WTP-101

Developing Web Applications with Standards

using W3C org standard technologies such as, HTML, CSS, XML, XSD and XSL

Attributions

- **World Wide Web Consortium**
  - http://www.w3c.org
- **Sandra Clark**
  - CSS for Better Sites – CFUN04
  - http://www.cfconf.org/

Web Standards

Module Road Map

- **Web Standards**
- Web Architecture: Resources, URI and HTTP
- HTML and XHTML
- XML, XML Schemas and XML Parsing
- CSS
- XSLT

What are Web Standards

- **Worldwide Web Consortium (W3C)**
  - Recommends Standards for Web Development
- **Recommendations:**

http://www.w3.org

Specifications for the Web's formats and protocols must be compatible with one another and allow (any) hardware and software used to access the Web to work together

w3c.org – The “one” web

- **The W3C Technology Stack**

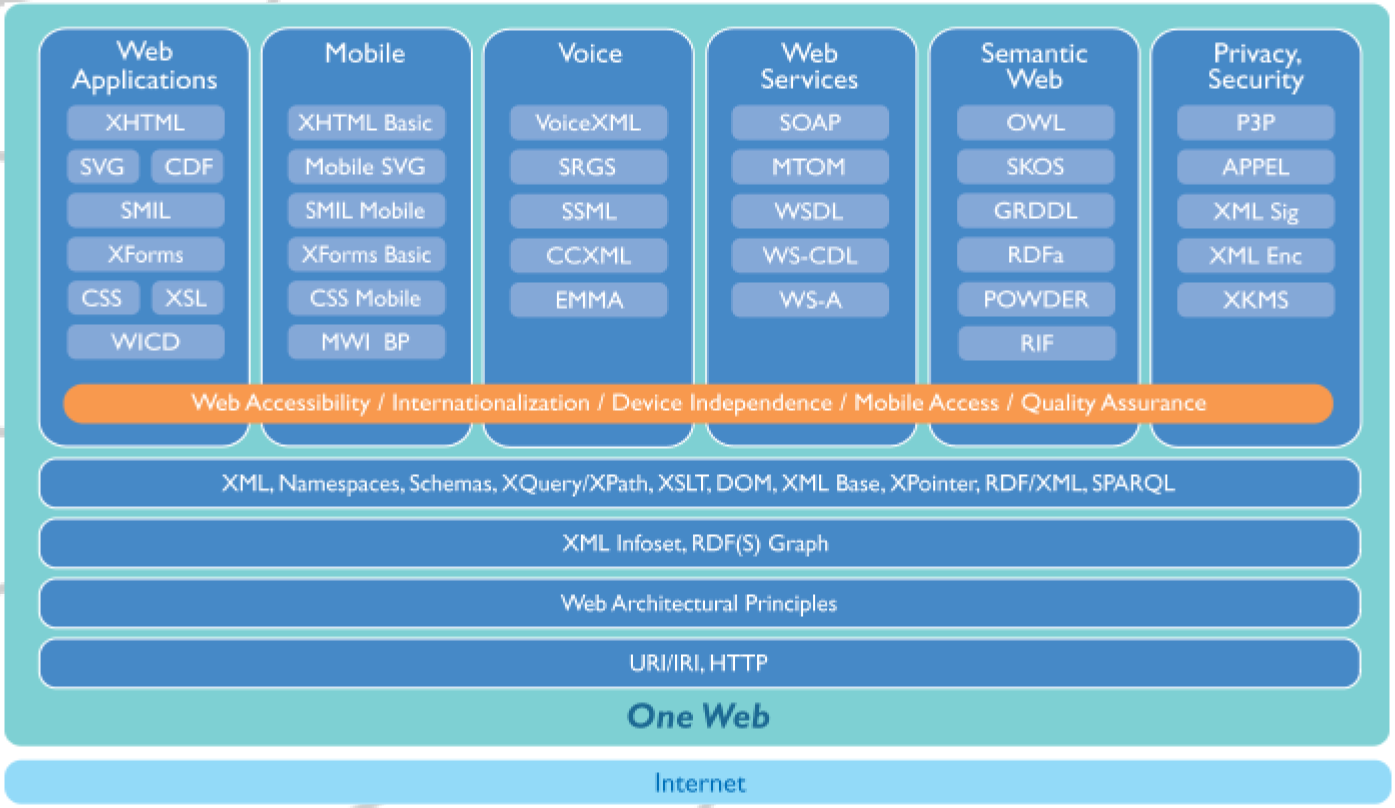


Figure: http://www.w3.org/Consortium/technology

What Standards?

- **Standards for the Web means:**
  - Structural Languages
    - **HTML** – Publishing Language of the Web
    - **XHTML** - Extensible Hypertext Markup Language 1.0 and 1.1
    - **XML** - Extensible Markup Language 1.0
  - Transformations
    - **XSL** - Extensible Stylesheet Language
    - **XPath** – XML Path Language
  - Presentation
    - **CSS** - Cascading Style Sheets Levels 1 and 2
  - as well as emerging standards, such as those for television and PDA based User Agents

Web standards are important

- **Designing and building with Web standards**
  - **Simplicity**
    - Simplifies and lowers the cost of production
  - **Accessibility**
    - Delivers sites that are accessible to more people
    - Delivers sites that are accessible more types of Internet devices.
  - **Continuity**
    - Sites will continue to function correctly as traditional desktop browsers evolve, and as new Internet devices come to market

Quoted from http://www.webstandards.org mission statement

XML, HTML, XHTML, XSL & CSS

- **XML for content**
  - Most portable way to share and transfer information
- **HTML/XHTML for publishable document structure**
  - Structure does matter
- **XSL for transformation**
  - Transform between document types
- **CSS for presentation**
  - If it isn't content it doesn't belong in HTML

Standards Related

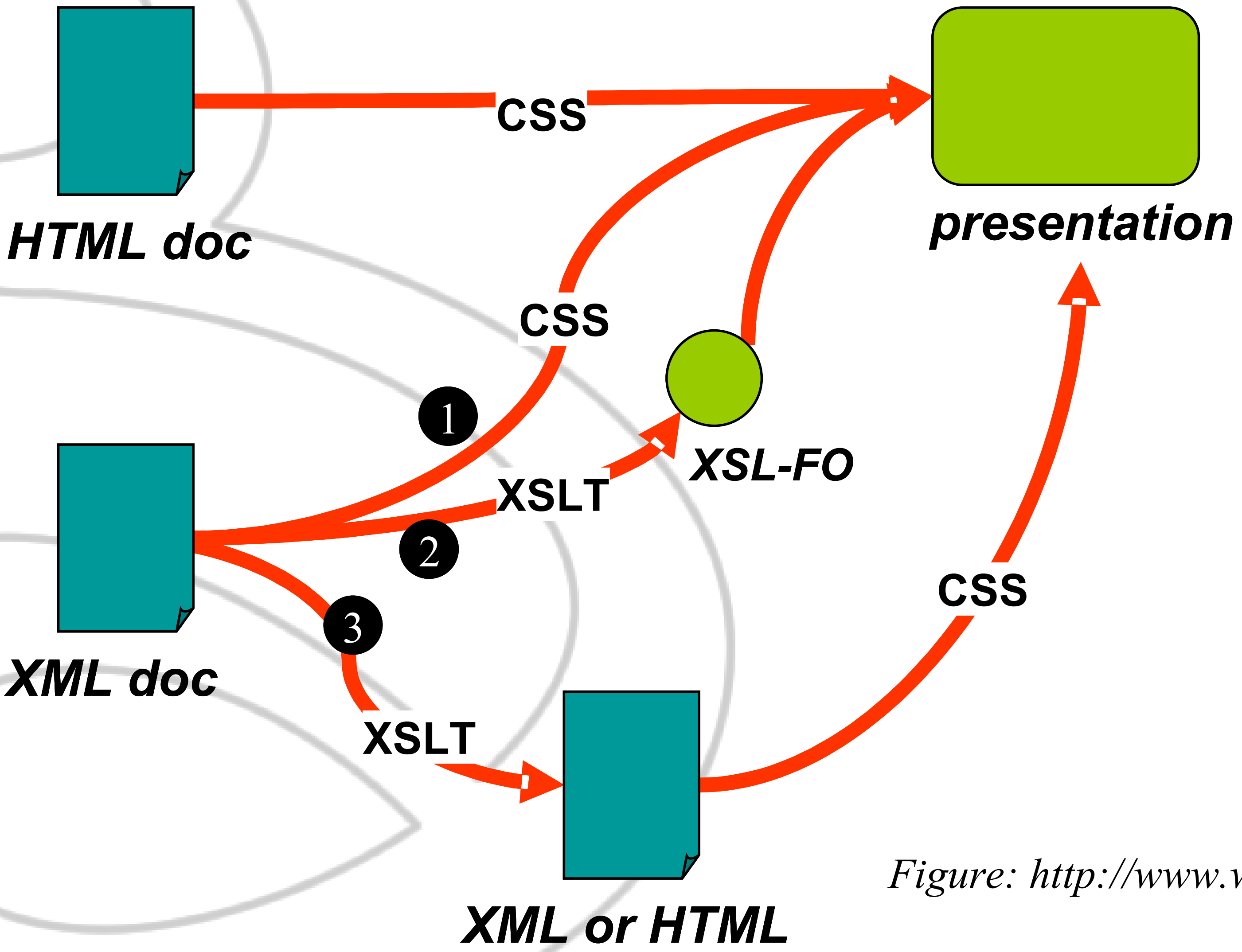


Figure: http://www.w3c.org

Web Architecture

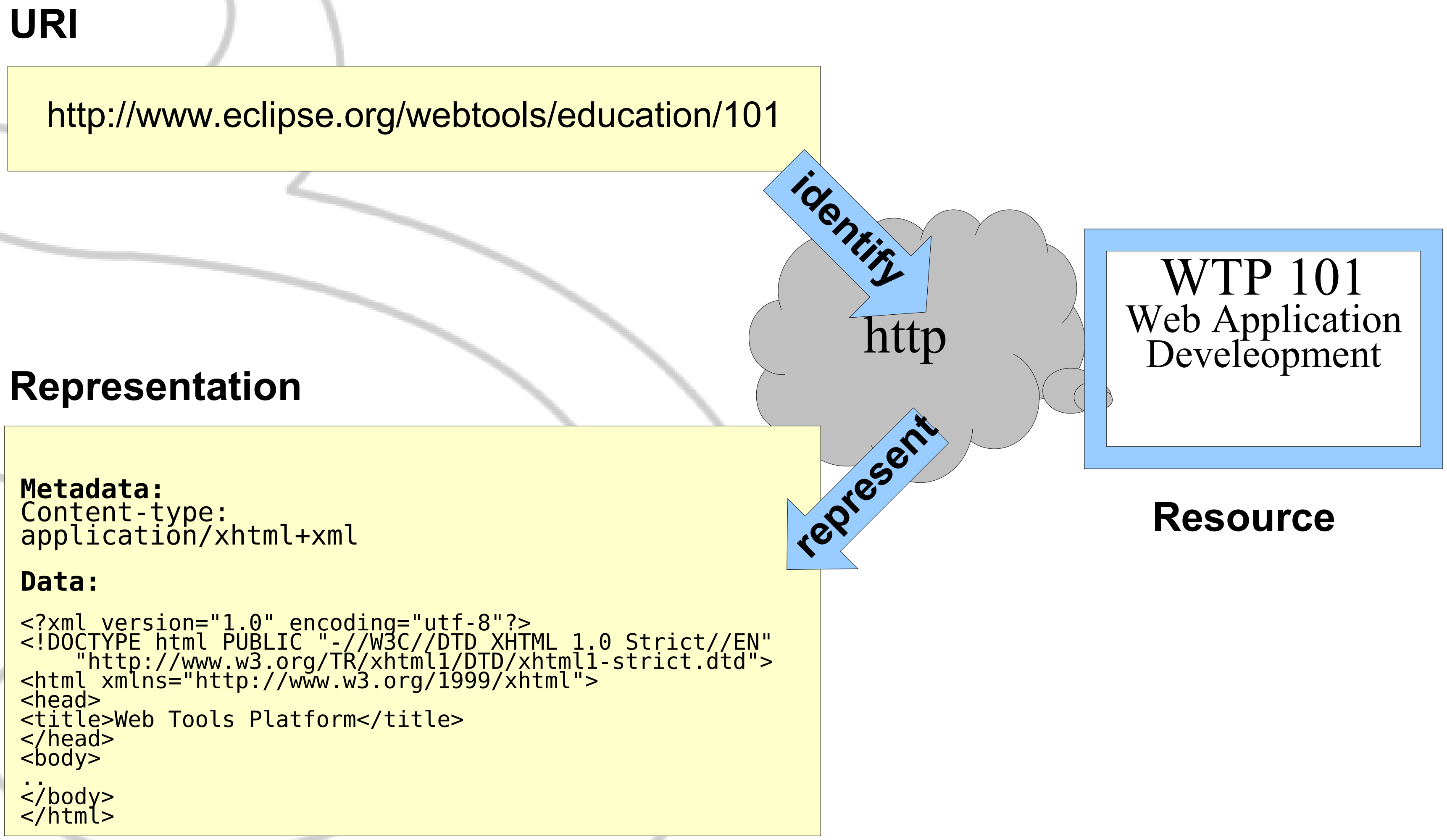
Module Road Map

- Web Standards
- **Web Architecture: Resources, URI and HTTP**
- HTML and XHTML
- XML, XML Schemas and XML Parsing
- CSS
- XSLT

Section Goals

- To learn basic Web architecture
- To learn how Resources, URI and HTTP are used to access information on web servers

Simple Web Architecture



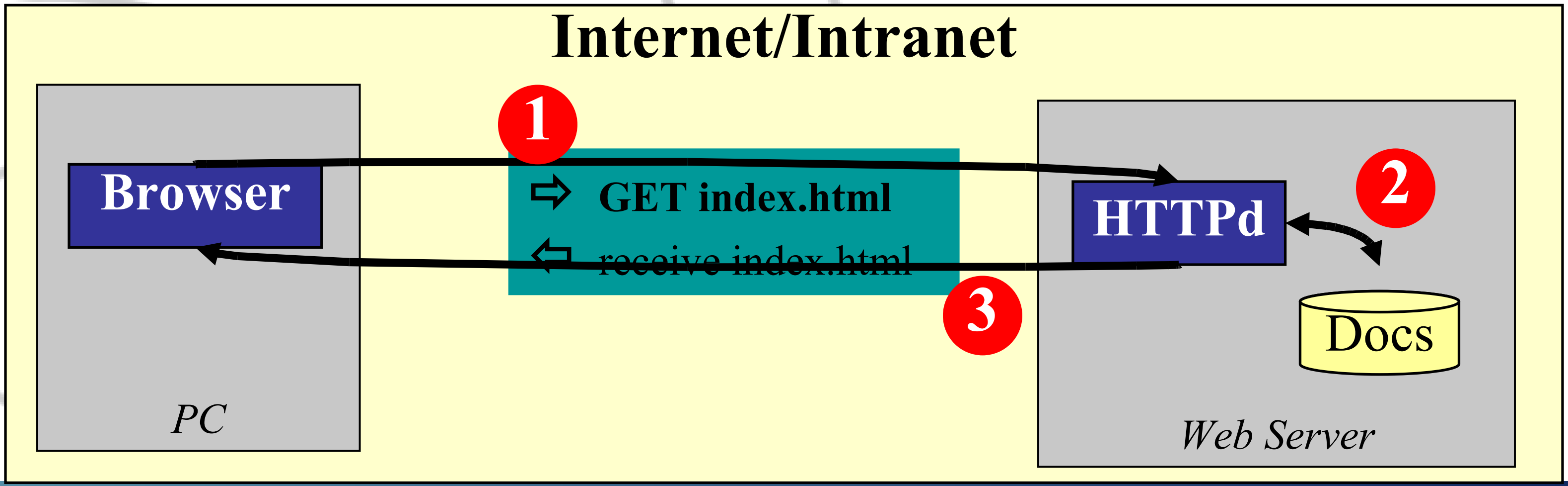
```
Metadata:
Content-type:
application/xhtml+xml

Data:

<?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">
<head>
<title>Web Tools Platform</title>
</head>
<body>
..
</body>
</html>
```

Http: Protocol of the Web

- **The Internet consists of servers, clients, and routers**
  - Servers provide the information
  - Clients use the information on the servers
  - Routers provide the network that allows clients and servers to communicate
- **Clients and servers typically communicate using HyperText Transfer Protocol (HTTP)**

Simple HTTP

- **URI:**
  - The browser connects to the Web Server using a socket
  - The browser sends a “GET” request
- **Resource:**
  - The server resolves the request
  - Standard web pages are produced by the server
- **Representation:**
  - The HTML is sent to the browser
  - The socket is closed; the browser renders the document using HTML

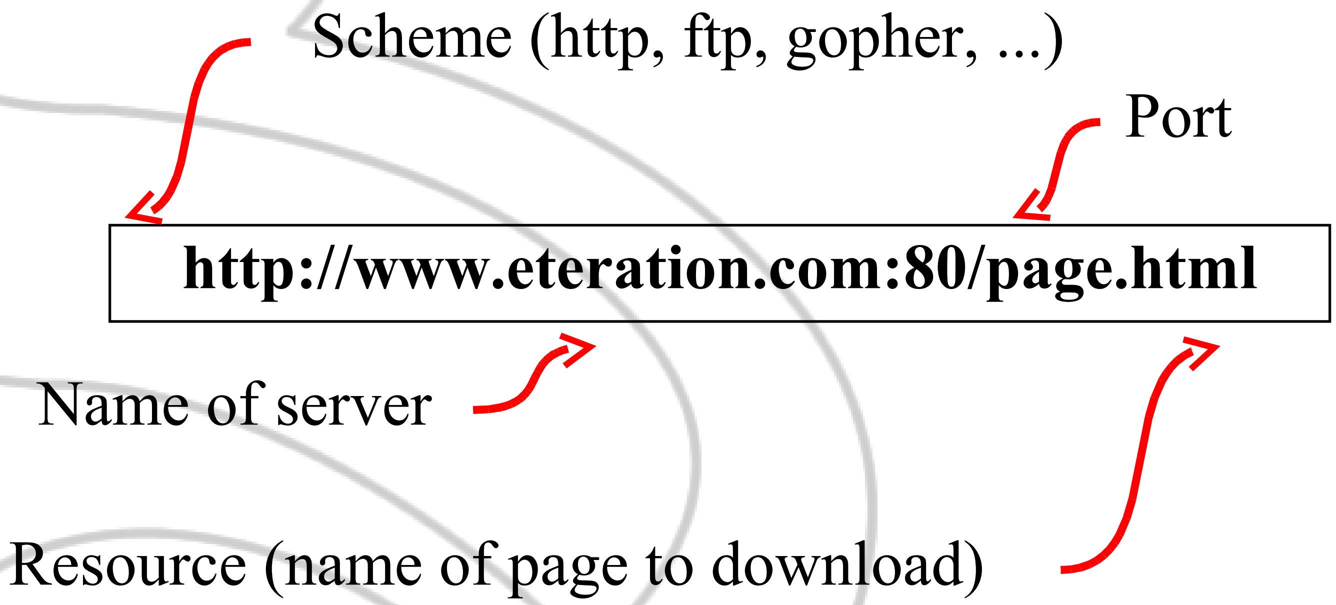


Atomic Requests

- **HTTP requests are non-conversational**
  - A different socket is used to satisfy each request
- **Traditional HTTP provides no mechanisms for multiple request relationships with clients**
  - Cookies can be used to maintain information about the client’s identity

What is an URL?

- **Uniform Resource Locator, or an address pointing to an Internet resource**


Scheme (http, ftp, gopher, ...)
Port
http://www.eteration.com:80/page.html
Name of server
Resource (name of page to download)

If you don’t specify a port, 80 is assumed.

URLs

- A URL specifies the identity of the computer as well as the required resource
- File resources are specified relative to a “web root”
  - The “web root” is a directory on the server
  - The resource may include subdirectory information

http://localhost:7001/stuff/page.html

Access the file /stuff/page.html from the server running on port 7001 on the local computer

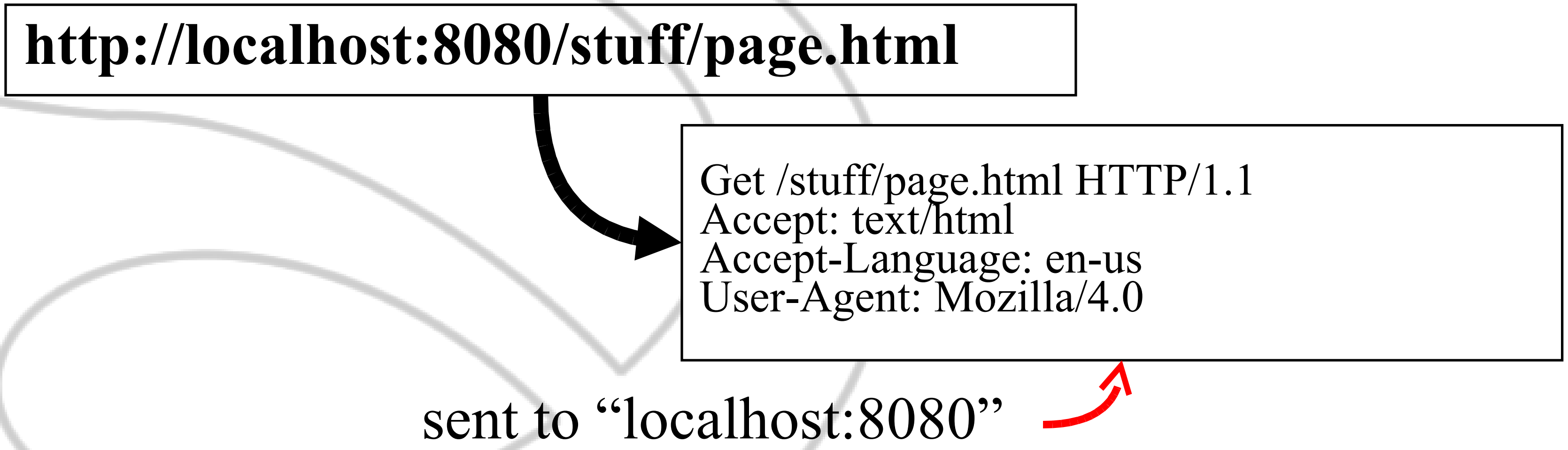
The URL may be shown at the top of your browser as the "location" or "address"

Clients

- **Clients access information provided by the servers**
  - Web browsers are probably the most common web clients
- **A client requests files by sending a HTTP request to server**
  - The request is sent over the internet using sockets
  - The file is specified in the request using a Uniform Resource Locator (URL)

HTTP Request

- **The request is formed by the client to inform the server of the request**
- **The request header includes:**
  - Supported HTTP version, type of the requestor (User-agent), accepted formats (Accept), accepted languages, cookies, ...



http://localhost:8080/stuff/page.html

```
Get /stuff/page.html HTTP/1.1
Accept: text/html
Accept-Language: en-us
User-Agent: Mozilla/4.0
```

sent to “localhost:8080”

Servers

- **Web servers provide information to web clients**
  - When a request comes in from a client, the server “serves” a response
- **The response contains header information as well as the content of the page**
- **The type is contained in the header**
  - This specifies what type of information is being returned in the response (HTML page, an image, sound file, ...)
  - The client uses the type to decode the information in the response and present it to the user

HTTP Response

- **The server’s response includes a header followed by content data**
  - The client uses information in the header to determine what to do with the content
- **The response header includes**
  - Content type, content length, cookies, ...

```
Server: JavaWebServer/1.0
Content-Type: text/html
Set-Cookie: id=954096

<HTML>
<BODY>
Hello World!
</BODY>
</HTML>
```

What is MIME?

- **Multipurpose Internet Mail Extensions protocol**
  - Standard for identifying and encoding binary data for transmission
  - Originally designed for sending e-mail attachments
- **HTTP uses MIME**
  - Identify the type of object in the response
  - Typically “text/html” which indicates that the return value is an HTML document
- **Browsers use this information to decide what to do with the content**
  - MIME also specifies a number of different encoding schemes for transporting 8-bit data over 7-bit protocols

MIME Encoding is not part of this course.

Some MIME Types

- **Content types are specified as a type/subtype pair**
  - Both the type and subtype are required
- **text/html**
  - The content of the message is HTML-formatted text
- **text/plain**
  - The content of the message is unformatted text
- **image/jpeg**
  - The content of the message is a JPEG image

MIME Types are case in-sensitive.

Cookies

- **Servers return additional information to the client via cookies**
  - Clients return the cookie information on subsequent requests
- **Cookies can be used to maintain a relationship between a browser and the server**
- **Cookie's life span can be configured**
  - Live until a specified date and time
  - Live until the browser closes

Web Pages

- **Web pages consist of text and HTML tags which provide formatting “suggestions” to web browsers**
- **Pages may contain images, movies, sounds, and other types of multimedia**
- **Pages may also contain client-side technologies**
  - Java applets, JavaScript, ActiveX components which are downloaded and executed on the client
- **Pages can provide links to other pages**
  - Links allow a user to move quickly and easily between related web pages

A web site is a collection of related web pages.

Pages Can Be Static or Dynamic

- **A web page may be an actual file located on a server**
  - Static content
- **Web pages may also be dynamically generated by the server**
  - Java servlets, Java Server Pages (JSPs)
  - Many, many others!

Dynamic Content

- **Servlets and JSPs are accessed using a request with a URL - just like a regular page**
- **Unlike a regular page, the content in the response is generated dynamically by the servlet or JSP**
- **Servlets don’t just generate HTML!**
  - Servlets can also be used to generate other MIME Types such as images
  -
- **Servlets are the subject of another course!**

What You Have Learned

- The Internet consists of servers, clients, and routers
- Web clients access information on web servers using HyperText Transfer Protocol (HTTP)
- Web pages contain text and multimedia
- Web pages may be static or generated dynamically

Hands-On Lab

- **Setup a Preview Server**
  - Software is provided with WTP
- **Create a simple page**
  - Hello world will suffice
- **Monitor HTTP traffic with TCP-IP Monitor**
  - TCPIP Monitor is a proxy between the browser and the server

HTML and XHTML

Module Road Map

- Web Standards
- Web Architecture: Resources, URI and HTTP
- **HTML and XHTML**
- XML, XML Schemas and XML Parsing
- CSS
- XSLT

Section Goals

- To learn Web standards for HTML and XHTML
- To learn the structure of an HTML document
- To learn how to use basic HTML tags

HTML Overview

- **HTML stands for HyperText Markup Language**
- **HTML files consist of text and tags**
  - Text provides the content of the page
  - Tags provide formatting "suggestions" to the client
    - It is up to the client how these suggestions are implemented
- **HTML tags are case-insensitive**
- **Whitespaces within HTML files are generally ignored**
  - Formatting tags are used instead to specify
    line breaks, indentation, etc.

XHTML

- **XHMTL is an xml compliant version of HTML 4.01**
- **Benefits of using XHTML**
  - Easier to validate against
  - Because its more stringent, we are more careful
  - Requires the use of CSS for all presentation.
  - Standard across most User Agents

HTML vs. XHTML

- **Element and Attributes**
  - HTML
    - <H1></H1>
    - <Input type="Hidden">
  - XHTML must be lowercase
    - <h1></h1>
    - <input type="hidden" />
- **End tags are required**
  - HTML
    - <p>
  - XHTML
    - <p></p>
- **Empty Elements**
  - HTML
    - <br> , <hr>
  - XHTML
    - <br/>, <hr />
- **Quotes**
  - HTML
    - <input type=Hidden value='myvalue'>
  - XHTML
    - <input type="hidden" value="myvalue" />
- **name/value pairs**
  - HTML
    - <input type="checkbox" checked>
  - XHTML
    - <input type="checkbox" checked="checked"/>

DOCTYPE

- **XHTML Documents must be well formed**
  - MUST start with a <!DOCTYPE>
- **User Agents (browsers) use the DOCTYPE**
  - Choose what mode to use when rendering your HTML

```
<?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">
<head>
<title>Web Tools Platform</title>
</head>
<body>
..
</body>
</html>
```

Which mode am I in?

- **To check which Rendering mode your computer is in, use the following:**
  - IE6 – Opera
    - javascript:alert(document.compatMode);
      - CSS1CompatMode – Standards Based Rendering
  - Firefox, Mozilla – Netscape
    - CTRL-I for page information.

Forcing User Agents

- **Force Standards Mode**
  - Example: HTML 4.x Strict

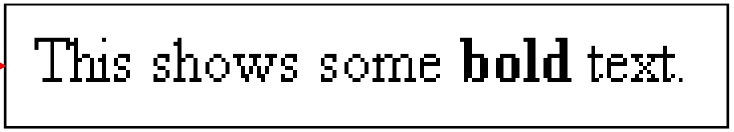
    <!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN" "
    http://www.w3.org/TR/html4/strict.dtd">

- **Quirks Mode - XML declaration with the DocType**
  - You need to use features from browser supports
    - will Force IE6 and Opera into Quirks Mode
  - Avoid using <?xml version="1.0" encoding="UTF-8"?>
    - Stay in standards mode
  - More Information: http://www.quirksmode.org/css/quirksmode.html

HTML Tags

- **Most tags have a start tag that indicates the start of the formatting and an end tag to specify the end**
  - Start tags are of the form <tag>
  - End tags are of the form </tag>
- **The formatting applies to the text between the start and end tag**
- **Some tags also have attributes which provide more information within the start tag**
  - Attribute values may use single or double quotes
  - Single quotes will make your life easier later...

```
This shows some
<b>bold</b> text.
```


This shows some **bold** text.

Page Structure Tags...

- **Tags used to specify the structure of the page**
  - Pages have a head and a body
- **Pages start with a <html> and end with a </html>**
  - Tells the browser what type of file it is
- **The <head> tag comes at the top of the page**
  - May contain a <title> tag
    causes the window name to be changed while the page is being displayed
- **The <body> tag follows the <head></head> tags**
  - The body contains the content of the page

...Page Structure Tags

```
<html>
  <head>
    <title>Page title</title>
  </head>
  <body>
    <h1> Header</h1>
    ...Page content...
    <h2>Subtitle</h2>
    ...More content...
  </body>
</html>
```

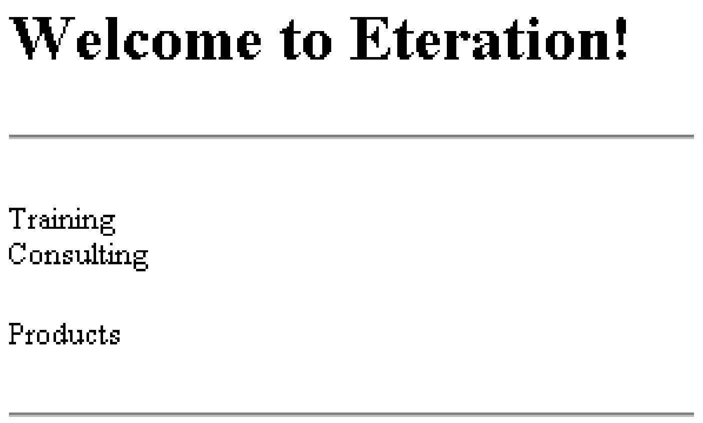
Basic Formatting Tags...

- <!-- ... --> - Comment
- <b> - Bold text
- <i> - Italicized text
- <u> - Underlined text
- <br/> - Add a line break to the text
- <hr/> - Add a line break and header rule
- <p> - Paragraph
  - <p align="right" > - Start a new right-justified paragraph
- <h1> - Text is formatted as a level-1 heading
  - Can also use <h2>, <h3>, <h4>, <h5>, and <h6>
- <center> - Text contained in these tags is center-justified

By default, text is left-justified

...Basic Formatting Tags

```
<html>
<head>
<title>Eteration!</title>
</head>
<body>
  <h1>Welcome to Eteration!</h1>
  <hr />
  <p>Training<br />
  Consulting</p>
  <p>Products</p>
  <hr />
</body>
</html>
```



Welcome to Eteration!

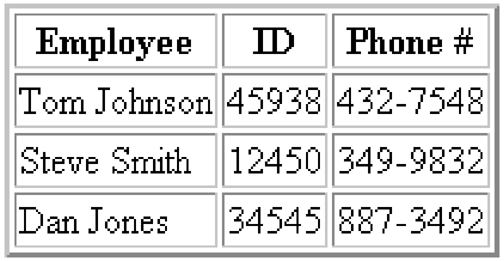
Training
Consulting

Products

Paragraph tags should have an end tag!

Table Tags

- **A table is specified by providing tags for each row; the columns are specified with each row**
- **Tags:**
  - <table> - Creates an HTML table
  - <tr> - Starts a new row within a table
  - <td> - Starts a new cell within a table row
  - <th> - A heading cell within a table



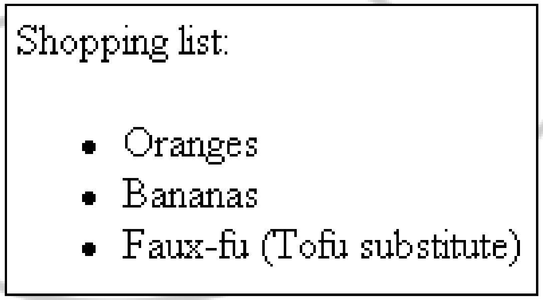
Employee	ID	Phone #
Tom Johnson	45938	432-7548
Steve Smith	12450	349-9832
Dan Jones	34545	887-3492

```
<table border="2">
  <tr><th>Employee</th> <th>ID</th> <th>Phone#</th></tr>
  <tr><td>Tom Johnson</td><td>45938</td><td>432-7548</td></tr>
  <tr><td>Steve Smith</td><td>12450</td><td>349-9832</td></tr>
  <tr><td>Dan Jones</td><td>34545</td><td>887-3492</td></tr>
</table>
```

HTML Lists

- **HTML has tags that output text in a list format**
  - <ul> - Unordered (bullet) list
  - <ol> - Ordered (numbered) list
  - <li> - Start a new entry in a list (ordered or unordered)

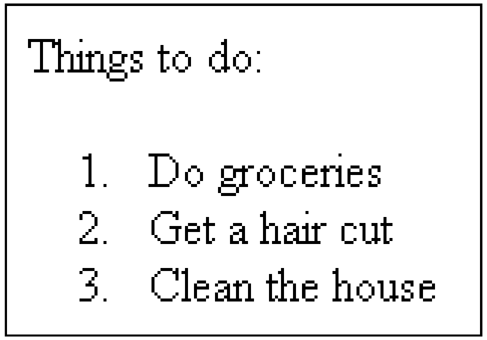
```
Shopping list:
<ul>
  <li>Oranges</li>
  <li>Bananas</li>
  <li>Faux-fu (Tofu substitute)</li>
</ul>
```



Shopping list:

- Oranges
- Bananas
- Faux-fu (Tofu substitute)

```
Things to do:
<ol>
      <li>Do groceries</li>
      <li>Get a hair cut</li>
      <li>Clean the house</li>
</ol>
```



Things to do:

1. Do groceries
2. Get a hair cut
3. Clean the house

HTML Links

- **Create a hyperlink using the <a> tag**
- **This tag has one attribute call href**
  - Used to specify the URL of the location to link to
- **The link can refer to an HTML page, a servlet, an image, ...**

```
Click
<a href="http://www.eteration.com/education/">here</a>
 to go to education pages.
```

White space is ignored by HTML formatters

The Image Tag

- **Image tags are used to display graphical images**
- **The image tag can have a number of different parameters**
- **“src”**
  - The source URL of the image; the browser will use this URL to make a request for the image
- **“alt”**
  - Specifies alternative text to display if the browser can’t (or won’t) display the graphic
- **“height” and “width”**
  - Used to customize the size of the image without altering the source file

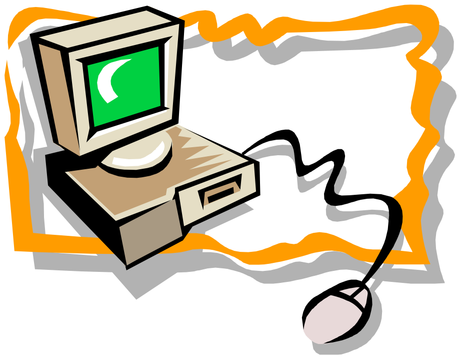
```
<img src="images/eteration400.gif" alt=“Eteration Logo” />
```

What You Have Learned

- How a web page is structured
- How to use basic HTML tags
- How to add lists and hyperlinks to your HTML pages

Hands-On Lab

- **Create a Web page**
  - XHTML Transitional 1.0
  - Validate XHTML at http://validator.w3.org/
- **Use tables for layout**
- **Use tables for listing objects**
- **Tables are very complex to work with.**
  - We will fix some of the problems later



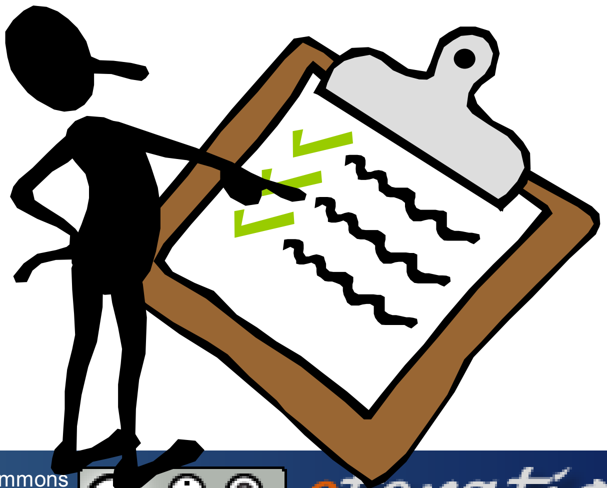
XML and XML Schemas

Module Road Map

- Web Standards
- Web Architecture: Resources, URI and HTTP
- HTML and XHTML
- **XML and XML Schemas**
- CSS
- XSLT

Section Goals

- To learn about XML
- Compare HTML, SGML and XML
- To learn about DTDs
- To learn about XSDs
- To learn basic XML parsing techniques an APIs

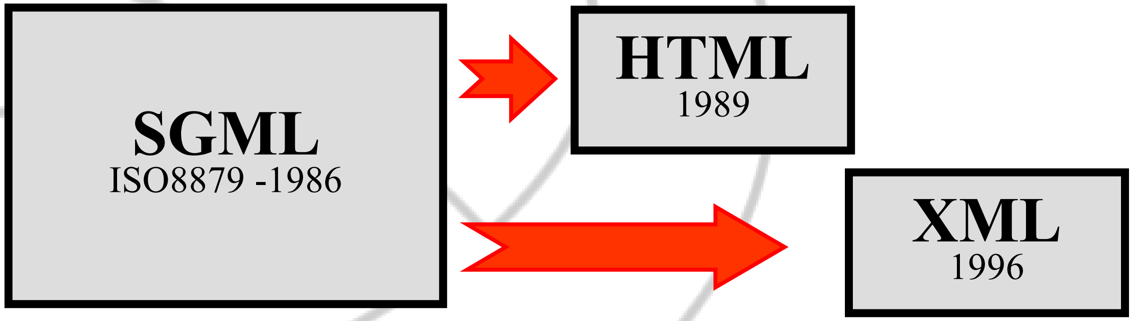


Common Terms

• **XML:**	**eXtensible Markup Language**
• **XSD:**	**XML Schema Definition**
• **DTD:**	**Document Type Definition**

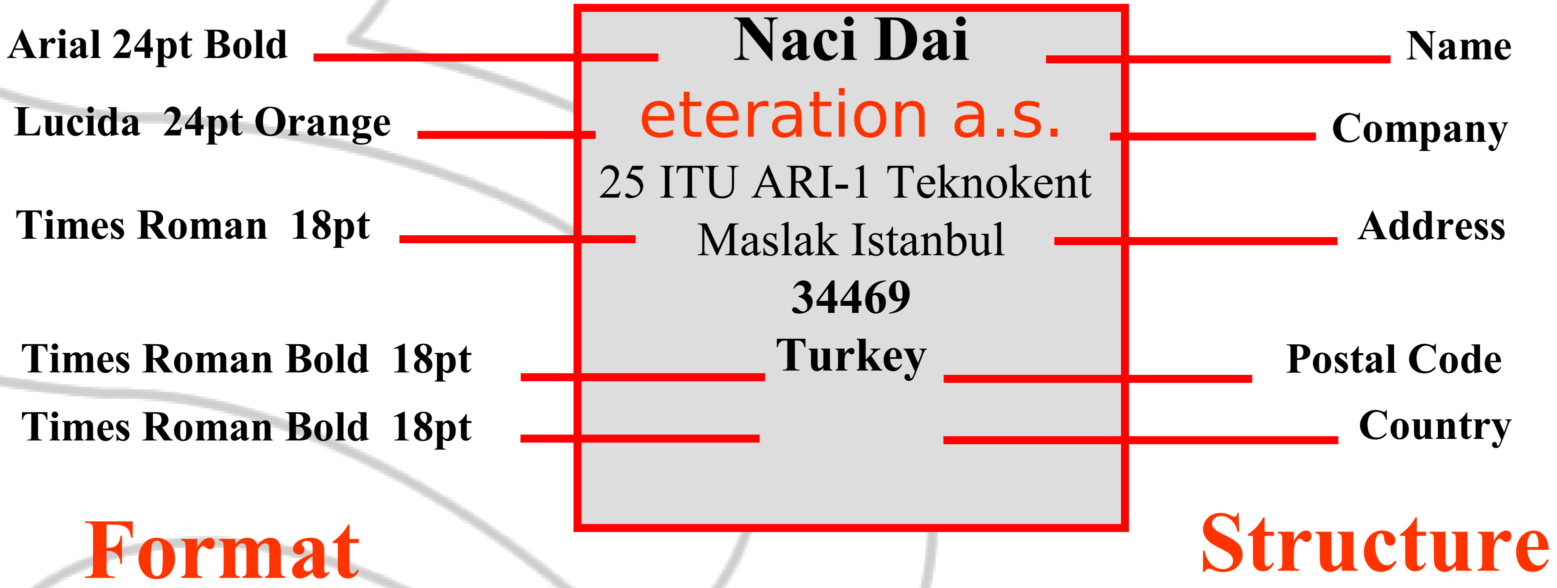
SGML Background

- **Standard Generalized Markup Language (ISO 8879)**
  - Motivated by heavy document processing requirements of large organizations
  - Exchange text without loosing “structure”
  - Complex failed to gain wide acceptance
- **Both XML and HTML came form SGML**



Format Markup vs. Structure Markup

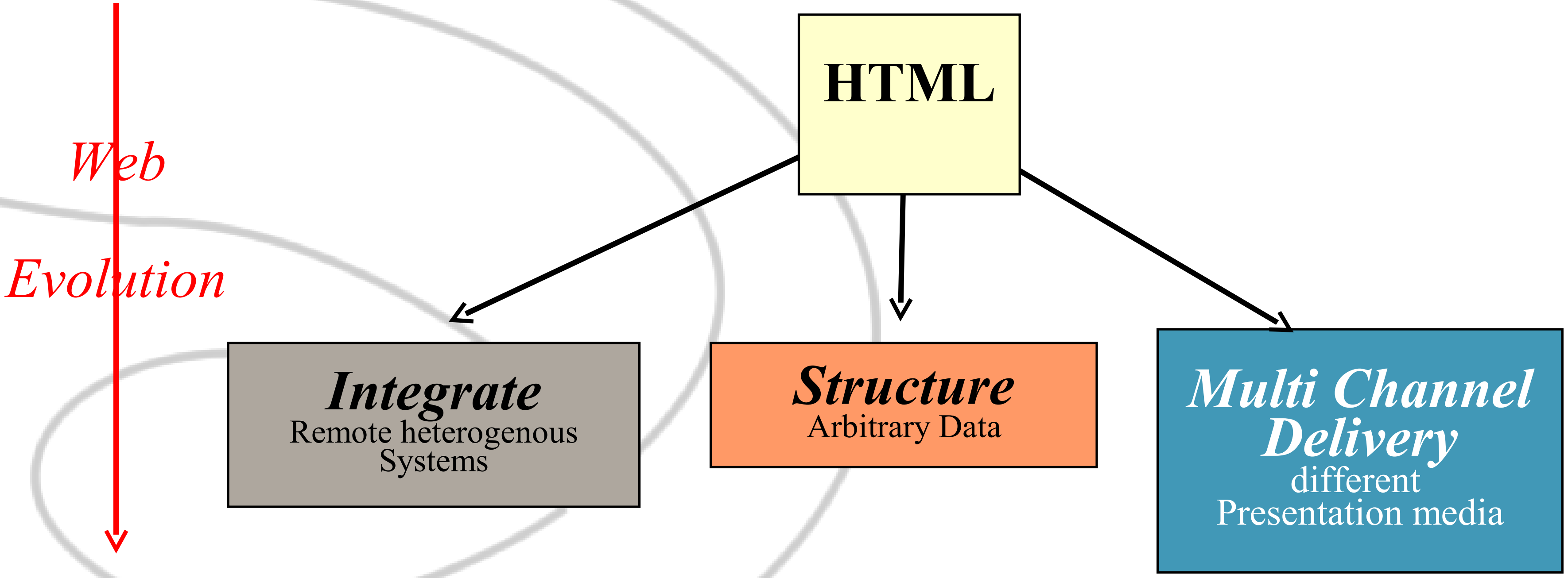
- **Meaning comes with structure**
  - How can you tell the name of this person?



Markup Identifies Elements of a Document

HTML is Limited

- **Simple markup language**
  - Not designed for structuring data
- **Result:**
  - Not for arbitrary universal custom data



What is XML?

- **EXtensible Markup Language**
- **XML is a *metadata* language**

- **Data is:**
  - Web page
  - Printed Book
  - Product
- **Metadata is:**
  - Information about data (data about data)
  - Describing what the data is, identifying content

XML is Extensible

- **Define your own tags**
  - There is no single set of XML tags
  - Unlike HTML, where there is a core set of tags
    - Comprimising extensibility HTML is easy to learn and use

```
<html>
<head>
<title>Eteration</title>
</head>
<body>
<br />
<h1>Hello!</h1>
</body>
</html>
```

html

```
<address>
        <name>Naci Dai</name>
        <company>Eteration</company>
        <street>25 ARI-1 ITU Teknokent</street>
        <zip>34469</zip>
        <country>Turkey</country>
</address>
```

```
<order>
<price>10$</price>
..
</order>
```

```
<message>
<text>Hello</text>
..
</message>
```

xml

XML is for Markup

- **Markup is identifying disctinct elements of documents**
  - Essential for documents to make sense

John Smith
eteration
Suite 25.
ITU ARI-1 Teknokent
ISTANBUL
34469 Turkey

Plain text

markup

```
<?xml version="1.0" encoding="UTF-8"?>
<address>
  <name>Naci Dai</name>
  <company>Eteration</company>
  <suite>25</suite>
  <street>ITU ARI-1 Teknokent</street>
  <zip>34469</zip>
  <city>Istanbul</city>
  <country>Turkey</country>
</address>
```

xml

XML is a Language

- **XML is a formal document markup language**
- **A document has a physical and logical structure**
  - Physical:
    - Composed of units called entities thay may refer to others
    - There is a "***root***" or document entity
  - Logical
    - Composed of declarations, elements, attributes, comments, character references, and processing instructions
- **XML has syntax**
  - Indicated in the document by explicit markup
  - The logical and physical structures must nest properly

XML Elements

```
<invoice>
  <from>ABC TELECOM, Inc.</from>
  <to>John Smith</to>
  <description>Local Phone Service</description>
  <date type="from">16 May 1999</date>
  <date type="to">15 Jun 1999</date>
  <date type="due">15 Jul 1999</date>
  <amount>$50.00</amount>
  <taxRate>6</taxRate>
  <totalDue>$53.00</totalDue>
</invoice>
```

Element describes data

- One can define any element
- Element can contain other elements
- An element is terminated by </…>

XML Attribute

- **Describes an element**
  - One can define any attribute
  - Cannot contain other elements or attributes

```xml
<?xml version="1.0" encoding="UTF-8"?>
<invoice type="bill" period="monhly">
  <from>ABC TELECOM, Inc.</from>
  <to>John Smith</to>
  <description>Local Phone Service</description>
  <date type="from">16 May 1999</date>
  <date type="to">15 Jun. 1999</date>
  <date type="due">15 Jul. 1999</date>
  <amount currency="USD ">$50.00</amount>
  <taxRate>6</taxRate>
  <totalDue>$53.00</totalDue>
</invoice>
```

Grammars for XML Documents

- **Two current standards for constraining XML with grammars**
  - DTD (Document Type Definition)
  - XML Schema

DTD: Document Type Definition

- **DTD**
  - defines document structure
  - makes XML data usable for different programs
  - can be declared inline or as external reference
- **Internal DOCTYPE declaration**
  - <!DOCTYPE root-element [element-declarations]>
- **External DOCTYPE declaration**
  - <!DOCTYPE root-element SYSTEM "filename">

DTDs originate from SGML and they are not XML-like

hint: When possible use XML Schemas

DTD Example

```
<?xml version="1.0"?>
<!DOCTYPE email [
      <!ELEMENT email(to+, from, subject, message)>
      <!ELEMENT to         (#PCDATA)>
      <!ELEMENT from   (#PCDATA)>
      <!ELEMENT subject    (#PCDATA)>
      <!ELEMENT message(#PCDATA)>

]>
```

email.dtd

```
<?xml version="1.0"?>
<!DOCTYPE email SYSTEM "email.dtd">
<email>
  <to>info@eteration.com</to>
  <from>webmaster@eteration.com</from>
  <subject>Important</subject>
  <message>Hello!!!</message>
</email>
```

email.xml

XSD : XML Schema Definition

- **XSD : XML Schema Definition**
  - Is an XML language for describing and constraining the content of XML documents.
  - Alternative to DTD
- **XSD: specifies structure of XML document i.e.**
  - elements and attributes in the XML doc
  - XML element hierarchy
  - element data-types and occurrences
- **http://www.w3.org/2001/XMLSchema**

Types and Elements

- **XSD schemas contain type definitions and elements**
  - Type definitions define XML data type
    - address, customer, purchaseOrder,...
  - Elements represent items created in the XML file
    - If the XML file contains a PurchaseOrder type, then the XSD file will contain the corresponding element named PurchaseOrder.

XSD template

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema
  xmlns:xs="http://www.w3.org/2001/XMLSchema"  1
  targetNamespace="http://www.eteration.com"  2
  xmlns:tns="http://www.eteration.com"  3
  elementFormDefault="qualified">  4
</xs:schema>
```

1 – Elements and data-types used come from here. Prefix these elements with *xs*

2 – Elements defined in this schema have this namespace.

3 – Default namespace

4 – Must be namespace qualified

XML referencing an XSD

- Corresponding xml references xsd.
- Validation checks formation and cross checks XML against XSD

```
<?xml version="1.0" encoding="UTF-8"?>
<m:message
   xmlns:m="http://www.example.org/message"
   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
   xsi:schemaLocation="http://www.example.org/message message.xsd">
  <m:to>Derya</m:to>
  <m:from>Esma</m:from>
  <m:subject>Please call</m:subject>
  <m:text>Call me ASAP</m:text>
</m:message>
```

xsd namespace

ref xsd file

Namespaces

- **XML Namespaces provide a method to avoid element name conflicts**
  - a name conflict will occur when two different documents use the same element names.
- **Every XML Schema uses at least two namespaces**
  - targetNamespace
  - XMLSchema namespace
    - http://www.w3.org/2001/XMLSchema

Need for Namespaces

```
<?xml version="1.0" encoding="ISO-8859-1" standalone="yes"?>
<book>
   <!-- title of a book -->
   <title> Eclipse Web Tools Platform</title>
```

```
    <figure>
        <!-- title of a figure -->
        <title>Simple Web Architecture</title>
```

Ambigous

With namespace

```
     <ns1:book xmlns:ns1="http://example.org/book">
         <ns1:title>Eclipse Web Tools Platform</ns1:title>
         <ns2:figure xmlns:ns2="http://example.org/book/figure">
             <ns2:title>Simple Web Architecture</ns2:title>
```

Namespace Syntax

- **Two parts**
  - Namespace declaration
  - Elements and attributes
- **Declaration**
  - A *prefix* is associated with URI
  - The association is defined as an attribute within an element
    - xmlns:*prefix*
  - *xmlns* is Namespace keyword, prefix is user-defined

```
<classes  xmlns:XMLclass="http://www.example.org/test">
    <XMLclass:syllabus>
     ...
    </XMLclass:syllabus>
</classes>
```

Namespace Declaration

- **Can be declared in:**
  - root element
  - lower level element
- **Multiple different namespaces can be defined**
- **Same prefix can be redefined**
  - Scope of Namespace declaration is within the element where it is defined

Elements and attributes

- **Examples**
  - svg:set
  - mathml:set
- ***prefix*: *local part***
  - prefix identifies the namespace an element and attribute belongs to
  - local part identifies the particular element or attribute within the namespace
  - Qualified name
- **Naming rules:**
  - **Prefix** can be composed from any legal XML name character except ":"
  - "xml" (in any case combination) is reserved so cannot be used as prefix
  - **Local** part cannot contain ":"

Namespace URI

- **URI cannot be prefix**
  - "/", "%", and "~" are not legal in XML element names
- **URI could be standardized**
  - (by industry standard orgs) while prefixes are just convention
- **URI are just "identifiers"**
  - URI does not have to be in "http" form
  - URI does not have to be resolved
  - It is like a "constant value"

Default Namespace

- **Denoted with xmlns attribute with no prefix**
  - Applied only to unprefixed element and its descendant elements
- **Applies only to elements not attributes**

```
<?xml version="1.0"?>
<html xmlns="http://www.w3.org/1999/xhtml"
      xmlns:xlink="http://www.w3.org/1999/xlink">
  <head><title>Three Namespaces</title></head>
  <body>
    <h1 align="center">An Ellipse and a Rectangle</h1>
    <svg xmlns="http://www.w3.org/2000/svg"
         width="12cm" height="10cm">
      <ellipse rx="110" ry="130" />
      <rect x="4cm" y="1cm" width="3cm" height="6cm" />
    </svg>
```

Types of Namespaces

- **target Namespace**
  - Namespace for XML Schema document itself
- **source Namespaces**
  - Definitions and declarations in a schema can refer to names that may belong to other namespaces

```
<xsd:schema
      targetNamespace='http://www.SampleStore.com/Account'
      xmlns:xsd='http://www.w3.org/1999/XMLSchema'
      xmlns:ACC= 'http://www.SampleStore.com/Account'>

   <xsd:element name='InvoiceNo' type='xsd:positive-integer'/>
   <xsd:element name='ProductID' type='ACC:ProductCode'/>
   <xsd:simpleType name='ProductCode' base='xsd:string'>
     <xsd:pattern value='[A-Z]{1}d{6}'/>
   </xsd:simpleType>
```

targetNamespace

- **The namespace that is assigned to the schema created**
  - The names defined in a schema are said to belong to its target namespace
  - The namespace an instance is going to use to access the types it declares
- **Each schema has:**
  - One target namespace
  - Possibly many source namespaces

Defining Types

- **Types may be simple or complex**
  - SimpleTypes
    - cannot contain elements or have attributes
    - are types that are included in the XML Schema definition (boolean, string, date, etc.)
  - ComplexType
    - can contain attributes and elements

Common XML Schema Data Types

- string
- boolean
- decimal
- float
- double
- duration
- dateTime
- time
- date

XSD: SimpleType Example

- Describes the data allowed in a Simple Field:

```
<simpleType name="name">
    <restriction base="string"></restriction>
    <xs:pattern value="([a-z][A-Z])+"/>
</simpleType>
```

- More Restriction Specs:

```
<xs:restriction base="xs:integer">
     <xs:minInclusive value="0"/>
     <xs:maxInclusive value=“100"/>
     <xs:pattern value="[0-9][0-9][0-9]"/>
 </xs:restriction>
```

- Constraints: enumeration, length, minLength, whitespace etc.

XSD: ComplexType Example

- **Similar to defining a Java class or a Data Structure**
  - Can use own types

```
<complexType name="PersonType">
    <sequence>
        <element name="name" type="string"/>
        <element name="surname" type="string"/>
        <element name="address" type="tns:AddressType"/>
        <element name="phoneNumber" type="tns:PhoneType" />
    </sequence>
</complexType>
```

Type & Element

- **Name the Type if it will be used again**

```
    <xs:complexType name="AddressType">
      <xs:sequence>
        <xs:element name="street1"  type="xs:string" />
        <xs:element name="street2"  type="xs:string" />
        <xs:element name="postcode" type="xs:string" />
        <xs:element name="city"     type="xs:string" />
      </xs:sequence>
    </xs:complexType>


    <xs:element name="shippingAddress" type="tns:AddressType" />
    <xs:element name="invoiceAddress" type="tns:AddressType" />
```

XSD: Indicators

- **Order**
  - all
    - Not ordered
  - choice
    - One of
  - sequence
    - Ordered

```
<xs:choice>
   <xs:element name="employeeName"
       type="xs:string"/>
   <xs:element name="employeeNum"
       type="xs:integer"/>
</xs:choice>
```

- **Multiplicity**
  - minOccurs / maxOccurs - Use unbounded for open boundary

```
<xs:element name="person" maxOccurs="unbounded">
  <xs:complexType>
    <xs:sequence>
      <xs:element name="full_name" type="xs:string"/>
      <xs:element name="child_name" type="xs:string"
            minOccurs="0" maxOccurs="5" />
     </xs:sequence>
    </xs:complexType>
</xs:element>
```

Importing a Schema

- **Reuse and refactor XSD documents**
  - Partition namespaces
  - Use existing schemas
- **Import**
  - XSD is not same namespace
- **Include**
  - XSD is the same namespace

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
   xmlns:store= "http://www.store.com/store"
   xmlns:catalog="http://www.partner.com/catalog">
  <xs:import
     namespace='http://www.partner.com/catalog'
     schemaLocation='http://www.partner.com/catalog.xsd'/>
  <xs:element name='stickyGlue' type='catalog:SuperGlueType'/>
```

What You Have Learned

- **XML**
  - standard for data interchange
  - was designed to describe data and to focus on what data is
  - text-based
  - does not define tags of its own

Hands-On Lab

- Create a Schema for the ObjectShop catalog
  - Use WTP XSD Editor
- Create Sample Catalogs
- Validate catalog files using XSD

CSS

Module Road Map

- Web Standards
- Web Architecture: Resources, URI and HTTP
- HTML and XHTML
- XML and XML Schemas
- **CSS**
- XSLT

What is CSS?

- **CSS: Cascading Style Sheets**
  - The method used to divide the content from the presentation on web pages.
- **Styles**
  - define **how to display** HTML elements
  - normally stored in **Style Sheets**

Recall: Standards Related

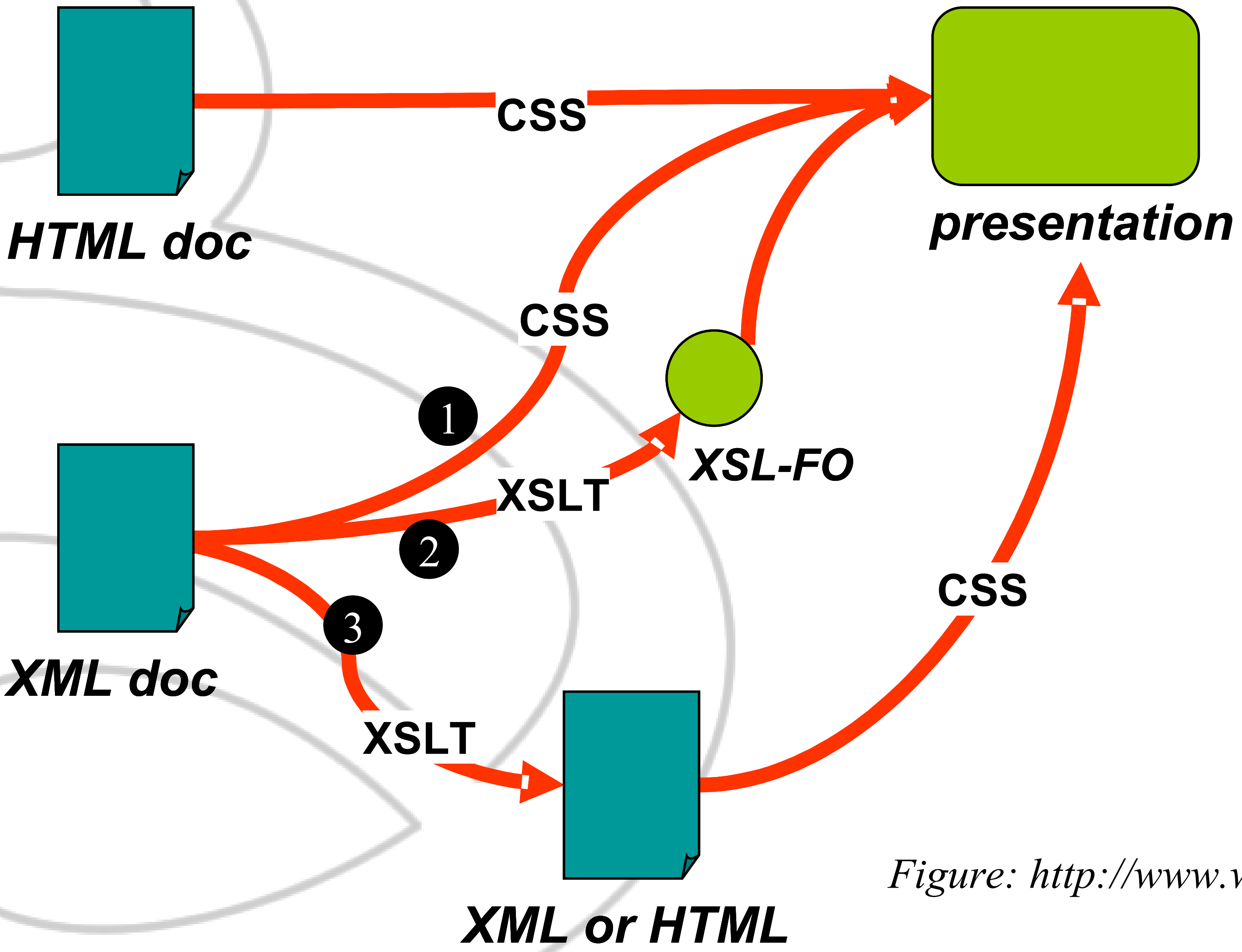


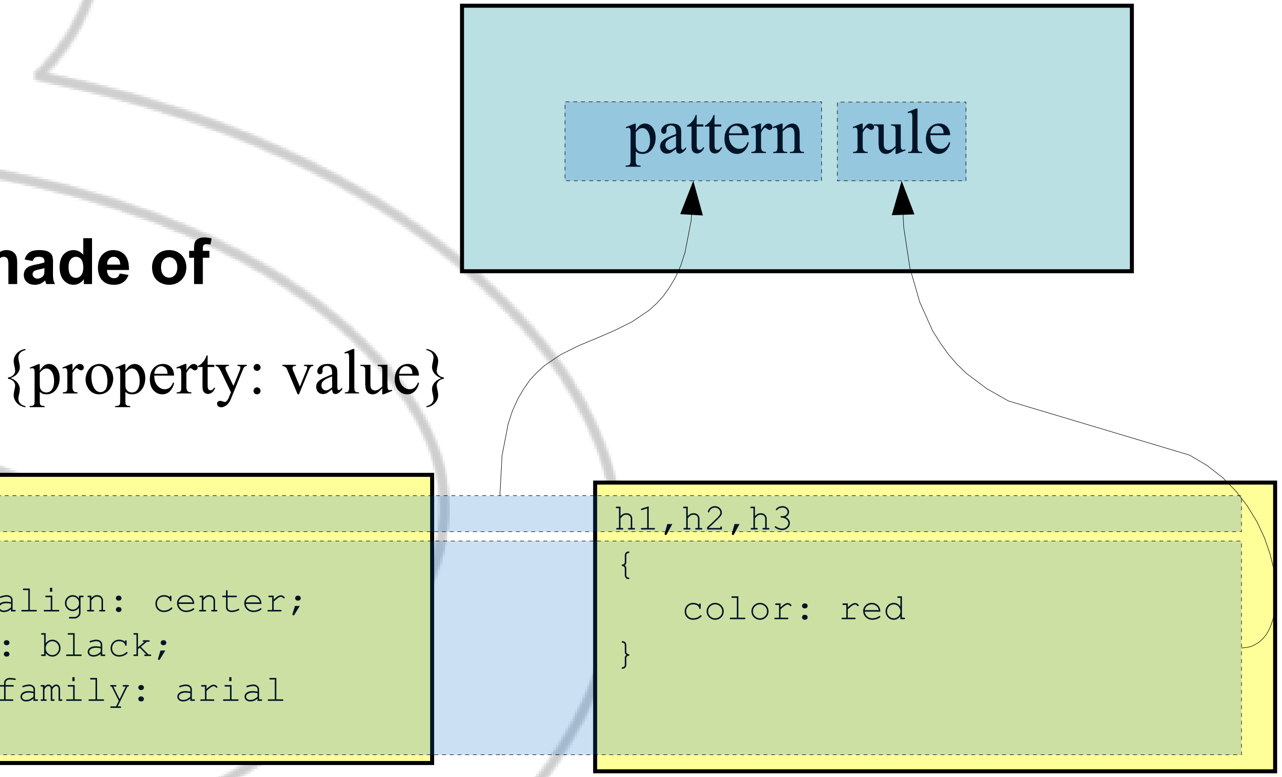
Figure: http://www.w3c.org

CSS Design Benefits

- **Maintenance and Flexibility**
  - Cleaner / Less code
  - Refactor presentation reduce repetitive styling
  - Better document structure
- **Accessible**
  - Structure is separated from presentation
  - Ability to present content on multiple devices such as mobile handhelds and formats (printer-friendly etc.)
- **Faster download times and smaller pages**
  - Tableless layouts, no repetition, all styles in one place

CSS Syntax

- **The CSS syntax is made up of two parts:**
  - Pattern
  - Rule
- **Rule is made of**
  - property
  - value



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

```
h1,h2,h3
{
   color: red
}
```

CSS Pattern Matching: Selectors

- **Match things in a document to apply a rule**
  - Document elements
  - Elements with specific ids
  - Element with specific classes
- **More than one pattern can be associated with a rule**
  - Separated with comma

```
h1 , h2,  h3
{
   color: red
}
```

CSS2 Selector Patterns

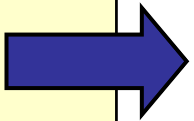
- **Pattern matching rules determine which style rules apply to elements in the document tree.**
  - Patterns are called **selectors** that range from simple element names to rich contextual patterns.
  - If all conditions in the pattern are true for a certain element, the selector matches the element.
- **Some examples of selectors**
  - Type Selectors
  - Class and ID Selectors
  - Descendant and Child Selector
  - Universal Selector
  - Adjacent Selectors
  - Attribute Selectors

See: http://www.w3.org/TR/CSS2/selector.html#q2

Type Selectors

- **Matches the name of a document(html) element type**
  - The following rule matches all H1 elements in the document tree:
  - h1 { font-family: sans-serif }

```
<style type="text/css">
p{
   text-align: left;
   color:"red";
   font-size: 20px; }
</style>
...
<p>This is first paragraph </p>
<p>This is second paragraph </p>
```



This is the first paragraph
This is the second paragraph

Class Selectors

- **Match all elements with the given class attribute**
  - Specified with '.' before the class name
  - Only one class attribute can be specified per HTML element
- **Examples**
  - **p.article** - All paragraphs with a class of "article"
  - **.error** - Any element with a class of "error".

```
p.first{
   text-align: left;
   color:"red";
   font-size: 20px; }
p.second{
   text-align:left;
   color:"blue";
   font-size: 16px; }
...
<p class="first">This is first paragraph </p>
<p class="second">This is second paragraph </p>
```

This is the first paragraph
This is the second paragraph

ID Selectors

- **Matches the given id attribute**
  - An id must be unique in a page.
  - Use a # in the selector
- **Examples**
  - div#menu - *selects the div element with the id of "menu"*
  - #header - *selects the element with the id of "header".*

```
#redtext{
   text-align: left;
   color:"red";
   font-size: 20px; }

<p id="redtext">This is first paragraph </p>
```

This is the first paragraph

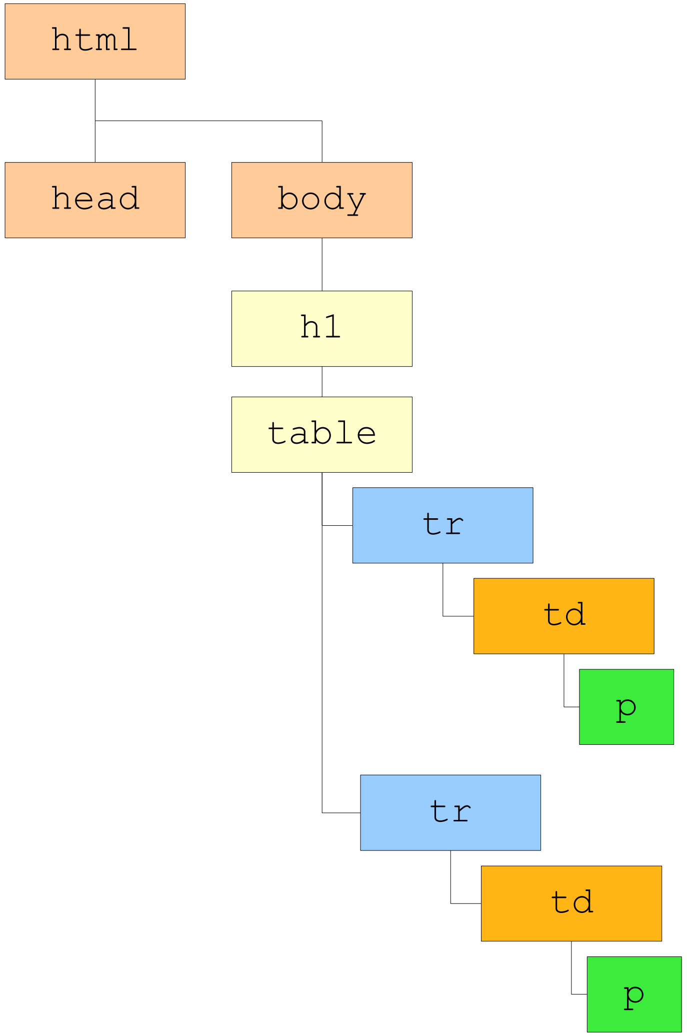
Another page

```
...
<h1 id="redtext">This is a header
```

This is a header

Descendant Selectors

- **Match an element that is the descendant of another element in the document tree**



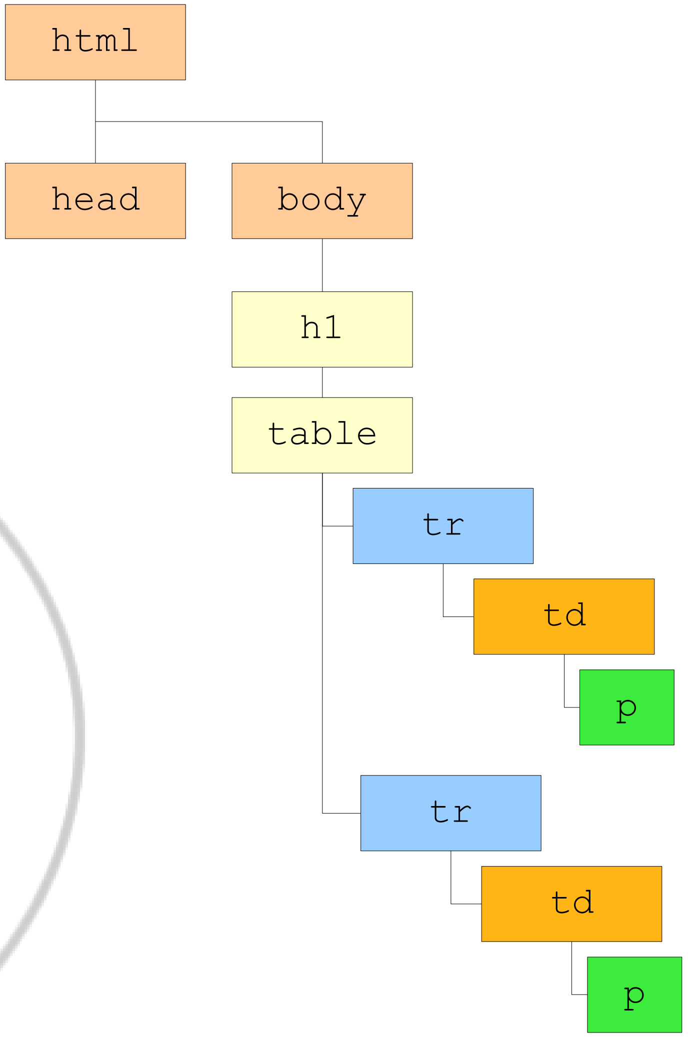
Examples:

- **body p {font-weight:bold;}**
  - Any paragraph text which is a descendant of body
- **tr td p {color: red;}**

Child Selector

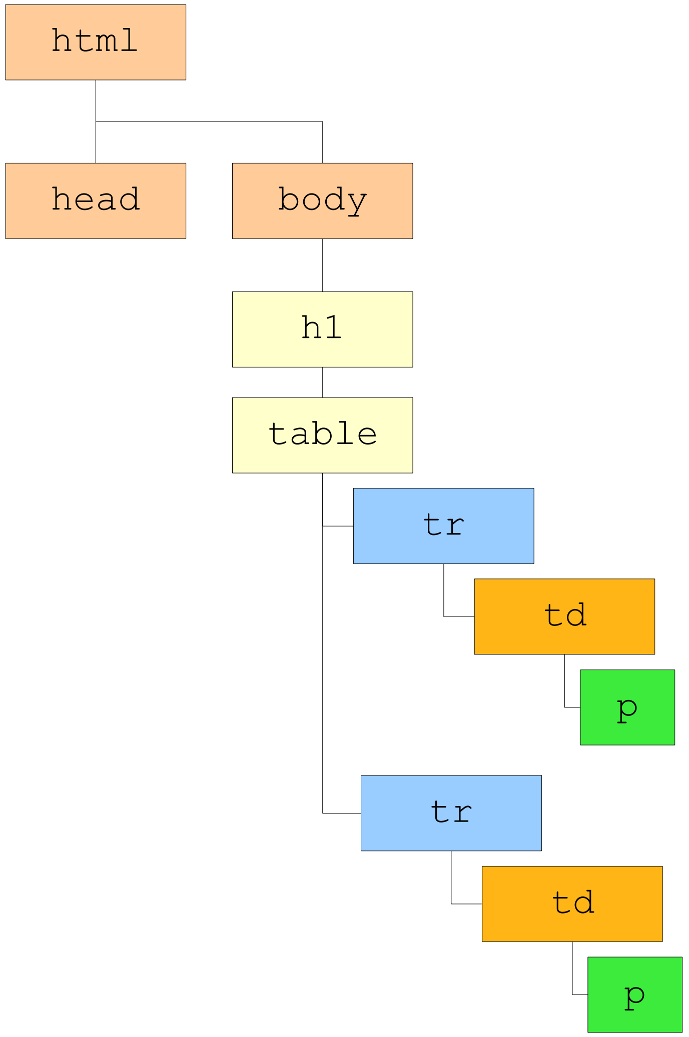
- **Matches when an element is the child of another element**

```
tr > td > p
{
   color: green;
}
```



Adjacent Selectors

- **Selects an element that follows another element**
  - Text between tags have no effect
- **Example:**
  - h1 + table { width: 100%; }



Universal Selectors

- **Matches an element that is a grandchild or later descendant of another element.**
  - Selects paragraphs that are at least one selector removed
  - Note spaces before and after *
    - div * p
      - p element that is a grandchild or later descendant of a div

Attribute Selectors

- **Attribute selectors may match in four ways:**
- **[att]**
  - The "att" attribute is set, whatever the value of the attribute.
- **[att=val]**
  - "att" attribute value is exactly "val"
- **[att~=val]**
  - "att" attribute value is a space-separated list of "words", one of which is exactly "val"
- **[att|=val]**
  - "att" attribute value is a hyphen-separated list of "words", beginning with "val"
    - This is primarily intended to allow language subcode matches (e.g., the "lang" attribute in HTML)

http://www.w3.org/TR/CSS2/selector.html#attribute-selectors

Getting documents ready for CSS

- **CSS is case sensitive:**
  - HTML names should match match the name of the selector exactly.
  - <p class="red" /> does not match **p.Red{}**
  -
- **Use ids and class attributes to mark elements**
  - No spaces
  - <input id="first-name" />
  - <input id="last-name" />

Inserting a style sheet

- **Three ways of inserting a style sheet**
  - External Style Sheet
  - Internal Style Sheet
  - Inline Styles

External Style Sheet

- **An external style sheet is ideal**
  - when the style is applied to many pages
- **Link to the style sheet using the <link> tag.**
  - The <link> tag goes inside the head section
- **Style sheet file**
  - should be saved with a .css extension
  - should not contain any html tags

```
<head>
<link rel="stylesheet" type="text/css" href="mystyle.css" />
</head>

<body>
<p class="first">This is first paragraph</p>
<p class="second">This is second paragraph</p>
</body>
```

Internal Style Sheet

- **Internal Styles**
  - should be used when a single document has a unique style
  - Is defined by using <style> tag in the head section

```
<head>
<meta   http-equiv="Content-Type"
content="text/html; charset=ISO-8859-1" />

<style  type="text/css">
   p {color: white; }
   body {background-color: black; }
</style>

</head>
```

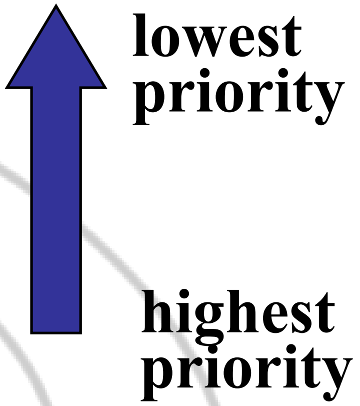
Inline Styles

- **Placing CSS in the HTML code**
- **This method should be used sparingly**
  - For example, when a style is applied to a single occurrence of an element.

```
<p style="background: black; color: white;">
This is new background and font color with inline CSS
</p>
```

Cascading Order

- **Styles will "cascade" by the following rules**
  - Browser default
  - External Style Sheet
  - Internal Style Sheet
  - Inline Style



CSS Background

- **Defines the background effects on an element**
  - **background**
    - all background properties in one declaration.
  - **background-attachment**
    - sets whether a background image is fixed or scrolls with the rest of the page.
  - **background-color**
    - background color of an element
  - **background-image**
    - Sets an image as the background
  - **background-position**
    - sets the starting position of a background image
  - **background-repeat**
    - sets if/how a background image will be repeated

CSS Background Examples

```
h4 { background-color: white; }
```

```
body
{
background-image: url(point.gif);
background-repeat: repeat-x
}
```

```
p { background-image: url(smallPic.jpg); }
```

```
body
{
background-image: url(stars.gif);
background-attachment: scroll
}
```

CSS Text

- **Defines the spacing, decoration, and alignment of text**
- **Properties**
  - color
  - direction
  - letter-spacing
  - text-align
  - text-indent
  - text-decoration
  - white-space
  - word-spacing

```
h2{ text-decoration:
underline; }


p { text-indent: 20px; }
```

CSS Font

- **Defines the font in text**
- **Properties**
  - font
  - font-family
  - font-size
  - font-style
  - font-weight
  - ...

```
p { font: italic small-caps bold 12px arial }
p { font-size: 12px; }

ol{ font-size: 10px; }

p { font-style: italic; }

ul{ font-weight: bolder; }
```

CSS Border

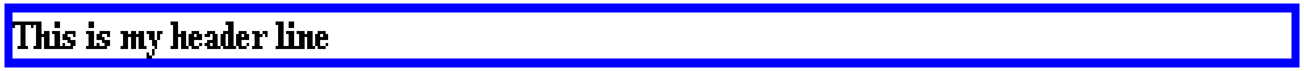
- **Allows for complete customization of the border that appear around HTML elements**
- **Properties**
  - border
  - border-color
  - border-style
  - border-bottom
  - border-bottom-color
  - border-bottom-style
  - border-bottom-width
  - ....

```
table {

   border-width: 7px;
   border-style: outset; }

td {

   border-width: medium;
   border-style: outset; }

p {

   border-width: thick;
   border-style: solid;  }
```

CSS Margin

- **Defines the space around the elements**
- **Properties**
  - margin
  - margin-bottom
  - margin-left
  - margin-right
  - margin-top

```
h5{ margin-top: 0px;
margin-right: 10px;
margin-bottom: 10px;
margin-left: 10px;
border: 3px solid blue; }
```

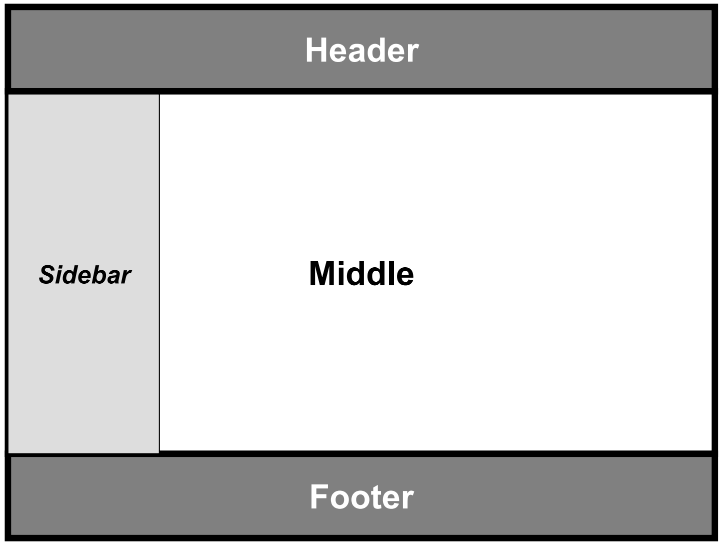

This is my header line

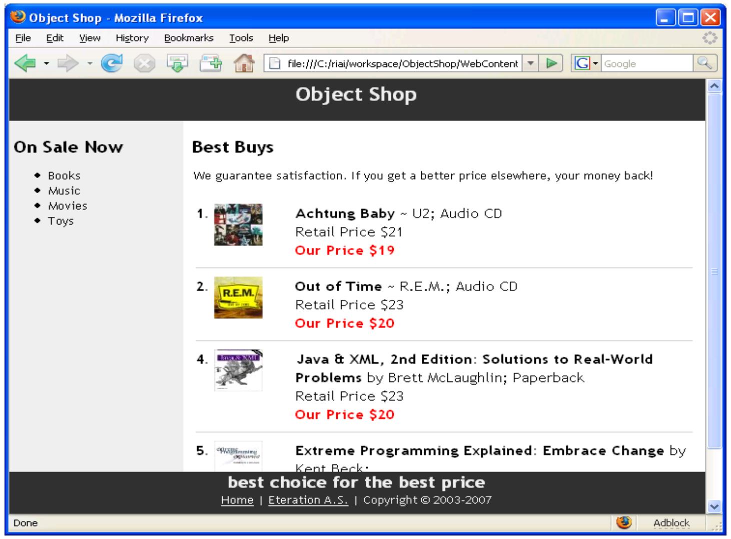
CSS and Tableless Layouts

- **You can use CSS to do tableless layouts**
  - float
  - Position: fixed (position absolute)
  - HTML <div> tags

DIV Based Page Layout with CSS

- **Table-based layouts are common**
- **Use div tags and CSS**
  - Reduces markup code
  - Separates content from its visual presentation
- **DIV tag**
  - Used as a container within our Web page
  - Creating sections or divisions




Object Shop - Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/riai/workspace/ObjectShop/WebContent
Google
Done
Adblock

Object Shop

On Sale Now

- Books
- Music
- Movies
- Toys

Best Buys

We guarantee satisfaction. If you get a better price elsewhere, your money back!

1. **Achtung Baby** ~ U2; Audio CD
   Retail Price $21
   Our Price $19
2. **Out of Time** ~ R.E.M.; Audio CD
   Retail Price $23
   Our Price $20
4. **Java & XML, 2nd Edition: Solutions to Real-World Problems** by Brett McLaughlin; Paperback
   Retail Price $23
   Our Price $20
5. **Extreme Programming Explained: Embrace Change** by Kent Beck;

best choice for the best price

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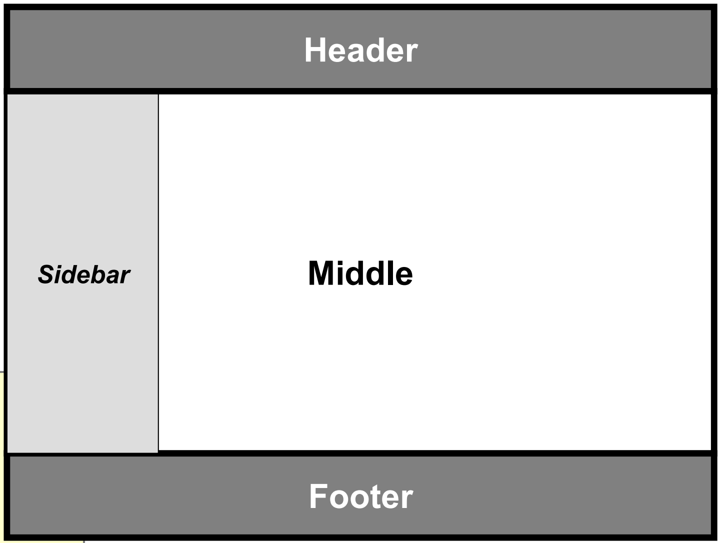
Div Example

```
    <body>
        <div id="headerregion"></div>
        <div id="middleregion">
                <div id="sidebar"></div>
                <div id="middle"></div>
        </div>
        <div id="footerregion"></div>
   </body>
```



Liquid Page Designs

- **Fixed Locations (position)**

```
    div#headerregion {
        position: absolute;
        width: 100%;
        top: 0;
        left: 0;
        height: 50px;
    }
    /* position:fixed for modern browsers (IE 7 / Firefox) NO scroll */
    body > div#headerregion {
        position: fixed;
    }
```

- **Flow around (float)**

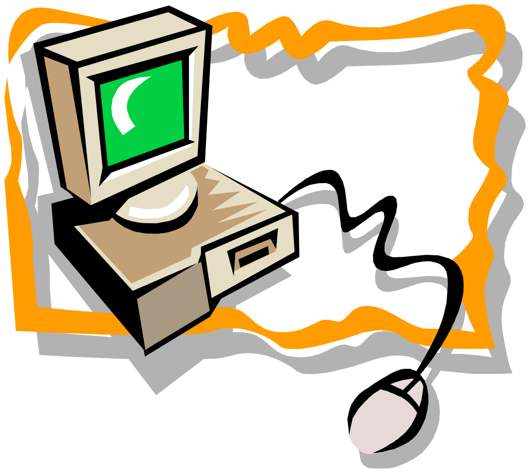
```
    div#sidebar {
        width: 180px;
        float: left;
    }
```

What You Have Learned

- **Cascading Style Sheets are a way to control the look and feel of your HTML documents in an organized and efficient manner.**
- **With CSS you will be able to**
  - Add new looks to your old HTML
  - Completely restyle a web site with only a few changes to CSS code

Hands-On Lab

- Create a CSS to manage look-and-feel of a site
- Manage Layout using <div> regions instead of tables



XSLT

Module Road Map

- Web Standards
- Web Architecture: Resources, URI and HTTP
- HTML and XHTML
- XML and XML Schemas
- CSS
- **XSLT**

XSLT

- **Extensible Stylesheet Language Transformations**
- **Transform XML documents into:**
  - XML, XHTML, HTML, ..
- **Generate *an* output from *two* input files:**
  - Content: An XML document
  - Transformation: An XSL document that contains the “template” and XSL transformations to insert content from XML
- **XSL is a *programming language***
  - **NOT** a simple one
  - Debugging your XSL

XSL - Hello World

- XML: helloworld.xml

```
<?xml version="1.0"?>
<?xml-stylesheet type="text/xsl" href="helloworld.xsl"?>
<message>Hello World!</message>
```

- XSL: helloworld.xsl:

```
<?xml version="1.0"?>
<xsl:stylesheet version="1.0"
  xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
  <!-- one rule, to transform the input root (/) -->
  <xsl:output method="html" />
  <xsl:template match="/">
    <html>
      <body>
        <h1>
          <xsl:value-of select="message" />
        </h1>
      </body>
    </html>
  </xsl:template>
</xsl:stylesheet>
```

Result file:

```
<html>
 <body>
     <h1>
      Hello World!
     </h1>
 </body>
</html>
```

Anatomy of the XSL file

```
<?xml version="1.0"?>
<xsl:stylesheet version="1.0"
   xmlns:xsl="http://www.w3.org/1999/XSL/Transform">
   <xsl:output method="html" />
   <xsl:template match="/">
      <html>
         <body>
            <h1>
               <xsl:value-of select="message" />
            </h1>
         </body>
      </html>
   </xsl:template>

</xsl:stylesheet>
```

Start

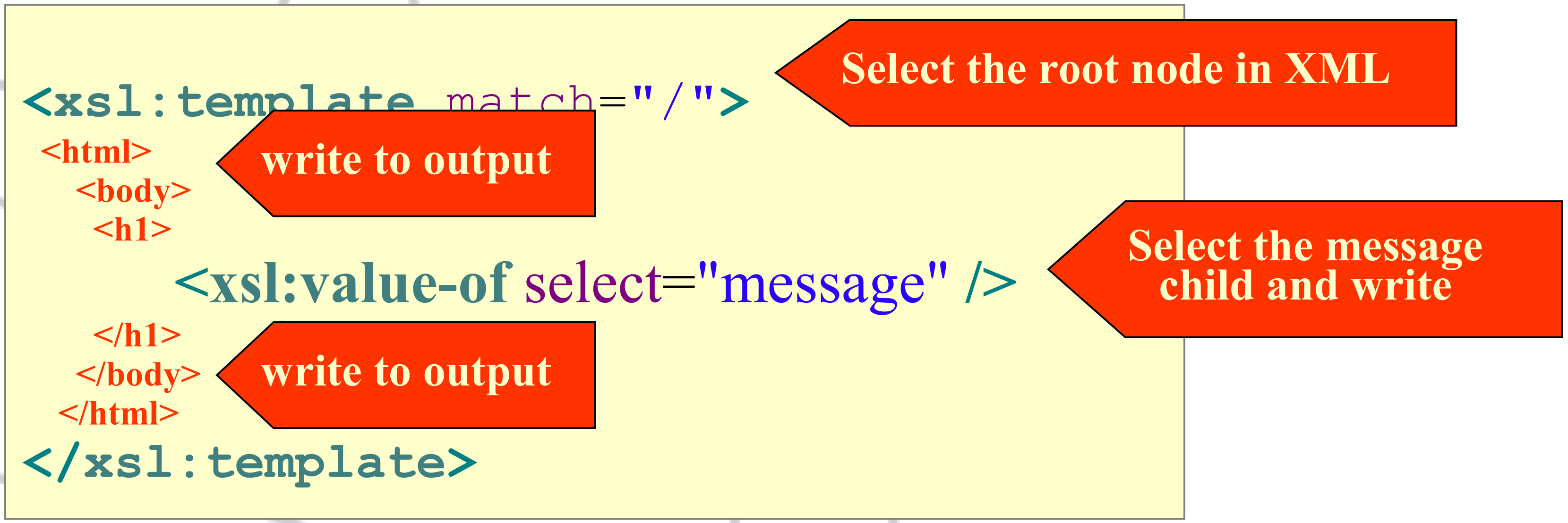
Content-type of output

Contains multiple templates

End

How did we get to text in the message?

Templates



```
<xsl:template match="/">
 <html>
   <body>
    <h1>
        <xsl:value-of select="message" />
    </h1>
   </body>
  </html>
</xsl:template>
```

Select the root node in XML
write to output
Select the message child and write
write to output

- **Alternative select statements**
  - ./message
  - with **XPath** functions
    - /message/**text()**
    - ./message/**text()**

Inside the XSLT Transformation

1. **Read the XML document and store it as a Tree of nodes**

3. **Match templates to parts of the tree**
   - <xsl:template match="/"> select the entire tree
   - <xsl:template match="..."> use it to select subsets

4. **Apply the rules in each the template to create a new structure**
   - <xsl:apply-templates/> Call additional templates from the root template

5. **Unmatched parts of the XML tree are not changed**

7. **Write the transformed tree as a text document**

XSL can run on the server and the client

- **Server:**
  - Xalan, Saxon, Xerces, etc. can be used to read and write files
  - Use XSLT to change XML files into HTML files before sending them to the client
  - More portable (Less to expect from a browser)
- **Client**
  - A *modern* browser can use XSLT to change XML into HTML on the client side
  - Internet Explorer 6+
  - Netscape 6+
  - Mozilla, Firefox 1+, Opera 8+, ..

xsl:value-of

<xsl:value-of select="XPath expression"/>

- **selects the contents of an element and adds it to the output stream**
  - The select attribute is required
  - Notice that xsl:value-of is not a container, hence it needs to end with a slash

- **Example:**

  <h1> <xsl:value-of select="message"/> </h1>

xsl:for-each

Loop statement

<xsl:for-each select="XPath expression">

Text to insert and rules to apply

</xsl:for-each>

- **Example:** Select all books **(//book)** and list the titles **(title)**:

```
<ul>
     <xsl:for-each select="//book">
        <li><xsl:value-of select="title"/></li>
     </xsl:for-each>
</ul>
```

Filtering output

Filter output with a criterion

```
title[../genre='mystery']
```

Legal filter operators are:

= != &lt; &gt;

Example: Select all school books **(//book)** and list the titles **(title)**:

```
<ul>
  <xsl:for-each select="//book">
    <li>
     <xsl:value-of select="title[../genre='mystery']"/>
     </li>
  </xsl:for-each>
</ul>
```

***title* and *genre* are at the same level of the XML tree (they are both inside the book). "../ " takes us to the level of the book and we select "genre"**

There is a catch!
Other items will also show in the list as empty items

But it doesn’t work right!

```
<xsl:for-each select="//book">
    <li>
      <xsl:value-of  select="title[../genre='mystery']" />
    </li>
</xsl:for-each>
```

outputs for *every* book,

- Empty bullets for other books
- Do not use xsl:value-of to filter

Alternative Filter:

```
<xsl:for-each select="//book[./genre='mystery']">
    <li>
      <xsl:value-of  select="title" />
    </li>
</xsl:for-each>
```

OR

xsl:if

- Include content when condition is true
- Example:

```
<xsl:for-each select="//book">
      <xsl:if test="genre='mystery'" >
         <li>
            <xsl:value-of  select="title" />
         </li>
       </xsl:if>
</xsl:for-each>
```

xsl:choose

- XSL switch ... case ... default statement
- The syntax is:

```
<xsl:choose>
    <xsl:when test="some condition">
        ... some code ...
    </xsl:when>
    <xsl:otherwise>
        ... some code ...
    </xsl:otherwise>
</xsl:choose>
```

xsl:sort

- **Sorting inside an xsl:for-each**
  - Attribute of the sort tells what field to sort on
- **Example:**

```
<ul>
    <xsl:for-each select="//book">
      <xsl:sort select="author"/>
      <li> <xsl:value-of select="title"/> by
              <xsl:value-of select="author"/>
      </li>
    </xsl:for-each>
</ul>
```

xsl:text

- **<xsl:text>...</xsl:text> helps with:**
  - Whitespaces and special characters

```
<xsl:text  disable-output-escaping="yes">&amp;nbsp;</xsl:text>
```

Creating tags from XML data

- XML
  <label>Eteration A.S.</label>
  <url>http://www.eteration.com</url>

- Desired Result
  <a href="http://www.eteration.com">
  Eteration A.S.</a>

- We cannot use invalid XML within XSL
  - <xsl-valueof> does not work inside a tag
  - Same with <img /> tags

Solutions

Using: `<xsl:attribute name="...">`

```
<a>
    <xsl:attribute name="href">
            <xsl:value-of select="url"/>
     </xsl:attribute>
     <xsl:value-of select="label"/>
</a>
```

Using attribute value template: `{...}`

```
<a href="{url}">
   <xsl:value-of select="label"/>
</a>
```

Modularization with Templates

- XSL can be divided into multiple templates using:
- Call by name

    <xsl:call-template name=“*template_name*"/>

- By using XML tree select statements:
  - <xsl:apply-templates select=“*book*"/>

```
<xsl:template match="/">
    <html>
      <body>
        <xsl:apply-templates />
      </body>
    </html>
</xsl:template>
<xsl:template match=“book">
    <h1>Book Information</h1>
    <xsl:apply-templates select=“title" />
</xsl:template>
```

xsl:apply-templates

- **Apply template rule**
  - current element
  - current element’s child nodes
- **Optional: select attribute,**
  - Applies the template rule only to the child that matches
- **Multiple <xsl:apply-templates>**
  - Select attributes
  - the child nodes are processed in the same order as the <xsl:apply-templates> elements

When templates are ignored

- **A template is skipped if it does not apply**
- **Use select="/“ to always process**
  - If it didn’t, nothing would ever happen

Warning:

If a template applies to an element, templates are not automatically applied to its children

Applying templates to children

```
 <book>
       <title>Les Miserables</title>
       <author>Victor Hugo</author>
</book>
```

```
<xsl:template match="/">
 <html>
 <head></head>
  <body>
  <b><xsl:value-of select="/book/title" />
  </b>
  <xsl:apply-templates select="/book/author" />
  </body>
  </html>
</xsl:template>

<xsl:template match="/book/author">
    by <i><xsl:value-of select="." /></i>
</xsl:template>
```

With apply-template line:
Les Miserables by *Victor Hugo*

Without apply-template line:
Les Miserables

Calling named templates

- You can name a template, then call it, similar to the way you would call a method in Java
- The named template:
```
<xsl:template name="myTemplateName">
    ...body of template...
</xsl:template>
```
- A call to the template:
```
<xsl:call-template name="myTemplateName"/>
```
- Or:
```
<xsl:call-template name="myTemplateName">
    ...parameters...
</xsl:call-template>
```

Templates with parameters

```
<xsl:call-template name="showPeople">
        <xsl:with-param name="title" select="/project/title"/>
        <xsl:with-param name="people"
                                   select="/project/team/members"/>
</xsl:call-template>
```

- **Parameterized template:**
  ```
  <xsl:template name="showPeople">
      <xsl:param name="title"/>
      <xsl:param name="people"/>
  ```
  ...template body...refer to parameters as "$title" *and* "$people"
  ```
  </xsl:template>
  ```
  - Parameters are matched up by *name,* not by position

Generating XSL output with Java

Basic procedure for XSL transformation with Xalan:

2. Instantiate a TransformerFactory
   – Use the TransformerFactory static newInstance()
3. Generate a Transformer from XSLT source
   – TransformerFactory newTransformer(Source stylesheet)
   – Template
4. Apply transformation
   – transform(Source xmlSource, Result transformResult)
   – The Templates object to the XML Source

What You Have Learned

- XSL and XSL constructs
- Transforming XML document into different types of documents

Hands-On Lab

- Create an XSLT to create the Web page from XML
  - objectshop.xml
  - objectshop.xsl
- Use CSS to create the presentation
  - objectshop.css