Client-Side Web GIS

JavaScript and the DOM
and jQuery

Image from NASA: https://commons.wikimedia.org/wiki/File:Earth_Western_Hemisphere_transparent_background.png#filelinks

WV VIEW

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1

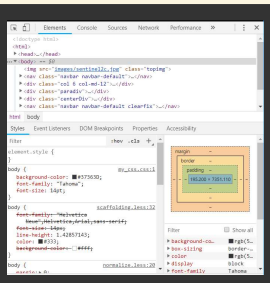
JavaScript and the DOM

2

2

The DOM

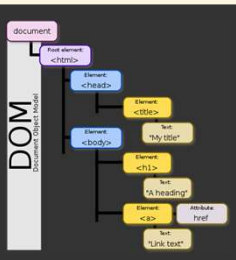
- DOM = Document Object Model
- HTML is parsed by the browser to create the DOM
- Attempt to convert the structure and content of the HTML document into an object model represented as a node tree
- Browser uses this model to render the webpage



3

3

DOM Objects



- The W3C Document Object Model (DOM) is a platform and language-neutral interface that allows programs and scripts to dynamically access and update the content, structure, and style of a document
- The HTML DOM is a standard object model and programming interface for HTML. It defines:
  - The HTML elements as objects
  - The properties of all HTML elements
  - The methods to access all HTML elements
  - The events for all HTML elements
- The HTML DOM is a standard for how to get, change, add, or delete HTML elements

Language from:
https://www.w3schools.com/js/js_htmldom.asp

https://commons.wikimedia.org/wiki/File:DOM-model.svg

4

4

Properties and Methods

- HTML elements defined as JavaScript Objects
- Property = value that you can get or set (like changing the content of an HTML element)
- Method = action you can do (like add or deleting an HTML element)

https://www.w3schools.com/js/js_htmldom_methods.asp

5

5

Finding and Changing Elements

Find HTML Elements

Method	Description
document.getElementById()	Find an element by its ID
document.getElementsByTagName()	Find element(s) by tag name
document.getElementsByClassName()	Find element(s) by class name

Change HTML Elements

Method	Description	Type
element.innerHTML =	Change inner HTML	Property
element.attribute =	Change attribute value	Property
element.style.property =	Change style	Property
element.setAttribute(attribute, value)	Change attribute value	Method

https://www.w3schools.com/js/js_htmldom_document.asp

6

6

Adding and Deleting Elements

Add and Delete Elements

Method	Description
document.createElement(*element*)	Create an HTML element
document.removeChild(*element*)	Remove an HTML element
document.appendChild(*element*)	Add an HTML element
document.replaceChild(*new, old*)	Replace an HTML element
document.write(*text*)	Write into the HTML output stream

https://www.w3schools.com/js/js_htmldom_document.asp

7

7

Events

Mouse Event	Keyboard Event	Form Events	Document/ Window Event
click	keypress	submit	load
dblclick	keydown	change	resize
mouseenter	keyup	focus	scroll
mouseleave		blur	unload
mouseup			
mousedown			
hover			

https://www.w3schools.com/jquery/jquery_events.asp

8

8

Event Listeners

```
var div1 = document.getElementById("openingDiv");
var btn1 = document.getElementById("btn1");

btn1.addEventListener("click", function () {
  if (div1) {
    div1.parentNode.removeChild(div1);
  }
});
```

9

9

Example 1: Remove a div

Get and save to variable using 's ID

Get button and save to variable using button's ID

Add click event listener to button

Define what happens on event

```
var div1 = document.getElementById("openingDiv");
var btn1 = document.getElementById("btn1");

btn1.addEventListener("click", function () {
  if (div1) {
    div1.parentNode.removeChild(div1);
  }
});
```

10

10

Example 2: Toggle between pictures

Get image element and save to variable using image element's ID

Get button and save to variable using button's ID

Add click event listener to button

Define what happens on event based on current state of image src attribute

```
var image = document.getElementById("img1");
var btn2 = document.getElementById("btn2");

btn2.addEventListener("click", function () {
  if (image.src === "URL or PATH") {
    image.src = "URL or PATH";
  } else {
    image.src = "URL or PATH";
  }
});
```

11

11

Example 3: Change body background color

Get button and save to variable using button's ID

Add click event listener to button

Define what happens on event

```
var btn3 = document.getElementById("btn3");

btn3.addEventListener("click", function () {
  document.body.style.backgroundColor = "#ffffff"
});
```

12

12

Example 4: Toggle between stylesheets

Get stylesheet element using stylesheet's ID

Get button and save to variable using button's ID

Add click event listener to button

Define what happens on event depending on current state of stylesheet href attribute

```
var stylesheetLink = document.getElementById("mySheet");
var btn4 = document.getElementById("btn4");

btn4.addEventListener("click", function () {
  if (stylesheetLink.href === "URL or PATH") {
    stylesheetLink.href = "URL or PATH ";
  } else {
    stylesheetLink.href = "URL or PATH ";
  }
});
```

13

13

Example 5: Add a paragraph

Get button and save to variable using button's ID

Get to put new paragraph in and save to variable using 's ID

Add click event listener to button

Define what happens on event: (1) create a new paragraph, (2) add text content to new paragraph, (3) add paragraph as child to specified

```
var btn5 = document.getElementById("btn5");
var contentDiv = document.getElementById("finalDiv");

btn5.addEventListener("click", function () {
  var newParagraph = document.createElement("p");
  newParagraph.textContent = "Added paragraph";
  contentDiv.appendChild(newParagraph);
});
```

14

14

Example 6: Change text color for a span

Get span and save to variable using span's ID

Get button and save to variable using button's ID

Add click event listener to button

Define what happens on event

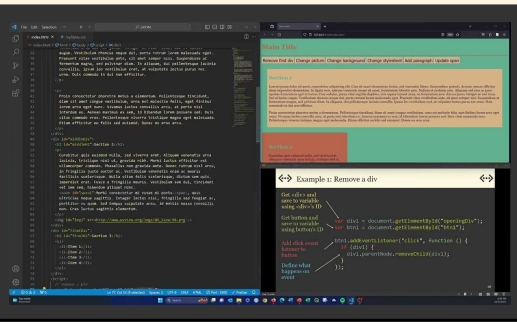
```
var span1 = document.getElementById("span1");
var btn6 = document.getElementById("btn6");

btn6.addEventListener("click", function () {
  span1.style.color = "#5ba691";
});
```

15

15

Video: JS DOM Manipulation



16

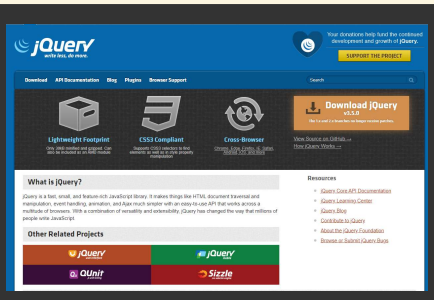
16

jQuery

17

17

What is jQuery?



https://jquery.com/

18

18

Connecting to jQuery

- Download the library
- Connect to the CDN
  - Google
  - Microsoft

```
<script src="https://ajax.googleapis.com/ajax/libs/jquery/3.4.1/jquery.min.js"></script>
<script src="https://ajax.aspnetcdn.com/ajax/jQuery/jquery-3.4.1.min.js"></script>
```

https://jquery.com/

19

19

Basic Syntax

HTML Element that is interacted with

Type of event

```
$(HTML Element).event(function(){
  $(HTML Element).action();
});
```

Element to be manipulated

How to manipulate element

20

20

Waiting for Doc to Load

```
$(document).ready(function(){
  $(".my_btn").click(function(){
    $(".my_btn").css({"background-color": "gray"});
  });
});
```

21

21

CSS Selectors with jQuery

Reference to CSS selector

```
$(document).ready(function(){
   $(".my_btn").click(function(){
      $(".diva").toggleClass('divb');
 });
```

Reference to CSS selector

22

22

Events

Mouse Event	Keyboard Event	Form Events	Document/ Window Event
click	keypress	submit	load
dblclick	keydown	change	resize
mouseenter	keyup	focus	scroll
mouseleave		blur	unload
mouseup			
mousedown			
hover			

https://www.w3schools.com/jquery/jquery_events.asp

23

23

Types of Effects

- hide()/show()/toggle() = Hide or show an element on the page in response to an event or toggle between hiding and showing an event
- fadeIn()/fadeout()/fadeToggle()/fadeTo() = Fade an element in or out, toggle between fade in and fade out, and fade to defined opacity
- slideDown()/slideUp/slideToggle() = slide an element up or down or toggle between sliding up and town
- animate() = define a custom animation
- stop() = stop an animation or effect before it finishes
- Callback Functions = define an action to occur after the current effect is finished.

24

24

Hide/Show

```
<script>
  $(document).ready(function(){
   $(".my_btn").click(function(){
    $(".diva").toggle(1000);
   });
  });

</script>
```

```
<body>

    <h2>Show/Hide Example</h2>

    <button class="btn btn-primary my_btn">Hide Div</button>

    <div class="diva">
        <p>Some text.</p>
        <p>Some more text.</p>
    </div>

    <div class="divb">
        <p>Some text.</p>
        <p>Some more text.</p>
    </div>

</body>
```

25

25

Hide/Show

```
<script>
  $(document).ready(function(){
   $(document).on('keypress', function(e) {
        if (e.originalEvent.key=="s") {
            $(".diva").show();
        } else if (e.originalEvent.key== "h") {
            $(".diva").hide();
        };
   });
  });
</script>
```

26

26

on() Method

```
<script>
  $(document).ready(function(){
   $(".my_btn").on({
    click: function(){
     $(".diva").slideToggle("slow");
    },
    contextmenu: function(){
     $(".diva").fadeToggle("fast");
     }
   });
  });
</script>
```

27

27

Callbacks

```
<script>
  $(document).ready(function(){
    $(".my_btn").click(function(){
      $(".diva").toggle("slow", function(){
        alert("Div 1 Has been Toggled")
      });
    });
  });
</script>
```

28

28

Chaining

```
<script>
  $(document).ready(function(){
    $(".my_btn").click(function(){
      $(".diva").css("background-color", "red")
          .css("color", "white")
          .css("font-size", "24pt");
    });
  });
</script>
```

29

29

Get and Set

- jQuery can be used to manipulate the DOM
- Get methods will return element content from the DOM
- Set methods will set or change content from the DOM
- text() = set or return text content of selected element
- html() = set or return content and HTML markup
- val() = set or return values of form fields
- attr() = set or return attribute values

30

30

Set

```
<script>
  $(document).ready(function(){
    $(".my_btn").click(function(){
      $('.p1').html("<i>The text is
                changed.</i>")
    });
  });
</script>
```

```
<body>

<h2>Show/Hide Example</h2>

<button class="btn btn-primary my_btn">Click Here</button>

<div class="diva">
<p class="p1">Some text.</p>
<p>Some more text.</p>
</div>

<div class="divb">
<p class="p1">Some text.</p>
<p>Some more text.</p>
</div>

</body>
```

31

31

Add and Remove

- Add methods can add new content to the DOM
- Remove methods can remove or delete content from the DOM

Add Methods	Description	Remove Methods	Description
append()	Insert content at the end of selected element	remove()	Remove selection element and its children
prepend()	Insert content at the beginning of selected element	empty()	Remove child elements from selected elements
after()	Insert content at the end of selected element		
before()	Insert content before the selected element		

32

32

Add

```
<script>
  $(document).ready(function(){
    $('.my_btn').click(function(){
      $('.p1').after("<p>Added text.<p>");
    });
  });
</script>
```

33

33

Remove

```
<script>
  $(document).ready(function(){
    $('.my_btn').click(function(){
      $('.diva').remove();
      $('.divb').empty();
    });
  });
</script>
```

34

34

CSS Manipulation

Methods	Description
addClass()	Add 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

35

35

css() Method

```
<script>
  $(document).ready(function(){
    $('.my_btn').click(function(){
      $('.diva').css("background-color", "DarkKhaki");
      $('.divb').css({"background-color":"white",
                      "color":"black", "font-size":"32pt"});
    });
  });
</script>
```

36

36

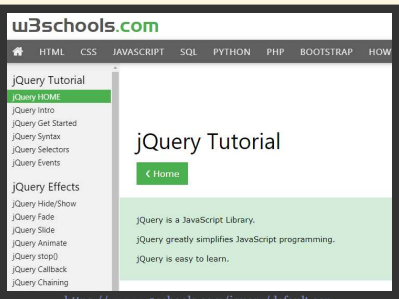
toggleClass() Method

```
<script>
  $(document).ready(function(){
    $(".my_btn").click(function(){
      $(".diva").toggleClass('divb');
  });
  });
</script>
```

37

37

Resources

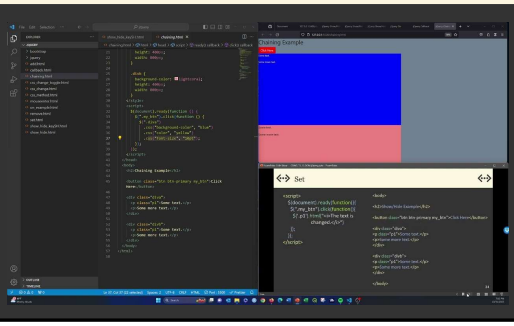


https://www.w3schools.com/jquery/default.asp

38

38

Video: jQuery



39

39

This is the end of this lecture module.

Please return to the West Virginia View Webpage for additional content.

40