

A Practical Introduction to HTML, CSS & JavaScript

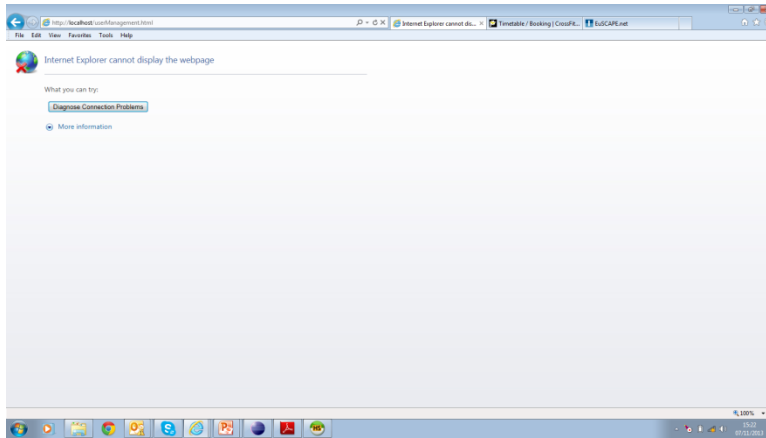
Dr. Chris Tomlinson

chris.tomlinson@imperial.ac.uk

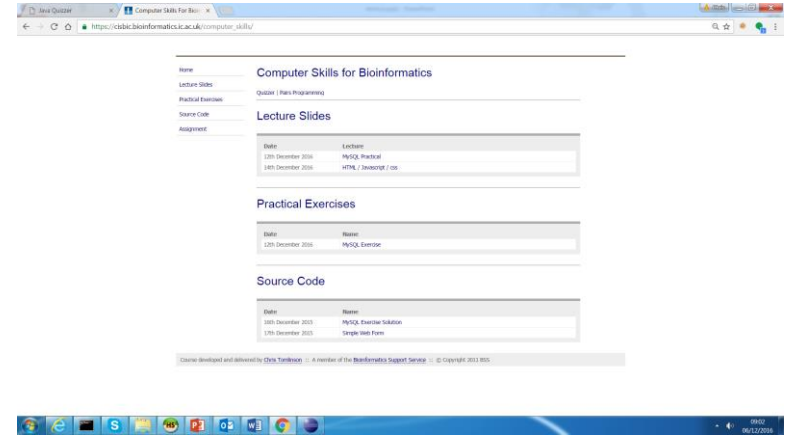
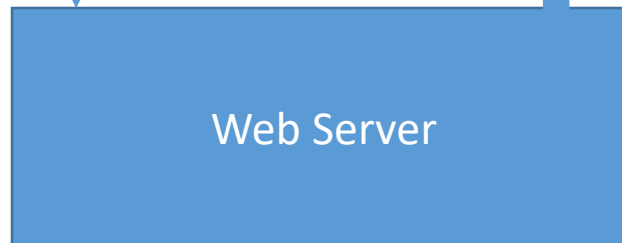
Outline

- **Introduction**
 - **HTML**
 - **JavaScript, from static to dynamic**
 - **CSS – a brief introduction**
-
- http://dataman.bioinformatics.ic.ac.uk/computer_skills

The Internet : What is happening?



Request (URL)
URL is decoded
and the request is
sent to the correct
webserver



Response is a text stream in the
form of a html document
<html>....</html>
The web browser interprets the
html and displays it



HTML Documents

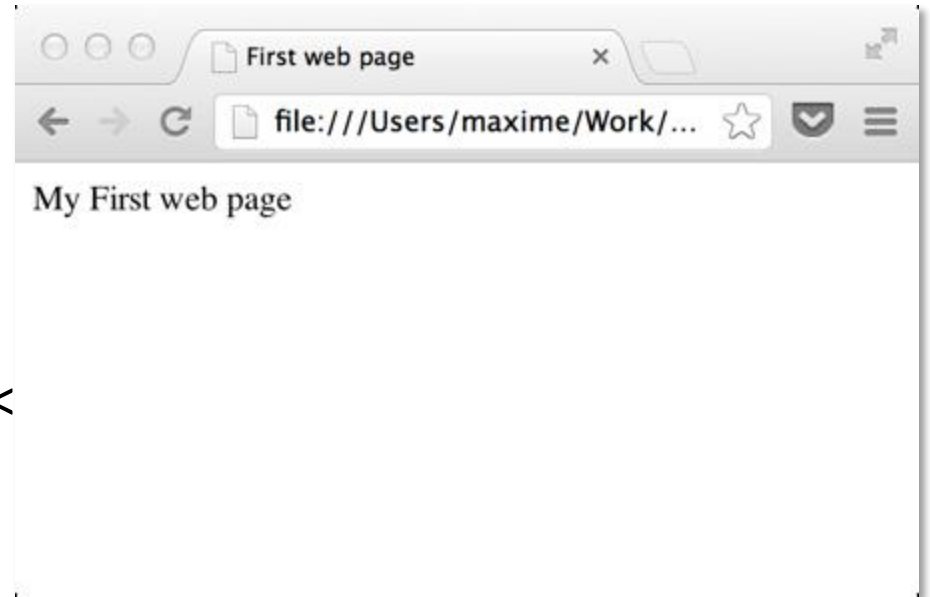
- HTML is the language of the web (Hyper Text Markup Language)
- Every internet browser can interpret and display HTML documents
- In reality HTML is just a stream of text that is formatted and displayed for you on the screen by the web browser
- HTML documents consist of a series of pairs of tags often with text and other tags in between the tags
- A tag pair has an opening tag and a closing tag
- HTML tags are contained within <> (chevrons)
- An opening tag is like this <html>
- A closing tag is like this </html>
- Tags should match (generally)
- HTML documents can be written in files with the postfix '.html'
 - i.e. page1.html

HTML Code

- Visit a web page that you like
 - Right click on the page
 - Select the 'View Source' option
-
- This is what the web server sends back to the browser
 - The browser interprets and displays it

HTML Example Page 1

```
<!doctype html>
<html>
  <head>
    <title>First web page<
  </head>
  <body>
    My First web page
  </body>
</html>
```

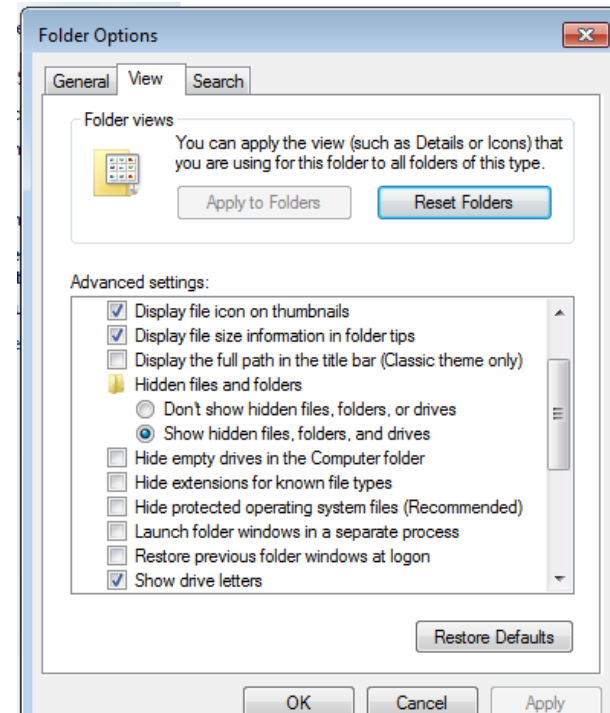


Other HTML Tags

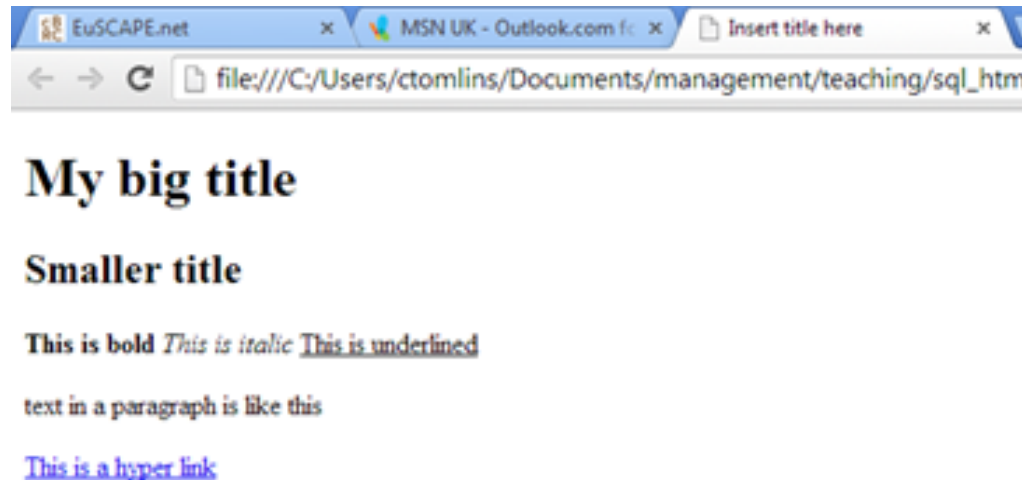
- Hyperlink tag;
 - `Link Text`
- Headings
 - `<h1>Big Heading</h1>`
 - `<h2>Smaller Heading</h2>`
 - `<h3>Even Smaller Heading</h3>`
- Text
 - `<p>Paragraph</p>`
 - `Bold`
 - `<i>Italic</i>`
 - `<u>underline</u>`
 - `
` newline tag
 - `<hr/>` horizontal rule (line) across page

Exercise 1: Your First Web Page

- Make a new folder in your file system called web files or something like
- Make sure that file extensions are displayed so that they can be changed to .html
 - In windows; Control Panel->Appearance and Personalisation->Folder Options
 - Then un tick 'Hide extensions for known file types'
- Make a new text file in the directory called page1
- Change the file extension so that it is called page1.html



Make the page below in your file using the html tags we have just seen



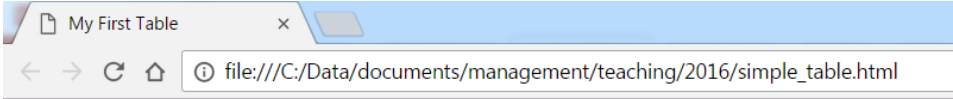
- Make the link go to the following web page (http://dataman.bioinformatics.ic.ac.uk/computer_skills)
- Visualise the page by opening it in a web browser
 - Internet Explorer : File->Open
 - Chrome : You can type the path in the address bar (file:///C:/html/page1.html)

HTML Tables

- Tables are a very useful way of visualising information
- Tables have rows and columns
- The tags are;
 - `<table></table>` : outer table tags
 - `<th></th>` : table header row (for the first row of a table only)
 - `<tr></tr>` : for a normal table row
 - `<td></td>` for a table element

A Very Simple Table

```
<!DOCTYPE html>
<html>
<head>
<meta charset="ISO-8859-1">
<title>My First Table</title>
</head>
<body>
<table border=1>
  <tr>
    <th>Column 1 Head</th>
    <th>Column 2 Head</th>
  </tr>
  <tr>
    <td>Column 1 Row 1 Data</td>
    <td>Column 2 Row 1 Data</td>
  </tr>
  <tr>
    <td>Column 1 Row 2 Data</td>
    <td>Column 2 Row 2 Data</td>
  </tr>
</table>
</body>
</html>
```



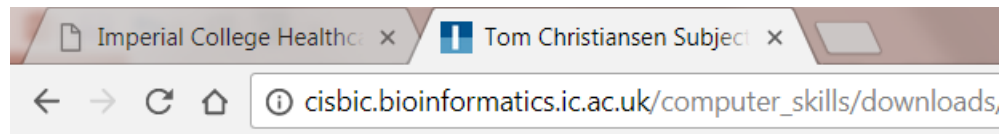
The screenshot shows a web browser window with the title "My First Table". The address bar displays the file path: file:///C:/Data/documents/management/teaching/2016/simple_table.html. The browser content shows a table with two columns and two rows of data.

Column 1 Head	Column 2 Head
Column 1 Row 1 Data	Column 2 Row 1 Data
Column 1 Row 2 Data	Column 2 Row 2 Data

Exercise 2: Your HTML Page with a table

- Using the same data model as from the MySQL Lecture Practical make a page to represent a subject's information inside a table.
- (first name, last name, gender, dob, smoker, drinker, study #)
 - Make the page title the Subject's name
 - Have a heading on the page of the subject's name (inside <h1> tags)
 - Put a table in it to contain the subject's attributes
 - Table should have 7 rows and 2 columns
 - Make up data to go in the cells

Exercise 2



Tom Christiansen Subject Details

First Name	Thomas
Last Name	Christiansen
Gender	Male
DOB	12/01/1979
Smoker	No
Drinker	Yes
Study #	1

Sending Information via the Web

- To develop an interactive web application a web page has to be able to send information to a webserver



Select Your Team

Your Team	Alvin and the Chipmunks ▼
Submit	Confirm

HTML Forms

- Information can be sent back to the server via web forms
- Web forms consist of web page components that capture information

Form Tag

- All components in a form are contained within the `<FORM></FORM>` tag.
- The opening form tag will usually look something like this;
 - `<form action="hospitals.html" method="POST">`
 - The action attribute is the address of the web page where information is sent
 - The method attribute is the type of request that is sent to the server, POST is almost always used with forms

Common Form Elements – Inside the <form></form> tags

Text

- Text Input

```
<input type="text" name="username" id="username" value="ctomlins" />
```

- Password Input

```
<input type="password" name="pass" id="pass" value="mypasswd" />
```

- Text Area

```
<textarea id="textareainput" name="textareainput" rows="5" cols="30">
```

Text inside the text area goes between the tags
</textarea>

Login Form

Intranet Login

Login to the intranet using the form below

Username	<input type="text" value="ctomlins"/>
Password	<input type="password" value="*****"/>
Submit	<input type="submit" value="Log in"/>

© Chris Tomlinson 2012

```
<FORM ACTION=login.html METHOD=POST>
```

```
<TR>
```

```
<TD >Username</TD>
```

```
<TD >
```

```
<INPUT NAME="username" ID="username" TYPE="TEXT" SIZE=50 MAXLENGTH=50 VALUE="">
```

```
</TD>
```

```
</TR>
```

```
<TR>
```

```
<TD >Password</TD>
```

```
<TD >
```

```
<INPUT NAME="password" ID="password" TYPE="PASSWORD" SIZE=50 MAXLENGTH=50 VALUE="">
```

```
</TD>
```

```
</TR>
```

```
<TR><TD >Submit</TD>
```

```
<TD >
```

```
<INPUT NAME="submit" TYPE="SUBMIT" VALUE="Log in">
```

```
</TD>
```

```
</TR>
```

```
</FORM>
```

Form Elements – Selectors

Pull Down List

```
<SELECT NAME=team_id ID=team_id>  
    <OPTION VALUE=1>Alvin and the Chipmunks</OPTION>  
    <OPTION VALUE=2>Fantastic Five</OPTION>  
    <OPTION VALUE=3>Serious Quiz Leaders</OPTION>  
</SELECT>
```

dataman.bioinformatics.ic.ac.uk/computer_skills/quizzer//index.html



Select Your Team

Your Team	<div>Alvin and the Chipmunks ▼</div> <div>Alvin and the Chipmunks</div> <div>Fantastic Five</div> <div>Serious Quiz Leaders</div>
Submit	

Form Elements : Radio Buttons

Database Design Team :: Fantastic Five

A relational database is exactly the same as a series of excel spreadsheets

true	<input type="radio"/>
false	<input type="radio"/>

Next Question

© Chris Tomlinson 2012

```
<INPUT NAME="qChoice" id="qChoice_1" TYPE="RADIO" VALUE="true" >  
<INPUT NAME="qChoice" id="qChoice_2" TYPE="RADIO" VALUE="false" >
```

Form Elements : Checkbox

```
<input id="molec_conf_1" name="molec_conf_1" type="CHECKBOX" value="1" checked>
```

```
<input id="molec_conf_2" name="molec_conf_2" type="CHECKBOX" value="1">
```

Have you confirmed the resistance determinant
using molecular methods? (check for yes)



Form Elements : Submit Button

- Pressing the submit button on a web form sends the information in it to the server
- The http address that the information is sent to is taken from the ACTION attribute of the form tag

Form Elements : Submit Button

```
<FORM ACTION=login.html METHOD=POST>
<TR>
<TD WIDTH = 25% ALIGN=left VALIGN=top BGCOLOR=#ffffff COLSPAN=1>Username</TD>
<TD WIDTH = 75% ALIGN=left VALIGN=top BGCOLOR=#ffffff COLSPAN=1>
    <INPUT NAME="username" ID="username" TYPE="EDIT" SIZE=50 MAXLENGTH=50 VALUE="">
</TD>
</TR>
<TR>
<TD WIDTH = 25% ALIGN=left VALIGN=top BGCOLOR=#ffffff COLSPAN=1>Password</TD>
<TD WIDTH = 75% ALIGN=left VALIGN=top BGCOLOR=#ffffff COLSPAN=1>
    <INPUT NAME="password" ID="password" TYPE="PASSWORD" SIZE=50 MAXLENGTH=50 VALUE="">
</TD>
</TR>
<TR><TD WIDTH = 25% ALIGN=left VALIGN=top BGCOLOR=#ffffff COLSPAN=1>Submit</TD>
<TD WIDTH = 75% ALIGN=left VALIGN=top BGCOLOR=#ffffff COLSPAN=1>
    <INPUT NAME="submit" TYPE="SUBMIT" VALUE="Log in">
</TD>
</TR>
</FORM>
```

Intranet Login

Login to the intranet using the form below

Username	<input type="text" value="ctomlins"/>
Password	<input type="password" value="*****"/>
Submit	<input type="submit" value="Log in"/>

Exercise 3: Make a Web Form

- Make a new page that contains a Web Form formatted using a html table. The table should have 7 rows and 2 Columns. In the first column should be the name of the item and in the second column the form component. The form will be for collecting information about patients and should contain the following items;
 - Make form method = POST, set ACTION = https://dataman.bioinformatics.ic.ac.uk/computer_skills/quizzier/subject.html
 - First name, Last Name (set id and name attributes = first_name, last_name)
 - Male or Female (radio buttons, id and name = gender, values Male = 1 Female =0)
 - Smoker (check box, id and name = 'smoker', value 1)
 - Drinker (check box, id and name = 'drinker', value 1)
 - Experimental Study (id and name = study_id pull down menu with 5 options Study 1...5, value 1...5)
 - A submit button

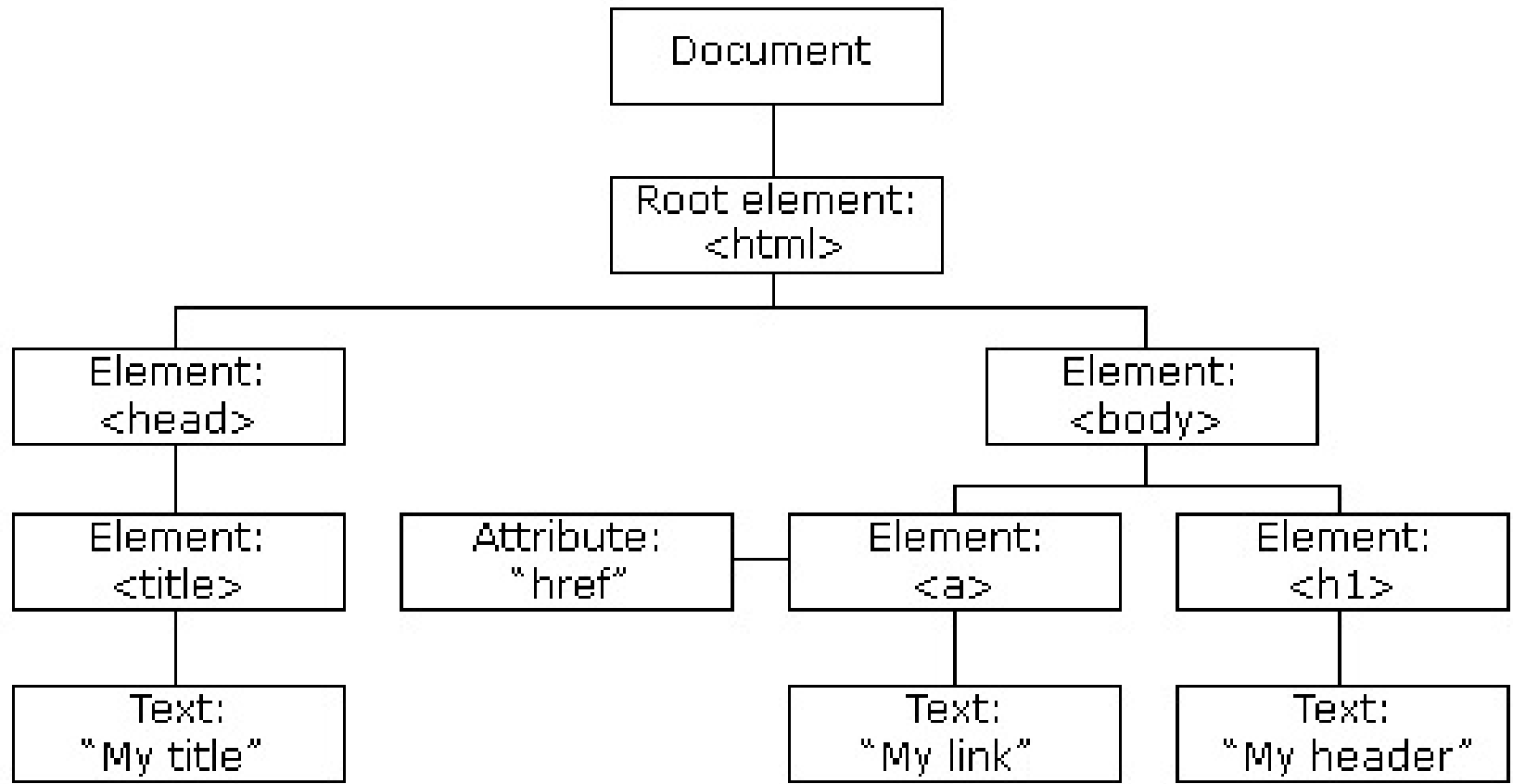
HTML Summary

- HTML is a syntax for formatting internet content
- Page content is placed inside nested html tags that contain formatting information for the browser
- Html forms allow a developer to make interactive web content, with information being sent back to the web server

Quiz followed by break

HTML Page Structure

Document Object Model (DOM)



Javascript

- Javascript is a language which enables you to put client side code into your web pages.
- This is used to make your web pages more interactive.
- The syntax of javascript is similar to Java but it is not really an OO language
- Javascript commands are often triggered by event listeners on page components

Calling Javascript from your page

- You can call scripts on your page when certain things happen. Some html components have an onMouseOver event listener built in.

```
<!doctype html>
<html>
  <head>
    <title>First Javascript page</title>
  </head>
  <body>
    <A HREF="#" onMouseOver="document.bgColor='black'">Black</a>
    <A HREF="#" onMouseOver="document.bgColor='green'">Green</a>
    <A HREF="#" onMouseOver="document.bgColor='yellow'">Yellow</a>
    <A HREF="#" onMouseOver="document.bgColor='red'">Red</a>
    <A HREF="#" onMouseOver="document.bgColor='brown'">Brown</a>
    <A HREF="#" onMouseOver="document.bgColor='white'">White</a>
  </body>
</html>
```

Exercise 4: Add Javascript to your web form

- With your form page from Exercise 3, add an onClick attribute to the button tag.
- The attribute should say;
 - ONCLICK="return confirm('Submit');"
- This will make a Yes/No dialog box popup when the button is pressed. The form will only be submitted if Yes is clicked (i.e. true is returned);

More Complex Javascript : Exercise 5

- A script (inside a webpage) is a small program containing commands embedded inside the html that makes up the page
- A script can have functions and variables like any program but can also operate on items within the web page
- A script can be also inserted inside a page using the `<SCRIPT> </SCRIPT>` tag.
- Many web page components have event listeners attached to them like the `onClick` and `onMouseOver` examples we have just seen.
- Scripts can be put in the head or body of a page or can be included from an external file
- Scripts usually contain functions that are triggered by the html event listeners.
- Put the script below into your form page and trigger `myFunction()`; when the `study_id` pull down is changed (use the `'ONCHANGE='` event listener)

```
<script type="text/javascript">  
    function myFunction(){  
        alert("Hello World");  
    }  
</script>
```

Javascript variable declaration

- Variables are not typed in Javascript and are declared using the var keyword;

```
var pi=3.142;
```

```
var str="A text string";
```

```
var obj;
```

All of the above are valid variable declarations

- Strings are concatenated with the + operator
- `var str3 = "any string :: "+str;`

More HTML : the <div> tag

- The div tag is used to define divisions or sections in a web page
- They are often used in conjunction with JavaScript and/or Cascading Style Sheets (css)
- For instance the following

```
<div style="color:#0000FF">  
<h3>This is a heading</h3>  
<p>This is a paragraph.</p>  
</div>
```

will output the text inside the div in blue (by evaluating the style attribute)

<div> : more info

- In order to make a link between a div tag and JavaScript (or css) the div tag needs to be given an id
 - `<div id="myDiv">.....</div>`
- You can then reference the div in your JavaScript
- This way of referencing page components by ID is also valid for all other elements in the Document Object Model (i.e. anything that is in your web page)

JQuery Library

- There are many prewritten JavaScript libraries that you can use to increase the power of the base JavaScript language
- One of the most popular ones is called JQuery and today it is widely used
- Download the JQuery library from the course site and store in the same directory as the web pages we have made

JQuery reference page component

- `var div_element=$("#myDiv");`
- The JavaScript statement above returns a reference to the element in the HTML document with the id myDiv
- Once you have a handle to the element you can then manipulate it
- JavaScript IS CASE SENSITIVE

```
<!doctype html>
<html>
    <head>
        <title>jQuery Example</title>
        <script src="jquery.js"></script>
    </head>
    <body>
        <div id="notMe" style="font: 15px arial, sans-serif;"><p>Div statement id="notMe"</p></div>
        <div id="myDiv" style="font: 15px arial, sans-serif;"><p>second div statement id="myDiv"</div>

        <script>
            var div_element=$("#myDiv");
            div_element.css( "border", "3px dotted red" );
            div_element.css("font-size", "27px");
        </script>
    </body>
```

Javascript if statement

//gender1 is a checkbox

```
if($("#gender1").is(":checked") ){  
    .....  
}  
else{  
    .....  
}
```

Manipulate Page Data on the Fly : Exercise 6

- chris.tomlinson@imperial.ac.uk

- Example of changing page content from Javascript;

```
var div_element=$("#myDiv");  
div_element.html("Change text between div tags of myDiv to this");
```

- Using the page that you have developed with a web form on it (exercise 3);
 - Include the jquery library in the head section of the code
 - Remove form tag from your code
 - In the HTML code insert a div tag below the web form and give it an ID
 - Insert a new javascript function into your code that will be triggered when the form Submit button is pressed (onClick='myFunction();').
 - In the script declare a variable called str that will contain the output. Use alert to display the contents of str while developing (alert(str);)
 - Get references to the form elements into variables jquery \$("#....") notation;
 - Build up the string using the following;
 - \$("#input1").val() – will give you the value of a text input called input1
 - use \$("#gender1").is(":checked") to find out if a checkbox / radiobutton is checked (in this case id is gender1)
 - Use \$("#study").children("option:selected").text(); to get the value of the pull down menu (if the pulldown has the id study)
 - \$("#displayDetails").html(str); : use this to set the inner text of the div

Client Side Validation of Form Data

- Exercise 6 showed how form data can be accessed from JavaScript and processed
- Techniques like this are often used for client side form validation
 - As your validation is exposed in the html document data should also be validated when sent back to the server

AJAX : Demonstration

- JavaScript is also used in lots of other ways
 - AJAX stands for Asynchronous JavaScript And XML
 - AJAX enables you to communicate with a server in an asynchronous way (i.e. JavaScript can send requests to the server in response to GUI actions rather than when the page is loaded)
 - One of the great things about JQuery is that it has an AJAX API built in
 - Look at the AJAX Demonstration at;
 - <http://glycosciences.med.ic.ac.uk/structures.html>



JavaScript and JQuery

- We have looked at some very simple JavaScripts today briefly using JQuery
- JavaScript allows you to insert programs into your web pages so that you can make the pages interactive
- JavaScripts are often (but not always) triggered by GUI functions
- JQuery is a JavaScript library that is widely used to construct sophisticated JavaScript interfaces.
- My advice is, ALWAYS USE the JQuery library for JavaScript implementations
- It simplifies the access of page elements and AJAX implementation
- Libraries like d3 are built on top of JQuery - demonstration

Quiz Part II : Then Short Break

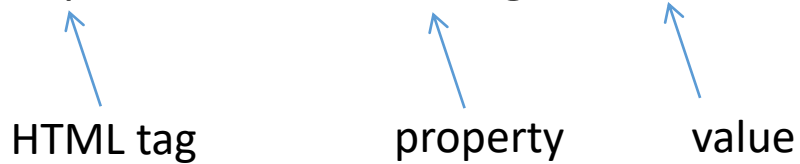
Cascading Style Sheets (css)

- css was introduced as a way of separating web page presentation from the logic of the page
- css directives define the look and feel of a web page and are solely to do with presentation
- css commands can be applied to a page in three ways;
 - In line as a part of HTML tags
 - Inside a page defined inside a `<style></style>` tag
 - In a separate file that a web page accesses

css syntax

```
p {color:red;text-align:center;}
```

HTML tag property value



```
/*This is a comment*/
```

```
p  
{  
text-align:center;  
/*This is another comment*/  
color:black;  
font-family:arial;  
}
```

Inline CSS

- Inside a tag the style property is added and css directives are added inside quotes
- The format of the css is <property>:<value>
- More than one css property can be separated by a semicolon
- We have already seen an example of this;

```
<div style="color:#0000FF">  
<h3>This is a heading</h3>  
<p>This is a paragraph.</p>  
</div>
```

- Text within the div will be displayed in blue

Css: Using a Style Tag

```
<!doctype html>
```

```
<html>
```

```
<head>
```

```
<style type="text/css">
```

```
    h2 {color: purple;}
```

```
</style>
```

```
</head>
```

```
<body>
```

```
<h2>title 2</h2>
```

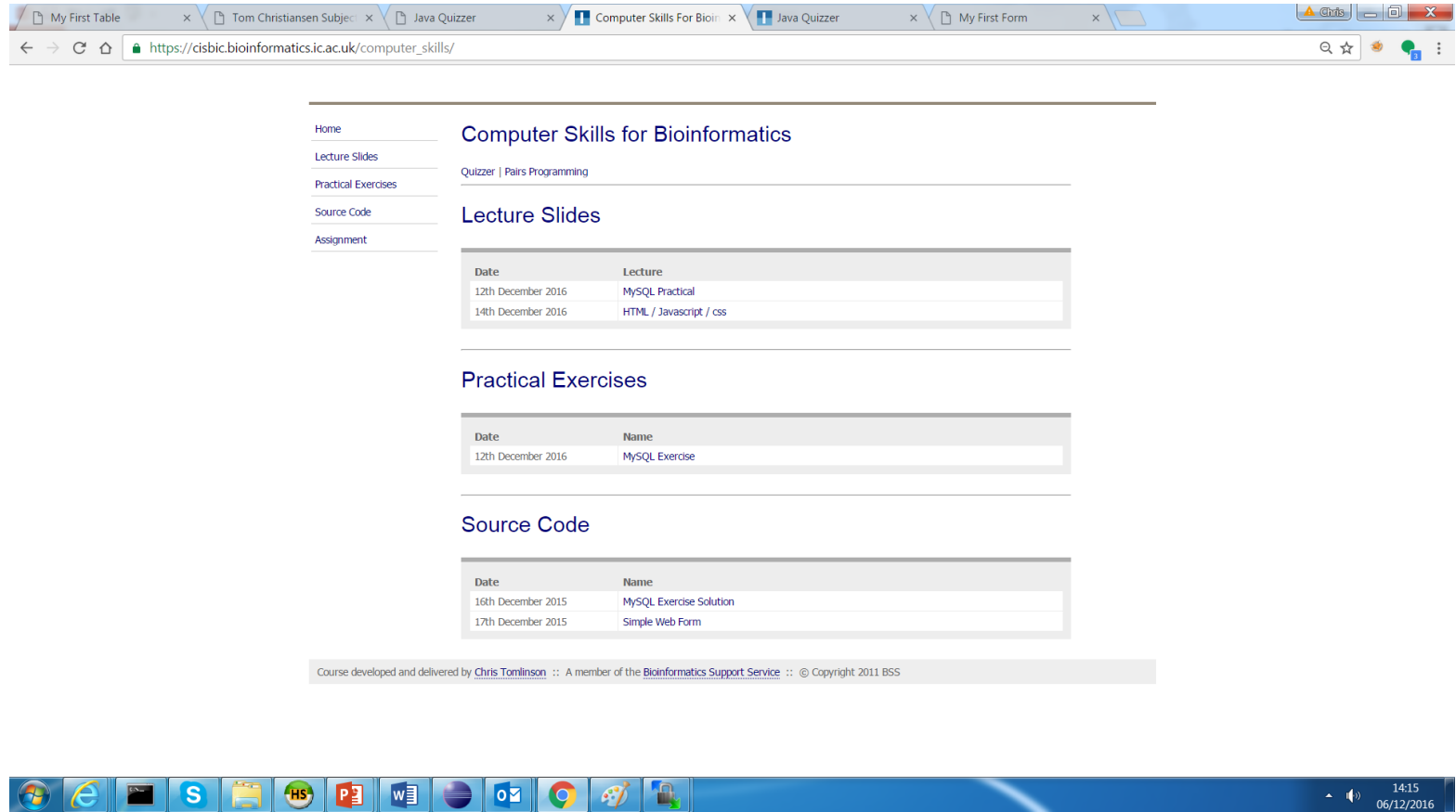
```
<p>
```

Lorem ipsum dolor sit amet, consectetur adipisicing elit,
sed do eiusmod tempor incididunt ut labore et dolore
magna aliqua. Ut enim ad minim veniam, quis nostrud
exercitation ullamco laboris nisi ut aliquip ex ea commodo
consequat. Duis aute irure dolor in reprehenderit in
voluptate velit esse cillum dolore eu fugiat nulla pariatur.
Excepteur sint occaecat cupidatat non proident, sunt in
culpa qui officia deserunt mollit anim id est laborum.

Css : Using an included File

- It is a good idea to completely separate the css from the HTML by putting the css code in a separate file.

Course Web Page



Course web page Header HTML

```
<HEAD>  
  
<TITLE>Computer Skills for Bioinformatics</TITLE>  
  
<LINK media=all  
href="https://dataman.bioinformatics.ic.ac.uk/computer_skills/css/style.css"  
type=text/css rel=stylesheet>  
  
</HEAD>
```

Exercise 7 : Apply css styling to your form

- Download the style.css file from the web and store it in the same directory as your form
- https://dataman.bioinformatics.ic.ac.uk/computer_skills/css/style.css
- Have a look at the file and the css directives in it
- Apply it to your web form (exercise 3) by copying the link line in the head section from the java course html into your webform html head section
- Then put your form inside a div tag like this;
 - `<div id=container>`
 - Your form html
 - `</div>`

Css : apply a style to an id

- In the css file you will have seen many items like this;

```
#content {  
    MARGIN-LEFT: 180px; WIDTH: 720px; MARGIN-RIGHT: 100px  
}
```

- This will apply the css to the section of the html with the id content

```
                <div id="content">  
                    elements in here have css style content applied to  
them                </div>
```

css : apply style to an id (2)

- This code in the style.css file will apply the css to elements within the <P></P> tags within a div with the id footer

```
#footer P {  
    PADDING-RIGHT: 5px; PADDING-LEFT: 5px; PADDING-BOTTOM: 5px; COLOR: #000077; PADDING-TOP: 5px; FONT-SIZE:  
    12px; MARGIN: 0px auto; WIDTH: 1200px; COLOR: #666; LINE-HEIGHT: 1.6em; FONT-FAMILY: Lucida Grande, Tahoma, Arial, Helvetica,  
    sans-serif;  
}
```

- Exercise 8
 - Modify the js function from exercise 6 so that it returns a string inside <p> tags inside a div with the id 'footer'.
 - Include the css file in the header

css : apply a style to more than one element

- The values of id attributes have to be unique by their nature
- If you want to apply a style to more than one element then you can use the class attribute of a tag
- `<div class="data-table"> ... </div>`
- `<table class="data-table"> ... </table>`

css : apply style using class

- These correspond to the .data-table directives at the bottom of the css file;
- So whenever data-table is included as a class attribute the css rules are applied
- This can be applied to many elements on a page

Exercise 9 : Apply a CSS class to your form table

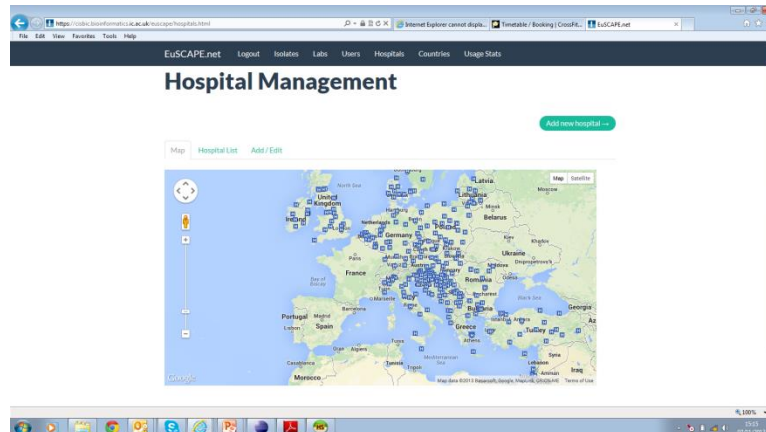
- Apply the data-table rules to the table containing the form (exercise 3) by including `class="data-table"` in the table tag

Working with multiple devices : Bootstrap

Bootstrap provides some powerful web css/JavaScript templates that are designed to work on mobile devices seamlessly

<http://getbootstrap.com/>

Demonstration



css Quiz

The End