

COS30045 Data Visualisation

Exercise 1.4 D3 Binding and Drawing with Data

ILO	Create web-based interactive visualisations using real-world data sets.
Aim:	Use D3 to generate elements on a webpage
Resources:	<p><i>Textbook:</i></p> <p>Chapter 5 Data Murray (2017) Interactive Data Visualisation (2nd Ed) on ProQuest</p> <p><i>Videos</i></p> <p>Academind D3 A Practical Introduction</p> <p>Academind on Data Binding</p>
Demonstrate	Academind D3 A Practical Introduction (Links to an external site.)

Note: This Task Guide is not meant to be fully explanatory. You will also need to work through the examples in the text book *Interactive Data Visualisation for the Web* by Murray.

Overview

In this tutorial we will start using D3.

Step 1: Start a basic HTML template with D3

Firstly you need to set up a basic HTML template and add in reference to the D3 library in the header. You access the D3 library by storing a copy of the D3 library in your program folder or by using the web link. The second method will make sure you are always using the most up to date version of D3.

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8"/>
  <meta name="description"    content="Data Visualisation"/>
  <meta name="keywords"      content="HTML, CSS, D3"/>
  <meta name="author"        content="Your name here"/>

  <title>Task 2.1 D3 Data Binding</title>

  <script src="https://d3js.org/d3.v5.min.js"></script>
</head>
<body>

  <h1>The D3 Journey starts here...</h1>

  <script>

    //D3 Code goes here

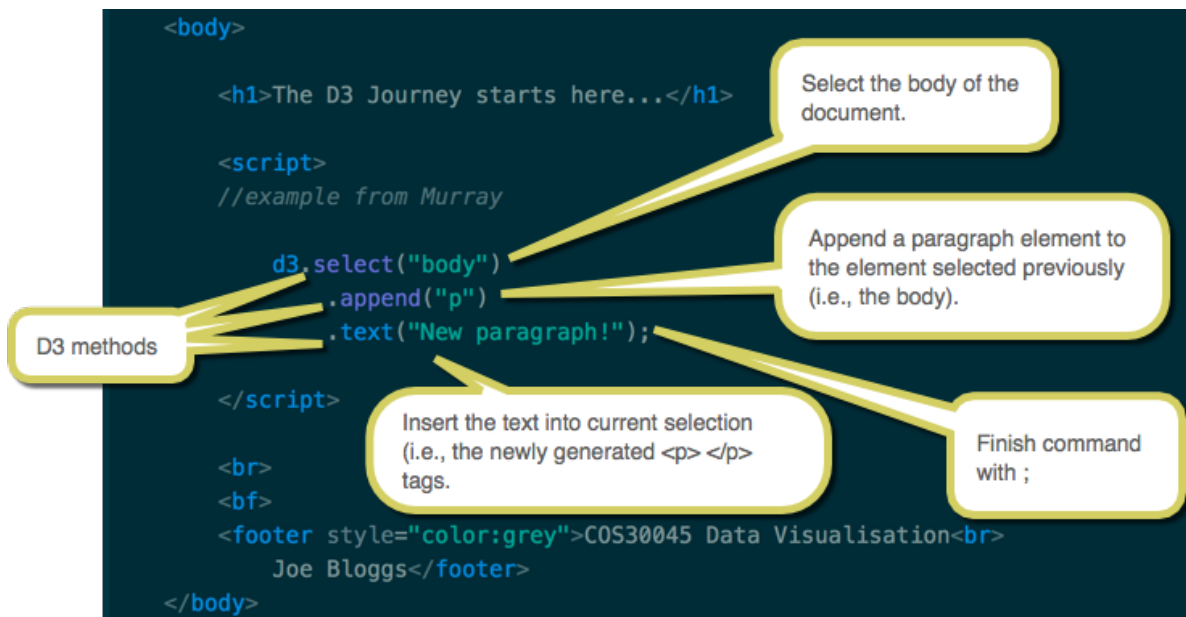
  </script>
```

reference to v5 of D3
library

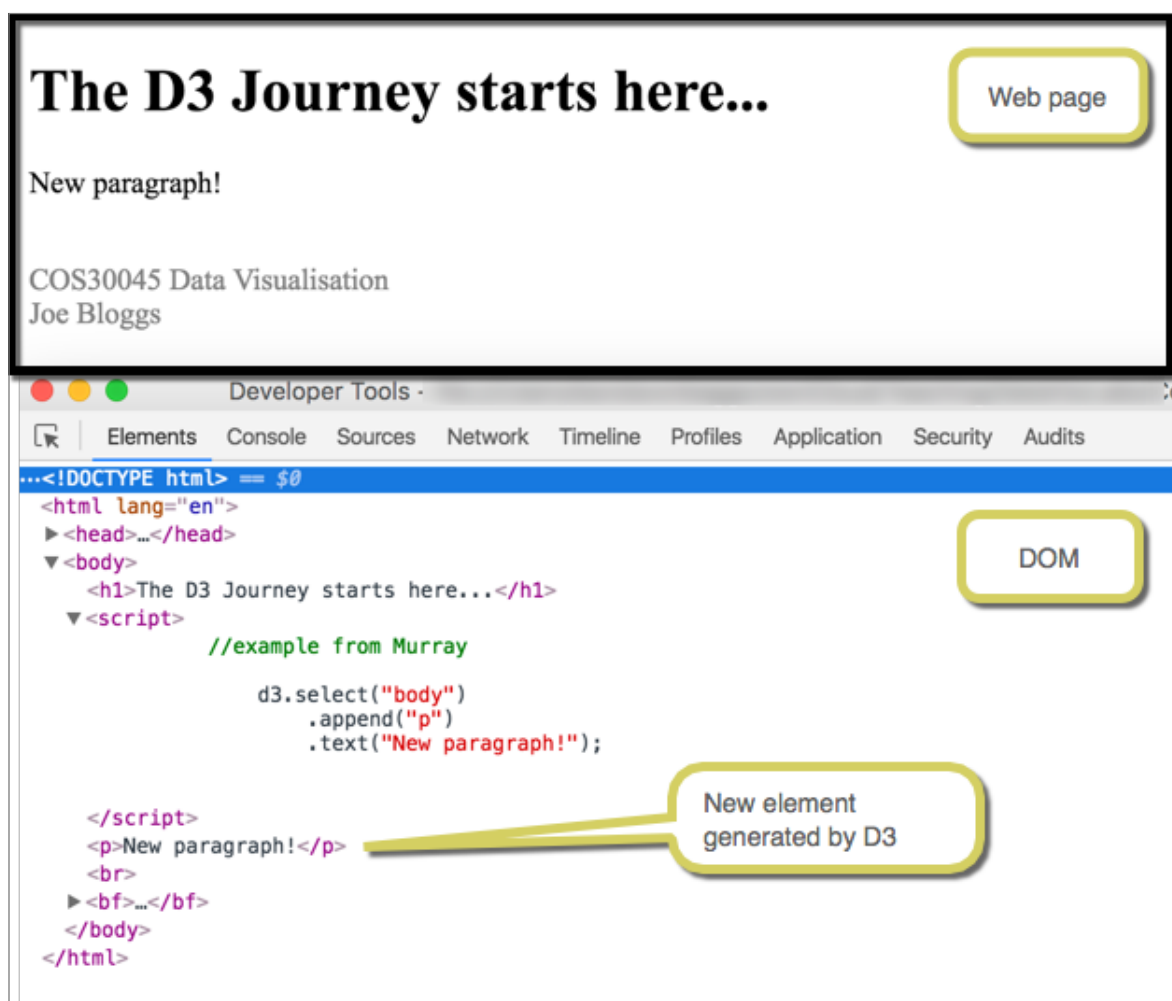
Note: D3 is now at v6. Feel free to use v6 instead.

Step 2 Generating new page elements with D3

Replace the `//D3 code goes here` with the following D3 code and run the web page.



If you inspect the DOM you will see that D3 has added (i.e., appended) an a new p element and filled it with the specified text.



Step 3 Binding data to page elements

D3 allows us to generate page elements and map them to data. We can then customise some aspect of the page element (e.g., a rectangle, circle etc) to reflect some aspect of the data (e.g., height of rectangle, area of circle, colour, thickness of line etc).

Just after the script tag, create a data variable containing numbers between 1 and 30. We will now bind the data set to a set of corresponding p elements.

The screenshot shows a web page with a dark blue header containing D3.js code and a white body with the output. Annotations explain the code and the resulting DOM structure.

```

<script>
  //example from Murray

  var dataset = [14, 5, 26, 23, 9];

  d3.select("body").selectAll("p")
    .data(dataset)
    .enter()
    .append("p")
    .text("New Paragraph");
</script>
  
```

Annotations for the code:

- `d3.select("body").selectAll("p")`: Selects all p (although they don't yet exist)
- `.data(dataset)`: Counts and prepares the data values
- `.enter()`: Appends a p element to match each placeholder
- `.append("p")`: Creates a new placeholder element for each bit of data
- `.text("New Paragraph")`: Takes the new p elements and inserts a text value

Page Content:

Creating and Formatting Paragraph Elements with D3

New Paragraph
 New Paragraph
 New Paragraph
 New Paragraph
 New Paragraph

5 p elements to match our 5 data points

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At the moment the data is attached to the p (you can see this by checking the DOM outputting the elements to the console using:

```
console.log(d3.selectAll("p"));
```

However, the data is currently not being visualised in the display. Let's get the data to print to the web page:

```

<script>

var dataset = [14, 5, 26, 23, 9];
//example from Murray

d3.select("body").selectAll("p")
  .data(dataset)
  .enter()
  .append("p")
  .text(function(d) {
    return d;
  });

</script>

```

Anonymous function - accepts d from the data set as an input and loops through each value

Use some selection rules (e.g., if, else, then...etc) and html formatting to produce something like the following:

Creating and Formatting Paragraph Elements with D3

Warning: Joe watched 14 cat videos today.

Joe watched 5 cat videos today.

Warning: Joe watched 26 cat videos today.

Warning: Joe watched 23 cat videos today.

Joe watched 9 cat videos today.

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Tip: You can use both `d` and the index `i` in your anonymous functions. For example:

```

.text(function(d, i) {
  return "i = " + i + " d = " + d;
})

```

Will give you the following output:

i = 0 d = 14

i = 1 d = 5

i = 2 d = 26

i = 3 d = 23

i = 4 d = 9

Requirements

Your submission must include:

- code demonstrating
 - standard HTML template with appropriate meta data and page title
 - the use of D3 to bind data values from a data set to html elements and display on a webpage
 - the use the data to manipulate some visual property of the html element
- To view in the console use:

```
console.log(d3.selectAll("p")) ;
```