Markup Languages

What is markup?

SGML – The Origin of the <TAG> syntax

HTML – HyperText Markup Language

CSS – Cascading Style Sheets

XML – eXtensible Markup Language

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Markup 1: The Need for Markup

- **Plain text** (ASCII, Unicode) is often not enough
  - Need structure – headings, bullets, …
  - Need style information – font, size, color, …
  - Need to incorporate other objects – images, …
- Solution: Use **markup**
  - Additional data or instructions included inside the text, intended to be interpreted by a program

Markup 2: Procedural Markup

- In the beginning: **Procedural markup**
  - Tell the system what to do
    - **.SK 1**
      This added
      information, called "markup", serves two
      purposes:
      .TB 4
      .OF 4
      .SK 1
      1.#Separating the logical elements of the
      document; and
      .OF 4
      .SK 1
      2.#Specifying the processing functions to be
      performed on those elements.

Tab stop 4
Offset 4
Skip vertical space, 1 unit
<explicitly numbered list>

  - Easy to process – but difficult to change

Markup 3: Structural Markup

- Eventually (late 60s): The idea of **structural markup**
  - Markup describes **what the text is**
    - This is a heading, this is a list, …
    - **<h2>**Heading**</h2>**
      <ol>
      **
Separating the logical elements of the document; and
**
      <li>Specifying the processing function to be performed on those elements.**</**
      **
**

Heading, level 2
Ordered list
List item start …
… and end
List item start…
… and end
End of list

  - Does not specify how to display this
    - Instead: Specified by the document processor or a style sheet
    - "Level 2 headings should be in 18-pt Myriad Pro Black"
    - "Ordered lists should be indented by 10 pt and …"
  - Don't mix **content** with **presentation**

Markup 4: Uses

- Structural markup is not just for word processing
  - Also for what you might call **data structures / databases**
    - **<book> <title>**Thinking in Java**</title>**
      <author>Bruce Eckel**</author>**
      <isbn>…**</isbn>**
  - For **mathematical formulas** (MathML)…
    - **<apply> <power/>**
      <apply> <plus/> <ci>a**</ci> <ci>**b**</ci> </apply>**
      <cn>2**</cn>**
      </apply>
  - For **music** (SMDL)…
    - **<ces id='ces4'>**
      <pitched exspec=exlist1><nompitch><gampitch><pitchnm>c</pitched>
      <rest exspec=exlist1></rest>
      </ces>
  - … for just about anything!

In some cases, this isn't really "markup" – the tags are the real information…

Markup 5: Common Structure?

- A **single markup language** cannot cover everything
- But a common structure has many benefits
  - Easier to learn similar languages
  - Common tools can be used (to some extent) – parsers, …

SGML 1: DTD, Tags

- **SGML** – Standard Generalized Markup Language
  - Meta-markup language from early 80's
    - A language in which you can define a markup language
    - Language definition is called DTD: Document Type Definition
    - Predecessor of XML – most of this applies to XML too!
  - Example DTD (extremely simple), defining four tags:
    - **<!ELEMENT note (from,to,text)>**
      <!ELEMENT from (#PCDATA)>
      <!ELEMENT to (#PCDATA)>
      <!ELEMENT text (#PCDATA)>

Can also define complex patterns for tag nesting.
Can define whether end tags are required, and so on.

#PCDATA: Parsed Character Data – can contain other tags

  - Example document:
    - **<note>**
      <from>Jonas**</from>**
      <to>Anyone who is still listening**</to>**
      <text>Don't fall asleep yet!**</text>**
      </note>

SGML 2: Tag Attributes

- Elements (tags) can have **attributes**
  - #REQUIRED, #IMPLIED or #CURRENT (repeat previous value)
    - <!ELEMENT image EMPTY>
      <!ATTLIST image id CDATA #IMPLIED>
      <!ATTLIST image height CDATA #REQUIRED>
      <!ATTLIST image width CDATA #REQUIRED>
    - <image height="100" width="200">

EMPTY: Nothing inside
<image></image>

CDATA: Character Data
(string data type)

  - Enumerated (list of possible values)
    - <!ELEMENT task (#PCDATA)>
      <!ATTLIST task status (important|normal) #REQUIRED>
    - <!-- This is a comment -->
      <task status="important">…</task>

Embed comments in
<!-- … --> (2 hyphens)

SGML 3: Entities

- **Entities** can be used as SGML "macros"
  - Declared in the DTD
    - <!ENTITY coursecode "TDDI48">
      <!ENTITY teacher "Jonas Kvarnström">
      <!ENTITY chapterTwo SYSTEM "chapter2.txt">
  - Used in documents
    - Ampersand / entity name / semicolon
    - The course &coursecode; is taught by &teacher;.
  - Can be used for single characters too
    - <!ENTITY ouml "ö">
      <!ENTITY eacute "é">
      <!ENTITY lt "<">
  - (Also other kinds of entities)

SGML 4: History

- SGML **history**:
  - Was quickly adopted by government
    - US DoD
    - European defence, transport, energy, and space agencies
    - …
  - Beyond this, not very widely spread…
    - Too few tools
    - Too flexible – too difficult to implement
    - Not much support from major software vendors
  - … until HTML was developed.

See also http://www.oasis-open.org/cover/gentle.html

HTML

HyperText Markup Language

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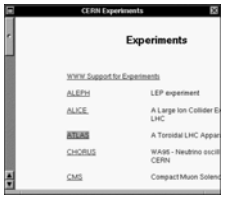
HTML 1: Early History

- **Hypertext** was an old concept even in 1989
  - Text where some words/phrases are links to other texts
  - Invented by Ted Nelson in 1968
- **HTML 1:** First developed by Tim Berners-Lee in 1989-91
  - HEP (High Energy Physics) / CERN (nuclear research)
  - Simple language defined in SGML
    - Few tags
    - Easy to use
  - First browser: "WorldWideWeb"
    - Used SGML tools
    - Wrote a simple DTD for HTML
    - Modified a text control for hyperlinks
    - Showed images in separate windows

Screenshot from 1993



HTML 2: 1993–1994

- **HTML 2:** Images and forms (1993–1994)
  - Mosaic: First browser with integrated text and graphics
    - Developed at NCSA (National Center for Supercomputing Applications)
  - Number of web servers explodes
    - 50 in dec 1992
    - 623 in dec 1993
    - 10022 in dec 1994
    - 74700 in dec 1995
    - 603367 in dec 1996
    - 3689227 in dec 1998
    - 104944594 in dec 2006
  - 13 Oct 1994:
    - Mosaic Netscape 0.9
    - http://www.zakon.org/robert/internet/timeline/#Growth

Mosaic in 1994 (?)

HTML 3: Chaos?

- **1995-1997:** The beginning of chaos
  - Competition: Internet Explorer, Netscape Navigator, others
    - No time to think, no time to wait for standardization
    - Each browser adds its own tags, and only implements *parts* of HTML 3
    - Each browser interprets some tags slightly differently
    - Each browser treats malformed tags differently:
      The web is full of documents that "look just fine on my computer!"
      ** **IMPORTANT** **
  - Web page design is seen as important
    - HTML was not made for this – markup was supposed to be structural
  - Web designers use all kinds of tricks for pixel-"perfect" layout
    - ****foo**** -- but anything below 16 is unreadable
    - Best viewed in Internet Explorer 4.0 at 800x600, 16 bpp.

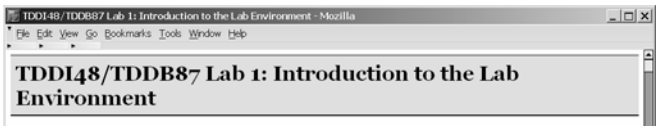
HTML 4: New Standards

- Now, the situation is **improving**
  - HTML 4.01 and XHTML are well-defined standards
    - By the World Wide Web Consortium, http://www.w3.org
  - New style markup standards separate style from structure
    - CSS (Cascading Style Sheets)
  - Browsers are becoming more standards-compliant
    - Firefox, Opera, even Internet Explorer from version 7.0
  - Automated page validation services exist
    - http://validator.w3.org/

HTML 5: A Basic HTML Page

- A basic HTML page: An old TDDI48 lab

```
<!DOCTYPE html public "-//W3C//DTD HTML 4.01 Transitional//EN"
"http://www.w3.org/TR/html4/loose.dtd">
<html>
 <head><title>TDDI48 Lab 1: Introduction to Java</title>
  <meta http-equiv="Content-Type"
        content="text/html; charset=iso-8859-1">
  <link rel="stylesheet" HREF="tddi48.css" TYPE="text/css">
 </head>
 <body>
  <h1 class="labheader first">TDDI48/TDDB87 Lab 1:…</h1>
  <p class="author"> Jonas Kvarnström…</body></html>
```



HTML 6: The General Structure

- The **DOCTYPE** declares that this is HTML
  - In our case, HTML 4.01
  - **Strict** version (only structural tags – use CSS for presentation!)
    - ***<!DOCTYPE html public "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">***
  - **Transitional** (use presentation tags sparingly!)
    - ***<!DOCTYPE html public "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">***
- All documents should have a DOCTYPE!
  - Without this, browsers don't know how to interpret your doc
    - Is it HTML 2, 3, 4, …?
    - Does it rely on Netscape-specific bugs? IE-specific bugs?
  - They enter *quirks mode -- guess* what you probably mean
    - With a doctype, they should "follow instructions" to the letter

HTML 7: The General Structure

- The rest of the document is enclosed in an **<html>** tag
  - The top element of the HTML DTD
    - Split into **<head>** and **<body>**

```
<html>
  <head>
    … global information about the document …
  </head>
  <body>
    … the actual contents of the document …
  </body>
</html>
```

HTML 8: The Head

- In the **head section**, you declare:
  - A title (usually shown in the window title bar)
    - **<title>**TDDI48 Lab 1: Introduction to Java**</title>**
  - Possibly some meta-information
    - **<meta name="description" content="First lab for TDDI48">**
    - **<meta name="keywords" content="Java, IDEA, lab, tutorial">**
  - Some meta tags correspond to HTML protocol headers
    - **<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1">**
    - **<meta http-equiv="Content-Language" content="en-GB">**

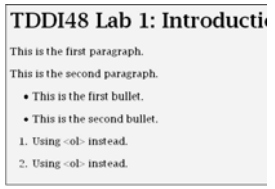
HTML 9: Special Links

- Possibly some "special" links (also in the head)

```
<link rel="Prev" href="sec4.html" title="Section 4">
<link rel="Next" href="sec6.html" title="6. Using the LINK tag">
<link rel="Alternate" href="sec5-swedish.html"
  title="5. Att använda META-taggar">
<link rel="Alternate" media="print" type="application/postscript" href="sec5.ps"
  title="Printable version (postscript)">
<link rel="Section" href="sec1.html" title="Introduction">
<link rel="Section" href="sec2.html" title="The BODY tag">
<link rel="Start" href="contents.html">
<link rel="Index" href="myindex.html">
<link rel="Contents" href="contents.ht
<link rel="Glossary" href="glossary.htm
```

HTML 10: The Body

- The body of the document contains the text
  - Headers: **<h1>**, **<h2>**, **<h3>**, …
    - **<h1 class="labheader">**TDDI48 Lab 1: Introduction to Java**</h1>**
  - Paragraphs: **<p>** (next **<p>**, **<h1>**, … ends the paragraph)
    - **<p>** This is the first paragraph.
      <p> This is the second paragraph.
    - Use **
** for a line break within a paragraph
  - Unnumbered lists: **<ul>**, **<li>**
    - **<ul>**
      ** <p>** This is the first bullet.
      ** <p>** This is the second bullet.
      **
**
  - Numbered lists: **<ol>**, **<li>**



HTML 11: Character styles

- Explicit styling – obsolete, **use CSS instead!**
  - Italics: ****…****
  - Bold: ****…****
  - Underline: **<u>**…**</u>**
  - Fonts: ****…****
- Implicit styling (may be OK sometimes; **CSS is better**)
  - Emphasized (usually italics): ****

HTML 12: Tables

- **Tables**:
  - **<table cellpadding="4">**

```
<thead>
  <tr><th>Item</th><th>Price</th></tr>
</thead>

<tbody>
  <tr><td>Foo</td><td>$100.00</td></tr>
  <tr><td>Bar</td><td>$200.00</td></tr>
  <tr><td>Gazonk</td><td>$300.00</td></tr>
</tbody>
```

  - **</table>**
  - cellpadding = additional space within each cell

Item	Price
Foo	$100.00
Bar	$200.00
Gazonk	$300.00

HTML 13: Embedded images

- **Images**:
  - Use the img tag
    - **<img src="image.png" alt="shown in text browser">**
    - Attribute **longdesc** points to a long description: longdesc="desc.html"
    - Attribute **title** usually shown as tooltip: title="Click here to go to …"
    - Specify **height** and **width** for faster layout: height="100" width="200"
    - **align**="left" to let text flow on the right hand side of the image
    - **align**="right"…
  - Or the more generic object tag
    - **<OBJECT data="image.png" type="image/png" …>**
      Shown if the object type is not supported
      </OBJECT>

HTML 14: Hyperlinks

- Hypertext: **References** to other locations!
  - Inserting a link to another document:
    - There is an ****index****.
    - Read more at ****the Java web site****.
  - Links within documents
    - First, place an anchor:
      <h1>Contents**</h1><a>**
    - Then, point to that anchor using "#" fragment s
      ****Go to the top****

Uses the URI fragment identifier syntax

  - Links can contain images
    - **<img src="foo.png">**

HTML 15: Character Entities, Comments

- Standard set of **character entities** in HTML
  - Borrowed from SGML
  - Always on the form &entity; (don't forget the semicolon!)
  - These three should always be written as entities:
    - < -- less than, "<"
    - > -- greater than, ">"
    - & -- ampersand, "&"
  - Many others that might not exist in your character encoding
    - é -- é
    - ö -- ö (but no need to encode this if you use iso-8859-1!)
    -   -- non-breaking space
- **Comments** can be embedded into HTML
  - Use standard SGML comments: <!-- comment -->

HTML 16: Standards

- Please don't write **non-standard HTML!**
  - Use the standard
    - HTML 4.01: http://www.w3.org/TR/html4
  - Include a DOCTYPE
    - Strict version (no presentation – use CSS!):
      <!DOCTYPE html public "-//W3C//DTD HTML 4.01//EN" "http://www.w3.org/TR/html4/strict.dtd">
    - Transitional (use CSS with possibly a few presentation tags):
      <!DOCTYPE html public "-//W3C//DTD HTML 4.01 Transitional//EN" "http://www.w3.org/TR/html4/loose.dtd">
  - Validate your documents
    - HTML validator: http://validator.w3.org/

CSS

Cascading Style Sheets

2007-01-26 Jonas Kvarnström

CSS motivation 1

- How should we define **the look of a web page**?
  - Old-style HTML: Embedded within the document
    - **<h2>**Chapter 1**</h2>**
      <img src="empty.gif" height="28"><!– spacing image -->
      ** **Intro** **
      ** **First paragraph of the main text** **
      ** **Second paragraph**<code>**some code**</code>** and more text** **
  - Disadvantages:
    - Cluttered with repetitive style information – hard to read, large
    - Consistency is hard to achieve
    - Want to change chapter style? Search and replace throughout the document – or throughout the website!

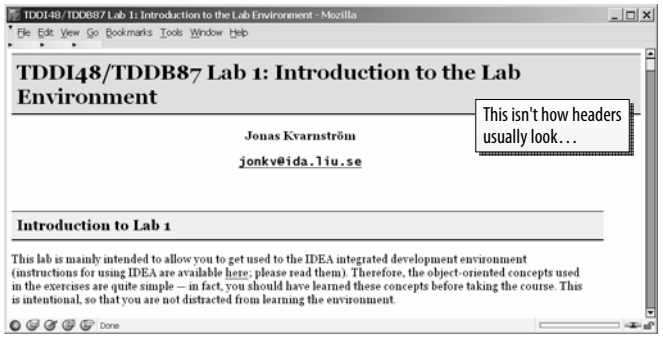
CSS motivation 2

- How should styles be defined?
  - Modern HTML: Use CSS – **Cascading Style Sheets**
    - **<h2>**Chapter 1**</h2>**
      ** **Intro** **
      ** **First paragraph of the main text** **
      ** **Second paragraph**<code>**some code**</code>** and more text** **
    - **H2** { **font-family**: Arial, helvetica; **font-size**: 32px; **font-weight**: bold; }
      H2 { **margin-bottom**: 28px; }
      P { **font-family**: Times New Roman; **font-size**: 11px; }
      P.intro { **font-family**: Arial, Helvetica; **font-size**: 12px; }
      CODE { **font-family**: Courier New, monospaced; **font-size**: 10px; **color**: green; }
  - Advantages:
    - Document is cleaner, easier to read
    - **Semantic** markup: "this is an intro paragraph", not "this has font x"
    - Easy to change styles in a central location
    - Document is smaller; also, CSS style file downloaded/cached separately

CSS 1: Example

- **<h1 class="labheader first">**TDDI48/TDDB87 Lab 1: Intro…**</h1>**
  <P class="author">Jonas Kvarnström**

<a …>**…**</P>**
  <h2 class="labheader">Introduction to Lab 1**</h2>**

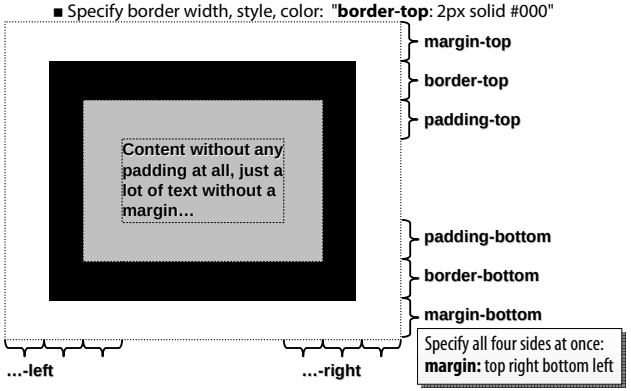


CSS 2: Selectors

- CSS **Selectors**: What items do a style apply to?
  - Specify a style for all tags of a certain kind
    - CSS: **H1** { … }
    - HTML: **<H1>**My heading**</H1>**
  - Specify a style for specific classes of tags
    - CSS: **P**.idea { …}
    - HTML: **<P class="idea">**IDEA-specific instructions here**</P>**
  - Specify a style for a specific element, given a unique ID
    - CSS: **DIV**#exercise4
    - HTML: **<DIV id="exercise4">**…**</DIV>**

CSS 3: Layout

- **Layout**: Margins, borders and padding
  - Specify border width, style, color: "**border-top**: 2px solid #000"



CSS 4: Measurements

- **Units of measurement** for layout:
  - 1 px = pixel (can be rescaled for high-resolution devices)
  - 1 pt = point (1/72 inch)
  - 1 mm = millimeter
  - 1 cm = centimeter
  - 1 in = inch
  - 1 ex
  - 1 em

  - Also: % (percent of some base value)
  - Also used for **width** and **height**

CSS 5: Colors

- **Color** specifications:
  - Named colors
    - aqua, black, blue, fuchsia, gray, green, lime, maroon, navy, olive, purple, red, silver, teal, white, yellow
  - RGB colors
    - #f00
    - #ff0000
    - rgb(255,0,0)
    - rgb(100%,0%,0%)

CSS 6: Heading Example Revisited

- **Back to the example**…
  - **<h1 class="labheader">**TDDI48/TDDB87…**</h1>**
    - **H1**.labheader, **H2**.labheader {
      margin-top: 3em; /* Except for "first" items */
      border-top: 1px solid #000;
      border-bottom: 2px solid #000;
      padding: 8px;
      text-align: left;
      font-weight: bold;
      }
    - **H1**.labheader { **font-size**: 180%; **background-color**: #ddddff; **color**: #000 }
    - **H2**.labheader { **font-size**: 120%; **background-color**: #eeeeff; **color**: #000; **width**: 42em }
    - **H1**.labheader.first { **margin-top**: 0em } **/* More specific! */**

CSS 7: Another Example

- **Alter the behaviour** of existing tags
  - Make the CODE tag blue
  - Make sure there are never line breaks in CODE
    - **<p>**
      Implement a concrete **<code>**draw()**</code>** method that prints "A circle is drawn".
    - **CODE** {
      font-family: monospace;
      white-space: nowrap;
      color: #4669ad
      }

Implement a concrete draw() method that prints "A circle is drawn".

CSS 8: Readability

- Change styles for **better readability**
  - Example: Course web page
  - Paragraphs within the "main" table: Max width 45 em
    - **TABLE**#main **P** { **max-width**: 45em; }
    - Not supported by IE 6 (but present in IE 7)
  - Line spacing: Slightly more (130%)
    - **TABLE**#main **P** { **line-spacing**: 130%; }

CSS 8: SPAN and DIV

- SPAN and DIV lets you (almost) **generate new tags**
  - DIV creates a new block – can contain paragraphs
  - SPAN is used within paragraphs
    - First create the package.
      Right-click the source path in the project pane (if it is not visible, select ****Window | Project: Alt-1****).
      Select ****New | Package**** and enter "se.liu.ida.****youremail****".
    - **SPAN**.menu { **color**: #46ad69; **font-family**: monospace; }
      SPAN.menu:before { **content**: "[[" }
      SPAN.menu:after { **content**: "]]" }

First create the package. Right-click the source path in the project pane (if it is not visible, select [[Window | Project: Alt-1]]). Select [[New | Package]] and enter "se.liu.ida.*youremail*".

CSS 9: SPAN and DIV are useful!

- **Use** SPAN and DIV!
  - Do not use inline formatting
  - Instead, create new classes for all relevant items
    - **SPAN**.label { … }
      SPAN.author { … }
      SPAN.subject { … }
      SPAN.email { … }
      DIV.message { … }
  - Don't say "this should be bold"
    - Use semantic markup with indirection
    - Say "This is a subject" [HTML]
    - Say "Subjects should be bold" [CSS]

CSS 10: Setting Page Colors and Attributes

- Altering the page body and link colors:
  - **BODY** {
    background: url("http://www.ida.liu.se/~jonkv/background.png")
    /* background: white; */
    color: black; /* for text */
    }

    A:link { **color**: #0000ff }
    A:visited { **color**: #a669ad }
    A:active { … }
  - **A**.external:link { **color**: #0000ff }
    <A class="external" href="http://…">Link to external site****

CSS 11: Different Media

- Different rules can be applied to different **media**
  - aural, braille, embossed, handheld, print, projection, screen, tty, tv
    - @media print {
      BODY {
      font-size: 10.5pt;
      font-family: book antiqua, serif;
      }
      PRE { font-size: 80%; }
      P, **LI**, **DD** {
      orphans: 2;
      widows: 2;
      max-width: 13cm;
      }
      }

CSS 12: External or Inline

- Style sheets can be **external** or **inline**
  - Internal – easier for small pages, if you're lazy
    - **<head>**
      <STYLE type="text/css">
      A.maplink { **text-decoration**: none }
      </STYLE>
      </head>
  - External
    - **<head>**
      <link rel="stylesheet"
      HREF="standard.css" TYPE="text/css" title="Standard">
      </head>
    - Can be reused between different documents
    - Can be cached separately by the browser
    - Often better authoring support ("CSS mode", not "CSS in HTML-mode")

CSS 13: Alternate Style Sheets

- **Alternate style sheets** can be specified
  - User agent should let you choose using menus
    - **<link rel="stylesheet"**
      HREF="standard.css" TYPE="text/css" title="Standard">
      <link rel="alternate stylesheet"
      HREF="large.css" TYPE="text/css" title="Large fonts">
      <link rel="alternate stylesheet"
      HREF="bw.css" TYPE="text/css" title="Black and white">

CSS 14: Standards

- **Use CSS** in your documents!
  - Write reusable, well-commented CSS
  - Use the standard
    - CSS 2: http://www.w3.org/TR/REC-CSS2/
  - Validate your documents
    - http://jigsaw.w3.org/css-validator/
  - Test your documents in different browsers
    - Browsers are buggy (especially CSS in IE 6)
    - Browsers only support part of CSS
  - Test your documents in a text-only browser
    - Use "links" or "lynx", for example – important for accessibility
  - Test your documents in low, medium and high resolution
    - No hardcoded tiny / huge font sizes…
  - Test at different zoom levels (Firefox: Ctrl-plus / Ctrl-minus)

XML: eXtensible Markup Language

A brief introduction

2007-01-26 Jonas Kvarnström

XML 1: eXtensible Markup Language

- **SGML is complex**
  - Difficult to implement in its entirety
  - Takes a long time to understand all features
  - Many features that are (almost) never used
- **XML: SGML light** (almost)
  - Many options removed, fixed to one setting
  - Started 1996; standard 1998

XML 2: Applications

- Like SGML, many applications exist
  - **CML**: Chemical Markup Language
    - **<chem> <molecule>**
      <atom n="2" charge="+1"> H **</atom>**
      <atom charge="-2" > O **</atom>**
      </molecule> </chem>
  - **BSML**: Bioinformatic Sequence Markup Language
  - **XHTML**: A stricter version of HTML
    - Subset of HTML 4, with stricter syntax (end tags required, …)
  - Plain **data storage**
    - Configuration files
    - Simple databases
    - Data exchange over the net
    - …

XML 3: DTD and Schema Examples

- Document type specified using **DTD or XML schema**
  - Not required -- useful for data validation
  - Example XML document:

```
<?xml version="1.0"?>
<text timestamp="08:45:00.000">
  The deadline of <name>homework 1</name>
  is <emph>March 9th 2137</emph>.
</text>
```

  - Example DTD:

```
<!ELEMENT text (#PCDATA | emph | name)*>
<!ATTLIST text
      timestamp NMTOKEN #REQUIRED>
```

    - Elements, subelements and attributes; ordering constraints
    - Strings and tokens – no other data types
  - Example XML schema: Next slide

XML 4: DTD and Schema Examples

- Example XML document:

```
<?xml version="1.0"?>
<text timestamp="08:45:00.000">
  The deadline of <name>homework 1</name>
  is <emph>March 9th 2137</emph>.
</text>
```

- Corresponding XML Schema:
  - Stronger constraints and type system (integers, dates, user-defined, …)

```
<xsd:element name="text">
  <xsd:complexType mixed="true">
    <xsd:sequence>
      <xsd:element ref="name"/> <xsd:element ref="emph"/>
    </xsd:sequence>
    <xsd:attribute name="timestamp" type="xsd:date"
use="required"/>
  </xsd:complexType>
</xsd:element>
```

XML 5: Namespaces

- **Namespaces** for short / unique identification
  - Like packages in Java

```
<?xml version="1.0"?>
<!-- all elements here are explicitly in the HTML namespace -->
<html:html xmlns:html='http://www.w3.org/TR/REC-html40'>
 <html:head>
  <html:title>Frobnostication</html:title>
 </html:head>
 <html:body>
  <html:p>Moved to
   <html:a href='http://frob.com'>here.</html:
  </html:p>
 </html:body>
</html:html>
```

Defines "html:" namespace prefix for this tag and its contents

URI is only used as an identifier – does not have to point to a retrievable resource!

XML 6: Namespaces

- You can mix multiple namespaces

```
<?xml version="1.0"?>
<!-- both namespace prefixes are available throughout -->
<bk:book xmlns:bk='urn:loc.gov:books'
      xmlns:isbn='urn:ISBN:0-395-36341-6'>
  <bk:title>Cheaper by the Dozen</bk:title>
  <isbn:number>1568491379</isbn:number>
</bk:book>
```

- You can define your own namespace…

```
<ida:course xmlns:ida="http://www.ida.liu.se/courseXML">
  <ida:teacher>Jonas Kvarnström</ida:teacher>
  <ida:name>…</ida:name>
  <othertag>…</othertag>
</ida:course>
```

XML 7: SAX and the DOM

- Two standard APIs for **parsing XML**
  - (And HTML, to some extent)
    - **SAX**: Simple API for XML Parsing
    - **DOM**: Document Object Model
  - More about this in another lecture!