

Session 17

jQuery

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jQuery Reading & References

■ Tutorials

<http://learn.jquery.com/about-jquery/how-jquery-works/>

<http://www.tutorialspoint.com/jquery/>

http://www.reference designer.com/tutorials/jquery/jq_1.php

<http://www.w3schools.com/Jquery/default.asp>

The referencedesigner site is slow going, but very complete, and has lots of examples.

Be careful, the jquery.com site has some articles that are not correct and others that do not introduce material in a logical way

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References

- Quick Reference Guide

www.tutorialspoint.com/jquery/jquery-quick-guide.htm

- API

<http://api.jquery.com/>

- jQuery events

<http://api.jquery.com/category/events/>

- jQuery selectors

<http://api.jquery.com/?s=selectors>

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Learning Goals

- Understand jQuery syntax and semantics
- Understand jQuery library as a way to
 - simplify the JavaScript event model

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jQuery

- Did you notice that
 - the combination of DOM and JavaScript is not elegant?
- With the emergence of Ajax, the importance of client side scripting is greatly increased
- Popular approach- jQuery
 - Cross-browser JavaScript library

jQuery name is misleading - it has little to do with queries

What is jQuery

- A JavaScript client-side library (most popular)
- Used by over 72% of the most popular Web sites (over 96% of sites with known JS libraries)
- Free (MIT license)
- Open source
- Provides for plug-ins (many libraries available)

jQuery Library Options

- Refer to the latest Web version of the library
- Refer to a particular library in the same directory as your html
 - Download a copy of the most recent library from the jQuery Web site
 - Place the downloaded file in your NetBeans application top-level directory or the directory holding your jQuery htm files
 - Reference it in your JSP or html

<http://jquery.com/download/>

```
<script src="jquery-3.3.1.js">
</script>
```

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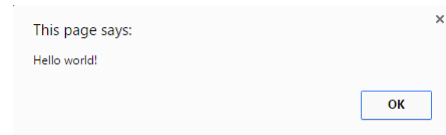
Hello jQuery World

```
<head>
<script src="https://code.jquery.com/jquery-3.3.1.js"> </script>
<script>
$(document).ready(function() {
  $("a").click(function() {
    alert("Hello world!");
  });
});
</script>
</head>
<body>
<a href="">Link</a>
</body>
```

The jQuery ready function provides a handler to execute when the page is ready to be manipulated (although maybe not fully loaded)

Event (e.g., ready) function parameter is typically an anonymous function

[Link](#)



\$ is a valid JavaScript identifier, and represents the jQuery function (i.e., \$(..) constructs a new jQuery object)

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jQuery Versions

- You can reference the jQuery version you have downloaded in a script tag, as in

```
<script src="jquery-3.3.1.js">
</script>
```

- Alternatively, you can reference an on-line jQuery version, as in

```
<script src="https://code.jquery.com/jquery-3.3.1.js">
</script>
```

Using the "latest" version is OK for this class, but not for a production environment (QA before using a new release)

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A Closer Look

```
<head>
<script src=" https://code.jquery.com/jquery-3.3.1.js"></script>
<script>
$(document).ready(
  function() {
    $("a").click(function() {
      alert("Hello world!");
    });
  });
</script>
</head>
<body>
<a href="">Link</a>
</body>
</html>
```

Anonymous handler function

`$(...)`, a jQuery selector, constructs a new jQuery object that contains html elements such as:

`$(document)` - document object

`$("a")` - all anchor elements in the page

The `click()` and `ready()` functions are methods of the jQuery object that define events.

`click()` binds a click event to all selected elements

The `click` function replaces the use of the JavaScript `onclick` event handler

(and we do not need `onclick` for every anchor tag)

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Binding of Handler to All Selected Elements

```
<script>
$(document).ready(function() {
  $("a").click(function() {
    alert("Hello world!");
  });
});
</script>
</head>
<body>
<a href="">Link</a>
<br />
<a href="">2nd Link</a>
...

```

jQuery statement binds the alert dialog to a click on any of the anchor tags

Clicking on either link results in the dialog box appearing

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jQuery Manipulation

- A jQuery manipulation statement consists of
 - jQuery selector
 - jQuery manipulation method (usually to manipulate the DOM)

```
$("#orderedlist").addClass("red");
```

Adds a class attribute to each of the matched elements as in
<xxxx class="red" ...>

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Properties of jQuery Object Instances

- `jquery` - String containing the jQuery version number
- `length` - the number of elements in the jQuery object

```
$("#orderedlist").length;
```

jQuery Selector + hide Manipulation

- Note that the selector syntax uses elements of XPath and CSS
 - `$(this).hide()` - hides the current element
 - `$("p").hide()` - hides all `<p>` elements
 - `$("p.test").hide()` - hides `p` elements with `class="test"`
 - `$(".test").hide()` - hides all elements with `class="test"`
 - `$("#test").hide()` - hides the element with `id="test"`
 - `$("*").hide()` - hides all elements
 - `$("[href]").hide()` - hides all elements with an `href` attribute

Selector Components

Not intuitive

- Space - element identifiers having spaces between them are known as descendant selectors
 - `$("#form input").css("border", "2px dotted blue");`
 - The selector will find **all** descendants (similar to // in XPath)
- Child - `$("#A > B")` selects child "B" elements of parent "A" (not grandchildren)
- Sibling - `$("#A + B")` is used to select an element B that just comes after A

Gets/sets the value of the
css style property

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jQuery Usage Styles

- jQuery functions return a jQuery object containing a collection of elements
- Two categories of functions (core and utility)
- `$()` function (core function)
 - Sometimes referred to as a command
 - factory method for the jQuery object
 - Returns a jQuery object
- `$.-`prefixed functions (utility function)
 - Are not applied to the jQuery object per se
 - Example
 - `$.each([1,2,3], function() { document.write(this + 1); });`

`$("#a").click(function() { alert("Hello world!");`

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jQuery Selectors ...

- Selecting elements in jQuery uses a combination of XPath and CSS selectors

- `$("*")` - "all selector" selects all elements in document
- `$("p > *")` - "child selector" selects all child elements of the paragraph elements
- `$("#specialID")` - selects the element with `id="specialID"`
- `$(".specialClass")` - "class selector" selects all the elements that have the class of *specialClass*.

Note similarity to XPath

Note similarity to CSS

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Descendant selectors

jQuery Selectors ...

- `$("p a.specialClass")` - This selector selects anchor elements with a class of *specialClass* declared within `<p>` elements
- `$("ul li:first")` - Selects only the first `` element descendant of the ``
- `$("#container p")` - Selects all elements matched by `<p>` that are descendants of an element that has an `id` of *container*.
- `$("li > ul")`: Selects all elements matched by `` that are children of an element matched by ``
- `$("strong + em")` - Selects all elements matched by `` that immediately follow a sibling element matched by ``.
- `$("p ~ ul")`: Selects all elements matched by `` that follow a sibling element matched by `<p>`

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jQuery Selectors

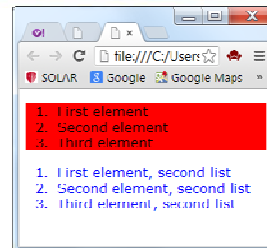
- `$(code, em, strong)` - Selects all elements matched by `<code>` or `` or ``
- `$(p strong, .myclass)` - Selects all elements matched by `` that are descendants of an element matched by `<p>` as well as all elements that have a class of `myclass`
- `$(":empty")` - Selects all elements that have no children.
- `$(p:empty)` - Selects all elements matched by `<p>` that have no children

Empty selector

Many more selectors in the jQuery Quick Guide

jQuery Selector Example

```
<style type="text/css">
.red { background-color: red;}
.blue { color: blue; }
.green { color: green; } </style>
...
$(document).ready(function() {
  $("#orderedlist").addClass("red");
  $("#orderedlist2 > li").addClass("blue");
});
...
<ol id="orderedlist" >
  <li>First element</li>
  <li>Second element</li>
  <li>Third element</li>
</ol>
<ol id="orderedlist2" >
  <li>First element, second list</li>
  <li>Second element, second list</li>
  <li>Third element, second list</li>
</ol>
```



Above JS adds class="red" to the first ol element and adds class="blue" to each of the li elements in the second ol element. This does not override any existing classes

More Selector Examples

- Hide all Paragraph elements that contain a class attribute:

```
$("#p[class]").hide();
```

- Show the first paragraph on the page:

```
$("#p:eq(0)").show();
```

Good for concealing an error message on a page - and making it visible when an error is detected

- Hide all divs that are currently showing:

```
$("#div:visible").hide();
```

- Get all list items that are children of an unordered list:

```
$("#ul/li") /* valid too: $("#ul > li") */
```

Pseudo class

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CSS Pseudo-Class

- A pseudo-class is used to define a special state of an element

- For example, it can be used to:

- Style an element when a user mouses over it
- Style visited and unvisited links differently
- Style an element when it gets focus

- Examples

- `p:first-child {color: blue;}`
- `a:visited {color: #00FF00;}`

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jQuery Psuedo-Classes

■ Examples:

- `$("p:first")`
- `$("p:last")`
- `$("tr:even")`
- `$("p:first-child")`
- `$("p:only-child")`

Yet More Selector Examples

- Get all paragraphs, with a class of 'foo', that contain an anchor tag:

```
$("p.foo a");
```

- Get list item that contains link with "Register" text inside:

```
$("li[a:contains('Register')]"); Like an XPath predicate operator
```

- Get the value of the input field whose name attribute is 'bar':

```
$("input[name=bar]").val();
```

Attribute value can be an unquoted name or a quoted string

- Get all checked radio buttons:

```
$("input[type=radio][checked=checked]");
```

Recap of jQuery Event Binding

■ A jQuery event handling statement consists of

- jQuery selector
- jQuery event function
- jQuery event handler

```
$(document).ready(function() {  
  $("a").click(function() {  
    alert("Hello world!");});});
```

The `$()` function is referred to as the jQuery factory function

Event Handler Parameter

■ Your event handler can use a parameter

■ Example

```
<a href="http://jquery.com/">jQuery</a>  
<script src="https://code.jquery.com/jquery-3.3.1.js">  
</script>  
<script>  
  $( document ).ready(function() {  
    $("a").click(function( event ) {  
      alert( "The link will take you to jquery.com" );  
      // event.preventDefault();  
    }); } );  
</script>
```

You can name this anything you want. It is an event object

jQuery Event Methods

- `preventDefault()` - The default action of the event will not be triggered
- `isDefaultPrevented()` - returns whether `preventDefault` was called for the event object
- `event.target` - returns which DOM element triggered the event
- `event.which` - returns which keyboard key or mouse button was pressed for the event

For example, for a click in an anchor tag, the only result will be the one specified in the event handler

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jQuery Event Object Properties

- Common event properties
 - `target` - DOM element that initiated the event
 - `relatedTarget` - another DOM element involved in the event, if any
 - `pageX` - mouse position relative to the left edge of the document
 - `pageY` - mouse position relative to the top edge of the document
 - `which` - key or button that was pressed (key or mouse events)
- Other event properties
 - `timestamp`
 - `type`

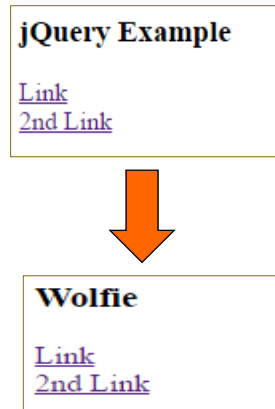
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Example

- Clicking on either link, will change "jQuery Example" to "Wolfie"

```
$(document).ready(function() {
  $("a").click(function(event) {
    event.preventDefault();
    $("h3").text("Wolfie");
  });
});
</script>
</head>
<body>
  <h3>jQuery Example</h3>
  <a href="">Link</a>
  <br />
  <a href="">2nd Link</a>
  ...
```

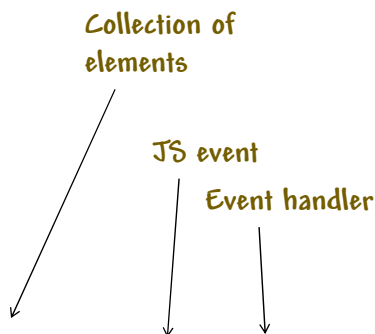


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Event Handlers Bound to Events

- You bind an event handler to a JavaScript event for a collection of elements
- For every onxxx event, there is a jQuery equivalent Check jQuery events



```
$("#a").click(function() { alert("Hello world!"); });
```

JavaScript Event	jQuery
blur	blur()
change	change()
click	click()
focus	focus()
	hover() - 2 handlers
load	load()
submit	submit()
etc.	

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Binding Events to Functions

```
$("#a").click(function() { alert("Hello world!"); });
```

- The example above uses an event helper method (anonymous function)
- Full syntax (which you would probably not use):

```
$("#a").bind('click', function);
```

Extra jQuery Events

- Many jQuery events go beyond the JavaScript events
 - ready
 - hover
- Other functions
 - find - further search the descendants of the already selected item
 - each - iterate over every element
 - append - append text to an element Similar to JSTL X library style

```
$(document).ready(function() {  
  $("#orderedlist").find("li").each(function(i) {  
    $(this).append( " BAM! " + i );  
  });  
});
```


Equivalence of XPath Predicates

- `filter()` - reduces the set to those that match the expression
- `not()` - removes all elements that match the expression

```
$(document).ready(function() {  
  $("li").not(":has(ul)")  
  .css("border", "1px solid black"); });
```

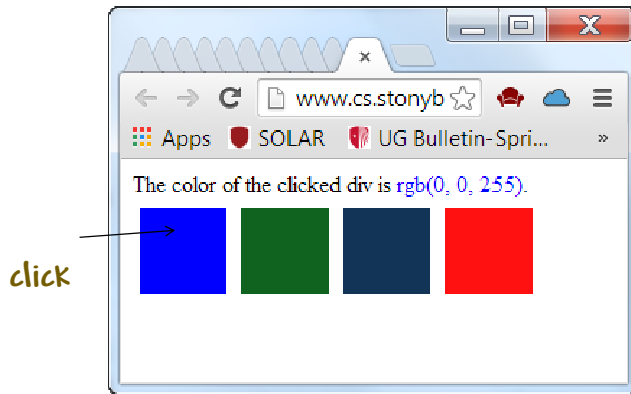
selects all `li` elements that have a `ul` element as a child and removes all such elements from the selection group. Therefore all `li` elements get a border, except the one that has a child `ul`

CSS Getter and Setter Functions

- Supports nearly all of CSS selectors
- `css()`
 - Getter - `css(propertyName)`
 - Setter - `css(propertyName, propertyValue)`
- Gets or sets a CSS property value from the first matched element
- Accounts for JavaScript function name differences among browsers

css() Example

www.cs.stonybrook.edu/~cse336/CSS-Example.htm



Notice the color of the text

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... css() Example

```

<style>
div { width:60px; height:60px; margin:5px; float:left; }
</style>
<script src="http://code.jquery.com/jquery-latest.js">
</script></head>
<body>
<span id="result">&nbsp;&nbsp;&nbsp;</span> <br>
<div style="background-color:blue;"></div>
<div style="background-color:rgb(15,99,30);"></div>
<div style="background-color:#123456;"></div>
<div style="background-color:#f11;"></div>
<script>
$("div").click(function () {
  var color = $(this).css("background-color");
  $("#result").html("The color of the clicked div is
  <span style='color:" + color + ";>" + color + "</span>.");
});
</script>

```

All div blocks are 60 x 60

Initially, this has no content

div element that was clicked

Element with an id of "result"

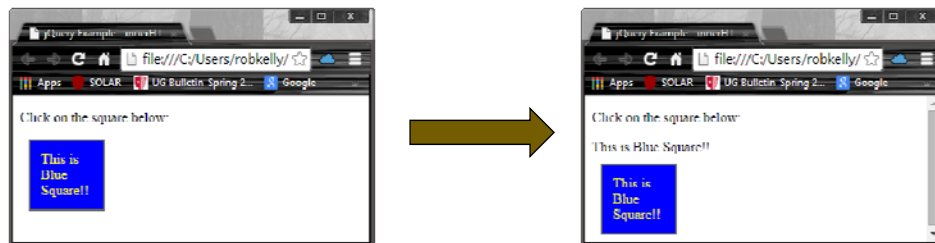
Acts like innerhtml

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html and text Methods

- **html()** method - gets the html contents (innerHTML) of the first matched element or set contents of every matched element
- **text** method - gets and/or sets the combined text contents of all matched elements
 - **text()** - gets the content of matched elements
 - **text(content)** - sets the content of matched elements
- **Method works for both on XML and XHTML documents**



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html() and text() Example

```

<script src=" https://code.jquery.com/jquery-3.3.1.js"> </script>
<script>
$(document).ready(function() { $("div").click(
    function () { var content = $(this).html();
    $("#result").text(content); }); });
</script>
<style> #division{ margin:10px;padding:12px; border:2px solid #666;
width:60px; }
</style> </head>
<body> <p>Click on the square below:</p>
<span id="result"> </span>
<div id="division" style="background-color:blue;color:yellow;">
This is Blue Square!! </div> </body>
    
```

A typical approach to displaying error messages is to insert the text into a div or span element

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DOM Attributes

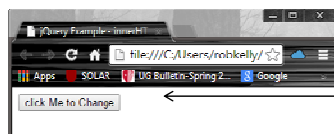
- We can access DOM attributes
 - `className`, `tagName`, `id`, `href`, `title`, `rel`, `src`
- `attr` method can be used to
 - fetch the value of an attribute from the first element in the matched set - `attr(attributeName)`
 - set attribute values onto all matched elements `attr(attributeName, attributeValue)`

Note jQuery distinguishes between an attribute and a property. An attribute does not change and some properties are not attributes

DOM Element Replacement ...

- You can replace a complete DOM element with the specified HTML or DOM elements
- Replace with HTML or simple text

`selector.replaceWith(content)`



Click on
button
to obtain



... DOM Element Replacement

- You can replace a complete DOM element with the specified HTML or DOM elements
- Replace with HTML or simple text

`selector.replaceWith(content)`

```
<script>
$(document).ready(function() {
  $("div").click(function () {
    $(this).replaceWith("<h1>jQuery is Great</h1>");
  }); });</script>
...
<div>
  <input type="button" value="click Me to Change" /> </div>
```

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Determine Number of Matches

- To determine the number of matched elements
 - length property (preferred approach)
 - size() method

```
alert( "Size: " + $("li").size() );
alert( "Size: " + $("li").length );
```

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Other DOM Attributes

<code>removeAttr(name)</code>	Remove an attribute from each of the matched elements.
<code>hasClass(class)</code>	Returns true if the specified class is present on at least one of the set of matched elements.
<code>removeClass(class)</code>	Removes all or the specified class(es) from the set of matched elements.
<code>toggleClass(class)</code>	Adds the specified class if it is not present, removes the specified class if it is present.
<code>val()</code>	Get the input value of the first matched element.
<code>val(val)</code>	Set the value attribute of every matched element if it is called on <code><input></code> but if it is called on <code><select></code> with the passed <code><option></code> value then passed option would be selected, if it is called on check box or radio box then all the matching check box and radiobox would be checked.

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