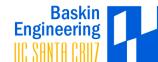


# Web Applications

## CSE183

Fall 2020

### Hypertext Markup Language



### Notices

- Administration 1 & 2 due 23:59 **Thursday October 15**
- Assignment 1 due 23:59 **Thursday October 8**

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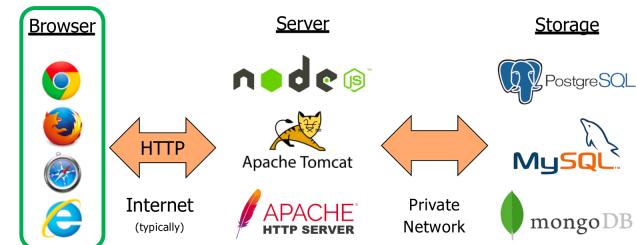
### Today's Lecture

- Browser Delivery
- Hypertext Markup Language (HTML)
- XML-Based HTML (XHTML)
- HTML5
- Questions

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### Full Stack Web Applications


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## Early User Interfaces

- Early applications were “green screen” / character-based displayed on “dumb” terminals with limited capabilities
- App ran on a remote mainframe or mini-computer

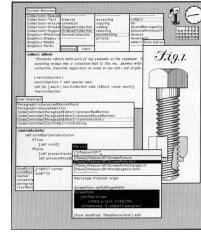


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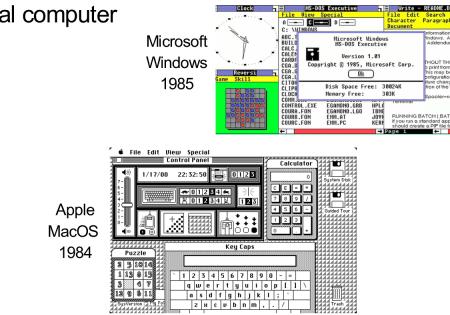
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## Graphical User Interfaces (GUIs)

- Since the 1970's applications have been able to access bitmapped displays via RGB framebuffers and make use of high-level GUI toolkits of buttons, tables, menus, etc.
- App ran on personal computer



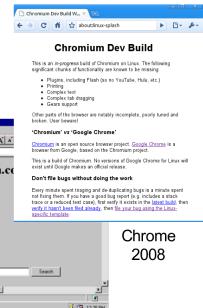
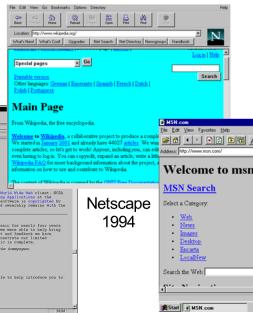
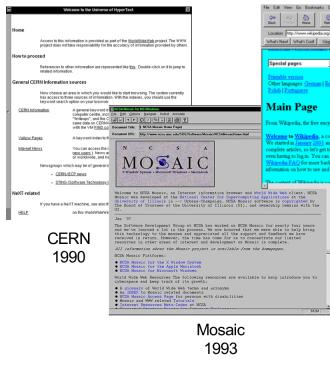
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## Browsers Changed the Game

- Since 1990 browsers display documents described in HTML

Internet Explorer  
1995

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## Browsers Changed the Game

- Since 1990 browsers display **documents** described in **HTML**
  - Until HTML5's canvas region, couldn't write pixels direct
- Applications constructed from documents
  - Initially multiple documents per app
  - Now (typically) single document manipulated with JavaScript
  - App typically runs partially in the browser, partially on a remote server

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## Hypertext Markup Language (HTML)

- **Markup Languages** include directives with content
  - Directives describe content or make presentation demands
  - Originated in the 1960's typesetting (printing) industry
  - Regarded as **declarative languages**
- General HTML App Approach
  - Start with your content
  - Annotate with **tags** (directives)
  - Leave the browser to render the content as directed
- Examples:
  - <i>Something in italics</i>
  - <title>Some Title</title>

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## HTML Tags

- Layout:
  - <h1> "display text inside tag as a top-level heading"
  - <p> "start a new paragraph"
  - <ul><li> "start an unordered, bulleted list"
- Formatting:
  - <i> "display text inside tag in *italics*"
  - <b> "display text inside tag in **bold**"
- External Information:
  - <img> "display an image"
- Should be terminated:
  - <i>Italic</i> is correct, <i>Italic is not
- Can be nested:
  - <i><b>Bold Italic</b></i> displays **Bold Italic**

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## HTML Example - Raw Text

The Hard Sell  
 Reasons for taking CSE183 include:  
 You need it to graduate.  
 You'll learn some cool stuff.  
 It'll give you interesting things to talk about in job interviews.

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## HTML Example - With Tags

```
<h2>The Hard Sell</h2>
<p>
  Reasons for taking
  <b>CSE183</b>
  include:
  <ul>
    <li>
      You need it to graduate.
    </li>
    <li>
      You'll learn some cool stuff.
    </li>
    <li>
      It'll give you interesting things to talk about in job
      interviews.
    </li>
  </ul>
</p>
```

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## HTML Example - Equivalent

```
<h2>The Hard Sell</h2><p>Reasons for taking<b>CSE183</b> include:<ul><li>You need it to graduate.</li><li>You'll learn some cool stuff.</li><li>It'll give you interesting things to talk about in job interviews.</li></ul></p>
```

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## HTML Example - Formatted

```
<h2>The Hard Sell</h2>
<p>
  Reasons for taking
  <b>CSE183</b>
  include:
  <ul>
    <li>
      You need it to graduate.
    </li>
    <li>
      You'll learn some cool stuff.
    </li>
    <li>
      It'll give you interesting things to talk about
      in job interviews.
    </li>
  </ul>
</p>
```

- Browsers do not care
- Programmers do
- IDEs will format for you

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## HTML Example - Rendered by Browser

### The Hard Sell

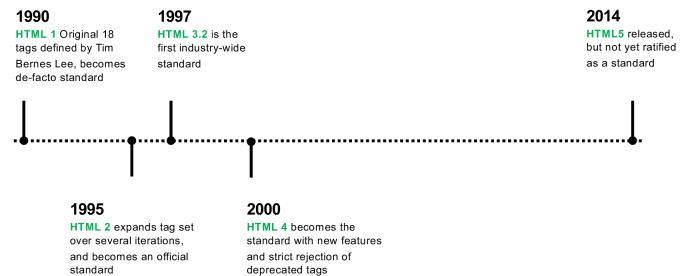
Reasons for taking **CSE183** include:

- You need it to graduate.
- You'll learn some cool stuff.
- It'll give you interesting things to talk about in job interviews.

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## HTML Evolution



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<http://www.modernizr.com/front-end-engineering/resources/html/html5-testory.html>

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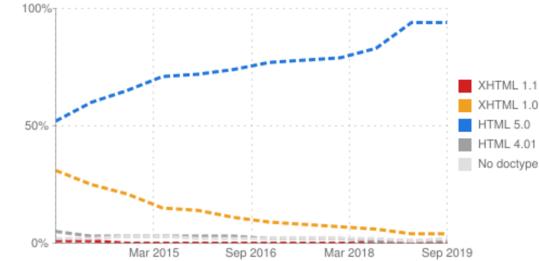
## HTML Evolution

- Influenced by browser peculiarities
  - What should the browser do if HTML has no paragraph closing tags?  
`<p>Whatever instead of <p>Whatever</p>`
  - Refuse to render the HTML?
  - Work out what tags are missing and act as if they were there?
  - Each browser had its own way of handling poorly formed HTML
  - Programmers started to rely on these browser quirks <sup>⑧</sup>
- **XHTML** (Extensible Hypertext Markup Language) grew out of HTML starting as an extension to HTML 4 in 1998
- Using XHTML can be thought of as requesting the browser honor a strict definition of HTML
- We will use XHTML in CSE183 assignments to ensure you write well-formed HTML

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## HTML - Version Adoption



http://www.w3.org/Standards/HtmlVersions 19

## XHTML - Basic Syntax

- Each file contains a single **Document**, a **hierarchy** (tree) of **elements** with the `<html>` at the top tree
- Elements may be nested
- Elements should have matching start and end tags
  - `<i>Italic</i>` is correct, `<i>Italic` is not
  - `<p/>` is valid shorthand for `<p></p>`
- Start tags can have **attributes**
  - `<input type="text">`
  - ``

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## XHTML - Example

```
<?xml version="1.0" encoding="utf-8"?>
<!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">
  <head>
    <title>Hello World</title>
  </head>
  <body>
    <h1>Hello World!</h1>
  </body>
</html>
```



**Hello World!**

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## XHTML - Example

```

<?xml version="1.0" encoding="utf-8"?>
<!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">

  <head>
    <title>Hello World</title>
  </head>
  <body>
    <h1>Hello World!</h1>
  </body>
</html>

```

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Declares this is an XHTML document conforming to version 1.0 of the standard

Outermost element of the document

Data about the document

Document content

## HTML - Common <body> Tags

<!-- Comment -->	Comments
<p>	New paragraph
 	Force a line break within the same paragraph
<h1> <h2> ...	Headings
<b> <i>	Boldface and italic
<pre>	Preformatted, whitespace is significant
<img>	Images
<a href="...">	Links to another Web page
<table> <tr> <td>	Tables
<ul> <li>	Unordered list (bulleted)
<ol> <li>	Ordered list (numbered)
<div> <span>	Group related elements on a single line with (<div>) or without (<span>) pre and post line breaks
<form> <input>	For constructing data input forms
<select> ...	

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[https://www.htmlpoint.com/html/html\\_tags\\_reference.htm](https://www.htmlpoint.com/html/html_tags_reference.htm) 23

## HTML - Common <head> Tags

<title>	Page title, appears in the browser window title bar
<meta>	Document keywords to help search engines
<link>	Include Cascading Stylesheet
<script>	Add JavaScript to a page - can also be used in <body>

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[https://www.htmlpoint.com/html/html\\_header.htm](https://www.htmlpoint.com/html/html_header.htm) 24

## HTML - Markup Characters

Can't use markup characters like < and > in document text so use **entities** by name or number, basic ones are:

Symbol	Description	Entity Name	Number Code
"	quotation mark	&quot;	&#34;
'	apostrophe	&apos;	&#39;
&	ampersand	&amp;	&#38;
<	less-than	&lt;	&#60;
>	greater-than	&gt;	&#62;

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[https://www.htmlpoint.com/html/html\\_entities.htm](https://www.htmlpoint.com/html/html_entities.htm) 25

## HTML - ISO 8859-1 Symbol Entities

Long list of special characters, including:

Result	Description	Entity Name	Number Code
	non-breaking space	&nbsp;	&#160;
®	registered trademark	&reg;	&#174;
™	trademark	&trade;	&#8482;

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[http://www.htmlpoint.com/html/html\\_entities.htm](http://www.htmlpoint.com/html/html_entities.htm)

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## HTML 5

- Newest version, but not yet a true standard
- New tags:
  - Content definition:
    - <article> <section> <header> <footer> <summary>
    - <mark> <figcaption> <figure>
    - <nav> <menuitem>
  - Drawing:
    - <svg> Scalable Vector Graphics - Draw shapes
    - <canvas> Draw from JavaScript - 3D with WebGL
  - Timed media playback:
    - <video> and <audio>

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<http://www.htmlboobies.com/tutorials/html5/new-tags-in-html5.html>

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## Next Lecture

- Wednesday: Cascading Style Sheets (CSS)
- Friday: Resource Locators and Links

## Tasks

- **Administration 1 & 2** due 23:59 **Thursday October 15**
- **Assignment 1** due 23:59 **Thursday October 8**

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