

# **Comp 336/436 - Markup Languages**

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## Markup - conforming to a standard

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- exciting opportunities are possible when we all conform to a standard
- document markup predates the internet and computers
- separation of content from format
- tradition of markup with copy editors
  - *manually marking up manuscripts for typesetters*
  - *e.g. a particular chapter heading in a given font size and style*

## Markup - historical context

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- in 1967, an engineer named William Tunncliffe suggested need for updates
  - *previous computerised system of codes for styles &c. too specific*
  - *codes were specific to a given program*
  - *codes should be replaced with a separation of content from format*
- in 1969, GML (Generalised Markup Language) was created at IBM
  - *used idea of generalised codes suggested by Tunncliffe*
- GML later emerged as the international standard SGML
  - *SGML (Standardised Generalised Markup Language)*

## Markup - SGML

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- SGML did not provide predefined classifications or markup tags
- SGML was a 'meta-language'
  - *a grammar and vocabulary used to define any set of tags*
- different disciplines, industries &c. could define their own specialised languages
- DTD (document type definition) required
- new language would be based on meta-language of SGML
  - *or a pre-existing specialised language also based on SGML*
- SGML often perceived as complicated, time-consuming, expensive...
- SGML became known as,

*Sounds good, maybe later*

## Markup - text encoding

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- practical value and importance to many disparate fields
  - *different domains, communities, organisations...*
- considerations of usage, depth, and scope
  - *lightweight markup options*
  - *prescribed schemas*
- often considered within a given context
  - *e.g. critical editions, indices, concordances...*
- can also be considered within broader context of *new media*
  - *e.g. multimedia, interactivity, networking...*

## Markup - typesetting

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*information formally distinct from the character sequence of the digital transcription of a text, which serves to identify logical or physical features or to control later processing....*

- distinct from the text itself
  - *serves to identify logical or physical features*
  - *or to help with later processing*
- unfamiliar expressions or codes
- considered within broader context
  - *computer based typesetting and text processing*
- 1960s to 80s typesetting and text processing offers foundation

## Markup - early encoding

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- encoding was initially specific to an application using
  - *codes for individual characters of the text*
  - *& codes for formatting commands*
- early computerised encoding of documents
  - *enter and store text in a file for future printing*
  - *encode individual characters of the text*
  - *using application specific codes*
  - *and codes for formatting commands*
- output of this process was formatted text

## Markup - descriptive in nature

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- descriptive markup became seen as the fundamentally correct approach
- objective is to decouple a document's inherent structure
  - *decouple from specific processing, rendering, &c.*
  - *often described as semantic*
- descriptive said to identify and describe the parts of a document
  - *instead of providing specific processing instructions*
- procedural was a command or instruction invoking formatting
- logical v graphical



# Markup - benefits of descriptive markup - simplified composition

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- with descriptive markup - intended formatting considerations
  - *make no claim on the attention of the author, compositor, transcriber...*
- with procedural markup - need to remember
  - *intended style conventions*
  - *specific commands required by formatting software for different effects...*
- with descriptive markup
  - *simply identify each text component as is*
  - *appropriate formatting may take place automatically*
- descriptive markup helps an author
  - *to work at an appropriate level of abstraction*
  - *TEI vs HNML*
  - *Article on HyperNietzsche*

# Markup - benefits of descriptive markup - structure-oriented editors

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- descriptive markup supports *structure-oriented editors*
  - *know about patterns of components*
  - *components found in a given genre of document*
- editors may use this knowledge to assist the author or compositor
- e.g. autocomplete, suggestions, syntax highlighting, linting...
- many different editors for markup encoding support this feature
- schema specific support in some editors
  - e.g. *Oxygen with TEI...*

# Markup - benefits of descriptive markup - alternative document views

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- output different views, rendering, formats for a given text
  - *e.g. an outline view of a text can be done automatically*
  - *use descriptive markup for chapters, sections, and headings*
- more detailed or specialised renderings and output
- use identified discipline specific components, e.g.
  - *equations*
  - *examples*
  - *cautions*
  - *lines spoken by a particular character*
  - ...

# Markup - benefits of descriptive markup - generic formatting

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- procedural markup
  - *appearance of paragraphs &c. edited with formatting commands*
  - *precede each paragraph in a page &c.*
- descriptive markup
  - *a formatting rule is specified for a paragraph*
  - *separation of concerns, abstraction of formatting*
- helps control formatting
  - *easier to markup and maintain*
  - *less error prone markup...*
  - *helps ensure consistency in projects and domains*

# Markup - benefits of descriptive markup - extras

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- descriptive markup helps support *textual apparatus*, e.g.
  - *creation of indices, appendices...*
  - *groups of lines, verses, quotes &c.*
- easily generate groupings of content
  - *tables, equations, plates, figures...*
- it offers device specific support
- descriptive markup may also be considered
  - *portable and interoperable*

# Markup - benefits of descriptive markup - retrieval & analysis

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- offers support for information retrieval
  - *fielded content may be systematically accessed*
  - *request all equations, headings, verses...*
  - *combine fields in queries for greater depth...*
- offers support for analytical procedures
  - *content analysis, statistical studies...*
  - *e.g. analysis of spoken language and style in a play...*

## Markup - other primary uses of markup - presentational

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- an attempt to infer document structure from cues in the encoding
- e.g. in a text file
  - *title of a document might be preceded by several new lines, spaces &c.*
  - *might be inferred as leading spaces or centred text*
- word processing and desktop publishing applications
  - *often attempt to deduce such structure from common conventions*
- many conventions for Wiki-type platforms
  - *may suggest ongoing attempts to resolve such issues*
- such apps will inevitably use markup to clarify such issues

## Markup - other primary uses of markup - procedural

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- procedural markup is also focused on the presentation of text &c.
- customarily now visible to the user editing the text file
- such markup is expected to be interpreted by software in the same order
- e.g. for a title
  - *a succession of formatting directives will be inserted into the file*
  - *usually added before the title and text*
  - *instructs software to centre, enlarge, add bold &c.*
- systems macros and scripting will often help
- examples include
  - *TeX*
  - *LaTeX*
  - *Postscript*
  - ...
- Example - Stanford LaTeX



# Markup - common examples

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- HTML
- XML - including common schemas for
  - *TEI*
  - *MEI*
  - *MathML*
  - ...
- SVG -
  - *also XML based*
- QML
- XAML
- RDF
  - *brief overview*
- many more...

## HTML - brief intro

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- HyperText Markup Language (HTML)
- HTML relies on keywords or element tags
- HTML can also use attributes within opening element tags
- keywords follow a rigidly defined syntax
- HTML creates web pages that web browsers can view
- an error or bug may cause the page to not render or simply render incorrectly
- to understand the current core of web page designing you need to know at least the basics of HTML

# HTML - elements and attributes

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## ***Element syntax***

- start with an opening element tag, and close with a closing tag
- content is everything between opening and closing element tags
- elements can contain empty content
- empty elements should be closed in the opening tag
- most elements permit attributes within the opening tag

## ***Attribute***

- attributes provide additional information to the parent element
- always added to the opening tag
- standard syntax of name/value pairs, `class="401"`
- standard attributes include
  - *class*
  - *id*
  - *style*
  - *title*

# HTML - structure of HTML

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- basic HTML tag defines the entire HTML document

```
<html>
...
</html>
```

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

# HTML - within the <body> - basics

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- to define the main body of the web page we use the element
- headings can be created using variants of
  - `<h1>`, `<h2>`.....`<h6>`
- we can now add some simple text in a

## element

- `<p>...</p>`
- add a line break
  - `<br />`
- add a horizontal line
  - `<hr />`
- comments can also be added through our HTML
  - `<!-- comment... -->`

# HTML - within the <body> - text formatting

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- formatting can be considered relative to stylistic and semantic requirements
- formatting is also available for embedded *code* viewing
- text formatting includes
  - *bold* <b>
  - *emphasis* <em>
  - *italic* <i>
  - *strong* <strong>
  - *sub* <sub> & *superscripted* <sup>
  - *inserted* <ins> & *deleted* <del>
- computer *code* formatting includes,
  - *code* <code>
  - *variables* <var>
  - *pre-formatted text* <pre>
- quotations, citations and definitions include,
  - *abbreviations* <abbr>
  - *acronyms* <acronym>
  - *citation* <cite>
  - *definition* <dfn>

# HTML - within the <body> - lists

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- list options in HTML
  - *unordered list* <ul>
  - *ordered list* <ol>
  - *definition list* <dl>
- list items <li> for <ul> and <ol>

```
<ul>
  <li>...</li>
</ul>

<ol>
  <li>...</li>
</ol>
```

- definition list uses
  - <dt> *for the item*
  - <dd> *for the definition*

```
<dl>
  <dt>Super Mario Bros.</dt>
  <dd>iconic platformer...</dd>
</dl>
```

# HTML - within the <body> - tables

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- organise data within a table
  - `<table>` element
- three primary child elements include
  - `<tr>`, `<th>`, `<td>`

```
<table>
  <tr>
    <th>header 1</th>
  </tr>
  <tr>
    <td>row 1, cell 1</td>
  </tr>
</table>
```

- add a `<caption>`
- span multiple columns using the `colspan` attribute
- span multiple rows using the `rowspan` attribute



# HTML - metadata & <head> element

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- add our CSS styling as either <link> or <style>
- add JavaScript using <script> element

```
<script type="text/javascript" src="assets/default/script.js" />
```

- add <title> of our page
  - *shown in the browser tab or window heading*

```
<title>Our Page Title</title>
```

- <base /> can be used to specify default address or target for all page links

```
<head>  
  <base href="http://www.w3schools.com/images/" target="_blank">  
</head>
```

- <meta /> adds metadata about the HTML document

```
<meta name="description" content="The Glass Bead Game" />  
<meta name="keywords" content="novel, fiction, herman hesse, electronic edition"
```

# HTML - better markup

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- web standards are crucial for understanding markup
  - *markup that goes beyond mere presentation*
- improved usage and structure, accessibility, integration...
- with standards, maintenance and extensibility becomes easier
- improved page structure and styling
  - *helps web designers and developers update and augment our code*
- poor markup usage
  - *to achieve a consideration and rendering of pure design*
  - *e.g. nesting tables many levels deep*
  - *adding images and padding blocks for positioning...*
- support for web standards continues to grow in popular browsers
- gives developers option to combine markup and styling
  - *HTML with CSS to achieve greater standards-compliant design*

# HTML - markup and standards

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- many benefits of understanding and using web standards, e.g.
- *reduced markup*
  - *less code, faster page loading*
  - *less code, greater server capacity, less bandwidth requirements...*
- *separation of concerns*
  - *content, structure, and presentation separated as needed*
  - *CSS used to manage site's design and rendering*
  - *quick and easy to update efficiently*
- *accessibility improvements*
  - *web standards increase no. of supported browsers & technologies...*
- *ongoing compatibility*
  - *web standards help improve chances of compatibility in the future...*

# HTML - better structure

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- consider *semantic* or *structured* markup
  - *within the context of app usage and domain requirements*
- trying to impart a sense of underlying meaning with markup
  - *correct elements for document markup*
- for a list
  - *use correct list group with list items - e.g. `ul`, `li`...*
- for a table
  - *consider table for data purposes*
  - *structure table & then consider presentation...*
- *semantic* markup helps create *separation of concerns*
  - *separate content and presentation*
  - *improves comprehension and usage*

# HTML - XHTML

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*"The XHTML family is the next step in the evolution of the Internet. By migrating to XHTML today, content developers can enter the XML world with all of its attendant benefits, while still remaining confident in their content's backward and future compatibility." (W3C - [www.w3.org/TR/xhtml1/#xhtml](http://www.w3.org/TR/xhtml1/#xhtml))*

- greater chance of comprehension, correct rendering...
- XHTML rules and valid markup

# HTML - XHTML validation

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- XHTML introduces many rules from XML, e.g.
  - *tags and attributes must be in lowercase*
  - *attributes must be enclosed with quotes*
  - *all tags must eventually close*
  - *no overlapping hierarchies*
  - *...*
- XHTML benefits include,
  - *improved standards compliancy for sites and apps*
  - *greater ease of sharing and collaboration*
  - *easier code debugging*
  - *opportunities for markup validation and compliance*
  - *improved search, archiving, rankings...*
- W3C provides an online validation tool
  - *<http://validator.w3.org/>*

## Resources

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- MDN - HTML Block-level vs Inline
  - [https://developer.mozilla.org/en-US/docs/Web/HTML/Block-level\\_elements#Block-level\\_vs.\\_inline](https://developer.mozilla.org/en-US/docs/Web/HTML/Block-level_elements#Block-level_vs._inline)
- MDN - HTML Global Attributes
  - [https://developer.mozilla.org/en-US/docs/Web/HTML/Global\\_attributes](https://developer.mozilla.org/en-US/docs/Web/HTML/Global_attributes)
- MDN - HTML Heading elements
  - [https://developer.mozilla.org/en-US/docs/Web/HTML/Element/Heading\\_Elements](https://developer.mozilla.org/en-US/docs/Web/HTML/Element/Heading_Elements)