College of Information Studies
University of Maryland Hornbake Library Building College Park, MD 20742-4345

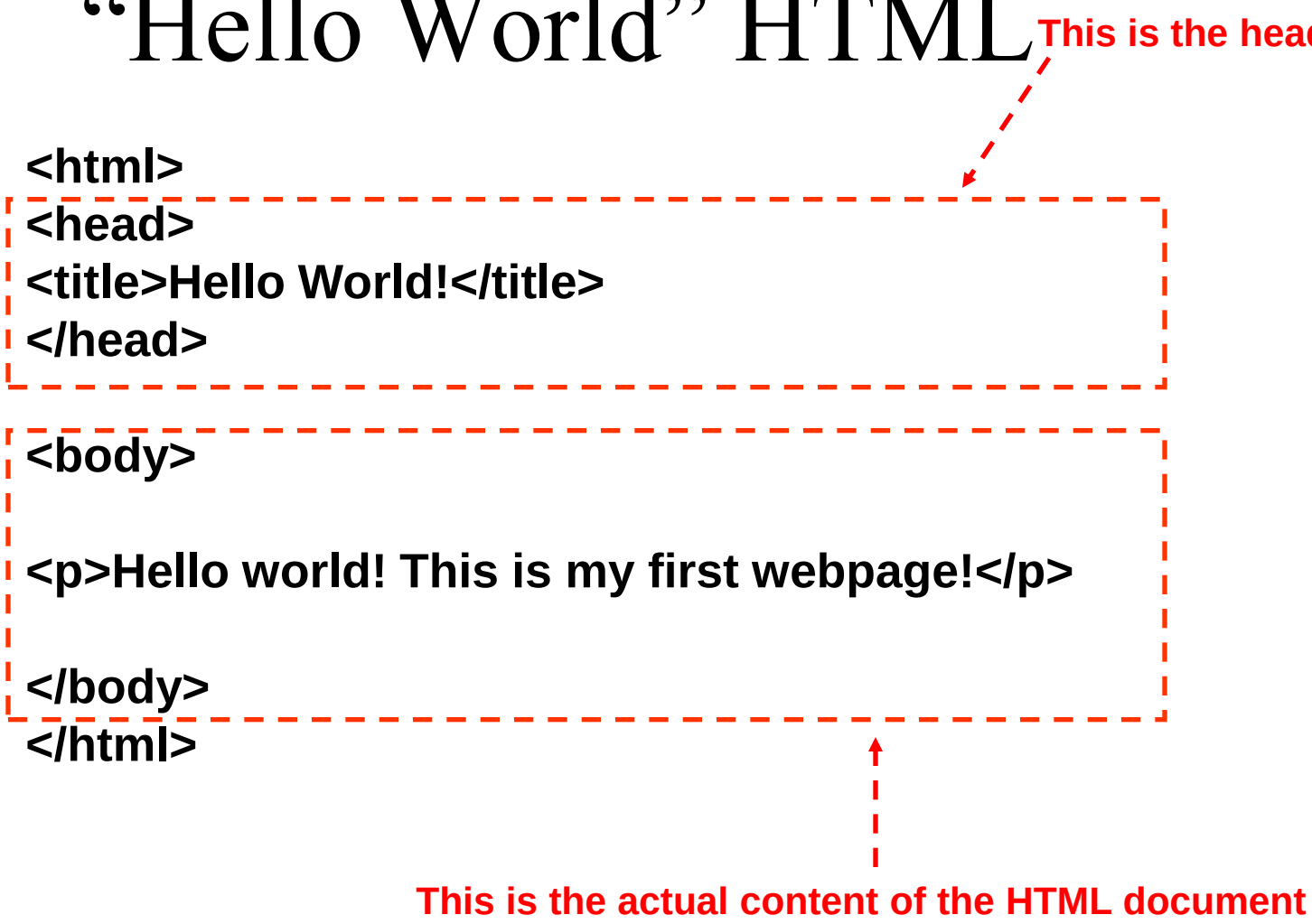
CSS, XML, Ajax

Week 4

LBSC 690

Information Technology

“Hello World” HTML



Rendering

- Different devices have different capabilities
  - Desktop
  - PDA
- Rendering maps logical tags to physical layout
  - Controls line wrap, size, font…
    - Place the title in the page border
    - Render <h1> as 24pt Times
    - Render as bold
- Somewhat browser-dependent
  - Internet Explorer and Netscape make different choices

HTML Document Structure

- “Tags” mark structure
  - <html>a document</html>
  - an ordered list
  - something in italics
- Tag name in angle brackets <>
  - Not case sensitive
- Open/Close pairs
  - Close tag is sometimes optional (if unambiguous)

Logical Structure Tags

- Head
  - Title
- Body
  - Headers: <h1> <h2> <h3> <h4> <h5>
  - Lists: <ol>, <ul> (can be nested)
  - Paragraphs:<p>
  - Definitions: <dt><dd>
  - Tables: <table> <tr> <td> </td> </tr> </table>
  - Role: <cite>, <address>, , …

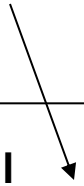
Physical Structure Tags

- Font
  - Typeface:
  - Size:
  - Color:
    - http://webmonkey.wired.com/webmonkey/reference/color_codes/Emphasis
  - Bold:
  - Italics:

(Hyper)Links

index.html

```
<html>
<head>
<title>Hello World!</title>
</head>
<body>
<p>Hello world! This is my first webpage!</p>
<p>Click <a href="test.html">here</a> for another page.</p>
</body>
</html>
```



test.html

```
<html>
<head>
<title>Another page</title>
</head>
<body>
<p>This is another page.</p>
</body>
</html>
```

Hypertext “Anchors”

- Internal anchors: somewhere on the same page
  - Students
    - Links to: Student Information
- External anchors: to another page
  - CLIS
  - CLIS students
- URL may be complete, or relative to current page
  - 2
- File name part of URL is case sensitive (on Unix servers)
  - Protocol and domain name are not case sensitive

Images

- <img src="*URL*"> *or* <img src="*path/file*">
  - <img src="http://www.clis.umd.edu/IMAGES/head.gif">
  - SRC: can be url or path/file
  - ALT: a text string
  - ALIGN: position of the image
  - WIDTH and HEIGHT: size of the image
- Can use as anchor:
  - <img src=*URL2*>

Tables

<table>
<tr><td> eenie </td><td> mennie </td><td> miney </td></tr>
<tr><td> mo </td><td> catch </td><td> a tiger </td></tr>
<tr><td> by </td><td> the </td><td> toe </td></tr>
</table>

Table Example

```
<table align=“center”>
<caption align=“right”>The caption</caption>
   < tr align=“LEFT”>
        <th> Header1 </th>
        <th> Header2</th>
   </tr>
   <tr><td>first row, first item </td>
        <td>first row, second item</td></tr>
   < tr><td>second row, first item</td>
        <td>second row, second item</td></tr>
</table>
```

Frames

- Divide browser pages into separate sections
  - Useful when you want to scroll separately
- Each section can display an HTML page
- Example 1: menu frame on the left side of a page

```
<frameset cols="10%,90%" >
        <frame src="template.html">
        <frame src="images.html">
</frameset>
```

- Example 2:
  - http://www.hq.nasa.gov/alsj/frame.html

Cascading Style Sheets (CSS)

- Specify appearance, based on structure

- Style rules “cascade” from broad to narrow:
  - Browser’s default behavior
  - External style sheet
  - Internal style sheet
  - Inline style

Some Ways of Using CSS

- Inline style:
  - Causes only the tag to have desired properties

```
<p style="font-family:arial; color:blue">…</p>
```

- Internal stylesheet:
  - Causes *all* tags to have the desired properties

```
…
<head>…
<style type="text/css">
p { font-family:arial; color:blue}
</style>
</head>
<body>
<p>…</p>
…
```

Customizing Classes

- Define a custom style for standard HTML tag

```
…
<head>…
<style type="text/css">
p.style1 { font-family:arial; color:blue}
p.style2 { font-family:serif; color:red}
</style>
</head>
<body>
<p class=“style1">…</p>
<p class=“style2">…</p>
…
```

External Style Sheets

- Store formatting metadata in a separate file

mystyle.css

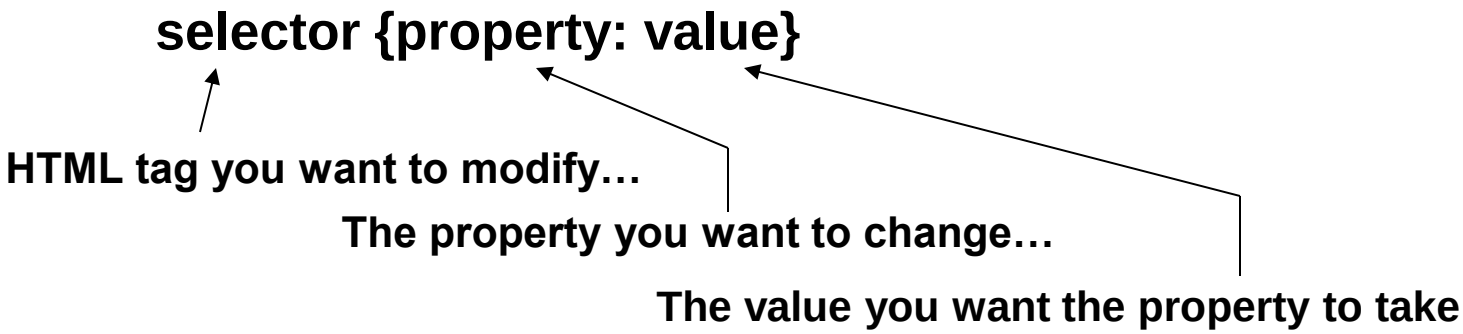
```
p.style1 { font-family:arial; color:blue}
p.style2 { font-family:serif; color:red}
```



```
…
<head>…
<link rel="stylesheet" href="mystyle.css" type="text/css" />
</head>
<body>
<p class="style1">…</p>
<p class="style2">…</p>
…
```

General Structure for CSS

- Basic syntax:



- Example:

```
p { text-align: center;
    color: black;
    font-family: arial }
```

Causes

- Font to be center-aligned
- Font to be Arial and black

Designing Web Pages

- Key design issues:
  - Content: What do you want to publish?
  - Style: How do you want to present it?
  - Syntax: How can you achieve that presentation?
- Sources of information
  - Online tutorials (there are lots of these)
  - Technical materials (e.g., the W3C HTML spec)

Some Style Guidelines

- Design for generic browsers
  - And test on every version you wish to support
- Provide appropriate “access points”
  - User needs and navigation strategies differ
- Design useful navigational aids
  - A Web search may lead to the middle of a site
- Include some indication of currency
  - Date of last update, “new” icons, etc.
- Indicate who is responsible for the content
  - Helps readers assess authority

Some Accessibility Guidelines

- Design for device independence
- Maintain compatibility with earlier browsers
  - Provide alternative pages if necessary
- Provide alternatives to aural and visual content
  - Alt tags for images, transcripts for audio
- Make is easy for assistive devices to work
  - Use structural (rather than layout-oriented) markup
  - Give a title to each frame
  - Only use HTML tables for table data (not content layout)
  - Use markup to indicate language switching

Section 508 (Federal Web pages)

- A **text equivalent** for every non-text element shall be provided.
- Equivalent **alternatives for any multimedia** presentation shall be synchronized with the presentation.
- Web pages shall be designed so that all information conveyed with color is also **available without color**.
- Documents shall be organized so they are **readable without requiring an associated style sheet**.
- Redundant text links shall be provided for each active region of a server-side image map.
- **Client-side image maps** shall be provided instead of server-side image maps except where the regions cannot be defined with an available geometric shape.
- **Row and column headers shall be identified for data tables**.
- Markup shall be used to **associate data cells and header cells** for data tables that have two or more logical levels of row or column headers.
- **Frames shall be titled** with text that facilitates frame identification and navigation.
- Pages shall be designed to **avoid causing the screen to flicker** with a frequency >2 Hz and <55 Hz.
- A **text-only page**, with equivalent information or functionality, shall be provided when compliance cannot be accomplished in any other way. The content shall be updated when the primary page changes
- When pages use **scripting languages** to display content or to create interface elements, the information provided by the script shall be identified with functional text that can be read by assistive technology.
- When a web page requires that an **applet**, plug-in or other application be present on the client system to interpret page content, the page must provide a link to a plug-in or applet that complies with the above.
- When electronic **forms** are designed to be completed on-line, the form shall allow people using assistive technology to access the information, field elements, and functionality required.
- A method shall be provided that permits users to **skip repetitive navigation links**.
- When a timed response is required, the user shall be alerted and **given sufficient time** to indicate more time is required.

HTML Editors

- Goal is to create Web pages, not learn HTML!
- Several are available
  - Macromedia Dreamweaver available commercially
  - Microsoft Word (Page->Edit with Word in IE 7
  - Many more options available on www.tucows.com
- Tend to use physical layout tags extensively
  - Detailed control can make hand-editing difficult
- You may still need to edit the HTML file
  - Some editors use browser-specific features
  - Some HTML features may be unavailable
  - File names may be butchered when you upload

HTML Validators

- Syntax checking: cross-browser compatibility
  - http://validator.w3.org
  - Try it on http://www.umd.edu ☹
- Style checking: Section 508 compliance
  - http://www.powermapper.com/products/sortsite/checks/accessibility-checks.htm
  - Try it on http://terpconnect.umd.edu ☹

What's Wrong with the Web?

- HTML
  - Confounds structure and appearance (XML)
- HTTP
  - Can't recognize related transactions (Cookies)
- URL
  - Links breaks when you move a file (PURL)

What’s a Document?

- Content
- Structure
- Appearance
- Behavior

History of Structured Documents

- Early standards were “typesetting languages”
  - NROFF, TeX, LaTeX, SGML
- HTML was developed for the Web
  - Too specialized for other uses
- Specialized standards met other needs
  - Change tracking in Word, annotating manuscripts, …
- XML seeks to unify these threads
  - One standard format for printing, viewing, processing

eXtensible Markup Language (XML)

- SGML was too complex
- HTML was too simple
- Goals for XML
  - Easily adapted to specific tasks
    - Rendering Web pages
    - Encoding metadata
    - “Semantic Web”
  - Easily created
  - Easily processed
  - Easily read
  - Concise

Some XML Applications

- Text Encoding Initiative
  - For adding annotation to historical manuscripts
  - http://www.tei-c.org/
- Encoded Archival Description
  - To enhance automated processing of finding aids
  - http://www.loc.gov/ead/
- Metadata Encoding and Transmission Standard
  - Bundles descriptive and administrative metadata
  - http://www.loc.gov/standards/mets/

Really Simple Syndication (RSS)

```
<?xml version="1.0"?>
<rss version="2.0">
<channel>
   <title>Lift Off News</title>
   <link>http://liftoff.msfc.nasa.gov/</link>
   <description>Liftoff to Space Exploration.</description>
   <language>en-us</language>
   <pubDate>Tue, 10 Jun 2003 04:00:00 GMT</pubDate>
   <lastBuildDate>Tue, 10 Jun 2003 09:41:01 GMT</lastBuildDate>
   <docs>http://blogs.law.harvard.edu/tech/rss</docs>
   <generator>Weblog Editor 2.0</generator>
   <managingEditor>editor@example.com</managingEditor>
   <webMaster>webmaster@example.com</webMaster>
   <ttl>5</ttl>
   <item>
      <title>Star City</title>
      <link>http://liftoff.msfc.nasa.gov/news/2003/news-starcity.asp</link>
      <description>How do Americans get ready to work with Russians aboard the International Space Station? They take
                  a crash course in culture, language and protocol at Russia's Star City.</description>
      <pubDate>Tue, 03 Jun 2003 09:39:21 GMT</pubDate>
      <guid>http://liftoff.msfc.nasa.gov/2003/06/03.html#item573</guid>
   </item>
</channel>
</rss>
```

See example at http://www.nytimes.com/services/xml/rss/

Atom Feeds

```
<?xml version="1.0" encoding="utf-8"?>
<feed xmlns="http://www.w3.org/2005/Atom">
<title>Example Feed</title>
<subtitle>A subtitle.</subtitle>
<link href="http://example.org/feed/" rel="self"/>
<link href="http://example.org/"/>
<updated>2003-12-13T18:30:02Z</updated>
<author>
    <name>John Doe</name>
    <email>johndoe@example.com</email>
</author>
<id>urn:uuid:60a76c80-d399-11d9-b91C-0003939e0af6</id>
<entry>
    <title>Atom-Powered Robots Run Amok</title>
    <link href="http://example.org/2003/12/13/atom03"/>
    <id>urn:uuid:1225c695-cfb8-4ebb-aaaa-80da344efa6a</id>
    <updated>2003-12-13T18:30:02Z</updated>
    <summary>Some text.</summary>
</entry>
</feed>
```

XML: A Family of Standards

- Definition: DTD
  - Known types of entities with “labels”
  - Defines part-whole and is-a relationships
- Markup: XML
  - “Tags” regions of text with labels
- Markup: XLink
  - Defines “hypertext” (and other) link relationships
- Presentation: XSL
  - Specifies how each type of entity should be “rendered”

XHTML Example

- View “The Song of the Wandering Aengus”
  - http://www.umiacs.umd.edu/~oard/teaching/690/spring08/notes/3/xml.htm
- Built from three files
  - yeats01.xml
  - poem01.dtd
  - poem01.xsl

XML Example

```
<?xml version="1.0"?>
<!DOCTYPE POEM SYSTEM "poem01.dtd">
<?xml-stylesheet type="text/xsl" href="poem01.xsl"?>
<POEM>
        <TITLE>The Song of Wandering Aengus</TITLE>
        <AUTHOR> <FIRSTNAME>W.B.</FIRSTNAME>
                <LASTNAME>Yeats</LASTNAME>
        </AUTHOR>
<STANZA>
        <LINE>I went on to the hazel wood,</LINE>
        <LINEIN>Because a fire was in my head,</LINEIN>
         <LINE>And cut and peeled a hazel wand,</LINE>
</STANZA>
</POEM>
```

Document Type Definition (DTD)

```
<!ELEMENT poem ( (title, author, stanza)* )>
 <!ELEMENT title (#PCDATA) >
<!ELEMENT author (firstname, lastname) >
<!ELEMENT firstname (#PCDATA) >
 <!ELEMENT lastname (#PCDATA) >
 <!ELEMENT stanza (line+ | linein+) >
 <!ELEMENT line (#PCDATA) >
<!ELEMENT linein (#PCDATA) >
```

#PCDATA	span of text
a,*b*	*a* followed by *b*
a|*b*	either *a* or *b*
*a**	0 or more *a*'s
a+	1 or more *a*'s

Specifying Appearance: XSL

```
<xsl:template match="POEM">
 <HTML>
<BODY BGCOLOR="#FFFFCC">
    <xsl:apply-templates/>
 </BODY>
</HTML>
</xsl:template>
```

```
<xsl:template match="TITLE">
 <H1>
<FONT COLOR="Green">
     <xsl:value-of/>
 </FONT>
</H1>
</xsl:template>
```

XLink Example

```
…….
<poem xmlns:xlink="http://www.w3.org/1999/xlink">
<author xlink:href="yeatsRDFS3.xml“
        xlink:type="simple">W. B. Yeats</author>
<poems>
<poem1 xlink:href="http://www.kirjasto.sci.fi/wbyeats.htm"
xlink:type="simple">The Rose</poem1>
<poem2 xlink:href="http://www.kirjasto.sci.fi/wbyeats.htm"
xlink:type="simple">The Tower</poem2>
</poems>
</poem>
…….
```

XHTML: Writing HTML as XML

```
<?xml version="1.0" encoding="iso-8859-1"?>
<html xmlns="http://www.w3.org/TR/xhtml1" >
<head>
   <title> Title of text XHTML Document </title>
</head>
<body>
<div class="myDiv">
    <h1> Heading of Page </h1>
     <p> here is a paragraph of text. I will include  inside this paragraph
           a bunch of wonky text so that it looks fancy. </p>
     <p>Here is another paragraph with  <em>inline emphasized</em>
           text, and <b> absolutely no</b> sense of humor. </p>
     <p>And another paragraph, this one  with an <img src="image.gif"
          alt="waste of time" />   image, and a <br /> line break. </p>
</div>
</body></html>
```

Some Basic Rules for XML

- XML is case sensitive
- XML declaration is the first statement
  - <?xml version="1.0"?>
- An XML document is a “tree”
  - Must contain one root element
  - Other elements must be properly nested
- **All** start tags must have end tags
- Attribute values must have quotation marks
  - <item id=“33905”>
- Certain characters are “reserved”
  - For example: < is used to represent <

Multiple XML Namespaces

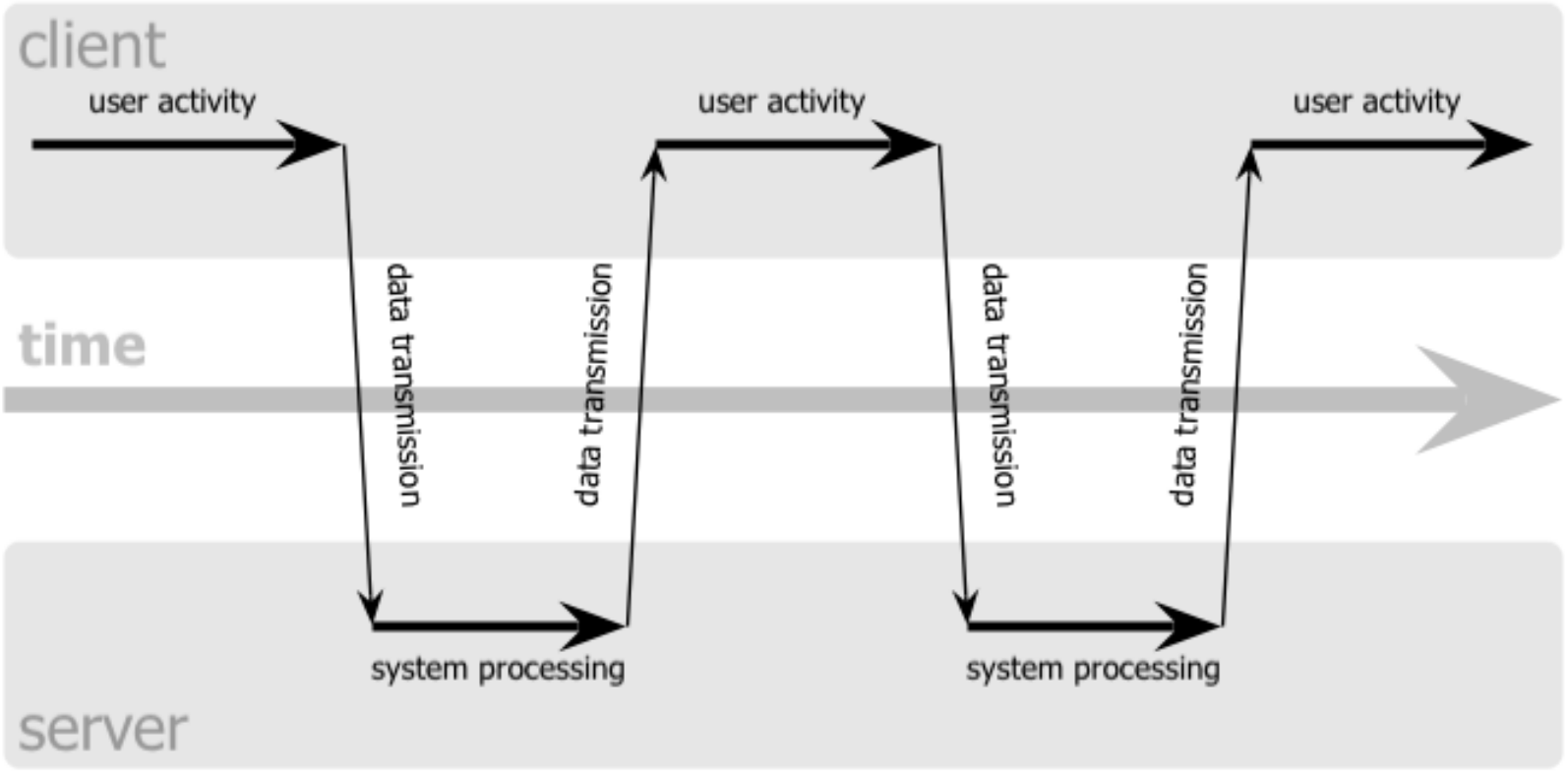
```
<?xml version="1.0"?>
<rdf:RDF
  xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
  xmlns:rss="http://purl.org/rss/1.0/"
  xmlns:dc="http://purl.org/dc/elements/1.1/">
  <rss:channel rdf:about="http://www.xml.com/xml/news.rss">
    <rss:title>XML.com</rss:title>
    <rss:link>http://xml.com/pub</rss:link>
    <dc:description>
      XML.com features a rich mix of
      information and services for the XML community.
    </dc:description>
    <dc:subject>XML, RDF, metadata, information
      syndication services</dc:subject>
    <dc:identifier>http://www.xml.com</dc:identifier>
    <dc:publisher>O'Reilly & Associates, Inc.</dc:publisher>
    <dc:rights>Copyright 2000, O'Reilly &
      Associates, Inc.</dc:rights>
  </rss:channel>
</rdf:RDF>
```

Example from http://www.xml.com/pub/a/2000/10/25/dublincore/

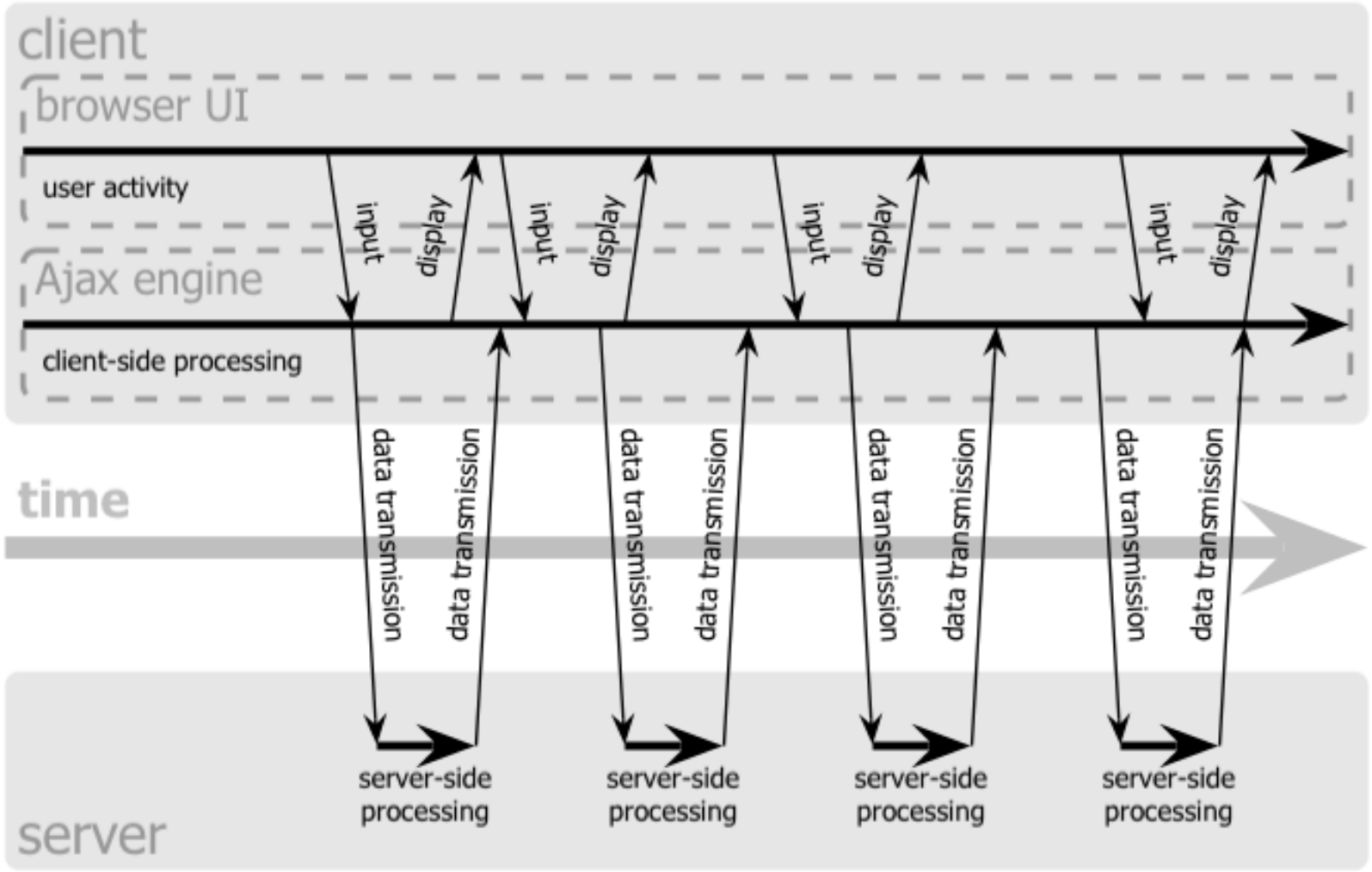
Some Ajax Applications

- Google Maps
  - http://maps.google.com
- Google Suggest
  - http://www.google.com/webhp?complete=1&hl=en
- Sajax Tables
  - http://labs.revision10.com/?p=5
- Sajax
  - http://www.modernmethod.com/sajax/

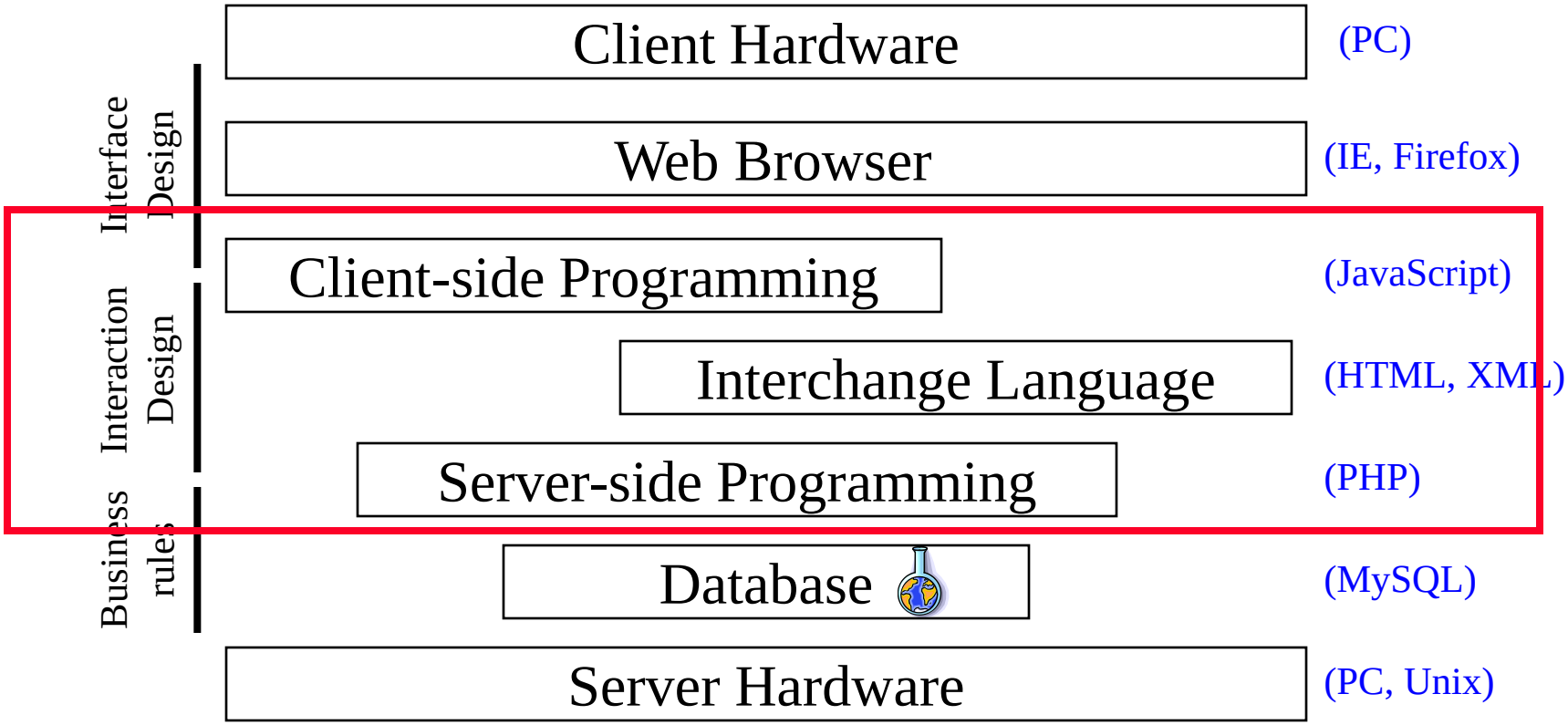
classic web application model (synchronous)



Ajax web application model (asynchronous)



- Relational normalization
- Structured programming
- Software patterns
- Object-oriented design
- Functional decomposition



Even More Uses of XML …

- **CML** – Chemical Markup Language
- **CellML** – biological models
- **BSML** – bioinformatic sequences
- **MAGE-ML** – MicroArray Gene Expression
- **XSTAR** – for archaeological research
- **MARCXML** – MARC in XML
- **AML** – astronomy markup language
- **SportsML** – for sharing sports data

Summary

- Learning to build simple Web pages is easy
  - Which is good news for the homework!
- All documents are structured documents
  - But some expose the structure better than others
- XML is a flexible markup language
  - Complete separation of structure and appearance

Before You Go

On a sheet of paper, answer the following (ungraded) question (no names, please):

What was the muddiest point in today's class?