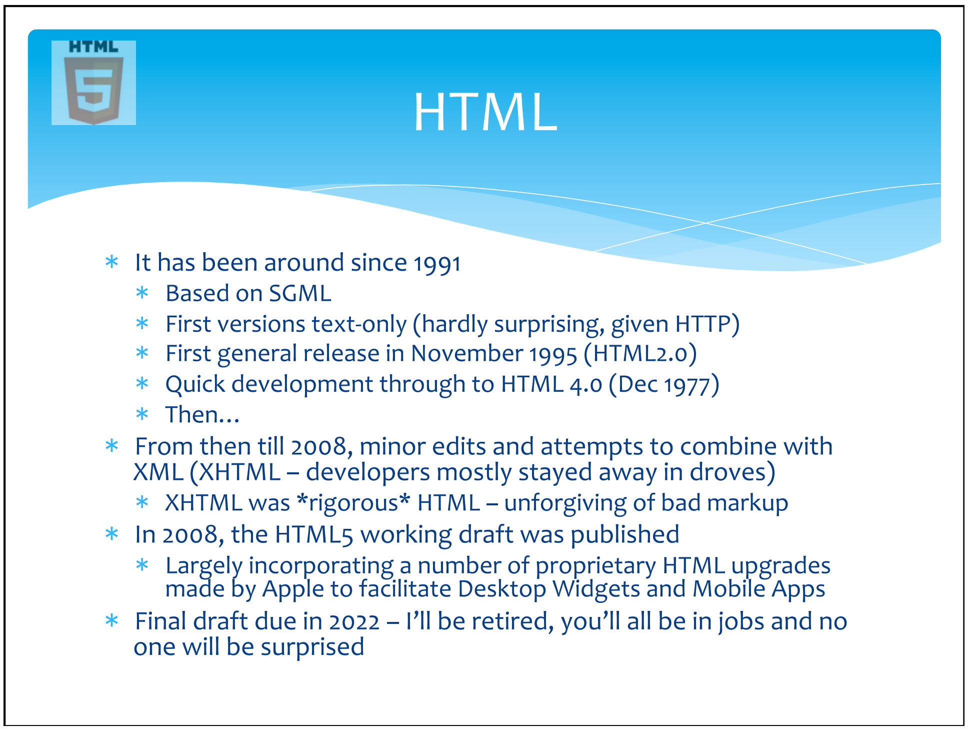
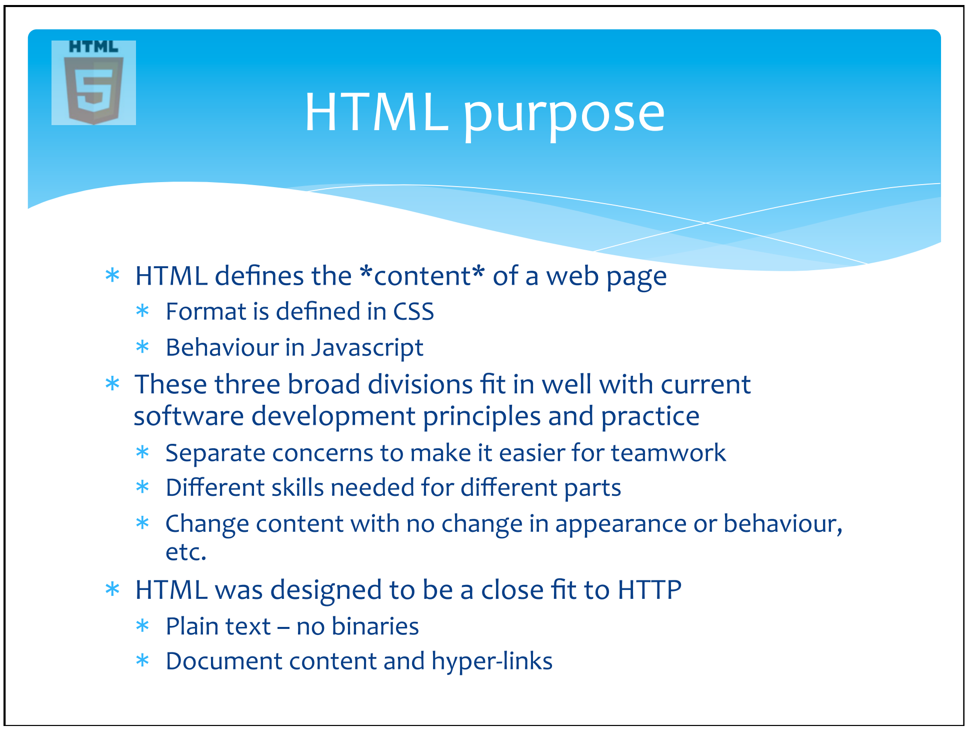
HTML5 & Javascript

Yer actual HTML 5



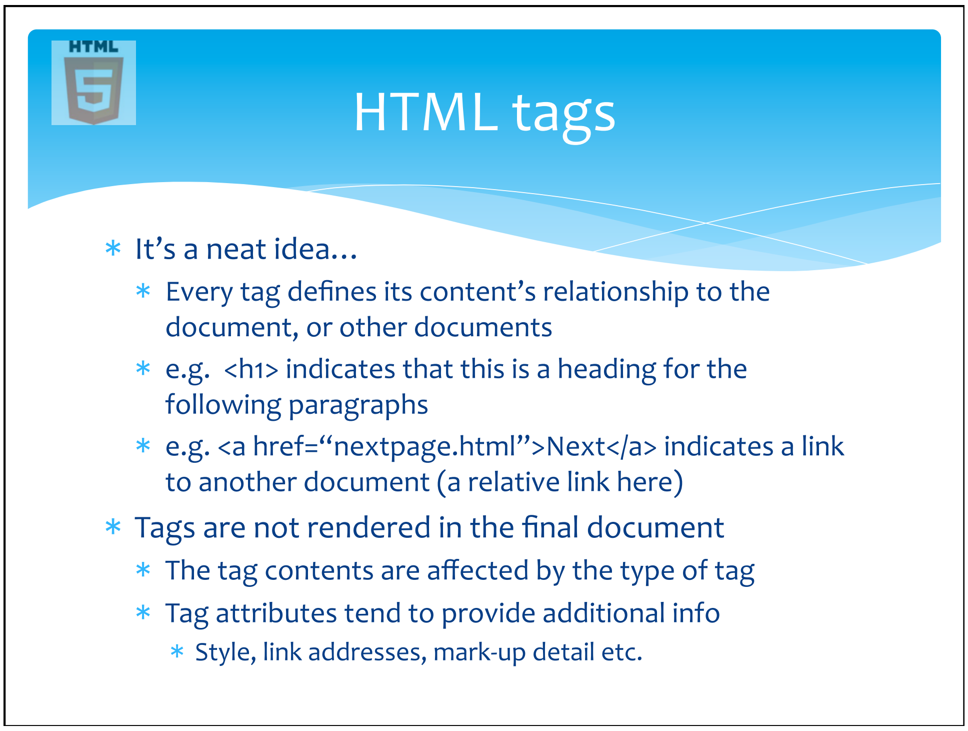
HTML

- It has been around since 1991
  - Based on SGML
  - First versions text-only (hardly surprising, given HTTP)
  - First general release in November 1995 (HTML2.0)
  - Quick development through to HTML 4.0 (Dec 1977)
  - Then…
- From then till 2008, minor edits and attempts to combine with XML (XHTML – developers mostly stayed away in droves)
  - XHTML was *rigorous* HTML – unforgiving of bad markup
- In 2008, the HTML5 working draft was published
  - Largely incorporating a number of proprietary HTML upgrades made by Apple to facilitate Desktop Widgets and Mobile Apps
- Final draft due in 2022 – I'll be retired, you'll all be in jobs and no one will be surprised



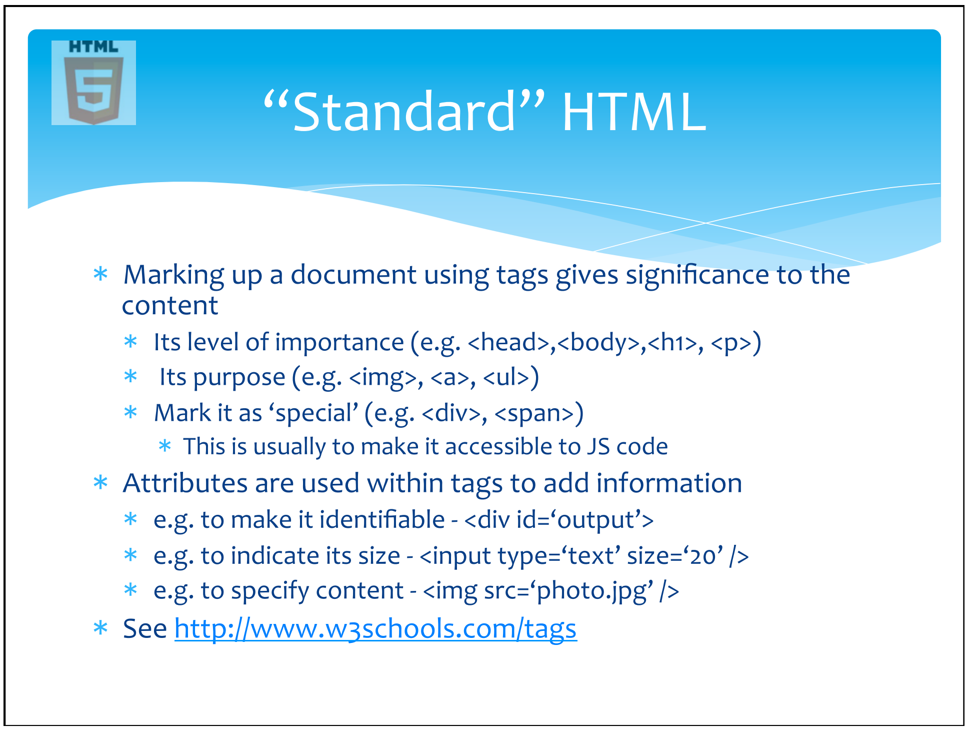
HTML purpose

- HTML defines the *content* of a web page
  - Format is defined in CSS
  - Behaviour in Javascript
- These three broad divisions fit in well with current software development principles and practice
  - Separate concerns to make it easier for teamwork
  - Different skills needed for different parts
  - Change content with no change in appearance or behaviour, etc.
- HTML was designed to be a close fit to HTTP
  - Plain text – no binaries
  - Document content and hyper-links



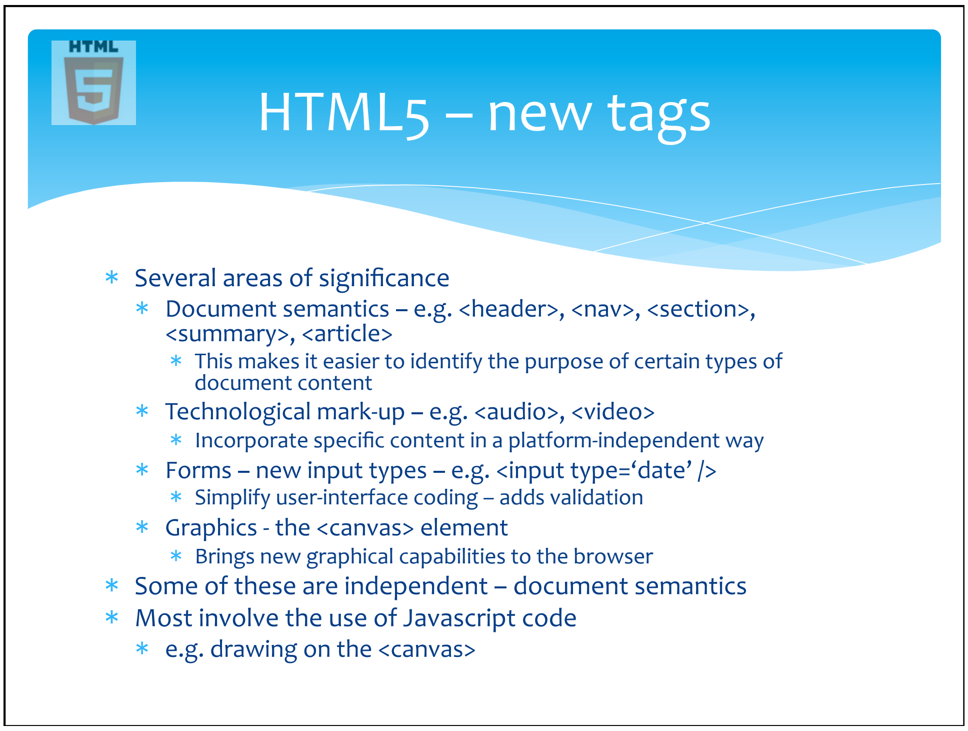
HTML tags

- It's a neat idea…
  - Every tag defines its content's relationship to the document, or other documents
  - e.g. <h1> indicates that this is a heading for the following paragraphs
  - e.g. <a href="nextpage.html">Next</a> indicates a link to another document (a relative link here)
- Tags are not rendered in the final document
  - The tag contents are affected by the type of tag
  - Tag attributes tend to provide additional info
    - Style, link addresses, mark-up detail etc.



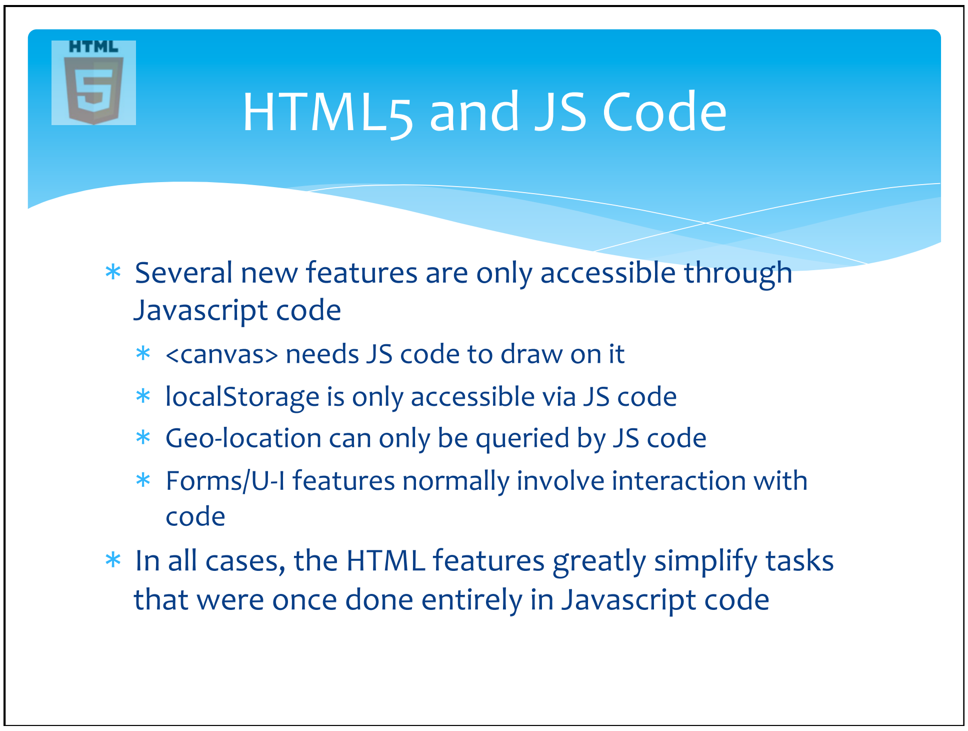
"Standard" HTML

* Marking up a document using tags gives significance to the content
  * Its level of importance (e.g. <head>,<body>,<h1>, <p>)
  * Its purpose (e.g. <img>, <a>, <ul>)
  * Mark it as 'special' (e.g. <div>, <span>)
    * This is usually to make it accessible to JS code
* Attributes are used within tags to add information
  * e.g. to make it identifiable - <div id='output'>
  * e.g. to indicate its size - <input type='text' size='20' />
  * e.g. to specify content - <img src='photo.jpg' />
* See http://www.w3schools.com/tags



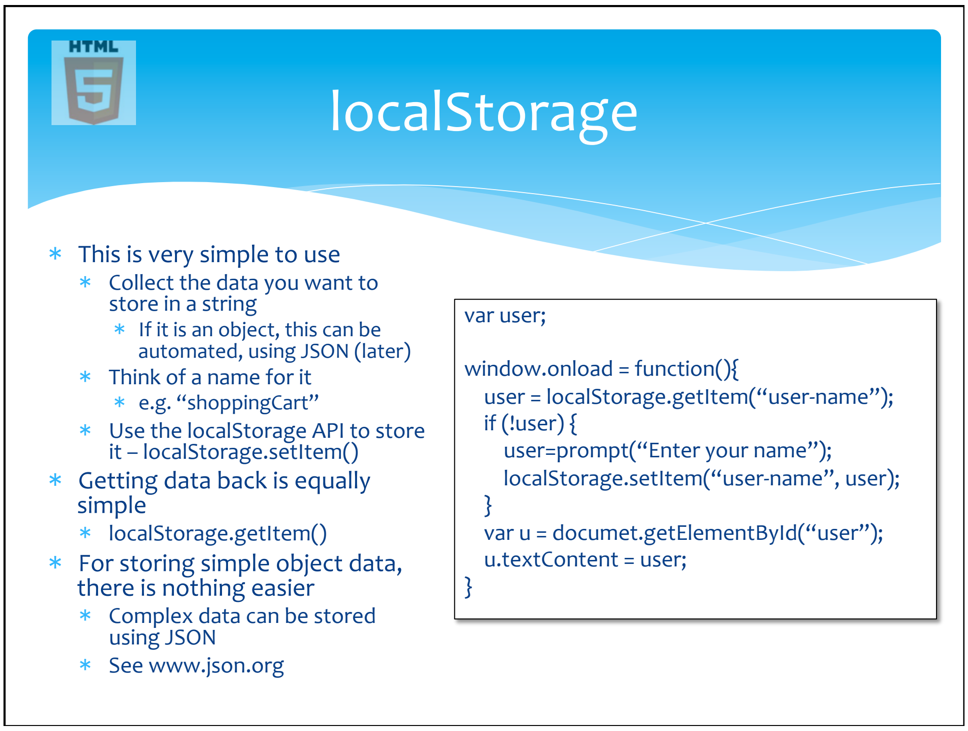
HTML5 – new tags

* Several areas of significance
  * Document semantics – e.g. <header>, <nav>, <section>, <summary>, <article>
    * This makes it easier to identify the purpose of certain types of document content
  * Technological mark-up – e.g. <audio>, <video>
    * Incorporate specific content in a platform-independent way
  * Forms – new input types – e.g. <input type='date' />
    * Simplify user-interface coding – adds validation
  * Graphics - the <canvas> element
    * Brings new graphical capabilities to the browser
* Some of these are independent – document semantics
* Most involve the use of Javascript code
  * e.g. drawing on the <canvas>



HTML5 and JS Code

- Several new features are only accessible through Javascript code
  - <canvas> needs JS code to draw on it
  - localStorage is only accessible via JS code
  - Geo-location can only be queried by JS code
  - Forms/U-I features normally involve interaction with code
- In all cases, the HTML features greatly simplify tasks that were once done entirely in Javascript code

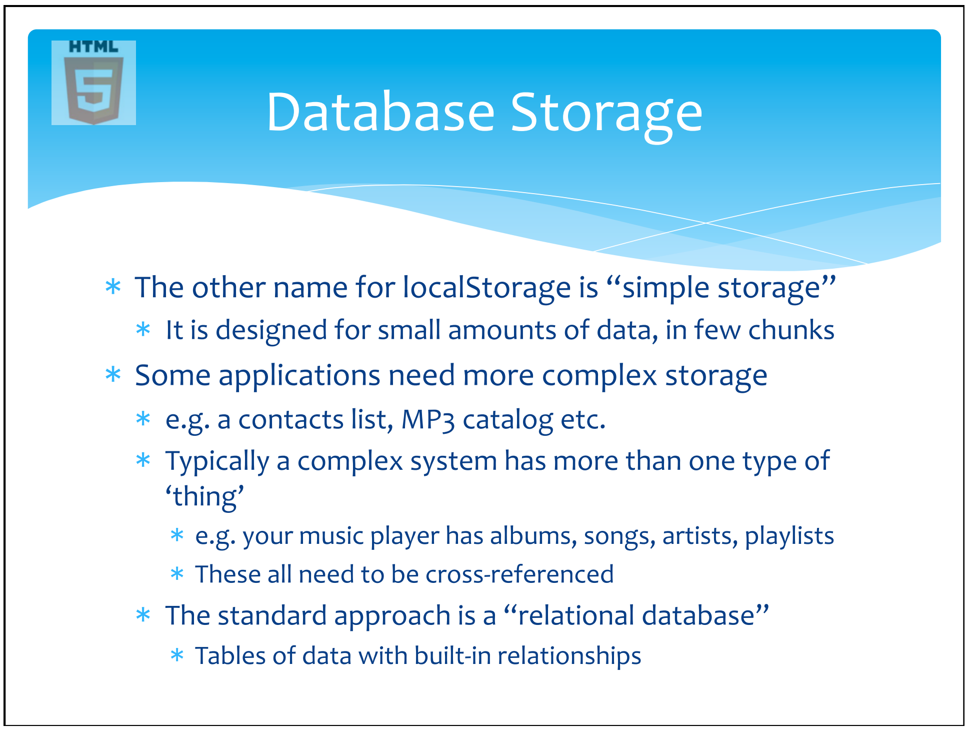


localStorage

- This is very simple to use
  - Collect the data you want to store in a string
    - If it is an object, this can be automated, using JSON (later)
  - Think of a name for it
    - e.g. “shoppingCart”
  - Use the localStorage API to store it – localStorage.setItem()
- Getting data back is equally simple
  - localStorage.getItem()
- For storing simple object data, there is nothing easier
  - Complex data can be stored using JSON
  - See www.json.org

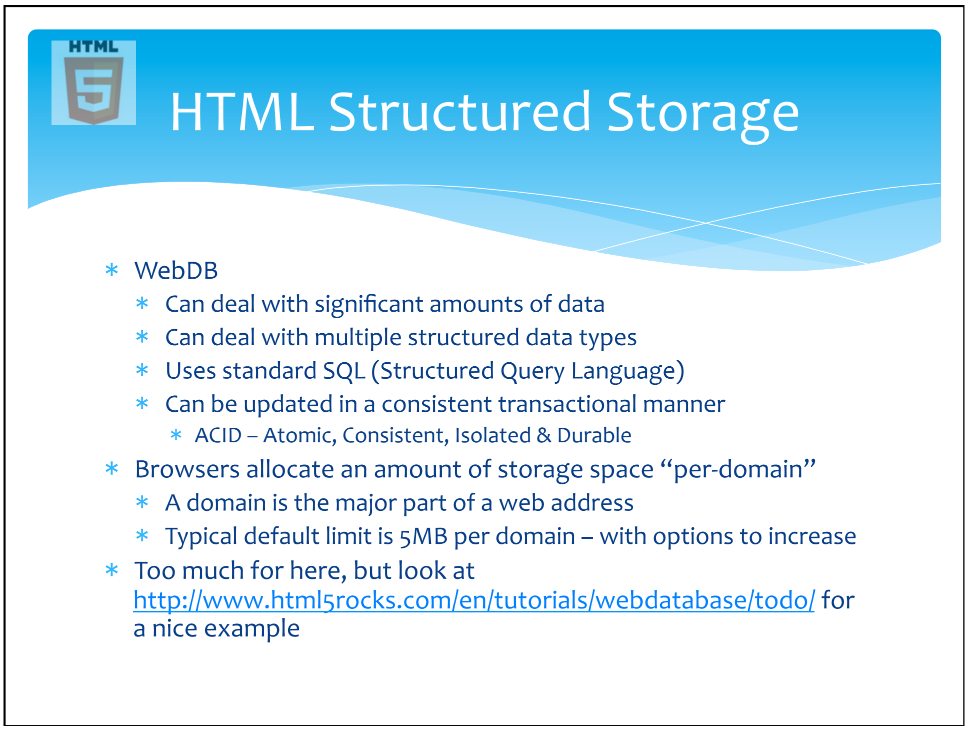
```
var user;

window.onload = function(){
   user = localStorage.getItem(“user-name”);
   if (!user) {
      user=prompt(“Enter your name”);
      localStorage.setItem(“user-name”, user);
   }
   var u = documet.getElementById(“user”);
   u.textContent = user;
}
```



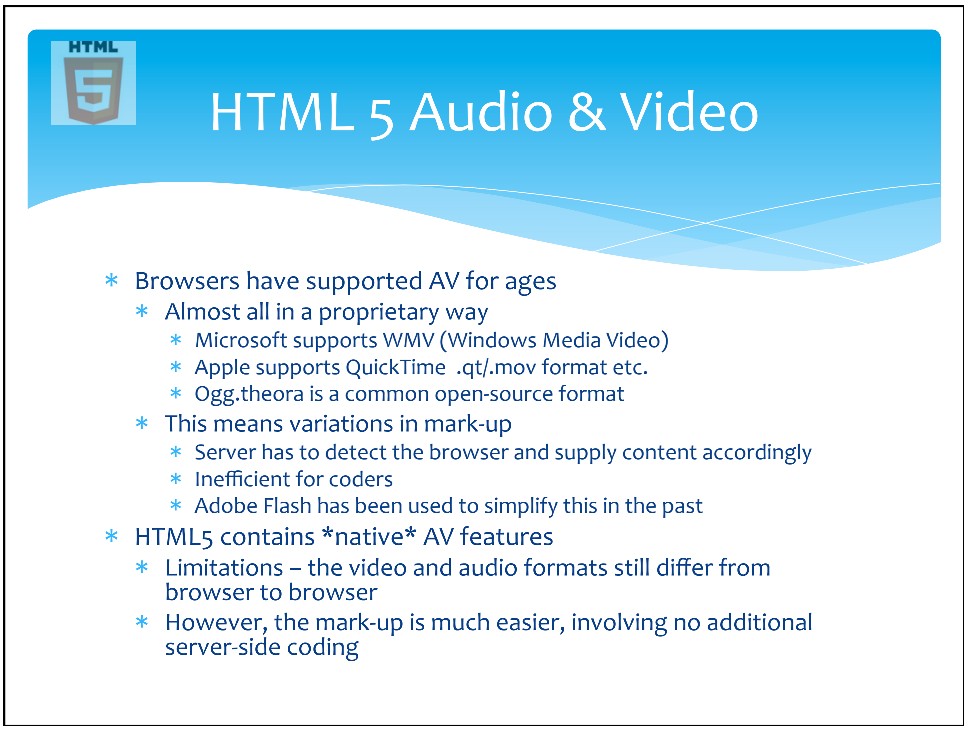
Database Storage

* The other name for localStorage is "simple storage"
  * It is designed for small amounts of data, in few chunks
* Some applications need more complex storage
  * e.g. a contacts list, MP3 catalog etc.
  * Typically a complex system has more than one type of 'thing'
    * e.g. your music player has albums, songs, artists, playlists
    * These all need to be cross-referenced
  * The standard approach is a "relational database"
    * Tables of data with built-in relationships



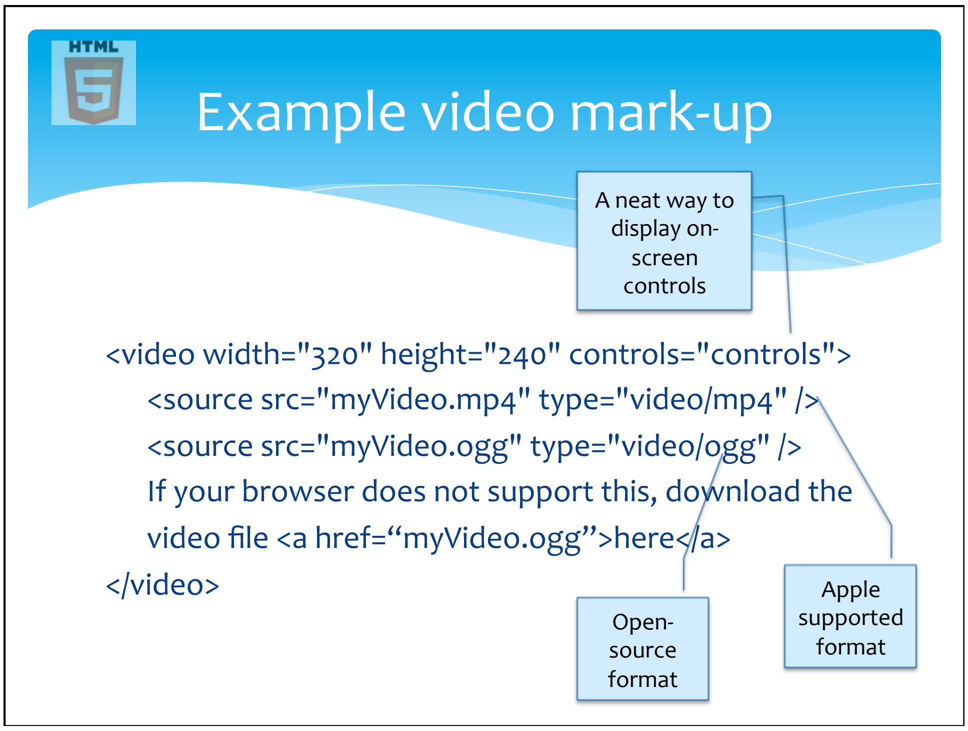
HTML Structured Storage

* WebDB
  * Can deal with significant amounts of data
  * Can deal with multiple structured data types
  * Uses standard SQL (Structured Query Language)
  * Can be updated in a consistent transactional manner
    * ACID – Atomic, Consistent, Isolated & Durable
* Browsers allocate an amount of storage space "per-domain"
  * A domain is the major part of a web address
  * Typical default limit is 5MB per domain – with options to increase
* Too much for here, but look at http://www.html5rocks.com/en/tutorials/webdatabase/todo/ for a nice example



HTML 5 Audio & Video

- Browsers have supported AV for ages
  - Almost all in a proprietary way
    - Microsoft supports WMV (Windows Media Video)
    - Apple supports QuickTime .qt/.mov format etc.
    - Ogg.theora is a common open-source format
  - This means variations in mark-up
    - Server has to detect the browser and supply content accordingly
    - Inefficient for coders
    - Adobe Flash has been used to simplify this in the past
- HTML5 contains *native* AV features
  - Limitations – the video and audio formats still differ from browser to browser
  - However, the mark-up is much easier, involving no additional server-side coding



Example video mark-up

A neat way to display on-screen controls

```
<video width="320" height="240" controls="controls">
    <source src="myVideo.mp4" type="video/mp4" />
    <source src="myVideo.ogg" type="video/ogg" />
    If your browser does not support this, download the
    video file <a href=“myVideo.ogg”>here</a>
</video>
```

Open-source format

Apple supported format

Geo-Location

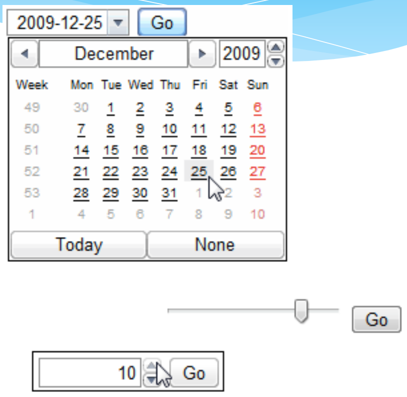
- This is a very cool feature in a very small amount of code
  - Set up a handler function
  - Call the getPosition() method
- That's it!
- There's a little more effort to add a map

```
function handler( position ){
  var latitude = position.coords.latitude;
  var longitude = position.coords.longitude;
  // Now do something with this information – show a
  // map for example.
}

window.onload = function() {
    navigator.geolocation.getCurrentPosition(handler);
}
```

HTML5 Forms

- Forms have been in HTML since HTML 2.0
  - A way of submitting info to a site
  - Text, lists and true/false boxes
- HTML5 adds a number of different styles
  - Sliders, spin-boxes, email-only, url-only, date-pickers, time-pickers, colour-pickers
- Biggest advantage – code free validation
- Biggest drawback – not all browsers do this well (yet!)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December 2009

Week	Mon	Tue	Wed	Thu	Fri	Sat	Sun
49	30	1	2	3	4	5	6
50	7	8	9	10	11	12	13
51	14	15	16	17	18	19	20
52	21	22	23	24	25	26	27
53	28	29	30	31	1	2	3
1	4	5	6	7	8	9	10

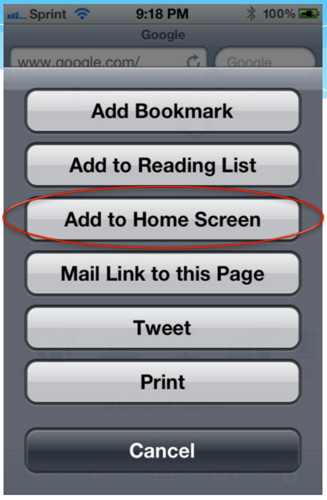
Today None

Go

10 Go

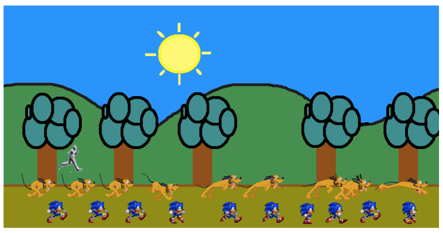
Offline Mode

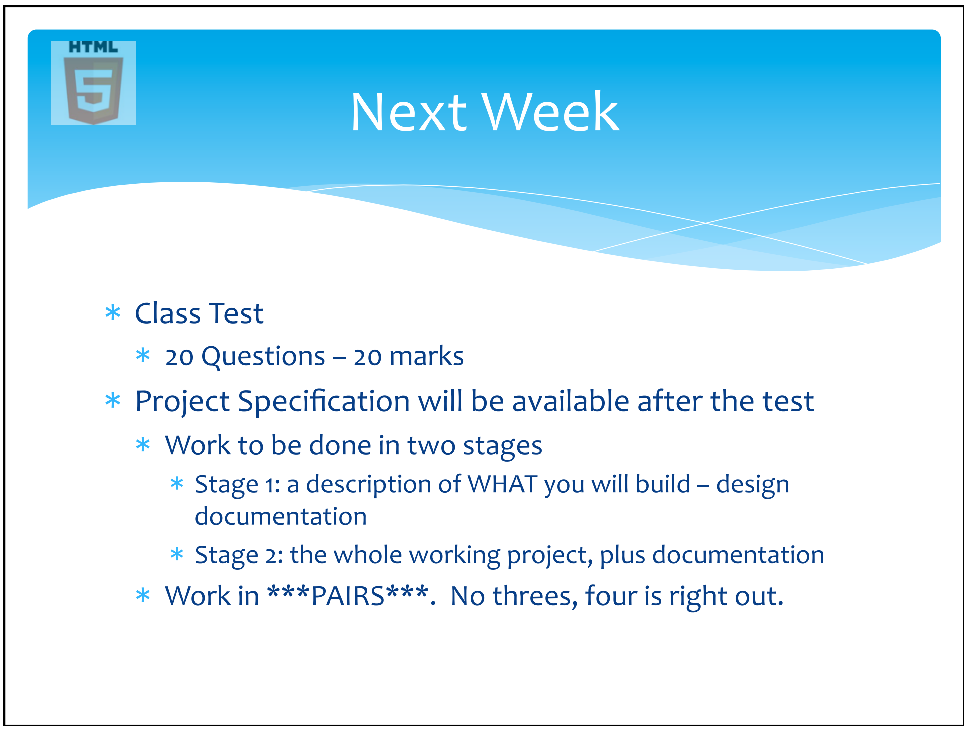
* Browsers maintain a ‘cache’
  * An area of disk storage where downloaded files are stashed, along with a time-stamp
  * Often, bandwidth can be saved by not downloading files that have not changed from the server
    * Use the cache version
* This is storing a copy of a web-app automatically
  * However, what if bits are missing – pages you never got to etc.
* The Manifest lets the web developer indicate all the files that are needed for a complete app
  * Then the browser can download them all, and the app can be run from the browser cache
  * Now an app can go “offline”



The Canvas

* Best for last
* The HTML5 Canvas is a ‘drawing’ area within a page
  * Code can draw lines, rectangles, circles, curves with different line and fill styles
  * Code can also drop bitmap graphics on to the canvas
  * Animation is easy
* The Canvas feature has led to a separate industry of HTML5 games
* Web-games are now among the fastest growing application sectors
* Javascript is now fast enough to make the browser capable of rendering action games
  * requestAnimatonFrame() function takes care of all the nasty details (double buffering etc.)





Next Week

* Class Test
  * 20 Questions – 20 marks
* Project Specification will be available after the test
  * Work to be done in two stages
    * Stage 1: a description of WHAT you will build – design documentation
    * Stage 2: the whole working project, plus documentation
  * Work in ***PAIRS***. No threes, four is right out.