SWINBURNE UNIVERSITY OF TECHNOLOGY

COS10011
Creating Web Applications

Lecture 3a – HTML

Acknowledgement: The contents in this document was adopted from learning material prepared by Alan Colman (Convener, SUT)
Last Update: 1 Feb 2017 by Jeffery Sijore

Labs - Reminder

- Labs are an essential part of this subject.
  It is important for you to work through the labs – preferably *before* your lab session.
- Labs consolidate and ***extend*** material covered in the lectures.

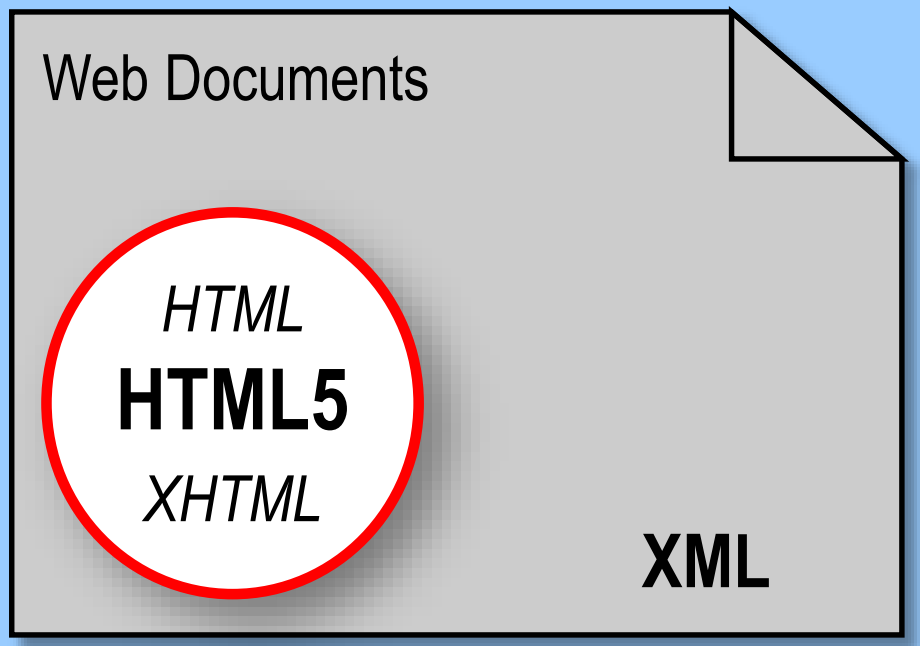
Unit of Study Outline

Internet Technologies: TCP/IP, URLs, URIs, DNS, MIME, SSL

Web Technologies: HTTP, HTTPS, Web Architectural Principles

Client Side Technologies:

Web Applications, Markup Languages



Last Lecture

- **HTML Documents**
  - HTML and XML elements
  - HTML Head (meta information) and body (content)
- **HTML Body elements (page content)**
  - Headings and Paragraph
  - Phrase tags and Special Characters
  - Lists and Table
  - Image and Anchor
  - Form, Form Attributes and Form Elements
- **HTML Structure**

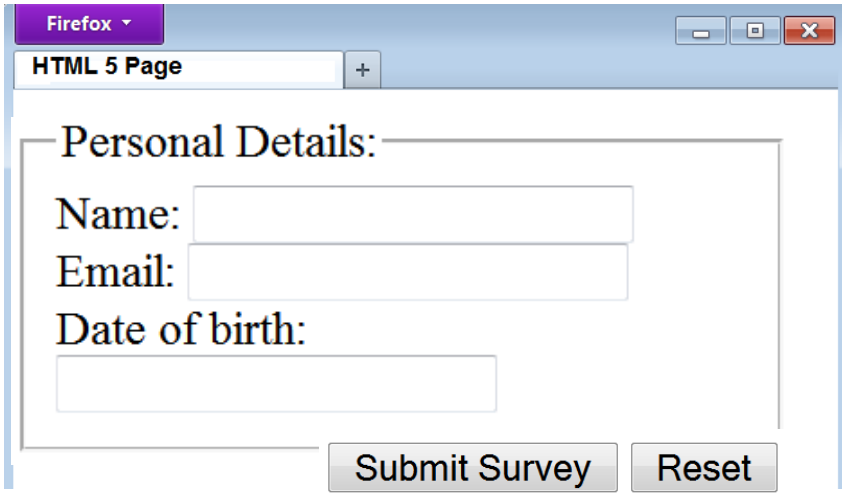
This Lecture - overview

- **HTML Content**
  - …
  - Form, Form Attributes and Form Elements
- **Validating HTML5 form data with regular expressions**
- **HTML Structure**
  - Div and Span
  - Navigation, Article, Section, Header, Footer, Main
  - Aside, Details, Figure

Example: **L3_basic_form.html**

Form element

- **<form> … </form>** provides a mechanism to allow a user to enter information into a web page.
- Entered information can be submitted to a server, which it turn can receive the data, process the data and generate a response.
- Possible responses may include:
  - ☐ display information on a web page;
  - ☐ adding data to a database; or
  - ☐ sending an email message.



Form (continued)

1. Form filled

Client

Client requests a web page containing a form by entering a URL on the web browser

Server responds by sending the webpage of the form as HTML

Server

2. Form result

Client clicks the **submit** button on the form which sends the **form data** to the form **action** URL for processing on the server

Server responds by processing the data received then sends the resulting HTML webpage

Form attributes (continued)

```
<form id="survey" method="post" action="process.php">
    <!-- Form elements here -->
</form>
```

- **id** - unique identifier of the form
- **method** -HTTP method used to submit the form – **get** or **post**
  - **get** is often used to submit data to obtain something
    e.g. search, or see a product (URL is visible in the browser)
  - **post** is often used to submit data for storage
    e.g. registration (URL is not visible in the browser)
- **action** - URL referring to where the data is to be submitted for processing
  - Absolute path is used if processing is from a different site
- ***Usually*** the <form> element contains all ***form control elements*** and all other form structuring elements.
- Nothing will be displayed or actioned, unless there are ***form control elements***.

HTML Forms

Form control elements:

- `<input ../>` defines a ***form control*** for the user to enter ***input***. Different ***input elements*** can be displayed ***based on*** the `type` *attribute* and include:

  Note: input is an empty or void element

  `text, checkbox, radio, password, submit, reset, hidden, file, image, button`

- `<select>` defines a ***form control*** for the ***selection of options*** from a ***selection list*** and can have the following *attributes:*

  `size, multiple, tabindex, disabled`

- `<textarea>` defines a ***form control*** for the user to enter ***multi-line text input*** and can have the following *attributes:*

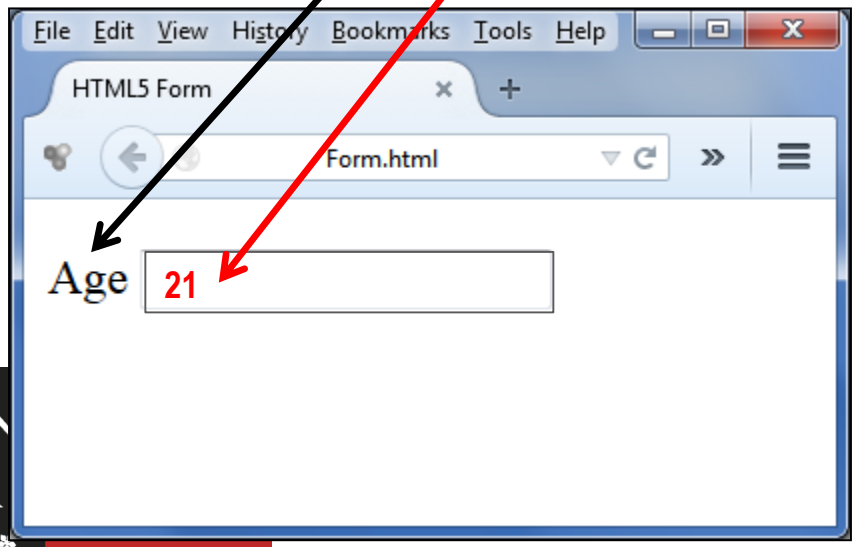
  `rows, cols, readonly, tabindex, accesskey, disabled`

Form Elements: Label

- **<label>…</label>** element associates a ***label*** with a ***form control.***

```
<form id="survey" method="post" action="process.php">
  <p><label for="age">Age</label>

  <input type="text" name="years" id="age"/></p>
 <!--  other form controls -->
</form>
```



Note: Each ***form control*** element has a **name** attribute. Data is passed in **name = value** pairs e.g. **years**=21

When label text is 'clicked' or 'touched' the form control is focused. This provides a better / larger target on touch screens.

Form Elements: Label

Technique #1

Preferred Technique! `for` is explicitly connected to `id`

```
<form id="survey" method="post" action="process.php">
  <p><label for="age">Age</label>
  <input type="text" name="age" id="age" /></p>
</form>
```

Technique #2

```
<form id="survey" method="post" action="process.php">
  <p><label>Age
    <input type="text" name="age" />
  </label></p>
</form>
```

This technique is very common but the **label** is ***not explicitly*** connected to an **id**entifier

Form Elements: Input Text

```
<p><label>Name
 <input type="text" name="name" maxlength="40"
                    size="20"/>
</label></p>
<p><label>Age
 <input type="text" name="age" maxlength="2"
              size="2" />
</label></p>
```

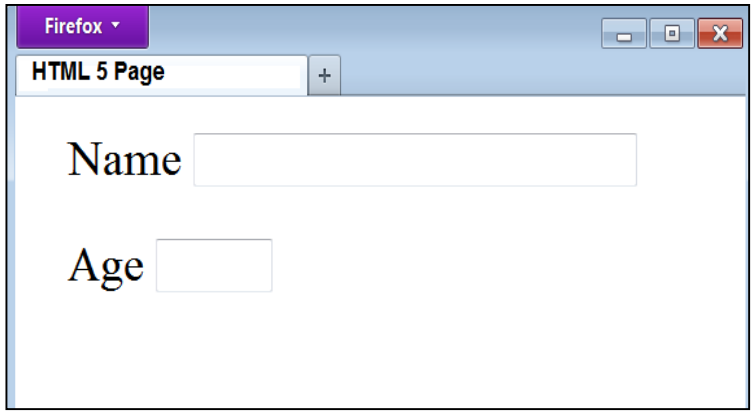
If **type** is not included, or is unidentified, type="text" is assumed.

type="text" is used for both text and numbers

name attribute is used to pass data for form processing

maxlength specify the maximum number of characters allowed

size sets the visible width of the text box



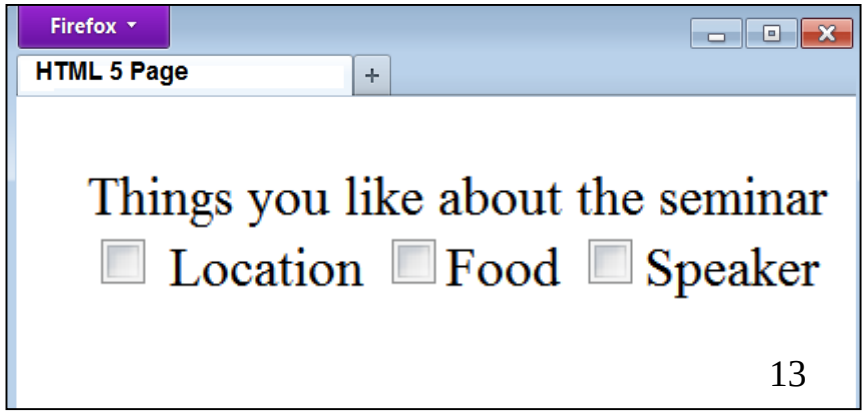
Form Elements: Input Checkbox

```
<p>Things you like about the seminar
  <br />
  <label><input type="checkbox" name="things[]"
       value="loc" />Location</label>
  <label><input type="checkbox" name="things[]"
       value="fud" />Food</label>
  <label><input type="checkbox" name="things[]"
       value="spk" />Speaker</label>
</p>
```

An array called "things"

As multiple checks are allowed, the **name** (sent to the server) must either

- Be different
- or the same but terminate with [ ]

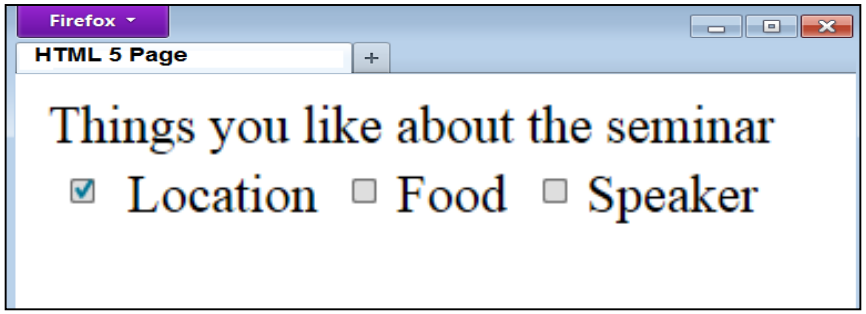


Form Elements: Input Checkbox

```
<p>Things you like about the seminar
  <br />
  <label><input type="checkbox" name="things[]"
      value="loc" checked="checked" />
      Location</label>
  <label><input type="checkbox" name="things[]"
       value="fud /">Food</label>
  <label><input type="checkbox" name="things[]"
       value="spk" />Speaker</label>
</p>
```

checked is used to initialised checkbox with a default check

checked="checked" is used for XHTML compliant code

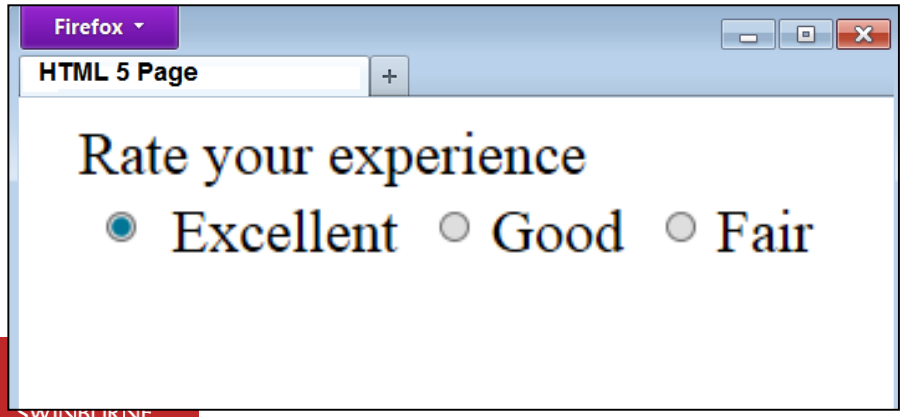


Note this for your assignments as they need to be well-formed XML

Form Elements: Input Radio Button

Best to group radio inputs with a fieldset and legend - see later.

```
<p>Rate your experience<br />
    <label><input type="radio" name="rating"
        value="Excel" checked="checked" />
       Excellent</label>
    <label><input type="radio" name="rating"
        value="Good" />Good</label>
    <label><input type="radio" name="rating"
        value="Fair" />Fair</label>
</p>
```



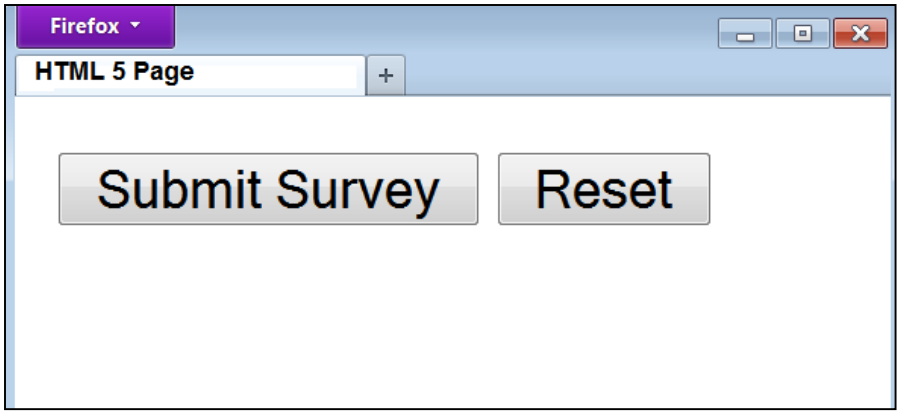
Note: Only ***one*** choice is allowed, *the **name** must be the same*

Form Elements: Input Submit and Reset

```
<p>
 <input type="submit" value="Submit Survey"/>
 <input type="reset" value="Reset" />
</p>
```

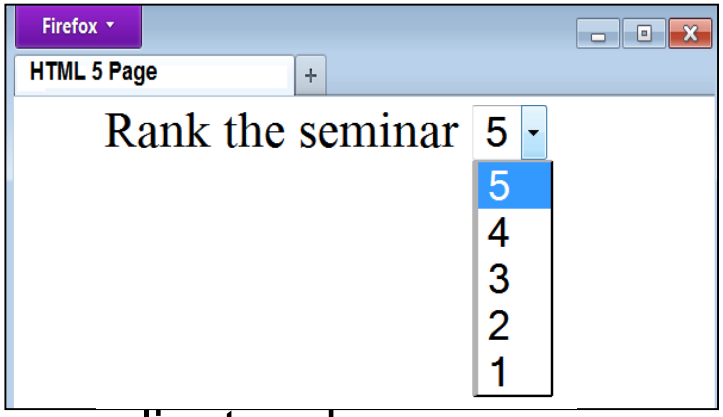
Make sure that the form has an input of type submit.

Note: Reset means set all input form fields to its initial value, and not clear its value.
It only has the effect of clearing, if the initial values are blank or empty



Form Elements: Select & Option

```
<p><label for="rank">Rank the seminar</label>
  <select name="rank" id="rank">
    <option value="5" selected="selected">5</option>
    <option value="4">4</option>
    <option value="3">3</option>
    <option value="2">2</option>
    <option value="1">1</option>
  </select>
</p>
```



- **selected="selected"** is used for XHTML compliant code

Form Elements: Text Area

- **<textarea>…</textarea>** defines a form control for the user to enter multi-line text input
- Text Areas can have the following attributes: rows, cols, readonly, tabindex, accesskey, disabled

```
<p><label>Comments<br />
   <textarea name="comments"
         rows="4" cols="20">
      Enter comments here.
   </textarea>
</label></p>
```

Note: all characters in the text area's element content are displayed verbose. So do not add blank spaces

Forms - Common errors – Watch out!

- Errors in *Form Control elements* may lead to *data errors*

input type = "radio"

one, from a limited number of choices

mutually exclusive – one checked, all others unchecked

same 'name'

***different 'value'** for elements in the group*

input type = "checkbox"

one or more, from a limited number of choices

*usually have **different 'name'** or use an array[]*

***select** and **option** (dropdown box)*

one (or more) options, from a limited number of choices

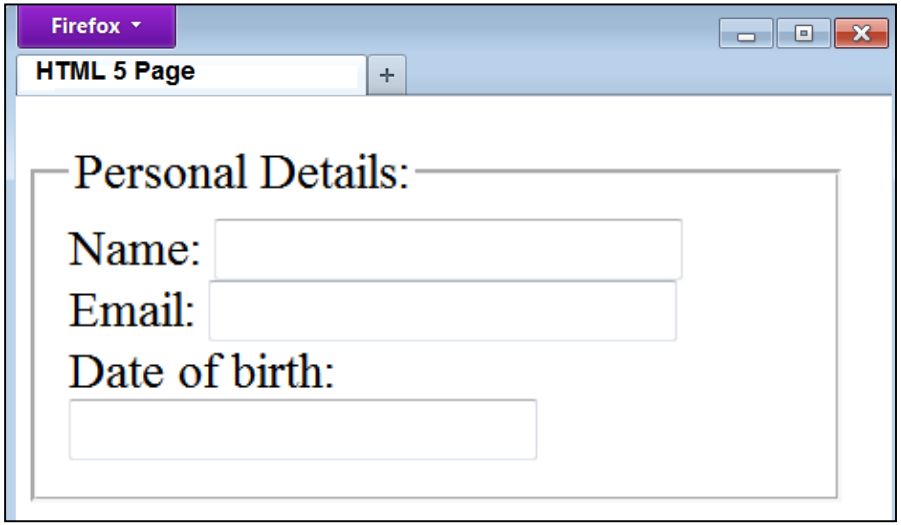
***'name'** only for **select** (can have a 'multiple' attribute)*

***different 'value'** for '**option**' elements (not 'name')*

HTML Forms: Fieldset & Legend

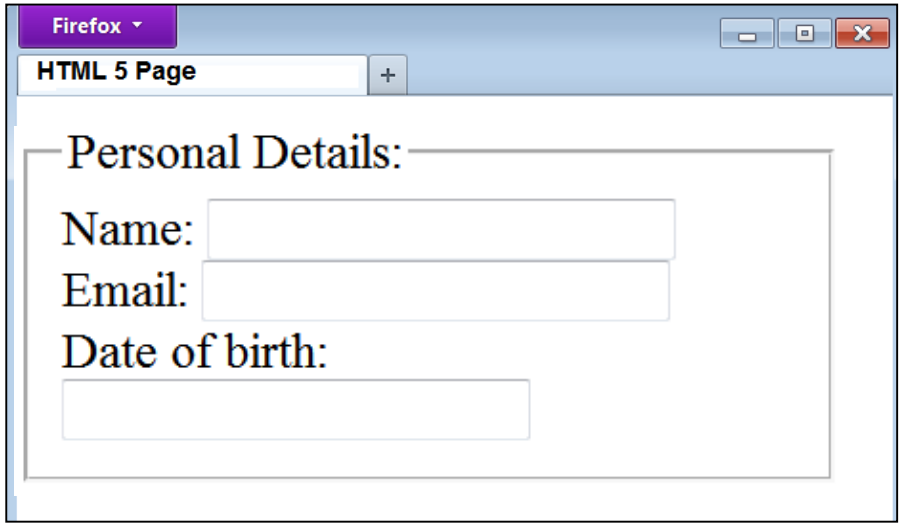
Other form elements:

- `<fieldset>` element is used for ***grouping*** related form controls, so authors can divide a form into smaller, more manageable parts, improving the usability of the form.
- `<legend>` element defines a ***caption for a fieldset*** and must be at the start of a fieldset, before any other elements. A legend can include an `accesskey` attribute.



Form Elements: Fieldset & Legend

```
<fieldset>
  <legend>Personal Details:</legend>
  <label>Name:
  <input type="text" name="pname" /></label>
  <label>Email:
  <input type="text" name="pemail" /></label>
  <label>Date of birth:
  <input type="text" name="pdob" /></label>
</fieldset>
```



HTML5 FORM ELEMENTS

Example: L3_basic_form.html

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HTML5 Form Elements

- HTML5 has new form input **types**
  Note that these are not yet universally supported by all browsers

http://html5test.com/

- Examples generated using Chrome.
  - ☐ color
  - ☐ date
  - ☐ datetime
  - ☐ email
  - ☐ month
  - ☐ number
  - ☐ range
  - ☐ search
  - ☐ tel
  - ☐ time
  - ☐ url
  - ☐ week

Note: If the browser does not understand the type, it will default to type="text"

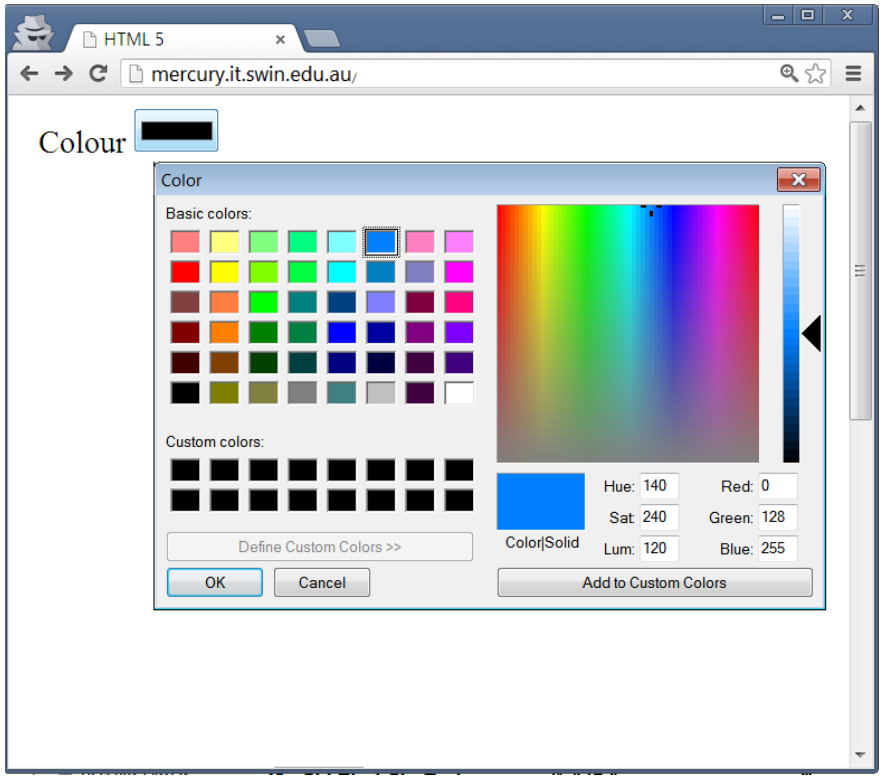
- Other **new attributes** include:
  autofocus, placeholder, pattern, required

HTML5 Form Elements: Colour

```
<p><label>Colour
    <input type="color" name="favcolor"
        autofocus />
</label></p>
```

The ***autofocus*** attribute defines which text input should have the default cursor position.

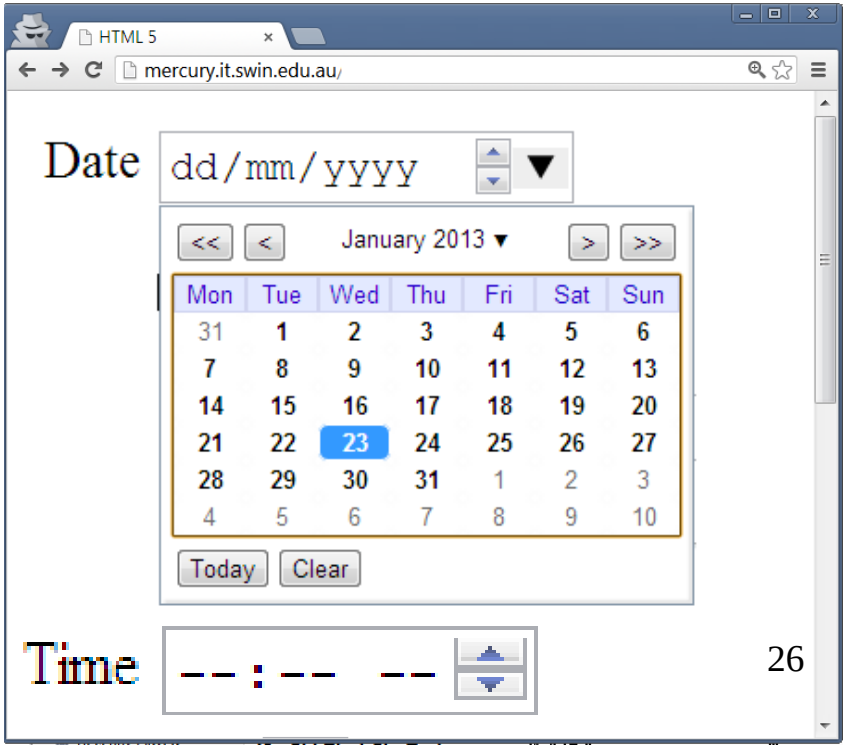
There can only be one field with autofocus. If there is more than 1 the first instance gets the focus.



HTML5 Form Elements: Date

```
<p><label>Date
    <input type="date" name="bday" />
</label></p>

<p><label>Time</label>
    <input type="time"
      name="starttime" />
</label></p>
```

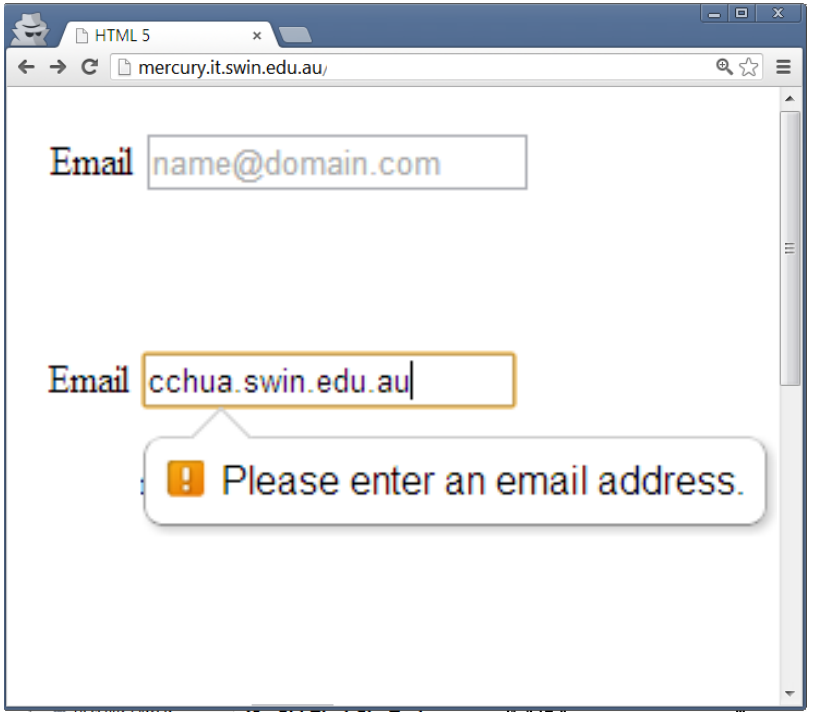


HTML5 Form Elements: Email

```
<p><label>Email
    <input type="email" name="contactemail"
     placeholder="name@domain.com"
     required="required" />
</label></p>
```

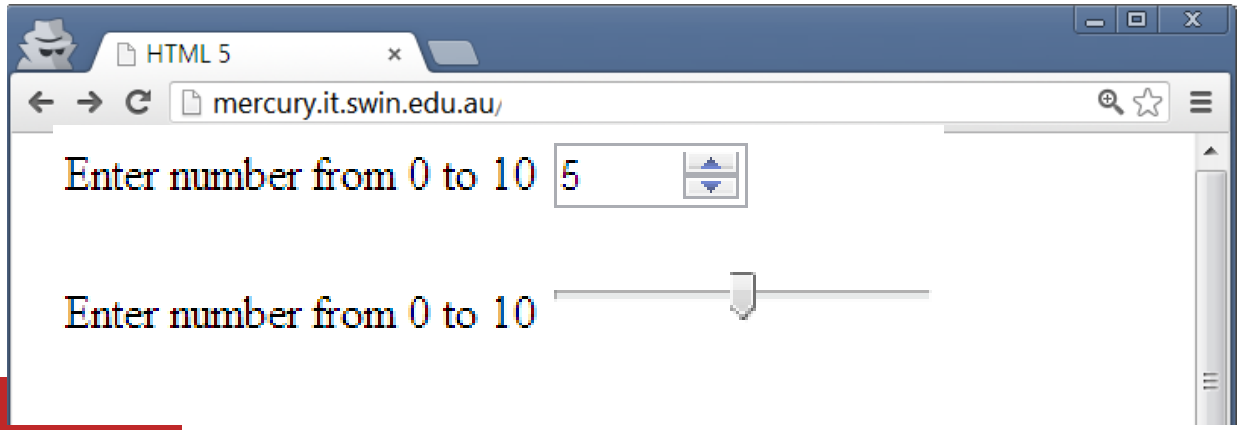
The **placeholder** attribute specifies a short hint that describes the expected value of an input field

The **required** attribute indicates that email field must be filled prior to submission



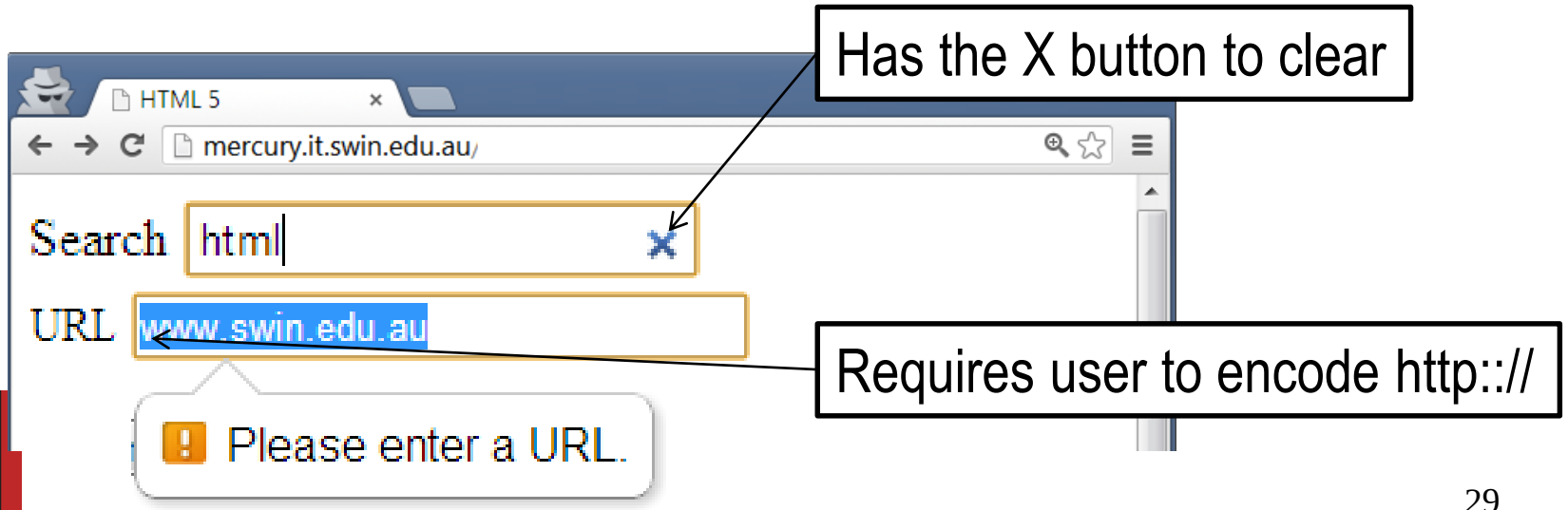
HTML5 Form Elements: Number

```
<p><label>Enter number from 0 to 10
    <input type="number" name="score" min="0"
           max="10" step="1" value="5" />
</label></p>
<p><label>Enter number from 0 to 10
    <input type="range" name="rating" min="0"
           max="10" value="5" />
</label></p>
```



HTML5 Form Elements: Search

```
<p><label>Search
    <input type="search" name="searchquery"
     placeholder="search query" />
</label></p>
<p><label>URL
    <input type="url" name="website"
     placeholder="http://www.domainname.au" />
</label></p>
```

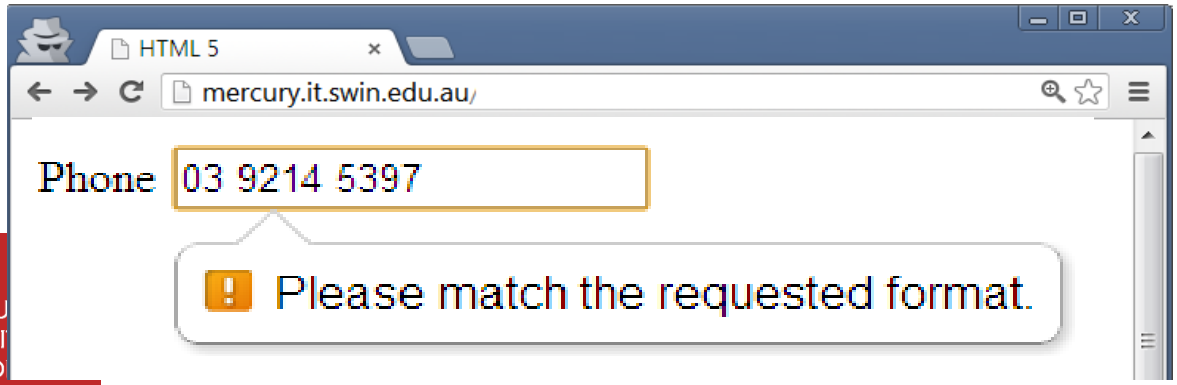


HTML5 Form Elements: Phone

```
<p><label>Phone
    <input type="tel" name="phone"
      placeholder="(##) ####-####"
      pattern="\(\d{2}\) +\d{4}-\d{4}" />
</label></p>
```

The **pattern** attribute specifies a regular expression that the <input> element's value is checked against.

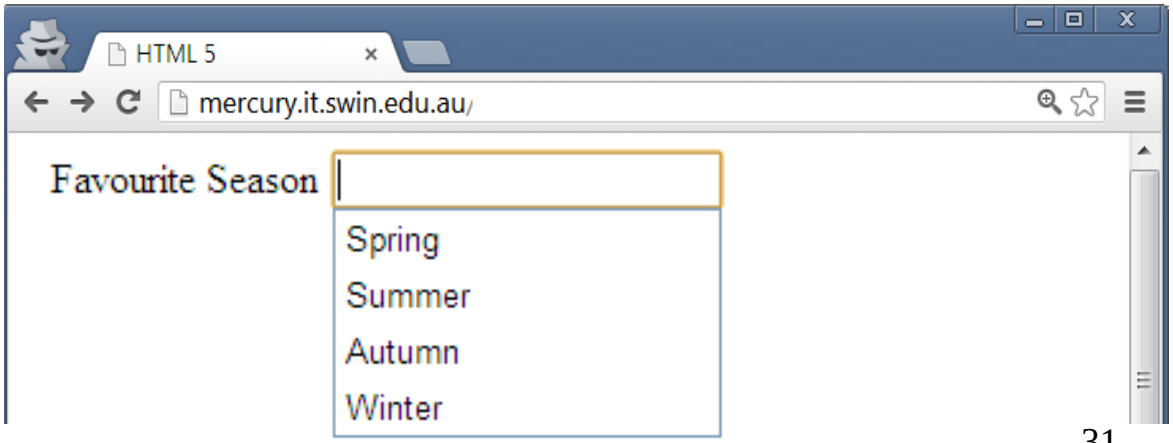
Works with the following input types: text, search, url, tel, email, and password.



HTML5 Form Elements: Data List

```
<p><label>Favourite Season
   <input type="text" name="favseason"
      list="seasons">
   <datalist id="seasons">
     <option value = "Spring">
     <option value = "Summer">
     <option value = "Autumn">
     <option value = "Winter">
   </datalist>
</label></p>
```

Make sure the id matches the list



This Lecture - overview

- HTML Content
  - …
  - Form, Form Attributes and Form Elements
- ***Validating HTML5 form data with regular expressions***
- **HTML Structure**
  - Div and Span
  - Navigation, Article, Section, Header, Footer, Main
  - Aside, Details, Figure

HTML Forms Input Data Control and Checking

- Examples

```
<form id="regForm" method="post“ action="….php">
    …
    <p><label for="catname">Cat&amp;apos;s Name</label>
    <input type="text" name= "catname" id="catname"
                        maxlength="20"
            size="10"
            required="required"/>
    </p>
    …
    <input type="email" name= "email" id="email" required="required"/>
</form>
```

Restricts the # characters

Size of text box

A value must be entered

HTML5 input control

Using patterns in HTML

- The pattern attribute uses a ‘regular expression’ to define the characters that can be entered into a field

```
<input type="text" name= "catname" id="catname"          maxlength="20"
       pattern="^[a-zA-Z ]+$"
       required="required"/>
```

Alpha characters or space only

```
<input type="text" name= "dob" id="dob"  maxlength="10" size="10“
       placeholder="dd/mm/yyyy"
       pattern="\d{1,2}/\d{1,2}/\d{4}"
       required="required"/>
```

Placeholders provide prompt to the user

dd/mm/yyyy
???? no range

```
/(?=d)(?:(?:31(?!.(?:0?[2469]|11))|(?: 30|29)(?!.0?2)|29(?=.0?2.(?:(?:(?:1[6--9]| [2--9]d)?(?:0[48]|[2468][048]|[13579]
[26])|(?:(?:16|[2468][048]|[3579] [26])00)))(?:x20|$))|(?:2[0--8]|1d|0? [1--9]))([--/])(?:1[012]|0?[1--9])1(?: 1[6--9]|[2--
-9]d)?dd(?:(?=x20d)x20| $))?/
```

Regular expressions not necessarily the best solution to every check!!

http://html5pattern.com/

What are Regular Expressions?

- ***Regular Expressions:***
  - are strings that describe the 'pattern' or 'rules' for strings
  - are strings that follow a set of syntax rules
  - can be used as a concise and consistent way to 'test' for matching patterns.
- ***Regular expressions can be great for checking form values!***
  - A simple regular expression can be the equivalent of many lines of code.

Where are they Used?

EVERYWHERE!

- **Regular Expressions** have a history in unix environments, became popular in many text editors, and were supported in text processing (programming) languages like Perl and Tcl.

  … but the catch was there were some variations in syntax ☹ mostly now the same basic syntax ☺

- **Regular Expressions** are used in many text search routines
- **Regular Expressions** are *very easy* to use ☺
  .... but *not so easy* to define the 'pattern' ☹

/(?=d)(?:(?:31(?!.(?:0?[2469]|11))|(?: 30|29)(?!.0?2)|29(?=.0?2.(?:(?:(?:1[6--9]| [2--9]d)?(?:0[48]|[2468][048]|[13579] [26])|(?:(?:16|[2468][048]|[3579] [26])00)))(?:x20|$))|(?:2[0--8]|1d|0? [1--9]))([--/])(?:1[012]|0?[1--9])1(?: 1[6--9]|[2--9]d)?dd(?:(?=x20d)x20| $))?/

RegExp - Basic Syntax

```
/pattern/modifiers
```

Pattern Basics

^	Start of string
$	End of string
.	Match any single character
(a|b)	a or b
(…)	Group section
[abc]	match any character in the set
[^abc]	not match in the set
[a-z]	match the range
\d	match a single digit from 0 to 9

Pattern Quantifiers

a?	0 or 1 of a
a*	0 or more of a
a+	one or more instance of a
a{3}	exactly 3 a's = aaa
a{3,}	3 or more a's
a{3,6}	between 3 to 6 a's
!(pattern)	"not" pattern

[\ ^ $. | ? * + ( ) are the 11 meta-characters, or special characters, used in the syntax.
If you want to include these in a RegExp literal you need to escape them with **** eg. **\(**

RegExp - Basic Examples

JavaScript	matches "Isn't JavaScript great?"
^JavaScript	matches "JavaScript rules!", not "What is JavaScript?"
JavaScript$	matches "I love JavaScript", not "JavaScript is great!"
^JavaScript$	matches "JavaScript", and nothing else

bana?na	matches "banana" and "banna", but not "banaana".
bana+na	matches "banana" and "banaana", but not "banna".
bana*na	matches "banna", "banana", and "banaaana", but not "bnana"
^[a-zA-z]+$	matches any string of one or more letters and nothing else.

http://www.sitepoint.com/article/expressions-javascript

x?	0 or 1 of x
x*	0 or more of x
x+	one or more instance of x

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RegExp - Basic Syntax

- **Groups & Ranges**
  - `.` Any character (except \n)
  - `(a|b)` a or b
  - `(…)` group
  - `(?:…}` passive group
  - `[abc]` set (“range”) a, b or c
  - `[^abc]` not a, b or c
  - `[a-g]` set range a to g
  - `[3-6]` set range of digits 3,4,5 and 6
  - `\n` “nth” group or subpattern

- **Pattern Modifiers**

/i case insensitive

/x allow comments and white space in pattern

…

RegExp - Some Sample Patterns

[A-Za-z0-9-]+ = Letters, numbers and hyphens

\d{1,2}\/\d{1.2}\/\d{4} = date as 19/9/2006

[^\s]+(?=\.(jpg|gif|png))\.\2 = jpg, gif or png filename

[1-9]{1}$|^[1-4]{1}[0-9]{1}$|^30 = any number from 1 to 30

#?([A-Fa-f0-9]){3}(([A-Fa-f0-9]){3})? = valid hex colour code

.{6,} = password six or more characters

(?=.*\d)(?=.*-a-z])(?=.*[A-Z]).{8,15} = password string
(at least 1 uppercase letter, 1 lowercase letter and 1 digit)

^.+@.+\..{2,3}$ = email address

\<(/?[^\>]+)\>/ = HTML tags

Remember: Same pattern may be used for checking form values, ***both*** on client-side and server-side.

Lecture - overview

- **HTML Content**
- ***Validating HTML5 form data with regular expressions***
- **HTML Structure**
  - ***Div and Span***
  - Navigation, Article, Section, Header, Footer, Main
  - Aside, Details, Figure

Example: **L3_html_with_structure.html**

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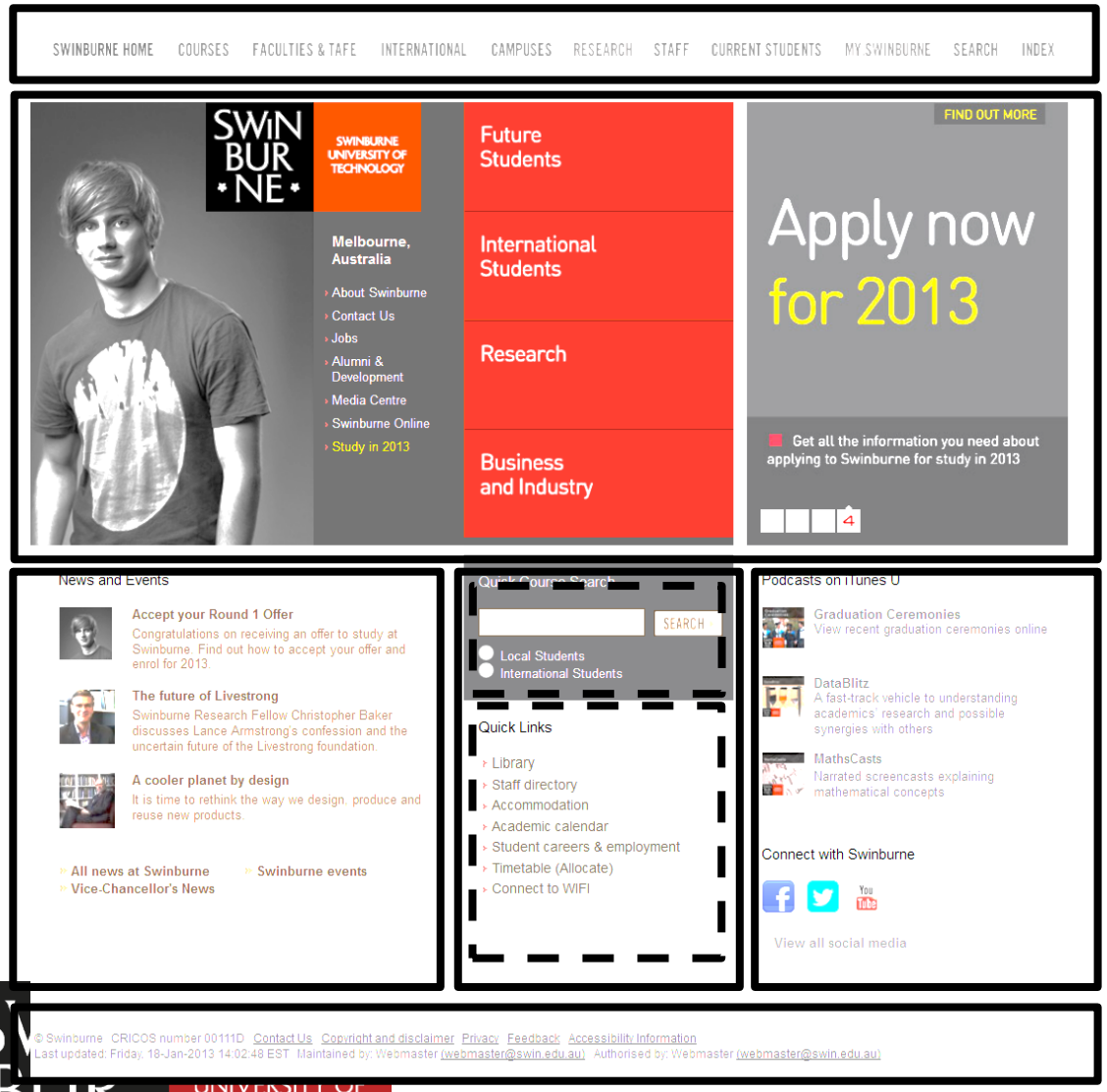
Division

- ** ... ** is a generic logical block level container used to divide content, e.g. section
- It has **no default** meaning or rendering behaviour, as it is a logical “division”.
- It plays a role in providing an arbitrary block container where a style can be applied to use CSS.
- **Do not** use a when you should be using a logical element like <p>.

Span

- **…** is a generic inline level container used to group other inline elements, such as text.
- It has **no default** meaning or presentation qualities.
- Similar to the element, the tag has a role in providing an arbitrary container but for inline elements.
- **Do not** use a when you should be using a logical element like or .

Division (continued)

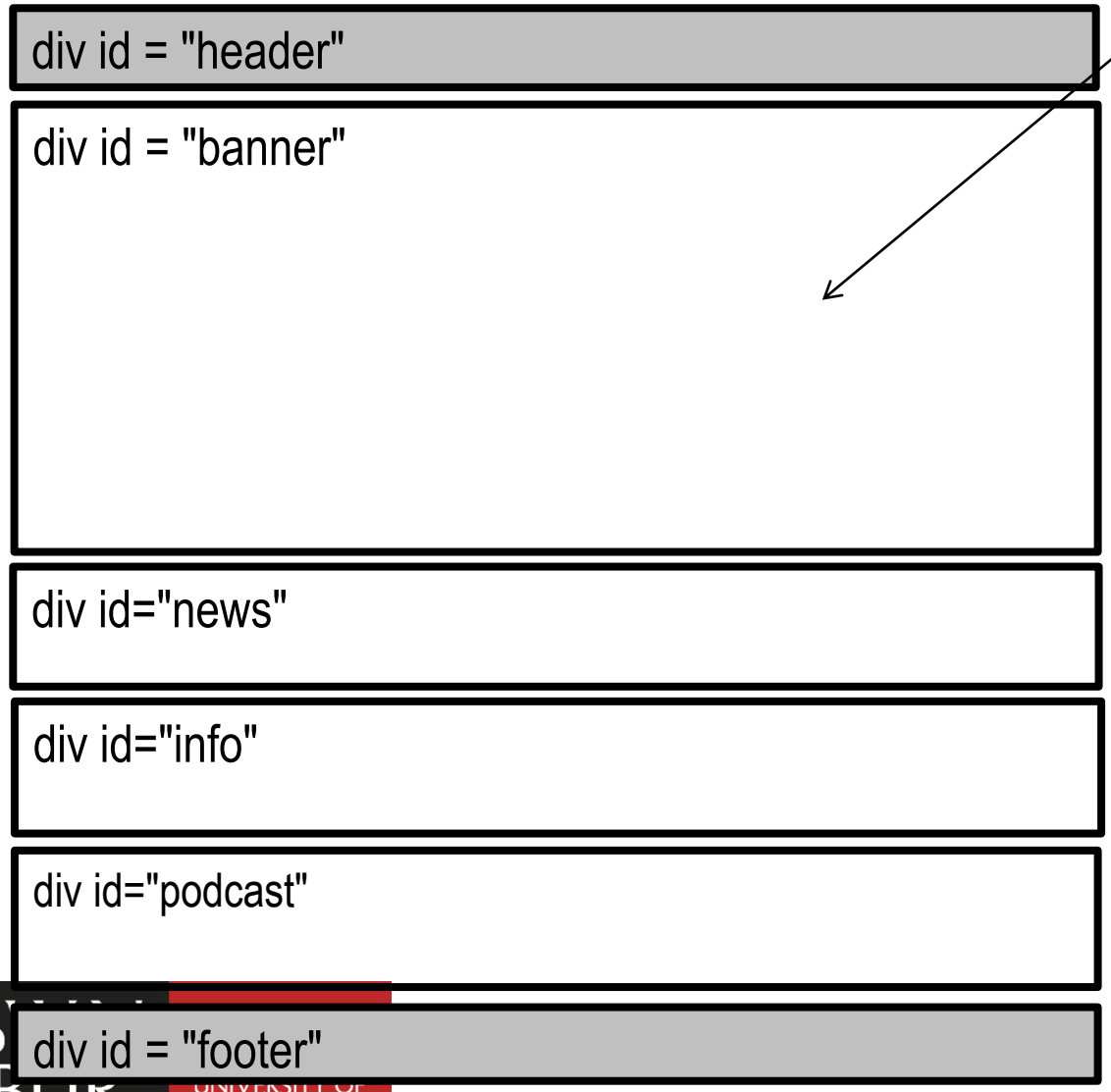


Main logical divisions

- Header (1)
- Banner (1)
- Columns (3)
- Footer (1)

May contain smaller logical divisions

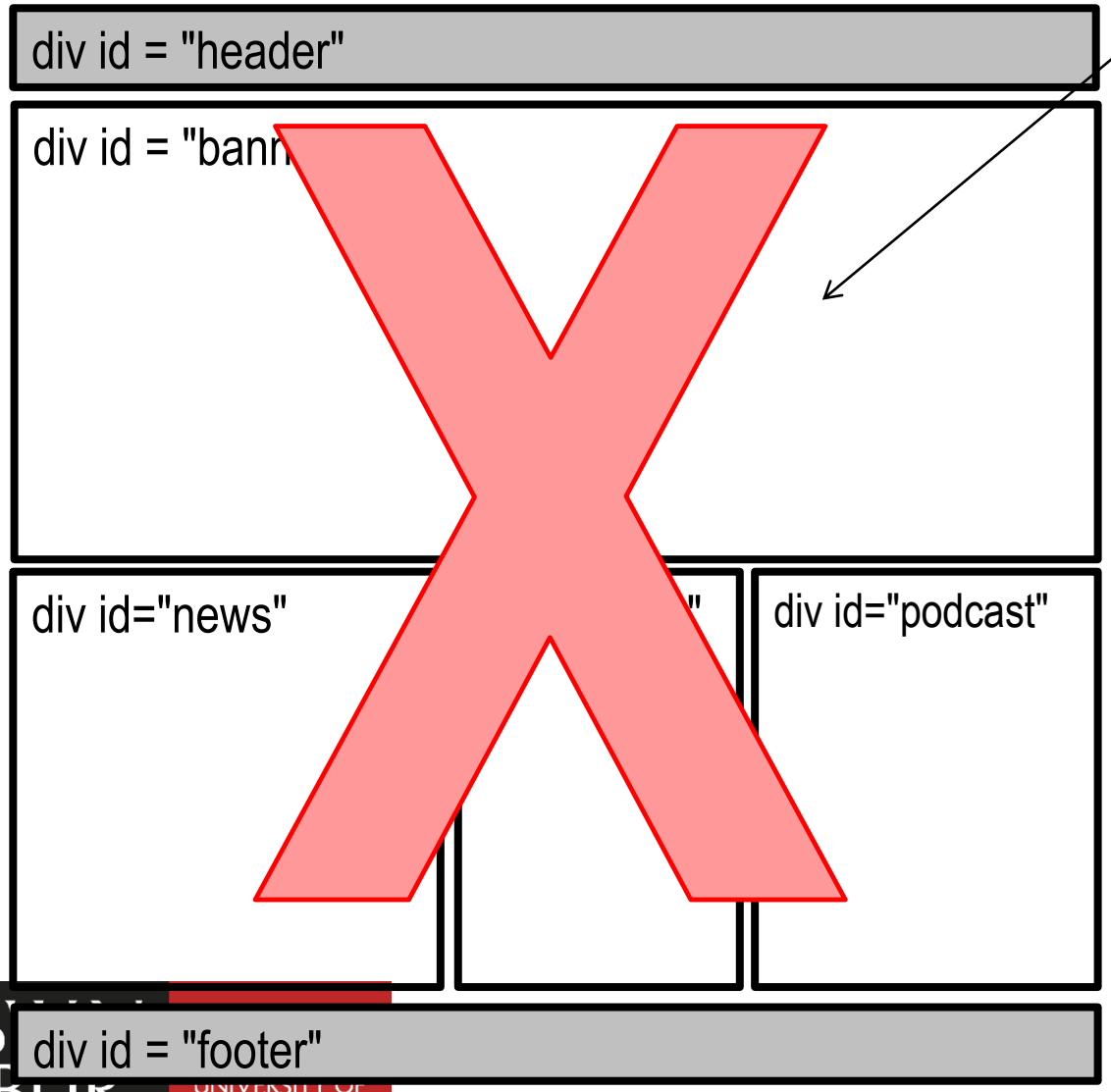
Division (continued)



Presented without CSS

- Always remember that **HTML** is only about **content** and **structure**, where these will appear on the screen will be specified through **CSS**

Division (continued)



Presented with CSS

- **id** is used if the style is only for one division on the web page
- **class** is used if style is applied to several divisions on the web page, for example multiple articles

Division and Span

- With and , the defined structure remain semantically *neutral* in terms of meaning to the browser.
- If a browser is to have a shortcut key to the page navigation, which will it jump to?
  Users may use different names, such as
  - …
  - …
  - …

Lecture - overview

- **HTML Content**
- ***Validating HTML5 form data with regular expressions***
- **HTML Structure**
  - Div and Span
  - ***Navigation, Article, Section, Header, Footer, Aside, Figure***

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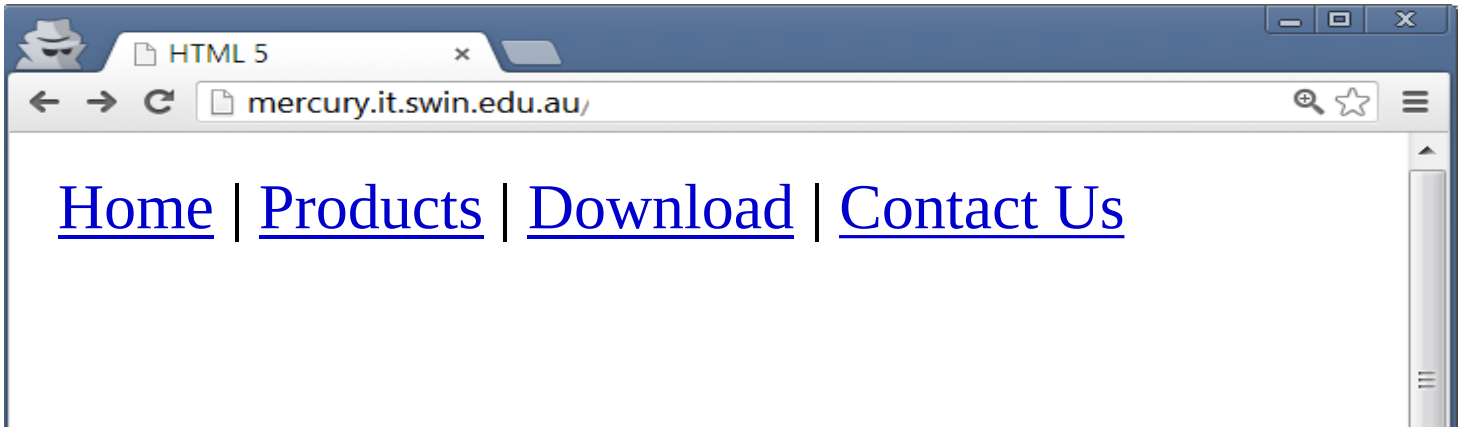
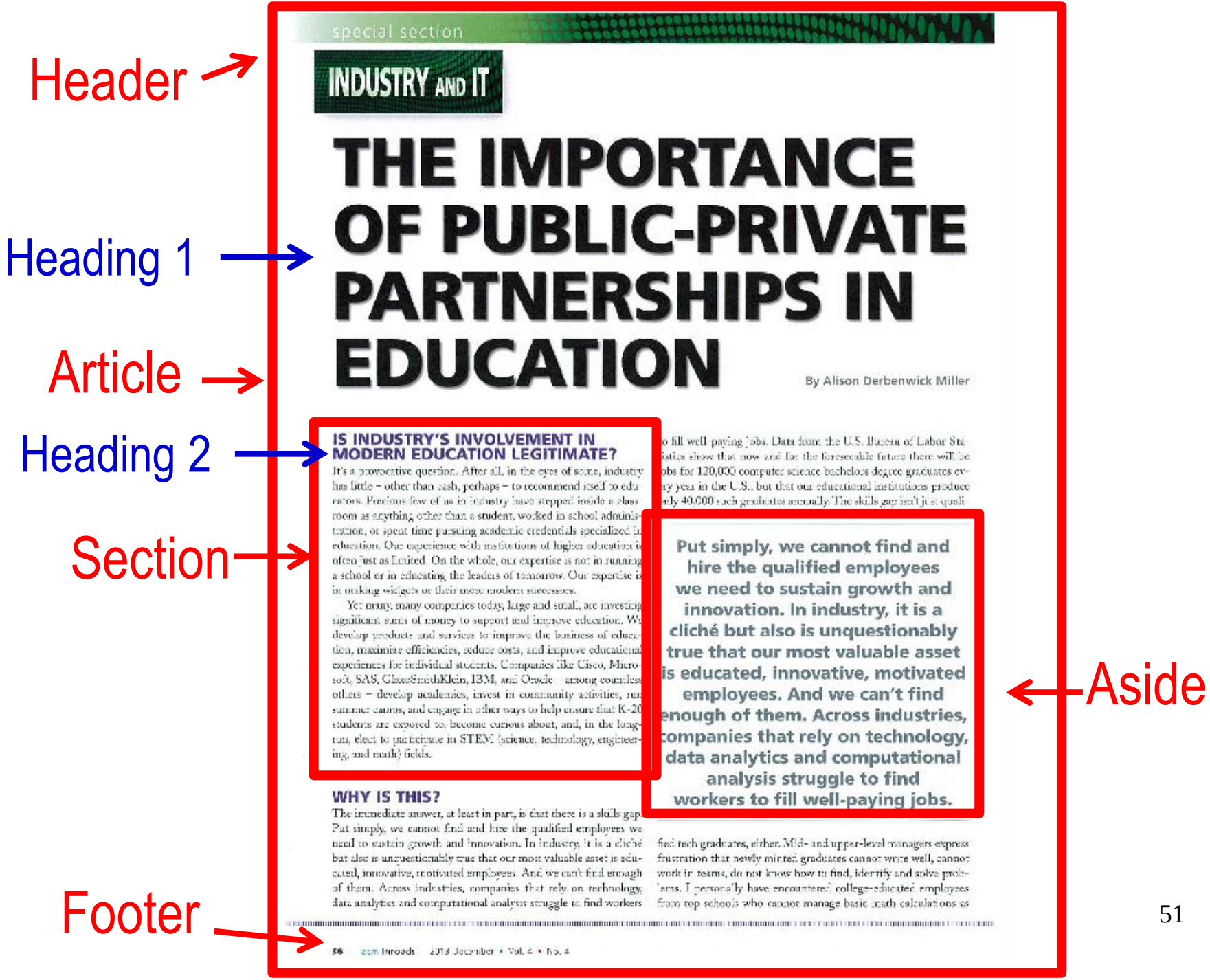
Navigation

- **<nav>…</nav>** specifies a section of navigation links.
- It is intended only for major block of navigation links.
  - Not all links of a document must be in a <nav> element
- Browsers, such as screen readers for disabled users, can use this element to determine whether to omit the initial rendering of this content.

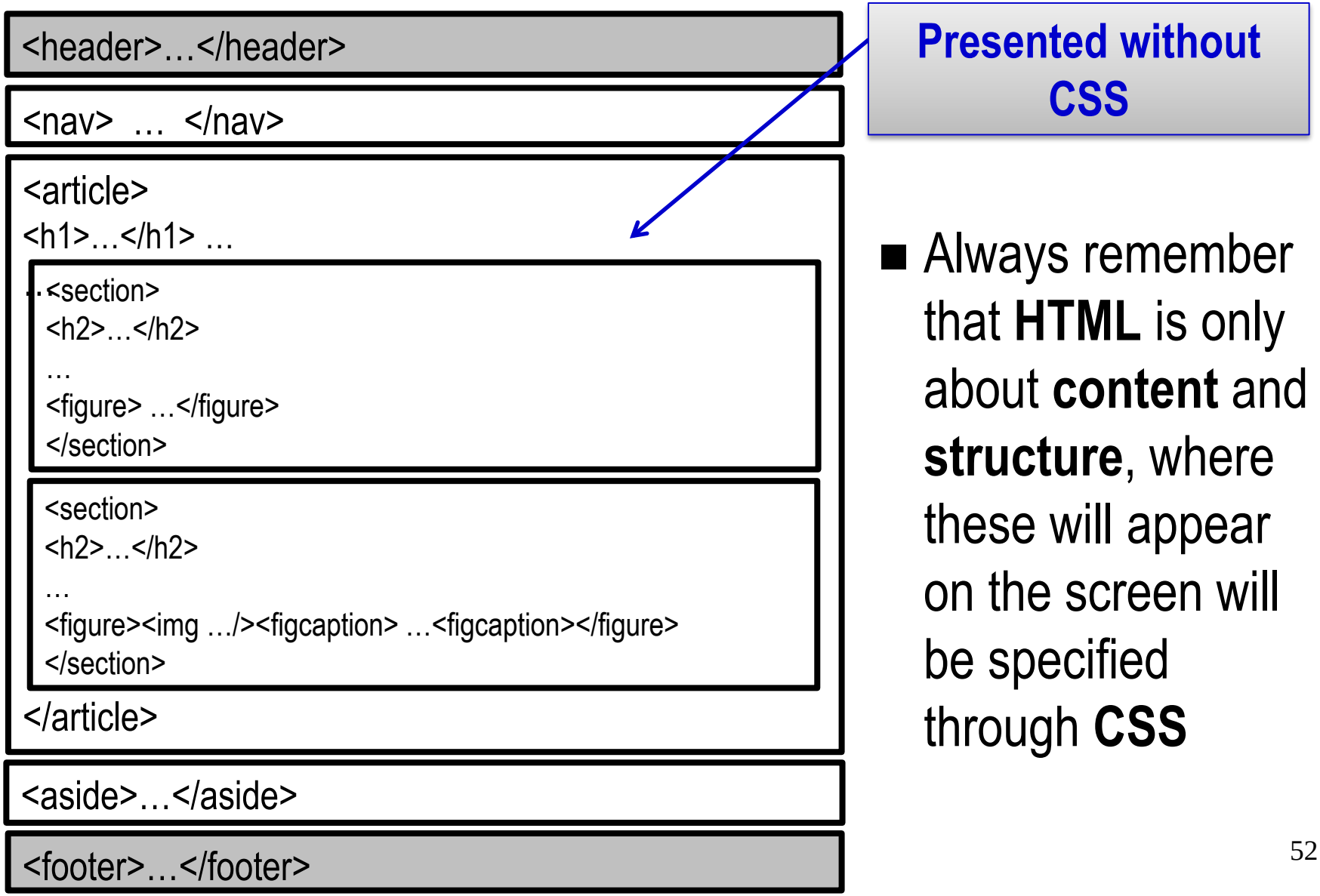
Navigation (continued)

```
<nav>
<a href="index.php">Home</a> |
<a href="product.php">Products</a> |
<a href="download.php">Download</a> |
<a href="contact.php">Contact Us</a>
</nav>
```



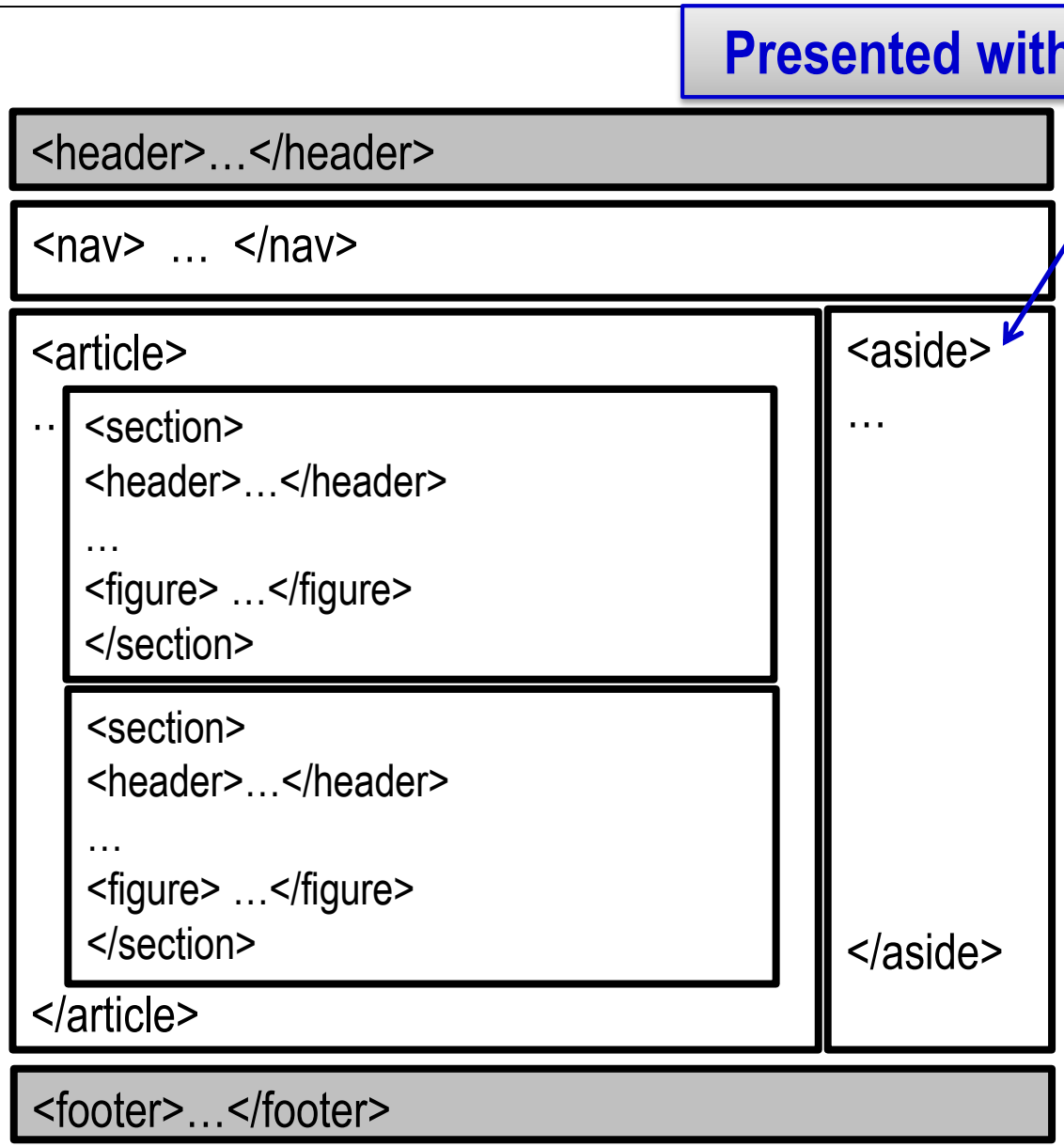

Header
Heading 1
Article
Heading 2
Section
Aside
Footer
special section
INDUSTRY AND IT
THE IMPORTANCE OF PUBLIC-PRIVATE PARTNERSHIPS IN EDUCATION
By Alison Derbenwick Miller
IS INDUSTRY'S INVOLVEMENT IN MODERN EDUCATION LEGITIMATE?
WHY IS THIS?
Put simply, we cannot find and hire the qualified employees we need to sustain growth and innovation. In industry, it is a cliché but also is unquestionably true that our most valuable asset is educated, innovative, motivated employees. And we can't find enough of them. Across industries, companies that rely on technology, data analytics and computational analysis struggle to find workers to fill well-paying jobs.

Structure: Putting it all together



- Always remember that **HTML** is only about **content** and **structure**, where these will appear on the screen will be specified through **CSS**

Structure: Putting it all together



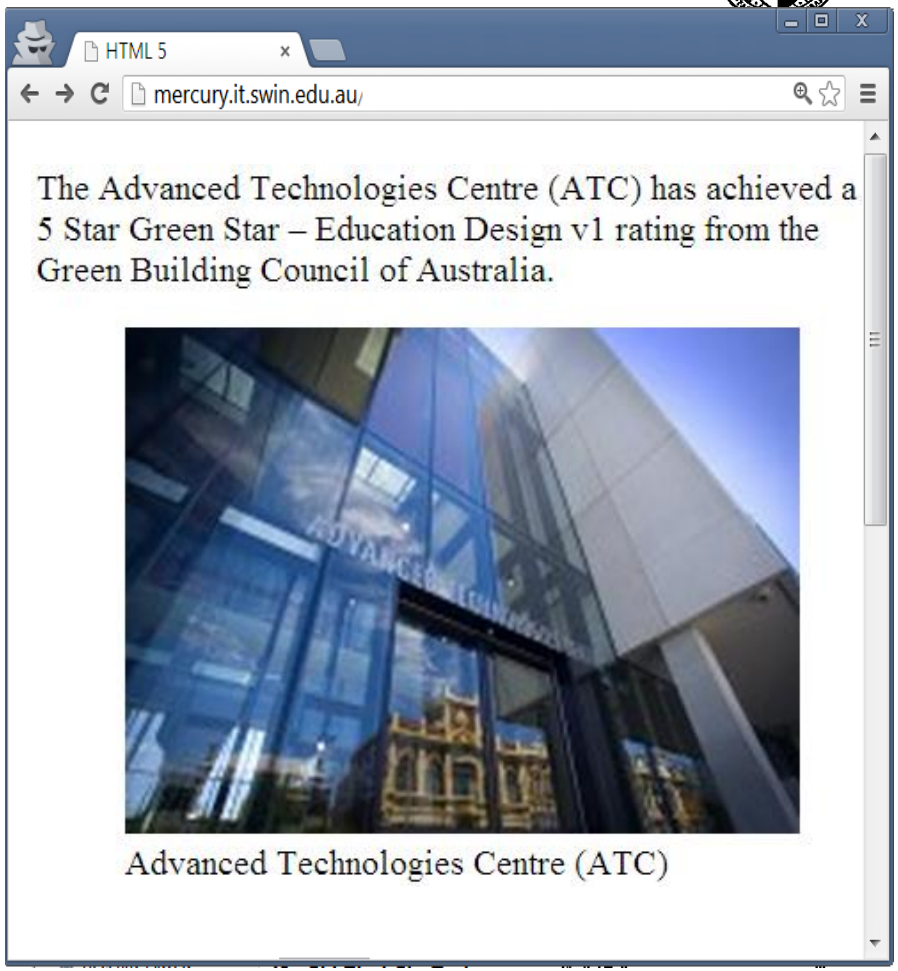
Figure

- **<figure>… </figure>** encloses a self-contained content such as illustrations, diagrams, photos, code listings
- Its position is independent of the main flow, and if removed it should not affect the flow of the document.
- The <figcaption> element is used to add a caption for the <figure> element.

Figure (continued)

```
<p>The Advanced Technologies Centre
(ATC) has achieved a 5 Star Green
Star – Education Design v1 rating
from the Green Building Council of
Australia.</p>

<figure>
<img
src="http://www.swinburne.edu.au/chan
cellery/mediacentre/images/content/la
rge_New_ATC_Building_1.jpg" alt="ATC"
width="300" height="220">
<figcaption>
Advanced Technologies Centre (ATC)
</figcaption>
</figure>
```



Next ....

- Design for Usability