Announcements

- Instructor: Nelson Padua-Perez (nelson@cs.umd.edu).
- TA: Kelly Lai (kellylai@mail.umd.edu).
- Class Web Site:
  http://www.cs.umd.edu/class/winter2009/cmsc298d/
- No posting of code in the forum.
- Password protected sections.

Fundamentals: Client/Server

- Client and server are two terms frequently used
- Client/Server Model
- Client/Server Model when talking about software
- Client/Server Model when talking about hardware

Fundamentals: IP Addresses

- **IP Address** - Unique address for machine on internet
  - Get from ISP when connecting to internet
  - Allows network to find your machine
- **Format**
  - 32-bit unsigned integer ➔ 128.8.128.8
- **Domain Name**
  - Text name corresponding to the numeric IP address
  - Example: www.wikipedia.org
- **Name and address for local machine**
  - localhost
  - 127.0.0.1
- **Running out of 32-bit IP addresses (new IPV6)**
- **Port Number – Identifies application/service in a computer**

Fundamentals: Web Server

- Web Server
  - Computer program that delivers (serves up) web pages.
  - It is like a person that is in charge of a warehouse.
- Popular Web Server Programs
  - Apache - http://www.apache.org/ Free!!!
  - IIS – Internet Information Services
  - Sun Java System Web Server
- You can install and run a web server in your computer.
- Local address: http://localhost or http://127.0.0.1/
- If you use a port different from default (80) you must specify it (e.g., http://127.0.0.1:8080/)
- Web server statistics
  - http://survey.netcraft.com/Reports/200810/
  - http://survey.netcraft.com/Reports/current/graphs.html

Fundamentals: DNS

- DNS – Domain Name Systems
- Protocol for translating domain names to IP addresses
  - Example: cs.umd.edu → 128.8.128.44
- Multiple DNS servers on internet
- DNS server may need to query other DNS servers
  - edu DNS server queries umd.edu server to find cs.umd.edu

Fundamentals: URLs

- URL – Uniform Resource Locator
- Represents web resource
  - Arbitrary files
  - Web pages
- Examples
  - http://www.cs.umd.edu/index.html
  - ftp://www.cs.umd.edu/pub/doc/policies.pdf
  - https://login.yahoo.com/
  - file://dir/my.txt

Fundamentals: URL Structure

URL consists of:

- Protocol
  - http
  - ftp
  - https (secure http)
  - file
  - …
- IP address (or domain name)
- Port (optional most of the time)
  - http://www.cs.umd.edu:80/
- Path

Fundamentals: Firefox

- Browser we will use.
  - http://www.mozilla.com/en-US/firefox/?from=getfirefox
- Extensions we would like to have
  - Error Console
  - Server Spy
  - Live HTTP Headers

Database Management Systems

- Database System – Allows you to store data and process data (e.g. submit queries, create indices, etc.)
- Examples:
  - Records of students at UMCP
  - Information about telephone numbers
- Software Systems
  - Oracle
  - MySQL (the one we will use ☺)
  - Postgres
- You can install MySQL in your computer

HTML

- Language used to define web pages.
- What the server sends to the browser.
- Browser reads HTML and renders the page
  - **May require downloading data from server (e.g., images)**

HTTP

- Hypertext Transfer Protocol (HTTP) → protocol that defines how user agents (e.g., browser) and web server can communicate
- HTTP is a request/response protocol between clients and servers
- Some methods (operations) defined as part of the protocol
  - GET → Use to download a resource (e.g., image, web page). Most common method used
  - HEAD → Returns only the header
  - POST → Submits data (e.g., form data) to the server
- Do not confuse with HTML.

PHP

- What is PHP?
  - Server-side, cross-platform, HTML Embedded scripting language.
  - Text files with .php extension.
- What does it allow us to do?
  - To dynamically generate HTML
  - To interact with other systems (e.g., DB Systems, File Systems)
- Examples
  - Flight Information
  - Application System

Software Installation

- Alternatives for Apache, MySQL, and PHP
  - Individual installation of packages (See Resources section, web page)
  - WAMP – Windows, Apache, MySQL, and PHP
    http://www.apachefriends.org/en/xampp-windows.html
  - MAMP – Macintosh, Apache, MySQL, and PHP
    http://www.mamp.info/en/mamp.html

- Alternatives for Editors
  - Notepad/WordPad or any other text editor.
  - Komodo Edit (Do not confuse with Komodo IDE)
    - http://www.activestate.com/komodo_edit/
  - Eclipse Plug-in (See resources section for additional information)
- **Your assignment for tomorrow**
  - Install Apache and PHP

Creating Web Pages

- HTML - HyperText Markup Language
- HTML Standard
  - Developed by the World Wide Web Consortium (W3C)
  - http://www.w3.org
- Document is described through a series of commands and directives present in a text file.
- HTML goal is to describe structure only. Presentation should be left to cascading style sheets
- When interpreted by an HTML **viewer** those commands determine the appearance of the page
- HTML documents are entirely ASCII text
- Commands are explicitly inserted
- Great HTML/CSS tutorial site
  - **http://www.htmldog.com/**

HTML

- Three versions of HTML
  - HMTL 4.01 Strict (excludes deprecated tags and attributes)
  - HTML 4.01 Transitional (less restrictive including appearance elements)
  - HTML 4.01 Frameset (identical to transitional but allows <body> to be replaced with <frameset>)
- Web Standards Project (www.webstandards.org)
  - Industry watchdog convincing web browsers developers to adhere to web standards
- HTML 4.01 is the last version for HTML. Next version is XHTML 1.0
- XHTML
  - Uses same tags as HTML 4.01
  - Enforces rules like closing tags, tags in lowercase, and others
- **We will use XHTML (strict) in this class.**
- **HTML Validation -** http://validator.w3.org/

HTML Basic Skeleton

- An html document has two main parts.
  - **Header** – provides information about the document.
  - **Body** – contents of the page.
- **Example 1 (htmlDoc1.html)**

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
    <head>
    <meta http-equiv="Content-Type" content="text/html; charset=ISO-8859-1" />
     <title>Template</title>
    </head>

    <body>
                <!--HTML CODE HERE-->
    </body>
</html>
```

- Let's validate the above document

HTML Tags

- Tag:
  - Specifies a command or directive.
  - It surrounds content and apply meaning to that content
- General format:
  - <***elementName attributes***>
- Most HTML elements have two tags:
  - Start tag and end tag
  - Example: <h1> text </h1>
- Tags and attributes will be in lowercase (XHTML requirement)
- Some tags are self-closed (ending them in />)

<hr />
 <meta /> <img />

Head/Title Tags

- <head> </head>
  - It does not generate displayed contents
  - Contains other tags (e.g., <title> </title>)
- <title> </title>
  - Part of the header
  - It is required
  - Search engines depend on it

Attributes

- An attribute extends or modify a tag
- Attributes
  - Only appear in the start tag
  - You can have several attributes in one tag each separated by spaces
  - Order is immaterial
- General format

  <ELEM ATTR=“attrValue”>Displayed Text</ELEM>
- Example

- All attribute values will be enclosed in “ “ for XHTML compliance

NestedTags/Spaces/Comments

- Nested tags are possible but don't overlap sets of them. Avoid the following:

  Message

- Browser Processing
  - Multiple spaces are converted to one space.

    John Mary Peter

    John Mary Peter
  - Line returns are ignored.
  - Comments
    - Represented by <!-- --> Note: (two sets of double -)
    - Examples
    - <!--The html code example starts at this point-->
    - Comments can not be nested

HTML Editors

- Text Editor
  - Any text editor (e.g., wordpad, notepad, pico, etc.)
- HTML Editors
  - Utilities designed to write HTML
  - Examples: CoffeeCup HTML Editor, HTMLjive
- Authoring tools
  - Frontpage
  - Dreamweaver – Fairly complex but powerful.
  - NVU – Free and available for (Windows, Linux, Mac) http://www.nvu.com/
- Recommended:
  - Amaya- http://www.w3.org/Amaya/
  - Komodo Edit - http://www.activestate.com/komodo_edit/

Frequently Used Tags

- Heading tags
  - <h1> text </h1>

    <h2> text </h2> … and so on until <h6> text </h6>
  - Higher numbers imply smaller headers
- Paragraph tag
  - paragraph
- Code – Use to define computer code
  - <code> </code>
- Horizontal Line - <hr />

Frequently Used Tags

- Emphasis
  - text here Text usually rendered in italics
  - text here Text usually rendered in bold
- Super/Sub script
  - _{text here}
  - ^{text here}
- Quotations
  - <q> quote here </q>
- Line Breaks
  -
- Verbatim (text displayed exactly as it appears)
  - <pre> text here </pre>
- **Example: HtmlDoc.html**

Lists

- **Unordered lists**
  -   tags to represent beginning and end
  -   to represent elements in the list
  - **Example: Lists.html**
- **Ordered lists**
  -   tags to mark beginning and end
  -   to represent elements in the list
- **Definition lists**
  - Consist of terms and definitions like in a glossary
  - Tags - <dl> </dl>
  - Terms specified using <dt> </dt> and definitions with <dd> </dd>
  - **Example: Lists.html**
- **Nested lists**

Image Inclusion

- We can include an image using the img tag

- **Example: Image.html**
- Although the width and height attributes are not required they are highly recommended. They can also be set through CSS

Links

- Link – connection between web resources
- Hypertext links are created using the <a> (anchor) tag.
- The link can be text :
  - ***CNN Web Page***
  - Notice that you **need to** specify the protocol (http://)
  - **Example: Links.html**
  - The URL can be absolute or relative
- The link can be an image:

```
<a href="http://www.umd.edu"><img src="testudo.jpg" alt="Testudos' image" /></a>
```

Tables

- To define a table we use the <table> tag
  - Border attribute controls table's border
  - By default borders are not visible
- Basic tags are associated with tables
  - <tr> - defines a row
  - <td> - defines a data element
  - <th> - define a header data element
  - <caption> - provides a caption for the table
    - Must appear after the <table> tag.
    - Must be used only once
- **Example: Tables.html**

Character Entity References

- Special Characters can be specified by
  - Name specification - *&name;*
  - Numeric specification - &#xxx;
- Commonly used characters

Copyright	©
Registered Trademark	®
&	&
<	<
>	>
Non break space	

- **Example: CharacterReferences.html**
- Complete list at: http://www.w3.org/TR/html4/sgml/entities.html

Block Elements/Inline Elements

- Comparison
  - Block elements begin on new lines whereas inline elements don't
  - Block elements create larger structures (allow you to define the large structure of your document) whereas inline elements don't
- Block Element Examples

  Paragraphs (<p>), Headings, Lists, Tables, Division ( ), Block Quotations, Preformatted Text (<pre>)
- Inline Element Examples

  Anchors (<a>), Images (<img>), Line Breaks (
)
- Block elements may contain other block elements, inline elements, and data. Some block elements may not contain other block elements
- Inline elements may contain inline elements and data

Inline Elements in Block Elements

- Why the following example does not validate?
- Example: validationProblem.html

Suggestions for Writing HTML Code

- Add the corresponding end tag immediately
- Use indentation
- Have a consistent style
- Use comments to separate sections of your code
- Validate your code as you develop it (not at the end)

CSS (Cascading Style Sheets)

- Official W3C standard for controlling presentation
- Specification: http://www.w3.org/TR/CSS21/
- Style Sheets
  - Text file with rules. It includes no html
  - Style sheets files use a .css extension
  - Allows you to apply typographic styles (font size, line spacing, etc.)
  - Allows you to apply spacing instructions
  - Allows you to have page layout control
  - Smaller html files by avoiding redundancy in style specification
  - Update collection of pages by updating only a single file
  - Example: ExternalFile.css
- Why CSS? http://www.csszengarden.com/

Rules

- Rule - Basic element of a style sheet
- Rule - describes the formatting associated with a page element
- Rule format

selector declaration

selector – identifies what should be styled in a web document (e.g., h1, p)
declaration – what and how that portion of the web document should be modified

- declaration - consists of *property: value* pair(s) enclosed in { }
- Examples:

```
h1 {color: green}
p  {
      font-size: 10px,
      color: red;
}
```

- Popular properties – color, font-family, font-size, text-decoration
- HTML Dog CSS Properties
  - http://www.htmldog.com/reference/cssproperties/

Types of Style Sheets

- **Inline**
  - Style information applied to specific tag (e.g., <p style=…”)
  - Avoid if possible
- **Internal**
  - Using the <style> tag in the header of the html document
  - Convenient to provide own style to a specific page
  - Example: InternalStyle.html
- **External**
  - External style sheet which web pages link to (see <link> tag)
  - Preferred approach
  - Example: ExternalFile.html and ExternalFile.css

CSS

- Why cascading?
  - Rules can come from different sources (inline, external file, etc.). The final set of rules that apply to a document comes from cascading all the sources
- Rule Conflict Resolution
  - To resolve conflicts, styles defined at a specific level override those set at a higher level

    Example: you can set the color of body text to be blue but you can override to red the text in a list
  - When multiple style files are linked or imported the last one will take precedence
- A child element inherits the same properties of its parent element (unless otherwise specified)

CSS Validator

- http://jigsaw.w3.org/css-validator/
- Notice you have three choices
  - By URI
  - By File Upload
  - By Direct Input

Colors

- You can specify colors using one of the following predefined colors:

  yellow, white, teal, silver, red, purple, orange, olive, navy, maroon, lime, green, gray, fuchsia, blue, black, aqua

- Source for colors

  http://www.w3schools.com/html/html_colors.asp

- You can specify a color by indicating the red, green and blue components. For example, all the following are equivalent:
  - red
  - rgb(255,0,0)
  - #ff0000

Kinds of Selectors

- **Type Selectors** – Those based on the name of an HTML tag
  - p { color: red; }
- **Pseudo-classes** – attached to selectors to specify a state. Four popular pseudo-classes are:
  - a:link – initial color of a link
  - a:visited – color for a visited link
  - a:hover – color when mouse hovers over link
  - a:active – color during the clicking of the link
- **Example:** Selectors.html, Selectors.css

Kinds of Selectors

- **Class Selectors** – Allow us to apply the same CSS rule to different elements
  - Use to create a style you need to apply many times in your document
  - Created with a period (also known as full stop).
  - Example: Selectors.html, Selectors.css
- **ID Selectors** – Like class selectors but appear only once in the document
  - Used when you need to apply a style only once in your document
  - Created using #
  - Example: Selectors.html, Selectors.css

Googles Page Creator

- http://pages.google.com/
- You need a gmail account
- Provides free hosting
- Your address will be:
  - http://YOURGMAILID.googlepages.com