CSCC09F
Programming on the Web

HTML5

new capabilities, status, usage

HTML5 Introduction

- HTML5 has been simmering for a long time, as browser vendors and developers agitated for more functionality without dependence on plugins and complex JavaScript
  - in the absence of an evolving HTML standard, people found other ways to get the job done, particularly with JavaScript manipulating the DOM
- HTML5 is a large and still-evolving specification; as in the early days of Web, browsers are ahead of the spec
- We will look at just a few of it's important features that are supported by most leading browsers …

Why XHTML Failed

- Tim Berners-Lee admitted in 2010: "The attempt to get the world to switch to XML, including quotes around attribute values and slashes in empty tags, and namespaces all at once didn't work."
- The W3C's plan to replace HTML with XHTML, using XML's stricter syntax rules was a failure for several reasons:
  - Users didn't bother to follow the stricter syntax because browsers didn't complain about non-strict/XML syntax (backward compat.)
  - The HTML group within the W3C didn't consult adequately with developers, browser vendors, and dissenters who didn't agree with W3C direction on HTML evolution
  - HTML simply wasn't keeping up with the evolution of the Web from documents toward apps

HTML5 Introduction

- The most important changes to HTML in 10+ years
- Until now, HTML has remained true to its roots, mainly a language for text-document markup
- HTML5 is a game-changer with (incomplete list):
  - <canvas> with associated drawing JavaScript API
  - Embedded media – <audio> and <video> via markup
  - Local storage and offline use – enabling Web apps to operate untethered to a network/server
  - Threading for better client-side performance
  - Web sockets and messaging API's
  - Better user-input support including validation
  - Geolocation, drag-n-drop
  - Oh, and also enhanced text-document structuring elements

HTML5 status and usage

- What is the status of HTML5, in terms of standardization
  - a draft standard (likely to remain that way for a long time)
- Can I start using HTML5, or should I wait for the standard to be approved, so I don't have to revise my documents as the standard evolves
  - HTML5 introduces powerful new constructs that support building more usable and responsive Web apps
  - Don't wait
- How can I get started with HTML5, are special headers required?
  - **`<!DOCTYPE html>`** (that's it!)

example: text5.html

HTML5 status and usage

- Do I have to rewrite all my existing HTML4/XHTML pages?
  - NO
- What changes are required to convert a validated XHTML document into an HTML5 document?
  - remove XML processor instruction (1st line)
  - replace XHTML DOCTYPE with simplified HTML5 version
  - change meta http-equiv tag to set content="text/html"
  - example: text5.html (a converted version of text.xml)
- Can I validate an HTML5 document?
  - The W3C's validator (http://validator.w3.org/) will check HTML5 documents (still considered experimental)

HTML5 Hello World!

```
<!DOCTYPE html>
<html lang="en">
  <head>
  <meta charset="utf-8" />
    <title>Hello World!</title>
  </head>
  <body>
    <h1>Hello World!</h1>
  </body>
</html>
```

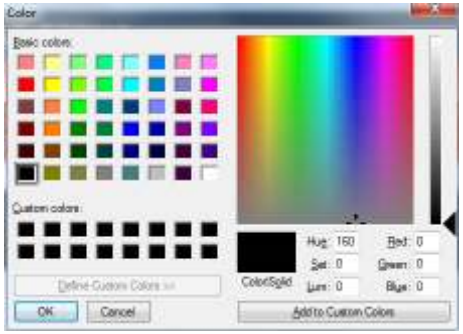
Document Structure

- Finer-grained page-description elements (can see some of these in the Backbone Todo example):
  - **<header… />**
  - **<nav… /> <!– navigation controls -->**
  - **<aside…/> <!– tangential information – like a sidebar -->**
  - **<article> … <section… /> … <section… /> … </article>**
  - **<footer… />**
- Previously typically relied on generic tags with class attribute values to denote their role as e.g. header, section, etc.

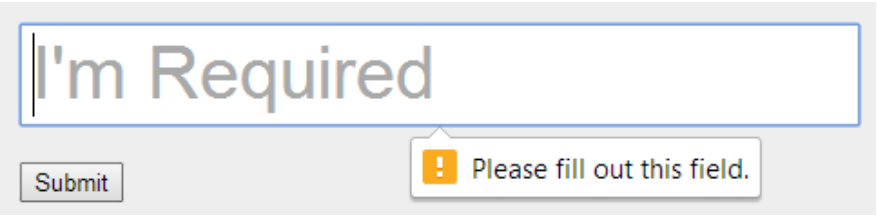
audio and video elements

- <audio> and <video> elements, e.g.
  - **<video src="myvid.ogv" width="160" height="120" />**
  - support direct embedding of audio and video in a page, without the need for a plugin (like Flash or Silverlight)
  - DOM controls for playback (play/stop/rewind etc.)
- Beware that audio and video are encoded using a variety of underlying technologies – not all encodings are supported by HTML5, and not all HTML5-capable browsers support all the HTML5 encodings

Forms



- Enhanced <form> elements, including
  - new input types, such as datetime, email, URL, color
  - input validation, e.g. for email, URL, telephone inputs
  - field required (cannot be left blank)
  - field autofocus (so user doesn't have to select it)
  - popup calendar to for date selection
  - color picker
  - sliders
  - search bars



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Embedding of XML Applications

- SVG (Scalable Vector Graphics)

- MathML (Math Meta Language)

$$\begin{aligned}\left(x^2-y^2\right)^4 &= (x-y)^4(x+y)^4 \\ &= \left(x^4-4x^3y+6x^2y^2-4xy^3+y^4\right)\times \\ &\quad \left(x^4+4x^3y+6x^2y^2+4xy^3+y^4\right)\end{aligned}$$

- example .xml files given later with XML lecture notes

HTML5 – what's new – API's

- HTML5 introduces several powerful API's that can be invoked via JavaScript:
  - 2D drawing, with a canvas element and drawing tools
  - a caching mechanism, for building offline apps
  - audio and video API's for interacting with the new audio and video elements
  - a history API for interacting with browser history (R/W)
  - a drag-and-drop API
  - an editing API
  - client-side storage: dictionaries, SQL databases
  - geolocation
  - threading for parallel execution of JavaScript
  - Web sockets – network communication w/o HTTP
  - messaging – text messages between clients

HTML5 – what's new – API's

- Assignments will make use of several of the new API's including client-side storage, geolocation, and drag-and-drop
- You can find many nice demo's and examples of HTML5 on the Web, e.g.:
  - http://html5demos.com/
  - http://craftymind.com/factory/html5video/CanvasVideo.html
  - http://htmlfive.appspot.com/static/stickies.html (offline app)

HTML5 status/usage summary

- HTML5 introduces new markup tags, and an extensive set of JavaScript API's
- HTML5 is not yet a W3C standard (one of the prime contributors wryly observed that it would receive standards-body approval sometime around 2023)
- However it is too important to sit around waiting for official sanctioning. Browser support is already widespread, though not consistent (however, even HTML4/XHTML are not entirely consistent across browsers)
- Existing XHTML documents easily convertible to HTML5