

HTML

Objectives

- Describe hypertext and HTML standards
- Understand HTML elements and markup tags
- Create the basic structure of an HTML file
- Insert an HTML comment
- Work with block-level elements
- Create lists, tables, hyperlinks and insert images
- Learn HTML5 tags
- Work with forms and inputs

Outline

1. Basic HTML

- hypertext
- tags & elements
- text formatting
- lists, hyperlinks, images
- tables, frames

2. HTML5

Hypertext & HTML

- HyperText Markup Language (HTML) is the language for specifying the *static* content of Web pages (based on SGML, the Standard Generalized Markup Language)
 - *hypertext* refers to the fact that Web pages are more than just text
 - can contain multimedia, provide links for jumping within the same document & to other documents
 - *markup* refers to the fact that it works by augmenting text with special symbols (tags) that identify the document structure and content type

Hypertext & HTML (cont.)

- HTML 1 (Berners-Lee, 1989): very basic, limited integration of multimedia in 1993, Mosaic added many new features (e.g., integrated images)
- HTML 2.0 (IETF, 1995): tried to standardize these & other features, but late in 1994-96, Netscape & IE added many new, divergent features
- HTML 3.2 (W3C, 1997): attempted to unify into a single standard but didn't address newer technologies like Java applets & streaming video
- HTML 4.0 (W3C, 1997): attempted to map out future directions for HTML, not just react to vendors
- HTML 5 (W3C, 2014): adds new tags and attributes

Tags and Elements

- HTML specifies a set of *tags* that identify structure of the document and the content type
 - tags are enclosed in `< >`
 - `` specifies an image
 - most tags come in pairs, marking a beginning and ending
 - `<title>` and `</title>` enclose the title of a page
- An HTML *element* is an object enclosed by a pair (in most cases) of tags
 - `<title>My Home Page</title>` is a TITLE element
 - `This text appears bold.` is a BOLD element
 - `<p>Part of this text is bold. </p>` is a PARAGRAPH element that contains a BOLD element

An HTML document is a collection of elements (text/media with context).

Structural Elements

- an HTML document has two main structural elements
 - HEAD contains setup information for the browser & the Web page
 - BODY contains the actual content to be displayed in the Web page

```
<html>
  <!-- First file---->
  <head>
    <title>My first HTML document</title>
  </head>
  <body>
    <p> Hello world! </p>
  </body>
</html>
```

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HTML documents : `<html>` and `</html>` tags

Comments: `<!--` and `-->`

HEAD section: `<head>` and `</head>` tags

BODY section: `<body>` and `</body>`

<head> and <body> elements

- <head> element
 - Title
 - Cascading Style sheet information
 - “Meta” data, such as who authored the page, keywords
 - JavaScript code
- The <body> element
 - Paragraphs
 - Tables and lists
 - Images
 - JavaScript code
 - PHP code

Text Layout

```
<html>
<!-- CS443 page02.html 17.09.14 -->
<head>
  <title>Text Layout</title>
</head>

<body>
  <p>
    This is a paragraph of text<br/>
    made up of two lines.
  </p>

  <p>
    This is another paragraph with a
    &nbsp; GAP &nbsp; between
    some of the words.
  </p>

  <p>
    &nbsp;&nbsp; This paragraph is<br/>
    indented on the first line<br/>
    but not on subsequent lines.
  </p>
</body>

</html>
```

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- For the most part, layout of the text is left to the browser
 - whitespace is interpreted as a single space
 - browser automatically wraps the text to fit the window size
- Can override some text layout
 - can specify a new paragraph (starts on a new line, preceded by a blank line) using `<p>...</p>`
 - can cause a line break using the `
`
 - can force a space character using ` `

Separating Blocks of Text

```
<html>
<!-- CS443 page03.html 15/08/06 -->
<head>
  <title>Blocks of Text</title>
</head>

<body>
  <h1>Major heading 1</h1>
  <p>
    Here is some text.
  </p>

  <h2>Subheading</h2>
  <p>
    Here is some subtext.
  </p>

  <hr/>

  <h1>Major heading 2</h1>
  <p>
    Here is some more text.
  </p>
</body>
</html>
```

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- Can specify headings for paragraphs or blocks of text
 - `<h1>...</h1>` tags produce a large, bold heading
 - `<h2>...</h2>` tags produce a slightly smaller heading
 - ...
 - `<h6>...</h6>` tags produce a tiny heading
- Can insert a horizontal rule
 - `<hr/>` draws line across window

The Basic Web page – A Worked Example

```
<html>
<!-- CS443  page22.html  17.10.14  -->
  <head>
    <title> Bill Smiggins Inc. </title>
  </head>
  <body>
    <h1>Bill Smiggins Inc.</h1>
    <h2>About our Company...</h2>
    <p>This Web site provides clients, customers,
      interested parties and our staff with all of
      the information that they could want on
      our products, services, success and failures.
    </p>
    <hr/>
    <h3> Products </h3>
    <p> We are probably the largest
      supplier of custom widgets, thingummybobs, and bits
      and pieces in North America. </p>
    <hr/>
  </body>
</html>
```

Text Appearance

```
<html>
  <!-- CS443 page25.html 15.08.06 -->
  <head>
    <title>Text Variations and Escape
Sequences</title>
  </head>
  <body>
    <h1>Text Variations</h1>
    <p>We can use <b>simple</b> tags to
      <i>change</i> the appearance of
      <strong>text</strong> within
      <tt>Web pages</tt>.
      Even super<sup>script</sup>
      and sub<sub>scripts</sub> are
      <em>supported</em>.</p>

    <h1>Text Escape Sequences</h1>
    <p>
      &amp; &lt; &gt; &quot; &copy;
    </p>
    <h1>Preformatted text</h1>
      <pre>
        University of Liverpool
        Department of Computer Science
        Ashton Building, Ashton Street
        Liverpool, L69 3BX, UK
      </pre>
    </body>
  </html>
```

- can specify styles for fonts
 - **... ** specify bold
 - *<i>... </i>* specify italics
 - **<big>... </big>** increase the size
 - **<small>... </small>** decrease the size
 - **...** put emphasis
 - **...** put more emphasis
 - **_{...}** specify a subscript
 - **^{...}** a superscript

Lists

```
<html>
<!-- CS443page07.html 23.09.08 -->
<head> <title>(Sort of) Simple Lists</title>
  <style type="text/css">
    .my_li:before { content: counter(list) ": ";
                  counter-increment: list; }
  </style> </head>
<body>

<ul style="list-style-type: square;">
  <li> ... first list item... </li>
  <li> ... second list item... </li>
</ul>
<dl>
  <dt> Dweeb </dt>
  <dd> young excitable person who may
    mature into a <em>Nerd</em> </dd>
  <dt> Hacker </dt>
  <dd> a clever programmer </dd>
  <dt> Nerd </dt> <dd> technically bright but
    socially inept person </dd>
</dl>
<ol style="list-style-type: none;
  counter-reset: list 29;" >
  <li class="my_li">Makes first item number 30.</li>
  <li class="my_li">Next item continues to number
31.</li>
</ol>

</body>
</html>
```

- There are 3 different types of list elements
 - `...` specifies an ordered list
 - `` identifies each list item
 - `...` specifies unordered list (using a bullet for each)
 - `` identifies each list item
 - `<dl>...</dl>` specifies a definition list
 - `<dt>` identifies each term
 - `<dd>` identifies its definition

Hyperlinks

```
<html>
<!-- CS443page08.html 17.10.14 -->

<head>
  <title>Hyperlinks</title>
</head>

<body>
  <p>
    <a href="http://www.liv.ac.uk">
      The University of Liverpool</a>
    <br/>
    <a href="page07.html"
      target="_blank">
      Open page07 in a new window</a>
  </p>
</body>

</html>
```

view page

- Perhaps the most important HTML element is the hyperlink, or ANCHOR
 - `...`
 - where URL is the Web address of the page
 - if the page is accessed over the Web, must start with http://
 - if not there, the browser will assume it is the name of a local file
 - `...`
 - causes the page to be loaded in a new Window

Hyperlinks (cont.)

```
<html>
<!-- CS443 page09.html 21.09.12 -->

<head>
  <title>Internal Links in a Page</title>
</head>

<body>
  <p>
    [ <a href="#HTML">HTML</a> |
      <a href="#HTTP">HTTP</a> |
      <a href="#IP">IP</a> |
      <a href="#TCP">TCP</a> ]
  </p>
  <p>
    Computer acronyms:
    <dl>
      <dt id="HTML">HTML</dt>
      <dd>HyperText Markup Language
      <dt id="HTTP">HTTP</dt>
      <dd>HyperText Transfer Protocol...</dd>
      <dt id="IP">IP</dt>
      <dd>Internet Protocol...</dd>
      <dt id="TCP">TCP</dt>
      <dd>Transfer Control Protocol...</dd>
    </dl>
  </p>
</body>
</html>
```

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- for long documents, you can even have links to other locations in that same document
- `<xxxx id="ident">...</xxxx>`
 - `ident` is a variable for identifying this location
 - "xxxx" can be any HTML element
- `...`
 - will then jump to that location within the file
- `...`
 - can jump into the middle of another file just as easily

Images

```

```

```
<html>  
<!-- CS443 page10.html 18.09.13 -->  
<head>  
  <title>Image example</title>  
</head>  
<body>  
  
  
<p>The Anglican Cathedral of Liverpool</p> </body>  
</html>
```

view page

Images (cont.)

- **src** - specifies the file name (and can include a URL)
- **width** and/or **height** - dimensions in pixel
- **title** - displayed when the mouse is “hovered” over the picture
- **alt** - text that is displayed when the image is missing, can't be loaded

Tables

```
<html>
<!-- CS443 page11.html 17.10.14 -->
<head>
  <title>Tables</title>
</head>
<body>
<h2>A Simple Table</h2>
  <table>
    <tr>
      <td> Left Column </td>
      <td> Right Column </td>
    </tr>
    <tr>
      <td> Some data </td>
      <td> Some other data </td>
    </tr>
  </table>
</body>
</html>
```

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`<table>...</table>` specify a table element

`<tr>...</tr>` specify a row in the table

`<td>...</td>` specify table data (i.e., each column entry in the table)

Layout in a Table

```
<html>
<!-- CS443 page12.html 17.10.14 -->

<head>
  <title>Table Layout</title>
</head>

<body>
  <table style="border: 1px solid;">
    <tr style="text-align: center;">
      <td style="border: 1px solid;">
        Left<br/>Column</td>
      <td style="border: 1px solid;
        vertical-align: top;">
        Right Column</td>
    </tr>
    <tr>
      <td style="border: 1px solid;">
        Some data</td>
      <td style="border: 1px solid;">
        Some data</td>
    </tr>
  </table>
</body>
</html>
```

view page

- Border on tables using the “style” attribute

```
<table style= "border: 1px
solid;">
```

- Horizontal & vertical layout within cells

```
<td style= "text-align:center">
<td style= "vertical-align:
bottom">
```

- Layout to an entire row

```
<tr style="text-align: center">
<tr style="vertical-align: top">
```

Table Width

```
<html>
<!-- CS443 page13.html 17.10.14 -->
<head>
  <title>Table Width</title>
</head>

<body>
<table style="width: 100%;">
  <tr>
    <td>left-most </td>
    <td style="text-align: right;">
      right-most</td>
  </tr>
</table>
</body>
</html>
```

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- by default, the table is sized to fit the data
- can override & specify the width of a table relative to the page

For example

```
<table style="width: 60%">
```

Other Table Attributes

```
<html>
<!-- CS443 page14.html 17.10.14 -->
<head>
  <title>Table Formatting</title>

  <style type="text/css" media="screen">
    table { border: 1px solid; padding: 1px;}
    th, td { border: 1px solid; padding: 10px;
             text-align: center; }
  </style>
</head>

<body>
  <table>
    <tr>
      <th>HEAD1</th> <th>HEAD2</th>
    <th>HEAD3</th>
    </tr>
    <tr>
      <td>one</td> <td>two</td> <td>three</td>
    </tr>
    <tr>
      <td rowspan="2"> four </td>
      <td colspan="2"> five </td>
    </tr>
    <tr>
      <td> six </td> <td> seven </td>
    </tr>
  </table>
</body>
</html>
```

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- Can control the space between cells & margins within cells using “padding” attribute

- Can add headings

`<th>` is similar to `<td>` but displays heading centered in bold

- Can have data that spans more than one column

`<td colspan="2">`

- Can span more than one row

`<td rowspan="2">`

Content vs. Presentation

- Most HTML tags define content type, independent of presentation.
 - exceptions? (e.g. `` `` for bold text and `<i>` `</i>` for italicized text)
- Style sheets associate presentation formats with HTML elements.
 - CSS1: developed in 1996
 - CSS2: released in 1998
 - CSS3: introduced in 1999, latest version (as of 2022)
- The trend has been towards an increasing separation of the content of webpages from the presentation of them.
- Style sheets allow us to maintain this separation, which allows for easier maintenance of webpages, and for a consistent look across a collection of webpages.

Content vs. Presentation (cont.)

- Style sheets can be used to specify how tables should be rendered, how lists should be presented, what colors should be used on the webpage, what fonts should be used and how big/small they are, etc.
- HTML style sheets are known as *Cascading Style Sheets*, since can be defined at three different levels
 - 1.*inline* style sheets apply to the content of a single HTML element
 - 2.*document* style sheets apply to the whole BODY of a document
 - 3.*external* style sheets can be linked and applied to numerous documents, might also specify how things should be presented on screen or in print lower-level style sheets can override higher-level style sheets
- User-defined style sheets can also be used to override the specifications of the webpage designer. These might be used, say, to make text larger (e.g. for visually-impaired users).

Inline Style Sheets

```
<html>
<!-- CS443 page17.html 17.10.14 -->

<head>
  <title>Inline Style Sheets</title>
</head>

<body>
  <p style="font-family:Arial,sans-
    serif;
           text-align:right">This is a
    right-justified paragraph in a sans
    serif
    font (preferably Arial), with some
    <span style="color:green">green
    text</span>.
  </p>

  <p>And <a style="color:red;
                text-decoration:none;
                font-size:larger;"
            href="page01.html">here</a>
    is a formatted link.
  </p>
</body>
</html>
```

view page

- Using the `style` attribute, you can specify presentation style for a single HTML element
- within tag, list sequence of **property:value** pairs separated by semi-colons

font-family:Courier,monospace

font-style:italic

font-weight:bold

font-size:12pt font-size:large font-size:larger

color:red color:#000080

background-color:white

text-decoration:underline

text-decoration:none

text-align:left text-align:center

text-align:right text-align:justify

vertical-align:top vertical-align:middle

vertical-align:bottom

text-indent:5em text-indent:0.2in

Inline Style Sheets (cont.)

```
<html>
<!-- CS443 page18.html 17.09.09 -->

<head>
  <title>Inline Style Sheets</title>
</head>

<body>
  <p>Here is an image
    
    embedded in text.
  </p>

  <ol style="list-style-type:upper-alpha">
    <li> one thing</li>
    <li> or another</li>
    <ul style="list-style-type:square;
              whitespace:pre">
      <li> with this</li>
      <li> or that</li>
    </ul>
  </ol>
</body>
</html>
```

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•more style properties & values

margin-left:0.1in margin-right:5%
margin:3em
padding-top:0.1in padding-bottom:5%
padding:3em

border-width:thin border-width:thick
border-width:5
border-color:red
border-style:dashed border-style:dotted
border-style:double border-style:none

whitespace:pre

list-style-type:square
list-style-type:decimal
list-style-type:lower-alpha
list-style-type:upper-roman

Inline Style Sheets (cont.)

```
<html>
<!-- CS443 page19.html 17.10.14 -->

<head>
  <title> Inline Style Sheets </title>
</head>

<body>
  <table style="font-family:Arial,sans-serif">
    <caption style="color:red;
                  font-style:italic;
                  text-decoration:underline">
      Student data. </caption>
    <tr style="background-color:red">
      <th> name </th> <th> age </th>
    </tr>
    <tr>
      <td> Chris Smith </td> <td> 19 </td>
    </tr>
    <tr>
      <td> Pat Jones </td> <td> 20 </td>
    </tr>
    <tr>
      <td> Doogie Howser </td> <td> 9 </td>
    </tr>
  </table>
</body>
</html>
```

view page

- style sheets can be applied to tables for interesting effects

Document Style Sheets

- Inline style sheets apply to individual elements in the page.
 - using inline style directives can lead to inconsistencies, as similar elements are formatted differently
 - e.g., we might like for all `<h1>` elements to be centered
 - inline definitions mix content & presentation
 - ➔violates the general philosophy of HTML
- As a general rule, inline style sheet directives should be used as sparingly as possible
- Alternatively, document style sheets allow for a cleaner separation of content and presentation.
 - style definitions are placed in the `<head>` of the page (within `STYLE` tags)
 - can apply to all elements, or a subclass of elements, throughout the page

Document Style Sheets

```
<html>
<!-- CS443 page20.html 17.10.14 -->

<head>
  <title>Document Style Sheets</title>
  <style type="text/css">
    h1 {color:blue;
        text-align:center}
    p.indented {text-indent:0.2in}
  </style>
</head>

<body>
  <h1> Centered Title </h1>

  <p class="indented">This paragraph
will have the first line indented, but
subsequent lines will be flush. </p>

  <p>This paragraph will not be
indented.
  </p>

  <h1> The End </h1>

</body>
</html>
```

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- document style sheets ensure that similar elements are formatted similarly
- can even define subclasses of elements and specify formatting
 - `p.indented` defines subclass of paragraphs
 - inherits all defaults of `<p>`
 - adds new features
 - to specify this newly defined class, place `class="ID"` attribute in tag
- note how "clean" the `<body>` element is

Document Style Sheets (cont.)

```
<html>
<!-- CS443 page21.html 17.10.14 -->

<head>
  <title> Inline Style Sheets </title>
  <style type="text/css">
    table {font-family:Arial,sans-serif}
    caption {color:red;
              font-style:italic;
              text-decoration:underline}
    th {background-color:red}
  </style>
</head>

<body>
  <table>
    <caption> Student data. </caption>
    <tr><th> name </th>      <th> age</th></tr>
    <tr><td> Chris Smith </td> <td> 19 </td></tr>
    <tr><td> Pat Jones </td>   <td> 20 </td></tr>
    <tr><td> Doogie Howser </td> <td> 9 </td></tr>
  </table>
</body>
</html>
```

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- document style sheets are especially useful in formatting tables
- effectively separates content from presentation
 - what if you wanted to right-justify the column of numbers?
 - what if you changed your mind?

Pseudo-Elements

```
<html>
<!-- CS443 page23.html 17.10.14 -->

<head>
  <title>Title for Page</title>
  <style type="text/css">
    a {color : red;
      text-decoration : none;
      font-size : larger}
    a:visited {color : black}
    a:active {color : orange}
    a:hover {color : blue}
    p:first-letter {font-size : large;
      color : white;
      background-color : darkblue}

  </style>
</head>

<body>
  <p> Welcome to my Web page.  I am so
  happy you are here.
  </p>
  <p> Be sure to visit
  <a href="http://www.cnn.com">CNN</a>
  for late-breaking news.
  </p>
</body>
</html>
```

view page

- pseudo-elements are used to address sub-parts of elements
- can specify appearance of link in various states
:visited :active :hover
- can specify format of first line in page or paragraph
:first-line
- can specify format of first letter in page or paragraph
:first-letter
- Danger* : changing the look of familiar elements is confusing

External Style Sheets

- modularity is key to the development and reuse of software
 - design/implement/test useful routines and classes
 - package and make available for reuse
 - saves in development cost & time
 - central libraries make it possible to make a single change and propagate the changes
- external style sheets place the style definitions in separate files
 - multiple pages can link to the same style sheet, consistent look across a site
 - possible to make a single change and propagate automatically
 - represents the ultimate in content/representation separation

Modularity & Style Sheets

```
<html>
<!-- CS443 page26.html 17.10.14 -->

<head>
  <title>Title for Page</title>
  <link rel="stylesheet"
        type="text/css"
        href="myStyle.css"
        title="myStyle" />
</head>

<body>
  <h1>Centered Title</h1>

  <p class="indented">This paragraph
will have the first line indented, but
subsequent lines will be flush.</p>

  <p>This paragraph will not be
indented.
</p>

  <h1>The End</h1>

</body>
</html>
```

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```
/* myStyle.css  CS443 02.09.05 */

h1 {color : blue; text-align : center}
p.indented {text-indent:0.2in}
```

- Ideally, the developer(s) of a Web site would place all formatting options in an external style sheet.
- All Web pages link to that same style sheet for a uniform look.
- simplifies Web pages since only need to specify structure/content tags
- Note: no <style> tags are used in the external style sheet

<div> and Tags

- Problem: font properties apply to whole elements, which are often too large
 - Solution: a new tag to define an element in the content of a larger element - ****
 - is an inline element used to mark up a part of text

```
<p> Now is the <span> best time </span> ever! </p>
```

- Use to apply a document style sheet definition to its content

```
<style type = "text/css">  
  .bigred {font-size: 24pt;  
    font-family: Ariel; color: red}  
</style>  
... ..  
<p> Now is the <span class="bigred">  
    best time </span> ever!  
</p>
```

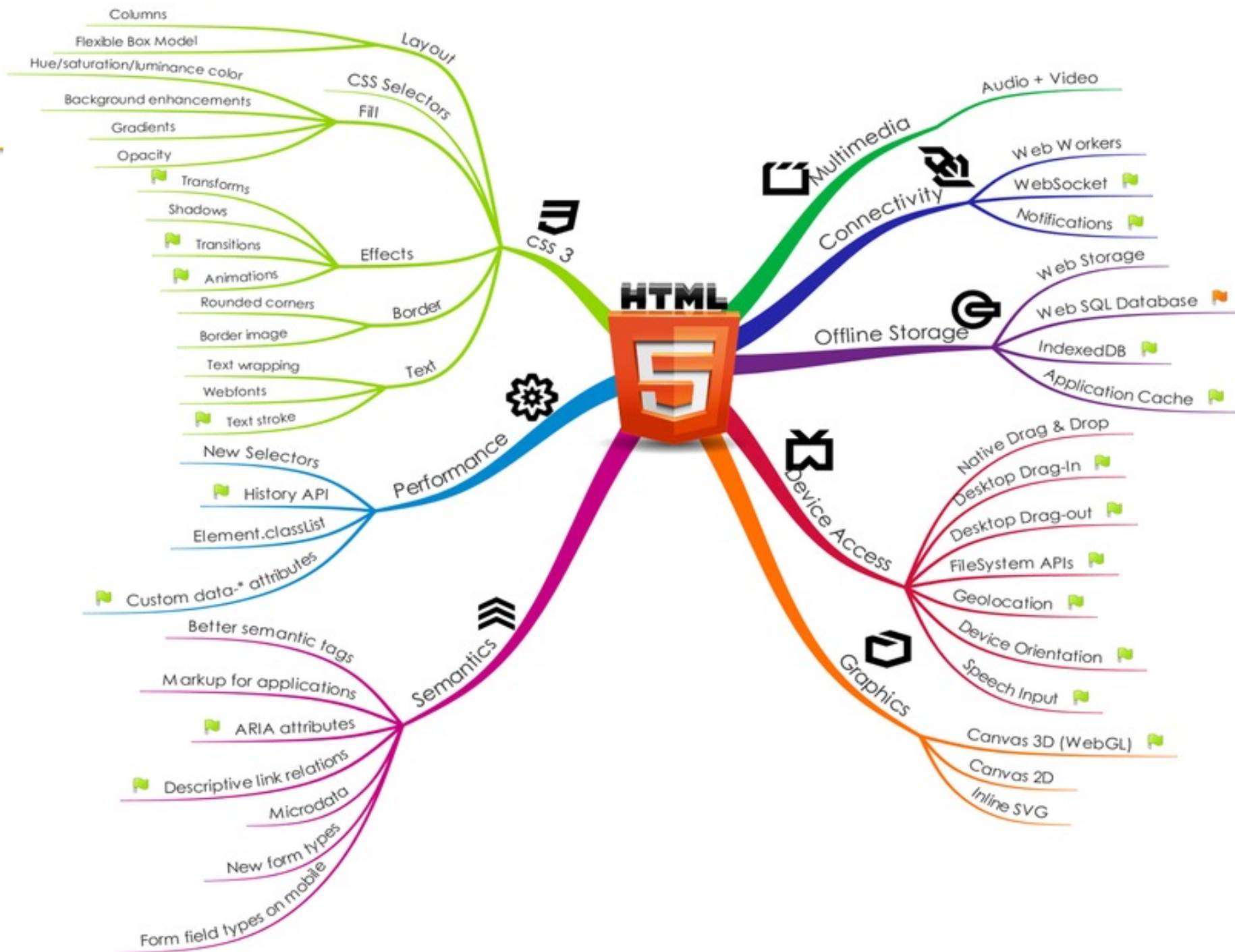
view page

- The tag is similar to other HTML tags, they can be nested and they have id and class attributes

Outline

1. Basic HTML

2. HTML5

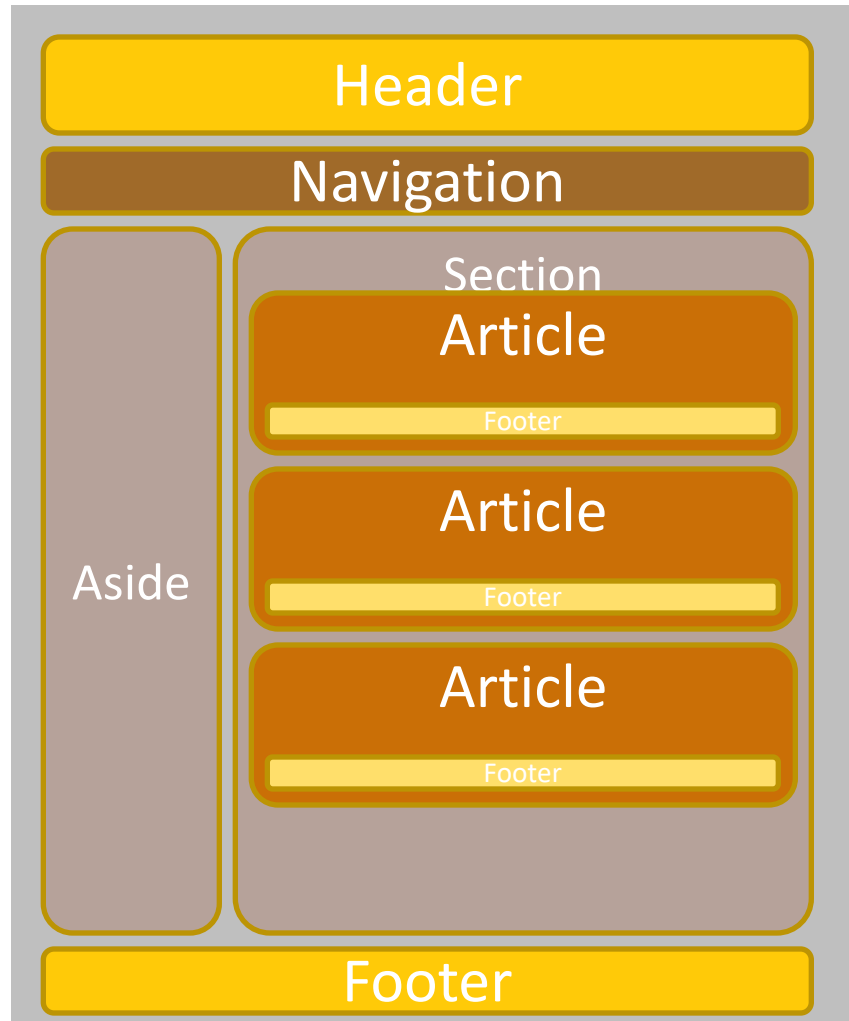


HTML5 New Tags

```
<!DOCTYPE html>
<html>
  <head>
    <meta charset="utf-8">
    <title>...</title>
  </head>
  <body>
    <header>...</header>
    <nav>...</nav>
    <article>
      <section>...</section>
    </article>
    <aside>...</aside>
    <figure>...</figure>
    <footer>...</footer>
  </body>
</html>
```

- HTML 5 specify DOCTYPE as follows: `<!DOCTYPE html>`
- specify Character Encoding as follows: `<meta charset="UTF-8">`
- New tags introduced in HTML5 for better structure
 - **header** – This tag represents the header of a section.
 - **footer** – This tag represents a footer for a section and can contain information about the author, copyright information, etc.
 - **nav** – This tag represents a section of the document intended for navigation.
 - **dialog** – This tag can be used to mark up a conversation.
 - **figure** – This tag can be used to associate a caption together with some embedded content, such as a graphic or video.

HTML5 New Tags



- **section** – This tag represents a generic document or application section. It can be used together with h1-h6 to indicate the document structure.
- **article** – This tag represents an independent piece of content of a document, such as a blog entry or newspaper article.
- **aside** – This tag represents a piece of content that is only slightly related to the rest of the page.

HTML5 New Tags

- HTML5 offers new elements for media content:

Tag	Description
<audio>	Defines sound content
<video>	Defines a video or movie
<source>	Defines multiple media resources for <video> and <audio>
<embed>	Defines a container for an external application or interactive content (a plug-in)
<track>	Defines text tracks for <video> and <audio>

```
<audio controls="true">
  <source src="audiodemo.ogg" />
  <source src=" audiodemo.mp3" />
  <source src=" audiodemo.wav" />
  Not supported.
</audio>
```



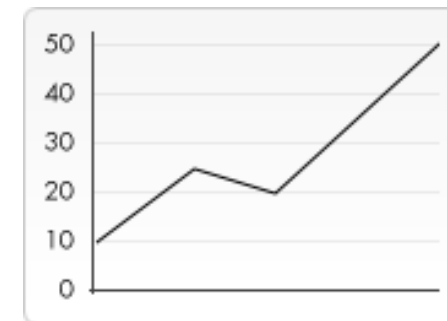
```
<video src="video.ogv" controls poster="poster.jpg" width="320"
height="240"> <a href="video.ogv">Download movie</a>
</video>
```

HTML5 New Tags

- <canvas> element:

Tag	Description
<canvas>	Used to draw graphics, on the fly, via scripting (usually JavaScript)

```
function draw() {  
    var ctx =  
    document.getElementById('canvas').getContext('2d');  
    var img = new Image();  
    img.onload = function(){  
        ctx.drawImage(img,0,0);  
        ctx.beginPath();  
        ctx.moveTo(30,96);  
        ctx.lineTo(70,66);  
        ctx.lineTo(103,76);  
        ctx.lineTo(170,15);  
        ctx.stroke();  
    }  
    img.src = 'images/backdrop.png';  
}
```



HTML5 New Tags

- New input elements:

button

checkbox

color

date

datetime

datetime-local

email

file

hidden

image

month

number

password

radio

range

reset

search

submit

tel

text

time

url

week

- Form

Number:

Range:

Month:

DateTime:

UTC

DateTime-Local:

Date:

Submit

Week	Mon	Tue	Wed	Thu	Fri	Sat	Sun
17	26	27	28	29	30	1	2
18	3	4	5	6	7	8	9
19	10	11	12	13	14	15	16
20	17	18	19	20	21	22	23
21	24	25	26	27	28	29	30
22	31	1	2	3	4	5	6

Today None