

Mobile Web Development I

Tommy MacWilliam

Harvard University

February 1, 2011

Announcements

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ Lecture videos available at:
<https://www.cs76.net/Lectures>
- ▶ Section information: <https://www.cs76.net/Sections>

Today

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ Mobile HTML tricks
- ▶ WebKit CSS3
- ▶ JavaScript
- ▶ jQuery
- ▶ Mobile DOM Events

Section Feedback

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ <http://tommymacwilliam.com/e76/feedback>
 - ▶ let me know how I'm doing!
- ▶ I don't like long surveys either, so give me feedback via an anonymous (I promise) 140-character tweet!

Meta Tags

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ mobile browsers do their best to display large pages on a small screen
 - ▶ aka pages not optimized for mobile devices
- ▶ if we're designing specifically for mobile devices, we need to let the browser know that
- ▶ you can customize your web app's icon on the homescreen:
 - ▶ `<link rel="apple-touch-icon" href="icon.png" />`
 - ▶ **don't like the gloss?** `<link rel="apple-touch-icon-precomposed" href="icon.png" />`

Meta Tags

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ we can use HTML `<meta>` tags to tell the mobile browser how to display our page
- ▶ `<meta name="viewport" content="user-scalable=no, width=device-width" />`
 - ▶ tell the browser to display the page width as the width of the device and prevent pinch zoom
- ▶ `<meta name="apple-mobile-web-app-capable" content="yes" />`
 - ▶ hide the browser address bar until the user scrolls up
- ▶ `<meta name="apple-mobile-web-app-status-bar-style" content="black" />`
 - ▶ change the color of the status bar (where the clock, signal strength, etc. is)

WebKit CSS Tricks

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ Prevent elements from being highlighted (as for copy/paste): `-webkit-user-select: none;`
- ▶ Disable the annoying dialog that pops up at the bottom of the device on touch+hold:
`-webkit-touch-callout: none;`
- ▶ Remove the annoying highlight color on touch events:
`-webkit-tap-highlight-color: rgba(0, 0, 0, 0);`

WebKit CSS3

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ WebKit (the layout engine behind both Safari and Chrome) provides implementations of cool new CSS features
- ▶ `-webkit-gradient(<type>, <start>, <end>, from(<color>), to(<color>));`
 - ▶ `-webkit-gradient(linear, left top, left bottom, from(#ccc), to(#999));`
- ▶ `-webkit-border-radius: <top-left> <top-right> <bottom-right> <bottom-left>;`
 - ▶ **also, `-webkit-border-top-left-radius`, etc.**

CSS3 Transforms

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ `-webkit-transform: <transform>;`
 - ▶ `-webkit-transform: rotate(45deg);`
 - ▶ `-webkit-transform: skew(45deg);`
 - ▶ `-webkit-transform: translate(100px);`
 - ▶ `-webkit-transform: matrix(1, -0.3, 0, 1, 0, 0);`

CSS3 Animations

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ `-webkit-transition: <property>
<duration> <function>`
 - ▶ apply this rule to the element to be animated
 - ▶ functions: linear, ease-in, ease-out, ease-in-out, cubic-bezier
- ▶ when the element's style is changed, all changes will be animated in and out
 - ▶ not just `-webkit-transform`! properties like color will be properly animated!

iPhone Inset Text

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ `text-shadow: <x-coordinate>
<y-coordinate> <blur> <color>`
 - ▶ `text-shadow: 0px 1px 0px #fff;`
- ▶ **design tip!**
 - ▶ light background? positive offsets, white-ish color
 - ▶ dark background? negative offsets, black-ish color

WebKit CSS3

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

▶ example time!



<http://tommymacwilliam.com/e76/section1/webkitcss.html>

JavaScript

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ JavaScript is the best programming language currently in existence
 - ▶ other people will try to tell you otherwise
 - ▶ they are wrong

JavaScript

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ JavaScript is a client-side scripting language for the web
 - ▶ PHP, Ruby, Python, etc. are server-side: executes on the server before HTML is downloaded
 - ▶ JavaScript code executes right in your web browser
 - ▶ scripting language just like Python and Ruby: no compiling or worrying about types
- ▶ JavaScript is not Java
 - ▶ JavaScript was named when Netscape added Java support (which at the time was super cool), so the name was a futile attempt to increase its popularity
 - ▶ kinda like Greenland/Iceland

JavaScript Syntax

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ syntax very similar to C, PHP
 - ▶ if, else, for, while, etc.
 - ▶ strings are built in
 - ▶ variables don't need dollar signs
- ▶ no types for variables or functions
 - ▶ `x = 5;`
 - ▶ `function increment(x) { return ++x; }`

JavaScript Scope

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ JavaScript scope is a bit different than other languages
- ▶ the `var` keyword limits a variable's scope
 - ▶ with `var`: scope limited to current *function* (not loop, as in C!)
 - ▶ without `var`: global scope

JavaScript Tags

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ JavaScript can be inserted into your page using the `<script>` tag
 - ▶ `<script>` inside `<head>`: will be evaluated before page loads (used for funtions and events)
 - ▶ `<script>` inside `<body>`: will be evaluated as page loads
- ▶ just like CSS, JS can also be placed in an external file using the `src` attribute (not `href`)
 - ▶ `<script type="text/javascript" src="script.js"></script>`
 - ▶ **CANNOT** say `<script type="text/javascript" src="script.js" />`

JavaScript Arrays

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ JS arrays also do not have a fixed size and can contain different types
 - ▶ declaring an array: `var numbers = [1, 2, 3, "4", 5.3];`
 - ▶ adding a new element to an array:
`numbers.push(6);`
 - ▶ removing and returning the first element of the array:
`numbers.shift();`
 - ▶ removing and returning the last element of the array:
`numbers.pop();`
 - ▶ removing element 3 (index = 2) from the array:
`numbers.slice(2, 1);`
 - ▶ first argument: index to start removing at
 - ▶ second argument: how many elements to remove
- ▶ JS arrays are objects! (`push`, `shift`, and `pop` are functions in the `Array` class)

JavaScript Hashtables

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ JS makes a difference between hashtables (key/value pairs) and arrays

- ▶ `var hashtable = { "name": "tommy",
"rank": 1 };`
 - ▶ `hashtable["occupation"] = "TF";`

JavaScript Objects

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ JS hashtables are also objects

- ▶ `var object = { "name": "tommy", "rank": 1 };`

- ▶ `object.occupation = "TF";`

- ▶ syntax is interchangeable!

JavaScript Objects

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ we can even add functions to our object
- ▶

```
var tf = { "name": "tommy", "grade":  
function() {  
alert("done!"); } };
```

 - ▶ the `tf` object has a name and a grade function
 - ▶

```
var name = tf.name; tf.grade();
```

JavaScript Loops

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ JavaScript provides the `for-in` loop for iterating over both arrays and hashtables

```
for (var i in tf)
    alert(i + "is: " + tf[i]);
```

- ▶ for an array, `i` will be an integer ranging from 0 to the array length - 1
- ▶ for a hash, `i` will be the keys in the hashtable
 - ▶ a hash CANNOT be accessed using numerical indexes (i.e. `tf[0]` is meaningless)

One Last Trick

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ remember, those meta tags for hiding the addressbar will only take effect if the user adds your app to their homescreen and then opens it from there
 - ▶ perhaps not so ideal!
- ▶ using JavaScript, we can made the addressbar slide up so we get more screen real estate before the user scrolls:
 - ▶

```
setTimeout(function() {  
    window.scrollTo(0, 1); }, 100);
```
 - ▶ after 100ms (to avoid confusing the user), scroll down so we can't see the addressbar anymore

jQuery

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ jQuery is a JavaScript library that is going to make your life a lot easier
- ▶ MIT and GPL licensed, and freely available from http://docs.jquery.com/Downloading_jQuery
 - ▶ for better performance, link to a CDN-hosted copy

jQuery Selectors

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ `document.getElementById` is verbose, weak, and lame
- ▶ jQuery's most important function addresses this: `$ ()`
 - ▶ allows you to select elements via CSS selectors
 - ▶ that means we can get a bunch of elements using their class, tag, etc.
 - ▶ sounds simple, but is *extremely* powerful

jQuery Selectors

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ selecting all `p` elements: `$ ("p")`
- ▶ selecting all images with the class "logo":
`$ ("img.logo")`
- ▶ selecting everything that doesn't have the id "navbar":
`$ (":not (#navbar)")`
- ▶ selecting the even elements in a list:
`$ ("li:nth-child(even)")`

jQuery Event Handling

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ jQuery allows us to easily and efficiently add event handlers to elements

```
$("img").bind('click', function(event) {  
    alert('you clicked an image!');  
});
```

- ▶ this event will be triggered for *all* images on the page, not just one!
- ▶ `bind` takes two arguments: the name of the event, and the event handler

jQuery DOM Manipulation

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ `after(content)`: adds content after all selected elements
- ▶ `before(content)`: adds content before all selected elements
- ▶ `append(content)`: appends content to the selected elements
- ▶ `remove`: remove selected elements from the page
- ▶ `show/hide`: show or hide an element from the page (complete with fading!)

jQuery CSS

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ jQuery also provides handy methods for manipulating style attributes
 - ▶ without them, you'd have to do a lot of awkward string parsing
- ▶ `css`: get the value of a single CSS property of the selected elements or set multiple properties at once
 - ▶ `$("#p").css({ color: "red", background: "black" });`
 - ▶ `$("#p").css("color") == "red"`
- ▶ `addClass/removeClass`: add or remove a CSS class from the selected elements
- ▶ `hasClass`: returns true if the selected elements have the given CSS class

jQuery AJAX

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ jQuery makes it really easy for us to make AJAX calls
 - ▶ remember, AJAX allows us to fetch data from other pages from JavaScript
- ▶ GET **request:** `$.get(<url>, <callback>);`
`$.get("page.php", function(data) {
 alert("page.php said: " + data)
});`
- ▶ POST **request:** `$.post(<url>, <callback>);`

jQuery

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ example time!
 - ▶ jquery.html

Mobile DOM Events

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ WebKit defines several events specifically for touch devices
 - ▶ `touchstart`: finger is placed on element
 - ▶ `touchmove`: finger already on element is moved
 - ▶ `touchend`: finger is removed from element
 - ▶ `gesturestart`: multiple fingers placed on element
 - ▶ `gesturechange`: multiple fingers on element moved
 - ▶ `gestureend`: multiple fingers removed from element

Mobile DOM Events

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

- ▶ the event handler for touch events takes a single argument, which gives you access to touch and gesture properties
 - ▶ `event.touches`: array of touch objects
 - ▶ `event.touches[i].pageX`,
`event.touches[i].pageY`
 - ▶ `event.scale`: pinch/zoom scale when moving fingers together or apart
 - ▶ `event.rotation`: degrees of finger rotation
- ▶ when using jQuery's `bind`, we need to use `event.originalEvent.touches` because jQuery's event object doesn't include these properties, but the browser's event object does

Mobile DOM Events

Mobile Web
Development I

Tommy
MacWilliam

Mobile HTML
Tricks

WebKit CSS3

JavaScript

jQuery

Mobile DOM
Events

▶ example time!

▶ <http://tommymacwilliam.com/e76/section1/events.html>