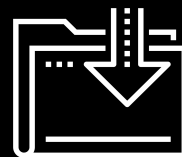




# JavaScript with D3.js

Data Boot Camp

Lesson 14.3



# Class Objectives

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By the end of this lesson, you will be able to:



Create charts by using data from API calls.



Use D3 for basic document object model (DOM) manipulation and event handling.



Apply the `this` keyword to reference elements within a function.



Dynamically manipulate the DOM through events.

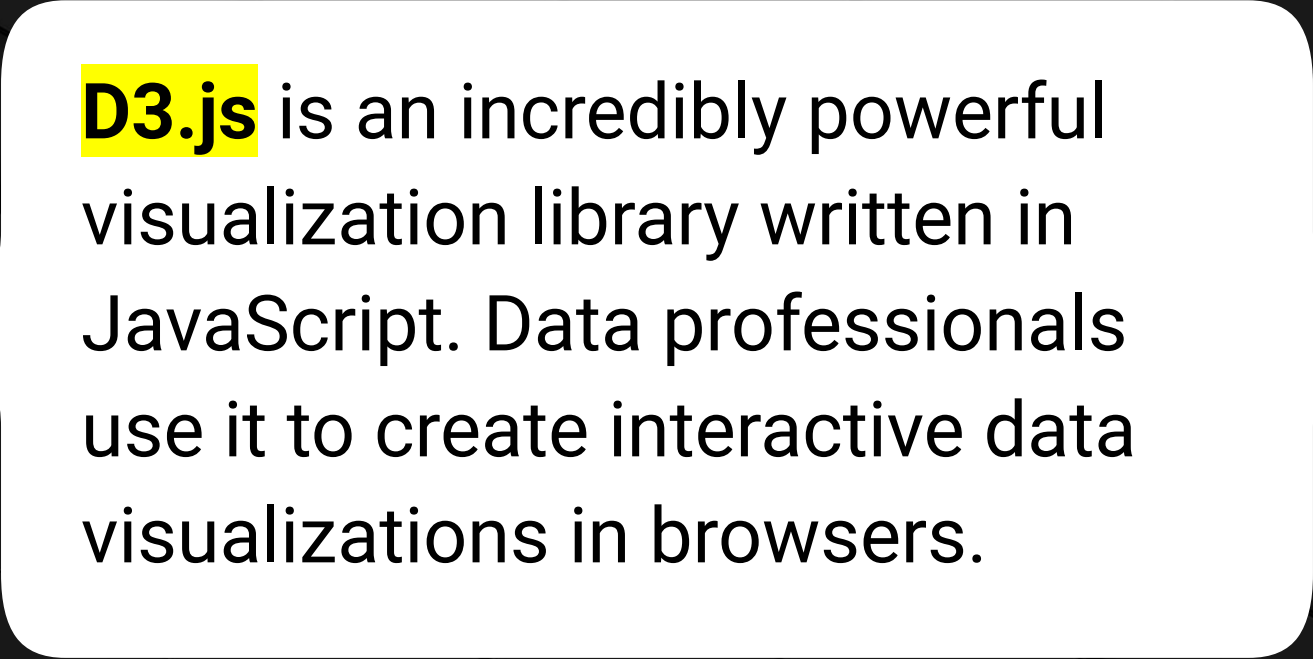


Manipulate charts through dropdown events and click events.



Use `Plotly.restyle()` to create dynamic charts.

# D3 and D3.json



**D3.js** is an incredibly powerful visualization library written in JavaScript. Data professionals use it to create interactive data visualizations in browsers.

# D3

D3 is a large library with many different subsets, and this class will focus on a subset of D3 for selecting and creating HTML elements dynamically.





# Instructor Demonstration

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D3.json



# Activity: D3.json

In this activity, you will make API calls to SpaceX that return information about the [roadster](#) and [capsules](#).

Suggested Time:

15 minutes



Time's Up! **Let's Review.**



# D3 Select and Append

# D3 Select & Append

Creates a reference  
to DOM element  
with the class **text1**

D3 link from d3js.org

Captures the **text** of that element

```
1 // Select the text of an HTML element
2 let text1 = d3.select("#text1").text();
3 console.log("text1 says: ", text1);
4
5 let text2 = d3.select("#text2").text();
6 console.log("text2 says: ", text2);
7
8 // Modify the text of an HTML element
9 d3.select("#text1").text("Hey, I changed this!");
10
11 // Capture the HTML of a selection
12 let myLink = d3.select(".my-link").html();
13 console.log("my-link: ", myLink);
14
15 // Select an element's child element
16 // An object is returned
17 let myLinkAnchor = d3.select(".my-link>a");
18 console.log(myLinkAnchor);
19
20 // Capture the child element's href attribute
21 let myLinkAnchorAttribute = myLinkAnchor.attr("href");
22 console.log("myLinkAnchorAttribute: " + myLinkAnchorAttribute);
23
24 // Change an element's attribute
25 myLinkAnchor.attr("href", "https://python.org");
26
27 // Use chaining to join methods
28 d3.select(".my-link>a").attr("href", "https://nytimes.com").text("Now this is a link to the NYT!!");
29
30 // Select all list items, then change their font color
31 d3.selectAll("li").style("color", "blue");
32
33 // Create a new element
34 let li1 = d3.select("ul").append("li");
35 li1.text("A new item has been added!");
36
37 // Use chaining to create a new element and set its text
38 let li2 = d3.select("ul").append("li").text("Another new item!");
39
```

```
1 <!DOCTYPE html>
2 <html lang="en">
3
4 <head>
5   <meta charset="UTF-8">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <meta http-equiv="X-UA-Compatible" content="ie=edge">
8   <title>D3 Select</title>
9   <script src="https://d3js.org/d3.v5.min.js"></script>
10
11 </head>
12
13 <body>
14   <h1>This is an HTML file</h1>
15   <div class="text1">This div has a class</div>
16   <div id="text2">This div has an id</div>
17   <div class="my-link">
18     <a href="https://github.com/d3/d3-selection">D3 Home</a>
19   </div>
20
```

index.html

HTML

Elements Console Sources Network Performance Memory

top Filter Default

text1 says: This div has a class  
text2 says: This div has an id

my-link:  
<a href="https://github.com/d3/d3-selection">D3 Home</a>

console

index.js

# D3 Select & Append

## index.html

```
1 <!DOCTYPE html>
2 <html lang="en">
3
4 <head>
5   <meta charset="UTF-8">
6   <meta name="viewport" content="width=device-width, initial-scale=1.0">
7   <meta http-equiv="X-UA-Compatible" content="ie=edge">
8   <title>D3 Select</title>
9   <script src="https://d3js.org/d3.v5.min.js"></script>
10
11 </head>
12
13 <body>
14   <h1>This is an H1</h1>
15   <div class="text1">This div has a class</div>
16   <div id="text2">This div has an id</div>
17   <div class="my-link">
18     <a href="https://github.com/d3/d3-selection">D3 Home</a>
19   </div>
20
21   <div class="deeplink">
22     <div class="outer">
23       <div class="inner">
24         <a href="https://github.com/d3/d3-selection">D3 Select</a>
25       </div>
26     </div>
27   </div>
28
29   <ul>
30     <li>Item 1</li>
31     <li>Item 2</li>
32     <li>Item 3</li>
33   </ul>
34 </body>
35 <script src="static/js/index.js"></script>
36
37 </html>
38
```

## index.js

```
1 // Select the text of an HTML element
2 let text1 = d3.select("#text1").text();
3 console.log("text1 says: ", text1);
4
5 let text2 = d3.select("#text2").text();
6 console.log("text2 says: ", text2);
7
8 // Modify the text of an HTML element
9 d3.select("#text1").text("Hey, I changed this!");
10
11 // Capture the HTML of a selection
12 let myLink = d3.select(".my-link").html();
13 console.log("my-link: ", myLink);
14
15 // Select an element's child element
16 // An object is returned
17 let myLinkAnchor = d3.select(".my-link a");
18 console.log(myLinkAnchor);
19
20 // // Capture the child element's href attribute
21 let myLinkAnchorAttribute = myLinkAnchor.attr("href");
22 console.log("myLinkAnchorAttribute: " + myLinkAnchorAttribute);
23
24 // Change an element's attribute
25 myLinkAnchor.attr("href", "https://python.org");
26
27 // Use chaining to join methods
28 d3.select(".my-link a").attr("href", "https://nytimes.com").text("Now this is a link to the NYT!!");
29
30 // Select all list items, then change their font color
31 d3.selectAll("li").style("color", "blue");
32
33 // Create a new element
34 let li1 = d3.select("ul").append("li");
35 li1.text("A new item has been added!");
36
```

## D3 Select & Append

## href attribute

console

index.html

index.js

## href attribute

## href attribute value

## Attributes of the element

```
attributes: NamedNodeMap
```

▼ href: href

```
value: "https://nytimes.org"
```

# D3 Select & Append

```
2 let text1 = d3.select(".text1").text();
3 console.log("text1 says: ", text1);
4
5 let text2 = d3.select("#text2").text();
6 console.log("text2 says: ", text2);
7
8 // Modify the text of an HTML element
9 d3.select(".text1").text("Hey, I changed this!");
10
11 // Capture the HTML of a selection
12 let myLink = d3.select("my-link").html();
13 console.log("my-link: ", myLink);
14
15 // Select an element's child element
16 // An object is returned
17 let myLinkAnchor = d3.select("my-link>a");
18 console.log(myLinkAnchor);
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20 // // Capture the child element's href attribute
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35 li1.text("A new item has been added!");
36
37 // Use chaining to create a new element and set its text
38 let li2 = d3.select("ul").append("li").text("Another new item!");
```

index.js

The href *attribute* of the object

```
// Change an element's attribute
myLinkAnchor.attr("href", "https://python.org");
```

console

Elements	Console	Sources	Network	>>
▶	top ▼	Filter	Default levels ▼	No Issues
text1 says: This div has a class	index.js:3			
text2 says: This div has an id	index.js:6			
my-link: <a href="https://github.com/d3/d3-selection">D3 Home</a>	index.js:13			
▶ Pt	index.js:18			
myLinkAnchorAttribute: https://github.com/d3/d3-selection	index.js:22			



# Activity: D3 Select

In this activity, you will use D3 to add a new row of data to a table.

Suggested Time:

15 minutes



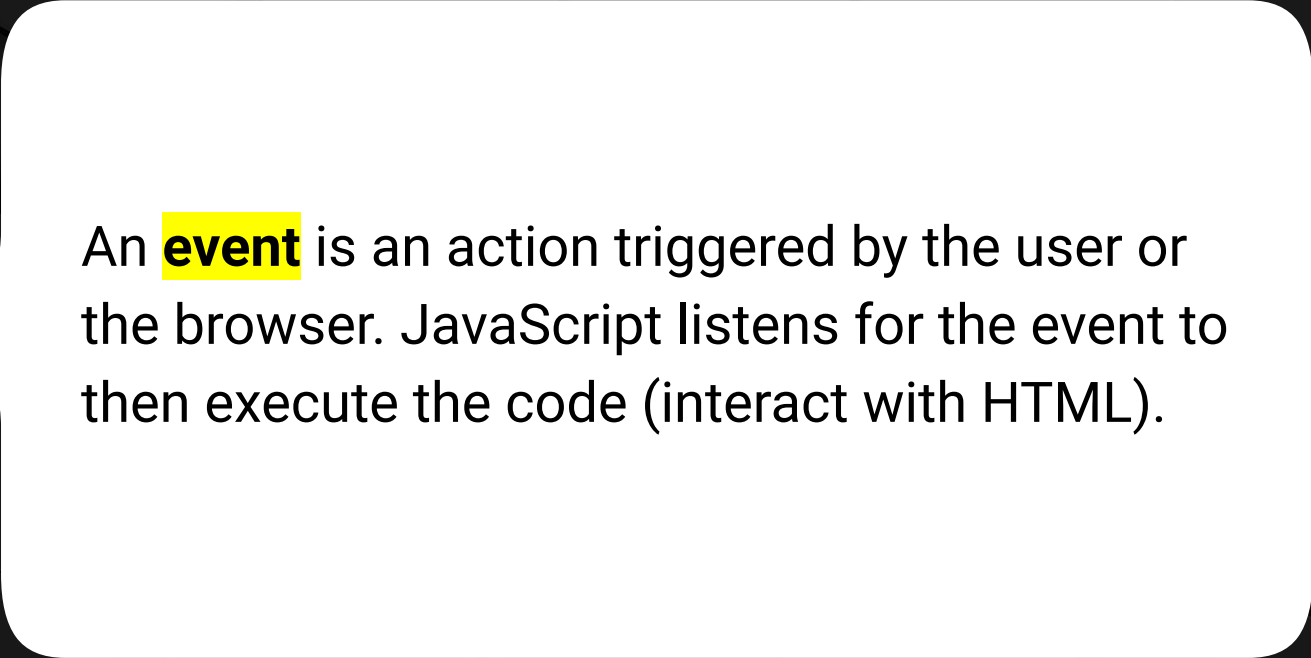
Time's Up! **Let's Review.**

# D3 Table and Event Listeners





**What is an event?**



An **event** is an action triggered by the user or the browser. JavaScript listens for the event to then execute the code (interact with HTML).

# D3 Table and Event Listeners

---

There are several event types that are supported by the browser, including:



click



scroll



change



pointerenter



keydown



pointerleave

```
function handleClick() {  
  console.log("A button was clicked!");  
  console.log(d3.event.target);  
}
```

# D3 Table and Event Listeners

---

Events have two main components:

<b>A target</b>	A reference to the object that dispatched the event.
<b>A handler</b>	A function that executes in response to the event occurring.

```
function handleClick() {  
  console.log("A button was clicked!");  
  console.log(d3.event.target);  
}
```



# Instructor Demonstration

---

## Event Listeners



# Activity: Button Clicks

In this activity, you will use D3 to create click handlers for upvotes and downvotes.

Suggested Time:

15 minutes

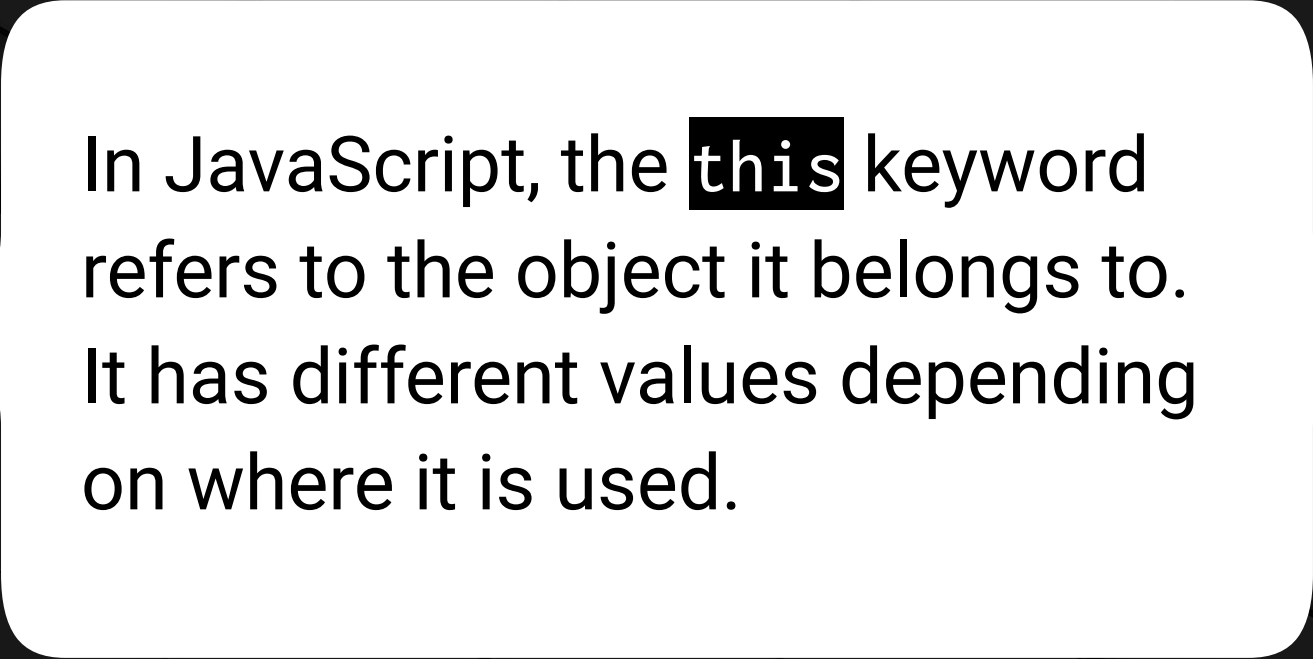


Time's Up! **Let's Review.**





Introducing **this**



In JavaScript, the **this** keyword refers to the object it belongs to. It has different values depending on where it is used.



**It can be very resourceful to identify  
which element triggered an event.**

# Introducing this

---

Selects all the buttons in the document.

```
d3.selectAll("button").on("click", function() {  
  console.log(this);  
});
```

Triggers a function that will log `this` to the console.

# Introducing this

---

We assign the the `li` element to the variable `listItem` using `d3.select(this)`. Selecting the element with D3 makes it possible to use D3 functions such as `style` or `text` on the element.

```
d3.selectAll("li").on("click", function() {  
  let listItem = d3.select(this);  
  listItem.style("color", "blue");  
  let listItemText = listItem.text();  
  console.log(listItemText);  
});
```



# Activity: `this` Button

In this activity, you will refactor the button activity with the `this` keyword.

Suggested Time:

15 minutes



Time's Up! **Let's Review.**



# Instructor Demonstration

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## Dropdowns and Plotly





# Activity: Government Expenditure

In this activity, you will enhance their event handling chops by creating a dynamic pie chart using Plotly. When users select a country from the dropdown menu, that country's dataset will display in the browser.

Suggested Time:

15 minutes



Time's Up! Let's Review.

# Questions?

