







Dynamic Websites
Topic 7:
Using Scripts (2)

Scope and Coverage

This topic will cover:



- Making use of jQuery to enhance their front ends;
- Selecting elements using jQuery selectors and filters;
- Manipulate and animate HTML elements through jQuery.



Learning Outcomes


By the end of this topic students will be able to:

- An introduction to jQuery
- Effects in jQuery
- Selectors and Filters
- HTML manipulation with jQuery
- jQuery for mobile devices
- JSON




Introduction

- In this lecture we look further into jQuery which is a library for JavaScript which simplifies and extends what it can do.
- jQuery is most popular JavaScript library in use on the Internet.
- It is essentially a huge JavaScript program that someone has written for use.
- There are several ways to make it available to a web page and for mobile devices.


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jQuery

- The best way is to download and install the library into a local directory.
- You can also use an external repository
 - With the understanding that this may slow down you applications because of the extra latency involved.
- You may choose which of these strategies to use yourself.
 - For this lecture, we will assume you are using an external repository.


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The Structure of jQuery

- jQuery provides an extension to the standard DOM model of JavaScript.
 - In technical terms, it is a **wrapper**. It embraces and adapts the functionality of DOM.
- jQuery provides for greater expressiveness when coding.
 - The code statements you write can be made to do a lot more than they would otherwise in plain JavaScript.
- All of this functionality is accessed through the jQuery API.



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A First jQuery Example - 1

- We place jQuery code in an event handler inside script tags. The event handler we use is called **ready**.
- This handler is triggered after the DOM is loaded, but before the page contents are placed on the document.
- We added the ready handler to our document, using the special jQuery notation.



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A First jQuery Example - 2

```
<html>
<head>
<title>jQuery Demo</title>
</head>
<body>
<a href="http://www.nccedu.com/">NCC Education</a>
<script src="http://code.jquery.com/jquery-1.6.1.js"></script>
<script>



$(document).ready(function(){
  $("a").click(function(event){
    alert("Thanks for clicking that link!");
  });
});

</script>
</body>
</html>
```

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jQuery Presentation Flourishes



- One of the other things provided by the jQuery library are a series of presentation flourishes.
 - These are known as **effects**.
 - Much as you often see in Powerpoint Presentations.
- We can make elements slowly appear, slowly disappear, animate and more.
 - As with any kind of presentational flourish, we should be wary of over-using the effect.
- If we wanted to stop the link working, then fade it out and in, we could.

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Fade In, Fade Out

- `preventDefault` stops the default interaction with the element (in this case, it stops us navigating to the destination).

```
$(document).ready(function(){
    $("a").click(function(event){
        event.preventDefault();
        $(this).fadeOut(2000);
        $(this).fadeIn(2000);
    });
});
```



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jQuery is JavaScript

- jQuery is a library of JavaScript, which means we can use normal code within jQuery functions too:



```
$(document).ready(function(){
    $("a").click(function(event){
        var i;

        event.preventDefault();
        for (i = 0; i < 10; i++) {
            $(this).fadeOut(500);
            $(this).fadeIn(500);
        }
    });
});
```

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Finding Elements with jQuery - 1



- This `$` notation indicates that we want to make use of jQuery – what follows is the element of which we wish to make use.
 - `$(document)` means “access the document element via jQuery”.
- If we want to get an element with a specific tag, we use the `$(tag)` syntax, such as `$(a)`.
 - Get all anchor tags
- We can also get more specific.

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Finding Elements with jQuery - 2



- jQuery permits us to match with class/name attributes with more ease than PHP or JavaScript.
 - The following example gets all <p> elements with the ID of "information"

```
<p id = "information">Hello, I am some information that is being presented to you!</p>  
<script>  
$(document).ready(function(){  
  $("p#information").click(function(event){  
    $(this).fadeOut(500);  
    $(this).fadeIn(500);  
  });  
});
```

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Selector - 1

- jQuery offers a range of selectors that allow us to select elements with either great precision or through broad criteria.
 - P#information is an example of a selector.
- The # symbol allows us to get an element by ID.
 - It does not need a tag, but this can be used to specialise the search.
- Classes (such as those defined in CSS) are indicated by a . Symbol.

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Selectors - 2

- For classes, we can indicate our desire to match those that have multiple matches by chaining the Symbols:
 - \$(".person.student") will get any elements that have both the person and student classes applied to them.
- We can also select multiple elements by using a comma separated list:
 - \$(".person,#thingy") will get any element that have had the CSS class "person" applied, as well as any with an ID of "thingy"

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Filters - 1

- jQuery also offers us a powerful mechanism for finding and manipulating elements.
 - These are **filters**.
- We indicate our wish to use these by following the selector with a colon and the filter to use.
 - :odd and :even will get all the odd and even items that match a tag.
 - :header will filter out any elements that are not indicated by header tags (h1, h2, h3 etc).

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Filters - 2

- There are around 20 different filters defined in the jQuery library.
 - We do not have time to cover all of them.
- You can use them to achieve very sophisticated ends in matching elements.
 - \$("#things,stuff:not") will get all the things that are **not** matched by the selector.
 - \$("things,stuff:has(b)") will get anything with the ID "things" or the class "stuff", provided that it contains somewhere within its innerHTML a tag.

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jQuery Events

- We can bind handlers to a wide range of events on a wide range of elements.
 - These map onto JavaScript events for the main part.
- Some of the common events we want to trap:
 - Mouseover
 - Click
 - Load
 - Change
 - Blur
 - However

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Modifying by Class

```
<html>
<doc>

  <!-- jQuery Demo's Title -->

  <title>
    jQuery (display:none)
  </title>

</head>
<body>
  <div id = "show" href = "#&#x2195; Education/>
    <div class = "waitdisplay">Wait!</div>
    <script src="http://code.jquery.com/jquery-1.6.1.js"></script>

    <script>
    $(document).ready(function(){
      if( $("#show").attr("href").indexOf("#&#x2195;") != -1){
        $("#waitdisplay").slideUp("slow");
      }
    });
  </script>
</body>
</html>
```



Animation

- We are not limited to the animation provided by the default methods.
 - jQuery permits us to modify any arbitrary CSS definition using the animate method.
- We provide the desired end point of the value, a duration, and a callback function.
 - Longer durations indicate slower animations.
- The callback function is executed at the end of the process.



Example Animations - 1

- We can have an element animate to a particular state, or to one that is relative.
- The below example shows animating an element so that its font size is changed to a maximum:



```
$(document).ready(function(){
    $('#a#show').click (function(event) {
        $('#textdisplay').animate ({fontSize: '4em'},
1000, function() {
        });
    });
});
```



Example Animations - 2



- This function shows an animation that increases the font size every time the function is triggered via a relative adjustment:

```
$(document).ready(function() {  
    $("#textDisplay").mouseover(function(event) {  
        $(this).animate({fontSize: '+=4em'},  
            1000, function() {  
                //  
            });  
    });  
});
```

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Callbacks



- Most jQuery effects permit you to define a callback function to be called when the animation is complete.
 - They are normally provided as a third parameter after the duration.
- JavaScript executes statements line by line.
 - Without using a callback, code following the effect will be executed before the animation completes.
 - We can see a callback stub in the calls made to the animate function.

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Animation with Callbacks



```
$(document).ready(function(){  
    $("#textDisplay").mouseover(function(event)  
    {  
        $(this).animate({fontSize: '+=4em'},  
            1000, function() {  
                alert("All done!");  
            });  
    });  
});
```

- Callbacks allow us to be sure that our animations sync up correctly with anything dependant on them.

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Manipulating HTML via jQuery

- As with JavaScript, we can change the innerHTML of an element, this time using the html method.
 - When used with no parameters, it returns the current innerHTML.
 - When used with a string parameter, it replaces it.
- Accessing elements for this is done in the same ways as for other methods:
 - \$(".textdisplay").html("Bing");

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Adding Attributes



- jQuery even lets us change the attributes on elements.
 - This is done using the attr function.
- While attributes are best avoided in XML, they are used constantly in HTML.
 - And it is an extremely powerful technique to alter them using jQuery.
- We could easily add alt tags to every image that lacks them, by using jQuery.
 - \$("img:not([alt])").attr("alt", "An image of some kind.");

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Adding CSS



- We can add CSS “on the fly” to elements using jQuery.
 - This is done using the css function.
- The code below shows how to “zebra-stripe” a table:

```
$(document).ready(function(){
  $("tr:odd").css('background', "#abcabc");
  $("tr:even").css('background', "#bacaba");
});
```

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jQuery and JavaScript

- All of this is very neat of course, but beyond simplifying coding, what is the benefit?
 - It turns out, the benefit is considerable!
- jQuery is a **cross browser** library.
 - Ajax requests are dependent on browsers.
 - jQuery handles most of the compatibility problems within its libraries.
 - We write the jQuery code, and the library makes it work on different browsers.

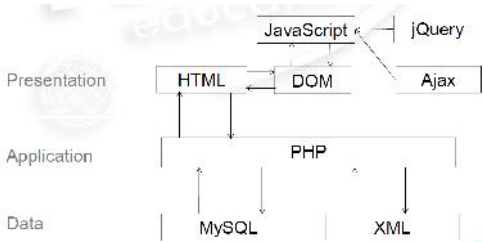
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Benefits of jQuery

- There are other benefits too:
 - Ease of element selection and manipulation
 - Ease of adding presentational flourishes
 - Simplified event handling
 - Small footprint
 - Support plug-ins
- However, as with all frameworks of this nature, the danger is that you end up relying on it.
 - You should always know how to accomplish the same goal in plain JavaScript.

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Our Architectures So Far



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jQuery for Mobile Devices

- jQuery Mobile can be used to create mobile web applications.
- jQuery Mobile works on most popular smartphones and tablets and is viewed best through GoogleChrome.
- You should add a style sheet and libraries to each page.

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Example jquery for mobile

```
<!DOCTYPE html>
<html>
<head>
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="stylesheet" href="http://code.jquery.com/mobile/1.4.2/jquery.mobile-1.4.2.min.css">
<script src="http://code.jquery.com/jquery-1.10.2.min.js"></script>
<script src="http://code.jquery.com/mobile/1.4.2/jquery.mobile-1.4.2.min.js"></script>
</head>
<body>
<div data-role="page">
<div data-role="header">
<h1>Welcome to Durham Zoo</h1>
</div>
<div data-role="main" class="ui-content">
<p>We are open 362 days a year. We are only closed Christmas Day and Easter Sunday.</p>
</div>
<div data-role="footer">
<h1>contact: durhamzoo@yahoo.co.uk</h1>
</div>
</div>
</body>
</html>
```

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JSON

- JavaScript Object Notation (JSON) stores and exchanges data.
- JSON is text, written with JavaScript object notation.
- JSON is independent to any programming language.
- XML is set of rules for encoding documents into machine-readable form.

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JSON or XML

- XML items are written in open and close tags
 - JSON you name the tags once
- JSON can bypass the XMLHttpRequest object when getting data.
- JSON is easier to read than XML
- AJAX includes XML, whereas JSON does not.

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Example JSON –v- XML

JSON Example

```
[{"firstName": "Sarah", "lastName": "Hamilton"}, {"firstName": "Steven", "lastName": "Vettel"}, {"firstName": "James", "lastName": "Palmer"}]
```



XML

```
<employees>  
<employee>  
  <firstName>Sarah</firstName> <lastName>Hamilton</lastName>  
</employee>  
<employee>  
  <firstName>Steven</firstName> <lastName>Vettel</lastName>  
</employee>  
<employee>  
  <firstName>James</firstName> <lastName>Palmer</lastName>  
</employee>  
</employees>
```

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Conclusion

- Dynamic and engaging web front ends are possible through the use of Ajax and JavaScript.
 - However, they can be made easier for us to do through the use of jQuery.
- jQuery is the most popular JavaScript library in use on the Internet at the moment.
 - Its popularity is largely due to the extremely high quality of the library itself.
- jQuery extends our ability to create our user interfaces.

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Terminology


- *jQuery* – library of JavaScripts.
- *JSON* – JavaScript Object Notation.
- *Callback* - allows us to be sure that our animations sync up correctly with anything dependant on them.

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References

- Code.jquery.com, 2017. [online] Available at <https://code.jquery.com/mobile>
- W3schools.com, 2017. [online] Available at www.w3schools.com

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Topic 7 - jQuery

Any Questions?
