Web and HTML Basics
A Complicated Ecosystem
The Client-Server Model

The Request-Response Loop
Definitions and History

Static Websites look identical for all users at all times
Definitions and History

Dynamic Websites: content is generated at run time, and page content varies from user to user
HTTP and Headers

HTTP stands for Hyper-Text Transfer Protocol.
Request headers include data about the client machine.
Response headers have information about the server answering the request and the data being sent.
The browser interprets HTML (HyperText Markup Language), CSS (Cascading Style Sheets), and JavaScript (client-side), and then renders the page. The web server interprets server-side languages, communicates with the database if necessary, and sends HTML back to the browser.
Web Servers

• A web server is nothing more than a computer that responds to HTTP requests.

• Webservers must choose an application stack to run a website. This application stack will include an
  • operating system,
  • web server software,
  • a database,
  • and a server-side scripting language for dynamic requests
Web Servers

We will rely on the LAMP software stack, which refers to

- **Linux** operating system,
- **Apache** web server,
- **MySQL** database, and
- **PHP** scripting language

Other stacks include:

- **WISA**: **Windows**, **IIS** web server, **SQL Server**, **ASP.net**
- **MERN**: **MongoDB**, **Express.js** (application framework / operating system), **React.js** (JavaScript library), **Node.js** (server-side JavaScript framework)
- **MEAN**: **MongoDB**, **Express.js** (application framework / operating system), **Angular.js** (JavaScript framework), **Node.js** (server-side JavaScript framework)
Software: Many Options

DATABASE SOFTWARE
- MySQL
- PostgreSQL
- Sqlite
- Oracle
- IBM DB2
- Microsoft SQL Server
- MongoDB

SCRIPTING SOFTWARE
- PHP
- ASP.NET
- Python
- Node.js
Why PHP?

<table>
<thead>
<tr>
<th>Language</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHP</td>
<td>77.8%</td>
</tr>
<tr>
<td>ASP.NET</td>
<td>7.3%</td>
</tr>
<tr>
<td>Ruby</td>
<td>5.2%</td>
</tr>
<tr>
<td>Java</td>
<td>4.6%</td>
</tr>
<tr>
<td>Scala</td>
<td>2.8%</td>
</tr>
<tr>
<td>JavaScript</td>
<td>2.0%</td>
</tr>
<tr>
<td>static files</td>
<td>1.9%</td>
</tr>
<tr>
<td>Python</td>
<td>1.3%</td>
</tr>
<tr>
<td>ColdFusion</td>
<td>0.3%</td>
</tr>
<tr>
<td>Perl</td>
<td>0.1%</td>
</tr>
<tr>
<td>Erlang</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

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Percentages of websites using various server-side programming languages

Note: a website may use more than one server-side programming language
HTML Overview
HTML Commands

Commands are called tags

Each tag is surrounded by <>

Some tags need ending tags containing /
  e.g. <h1> ... </h1>

Tags are not case sensitive, but best practice is to use lower case

Indentation and spacing are used to make the code more readable
Basic Structure

The html tags begin and end the document.

The head tags contain information about the web page and should appear only once.

The body tags contain the visible part of the web page and appear only once.

<html>
<head>

... 

</head>
<body>

... 

</body>
</html>
<!DOCTYPE html>
<html lang="en">
    <head>
        <meta charset="utf-8">
        <title></title>
    </head>
    <body>
        ...
    </body>
</html>
Creating your HTML file

Notepad++, Sublime Text, BBEdit (Mac)
- Save your file by choosing Save As
- Give your file a simple name and use the .html or .htm extension
- Change the Save As Type to All Files to avoid the .txt default extension

IDE’s
- Visual Studio Code
- Aptana
- Komodo (Mac compatible)
- PHP Storm
- NetBeans
- Dreamweaver
Viewing your file in a browser

Launch the Browser

From the File menu, choose Open. Click the Browse button

Locate your html file

(Or in Chrome, simply drag the file to an empty tab)

This only works if there are no server-side scripts.

If a server-side script is involved, the file must be uploaded to a web server and accessed from a URL.
Viewing changes

As you work on your file locally, you can simply Save any changes once your file is named correctly.

If the page is loaded in the Browser already, click the Refresh button to see the changes.
Entering Text

Enter text in the body section with the following optional tags:

Line break: `<br>`

Paragraph tags insert white space: `<p> </p>`

Heading tags
- Select heading size: h1 through h6
- Use a corresponding ending tag

`<h1>` is the largest
`<h3>` or `<h4>` are normal
`<h6>` is the smallest
Example

<html>
<head>
</head>
<body>

Here is a sample <br> web page
<p>It uses paragraph tags</p>
<h1>and heading tags</h1>
</body>
</html>
Some Style Elements

Strong: `<strong> ... </strong>`

Italics (emphasis): `<em> ... </em>`

Underline: `<u> ... </u>`

Tags may be nested as follows:
`<strong><em> CSC455 </em></strong>`

But don’t allow them to cross:
`<strong><em> CSC455 > </em></strong>`
Titles

The `<head>` section of an HTML document contains information about the page.

The `<title></title>` tags are placed in the `<head>` section to give the page a name. The text contained between the tags will appear in the title bar of the browser.

Formatting has no effect.

Additional information in the `<head>` section might be keywords for searching, meta information or comments, for example.
Example

<html>
  <head>
    <title>CSC 465 Example Web Page</title>
  </head>
  <body>
  
  </body>
</html>
## Common HTML character entities

<table>
<thead>
<tr>
<th>Entity</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>&amp;</td>
<td>&amp;</td>
</tr>
<tr>
<td>&lt;</td>
<td>&lt;</td>
</tr>
<tr>
<td>&gt;</td>
<td>&gt;</td>
</tr>
<tr>
<td>©</td>
<td>©</td>
</tr>
<tr>
<td>®</td>
<td>®</td>
</tr>
<tr>
<td>™</td>
<td>™</td>
</tr>
<tr>
<td>‘</td>
<td>‘ (opening single quote)</td>
</tr>
<tr>
<td>’</td>
<td>’ (closing single quote or apostrophe)</td>
</tr>
<tr>
<td>“</td>
<td>“ (opening double quote)</td>
</tr>
<tr>
<td>”</td>
<td>” (closing double quote)</td>
</tr>
<tr>
<td> </td>
<td>A non-breaking space. It will always be displayed</td>
</tr>
</tbody>
</table>

A complete list can be found at: [http://www.w3.org/MarkUp/html-spec/html-spec_13.html](http://www.w3.org/MarkUp/html-spec/html-spec_13.html)
Best Practices

Use all lower-case except for the DOCTYPE element
Use double quotes for all attribute values
Make sure any copied quotes are straight
# The primary HTML5 Semantic Elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>header</td>
<td>Introductory content.</td>
</tr>
<tr>
<td>main</td>
<td>The main content of the document.</td>
</tr>
<tr>
<td>section</td>
<td>A thematic grouping of content, typically with a heading.</td>
</tr>
<tr>
<td>article</td>
<td>Independent, self-contained content.</td>
</tr>
<tr>
<td>nav</td>
<td>A section containing links to other places or placeholders.</td>
</tr>
<tr>
<td>aside</td>
<td>A sidebar related to nearby content.</td>
</tr>
<tr>
<td>footer</td>
<td>The bottom content.</td>
</tr>
</tbody>
</table>

*Use div tags only when the HTML5 semantic elements don’t apply.*
## Some Basic Block Elements

<table>
<thead>
<tr>
<th>Element</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>p</code></td>
<td>paragraph</td>
</tr>
<tr>
<td><code>h1</code></td>
<td>largest heading</td>
</tr>
<tr>
<td><code>h6</code></td>
<td>smallest heading</td>
</tr>
<tr>
<td><code>div</code></td>
<td>generic block element</td>
</tr>
<tr>
<td><code>hr</code></td>
<td>horizontal rule (a line spanning the page)</td>
</tr>
<tr>
<td><code>ol</code> / <code>ul</code></td>
<td>ordered list / unordered list</td>
</tr>
<tr>
<td><code>li</code></td>
<td>list item (within an ordered or unordered list)</td>
</tr>
</tbody>
</table>

*Use div tags only when the HTML5 semantic elements don’t apply.*
San Joaquin Valley Town Hall

Welcome to San Joaquin Valley Town Hall.

We have some amazing speakers in store for you this season!

&copy; Copyright 2009 San Joaquin Valley Town Hall.
A page with header, section, and footer elements:

```html
<body>
  <header>
    <h1>Town Hall</h1>
  </header>
  <section>
    <p>Welcome to the Town Hall Website. </p>
    <p>We have some fascinating speakers for you this season!</p>
  </section>
  <footer>
    <p>&copy; Copyright 2012 San Joaquin Town Hall.</p>
  </footer>
</body>
```
Some Basic Inline Elements

<table>
<thead>
<tr>
<th>Tag</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>anchor tag, used for creating hyperlinks</td>
</tr>
<tr>
<td>img</td>
<td>image tag, used for including graphics</td>
</tr>
<tr>
<td>br</td>
<td>line break tag</td>
</tr>
<tr>
<td>code</td>
<td>used to represent programming code</td>
</tr>
<tr>
<td>span</td>
<td>generic inline element</td>
</tr>
</tbody>
</table>

Use span tags only when the HTML5 semantic inline elements don’t apply.
HTML attributes generally appear as name-value pairs, separated by =, and are written within the start tag of an element, after the element's name:

```html
<tag attribute="value"> content to be modified by the tag < / tag>
```

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>id</td>
<td>uniquely identifies the element on a page, must be distinct from other ids on the page</td>
</tr>
<tr>
<td>class</td>
<td>specifies a style class to apply consistent styles to all elements belonging to the same class</td>
</tr>
</tbody>
</table>
Anchor Element

• Specifies a hyperlink reference (href) to a file
• Text between the <a> and </a> is displayed on the web page.

<a href="contact.html">Contact Us</a>
<a href="http://uncw.edu">UNCW</a>

• href attribute
  ◦ Indicates the file name and a relative path or a full URL including http://
Absolute & Relative Hyperlinks

Absolute link
◦ Link to other websites

<a href="http://yahoo.com">Yahoo</a>

Relative link
◦ Link to pages on your own site

<a href="index.htm">Home</a>
Examples

Examples of relative and root relative URLs

Relative URLs that navigate up from the current folder

`../index.html` *up one level*

`../..//index.html` *up two levels*

Root relative URLs begin with `/` - do not use this type of referencing because it does not port well?

`/login.html` (refers to root\login.html)

`/images/logo.gif` (refers to root\images\logo.gif)
Examples

Basic attribute of the <a> tag: href

A link to a web page in the same directory:

<p>Go view our <a href="products.html">product list</a></p>

A link to a web page in a subdirectory of the parent directory:

<p>Read about the <a href="../company/services.html">services we provide</a></p>
Lists

Ordered lists are numbered:

<ol>
  <li>One</li>
  <li>Two</li>
  <li>Three</li>
</ol>

The li tag stands for *list item*
More Lists

Unordered lists are bulleted:

<ul>
  <li>One</li>
  <li>Two</li>
  <li>Three</li>
</ul>

The HTML at the left creates the following list:

- One
- Two
- Three
Validation: validator.w3c.org

W3C Markup Validation Service
Check the markup (HTML, XHTML, ...) of Web documents

Validate by URI  Validate by File Upload  Validate by Direct Input

Validate by File Upload
Upload a document for validation:

File: Browse... Lab0280L.html

More Options

Character Encoding (detect automatically)  Only if missing
Document Type (detect automatically)  Only if missing

List Messages Sequentially  Group Error Messages by Type
Show Source  Clean up Markup with HTML-Tidy
Show Outline  Validate error pages  Verbose Output

Note: file upload may not work with Internet Explorer on some versions of Windows XP Service Pack 2, see our information page on the W3C QA Website.