

CO456

Web

Week 1

Part 1 - Module Part Introduction

Part 2 - The Internet and the WWW

Part 1. Introduction - Contacts

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Part 1. Introduction - Subject Areas

- Protocols, basic structure of the Internet
- Client-side development
- Core Technologies
 - (X)HTML
 - CSS
 - JavaScript and the DOM
- Contemporary Web (e.g. HTML5, CSS3, SVG, jQuery and jQuery mobile, Box2dWeb)

Overall Aim: acquire knowledge and skills required for client-side (*front end*) Web site development.

Part 1. Introduction - Jobs

A typical vacancy

- **Front-end Developer - AngularJS - HTML5 - CSS3 - JavaScript -UX**
- Salary: £300 - £400 per day
- Date posted: 23/09/2016
- Job type: Contract
- Role: A leading E-commerce organisation based in central Manchester are currently looking to add a Front End Developer with UX design skills to their well established team. We are looking for an experienced Front End Developer who has worked within Agile environments. You must have experience with JavaScript and UX design.
- Skills: JavaScript; JQuery; Agile; CSS3 / HTML5; Experience with UX Design
- Company: This organisation is a market leading e-commerce organisation.

Extract from CWJobs.co.uk, 25 September 2017

- Most Web development vacancies assume HTML5 and CSS skills and specify “JavaScript” based on a default assumption that JS developers will possess other web skills.
- *Number of vacancies advertised in the UK (Note growth between 9 Jan 09/20 Dec 11/7 Jan 13/29 Sep 14/25 Sept 16) specifying: JavaScript=726/1689/2135 /1597/2565 jobs.*
- Local demand – many Web authoring and CMS concerns in Bucks and Thames Valley ‘corridor’.

Sources are: CWJobs.co.uk and <http://www.itjobswatch.co.uk/>

JavaScript

% of all programming language jobs



Orange = permanent; Silver = contract.

Source: <http://www.itjobswatch.co.uk/jobs/uk/javascript.do>, accessed 25 Sept 2017

Part 1. Introduction - Module schedule

Wk.	Lecture/subject area(s)	Practical	Reading (Moseley, 2007)
1	Introduction How the Web works	Internet/Web definitions and HTML report	Ch 1 (The way the Web works)
2	HTML 1 (Introductory - inc. lists and hyperlinks)	HTML	Ch 2 pp 24-36 (HTML)
3	HTML 2 (inc. tables, images and forms)	HTML	Ch 2 pp 36-48 (HTML) Ch 3 (XHTML and frames)
4	CSS 1 (Introduction and core CSS principles)	CSS – introductory styles, embedded styles.	Ch 4 pp 76-96.
5	CSS 2 (Positioning elements).	CSS– using IDs, classes and layout control.	Ch 4 pp 97-103.
6	CSS 3 (Advanced layout & navigation)	CSS – using CSS to produce button-like navigation from HTML list elements. (CW2a to be demonstrated).	Specialised articles.
7	JavaScript 1 (Fundamentals, variables)	JS – foundation constructs.	Ch 5 pp 108-116
8	JavaScript 2 (Functions, branches, loops).	JS – calling functions.	Review Ch 1 to Ch 4.
9	JavaScript 3 (Objects and the DOM).	JS – manipulating the DOM.	Ch 5 pp 117-124.
10	JavaScript 4 (Forms and validation). And DHTML	JS– validating user completed forms.	Ch 6 126-139.
11	HTML5, CSS3, - media, forms, gradients, SVG ('Edge') and other enhancements	Web frameworks taster session 1	Ch 6 139-145, Ch 7.
12	Integrated HTML5, CSS3 and JavaScript (continued)	Web frameworks taster session 2	See practical sheets for information sources
	Vacation		
13	Assignment	Assignment Workshop	See practical sheets for information sources
14	Assessment Period	Present completed assignment artefact (ASSESSED)	N/A

Part 1. Introduction – Assessment

- One piece of Course Work (100% assessment)
- ‘*Engineer*’ Web artefact(s) (to be specified later)
- Present and demonstrate artefacts in class
- Produce a written report on artefacts
- Assessed on evidence of:
 - Understanding of technologies;
 - Implementation;
 - Properly (engineered) ***separation of concerns*** for Web page structure, presentation and behaviour;
 - Report and ‘code’ presentation and clarity;
 - Report acknowledgement of sources (references);
 - Any creative use of HTML5, CSS3 and related frameworks.

Part 1. Introduction - References

- Module Text
 - Moseley R (2007) *Developing web applications*. John Wiley
- Other useful sources
 - Bates C (2006) ***Web programming***. John Wiley & Sons ISBN-13: 978-0470017753.
 - Castro (2011) ***HTML5 & CSS3***. Peachpit Press. ISBN-13: 978-0321719614.
 - McGrath M (2006) *JavaScript in Easy Steps*. Computer Steps.
 - McGrath M (2011) ***HTML5 In Easy Steps***. Easy Steps Ltd., UK. ISBN-13: 978-1840784251.
 - McManus (2011) ***Web Design In Easy Steps***. Easy Steps Ltd., UK. ISBN-13: 978-1840783803.
 - Moseley R (2007) ***Developing Web Applications***. John Wiley & Sons ISBN-13: 978-0470017197.
 - Robbins JN (2012) ***Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics***. O'Reilly Media ISBN-13: 978-1449319274.
 - http://www.w3.org/community/webed/wiki/Main_Page (Excellent educational reference from the organisation responsible for overseeing Web standards)
 - www.w3schools.com

Part 2. The Internet & WWW *History – pre Tim Berners-Lee*

- Driving force - US Department of Defense's need for a decentralised information architecture for command and control
- Late 1960s - DARPA (Defense Advanced Research Project Agency) launched ARPANET, the first wide area packet switching network.
- ARPANET was the origin of protocols and techniques that now used by the Internet.

Part 2. The Internet & WWW

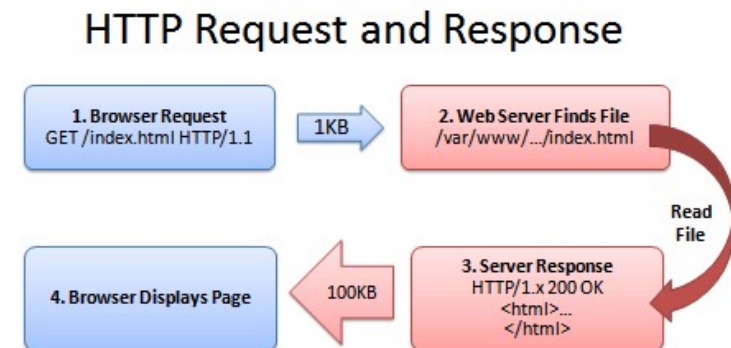
History – WWW & Tim Berners-Lee

- 1989 Tim B-L proposes the idea of a global hypertext space using a standard “Universal Document Identifier” while at the European Particle Physics Laboratory, CERN (originally *European Council for Nuclear Research*).
- 1990s – saw the advent of the browser, Web server and standards and protocols such as URIs, HTML, HTTP.
- 1994 – Tim B-L forms WWW Consortium (W3C) as a neutral body for agreeing standards.

Part 2. The Internet & WWW

The Internet & the WWW

- Internet computers and devices are located by their IP addresses e.g. 158.162.131.236
- The Domain Name System (DNS) is used to look up IP numbers corresponding to names (e.g. myUniversity.ac.uk)
- Computers in a Local Area Network (LAN) commonly have local IP addresses
- Computers in a LAN are connected to a gateway or router which is linked to an Internet Service Provider (ISP)
- The ISP provides access to the Internet, DNS lookup services and to email
- Internet communication uses the TCP/IP (Transmission Control Protocol/Internet Protocol) suite of protocols.
- Of all the TCP/IP protocols it is the HTTP (Hyper Text Transfer Protocol) that controls communication between a web server and a web browser.
- HTTP is used for sending requests from a web client (a browser) to a web server, and to return web content (web pages) from the server to the client.



Part 2. The Internet & WWW

Protocols and Programs

- Protocols are the standards/conventions that allow networks to communicate
- Communications must define where (e.g. the port/interface), how and the rules/conventions followed
- FTP (File Transfer Protocol) allows the transfer of files between clients and servers
- FTP can be vulnerable to firewalls and is not very secure on port 21
- Sending email relies on a Mail User Agent (MUA) adopting Simple Mail Transfer Protocol (SMTP) to send a message to the local Mail Transfer Agent (MTA)
- Receiving email commonly uses Post Office Protocol (POP3)
- Other standards include those for Instant Messaging (IM), Internet Relay Chat (IRC – which may also use Secure Sockets Layer *SSL*), remote machine access (e.g. Telnet &/or Secure Shell *SSH*)
- *If you only remember one of these! ... HTTP (Hypertext Transfer Protocol) is the main protocol for browser and web server communication.*

Part 2. The Internet & WWW

Secure connections

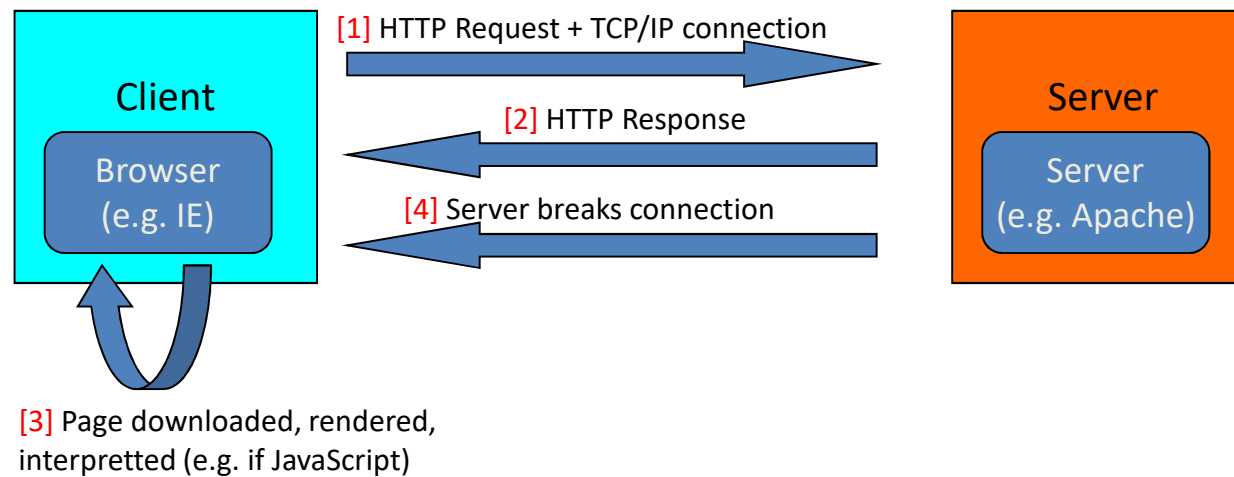
- SSH (Secure Shell) is similar to Telnet but allows secure communications with encryption over port 22
- SFTP is confusingly used for other protocols but the most important is perhaps Secure (Shell) File Transfer Protocol
- FTPS is FTP that utilizes Secure Sockets Layer (SSL) / Transport Layer Security (TLS)
- HTTPS provides authentication and encryption for e-commerce using versions of SSL and TLS

Part 2. The Internet & WWW

Client-side vs. server-side scripting - 1

- Client-side scripts (e.g. JavaScript, Flash, QuickTime, Jscript, VBScript - and the concern of this module) are commonly written into Web pages and are interpreted by the browser
- Client-side scripts are widely used for: [a] validating data entered into forms; [b] special effects
- Server-side scripts (e.g. PHP, ASP, Perl, Python, Cold Fusion, Java Server Pages) are executed by a scripting engine on a server
- Server-side scripts are widely used when: [a] specialised responses and complex business processes are involved; [b] security and access rights are issues; [c] data stores must be queried

Client-side scripting summarised



A JavaScript example of client-side function

[1] HTML PRODUCES a single text box and button;

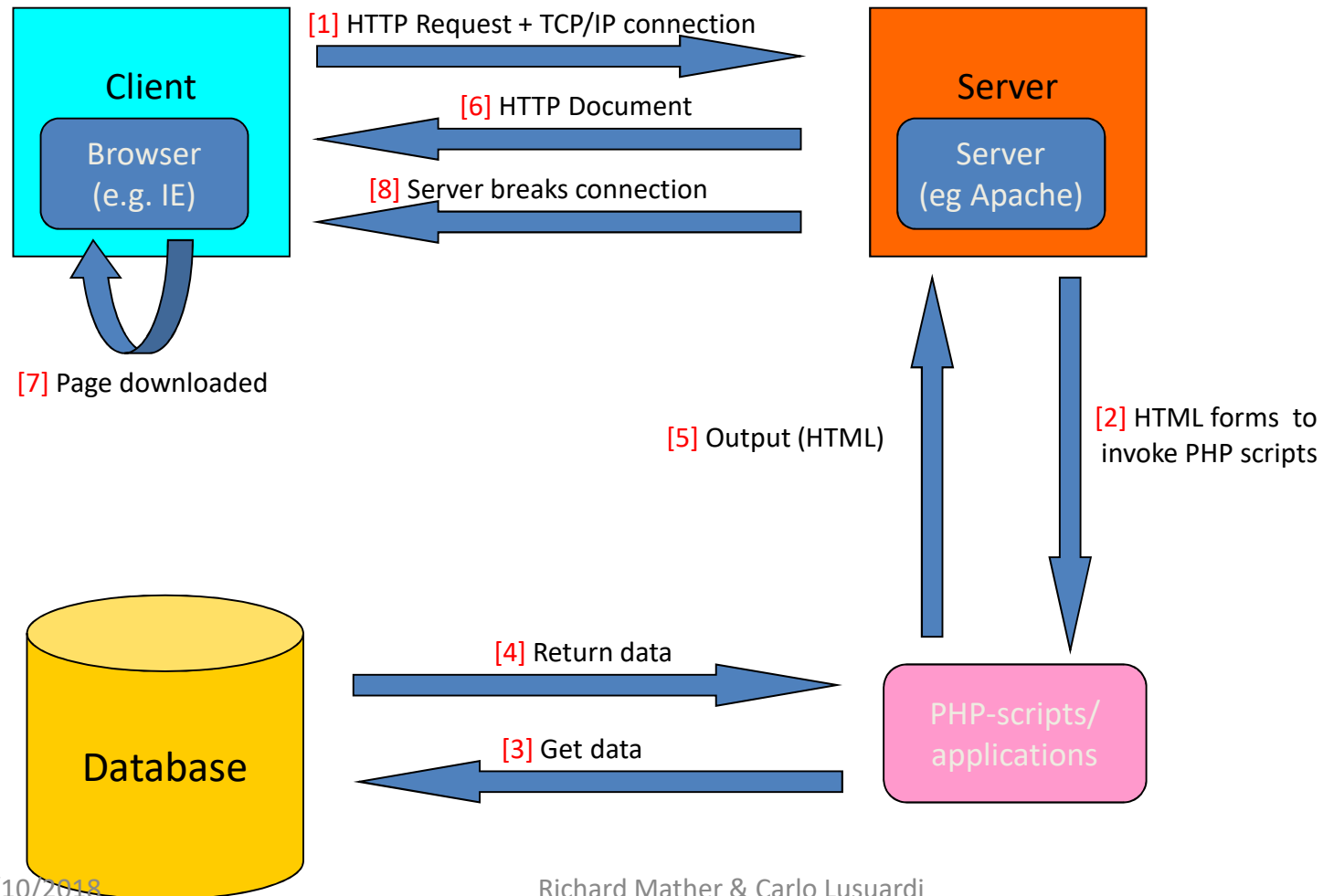
[2] then the user enters their name and clicks the button the JavaScript function is called;

[3] this displays a message greeting the user.

```
<html>
<head> <title>HTML JavaScript demo</title>
  <script type = "text/javascript" >
    function displayName(name)
    {
      window.alert("Hello " + name);
    }
  </script>
</head>
<body>
  <form name="frmInput">Enter your name
    <input type="text" name="txtname" />
    <br/><br/>
    <input type="button" value="Display message"
      onclick="displayName(frmInput.txtname.value)" />
  </form>
</body>
</html>
```


Server-side scripting summarised

PHP example with database



A PHP script example of server-side function

(NOTE no database is involved here)

The html is used as carrier for a 'value' returned by the server-side PHP engine.

```
<html>
<head></head>
<body>
<?php
    $myLecturer = "Carlo and Richard
    teach Web Development";
    echo $myLecturer;
?>
</body>
</html>
```

Basic PHP Example

Part 2. The Internet & WWW

Client-side vs. server-side scripting - 2

- Client-side script
 - **advantages** include: [1] greatly reduced need for data transfer and server-side processing; [2] faster 'application' response; [3] great for dynamic effects and for validating user input.
 - **disadvantages** include: [1] dependency on client to have technology available and enabled in the user's browser; [2] exposure of code if you want to protect intellectual property
- Server-side script
 - **advantages** include: [1] more robust and reliable since the server is optimized for the code that is running; [2] no browser compatibility issue; [3] wider range of development tools; [4] greater security over code and validation
 - **disadvantages** include: [1] the need to pass data back and forth to the server; [2] greater complexity.

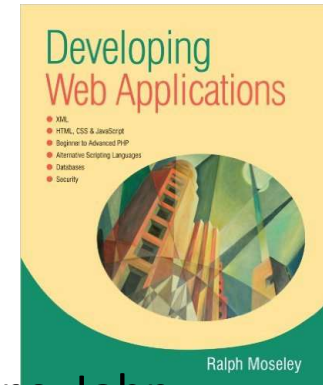
Part 2. The Internet & WWW

Resources for the developer

- WinSCP (Windows Secure CoPy) - open source SFTP and FTP client for Microsoft Windows that uses Secure Shell (SSH) (*Wikipedia*)
- PuTTY - terminal emulator application which can act as a client for the SSH, Telnet, rlogin, and raw TCP computing protocols (*Wikipedia*)
- Text editor, simple (e.g. Notepad) or sophisticated and script-sensitive
 - TextPad - <https://www.textpad.com/download/index.html>
 - Notepad++ - <https://notepad-plus-plus.org>
 - Sublime Text - <http://www.sublimetext.com/2>
- A wide range of Web authoring and image editing tools (not essential for this module)
- Choices of license - freeware = free - shareware = try free, pay later
- Which browser? Specification (e.g. support for IRC [*Internet Relay Chat = real-time Internet text messaging (chat) or synchronous conferencing*] and plugins), Issues over standards (e.g. rendering of CSS), control over preferences (e.g. cookies, active content, cache, auto-completion)

Part 2. The Internet & WWW

References



- Anon (undated) *Internet History, Living Internet*.
<http://www.livinginternet.com> (updated April 2012)
- Bates C (2006) *Web Programming: Building Internet Applications*. John Wiley.
- Moseley R (2007) *Developing web applications*. John Wiley.
- Nixon, R. (2015) *Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites*. " O'Reilly Media, Inc."
- Robbins JN (2012) *Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics*. O'Reilly Media ISBN-13: 978-1449319274.
- Walker G (undated) *PHP / MYSQL lecture notes*.
- W3C (as of 2012-15 this includes Opera's excellent tutorials)

Finishing up ...

The three “Web development” technologies of the “User Interface” (that underpin “User Experience”) are:

1. HTML:  Structure
2. CSS:  Presentation
3. JavaScript:  Behaviour

These pillars underpin more complex frameworks for distributed applications e.g. [1] jQuery and [jQuery mobile](#); [2] Leaflet mapping ‘skins’ JS (like google maps), allposter.com imagery, and openstreetmaps ...

... and elegantly explained by those [clever people at Google](#) ...

HTML, CSS,
and JavaScript
from the Ground Up