HTML - HyperText Markup Language

- Plain text
- Rendered by browser (Firefox, Opera, Camino, Safari, IE)
- Markup is in tags:
  `<p>` for paragraph
  `<img src="myplot.jpg?/>` for bringing in an image.
- Style - Cascading Style Sheets

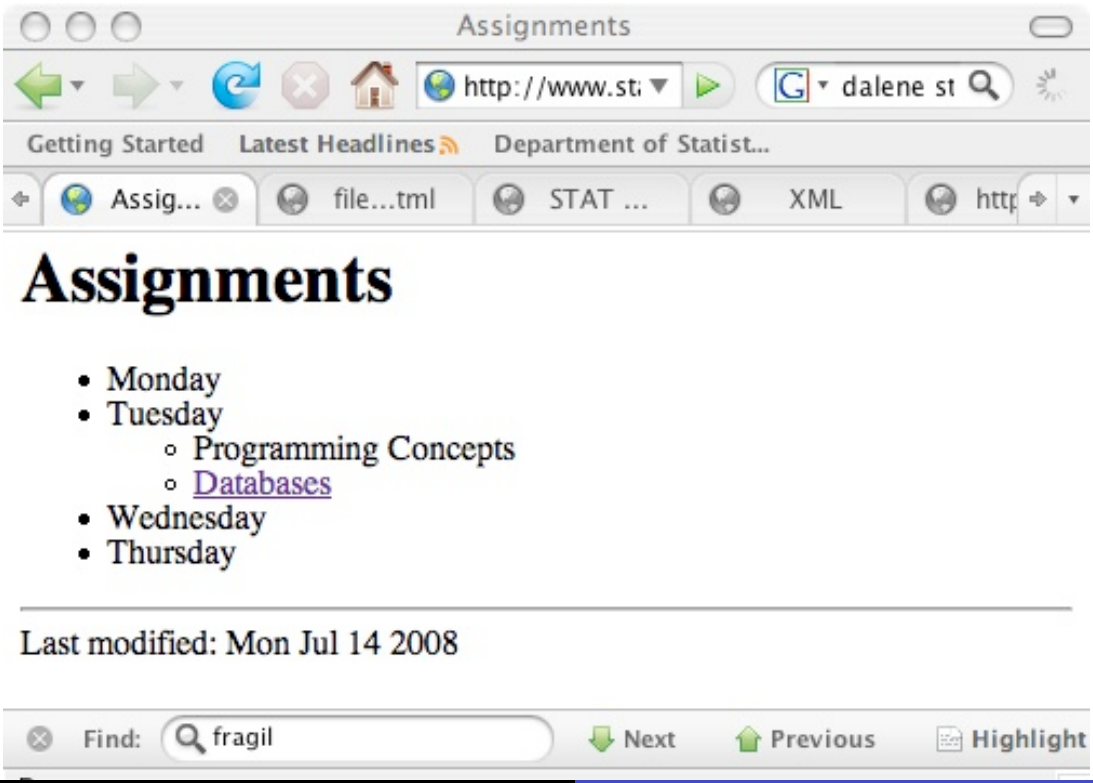
Simple HTML page

http://www.stat.berkeley.edu/users/statcur/Workshop2/Presentations/index.html

```
<html> <head>
<title>Assignments  </title>
<link rel="stylesheet" href="WS.css" />
</head>

<body>
<h1>Assignments </h1>
<ul>
   <li> Monday </li>
   ...  <ul>
           <li> Programming Concepts </li>
           <li> <a href= "RDBMS.pdf">Databases</a> ...
</ul>
<hr>
<!-- Comment -->
Last modified: Mon Jul 14 2008
</body>
</html>
```

Rendered HTML



XML

- XML is a meta-language facility for defining markup languages
- Framework for supplying meta-information to data
- Applications - Business to business, Data exchange (chemistry, biology, ...), Web presentation

Language Concepts

- Declarative language, rather than procedural
  Describe what the program should accomplish with the XML content, rather than how to go about accomplishing it.
- Structure hierarchical
  - Basic unit element, node, chunk
  - Needed for signifying nesting
- Capable of representing any data structure (e.g. tree, graph,)

Data Exchange

ASCII approach:

- Edited with simple text editor
- Natural connection between visual layout and way think about data set
- Simple for applications to read and write

But what about more complex data?

- 999 means missing
- 2.31 is measured in units of mm not inches
- ragged array - think Mannheim

XML features

- self-describing
- human readable
- easily generated by machine
- extensible format
- strict parsing rules
- tools shared across discpilines

Climate Science Modeling Language (CSML)

- Layers on top of Geographic Markup Language
- Climate science applications
- Developed by British Atmospheric Data Centre and British Oceanographic Data Centre
- Specialized feature types, e.g.
  - PointFeature - single point measurement, e.g. rain gauge measurement
  - PointSeriesFeature - series of single point measurements, e.g. time series from a tide gauge

```
<gml:featureMember>
  <PointSeriesFeature gml:id="feat02">
    <gml:description>January timeseries of raingauge measurements
    </gml:description>
  <PointSeriesDomain>
    <domainReference>
      <Trajectory srsName="urn:EPSG:geographicCRS:4979">
        <locations>0.1 1.5 25</locations>
        <times frame="#RefSys01"> 1 2 3 4 5 6 7 8 9 10 11
12 13 14 15 16 17 18 19 20 21 22 23 24 2 26 27 28 29 30 31
        </times>
      </Trajectory>
    </domainReference>
  </PointSeriesDomain>
  <gml:rangeSet>
    <gml:QuantityList uom="udunits.xml#mm">5 3 10 1 2 8 10 2 5
10 20 21 12 3 5 19 12 23 32 10 8 8 2 0 0 1 5 6 10 17 20
</gml:QuantityList>
</gml:rangeSet>
<parameter xlink:href="#rainfall"/>
</PointSeriesFeature>
</gml:featureMember>
```


Exchange Data

- European Central Bank provides daily exchange rates
- Provides data in several formats including HtML for the iPhone, and 2 XML formats
- XML formats developed by Statistics Data and Metadata Exchange intiative

```
<gesmes:Envelope xmlns:gesmes="http://www.gesmes.org/xml/2002-08-(
      xmlns="http://www.ecb.int/vocabulary/2002-08-01/eurofxref">
  <gesmes:subject>Reference rates</gesmes:subject>
    <gesmes:Sender>
      <gesmes:name>European Central Bank</gesmes:name>
    </gesmes:Sender>
    <Cube>
      <Cube time="2008-04-21">
        <Cube currency="USD" rate="1.5898"/>
        <Cube currency="JPY" rate="164.43"/>
        <Cube currency="BGN" rate="1.9558"/>
        <Cube currency="CZK" rate="25.091"/>
      </Cube>
      <Cube time="2008-04-17">
        <Cube currency="USD" rate="1.5872"/>
        <Cube currency="JPY" rate="162.74"/>
...
</Cube>
</gesmes:Envelope>
```


XML Elements

- Basic unit is an element, aka node or chunk
- Element delimited by tags, `<tag name>`
- Tags open and close the units:

  `<PointSeriesDomain> ..... </PointSeriesDomain>`
- Elements content can be other elements and text content
- Text content is also a node
- Elements must be properly nested
- Elements with no content can collapse the start and end tag

  `<Cube currency="CZK" rate="25.091"/>`

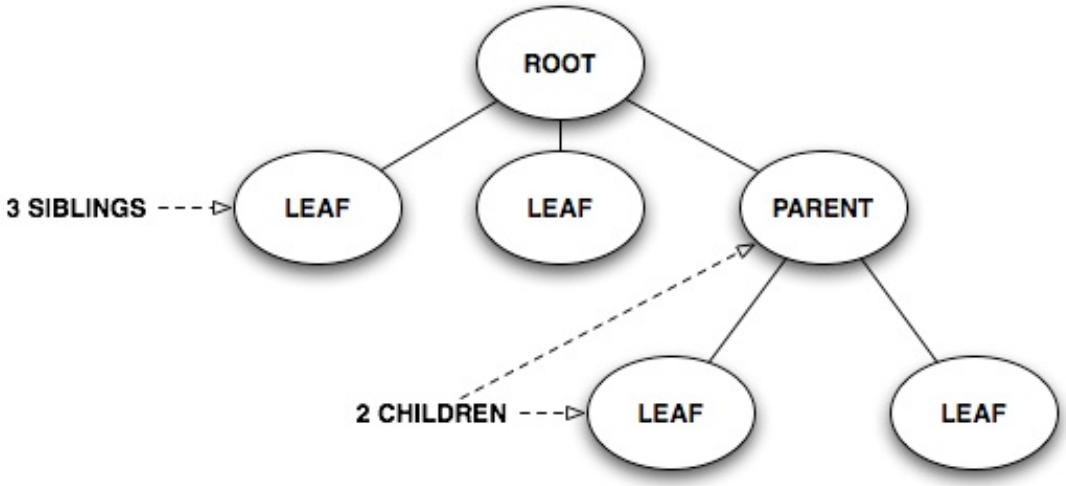
Well-formed XML

- Start and end tag names must match exactly (case-sensitive)
- Elements must nest properly
- Attributes associated with elements appear in name-value pairs,

```
<Cube currency="CZK" rate="25.091"/>
```

- Attribute values must appear in quotes
- Restrictions on tag names and attribute names

XML - Tree



Other Markup

- XML declaration appears outside root element
  ```
  <?xml version = "1.0" ?>
  ```
- Processing Instructions, e.g. apply a stylesheet
  ```
  <?xml-stylesheet href="docbook-css-0.3/driver.css"
  ```
- Comments that are not rendered
  ```
  <!-- This is a comment -->
  ```
- CDATA - character data that is not processed
  ```
  <![CDATA[
   Good for showing code
  ]]>
  ```
- Document-type Declaration - locates schema that describes the application specific grammar
  ```
  <!DOCTYPE HTML PUBLIC "-//IETF//DTD HTML//EN">
  ```