COMP4021
Internet Computing

HTML

David Rossiter & Gibson Lam

HTML

- HTML (**H**yper**t**ext **M**arkup **L**anguage) is the main language for creating web page content
- This presentation gives you a brief overview of HTML

- HTML and many other web languages are made by the World Wide Web Consortium (W3C)

W3C

WEB AND INDUSTRY

Automotive

Entertainment (TV and Broadcasting)

Publishing

Web Payments

Web of Data

Web and Telecommunications

Web of Things

WEB FOR ALL

Accessibility

Internationalization

Web Security

Privacy

W3C WORK GROUPS

Code of Ethics and Professional Conduct

W3C Groups

Participant guidebook

Current W3C Community Groups

Proposed W3C Community Groups

DEV RESOURCES
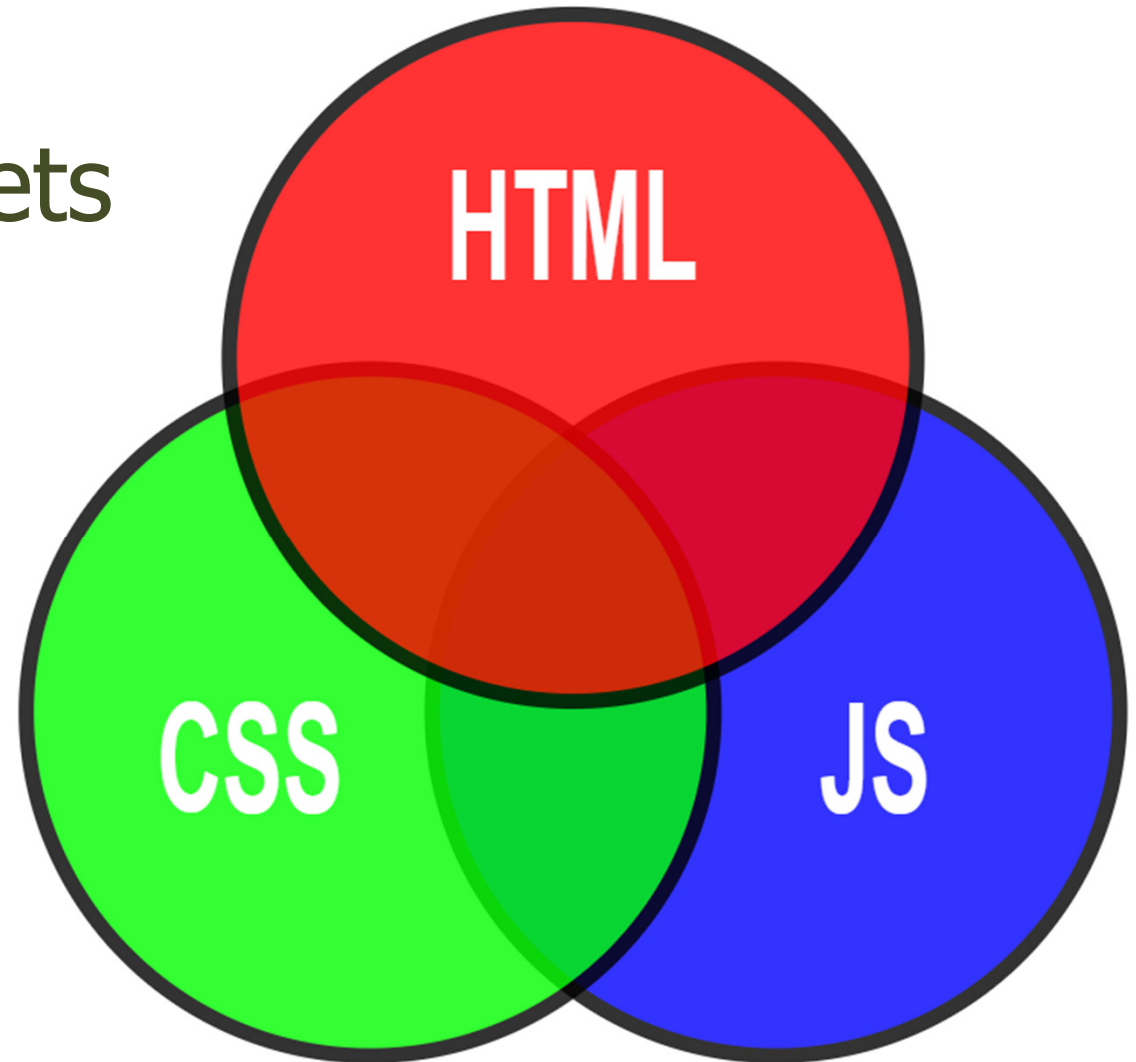
W3C DEVELOPERS

Validators

W3C cheatsheet

More Open Source Software

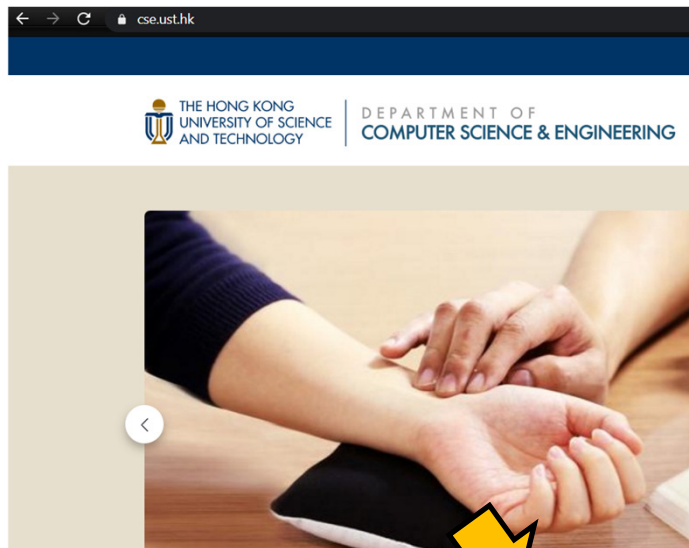Web Platform Tests

W3Cx (Training)

This shows some of the things which are discussed and have standards made about them at https://www.w3.org/

The 3 Main Skillsets

- HTML works together with style sheets (CSS) and JavaScript (JS)

- We will discuss CSS and JS in other presentations

Looking at Web Site HTML


```
1   <!DOCTYPE html>
2   <html lang="en">
3   <head>
4
5   <!-- Global site tag (gtag.js) - Google Analytics -->
6   <script async src="https://www.googletagmanager.com/gtag/js?id=UA-2771148-1"></script>
7   <script>
8     window.dataLayer = window.dataLayer || [];
9     function gtag(){dataLayer.push(arguments);}
10    gtag('js', new Date());
11
12    gtag('config', 'UA-2771148-1');
13  </script>
14  <!-- Google Analytics Ends -->
15
16      <meta charset="utf-8">
17      <meta content="IE=edge" http-equiv="X-UA-Compatible">
18      <meta name="viewport" content="width=device-width, initial-scale=1, shrink-to-fit=no">
19      <link rel="canonical" href="https://www.cse.ust.hk/">
20      <title>Department of Computer Science and Engineering - HKUST</title>
21
22      <link rel="icon" type="image/png" href="/favicon.png">
23      <link rel="stylesheet" href="https://fonts.googleapis.com/css?family=Muli:400,600,700">
24      <link rel="stylesheet" href="/css/app.css?=t1545143016">
25
26      <!-- HTML5 shim and Respond.js for IE8 support of HTML5 elements and media queries -->
27      <!--[if lt IE 9]>
28          <script src="https://oss.maxcdn.com/html5shiv/3.7.3/html5shiv.min.js"></script>
29          <script src="https://oss.maxcdn.com/respond/1.4.2/respond.min.js"></script>
30      <![endif]-->
31
32      <script src="/scripts/jquery/jquery-1.12.4.min.js"></script>
33      <!--script src="/scripts/jquery/jquery-ui-1.12.1/jquery-ui.min.js"></script-->
34      <script src="/scripts/script.js"></script>
35      <script src="/scripts/onload.js"></script>
36
37      <link rel="stylesheet" media="all" href="/styles/uni-form.css">
38      <link rel="stylesheet" media="all" href="/styles/fallback.css?=t1580885804">
39
40  </head>
    ody style="background-color:#E7DFCD">
```
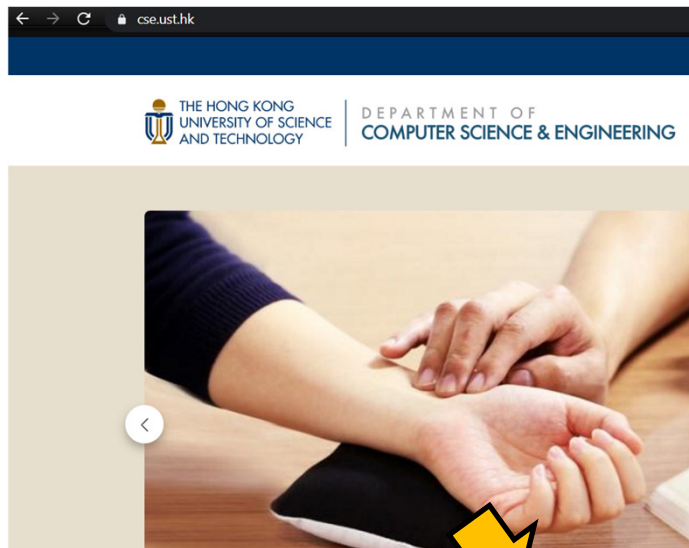
- *Right click* > View page source   Ctrl+u/ ⌘ + Option + u

Looking at Web Site HTML

- Click on the arrows to expand parts of the HTML

```
Elements    Console    Sources    Network

<!doctype html>
<html lang="en">
▶ <head>…</head>
▼ <body style="background-color:#E7DFCD">  ==  $0
    ▶ <main role="main">…</main>
      <script src="/js/vendor.js"></script>
      <script src="/js/app.js?=t1545052869"></script>
      <script>
      $(function() {
        $('[data-toggle="tooltip"]').tooltip()
      })
      </script>
  </body>
</html>
```
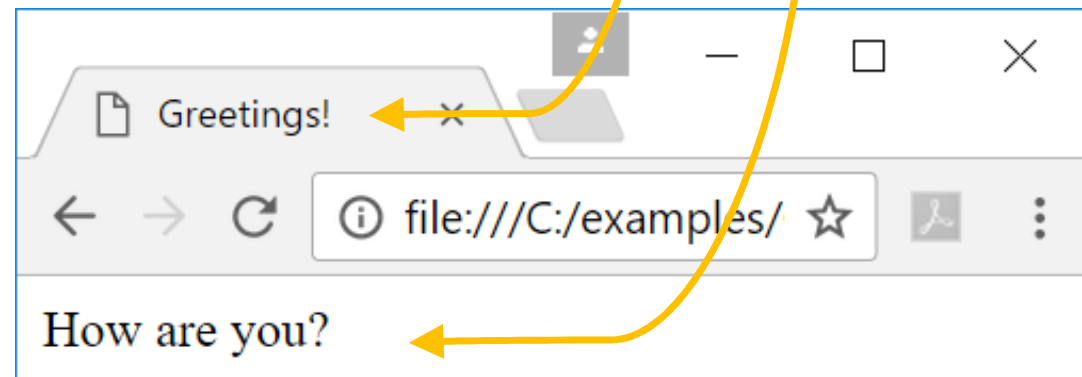
- *Right click* > Inspect

Ctrl+Shift+i/
⌘ + Shift + c

Basic Web Page Structure

- An HTML document has a `head` section and a `body` section

- Various things can go in the head section, such as the title

- The things you are actually see in the web page when it is shown in a browser goes in the body section

```
<!DOCTYPE html>
<html>
<head>
    <title>Greetings!</title>
</head>
<body>
    <p>How are you?</p>
</body>
</html>
```

Document Types

- The first line of an HTML document, for example:

<!DOCTYPE html>

tells the web browser what type of file it is A simple message telling the browser that this page is HTML. The first line is not actually HTML.

- There's more than one variation of HTML

- We are looking at the most commonly used HTML, so the line shown above should be put at the start

HTML Markup Tags

- HTML tags usually have a start and end, like this:

<p style="text-align:center"><code><body> ... </body></code></p>

<p style="text-align:center">Opening tag   Closing tag</p>

- There are 100+ HTML tags

- In this presentation we will look at the most common

- Many HTML tags are closed, but a few are not:

  – Examples of tags which must be closed:
  `<p>…</p>` (paragraph) and `<h1>…</h1>` (top level heading)

  – Examples of tags which don't get closed:
  `<img>` (image) and `<hr>` (horizontal ruler i.e. horizontal line)

  They do not have extra info in the middle.

Element and Tag

- These are two *tags*

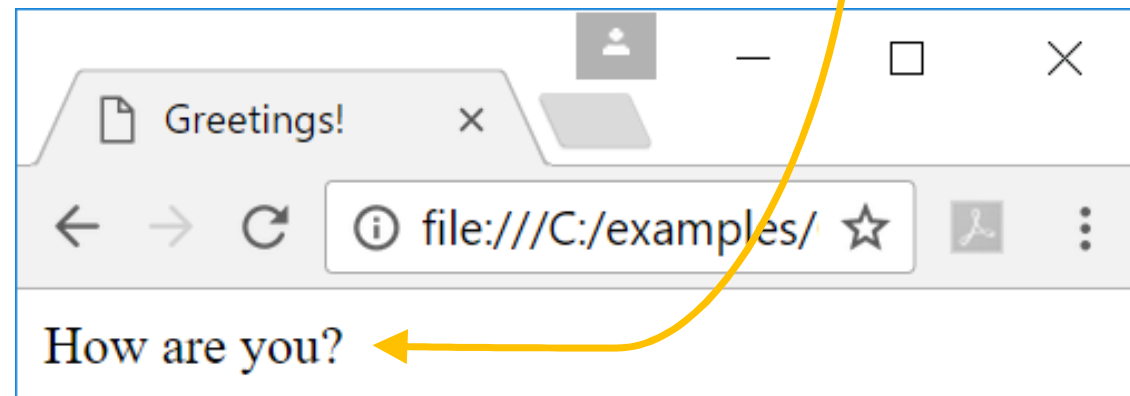`<p>This is a nice paragraph</p>`

- This is one *element*

The Body

- From now onwards we discuss various things that go in the body section

```
<!DOCTYPE html>
<html>
<head>
    <title>Greetings!</title>
</head>
<body>
    <p>How are you?</p>
</body>
</html>
```

```
<!DOCTYPE html>
<html><head><title>Greetings!
</title></head>
<body><p>     How are you?</p></body>
</html>
```

```
<!DOCTYPE html>
<html>
<head>
    <title>Greetings!</title>
</head>
<body>
    <p>How are you?</p>
</body>
</html>
```

Multiple Spaces are Not Important

- Like most text-based web languages, multiple spaces are treated the same as a single space
- That means these are the same, as far as the browser display is concerned

Hyperlinks

- The reason the Web is called the Web is because of *hyperlinks*

- Hyperlinks link one place to another place

- To create a hyperlink you use the `<a>` tag

- `<a>` means 'anchor'

- The tag then encloses something e.g. some text or an image

- When you select that thing the browser follows the link

Anchor
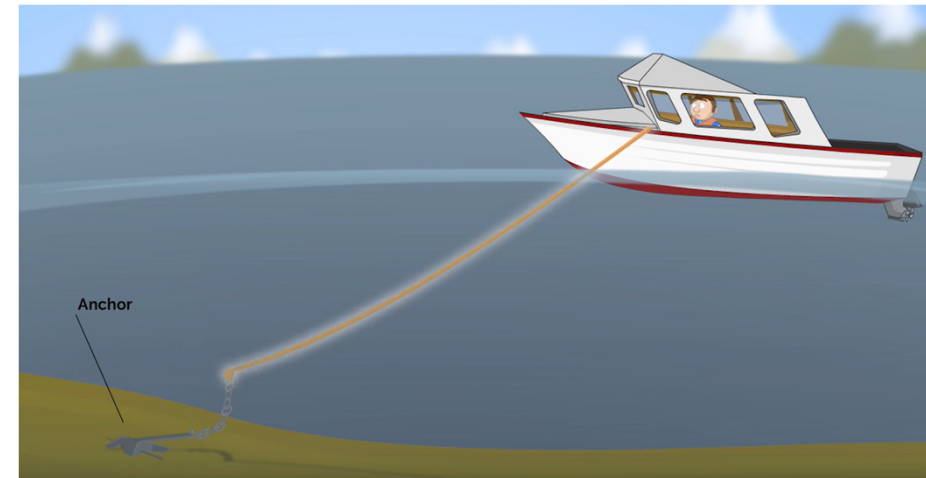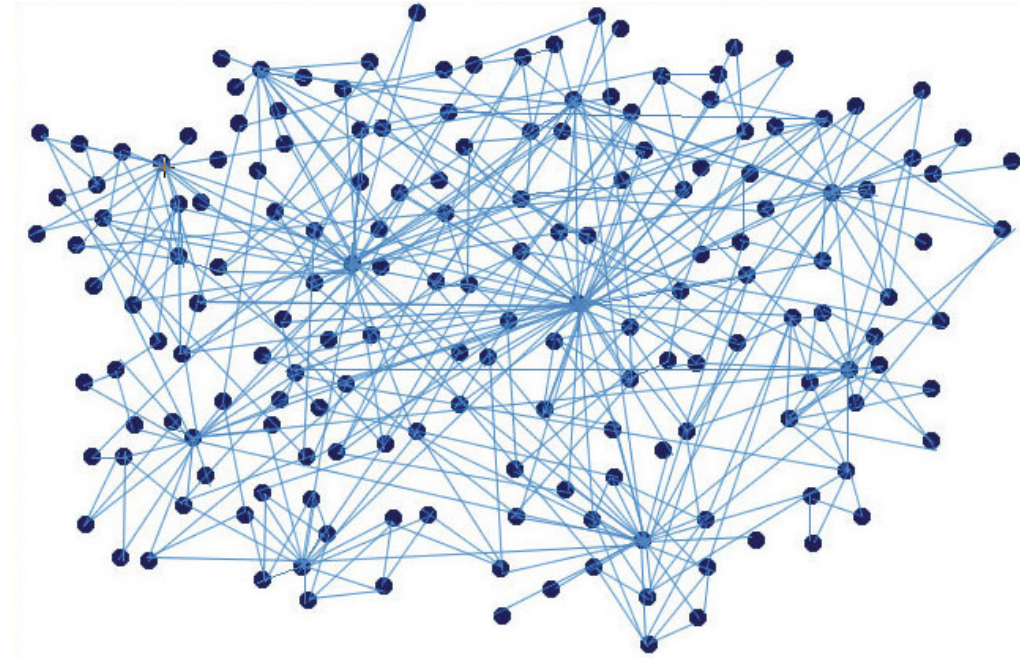
Links, Attributes

- Some HTML tags use parameters

- For example, a link to another web page can be created by using the `<a>` tag with an `href` parameter

- In HTML they are called *attributes* rather than parameters

- HTML attributes use quotation marks (even if it's a number)

```
<a href="https://canvas.ust.hk">

Click here to go to the canvas web site!

</a>
```

Click here to go to the canvas web site!

Relative or Absolute

- The link in the `href` attribute can be *relative* to the current file location, for example:

  ```
  <a href="more.html">Click to see more!</a>
  ```

  - The link points to an HTML file which is in the same folder as the HTML page

- The link could be *absolute*, like this:

```
<a href="https://www.cse.ust.hk/index.html">CSE Dept</a>
```

Text Elements

- Text elements show text with various kinds of formatting
- These HTML tags are commonly used:
  - `<p>…</p>` for paragraphs
  - `<h1>…</h1>` (top level heading)
    `<h2>…</h2>` (second level heading)
    `<h3>…</h3>` (third level heading)
    and so on for headers, i.e. big text

    - Examples on the next slide
- The general idea is that h1 is for the most important heading, h2 is for the next most important heading, etc

```
<!DOCTYPE html>
<html>
<head>
    <title>Text Elements</title>
</head>
<body>
    <h1>This is a Heading 1</h1>
    <p>This is a paragraph</p>
    <h2>This is a Heading 2</h2>
    <p>This is another paragraph</p>
    <h3>This is a Heading 3</h3>
    <p>This is the final paragraph</p>
</body>
</html>
```

This is a Heading 1

This is a paragraph

This is a Heading 2

This is another paragraph

This is a Heading 3

This is the final paragraph

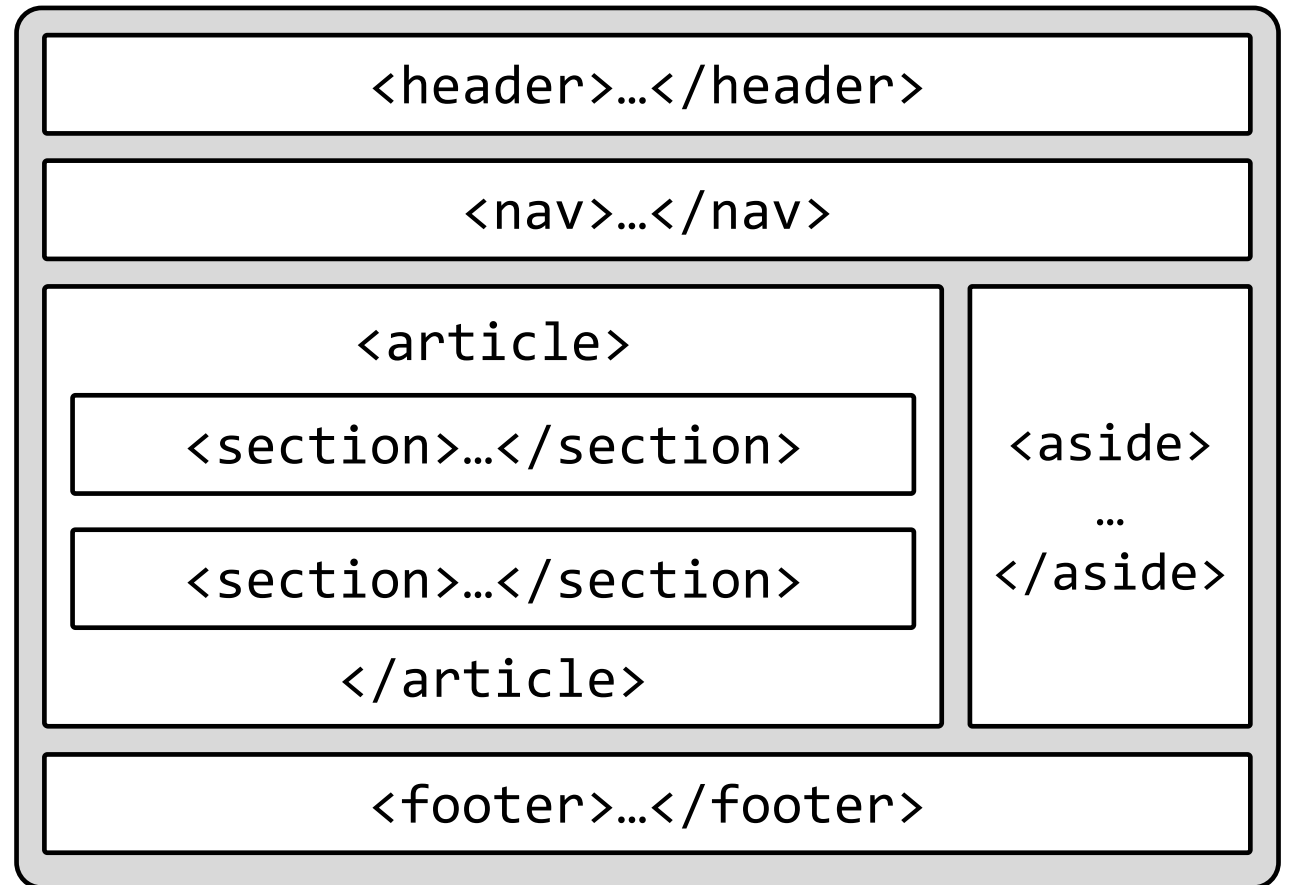# Grouping Elements - Structure

- The previous elements are simple text

- There are various tags which you can use to give extra structure to an HTML document

- Examples include `<nav>…</nav>` , `<article>…</article>` , `<section>…</section>` , `<header>…</header>` and `<footer>…</footer>` for different parts of a document

- There is also `<div>…</div>` which we will look at in another presentation

HTML Example Structure

- On the Web you will find HTML pages with `<article>` elements containing `<section>` elements

- You can also will find `<section>` elements containing `<article>` elements – both are OK

- After these few slides we won't look further at this

```
<header>...</header>
```

```
<nav>...</nav>
```

```
<article>
    <section>...</section>
    <section>...</section>
</article>
```

```
<aside>
    ...
</aside>
```

```
<footer>...</footer>
```

```
<header><h1>Grouping Elements</h1></header>
<article>
  <p>
  This page demonstrates the grouping elements such as
  <code>&lt;article&gt;</code>,
  <code>&lt;header&gt;</code> and
  <code>&lt;footer&gt;</code>.
  </p>
</article>
<footer><small>COMP4021 HTML Examples</small></footer>
```

","

- < and > are examples of special characters, see next slide

<> tag

An Example
of Structure

Header

Grouping Elements

This page demonstrates the grouping elements such as <article>, <header> and <footer>.

Article

COMP4021 HTML Examples

Footer

Text Formatting

- There are lots of formatting tags for text
- Some common ones:
  - `<b>…</b>` for bold, `<i>…</i>` for italic and `<u>…</u>` for underline text
  - `<big>…</big>` for big text, `<small>…</small>` for small text
  - `<sub>…</sub>` for subscript and `<sup>…</sup>` for superscript

    Big and small work relevant to the current text size.
  - `<code>…</code>` for program code
  - Examples on the next slide
- There is also `<span>…</span>` which we will look at in another presentation

```html
<!DOCTYPE html>
<html>
<head>
    <title>Text Formatting</title>
</head>
<body>
    <h1>Example Text Formatting</h1>
    <p>This is <b>bold text</b>.</p>
    <p>This is <i>italic text</i>.</p>
    <p>This is <u>underline text</u>.</p>
    <p>I am <big>big</big> and you are <small>small</small>.</p>
    <p>Subscript and superscript are useful in maths like
        (x<sub>0</sub>)<sup>2</sup>.</p>
    <p>You write <code>var x;</code> to create a variable
        <code>x</code> in JavaScript.</p>
</body>
</html>
```

Example Text Formatting

This is **bold text**.

This is *italic text*.

This is underline text.

I am big and you are small.

Subscript and superscript are useful in maths like $(x_0)^2$.

You write var x; to create a variable x in JavaScript.

Alternatives to `<b>` and `<i>`

- Officially, you are supposed to use `<strong>`…`</strong>` instead of `<b>`…`</b>`
- And you are supposed to use `<em>`…`</em>` instead of `<i>`…`</i>` (`<em>` means *emphasis*)
- The idea is that strong and emphasis have some kind of meaning, whereas `<b>` and `<i>` don't
- However, `<b>` and `<i>` are still very popular

Special Characters

What You See	What It's Called	HTML Code
"	quotation mark	"
'	apostrophe	'
&	ampersand	&
<	less-than	<
>	greater-than	>

- There's another 100+ special characters like this

From: https://www.tutorialspoint.com/html5/html5_entities.htm

Lists

- There are two types of lists:
  - Ordered list `<ol> … </ol>`
  - Unordered list `<ul> … </ul>`

- Each item within the list uses `<li> … </li>`

- See the next slide for examples

Today's Schedule

An ordered list

1. Breakfast at 8am
2. Lunch at 2pm
3. Dinner at 7pm

Shopping List

An unordered list

- Biscuits
- Instant noodles
- Apples
- Chocolate

Examples of Lists

```
<!DOCTYPE html>
<html>
<head>
    <title>List Elements</title>
</head>
<body>
    <h1>Today's Schedule</h1>
    <ol>
        <li>Breakfast at 8am</li>
        <li>Lunch at 2pm</li>
        <li>Dinner at 7pm</li>
    </ol>

    <h1>Shopping List</h1>
    <ul>
        <li>Biscuits</li>
        <li>Instant noodles</li>
        <li>Apples</li>
        <li>Chocolate</li>
    </ul>
</body>
</html>
```

Tables

- An HTML table is one way to get a structured layout

`<table>`

`<thead>`

  - `<thead>` means table head
  - `<th>` means table header i.e. the title of that column

    `<tr> <th>...</th> <th>...</th> <th>...</th> </tr>`

`</thead>`

  - `<tr>` means table row
  - `<tbody>` means table body

`<tbody>`

    `<tr> <td>...</td> <td>...</td> <td>...</td> </tr>`

    `<tr> <td>...</td> <td>...</td> <td>...</td> </tr>`

`</tbody>`

`</table>`

  - `<td>` means 'table data' i.e. a box in the table

- You can see the content is lined up in 3 columns
- <mark>By default a table does not show a border line</mark>

Skills	Difficulty	My Level
HTML	Easy	Some
CSS	Medium	A little
JavaScript	Hard	Zero

```
<table>
<thead>

<tr> <th>Skills</th> <th>Difficulty</th><th>My Level</th> </tr>

</thead>

<tbody>

<tr> <td>HTML</td>          <td>Easy</td>  <td>Some</td>      </tr>
<tr> <td>CSS</td>           <td>Medium</td><td>A little</td>  </tr>
<tr> <td>JavaScript</td><td>Hard</td>  <td>Zero</td>      </tr>
</tbody>
</table>
```

A Simple Table Example

Useful Form Elements

Here are some form elements that you may use later.

A drop down list: [Apple ▾]

A text input [Simple text input...]

A slider ────────═──────────

A text area
```
Please enter some
text here...
```

A button [Do Something!]

Forms

- A form is basically a set of inputs
- We will look at forms in another presentation

Graphics

- There's different ways to get graphics in a web page

- The most common approaches are:
  - Use `<img>` to embed an image file in the web page
  - Use `<svg>` for vector graphics (another presentation)
  - Use `<canvas>` to create and manipulate bitmap graphics

Putting Image Files in a Page

- The `<img>` tag puts an image inside a page, like this:

```
<h1>This is my face...</h1>
<img src="happy_face.jpg"
    alt="A happy face">
```

It's part of the HTML standard to do alternative text

- `src` means 'source' – the `src` attribute is the location of the image file

- `alt` means 'alternative' – this is text which can be used as an alternative for the image e.g. if a blind person is looking at the web page
  - The text describes the image

HTML Validator

- If you write incorrect HTML it might work in the browser you are using – but what about other versions of your browser, and other browsers, on PC/Mac/iOS/Android?

- It's better to get the HTML correct at the start

- 'Validation' means 'checking whether something is correct'

- W3C has a HTML validation service at:

    https://validator.w3.org/

- You can use it to check your HTML code

Validating Bad HTML

```
<!DOCTYPE html>
<html>
<head>

<title>Greetings!</title>
</head>
<body>
    <p><b>How are you?</p>
</body>
</html>
```

Validating the HTML using the W3C validator ➡

There is a problem in this area

1. **Error** End tag `p` seen, but there were open elements.

   From line 7, column 23; to line 7, column 26

   `w are you?</p>↵</bod`

2. **Error** Unclosed element `b`.

   From line 7, column 8; to line 7, column 10

   `y>↵     <p><b>How ar`

3. **Error** End tag for `body` seen, but there were unclosed elements.

   From line 8, column 1; to line 8, column 7

   `you?</p>↵</body>↵</htm`