)
 - URL (type=url)
 - Email (type=email)
 - Password (type=password)
 - Date (type = date)
 - Number (type = number)
 - Range (type=range)
 - Color (type=color)

HTML5 Semantics, Structure and APIs

- HTML 5, <http://www.w3.org/TR/html5/>
- The INPUT Elements within the FORM Element
 - Checkbox (type = checkbox)
 - Radio Button (type=radio)
 - Submit Button (type=submit)
 - Button (type=button)
 - Image Button (type=image)
 - Reset Button (type=reset)
 - File Upload (type=file)

HTML5 Semantics, Structure and APIs

- HTML 5, <http://www.w3.org/TR/html5/>
- INPUT Elements Attributes
 - maxlength, minlength
 - size
 - readonly
 - required
 - multiple
 - pattern
 - min, max
 - list
 - placeholder

HTML5 Semantics, Structure and APIs

- HTML 5, <http://www.w3.org/TR/html5/>
- Other Elements within Form Element
 - button
 - size
 - datalist
 - optgroup
 - option
 - textarea
 - keygen
 - output
 - progress
 - fieldset
 - legend

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Standard XHTML Document Structure

- Every XHTML document must begin with:
<!DOCTYPE html>
<html>, **<head>**, **<title>**, and **<body>** are required in every document (in XHTML, not HTML)
- The whole document must have **<html>** as its root
- html must have the lang attribute:
<html lang = "en"> (this one is for English)
- A document consists of a head and a body
- The **<title>** tag is used to give the document a title,
- The meta tag is used to provide the character set used
<meta charset = "utf-8" />
- UTF-8: 8-bit Unicode Transformation Format or ASCII characters

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Basic Text Markup

- Paragraph elements: <p> tag

```
<!DOCTYPE html>
<!-- welcome.html -->
<html lang = "en">
  <head>
    <title> Welcome to our Web site </title>
    <meta charset = "utf-8" />
  </head>
  <body>
    <p> Greeting from all of us!
  </p>
</body>
</html>
```

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welcome.html

- Microsoft Expression Web 4 – Web page authoring software

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0
Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-
transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <meta content="text/html; charset=utf-8" http-equiv="Content-
    Type" />
    <meta content="en-us" http-equiv="Content-Language" />
    <title>Greeting from all of us</title>
  </head>
  <body>
    <p>Greeting from all of us</p>
  </body>
</html>
```

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URL for the Web Page: htmlstruc.html

http://www.etcs.ipfw.edu/~lin/CECourses/2_HTML/Lectures/3_HTMLBasics.html

```
<html>
<!-- htmlstruc.html
      Author:
      Version:
-->
<head>
<title> Basic html Document Structure/Template </title>
</head>
<body>
<!-- Contents of html Document -->
<h1> Basic html Document Structure/Template </h1>
</body>
</html>
```

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URL for the Web Page: htmlstruc.html

Structured Markup Tags (for overall document)

<u>Begin Tag</u>	<u>End Tag</u>	<u>Meaning</u>
<html>	</html>	Placed at the beginning and end of the document
<head>	</head>	Define the header portion
<title>	</title>	Define the title of the document
<body>	</body>	Define document body
<!--	-->	One line comment
<!-- This is a comment -->		

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Optional Elements

- **<base>** -- Establish the document base location
- **<meta>** -- Provide keywords, descriptions to search engines, and client pull functions
- **<link>** -- Link a document to another document or an external style sheet
- **<script>** -- Add JavaScripts and VBScripts
- **<style>** -- Add embedded style sheet

Base Tag Example,

http://www.etcs.ipfw.edu/~lin/CECourses/2_HTML/03HTMLBasicsExs/basehref.html

```
<html>
<!-- basehref.html -->
<title> BASE href testing </title>
<head>
  <base href="http://www.etcs.ipfw.edu/~lin/html/">
</head>
<body>
  <h1>
    <!-- The file "headers.html" is located in the <BASE
    href="http://www.etcs.ipfw.edu/~lin/html/" -->
    <a href="headers.html"> Header Example
    <br>
  </h1>
</body> </html>
```

Web Browsers and Web Pages

- A web browser is a software application program for retrieving, presenting, and traversing information resources on the World Wide Web, (source: https://en.wikipedia.org/wiki/Web_browser)
- The major web browsers are
 - Firefox, <https://www.mozilla.org/en-US/firefox/new/>
 - Internet Explorer (IE), <http://windows.microsoft.com/en-us/internet-explorer/download-ie>
 - Google Chrome, <http://www.google.com/chrome/index.html>
 - Opera, www.opera.com
 - Safari, <https://support.apple.com/downloads/safari>
 - dia.org/wiki/Web_browser

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Web Browsers

- 2017 Internet Browser Software Product Comparisons, <http://internet-browser-review.toptenreviews.com/>
- Mozilla Firefox – Gold Award
- Google Chrome
- Opera
- Safari
- Internet Explorer
- Torch

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Web Browsers Market Shares

- Browser & Platform Market Share, July 2017, <https://www.w3counter.com/globalstats.php>
- Chrome 64.0%
- Safari 13.6%
- Internet Explorer & Edge 8.0%
- Firefox 6.8%
- Opera 3.2%

Web Browsers Market Shares

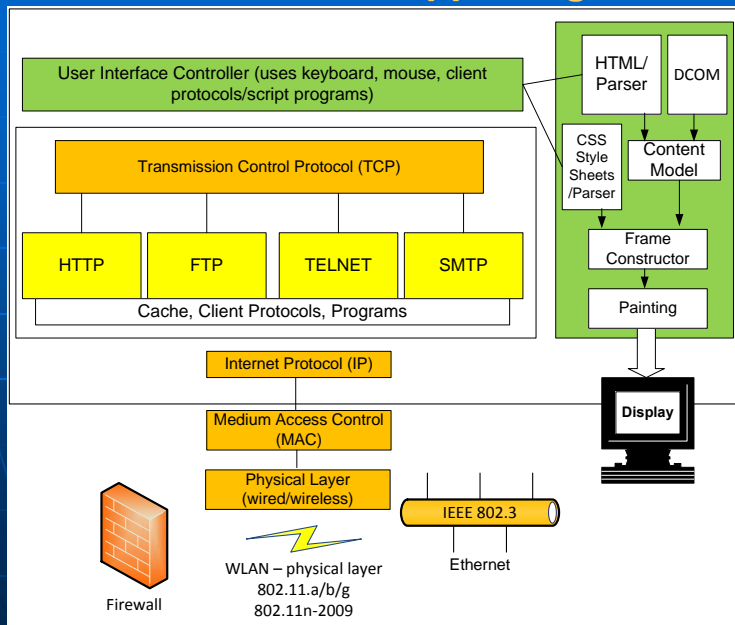
- Desktop Browser Version Market Share, Aug. 2018, <https://www.netmarketshare.com/browser-market-share.aspx>
 - Chrome 62%
 - Internet Explorer 11.87%
 - Firefox 10.79%
 - Microsoft Edge 4.29%
 - Safari 3.83%
 - Sogou Explorer 1.58%
 - Opera 1.52%
 - QQ 1.46%

Web Server Survey - Netcraft

Netcraft Web Server Survey

- May 2017 Web server survey,
<https://news.netcraft.com/archives/2017/05/25/may-2017-web-server-survey.html>
 - Microsoft IIS – 49.1%
 - Apache – 20.95%
 - NGINX – 29.22%
 - Google – 1.05%

Web Browser and Supporting Protocols



Web Browsers and Web Pages

- HTML 5, <http://www.w3.org/html/wg/drafts/html/CR/>
- The **Window** object
 - The **WindowProxy** object
- Session History and Navigation
 - The **History** interface, The **Location** interface
- Web application APIs
 - The **ErrorEvent** interface
 - **Events**: **Document** objects and **Window** objects
 - **Dynamic markup insertion**: `document.write()`, `document.writeln()`
 - Timers
 - User prompts
 - System state and capabilities
 - User interaction

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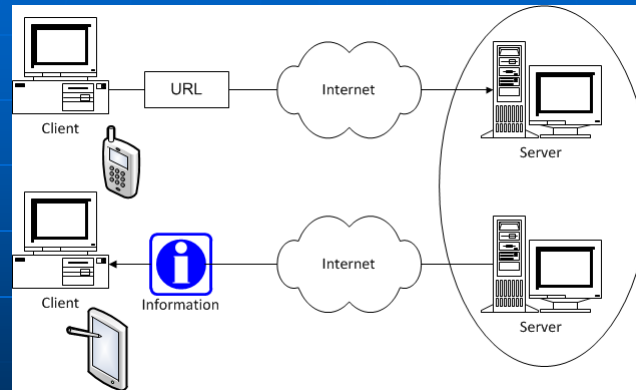
Web Browsers Monitoring Tools

- **Employee Monitoring Software**
 - Program activity
 - Screen shots
 - Email/Webmail
 - Document Tracking
 - Websites visited
 - Online Searches
 - Chat/IM
 - Detected Keywords
 - Keystrokes
 - Logon/Logoff

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Web Client-Server Computing Model



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Design & Build A Web Site

■ Web Site Design

- Types of Web Site: E-commerce, Business and Services, Topic sites, personal sites,
- System requirements – Analysis Phase
- Modular Design – Design Phase
 - Presentation tier, Business logic tier, Data tier
- Web server
 - Apache, IIS (Microsoft Internet Information Server), IBM WebSphere
- Application server
- Database server
- Application authoring and Programming Tools

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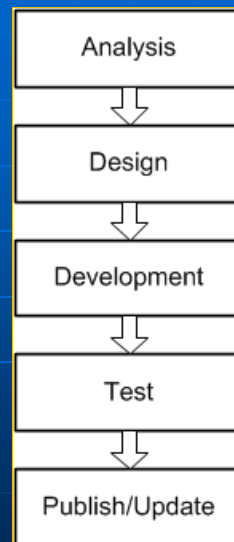
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Software for Web Site Design

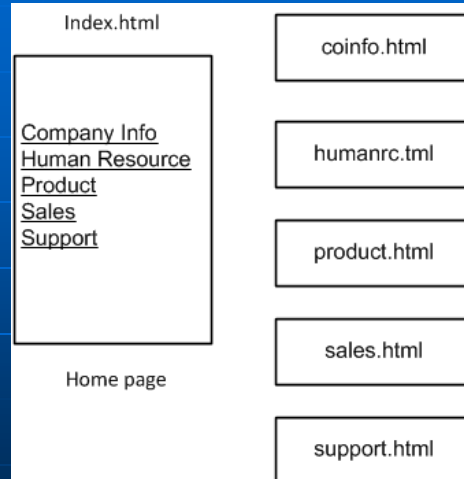
- HTML (HyperText Markup Language) Web page authoring
- XML (eXtensible Markup Language) page authoring
- Common Gateway Interface programming
- Generating and parsing HTML and XML
- Creating dynamic HTML pages
- HTTP clients and server Apps
- Web site management
- Databases and Apps
- Web applications

Design & Build An E-Commerce Site

- Web Site Design
 - Business and Services
 - System requirements
 - Modular Design
 - Web server
 - Database server
 - Application server
 - Programming Tools



Design - A Company Web Site



Summary