## Midterm Review

## Web Basics

– web server vs web browser
– HTTP
– TCP/IP
– W3C
– URL
– domain vs subdomain

## HTML

– web page structure
– basic tags
– block versus inline
– absolute vs relative URL
– index.html
– table
– lists
– anchors
– images

## XHTML

– differences with HTML
– rules
– purpose of the DOCTYPE declaration
– entities
– meta tag

## CSS

– purpose of CSS
– syntax of defining a CSS style
– how are properties and values defined
– selector types
– length types: relative and absolute
– font types
– named colours – defining as a hex RGB code
– levels of style – inline, embedded, linked
– grouped selectors
– class versus ID
– define a <div> element
– "box" model
– float property

## HCI

– What is HCI?
– 8 Golden Rules of user interface design
– what makes UI design hard?
– five features of Gestalt psychology
– Fitt's Law
– characteristics of a well-designed UI
  • affordance
  • forcing function
  • mapping

## Forms

– Use of the <form> tag
– form tag attribute name
– form elements: textarea, select, input
– defining a form
– fieldset
– readonly attribute

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7

## Frames

– given the frame HTML, show the resulting window display

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8

## The World Wide Web

- A document on the Web is called a **Web page,** identified by a unique address called the **Uniform Resource Locator,** or **URL**
- URL commonly referred to as a **Web address**
- `http://www.cnn.com`
- `ftp://ftp.testcom.edu`
- `http://203.23.104.3/`
- `http://www.cbc.ca/news/daily/reports.html`

11/5/2008

9

## TCP/IP

- Transmission Control Protocol / Internet Protocol
  – a set of protocols used by the internet
  – began as work done by US Defence Advanced Research Projects in the 70's
  – data is sent between computers in small packages, called *packets* in any order
  – Routers are computers which pick up packets on the network and figure out where they need to go

11/5/2008

10

## HTTP

- Hypertext Transfer Protocol
  – the communication rules a browser (a client) uses to talk to a web server
  – "protocol" = rules
  – Web server returns "response header" information back to the browser indicating the status of the request
    - E.g. Response code of 200 is good; 404 is file not found

11/5/2008

11

## Internet Protocol

- IP version 4 uses 32-bit addresses for a possible address space of 4.3 billion
- IP addresses are usually represented in dot-decimal notation – four *octets*
  – 192.60.40.230
- Localhost uses IP address range 127.0.0.0 to 127.255.255.255

11/5/2008

12

## The World Wide Web

- A URL is a type of **Uniform Resource Identifier (URI)**, which is a generic term for many types of names and addresses on the World Wide Web

## The World Wide Web

- **A Web site** refers to the location on the Internet of the Web pages and related content files (such as graphic files) that belong to a company, organization, or individual

## HTML Documents

- Originally, people created Web pages using Hypertext Markup Language
- **Hypertext Markup Language (HTML)** is a simple language used to create Web pages that appear on the World Wide Web

## Basic HTML Syntax

- HTML documents are text documents that contain:
  - formatting instructions, called **tags**
  - the text that is to be displayed on a Web page
- Some HTML tags have a start and end tag
  `<html>` ... `</html>`
  `<p>` ... `</p>`
- Some don't
  `<img>`
  - but their XHTML versions use them this way
  `<img ... />`   `<hr />`
  `<hr>`

## Basic HTML Syntax

- HTML tags are used to define text formats to controls that allow user input
- Tags are enclosed in angle brackets ( < > )
- Most tags consist of a starting tag and an ending tag that surround the text or other items they are formatting or controlling
- Tags are not defined inside of another tag (e.g. `<b> <i>>` is not well-formed HTML)
- No spaces after the opening bracket for the start tag   ( e.g. `< b>` is not well-formed HTML)

## Basic HTML Syntax

- XHTML = eXtensible HTML, just like HTML only better
- The rules for using HTML are not as strict as for XHTML
- HTML tag names should be in lowercase – browsers will happily accept tags defined as `<B>` instead of `<b>`  but the more accepted practice is lowercase. This is for XHTML compatibility.

# Common Structure and Formatting HTML Tags

**Table 1-1**   Common Structure and Formatting HTML Tags

| HTML Tag | Description |
|---|---|
| <b></b> | Formats enclosed text in a bold typeface |
| <body></body> | Encloses the body of the HTML document |
| <br> | Inserts a line break |
| <center></center> | Centers the enclosed text in the middle of the browser window |
| <head></head> | Encloses the page header and contains information about the entire page |
| <hn></hn> | Creates heading-level tags, where n represents a number from 1 (the largest) to 6 (the smallest) |
| <hr> | Inserts a horizontal rule |
| <html></html> | Starts and ends an HTML document |
| <i></i> | Formats enclosed text in an italic typeface |
| <img src="..."> | Displays an image file |
| <p></p> | Identifies enclosed text as a paragraph |
| <strong></strong> | Formats enclosed text in a strong typeface, similar to bold |
| <sub></sub> | Formats enclosed text as a subscript |
| <sup></sup> | Formats enclosed text as a superscript |
| <u></u> | Formats enclosed text as undefined |

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# Basic HTML Syntax

- HTML documents are free-format, meaning that any amount of white-space (blank lines, tabs, spaces) will be ignored

- All HTML documents begin with **<html>** and end with **</html>**

- Two other important HTML tags are the **<head>** tag and the **<body>** tag

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# Basic HTML Syntax

- The **<head>** tag pair and the tags it contains are referred to as the **document head**

- Following the document head is the **<body>** tag, which contains the document body

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# Basic HTML Syntax

- You use various parameters, called **attributes,** to configure many HTML tags

- You place an attribute before the closing bracket of the starting tag, and separate it from the tag name or other attributes with a space

```
<img src="bird.png" alt="photo of a robin">
```

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# The W3C

- To address the growing need for standards, Tim Berners-Lee established the **World Wide Web Consortium,** or **W3C,** in 1994 at MIT to oversee the development of Web technology standards

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# Web Browsers

- Browsers receive HTML information and determine how the content needs to be formatted in the window
- Gecko is the name of the Mozilla/Firefox display engine
- Trident is the name of the Internet Explorer display engine
- As of September 2008 Internet Explorer browsers are being used by about 77% of the market.
- Mozilla Firefox is 17%, Safari 3%
- http://www.thecounter.com/stats

## HTML element

Element

Start tag          Content          End tag

`<p class="foo">This is a paragraph. </p>`

Attribute          value
name

25

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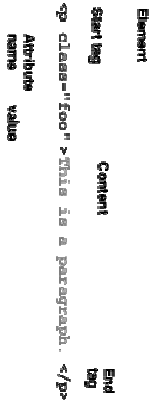
## Block versus Inline

- HTML is free format – any 'white space' in the HTML is ignored by the browser
  freeformat.html preview
- Which means the HTML code needs to provide the tags for any necessary spacing
- `<br>` (HTML) or `<br />` (XHTML form) – break, force start a new line
  freeformat_02.html preview

26

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## Block elements

- More block level tags … this list is not complete
  `<dl>` definition list `</dl>`
  `<pre>` preformatted text `</pre>`
  `<blockquote>` block quotation
  `</blockquote>`

27

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## Inline elements

- Inline elements do not usually begin a new line
  `<a>` anchor `</a>`
  `<b>` bold `</b>` but use CSS instead
  `<img>`
  `<span>` generic inline container `</span>`
  `<del>` deleted text `</del>`

28

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## HTML comments

- HTML comments provide descriptive information to the human reader only – not to the browser
- You may not nest comments.
- Comments can appear anywhere but they usually appear in the `<head>` section.

  `<!--`    Author: John P. Smith.
          Created: Sept 28, 2006
  `-->`

29

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## File names

- HTML files have a file extension of .html (or rarely .htm)
- The HTML file name should not contain non-alphanumerics such as spaces ~ / | \ * ? < > " .
- Good HTML file names                    Bad HTML file names
  favSongs.html                          fav Songs.html
  report_2008.html                       report~2008.html
  memberList_08.html
  member.List/08.html

30

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## File name case

- Unix file names are case sensitive
- Deepblue server is Unix so ... when you save your HTML files on your U: drive, note the case of the file names you use (and folder names too)
- If your file name on U: is `Lab_01.html`, then the URL must reference `Lab_01.html` not `lab_01.html`

  e.g.

  `http://www.cs.camosun.bc.ca/~c9999/comp140/Lab_01.html`

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## URL format

- Some URLs do not provide a local resource name

  e.g. `http://www.cs.camosun.bc.ca`

  By default, the web server will look for the file named `index.html` in that location in that case.
- A URL may include a port number to the web server. This number is 80 by default for HTTP servers and so may be omitted.

  `http://www.database_conn.com:7777/`

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## Domain and subdomain

- Main branches of the internet include Generic Top-Level Domains (TLDs)

| TLD | Meaning |
|-----|---------|
| com | Commercial entities : ibm.com apple.com |
| edu | Educational : mit.edu |
| name | Individuals' names : johnsmith.name |
| gov | US Government Departments |
| mil | US Military |
| net | Networking organization but like com now |
| org | Nonprofit organization : opensource.org |

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## Top-Level Domain

- IANA is operated by the Internet Corporation for Assigned Names and Numbers (ICANN), an international non-profit organization set up in 1998 by the Internet community to coordinate IANA responsibilities
- ICANN does not control access to or content on the internet
- ICANN cannot stop spammers
- In June 2008 ICANN adopted a new policy to relax the rules for the creation of new TLDs (but .xxx rejected)

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## Subdomain

- A subdomain is a part of a larger domain
- Subdomains can contain other subdomains
- Help organize by department, function or service
- In theory the subdomain chain can reach 127 levels and each name can be up to 63 characters but the whole domain name cannot exceed 255 characters
- `cs.camosun.bc.ca` – `bc.ca` is a subdomain of `ca`, `camosun.bc.ca` is a subdomain of `bc.ca`, and `cs.camosun.bc.ca` is a subdomain of `camosun.bc.ca`
- Each subdomain will have a designated administrator

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## Absolute and Relative URL

- An absolute URL is a fully qualified URL including the scheme, web server, domain and resource

  `http://www.example.com/Fall2008/report.html`

  `http://www.cbc.ca/Music/Songs.html`

  `http://www.pictures.com/birds/robin.png`

## Relative URL

- A relative URL is the local resource part of the absolute URL

  `Fall2008/report.html`

  `Music/Songs.html`

  `birds/robin.png`

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## Absolute and Relative URL

- If you define an HTML document's hypertext links using absolute URLs only, then what happens if the web pages move to a new folder or a new server name?
- All the hypertext references will have to change.
- A better approach is to use relative URLs as hypertext references instead so that it won't matter if the web server or parent folder changes.

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## HTML Tables

- `<table>  </table>` define a table
- Consists of rows and columns of cells each having the same dimensions of width and height
- By default each column's width is the minimum width needed to display the widest element within a column
- Row heights accommodate the text or image contained in the cell
- A table will not normally fill out the entire width of the screen or its container

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## HTML Tables

- Basic table structure:
- Within the `<table>  </table>` tags are the table
- `<tr>  </tr>` tags – one for each row in the table
- Within the `<tr>  </tr>` tags are the table data
- `<td>  </td>` tags – one for each cell in the row
- Usually each row has the same number of `<td>  </td>` tags defined

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## HTML Tables

- If your HTML is missing a closing `</td>` or `</tr>` or `</table>` tag, the browser will often correctly figure out what was intended but no guarantees – always define the closing tags to be safe

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## Table Attributes

- cellspacing = "n" or "p%" – defines the amount of space separating each cell
- cellpadding = "n" or "p%" – defines the amount of space between the cell contents and the cell's border
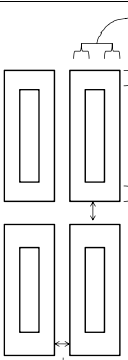
## Table Data

- The <td> tag has optional attributes rowspan and colspan to define a cell that stretches into another row or column
- <td rowspan="2"> </td> - cell spans its row and the row below it
- <td colspan="2"> </td> - cell spans its column and the column to the right

## Colspan

```
<table>
<tr>
<td> row 1 cell 1. </td>
<td> row 1 cell 2 </td>
</tr>
<tr>
<td colspan="2">row 2 cell 1 </td>
</tr>
</table>
```

| row 1 cell 1 | row 1 cell 2 |
|---|---|
| row 2 cell 1 | |

## Rowspan

```
<table>
<tr>
<td rowspan="2"> row 1 cell 1 </td>
<td> row 1 cell 2 </td>
</tr>
<tr>
<td> row 2 cell 2 </td>
</tr>
</table>
```

| row 1 cell 1 | row 1 cell 2 |
|---|---|
| | row 2 cell 2 |

## Lists

- Ordered Lists
  1. Open application
  2. Click File menu
  3. Select Open option
- Unordered Lists
  - apple
  - banana
  - cherry

## Ordered Lists

- Use the <ol> </ol> tags with list items identified by <li> </li>

```
<ol>
<li>Open application </li>
<li>Click File menu </li>
<li>Select Open option</li>
</ol>
```

## Unordered Lists

- Use the <ul> ... </ul> tags with list items identified by <li> ... </li>

```
<ul>
<li>apple</li>
<li>banana</li>
<li>cherry</li>
</ul>
```

## Lists

- A list can appear as a list item within an outer list

```
<ul>
<li>
    <ol>
    <li> Open application </li>
    </ol>
</li>
</ul>
```

## Lists

- A list item can be text, images, multimedia, hypertext references, tables, etc
- The numbering type of ordered lists (Roman numerals, e.g.) and the bullet types for unordered lists (square bullets, e.g.) is defined with CSS

## Definition Lists

- Defines a **term** and its **description**

```
<dl>
<dt>CIO</dt>
<dd>Chief Information Officer, the person
responsible for directing information technology
policies within an organization</dd>
<dt>hacker</dt>
<dd>Highly skilled computer programmer</dd>
</dl>
```

## Anchor

- Anchor tag defines a hypertext link to another resource on the internet, or another part of the same HTML document
- Anchors can be defined for text or images
- Typically the hypertext link is indicated in the browser by three cues:
  - The image is bordered in blue by default
  - The text is underlined and coloured blue by default
  - When the cursor hovers over link, the status bar shows the reference and the cursor changes shape

## Anchor

- Usual attribute is href for hypertext reference

  `<a href="where you want to go">some text </a>`

- Reference can be absolute URL or relative URL

Visit <a href="http://www.apple.com"> Apple </a>

My dog <a href="images/myDog.jpg">Spot</a>

## Anchor names

- For large HTML documents you can place named anchors at the start of each section

  `<a href="#aardvark">About aardvarks</a>`
  `<a href="#giraffe">Great giraffes</a>`
  `<a href="#tiger">Terrific tigers</a>`
  ...
  `<h2><a name="aardvark">About aardvarks</a></h2> ....`

## Anchor names

- Anchor names must be unique within the HTML document – case does not matter
  - If duplicate names are found, the first is used
  - If name is not found, top of the document shown
- Anchor names must be valid alphanumeric characters (a-zA-Z0-9) – no spaces
- An anchor link may not be nested inside the tag of another anchor link
- If you forget the closing </a> tag, the entire text will be make a hypertext link

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## Anchor title

- The title attribute specifies a tooltip text to add information about a link for the user
- Can be used by visually impaired to make browser "speak" the link

<a href="aardvark.html" title="This link will take you to the aardvark page"> The Aardvark </a>

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## Images

- The <img> tag specifies that an image is to be shown
- Attribute src defines the location and name of the image file
- Image types can be any valid picture format: jpg, png, bmp, gif, pcx, etc
- The web server configuration file defines which picture files are acceptable based on the file name extension

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## Images

<img src="http://www.mypics.com/bird.png">

<img src="images/spot.jpg">

<img src="bigBlue.bmp">

---

## Images

- Images can be hypertext links
- The image by default will be bordered in blue
- Use the anchor tag surrounding the img tag

<a href="myDog.html" title="Visit my dog">
  <img src="spot.jpg">
</a>

---

## Image attributes

- width="n" or "p%" – override the image width dimension
- height="n" or "p%" – override the image height dimension
- alt is strongly recommended to describe the picture in case it cannot be displayed
  - avoid irrelevant or meaningless alternate text

<img src="myDog.png" alt="My dog Spot is a Golden Retriever.">

## HTML semantic tags

- Web page authors began to realize that what they really wanted was a set of HTML tags that defined the *type* of information -- not necessarily the format
- Tags work best when they describe **what type** of information **rather than how** it should be rendered → "semantic tags"
- For example, <h1> defines a major heading, <p> defines a paragraph, <ol> an ordered list, <em> emphasized text, <q> a quotation
- Presentational elements (e.g. <font>, <center>, <strike>) are not semantic elements

61

## HTML semantic tags

- The idea took shape: the "style" of a web page (or web site) and its content should be independent of each other
- With **semantic tags** you define the type of information -- the style work is separate
- This is a better approach because a different style can be easily defined, modified or re-used for each semantic tag
- Browsers can use own style or a user style

62

## HTML presentation tags

- Defining HTML layout the old way example: **<font size="2" face="Verdana" color="red"> This text will be rendered using a different font size, face and colour. </font>**
- One problem with <font> is this: It does not allow flexibility to the browser or other display/device how to render the text
- What if viewer wants to make the text larger? Browser is constrained by <font>
- Also, what if that format description needs to change at some point? Global search & replace.

63

## XHTML

- A stricter form of HTML called XHTML was proposed in 2000
- eXtensible HTML – same HTML tags
- Based on XML – Extensible Markup Language
- XML is all about semantic tags
- You can define your own tags in XML and the rules and attributes for them

64

## XHTML Rule 1

- XHTML documents must be well-formed
  - All elements must have either closing tags or be written in a special form (e.g. <br /> )
  - No overlapping elements
    - Compliant: <p> ... <em> ...</em> </p>
    - Not compliant: <p> ...<em> ... </p>

65

## XHTML Rule 2

- XHTML documents must use lower case for all HTML element and attribute names
  - XML is case sensitive so <p> and <P> would be considered different tags
    - Compliant: <img src="myDog.png" />
    - Not compliant: <IMG SRC="myDog.png" />

66

# XHTML Rule 3

- XHTML elements cannot omit the end tag
  - Compliant: <p>sample text...</p> <p>Story...</p>
  - Not compliant: <p>sample text.. <p>Story .. </p>

67

# XHTML Rule 4

- XHTML element attributes must be quoted, even if they are numeric
  - Compliant: <td rowspan="3">
  - Not compliant: <td rowspan=3>

68

# XHTML Rule 5

- XHTML does not support attribute shortcuts
  – In HTML it was possible to provide the attribute name in the element to enable it
  - Compliant: <option checked="checked">
  - Not compliant: <option checked>

69

# XHTML Rule 6

- Empty elements must either have an end tag or the start tag must end with />
  - Compliant: <br /> <hr /> <img src="myDog.png" />
  - Not compliant: <br> <hr> <img src="myDog.png">

70

# XHTML Rule 7

- Avoid line breaks and multiple white space within attribute values
  - Compliant: <img src="myDog.png" />
  - Not compliant: <img src=" myDog.png

" />

71

# XHTML Rule 8

- The ampersand character cannot be used – use its HTML entity equivalent &amp;
  - Compliant: <title>Arts &amp; Science</title>
  - Not compliant: <title> Arts & Science </title>

72

## XHTML DTD

- An XHTML document requires a special header defining the "Document Type Definition" (DTD – used by all XML files)
- XHTML DTD defines the type of XHTML rules the document is following (for backward compatibility)
  - Strict – no deprecated HTML elements allowed
  - Transitional – presentation elements like font allowed
  - Frameset – for frameset documents (90's feature)

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## XHTML DOCTYPE

- In order to validate an XHTML document, the DOCTYPE declaration may be used*

```
<!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" xml:lang="en"
lang="en">
```

This header indicates that the following XHTML follows the strict form of XHTML

- There is some debate about how DOCTYPE is used by the browser – see http://www.hixie.ch/advocacy/xhtml

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## HTML Entities

- Many characters such as these ones: < > & " have a special meaning in HTML, and therefore cannot be used in the HTML document
- So, to display them, you use an entity, which is

| Result | Description | Entity Name | Entity No. (Decimal) |
|--------|-------------|-------------|----------------------|
| | Non-breaking space |   |   |
| < | Less than | &lt; | &#60; |
| > | Greater than | &gt; | &#62; |
| & | Ampersand | &amp; | &#38; |
| " | Double quote | &quot; | &#34; |
| € | Euro | &euro; | &#8364; |

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## Meta tags

- Provides information about the document
- Meta tags are placed within the head section of an HTML document
- Meta tags are never displayed in the browser as content but instead can work behind the scene

`<meta name="description" content="Web site offers a set of visual tools to help plan your next camping trip">`

`<meta name="keywords" content="camping, campfire, tent, hiking, outdoors, fishing>`

`<meta http-equiv="refresh" content="5" />` - automatically refresh the current web page every five seconds

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## Style Sheets

- In the mid-90's a new approach to web page definition was developed using style sheets
- A style sheet is a set of defined presentation instructions that is separate from the content
- The concept of style sheets had been around since SGML days

```
CSS
HTML      HTML
```

---

## Origin of CSS

- W3C has produced three style recommendations CSS1, CSS2, and CSS3 – each one building on the previous version - http://www.w3.org/TR/CSS21/
- Not all browsers implement these consistently
- Early browsers (MS Internet Explorer 3 and 4) did not fully support CSS
- As of July 2008, no browser has yet fully implemented CSS2 – some more than others
- http://en.wikipedia.org/wiki/Comparison_of_layout_engines_(CSS)

## Why CSS?

- CSS skill is essential for web page design
- HTML skill allows you to understand how to structure the HTML content but not how to present it effectively
- Easily change the presentation of an entire web site by modifying a single CSS style sheet
- CSS knowledge used in a variety of programming web projects
- If there is a problem with your CSS, usually there are no error messages – check with Firebug on Firefox

79

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## CSS Style Attribute and Tag

- CSS can use the style attribute and the style tag

```
<h1 style = "property : value; property : value; ..." >
```
declaration

```
<style>
    selector { property : value; property : value; ... }
</style>
```

the selector is usually an HTML tag name
The final ; is optional.

80

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## CSS Values

- Values can be numbers, strings, keywords, lengths, colour values, urls or percentages
- For numbers, only decimal values
- Strings, use double or single quotes
- For keywords (e.g. *auto, none* or any of the known colour names), do not use quotes (e.g. color: "red" is illegal -- color:red is good)
- A zero length value does not require a length identifier (e.g. "margin: 0")
- Colour values can be a keyword or RGB notation

82

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## Lengths

- Fonts scaled using the font-size property
- Two types of length units: relative and absolute
  - Relative lengths units specify a length relative to another length property
    - More easily scaled from one display device to another
    - em – the 'font-size' of the relevant font
    - ex – the 'x-height' of the relevant font
    - px – pixels, relative to the viewing device

83

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## CSS Properties

- Properties are relevant to the tag
- Properties and values are case insensitive but standard is to use lowercase
- Some of the CSS property names are not consistent unfortunately: e.g. color:blue not text-color or text:blue
- Examples: background, border, margin, padding, font-size, font-family, letter-spacing, word-spacing, visibility
- Not every property works consistently for each browser! Test for each browser.

81

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## Lengths

- Absolute lengths units are useful only when the physical properties of the output device are known
  - in – inches
  - cm – centimeters
  - mm – millimeters
  - pt – points – 72 points equal one inch
  - pc – picas – 1 pica equals 12 points

84

## Fonts in CSS

- A font is a typeface used to display text
- A font is an operating system resource, not a browser resource
- CSS recognizes five *generic font families*: serif, sans-serif, monospace, cursive, and fantasy
- Monospace is a fixed font; serif and sans-serif are proportional fonts
- Serif family of fonts include: Times New Roman and Century Schoolbook
  - Most widely used of the font families for print books, magazines
  - But sans-serif considered easier to read on computer screens    http://www.w3.org/TR/CSS2/fonts.html#q1

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## Fonts in CSS

- Sans-serif font family includes: Arial and Verdana
  - Much easier to read on monitors as the "serifs" can blur on lower resolution screens
  - Verdana was invented for use on the web
- Monospace: Courier New, Lucida, Consolas
  - Also called "fixed pitched" fonts because all characters have the same width
  - Use for showing programming code or implying typewritten text
  - Before CSS this was required for text alignment in table format especially for columns of dollar amounts (decimal point alignment)
  http://en.wikipedia.org/wiki/Samples_of_Monospaced_typefaces

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## Fonts in CSS

- Limit usage of fantasy and cursive fonts as they are not widely available and can be hard to read - especially for non-English speakers
  - If you must use them, keep text very short
- Cursive e.g. Comic Sans, Vivaldi
- Fantasy e.g. COPPERPLATE, Impact

---

## Fonts in CSS

- When specifying the font family, list your preference first, and the most generic last
- If the font name has multiple words, put it in double quotes, or in single quotes if using the style attribute
  <p style="font-family:"Courier New",Courier, monospace">
- Using style tag:
font-family: Verdana, Geneva, Arial, sans-serif;
font-family: "Courier New", Courier, monospace;
font-family: "Times New Roman", Times, serif;

---

## Fonts in CSS

- font-weight sets how thick or thin the characters in text are displayed
  - Default is normal (or use number 400)
  - bold, bolder, lighter same as values (700, 800 and 300)
- font-style indicates the style
  - Default is normal
  - italic, oblique
- font-size sets how large the font is to appear
  - Can use a length value (e.g. 12px or 1.2em) or a %

---

## CSS Property Shortcut

- When defining background, border, font, margin, or padding properties, there is a shortcut to collapse all the sub-properties into one.
- Order of the values does not matter
style="font-weight: bold; font-family: Verdana, sans-serif; font-size: 2em; line-height: 1.2em;"
  - Into this shortcut:
style="font: bold 2em/1.2em Verdana, sans-serif;"

# CSS Property Shortcut

- Another example
  style="padding-top:5px; padding-right:10px; padding-bottom:8px; padding-left:12px;"
  style = "padding: 5px 10px 8px 12px;"
  The order is : T R B L (clockwise from noon) - or TRouBLe
  style = "padding: 5px 10px;"  means 5px for top and bottom; 10px for left and right
  style = "padding: 5px;" means 5px all around

# Colour keywords

- The list of HTML 4 color keywords is: aqua, black, blue, fuchsia, gray, green, lime, maroon, navy, olive, orange, purple, red, silver, teal, white, and yellow.



RR GG BB
is the format.
If the two hexadecimal digits
of the colour are the same,
then you can specify the one digit.
e.g. white is #fff or #ffffff
alternative formats:
rgb(255, 255,255)  or
rgb(100%, 100%, 100%)

http://www.w3.org/TR/SVG/types.html#ColorKeywords
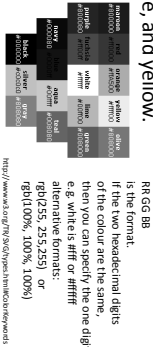
# URL value

- URLs to picture files are sometimes values to CSS properties – use the *url* CSS function
- URL may be single-quoted or double-quoted or not quoted
  body { background:
  url("http://www.example.com/forest.jpg")}
  li { list-style:
  url(http://www.example.com/redBullet.png) }

# Colour Properties

- color sets the text colour
- background-color can be transparent or a colour value
- background-image can be none or a URL value
- background-attachment can be scroll or fixed
- background-repeat can be no-repeat, repeat, repeat-x, repeat-y
- background-position can be a length, top, center, bottom, left, or right

# Style Attribute example

- Example of CSS – the style attribute is used
  &lt;h1 style="color:blue"&gt;This blue header &lt;/h1&gt;
  &lt;p style="font-family:Arial;"&gt; First paragraph &lt;/p&gt;
  &lt;h1 style="color:red"&gt;This red header &lt;/h1&gt;
  &lt;p style="font-family:Courier;"&gt;Second paragraph&lt;/p&gt;

  **This blue header**

  First paragraph

  **This red header**

  Second paragraph

# Style Tag example

- Use of the style tag
  &lt;style  type="text/css"&gt;
  h1   { color: blue; }
  h2   { color: red; }
  p    { font-family: Arial, Helvetica; }
  &lt;/style&gt;
- Defines style for the tags for this HTML page

# CSS Levels of Style

- CSS has three levels of style
  - Inline style
    - Defines the style just for the one occurrence of that tag
    - Style attribute is used
  - Embedded style (also called Internal style)
    - Defines a set of tag styles for just the HTML document
    - Style tag is used
  - External style (also called Linked style)
    - Defines a set of tag styles to be used for multiple HTML documents

97

---

# Inline Style

- The style attribute within the tag defines the needed presentation
- CSS inline style is used when a specific instance of a tag in the HTML requires a format

  ```
  <h1 style="color:blue">Blue heading</h1>
  <h1> Normal heading</h1>
  <h1 style="color:red">Red heading </h1>
  ```

98

---

# Embedded Style

- The styles for the tags are defined within the HTML file inside the <head> section
- The styles are for that HTML document only
- The CSS styles are enclosed in the tag

  ```
  <style type="text/css">
     h1  { color: blue; }       ←——— Note how
                                      the style is
  </style>                          defined
                                      here
  ```

99

---

# External Style

- The CSS styles are defined within a separate file e.g. The file site.css contains:

  ```
  h1   { color: blue; }
  ```

- The <link> tag is used in the HTML file to indicate the name of the external CSS file
- The <link> tag is defined in the HTML file's head section

  ```
  <link rel="stylesheet" type="text/css"
       media="screen"  href="site.css">
  ```

100

---

# Cascading

- "Cascading"
  - HTML tags may have different styles applied to them – which one is used by the browser?
  - All styles "cascade" into a single style sheet *in part* by the following **proximity** rule
    - Browser default style – lowest priority
    - External style sheet (a .css file)
    - Embedded style sheet (inside <head> section)
    - Inline style (inside an HTML tag) – highest priority
  - there are other, more complicated rules

101

---

# CSS Syntax

- Place the properties on separate lines for readability
- Comments are enclosed with /* and */

  ```
  p { color:black;
      font-family: "Times New Roman";
      text-align:  left;
      font-size:   15pt; /* test */
  }
  ```

102

## Group Selectors

- A group of different tags can share the same style definition — comma is used

  h1, h2, h3   { color : blue; }
  p, h1, h2    { text-align: left; }
  ol, ul       { margin-right: 20px; }

---

## Tags div and span

- The div tag defines a block-level region which may contain text or other content

  <div style="color:blue;">
  This is a line of blue text. </div>

- The span tag defines an inline region
  The Delicious apple
  is <span style="color:red;"> red </span> .

---

## Div tag

- Nesting tags within a div
  <div style="color:blue;">
  <p>This is the first paragraph.</p>
  <p style="color:red;">
  This is the second paragraph.
  </p>
  </div>

  This is the first paragraph.

  This is the second paragraph.

---

## CSS Rule of Proximity

- The closer style rule will be applied
  – Inline style overrides embedded style
  – In the case of nested tags (like div), the style rules of the innermost tags override the style rules of the outer tags
    <div style="color:yellow;">  This is yellow.
    <div style="color:green;">  This is green.
    <div style="color:blue;"> This is blue.
    </div> </div> </div>

---

## Selectors

- For embedded styles or linked styles
- A CSS selector is the name you give to a style
- Three types
  – HTML selector
    • redefines the appearance of the HTML tag
  – class selector
    • defines a style that one or more HTML tags will share
  – ID selector
    • defines a unique style used by objects assigned a unique ID

---

## HTML Selector

- Simplest variety of selector
- The defined style for that HTML selector is applied to all HTML tags of that type in the document
  <style type="text/css">
  b { font-family: "Courier", serif;
      font-size: 1.1em;
      color: blue;
  }
  </style>

# Class Selector

- Instead of an HTML tag name, you make up your own name preceded by a period
- Any HTML tags identified by that name as its class attribute has that style

```
<style type="text/css">
.headline  { font-family: "Courier", serif;
             color: blue; }
</style>
</head>
<body>
<b class="headline">This is bold blue styled text</b> <br />
<p class="headline">This paragraph is blue too</p>
```

109

# ID Selector

- Identifies the style for a unique instance of the element defined by the ID name

```
<style type="text/css">
#menu    { text-transform: uppercase; }
</style>
</head>
<body>
<div id="menu"> Text will show as uppercase.
</div>
```

110

# Classes vs IDs

- Use classes when there are multiple occurrences of that style in a web page
  - mnemonic:
    - class has many students
    - ID – the letter I = one
- Use ID when there is only one
- Classes and IDs may be applied to specific HTML selectors

```
    p.bluetext { color:blue; }
    div#part1 { font-weight:bold; }
```

111

# Grouped Selectors

- Selectors may be grouped as needed separated by a comma

```
.headline , .mainline , .info { color:red; }
.headline { font-size: 16pt; }
.mainline { font-size: 12pt; }
.info  { font-size: 10pt; }
```

112

# Descendant Selector

- CSS allows you to define a style for selectors within specified contexts
  - e.g. Define bold style to show text blue only if the bold is used within a paragraph
  - Or the list item text size only for ordered lists not unordered lists
- Define the style with the two selectors separated by a space. The order of the selectors matters.

```
p b { color: blue; }
b p { color: red; }
ol li { text-size: 12pt; }
```

113

# CSS Rules

- With these rules CSS needs a formula to determine which styles to apply if a selector has a class style, an ID style and an HTML style

```
<style type="text/css">
p#info { color: blue; }
p.note { color: red; }
p      { color: green;}
</style>
</head>
<body>
<p id="info" class="note">This will appear blue.
</div>
```

114

## Style Priority

- When multiple styles can apply, the ID style overrides a class style, and the class style overrides an HTML style
- Style defined within the tag's style attribute overrides all others.
- This is relevant only when the same properties are defined; otherwise, the properties are all applied

115

## CSS Rule of Specificity

- CSS has rules to determine which selector's styles will be applied
- Each HTML element counts as 1, each class style counts as 10, ID styles count as 100 – highest total wins

```
<style = "text/css">
div p  { color: blue; }    ← sum is two
p      { color: red; }     ← sum is one
</style> </head>
<body>
<div>
<p> This will appear blue. </p>
</div>
```

116

## CSS Box properties

- CSS can define a box of text you can format anyway you like
- margin, padding, border, background, position properties can be specified in CSS for each box of text
- http://www.cs.princeton.edu/~dp/html/css/lectures/css/boxes/CSS_week4.html



117
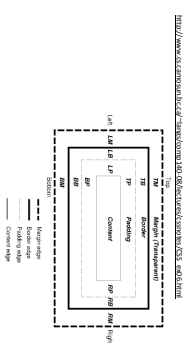
## Float property

- Float property is usually applied to an image to make it appear to the left or right of surrounding text.
- <img style="float:right" src="tree.png"> This is a picture of a tree. ...



118

118

## Links

- Anchor tags have their own properties called *pseudo-classes* and they must be defined in this order

```
a:link { color: blue; } ← a link not yet clicked
a:visited { color: red; } ← a link you clicked
a:hover { color: green; } ← as you hover over
a:active { color: black; } ← as you click link
```

LVHA

- Can use text-decoration:none to remove underline on hypertext link text

119

119

## HCI is born

- In 1982, the Association for Computing Machinery (ACM) approved the naming of a Special Interest Group on Computer-Human Interaction (SIGCHI)
  – Goals include promoting the use of human factors in the human-computer interaction process

120

120

## What is HCI ?

- Human Computer Interaction
- It is a discipline concerned with the **design, evaluation** and **implementation** of interactive computing systems for human use and with the study of the major phenomena surrounding them
- http://sigchi.org/cdg/cdg2.html

121

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122

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## Goals of HCI

- ■ Safety
  - ■ Safety of users and safety of data
  - ■ Privacy Issues
- ■ Utility
  - ■ Services the system provides
- ■ Effectiveness
  - ■ User's ability to accomplish a desired goal

123

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## Goals of HCI

- Efficiency
  - How quickly users can accomplish goals
- Usability
  - Ease of learning and ease of use
  - "Learnability"
- Appeal
  - How well users like the system
  - First impressions and long-term satisfaction

124

---
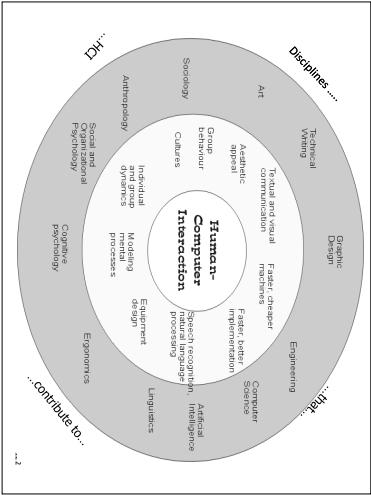
## What is UI?

- The UI is made up of everything that the user experiences, sees and does with the computer system:
  - the match with the tasks of the user
  - the metaphor that is used (e.g., the desktop)
  - the controls and their behaviors
  - navigation within and flow between screens
  - integration among different applications
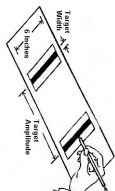  - the visual design of the screens

125

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## Usability

- Five E's of Usability:
  - Effective – how completely and accurately the work or experience is completed or goals reached
  - Efficient – how quickly this work can be completed
  - Engaging – how well the interface draws the user into the interaction and how pleasant and satisfying it is to use

126

## Usability

- Error Tolerant – How well the product prevents errors and can help the user recover from mistakes that do occur
  - Easy to Learn – how well the product supports both the initial orientation and continued learning throughout the complete lifetime of use
- These dimensions of usability are usually in tension with each other

## Why UI Design is Hard

- It is a given that all program apps will have a graphical user interface
- It is estimated that 47% to 60% of application code concerns the UI
- GUI may take as much as 40% of the development effort
- If UI done wrong, system will not be used

## Good UI Design is important

- Reduction in coding costs
- High cost of interface problems
- Serious life-threatening errors averted with good UI design
- Good interfaces sell products
- Increased use of computers in the environment

## Encoding Specificity Principle

- Memory best when the cues present at retrieval match those encoded (present) at study
  - Studying in the same room and seat as the exam itself
  - Emotional, mood dependent

## Constructivism

- Our brains do not create a pixel-by-pixel recording of a scene like a digital camera
- Instead we construct intervening models that abstract and summarize what comes out of the optic nerve
- These models influence what we perceive

## Fitt's Law - ergonomics

- A model of human movement, predicting the time required to rapidly move from a starting position to a final target area, as a function of the distance to the target and the size of the target.

- Fitts' law is used to model the act of *pointing*, both in the real world, for example, with a hand or finger and on computers, for example, with a mouse.

## Characteristics of a well designed UI

- Affordances – each operation is visible
- Mapping – the relationship between the actual action of the device and the action of the user is made obvious
- Feedback– user's actions are acknowledged

133

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## Characteristics of a well designed UI

- Conceptual model – describes the behaviour of the device
- Forcing functions – prevents users from making errors
- Automatic learning – provides consistencies and practice to support user interface skills

134

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## Eight Golden Rules of UI Design

1. Strive for consistency
2. Cater to universal usability
3. Offer informative feedback
4. Design dialogs to yield closure
5. Offer error prevention and simple error handling.
6. Permit easy reversal of actions.
7. Support internal locus of control
8. Reduce short-term memory load.

Schneiderman, Ben Designing the User Interface, 3rd Ed

135

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## UI Slogans

- Make it hard for the user to make errors.
- Make it easy for a beginner to become an expert.
- Involve the user in the UI design.
- Things that look the same should act the same.
- Testing, testing, testing.
- The best interface is one the user doesn't notice.

136

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## HTML Form

- A form is a practical method for collecting information from the user
- Forms on a web page are set up using a combination of HTML form tag elements and a script (written in PHP, ASP, Perl,etc)
- Scripts are commonly called CGI (Common Gateway Interface) and run on the web server (will not run locally properly)

137

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## HTML form elements

- HTML form elements include
  – Input boxes for text and numeric values
  – Radio buttons, also called option buttons to select a single option from a predefined list
  – Selection lists for longer lists of options in a drop-down listbox
  – Check boxes to specify an item as either being selected or not selected
  – Text areas for longer amounts of text
  – Submit button to submit the form data to the CGI script
  – Reset button to reset the form to its original state

138

## Form tag

- The <form> element includes properties that control how the form is processed, information on which CGI script is used, how the data is transferred to the script
- <form name = "myForm"
  action = "script name"
  method = "method name" >
  ... form elements
  </form>

139

## TextArea

- A field for entering multiple lines of information
- By default, the shape is a blank field of four lines and 40 characters wide
- Name attribute required
- To control how the text is wrapped in a text area, use the **wrap** attribute
  - wrap="off" turns off text wrapping
  - wrap="soft" or "virtual" turns text wrapping on but does not send text wrapping data to web server
  - wrap="hard" or "physical" turns text wrapping on and also sends text wrapping data to web server

140

## Input – type checkbox

- checkbox, a simple check box control
  - Zero, one, or many selectable options
  - Make preselected options with checked="checked"
  - To make PHP scripts work easier place [] at the end of the name attribute

<input type="checkbox" name="os[]"
value="unix" /> Unix
<input type="checkbox" name="os[]"
value="WinXP" /> Windows XP
<input type="checkbox" name="os[]"
value="Mac" checked="checked" /> Mac OS

142

## Input

- Unlike textarea and select the input tag is a single tag
- Used for text box, check boxes, radio buttons, passwords
- Attributes:
  - name, the name of the data field
  - size, the length of the field in characters, default is 20
  - maxlength, max number of input characters to accept
  - value, usage depends on the type of input element

143

## Select

- Has two parts: <select> tag and <option> tag
- Shows a list of options in either a pop-up menu or a scrolling list
- Number of options to show use size="n"
- Multiple selections use multiple="multiple"
- Preselect options with selected="selected" in the option tag

141

## Input

- value attribute, if the input element type is text or password, this is the default text to display; for checkbox or radio button, this is the value returned to the server; for submit and reset buttons this is the text to show inside the button
- checked attribute, sets a radio button or check box to "on" – usage: checked="checked"
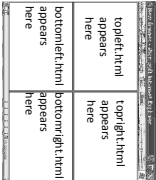
144

# Input – type text

- Type attribute
  - Text, default value for type attribute, accepts text from the user

```
<input name = "firstname" />
<input type="text" name= "phone" size="15"
    maxlength="12" />
<input name="country" value="Canada" />
```

---

# Input – type password

- password, a kind of text field but the user's typed characters are shown onscreen as bullets to prevent echoing of characters – this is **not** encrypting the data sent to the server

```
<input type="password" name="password"
    size="30" maxlength="30" />
```

---

# Input – type checkbox

- checkbox, a simple check box control
  - Zero, one, or many selectable options
  - Make preselected options with checked="checked"
  - To make PHP scripts work easier place [] at the end of the name attribute

```
<input type="checkbox" name="os[]"
    value="unix" /> Unix
<input type="checkbox" name="os[]"
    value="WinXP" /> Windows XP
<input type="checkbox" name="os[]"
    value="Mac" checked="checked" /> Mac OS
```

---

# Input – type radio button

- Allows only one option selected
  - All the radio elements must have same name attribute
  - Can supply optional checked="checked" to preselect

```
<input type="radio" name="user" value="home" />
    Home
<input type="radio" name="user" value="business"
    checked="checked" /> Business
```

---

# Organizing Form Elements

- You can group different form components into a related group called a *fieldset*
- Makes it easier for visitors to the page to understand the form and fill it out properly
- The legend tag is descriptive text

```
<fieldset>
    <legend>Personal Information<legend>
    ... Rest of form elements
</fieldset>
```

---

# Readonly Attribute

- For textarea, text and password form elements
- Prevents user input into those fields having the readonly attribute defined
- Readonly elements can receive focus but cannot be modified by the user
- Readonly elements are included in tabbing navigation

```
<input type="text" name="dept" value="T2EH-
    QW" readonly="readonly" />
```

## Frame Layout

- The general syntax for creating an HTML file with frames:

```
<html>
<head>
    <title>Page Title</title>
</head>
<frameset>
        Frame Definitions
</frameset>
</html>
```

151

## Creating Frames



```
<frameset rows="50%, 50%">
<frameset cols="50%, 50%">
<frame src="topleft.html">
<frame src="topright.html">
</frameset>
<frameset cols="50%, 50%">
<frame src="bottomleft.html">
<frame src="bottomright.html">
</frameset>
</frameset>
```

topleft.html appears here

topright.html appears here

bottomleft.html appears here

bottomright.html appears here

152