

Comp 324/424 - Client-side Web Design

Fall Semester 2018 - Week 2

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DOM Basics - sample

```
<!DOCTYPE html>
<html>
  <head>
    <base href="media/images/">
    <meta charset="UTF-8">
    <!-- week 3 - demo 1 -->
    <title>Week 3 - Demo 1</title>
  </head>
  <body>
    <header>
      <h1>Ancient Egypt</h1>
    </header>
    <nav>...</nav>
    <main>
      <section>
        <p>
          Welcome to the Ancient Egypt information site.
        </p>
        <figure>
          
          <figcaption>Ptolemaic temple at Philae, Egypt</figcaption>
        </figure>
      </section>
      <aside>
        Temple at Philae in Egypt is Ptolemaic era of Egyptian history.
      </aside>
    </main>
    <footer>
      foot of the page...
    </footer>
  </body>
</html>
```

- Demo - DOM Basics - Sample

DOM Basics - index.html page

index.html usage and structure

- basic `index.html` page for loading web apps
- app will start with the `index.html` document
 - *html pages saved as `.html` or `.htm`*
 - *`.html` more common...*
- `index.html` acts as a kickstart
 - *for loading and rendering the app*
 - *loads other app resources - CSS, JS...*
- consistent elements in the HTML DOM
 - *`<html>`, `<head>`, and `<body>`*
- HTML5 apps will add
 - *`<header>`, `<main>`, and `<footer>` (when required)*
 - *many other elements for building the app...*

HTML Basics - metadata & <head> element - part I

- part of a HTML document's metadata
- allows us to set metadata for a HTML page
- customised just for that page or replicated as a site-wide implementation
- we can add numerous additional elements to <head>
- add similar links and code for JavaScript
 - use the `<script>` element & attributes such as `type` and `src`
 - HTML4 requires `type` and `src`
 - HTML5 requires `src`

```
<!-- HTML4 and XHTML -->  
<script type="text/javascript" src="script.js"></script>  
<!-- HTML5 -->  
<script src="script.js"></script>
```

HTML Basics - metadata & <head> element - part 2

- add a <title> element with text added as the element content
 - *shown in the browser tab or window heading*

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

- set a default base address for all relative URLs in links within our HTML

```
<base href="/media/images/" target="_blank">
```

- links now simply use the base URL or override with full URL

```
  
<a href="http://www.flickr.com">Flickr</a>
```

- <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 - <head> element example

```
<head>
  <meta charset="utf-8">

  <title>Sample...</title>
  <meta name="description" content="sample metadata">
  <meta name="author" content="COMP424">

  <link href="style.css" rel="stylesheet">
  <script src="script.js"></script>
</head>
```

HTML Basics - <body> - part I

intro

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

```
<p>...</p>
```

- add a line break using the
 element
 -
 for strict XHTML void
- <hr> element adds a horizontal line
 - <hr /> for strict XHTML void
 - implies rendering division
 - instead of defined structural divide...
- comments can also be added through our HTML

```
<!-- comment... -->
```

HTML Basics - <body> - part 2

linking

- linking is an inevitable part of web design and HTML usage
- can be considered within three different contexts
 - *linking to an external site*
 - *linking to another page within the same site*
 - *linking different parts of the same page*
- add links to text and images within the HTML
- <a> element for links plus required attributes, e.g.

```
<!-- external link -->
<a href="http://www.google.com/">Google</a>
<!-- email link -->
<a href="mailto:name@email.com">Email</a>
<!-- internal page link -->
<a href="another_page.html">another page</a>
<!-- define internal anchor - using name attribute -->
<a name="anchor">Internal anchor</a>
<!-- define internal anchor - using ID attribute -->
<a id="anchor">Anchor</a>
<!-- internal anchor link -->
<a href="#anchor">Visit internal anchor</a>
<!-- internal anchor link on another page -->
<a href="/another_page.html#anchor">Visit internal anchor</a>
<!-- internal anchor link on a page on an external site -->
<a href="https://www.test.com/test.html#anchor">Visit internal anchor on external site</a>
```

- Demo - HTML - Internal Anchor

HTML Basics - <body> - part 3

linking - cont'd

- standard attributes supported by <a> element include
 - *class, id, lang, style, title...*
- optional attributes are available for <a> element including
 - *target, href, name...*
- target attribute specifies where the link will be opened relative to the current browser window
- possible attribute values include

```
<!-- open link in new window or tab -->
_blank
<!-- same frame -->
_self
<!-- open within parent frameset -->
_parent
<!-- open in the same window -->
_top
```

- Demo - HTML - Internal Anchors with Scroll

HTML Basics - <body> - part 4

images

- allows us to embed an image within a web page
- element requires a minimum src attribute

```
  

```

- other optional attributes include
 - *class, id, alt, title, width, height...*
- use images as links
- image maps

```
<map name="textmap">  
  <area shape="rect" coords="..." alt="Quote 1" href="notes1.html" />  
</map>
```

- Demo - Woolf Online

HTML Basics - <body> - part 5

tables

- organise data within a table starting with the <table> element
- three primary child elements include
 - *table row, table header, table data*
 - <tr>, <th>, <td>

```
<table>
  <caption>424 - basic test table</caption>
  <tr>
    <th>heading 1</th>
    <th>heading 2</th>
  </tr>
  <tr>
    <td>row 1, cell 1</td>
    <td>row 2, cell 2</td>
  </tr>
</table>
```

- also add a <caption>
- span multiple columns using the colspan attribute
- span multiple rows using the rowspan attribute
- Demo - Basic Structural Example

HTML Basics - <body> - part 6

lists

- unordered list , ordered list , definition list <dl>
- and contains list items

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

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

- definition list uses <dt> for the item, and <dd> for the definition

```
<dl>  
  <dt>Game 1</dt>  
  <dd>our definition</dd>  
</dl>
```

HTML & JS Example - add basic toggle to lists - HTML

```
<!doctype html>
<html lang="en">
  <head>
    <meta charset="utf-8">
    <title>DOM Manipulation - Node Toggle</title>
  </head>
  <body>
    <header>
      <h3>DOM manipulation - Node Toggle</h3>
    </header>
    <section id="quote">
      <p>
        <blockquote id="berryhead" data-visible="true">
          Shine through the gloom, and point me to the skies...
        </blockquote>
      </p>
    </section>
    <section id="content">
      <h4>Planets...</h4>
      <div id="list-output">
        <span id="toggle">toggle...</span>
        <ul id="planets" data-visible="true">
          <li>Mercury</li>
          <li>Venus</li>
          <li>Earth</li>
          <li>Mars</li>
          <li>Jupiter</li>
          <li>Saturn</li>
          <li>Uranus</li>
          <li>Neptune</li>
          <li>Pluto</li>
        </ul>
      </div>
    </section>
    <!-- load JS files - pre module design example -->
    <script type="module" src="./toggle.js"></script>
  </body>
</html>
```

HTML & JS Example - add basic toggle to lists - JS Option I

- various options for toggling visibility of DOM nodes
- option I relies on inefficient iterator of child nodes
- nodes may include elements, text, attributes...

```
// toggle switch
let toggle = document.getElementById('toggle');

// get node in DOM
let domNode = document.getElementById('planets');

toggle.addEventListener('click', () => {
  // get child nodes
  let nodeChildren = domNode.children;
  console.log(nodeChildren);
  if (domNode.getAttribute('data-visible') === 'true') {
    domNode.setAttribute('data-visible', 'false');
    // modify display property for each child
    for (let child of nodeChildren) {
      child.style.color = '#779eab';
      child.style.display = 'none';
    }
  } else {
    domNode.setAttribute('data-visible', 'true');
    // modify display property for each child
    for (let child of nodeChildren) {
      child.style.color = '#000';
      child.style.display = 'list-item';
    }
  }
});
```

- Demo - List Toggle Children

HTML & JS Example - add basic toggle to lists - JS Option 2

- option 2 uses more efficient DOM properties to access required nodes
- access element nodes & ignores text &c. nodes in DOM...

```
// toggle switch
let toggle = document.getElementById('toggle');

toggle.addEventListener('click', () => {
  // get sibling element to toggle...
  let siblingNode = toggle.nextElementSibling;

  // check child node element visibility
  if (siblingNode.getAttribute('data-visible') === 'true') {
    // update visibility
    siblingNode.setAttribute('data-visible', 'false');
    // hide sibling node
    siblingNode.style.display = 'none';
  } else {
    // update visibility
    siblingNode.setAttribute('data-visible', 'true');
    // show sibling node
    siblingNode.style.display = 'block';
  }
});
```

- Demo - List Toggle Sibling
- JS Info - DOM Nodes

HTML & JS Example - add basic toggle to lists - JS Option 3

- add some initial animation

```
...
function slideUp() {
  if (slideHeight < 1) {
    console.log('slide up - height less than 1...');
    return;
  }
  slideHeight -= 2;
  siblingNode.style.height = slideHeight + 'px';
  requestAnimationFrame(slideUp);
}

requestAnimationFrame(slideUp);
...
```

- Demo - Toggle vertical with animation
- Demo - Toggle horizontal with animation
- MDN - requestAnimationFrame

HTML Basics - <body> - part 7

forms

- used to capture data input by a user, which can then be processed by the server
- <form> element acts as the parent wrapper for a form
- <input> element for user input includes options using the *type* attribute
 - *text, password, radio, checkbox, submit*

```
<form>  
  Text field: <input type="text" name="textfield" />  
</form>
```

- process forms using
 - e.g. *JavaScript...*

HTML - better markup

- 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

- 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

- 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*

Semantic HTML - intro

- importance of web standards
 - *and their application to HTML markup and documents*
- standards help drive a consideration of markup, e.g. HTML
 - *usage for what they mean*
 - *not simply how they will look...*
- semantic instead of purely presentational perspective
 - *introduction of meaning and value to the document*
- when pages are processed
 - *impart structure and meaning beyond mere presentation*
- a core consideration for usage of markup languages
- issues persist with HTML element usage
 - *e.g. inline elements such as `` and `<i>`*

Semantic HTML - a reason to care

- Semantic HTML - opportunity to convey meaning with your markup
 - *meaning may be explicit due to the containing element*
 - *implicit due to a structured grouping of elements*
- markup makes it explicit to the browser
 - *underlying meaning of a page and its content*
- notion of meaning and clarity also conveyed to search engines
 - *fidelity with query and result...*
- semantic elements provide information beyond page rendering and design
- use semantic markup correctly
 - *create more specific references for styling*
 - *greater chance of rendering information correctly*

Semantic HTML - example usage

```
<!-- incorrect element chosen -->  
<div id="code">  
  document.addEventListener('click', function () {  
    console.log('Click received...');  
  });  
</div>
```

```
<!-- correct element chosen -->  
<code>  
  document.addEventListener('click', function () {  
    console.log('Click received...');  
  });  
</code>
```

- Demo - semantic example usage

Semantic HTML - correct usage

- need to ensure elements convey their correct meaning
 - *i.e. the meaning expected for the contained content*
- e.g. often see the following elements mis-used and applied incorrectly for markup,
 - `<p>` - paragraphs
 - `` - unordered list
 - `<h1>` to `<h6>` - headings
 - `<blockquote>` - *blockquote*
- using `<blockquote>` to simply help indent text
 - *instead of CSS margins...*
- or the perennial mis-use of a `<p>`
 - *simply add extra space between elements*

```
<p>&nbsp;<p>
```


HTML - structure & validation - example

Using lists correctly...

```
<li>nice</li>  
<li>cannes</li>  
<li>menton</li>
```

- list markup looks OK
 - *still fails validation for an obvious reason*
 - *missing structural grouping for list items*
 - *not valid markup...*
- semantics of the overall list are missing
- Demo - basic list items

HTML - a semantic point of view

```
<ul>
  <li>nice</li>
  <li>cannes</li>
  <li>menton</li>
</ul>
```

- from the perspective of semantics
 - *meant to act as a group of items that belong together*
- denote such groupings with correct semantic markup
- structuring items to clearly denote their meaning and purpose
- consider global attributes
 - https://developer.mozilla.org/en-US/docs/Web/HTML/Global_attributes
- Demo - basic group

HTML - benefits of structure & validation

- define and create a meaningful structure for required markup
 - *improves usage and flexibility as project develops*
 - *provides extensible structure for project*
- for example, benefits include
 - *helps increase ease of CSS styling*
 - *creates properly structured documents*
 - *improves general management of updates to markup*
 - ...
- easier to understand and easier to maintain and update
- structured, valid markup aids in repurposing data
 - *into various representations of information*

HTML - benefits of structure & validation - example I

e.g. a standard list

```
<ul>
  <li>nice</li>
  <li>cannes</li>
  <li>menton</li>
  <li>antibes</li>
  <li>grasse</li>
</ul>
```

- Demo - basic group style

HTML - benefits of structure & validation - example 2

e.g. lists for navigation, menus, tabs...

```
<ul id="menutabs">
  <li><a href="nice">nice</a></li>
  <li><a href="cannes">cannes</a></li>
  <li><a href="menton">menton</a></li>
  <li><a href="antibes">antibes</a></li>
  <li><a href="grasse">grasse</a></li>
</ul>
```

- Demo - basic menu tabs

HTML - markup for headings - part I

- HTML is flexible in markup usage
 - *due to presentational versus structural considerations*
- headings might be perceived as purely presentational, e.g.

```
<span class="heading">Chapter 1</span>
```

- issues with presentational markup, e.g.
 - *visual browsers with CSS will render as expected*
 - *no CSS, and browsers will render as normal text*
 - *non-visual browsers = normal text and no heading*
 - *accessibility issues...*
- search engines, ranking, spiders...
 - *will not process this markup as a heading*
 - *no semantic meaning...*
 - *recorded as normal text*
- CSS styles can be unique
 - *but restricted to class usage with heading*

HTML - markup for headings - part 2

- many different ways to markup content with HTML, e.g.

```
<p><b>Chapter 1</b></p>
```

- issues still exist with variant markup options, e.g.
 - *visual browsers will render text in bold & same size as default*
 - *unique styling is problematic...*
 - *search engines, ranking, spiders...*
 - will not process this markup as a heading
 - no semantic meaning...
 - recorded as normal text

HTML - markup for headings - part 3

- use markup correctly with structure and meaning, e.g.

```
<h3>Chapter 1</h3>
```

- benefits of this markup, e.g.
 - *conveys meaning to contained text*
 - *visual and non-visual browsers treat heading correctly*
 - regardless of any associated styles...
 - *easy to add unique styles with CSS*
 - *search engines &c. will interpret this markup correctly*
 - extract keywords, semantics, structure...

HTML - markup for tables

- great example of poor usage of HTML markup is `<table>` element
- main issue is use of nested tables and spacer elements, images...
- if used correctly in structured markup
 - *tables can be very useful structure*
 - *impart a sense of semantic organisation to data*
 - *creating various interpretive information*
- what is a table for?
 - *structuring data*
 - *data to impart curated information...*

HTML - markup for tables - example I

- simple table example - columns and rows for *presentation* purposes

```
<p>Travel Destinations</p>
<!-- basic table structure - minimal - rows and columns -->
<table>
  <tr>
    <td><b>Place</b></td>
    <td><b>Country</b></td>
    <td><b>Sights</b></td>
  </tr>
  <tr>
    <td>Nice</td>
    <td>France</td>
    <td>Cours Saleya</td>
  </tr>
  <tr>
    <td>Cannes</td>
    <td>France</td>
    <td>La Croisette</td>
  </tr>
  <tr>
    <td>Antibes</td>
    <td>France</td>
    <td>Picasso museum</td>
  </tr>
</table>
```

example

- Demo - basic table for presentation

HTML - markup for tables - example 2

- add semantic structure & elements to table caption - replace `<p>` with correct `<caption>` usage for a table...

```
<!-- basic table structure - minimal - add a caption -->
<table>
  <caption>Travel Destinations</caption>
  ...
```

- modern browsers style `<caption>` by default
 - *centred above the table*
- modify styling as required

example

- Demo - basic table caption

HTML - markup for tables - example 3

- add a summary attribute to the table

```
<!-- basic table structure - minimal - add summary attribute -->
<table summary="structured table data for travel destinations...">
  <caption>Travel Destinations</caption>
  ...

```

- add further meaning and structure to the table
 - *use of a summary attribute on the table element*
- processed by the browsers for semantics
- particularly useful for non-visual browsers

example

- Demo - basic table with summary

HTML - markup for tables - example 4

- add correct headers <th> to the table

```
<!-- basic table structure - minimal - add table headers -->
<table summary="structured table data for travel destinations...">
  <caption>Travel Destinations</caption>
  <tr>
    <th>Place</th>
    <th>Country</th>
    <th>Sights</th>
  </tr>
  ...

```

Benefits include:

- remove need for presentational markup, bold elements
- visual browsers process structural and presentation qualities of headings
- such heading elements can also be useful for non-visual browsers

example

- Demo - basic table with headers

HTML - markup for tables - example 5

- table markup and accessibility markup...

```
<!-- basic table structure - accessibility - add ids and headers -->
<table summary="structured table data for travel destinations...">
  <caption>Travel Destinations</caption>
  <tr>
    <th id="place">Place</th>
    <th id="country">Country</th>
    <th id="sights">Sights</th>
  </tr>
  <tr>
    <td headers="place">Nice</td>
    <td headers="country">France</td>
    <td headers="sights">Cours Saleya</td>
  </tr>
  ...

```

- creating a known relationship between the table's header, and its data
- a screen reader, for example, may read this table as follows,
 - *Place: Nice, Country: France, Sights: Cours Saleya*
- established a pattern to the output information for non-visual devices...

example

- Demo - basic table with accessibility

HTML - markup for tables - example 6

- add extra semantic markup for thead, tfoot, tbody...

```
<!-- basic table structure - add head, foot, body -->
<table summary="structured table data for travel destinations...">
  <caption>Travel Destinations</caption>
  <thead>
    <tr>
      ...
    </tr>
  </thead>
  <tfoot>
    <tr>
      ...
    </tr>
  </tfoot>
  <tbody>
    <tr>
      ...
    </tr>
  </tbody>
</table>
```

- head and foot elements customarily go above the table body
 - allows modern browsers, readers, &c. to load that data first
 - then render the main table content

Benefits include:

- better underlying structure to data
- greater ease for styling a table due to clear divisions in data and information
- structural and presentational markup now working together correctly...

example

- Demo - basic table with head, foot, body

HTML - presentational vs structural

- consider *presentational* vs *structural*
 - e.g. *usage of quotations in markup*
 - *similar consideration to headings...*
- need to convey meaning and structure
- rather than a mere presentational instruction
- consider HTML's phrase elements
 - e.g. `<cite>`, `<code>`, `<abbr>`
- each phrase element imparts a sense of underlying meaning
 - *structure & then presentation...*

HTML - minimising markup

- noticeable benefit to creating sites with valid markup
 - *separation of structural from presentational*
 - *general reduction in required markup*
- simply conforming to the W3C's specifications
 - *does not inherently guarantee less code for your project*
 - *possible to include many unnecessary elements & retain valid markup*
 - *markup may still be valid*
- project issues may include:
 - *lack of efficiency*
 - *extraneous markup and code*
- to help minimise markup
 - *consider classes added to markup*
 - *are there too many? are they all necessary? &c.*
 - *avoid class usage for unique reference*
 - *avoid <div> usage for explicit block-level elements*

Demos

- Basic group
- Basic group style
- Basic list items
- Basic menu tabs
- Basic table caption
- Basic table for presentation
- Basic table with accessibility
- Basic table with head, foot, body
- Basic table with headers
- Basic table with summary
- DOM Basics - Sample
- HTML - Internal Anchor
- HTML - Internal Anchors with Scroll
- List Toggle Children
- List Toggle Sibling
- Semantic example usage
- Toggle horizontal with animation
- Toggle vertical with animation

Resources

- [JS Info - DOM Nodes](#)
- [MDN - Global Attributes](#)
- [MDN - HTML developer guide](#)
- [MDN - requestAnimationFrame](#)