jQuery

Why jQuery?

JavaScript is a powerful language, but coding to browsers is difficult:

- Code that works great in Chrome, Firefox, Safari, ... will fail in IE and vice versa
- Browsers have different implementation of specs in each version
- With the rise of mobile devices maintaining browsers compatibility becomes difficult.

jQuery library

The jQuery JavaScript library adds many useful features to JavaScript:

- Many useful extensions to the DOM (enhancing/upgrading DOM objects)
- Adds utility functions for built-in types String, Array, Object, Function
- Improves event-driven programming
- Many cross-browser compatibility fixes
- Makes Ajax programming easier

- jQuery can be downloaded to your application in either compressed or uncompressed forms from different locations and using different methods
  - Refer http://jquery.com/download/

Your best friend: http://api.jquery.com/

jQuery Design Principles

jQuery is so powerful because of these design principles

- An expressive method for defining a set of elements
- A superset of CSS selectors
- Useful and commonly needed methods for navigating the DOM tree
- Heavily overloaded APIs
- Functional programming techniques that apply operations to sets of elements at a time
- Method chaining for succinct operations

Aspects of the DOM and jQuery

Identification:
- How do I obtain a reference to the node that I want.
- Using css-like selectors to get target nodes

Traversal:
- How do I move around the DOM tree.
- Using children, sibling, parent, etc links to get target nodes

Node Manipulation:
- How do I get or set aspects of a DOM node.
- e.g., style, attributes, innerHTML

Tree Manipulation:
- How do I change the structure of the page.
- Add or Remove nodes

jQuery $ function signatures

Responding to the page ready event

```
   $(function);
```

Identifying elements

```
   $("selector", [context]);
```

Upgrading DOM elements

```
   $(elements);
```

Creating new elements

```
   $("<html>", [properties]);
```

Page ready event -- `window.onload`

We cannot use the DOM before the page has been constructed. jQuery gives us a more compatible way to do this.

The DOM way

```
window.onload = function() {
  // do stuff with the DOM
}
```

The direct jQuery translation

```
$(document).ready(function() {
  // do stuff with the DOM
});
```

The jQuery way

```
$(function() {
  // do stuff with the DOM
});
```

Main Points

It is important to realize that the `$()` function is heavily overloaded. It will behave differently depending on the arguments it has, including running a callback function on page load, selecting DOM elements, wrapping DOM elements, and creating new DOM elements. ***Science of Consciousness:*** In ordinary waking state consciousness we might perceive ourselves as very different people depending on surface characteristics such as our job or skills. By having the experience of pure awareness we realize that these are all different aspects of our true non-changing Self.

jQuery / DOM selector comparison

`getElementById("id")`	`$("#id")`
`getElementsByTagName("tag")`	`$("tag")`
`getElementsByName("somename")`	`$("[name='somename']")`
`querySelector("selector")`	`$("selector")`
`querySelectorAll("selector")`	`$("selector")`

`$("[name='somename']")` is instance of the general selector `$("[someAtt='someVal']")`

Example

Change the background color of all paragraphs to yellow:

```
<body>
        <p>This is the first paragraph</p>
        <p>This is the second paragraph</p>
        <p>You get the idea...</p>
</body>
```

```
var allParas = document.querySelectorAll("p");
for (var i = 0; i < allParas.length; i++) {
        allParas[i].style.backgroundColor = "yellow";
}
```

```
        $("p").css("background-color", "yellow");
```

jQuery object

The $ function always (even for ID selectors) returns an array-like object called a jQuery object.

This returned jQuery object wraps the originally selected DOM objects.

You can access the actual DOM object by accessing the elements of the jQuery object.

```
// Not the same
document.getElementById("myid") !== $("#myid");
document.querySelectorAll("p") !== $("p");

// true
document.getElementById("myid") === $("#myid")[0];
document.getElementById("myid") === $("#myid").get(0);
document.querySelectorAll("p")[0] === $("p")[0];
```

Using $ as a wrapper (upgrade)

- $ adds extra functionality to DOM elements
- Passing an existing DOM object to $ will give it the jQuery upgrade

```
// convert regular DOM objects to a jQuery object
var elem = document.getElementById("myelem");
elem = $(elem);

var elems = document.querySelectorAll(".special");
elems = $(elems);
```

Main Points

When the argument to `$()` is a CSS selector the function will return a "jQuery object" that contains a group of selected DOM elements. CSS selectors are a simple, natural, and powerful tool used by jQuery to identify groups of DOM elements. **Science of Consciousness:** A mantra is a simple, natural, and powerful tool that we use in the TM Technique.

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Types of DOM nodes

```
<p>This is a paragraph of text with a <a href="/path/page.html">link in it</a>.</p>
```

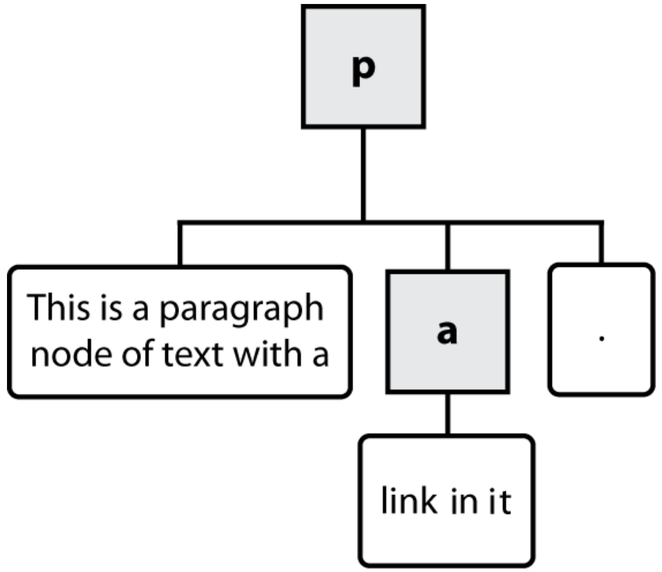
Element nodes (HTML tag)

can have children and/or attributes

Text nodes (text in a element)

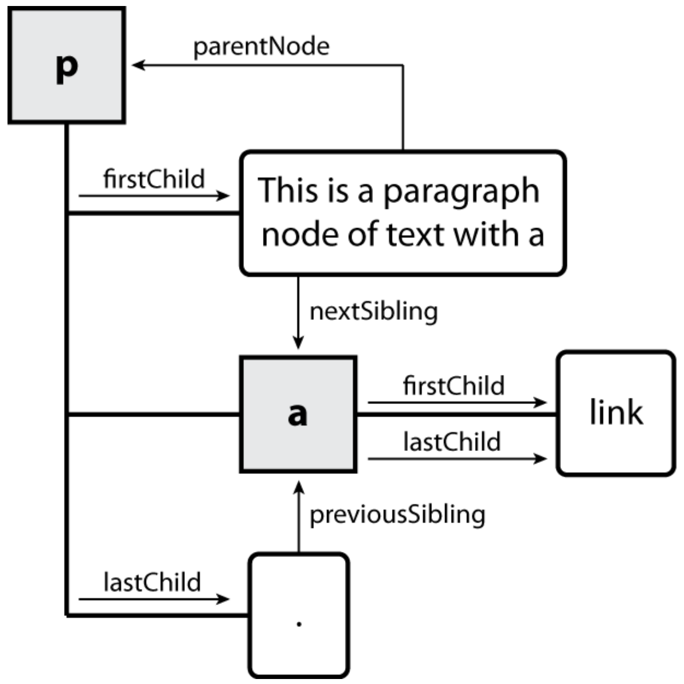
Attribute nodes (attribute/value pair)

not usually shown when drawing the DOM tree



DOM tree traversal example

```
<div>
    <p id="foo">This is a paragraph of text with a
    <a href="/path/to/another/page.html">link</a>.</p>
</div>
```



jQuery Traversing - Ancestors

An ancestor is a parent, grandparent, great-grandparent, and so on.

- `parent()` - returns the direct parent element of the selected element.
- `parents()` - returns all ancestor elements of the selected element.
  - You can also use an optional parameter to filter the search for ancestors.
- `parentsUntil()` - returns all ancestor elements between the selector and stop.

```
$("span").parent();
$("span").parents();
$("span").parents("ul"); // returns all ancestors of all <span> elements that are <ul> elements
$("span").parentsUntil("div");
```

jQuery Traversing - Descendants

A descendant is a child, grandchild, great-grandchild, and so on.

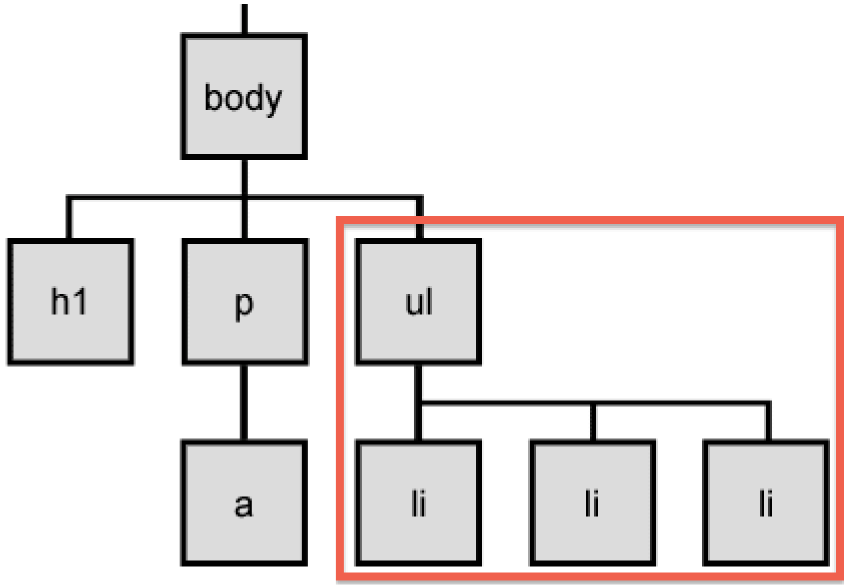
- **`children()`** - returns all direct children of the selected element.
  - You can also use an optional parameter to filter the search for children.
- **`find()`** - returns descendant elements of the selected element

```
$("div").children();

// returns all <p> elements with the class name "first", that are direct children of <div>
$("div").children("p.first");

// returns all <span> elements that are descendants of <div>:
$("div").find("span");

// returns all descendants of <div>
$("div").find("*");
```

`.find()` Contextual Element Identification

jQuery gives two identical ways to do contextual element identification:

```
var elem = $("#myUL");

// These are identical
var specials = $("li.special", elem);
var specials = elem.find("li.special");
```



Notice:

- `h1, p, ul` are children to body (they are related to each other as siblings)
- a element is descendent of body, and child of p
- p is parent to a

jQuery Traversing - Siblings

- `siblings()` - returns all sibling elements of the selected element
  - You can also use an optional parameter to filter the search for siblings
- `next()` - returns the next sibling element of the selected element.
- `nextAll()` - returns all next sibling elements of the selected element
- `nextUntil()` - returns all next sibling elements between the *selector* and stop.
- `prev()`
- `prevAll()`
- `prevUntil()`

jQuery Traversing - Filtering

```
// selects the first <p> element inside the first <div> element
$("div p").first();

// selects the last <p> element inside the last <div> element
$("div p").last();
```

The `filter()` method lets you specify a criteria. Elements that do not match the criteria are removed from the selection, and those that match will be returned

```
// returns all <p> elements with class name "intro"
$("p").filter(".intro");

// returns all elements that do not match the criteria - opposite to filter
$("p").not(".intro");
```

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jQuery - Get and Set CSS Classes

- **`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

```
$("h1, h2, p").addClass("blue");
$("div").addClass("important");
$("#div1").addClass("important blue");
$("h1, h2, p").removeClass("blue");
$("h1, h2, p").toggleClass("blue"); // add if not found, remove if exists
```

.css()

The `css()` method sets or returns one or more style properties for the selected elements.

```
$("p").css("background-color"); // returns the background-color value
$("p").css("background-color", "yellow"); // sets the value

// set a background-color and a font-size for ALL matched elements
$("p").css({
   "background-color": "yellow",
   "font-size": "200%"
});

// Modifier Syntax
$("p").css(propertyName, function(idx, oldValue) {
       return newValue;
});
```

`.css()` behavior

Getters typically **operate only on the first of the jQuery object's selected elements.**

```
<ul>
   <li style="font-size: 10px">10px font size</li>
   <li style="font-size: 20px">20px font size</li>
   <li style="font-size: 30px">30px font size</li>
</ul>
$("li").css("font-size"); // returns '10px'
```

Setters typically **operate on all of the selected DOM elements.**

```
$("li").css("font-size", "15px"); // sets all selected elements to '15px'
<ul>
   <li style="font-size: 15px">10px font size</li>
   <li style="font-size: 15px">20px font size</li>
   <li style="font-size: 15px">30px font size</li>
</ul>
```

Common jQuery mistake

```
// bad jQuery
~~$(".main").css("top", parseInt($(".main").css("top")) + 100 + "px");~~
```

The above example does not take full advantage of jQuery syntax.
Does not work if there are multiple selected objects. Why is that?

A corrected version:

```
// good jQuery
$(".main").css("top", function(idx, old) {
                          return parseInt(old) + 100 + "px";
                 });
```

jQuery method returns

When there is no other return to make, jQuery methods return the same jQuery object back to you

```
$("#myid");                                jQuery object
$("#myid").children();                     jQuery object
$("#myid").css("margin-left", "10px");     jQuery object
$("#myid").addClass("special");            jQuery object

$("#myid").css("margin-left");             String
```

jQuery chaining

```
$("#main").css("color", "red");
$("#main").attr("id", "themainarea");
$("#main").addClass("special");
```

The implicitly returned jQuery object allows for chaining of method calls.

```
$("img").css("color", "red")
        .addClass("special")
        .src = "foo.png";
```

Expression return value at each line:

```
// [<img />, ...]
// [<img style="color: red" />, ...]
// [<img class="special" style="color: red" />, ...]
// cannot chain further because this is an assignment :(
```

.attr()

- jQuery has a wrapper function for getting/setting various attributes of selected elements.
- Allows us to chain our method calls.

```
// poor jQuery style
$("img").css("color", "red")
        .addClass("special")
        .src = "foo.png";

// good jQuery style
$("img").css("color", "red")
        .addClass("special")
        .attr("src", "foo.png"); // we could chain further right here
```

More node manipulation with jQuery

`.hide()`	toggle CSS display: none on
`.show()`	toggle CSS display: none off
`.empty()`	remove everything inside the element, innerHTML = ""
`.html()`	get/set the innerHTML without escaping html tags
`.text()`	get/set the innerHTML, HTML escapes the text first
`.val()`	get/set the value of a form input, select, textarea, ...
`.height()`	get/set the height in pixels, returns a Number
`.width()`	get/set the width in pixels, return a Number

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DOM innerHTML hacking

- Why is following code bad?

```
document.getElementById("myid").innerHTML += "<p>A paragraph!</p>";
```

- Imagine that the new node is more complex:
  - ugly: bad style on many levels (e.g. JS code embedded within HTML)
  - error-prone: must carefully distinguish " and '
  - can only add at beginning or end, not in middle of child list

```
document.getElementById("myid").innerHTML += "<p style='color: red; " +
    "margin-left: 50px;' " +
    "onclick='myOnClick();'>" +
    "A paragraph!</p>";
```

Creating new nodes

name	description
document.createElement("*tag*")	creates and returns a new empty DOM node representing an element of that type
document.createTextNode("*text*")	creates and returns a text node containing given text

```
// create a new <h2> node
var newHeading = document.createElement("h2");
newHeading.innerHTML = "This is a heading";
newHeading.style.color = "green";
```

- merely creating a element does not add it to the page
- you must add the new element as a child of an existing element on the page...

Modifying the DOM tree

- Every DOM element has these methods:

name	description
appendChild(*node*)	places given node at end of this node's child list
insertBefore(*new, old*)	places the given new node in this node's child list just before old child
removeChild(*node*)	removes given node from this node's child list
replaceChild(*new, old*)	replaces given child with new node

```
var p = document.createElement("p");
p.innerHTML = "A paragraph!";
document.getElementById("myid").appendChild(p);
```

Create nodes in jQuery

- The $ function to the rescue again

```
var newElement = $("<div>");
$("#myid").append(newElement);
```

- jQuery programmers typically 1 line it

```
$("#myid").append($("<div>"));
```

Creating a complex nodes in jQuery

- The terrible way, this is no better than innerHTML hacking

```
$("<p id='myid' class='special'>My paragraph is awesome!</p>")
```

- The bad way, decent jQuery, but we can do better

```
$("<p>")
    .attr("id", "myid")
    .addClass("special")
    .text("My paragraph is awesome!");
```

- The good way

```
$("<p>", {
    "id": "myid",
    "class": "special",
    "text": "My paragraph is awesome!"
});
```

Main Points

The jQuery object returned by the selection mode of `$()` is a collection of DOM elements wrapped by jQuery functionality. This object can read style properties as well as set them by using the `css()` method of jQuery. **Science of Consciousness:** Our TM practice develops our ability to locate or experience quiet states of awareness. Advanced techniques and the TM-Sidhi Program develop abilities to experience and manipulate different characteristics of pure consciousness.

`.each()` loop

```
$("li").each(function(index, e) {
        e = $(e);
        // do stuff with e
});

$("li").each(function() {
        let e = $(this);
        // do stuff with e
});
```

- return `false` to exit the loop early
- e is a plain old DOM object, We can upgrade it again using `$` if we want
- The `this` keyword refers to the same selected element as e
- (when a function is called by an object, that object becomes the context or 'this' parameter)

Attaching event handlers the jQuery way

To use jQuery's event features, you must pass the handler using the jQuery object's event method

```
~~DOMObject.onevent = function;~~
jQueryObject.event(function);

// call the playNewGame function when the Play button is clicked
$("#play").click(playNewGame);

function playNewGame(evt) {
       // respond to the click event
}
```

You can trigger the event manually by calling the same function with no parameters

```
$("#play").click();
```

Event handler binding

Event handlers attached unobtrusively are bound to the element. Inside the handler, that element becomes this (rather than the window)

```
<script>
$( function() {
	$("#textbox").mouseout(sayHi); // bound to text box here
	$("#btn").click(sayHi); // bound to submit button here
} );

function sayHi() { // sayHi knows what object it was called on
	this.value = "sayHi";
}
</script>
```

```
<div>
	<input id="textbox" />
	<input type="submit" id="btn" value="Save" />
</div>
```

CONNECTING THE PARTS OF KNOWLEDGE WITH THE WHOLENESS OF KNOWLEDGE

The TM Technique and Pure Consciousness

1. jQuery is a powerful and widely used JavaScript API for working with the DOM that provides cross-browser compatibility.
2. The $() function is heavily overloaded. It will be a different function depending on the arguments it has, including running a callback function on page load, selecting DOM elements, wrapping DOM elements, and creating new DOM elements.

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3. Transcendental consciousness. The TM Technique is a convenient and cross-platform API for experiencing transcendental consciousness.
4. Impulses within the transcendental field: Thoughts and actions at quiet levels of awareness are simple, natural, and effective because they are in accord with all the laws of nature that reside at these deep levels.

5. Wholeness moving within itself: Advanced TM Techniques and the TM-Sidhi Programs are powerful APIs for bringing the calm dynamism and bliss of pure consciousness into the experiences of daily activity.