Why HTML5?

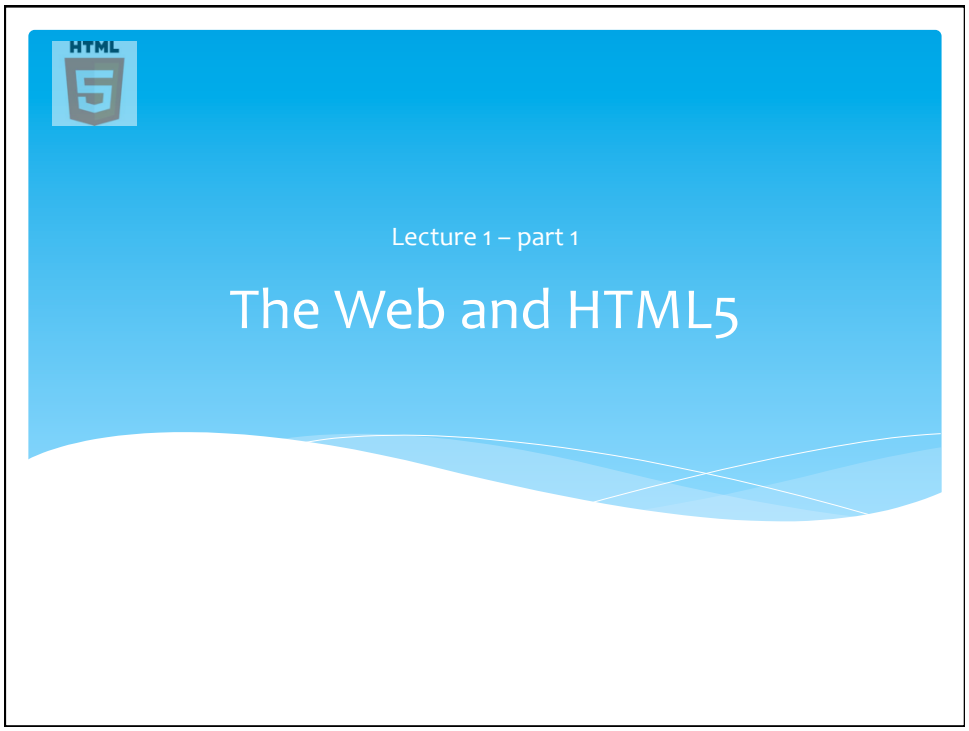
- HTML5 is a new(ish) web standard
  - 2008 draft, due to be completed by the end of this year, ratified Sept. 2014
  - In current use
  - Supported by Apple, Microsoft, Adobe, Google, Facebook, Twitter….
- It is compatible with a wide range of browsers, including those in smartphones, tablets and other mobile kit
  - We use it in the Programming for Mobile Devices module
- It supports many advanced features through Javascript APIs
  - Native video, audio and image formats
  - Geo-location
  - Access camera, accelerometers and other on-board mobile devices
  - Client-side (i.e. browser based) data storage in structured & unstructured forms
- It is widely regarded as the future of Enterprise Mobile Applications

Why Javascript?

- Long answer:
  - Javascript is widely supported in operating systems, browsers and even in server-side applications
  - It is well used and understood by programmers and web developers
  - There is at least one Javascript engine in every computer system from the last decade
  - It is easy to learn
  - It is well supported by programming tools – many of them free
- Short answer:
  - It is the only language that is supported in HTML5

This module

- COMP0867, a second level programming module
  - You are expected to have done at least one programming module before this
- 12 Weeks, during which
  - 10 lectures on principles, methods and practice
  - 7 (maybe 8) lab sessions
- Assessment
  - ONE class test (week 6)
  - Two coursework submissions
    - Week 8: Detailed technical proposal for a web-application
    - Week 12: Submission of a working project
- Attendance will be monitored in all lectures and labs – usual university regulations apply regarding repeated absence



The World-wide-web

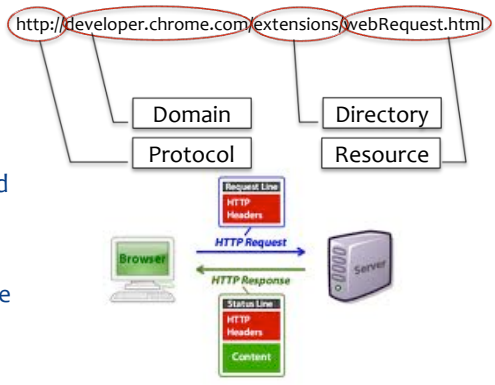
* You could think of the web as one big networked application
  * Its job is to deliver content to browsers
  * Content is anything you can put on a web page PLUS
    * Information from connected databases
    * Data from remote sensors (e.g. weather stations), cameras, manufacturing plant, power stations, exploration platforms etc.
    * Streamed data from video cameras, microphones
  * It has a secondary purpose, uploading information from browsers to servers
* HTML5 is becoming the predominant framework for managing the delivery of content and provides an important upload channel.

Client-Server

- The Internet is a large client-server network of networks
  - Network – interconnected computing resources
    - in theory any computer can connect to any other
    - In practice, security protocols limit the interconnectivity
      - Typically, only special server nodes allow connections
  - Client-Server – a communications system, based on a very simple protocol
    - A client requests some information or resource from a server
    - The server responds with the requested information
- Because of the simplicity of client-server, the internet is a robust, fault tolerant infrastructure

Web requests

- A client requests information using a URL (Uniform Resource Locator)
- This is a string of text that indicates the location of a resource (typically an HTML file)
- A request can also contain headers, which are blocks of additional information associated with the request
  - e.g. to indicate what type of content can be in the response
  - e.g. cookies – client-side info the server needs to know

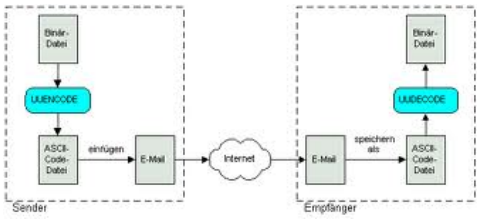


Web Page content

- The Internet is a big set of interconnected computer networks
  - Network traffic can cross the Internet via a number of ***protocols***, all of which sit on top of the Internet Protocol
    - Transmission Control Protocol (TCP) – brings fault tolerance
    - File Transfer Protocol (FTP) – for moving binary files
    - Mail (Simple Mail Transport Protocol, Post Office Protocol etc.) – for mail, of course
    - SSL (Secure Sockets Layer) – for encrypted information
    - HTTP (Hyper-Text Transport Protocol) – for web pages
- The world-wide-web is restricted to HTTP
  - Hyper-text documents in plain text format

MIME types

- HTTP does not accept binary content
  - Photos, Audio, Video do not fit on to the HTTP protocol
- Multipurpose Internet Email Extensions were devised to get around this restriction
  - Used to allow non-textual content (e.g. images, audio) on a web page
  - All MIME extensions are encoded into a plain-text for at the server, and decoded back to binary at the client
- UUEncoding or Base64 encoding are the algorithms used to encode/ decode between binary content and text
- Servers need to be set-up to provide support for specific MIME types

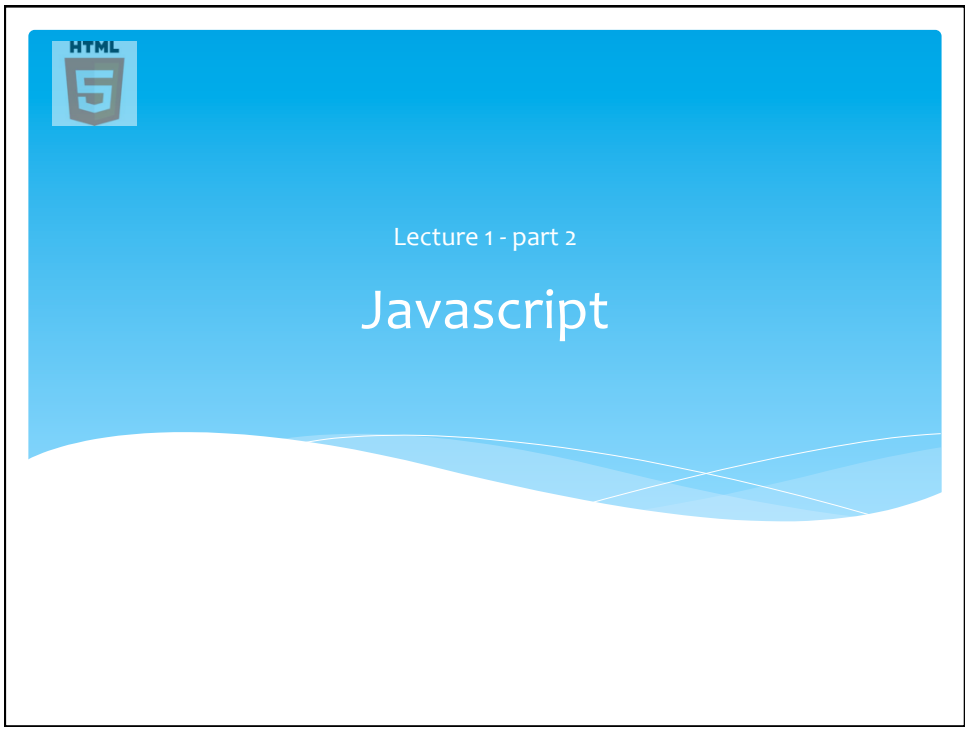


HTML 5

* A **standard**, not a specific technology
* Extensible – the standard is not restricted to what is available now
* HTML + a number of specific extensions to meet specific requirements
* New mark-up tags
  * Document content
  * Document structure
  * Forms
* Support for *standardized* technologies
  * Video, Audio, Images
  * Geo-location
  * Local data storage
  * Offline apps
  * Canvas (for drawing)
  * Imaging (cameras, video)

HTML5 Benefits

* The ***most important*** feature of HTML 5 is its ***standard***
  * Compliant browsers must implement the specified technologies in the specified way
  * Gets rid of "vendor-specific" issues, such as mark-up working on one browser and being incompatible with others
  * There is a lot of work to be done before this is true
* However, most current browsers support a large subset of the HTML 5 standard NOW
  * Browse to http://acid3.acidtests.org/ or http://html5test.com/ to see how your browser does
  * Browse to http://www.quirksmode.org/dom/html5.html to see how different browsers compare



Javascript history

* Mocha – developed by Brendan Erlich in 1995 to provide scripting facilities in Netscape Navigator
* Renamed to LiveScript before release
* Quickly renamed to Javascript (after first version was released) in a deal with Sun
  * This was intended to make Java and Javascript appear to be related – a downright fib!
  * Javascript is a very different language from Java
* Defined as a standard (§ ECMAScript) in June 1997
  * (§ European Computer Standards Association)

Javascript Characteristics

- Interpreted – usually considered to be an easier form of language to learn
- Lightweight – Javascript has a fairly small core, that can be incorporated into new browsers quickly
- Dynamic – Javascript associates values with variables, not types. A variable that was initially a number can have a string allocated to it with no error
  - Note – most programmers consider this to be a BAD THING
- Functional – functions in Javascript are also objects
  - This is a very powerful feature and promotes a flexible program structure
- Object-based – Java variables are objects: containers for data and functions
- Prototypical – all Javascript objects have a prototype, which can be used to create extensions to types
- Flexible deployment – Javascript can be used
  - In the web browser to create web-apps
  - On servers, to create lightweight services (see Node.js)
  - On the desktop (Mac OS or Windows) to create desktop applications (see OS X Dashcode, or Windows 8 SDK)

Javascript as a Development Language

- Used for:
  - Websites
  - Mobile Apps
  - Desktop apps
  - Web servers
- Also used for:
  - Phishing
  - Various internet scams
  - General online bad-behaviour
- Programming in Javascript supported by
  - Good tools (e.g. WebStorm, JSLint, Jasmine)
  - Good practices
    - As espoused by Douglas Crockford, Stoyan Stefanov
  - Good learning resources
    - W3CSchools
    - Mozilla Developer Network
    - CodeAcademy
    - ejohn.org/apps/learn/

Module Resources

* Moodle website: http://moodle.uws.ac.uk
* WebStorm: www.jetbrains.com/webstorm
  * Note – we have an educational license for labs
  * You can get a free student license direct from Jetbrains site. See Moodle Week 1 for details on signing up for a student account
* ***Recommended*** text book: Object-Oriented Javascript, by Stefan Stoyanov, ISBN-10-1847194145, £23.74 from Amazon.co.uk
  * Expensive but the best match to this module