Client-side JavaScript

jQuery

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The jQuery library

jQuery is a lightweight, **"write less, do more"**, JavaScript library.
The purpose of jQuery is to make it much easier to use JavaScript.

jQuery takes a lot of common tasks that require many lines of JavaScript code to accomplish, and wraps them into methods that you can call with a single line of code.

The jQuery library contains the following features:

- HTML/DOM manipulation
- CSS manipulation
- HTML event methods
- Effects and animations
- AJAX
- Utilities

The jQuery library

There are two versions of jQuery available for downloading:

- **Production version** - this is for your live website because it has been minified and compressed
- **Development version** - this is for testing and development (uncompressed and readable code)

Both versions can be downloaded from http://jQuery.com

The jQuery library is a single JavaScript file, to be referenced with the HTML <script> tag (notice that the <script> tag should be inside the <head> section):

```
<head>
<script src="jquery-3.6.1.js"></script>
</head>
```

The jQuery-x.y.z.js file must be placed in the same directory of the HTML page.

The jQuery library

Alternatively, jQuery can be included from a **CDN (Content Delivery Network)**. For example, Google hosts jQuery.

To use jQuery from Google, use:

```
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/
jquery.min.js"></script>
</head>
```

Full list of libraries hosted by Google:

https://developers.google.com/speed/libraries/

The jQuery library

The jQuery syntax is tailor made for **selecting** HTML elements and performing some **action** on the element(s).

Basic syntax is: **$(*selector*).*action*()**

- A $ sign to define/access jQuery
- A (*selector*) to "query (or find)" HTML elements
- A jQuery *action*() to be performed on the element(s)

Examples:

`$("p").hide()` - hides all <p> elements.

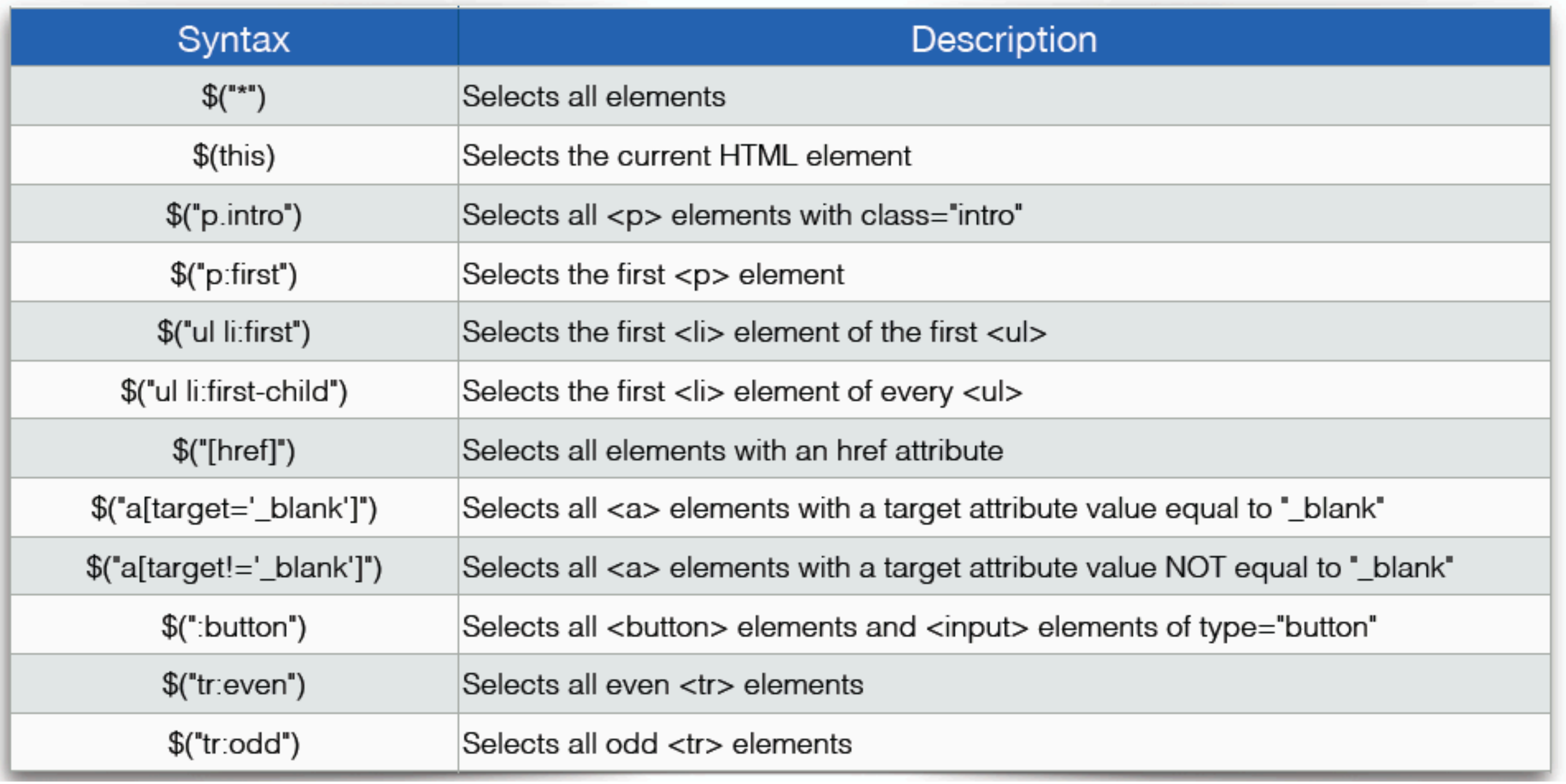
`$(".test").hide()` - hides all elements with class="test".

`$("#test").hide()` - hides the element with id="test".

The jQuery library

http://www.w3schools.com/jquery/trysel.asp

jQuery selectors examples:



Syntax	Description
$("*")	Selects all elements
$(this)	Selects the current HTML element
$("p.intro")	Selects all <p> elements with class="intro"
$("p:first")	Selects the first <p> element
$("ul li:first")	Selects the first <li> element of the first <ul>
$("ul li:first-child")	Selects the first <li> element of every <ul>
$("[href]")	Selects all elements with an href attribute
$("a[target='_blank']")	Selects all <a> elements with a target attribute value equal to "_blank"
$("a[target!='_blank']")	Selects all <a> elements with a target attribute value NOT equal to "_blank"
$(":button")	Selects all <button> elements and <input> elements of type="button"
$("tr:even")	Selects all even <tr> elements
$("tr:odd")	Selects all odd <tr> elements

The jQuery library

To prevent any jQuery code from running before the document is finished loading (is ready), put all the jQuery methods inside a **document ready event**:

```
$(document).ready(function(){

   // jQuery methods go
here...

});
```

```
<!DOCTYPE html>
<html>
<head>
<script src="https://
ajax.googleapis.com/ajax/libs/jquery/
3.6.1/jquery.min.js">
</script>
<script>
$(document).ready(function(){
  $("button").click(function(){
    $(this).hide();
  });
});
</script>
</head>
<body>
<h2>This is a heading</h2>
<p>This is a paragraph.</p>
<p>This is another paragraph.</p>
<button>Click me</button>
</body>
</html>
```

The jQuery library

If your website contains a lot of pages, and you want your jQuery functions to be easy to maintain, you can put your jQuery functions in a separate .js file.

```
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/
jquery.min.js"></script>
<script src="my_jquery_functions.js"></script>
</head>
```

The jQuery library

In jQuery, most DOM events have an equivalent jQuery method.

To assign a click event to all paragraphs on a page, you can do this:

```
$("p").click();
```

The next step is to define what should happen when the event fires. You must pass a function to the event:

```
$("p").click(function(){
  // action goes here!!
});
```

The jQuery library

The example hides **p1** when clicked, and displays an alert with the text content of **p2** when double-clicked.

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/
jquery.min.js"></script>
<script>
  $(document).ready(function(){
    $("#p1").click(function(){
      $(this).hide();
    });
    $("#p2").dblclick(function(){
      alert("You double-clicked \"" + $(this).text() + "\"");
    });
  });
</script>
</head>
<body>
<p id="p1">If you click on me, I will disappear.</p>
<p id="p2">Click me away!</p>
</body>
</html>
```

The jQuery library

The example changes the content of a paragraph when you enter or leave it.

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/
jquery.min.js"></script>
<script>
  $(document).ready(function(){
    $("#p1").mouseenter(function(){
      $("#p1").text("You are on the paragraph!");
    });
    $("#p1").mouseleave(function(){
      $("#p1").text("You are not on the paragraph!");
    });
  });
</script>
</head>
<body>
<p id="p1">Enter this paragraph.</p>
</body>
</html>
```

The jQuery library

The example changes the content of a paragraph when you select or unselect it.

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/
jquery.min.js"></script>
<script>
  $(document).ready(function(){
    $("#p1").mousedown(function(){
      $("#p1").text("You are clicking the paragraph!");
    });
    $("#p1").mouseup(function(){
      $("#p1").text("You are not clicking the paragraph!");
    });
  });
</script>
</head>
<body>
<p id="p1">This is a paragraph.</p>
</body>
</html>
```

The jQuery library

The example changes the content of a form field when you select or unselect it.

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/
jquery.min.js"></script>
<script>
  $(document).ready(function(){
    $("input").focus(function(){
      $(this).val("I got focus");
    });
    $("input").blur(function(){
      $(this).val("I lost focus");
    });
  });
</script>
</head>
<body>
Name: <input type="text" name="fullname"><br>
Email: <input type="text" name="email">
</body>
</html>
```

The jQuery library

The example changes the content of a div
when you select an option or submit the form.

```
<!DOCTYPE html>
<html>

<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/
jquery.min.js"></script>
</script>
<script>
  $(document).ready(function(){
    $(".target").change(function() {
      $("#other").text("User selected " + $(this).val());
    });
    $("#myForm").submit(function() {
      alert("User submitted the form!");
    });
  });
</script>
</head>

...
```

The jQuery library

The example changes the content of a div when you select an option or submit the form.

```
...

<body>
<form id="myForm">
<input class="target" type="text" value="Field 1">
<select class="target">
<option value="option1" selected="selected">Option 1</option>
<option value="option2">Option 2</option>
</select>
<button type="submit">Submit</button>
</form>
<div id="other">Trigger the handler</div>
</body>

</html>
```

The jQuery library

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/
jquery.min.js"></script>
<script>
  $(document).ready(function(){
    $(window).resize(function() {
      $("#other").append("Resizing<br/>");
    });
    $("#longDiv").scroll(function() {
      $("#other").append("Scrolling<br/>");
    });
  });
</script>
</head>
...
```

`resize()` attaches an event handler function to the window element that is executed when the user resizes the browser - it is only available for window

`scroll()` attaches an event handler function to an HTML element that is executed when the user scrolls the element (e.g., a long div) - it can be applied to window or to elements with the `overflow` CSS property set to `scroll` (or `auto` when the element's height or width is less than the height or width of its content).

The jQuery library

```
...
<body>
<div id="longDiv" style="overflow: scroll; width: 200px; height: 100px;">
Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod
tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim
veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea
commodo consequat. Duis aute irure dolor in reprehenderit in voluptate
velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat
cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id
est laborum.
</div><br/>
<div id="other">Resize the window or scroll the other div<br/></div>
</body>
</html>
```

The jQuery library

jQuery lets you define **custom events**.

`trigger()` fires events and is also used to fire the custom ones - its first parameter is the event name, the optional second one is an array of data to be passed along.

```
$("#foo").trigger( "custom", [ "Custom", "Event" ] );
```

`on()` and **`off()`** allow for adding and removing event handlers to/from HTML elements.

Example:

```
$("p").on("click", function(){
        alert( $(this).text() );
      });
$("p").trigger("click");
```

The jQuery library

With jQuery, you can implement **animation effects**.
You can hide and show HTML elements with the **`hide()`** and **`show()`** methods:

```
$(selector).hide(speed,callback);
$(selector).show(speed,callback);
```

The optional `speed` parameter specifies the speed of the hiding/ showing, and can take the following values: "slow", "fast", or milliseconds.
The optional `callback` parameter is a function to be executed after the `hide()` or `show()` method completes.

```
$("button").click(function(){
    $("p").hide(1000);
});
```

The jQuery library

You can toggle between the `hide()` and `show()` methods with the **`toggle()`** method.

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/jquery.min.js">
</script>
<script>
$(document).ready(function(){
    $("button").click(function(){
        $("p").toggle();
    });
});
</script>
</head>
<body>
<button>Toggle</button>
<p>This is a paragraph with little content.</p>
<p>This is another small paragraph.</p>
</body>
</html>
```

The jQuery library

With jQuery you can **fade** an element in and out of visibility.

jQuery has the following fade methods:

```
$(selector).fadeIn(speed,callback);

$(selector).fadeOut(speed,callback);

$(selector).fadeToggle(speed,callback);

$(selector).fadeTo(speed,opacity,callback);
```

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_fadein

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_fadeout

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_fadetoggle

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_fadeto

The jQuery library

With jQuery you can create a sliding effect on elements.

jQuery has the following slide methods:

```
$(selector).slideDown(speed,callback);

$(selector).slideUp(speed,callback);

$(selector).slideToggle(speed,callback);
```

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_slide_down

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_slide_up

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_slide_toggle

The jQuery library

The jQuery **animate()** method is used to create custom animations.

```
$(selector).animate({params},speed,callback);
```

The required params parameter defines the CSS properties to be animated.
The optional speed parameter specifies the duration of the effect. It can take the following values: "slow", "fast", or milliseconds.
The optional callback parameter is a function to be executed after the animation completes.

```
$("button").click(function(){
    $("div").animate({left: '250px'});
});
```

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_animation1

The jQuery library

Multiple properties can be animated at the same time:

```
$("button").click(function(){
    $("div").animate({
        left: '250px',
        opacity: '0.5',
        height: '150px',
        width: '150px'
    });
});
```

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_animation1_multicss

Color animation is not included in the core jQuery library.
To animate color, it is necessary to download the Color Animations plugin from jQuery.com

The jQuery library

By default, jQuery comes with queue functionality for animations. This means that if you write multiple `animate()` calls after each other, jQuery creates an "internal" queue with these method calls.

Then it runs the animate calls ONE by ONE.

So, if you want to perform different animations after each other, we take advantage of the queue functionality:

```
$("button").click(function(){
    let div = $("div");
    div.animate({height: '300px', opacity: '0.4'}, "slow");
    div.animate({width: '300px', opacity: '0.8'}, "slow");
    div.animate({height: '100px', opacity: '0.4'}, "slow");
    div.animate({width: '100px', opacity: '0.8'}, "slow");
});
```

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_animation

The jQuery library

One very important part of jQuery is the possibility to **manipulate the DOM**.

Four simple, but useful, jQuery methods for DOM manipulation are:

- `text()` - Sets or returns the text content of selected elements
- `html()` - Sets or returns the content of selected elements (including HTML markup)
- `val()` - Sets or returns the value of form fields
- `attr()` method is used to get attribute values

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_dom_html_get
http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_dom_val_get
http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_dom_html_set

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_dom_attr_get
http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_dom_attr_set2

The jQuery library

Four jQuery methods that are used **to add new content**:

- `append()` - Inserts content at the end of the selected elements
- `prepend()` - Inserts content at the beginning of the selected elements
- `after()` - Inserts content after the selected elements
- `before()` - Inserts content before the selected elements

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_html_append
http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_html_append2

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_html_prepend

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_html_after
http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_html_after2

The jQuery library

To remove elements and content, there are mainly two jQuery methods:

- `remove()` - Removes the selected element (and its child elements)
- `empty()` - Removes the child elements from the selected element

The jQuery `remove()` method also accepts one parameter, which allows you to filter the elements to be removed.

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_dom_remove
http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_dom_remove3

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_dom_empty

The jQuery library

jQuery has several methods for **CSS manipulation**. The most important are:

- `addClass()` - Adds one or more classes to the selected elements
- `removeClass()` - Removes one or more classes from the selected elements
- `toggleClass()` - Toggles between adding/removing classes from the selected elements
- `css()` - Sets or returns the style attribute

The jQuery library

```
<!DOCTYPE html>
<html>
<head>
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.1/jquery.min.js">
</script>
<script>
$(document).ready(function(){
  $("button").click(function(){
    $("p").addClass("yellow-class");
    $("p").css({"font-size":"200%", "color":"red"});
    alert("Background color = " + $("p").css("background-color"));
  });
});
</script>
<style type="text/css">
  .yellow-class {
    background-color: yellow !important;
  }
</style>
</head>
<body>
<h2>This is a heading</h2>
<p style="background-color:#ff0000">This is a paragraph.</p>
<p style="background-color:#00ff00">This is a paragraph.</p>
<p style="background-color:#0000ff">This is a paragraph.</p>
<button>Return background-color of p and add a class</button>
</body>
</html>
```

The jQuery library

And more..

- methods for working with the dimensions of elements and browser window

- methods for traversing, which means "move through", are used to "find" (or select) HTML elements based on their relation to other elements

- methods for AJAX functionalities; you can request text, HTML, XML, or JSON from a remote server using both HTTP GET and HTTP POST, and you can load the external data directly into the selected HTML elements of your web page

http://www.w3schools.com/jquery/jquery_ref_ajax.asp

The jQuery library

Send an HTTP GET request to a page and get a result back:

```
$("button").click(function(){
    $.get("demo_test.asp", function(data, status){
        alert("Data: " + data + "\nStatus: " + status);
    });
});
```

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_ajax_get

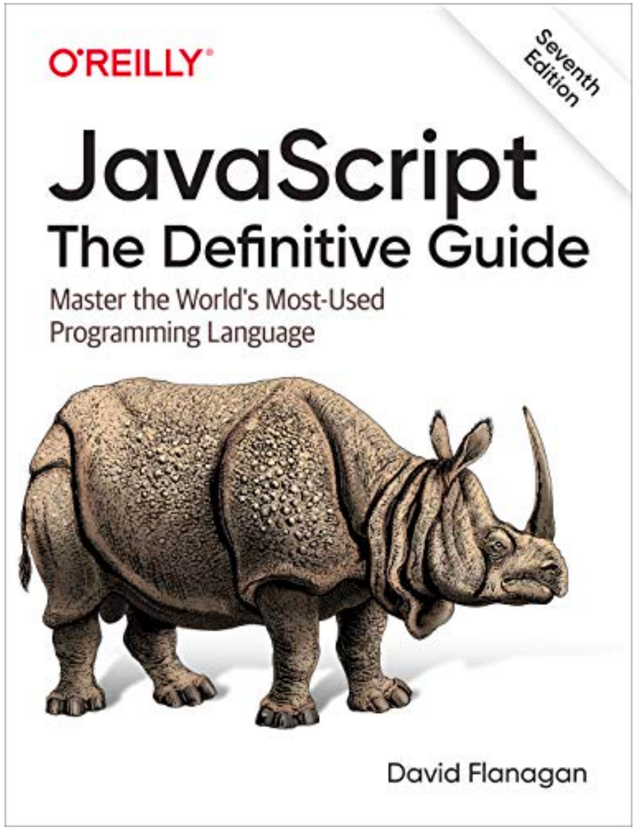
Get and run a JavaScript using an AJAX request:

```
$("button").click(function(){
    $.getScript("demo_ajax_script.js");
});
```

http://www.w3schools.com/jquery/tryit.asp?filename=tryjquery_ajax_getscript

References

D. Flanagan
JavaScript - The Definitive Guide
ed. O’Reilly, 2020



http://www.w3schools.com/js/default.asp