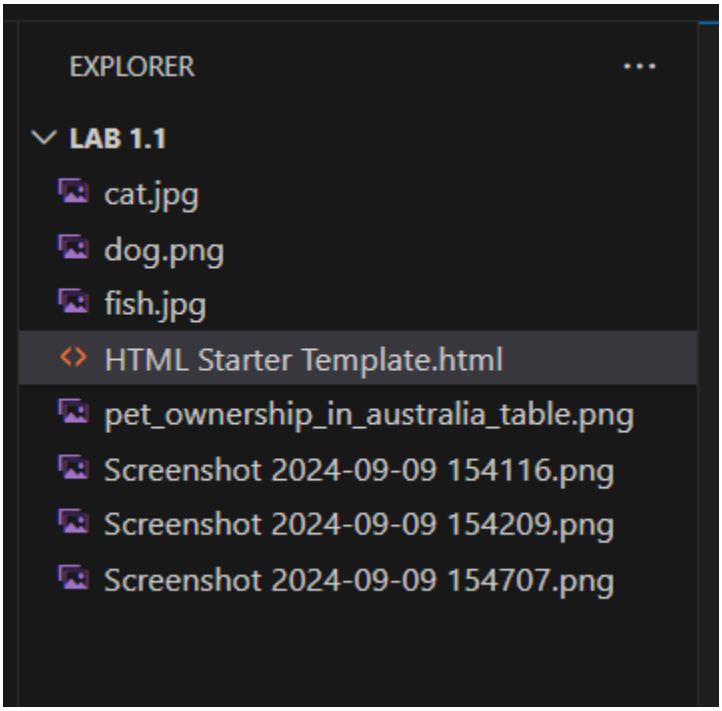
Swinburne University of Technology

COS30045 - Data Visualisation

Lab Exercise Demonstration 1 (Exercises 1.1 - 2.4)

Student: Nguyen Anh Duc – 103488489
Lecturer: Ms, Nguyen Thuy Linh
Tutor: Mr. Vu Ngoc Binh

Lab 1.1



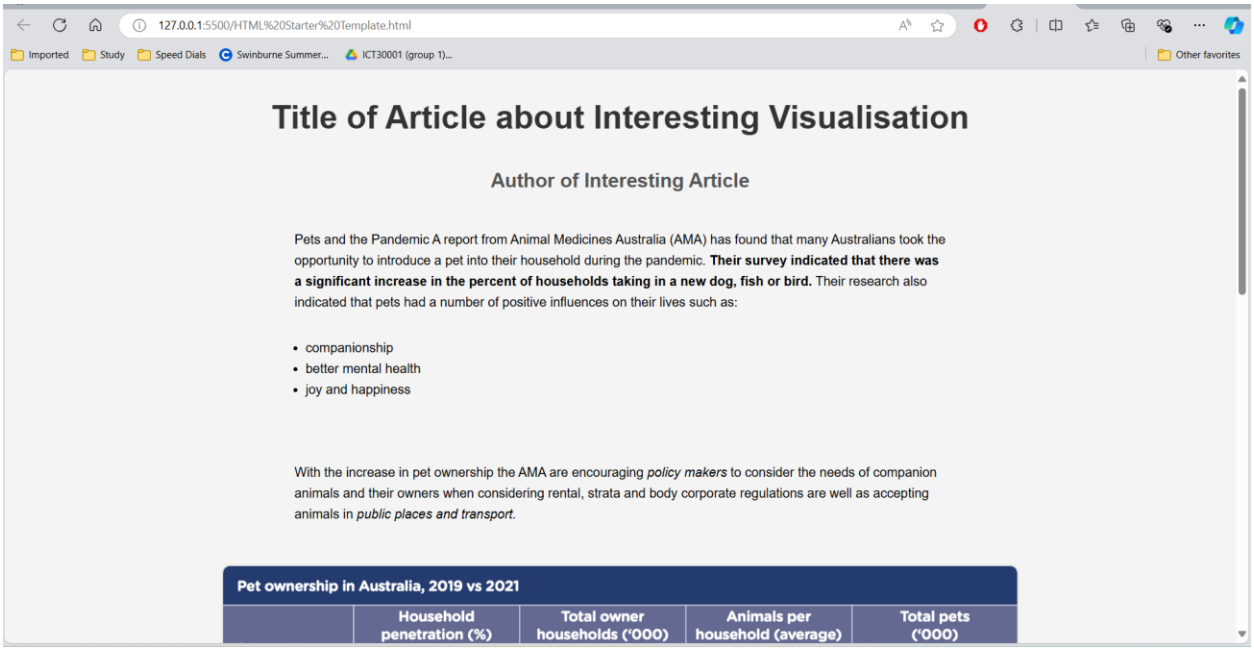

```html
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <meta name="description" content="Data Visualisation Exercise 1" />
    <meta name="keywords" content="HTML, CSS" />
    <meta name="author" content="Your name here" />

    <title>Task 1.1 HTML and CSS Demo Page</title>
    <!--Insert description of exercise  -->

    <style>
        body {
            font-family: Arial, sans-serif;
            line-height: 1.6;
            margin: 20px;
            background-color: #f4f4f4;
        }

        h1 {
            color: #333;
            text-align: center;
            font-size: 2.5em;
```

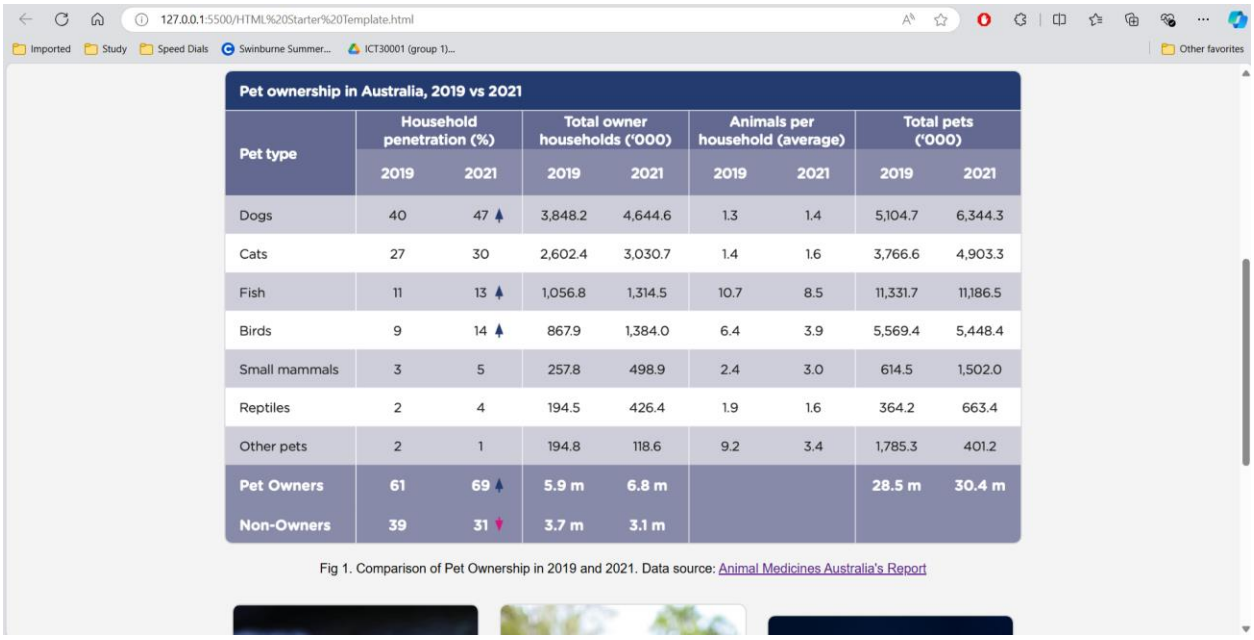
```
}

h2 {
    color: #555;
    text-align: center;
    font-size: 1.5em;
    margin-bottom: 20px;
}

p {
    max-width: 800px;
    margin: 0 auto;

    padding: 20px;
    border-radius: 8px;

}

ul {
    margin-top: 10px;
    padding-left: 350px;
}



figure {
    text-align: center;
    margin-top: 20px;
}

img {
    width: 300px;
    height: auto;
    margin: 10px;
    border-radius: 10px;
    border: 2px solid #ddd;
}

button {
    padding: 10px 20px;
    margin: 5px;
    border: none;
    border-radius: 5px;
    cursor: pointer;
    font-size: 1em;
```

```
        }

        .button1 {
            background-color: #4CAF50;
            color: white;
        }

        .button2 {
            background-color: #2196F3;
            color: white;
        }

        .button3 {
            background-color: #f44336;
            color: white;
        }

        footer {
            text-align: center;
            margin-top: 50px;
            font-size: 0.9em;
            color: #777;
        }

        .image-container {
            text-align: center;
            margin: 20px 0;
        }

        .image-container img {
            display: inline-block;
        }
    </style>

</head>

<body>

    <h1>Title of Article about Interesting Visualisation</h1>
    <h2>Author of Interesting Article</h2>
    <p>
        Pets and the Pandemic

        A report from Animal Medicines Australia (AMA) has found that many
Australians took the opportunity to introduce
```

```
        a pet
        into their household during the pandemic. <b>Their survey indicated that
there was a significant increase in the
            percent of
            households taking in a new dog, fish or bird.</b> Their research also
indicated that pets had a number of
        positive
        influences on their lives such as:

    <ul>
        <li>companionship</li>
        <li>better mental health</li>
        <li>joy and happiness</li>
    </ul>
    </p>

    <p>With the increase in pet ownership the AMA are encouraging <i>policy
makers</i> to consider the needs of
        companion
        animals and their owners when considering rental, strata and body
corporate regulations are well as accepting
        animals in
        <i>public places and transport.</i>
    </p>
    <figure>
        <img src="/pet_ownership_in_australia_table.png" alt="Trulli"
style="width:70%">
        <figcaption>Fig 1. Comparison of Pet Ownership in 2019 and 2021. Data
source: <a
                href="https://animalmedicinesaustralia.org.au/wp-
content/uploads/2021/08/AMAU005-PATP-Report21_v1.41_WEB.pdf">Animal
                Medicines Australia's Report</a></figcaption>
    </figure>

    <div class="image-container">
        <img src="cat.jpg" alt="cat in Australia">
        <img src="dog.png" alt="dog in Australia">
        <img src="fish.jpg" alt="fish in Australia">
    </div>


    <footer>COS30045 Data Visualisation</footer>

</body>
```

```
</html>
```

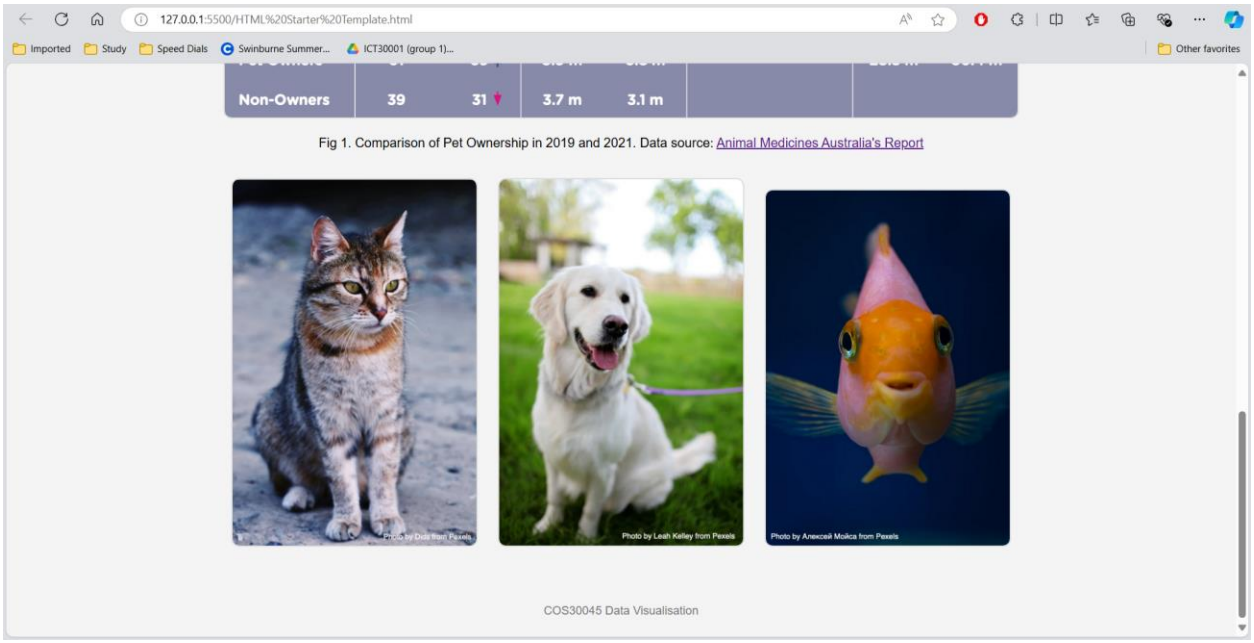




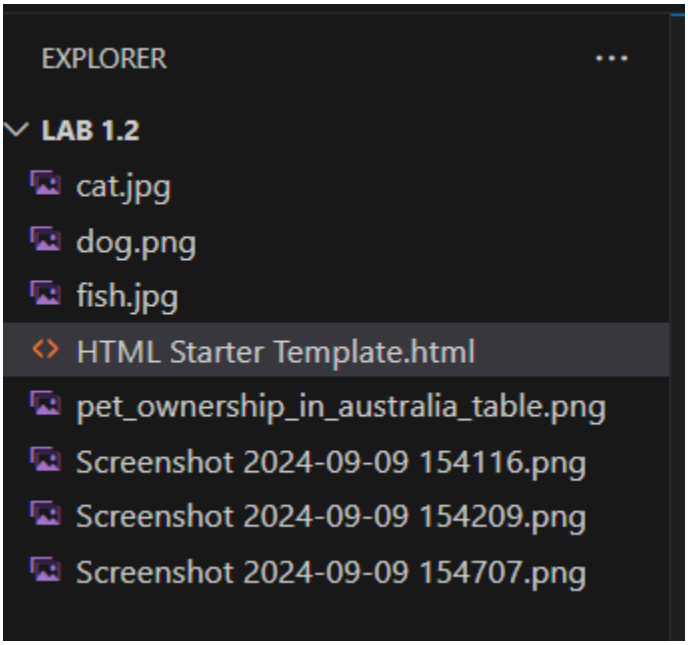
Pet ownership in Australia, 2019 vs 2021

Pet type	Household penetration (%)		Total owner households ('000)		Animals per household (average)		Total pets ('000)	
	2019	2021	2019	2021	2019	2021	2019	2021
Dogs	40	47 ▲	3,848.2	4,644.6	1.3	1.4	5,104.7	6,344.3
Cats	27	30	2,602.4	3,030.7	1.4	1.6	3,766.6	4,903.3
Fish	11	13 ▲	1,056.8	1,314.5	10.7	8.5	11,331.7	11,186.5
Birds	9	14 ▲	867.9	1,384.0	6.4	3.9	5,569.4	5,448.4
Small mammals	3	5	257.8	498.9	2.4	3.0	614.5	1,502.0
Reptiles	2	4	194.5	426.4	1.9	1.6	364.2	663.4
Other pets	2	1	194.8	118.6	9.2	3.4	1,785.3	401.2
Pet Owners	**61**	**69** ▲	**5.9 m**	**6.8 m**			**28.5 m**	**30.4 m**
Non-Owners	**39**	**31** ▼	**3.7 m**	**3.1 m**				

Fig 1. Comparison of Pet Ownership in 2019 and 2021. Data source: Animal Medicines Australia's Report



Lab 1.2




```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <meta name="description" content="Data Visualisation Exercise 1" />
    <meta name="keywords" content="HTML, CSS" />
```

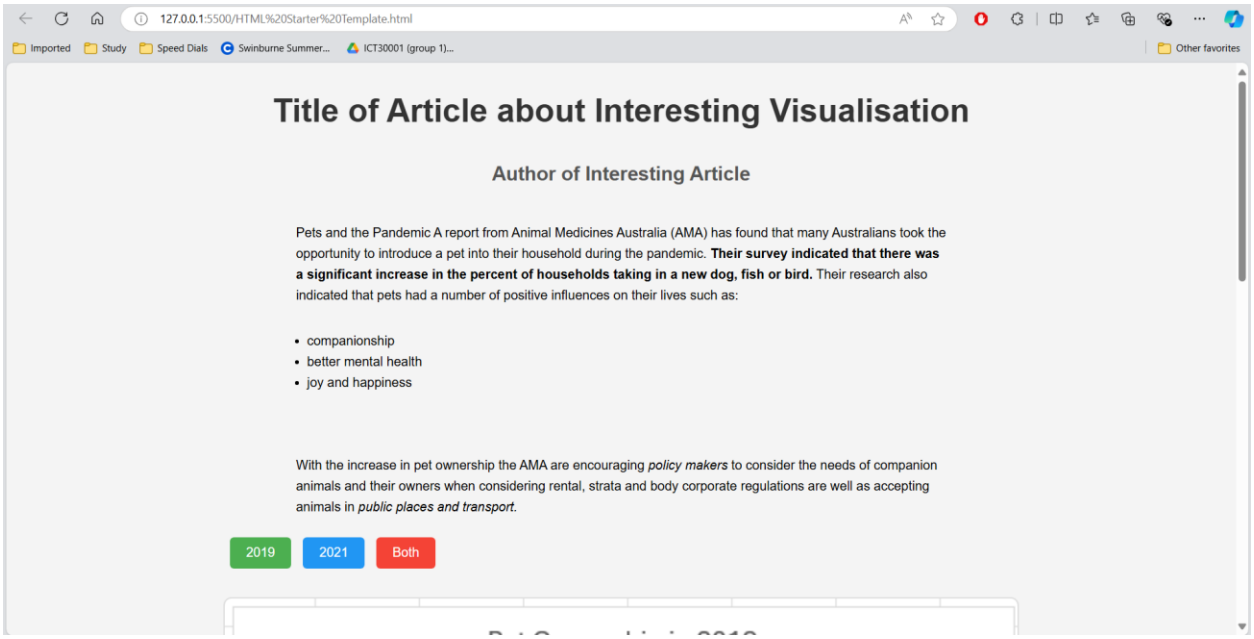
```
    <meta name="author" content="Your name here" />

    <title>Task 1.2 Javascript</title>
    <!--Insert description of exercise  -->

    <style>
        body {
            font-family: Arial, sans-serif;
            line-height: 1.6;
            margin: 20px;
            background-color: #f4f4f4;
        }

        h1 {
            color: #333;
            text-align: center;
            font-size: 2.5em;
        }

        h2 {
            color: #555;
            text-align: center;
            font-size: 1.5em;
            margin-bottom: 20px;
        }

        p {
            max-width: 800px;
            margin: 0 auto;

            padding: 20px;
            border-radius: 8px;

        }

        ul {
            margin-top: 10px;
            padding-left: 350px;
        }



        figure {
            text-align: center;
            margin-top: 20px;
```

```
        }

        img {
            width: 300px;
            height: auto;
            margin: 10px;
            border-radius: 10px;
            border: 2px solid #ddd;
        }

        button {
            padding: 10px 20px;
            margin: 5px;
            border: none;
            border-radius: 5px;
            cursor: pointer;
            font-size: 1em;
        }

        .button1 {
            background-color: #4CAF50;
            color: white;
        }

        .button2 {
            background-color: #2196F3;
            color: white;
        }

        .button3 {
            background-color: #f44336;
            color: white;
        }

        footer {
            text-align: center;
            margin-top: 50px;
            font-size: 0.9em;
            color: #777;
        }

        .image-container {
            text-align: center;
            margin: 5px 0;
        }
```

```
        .image-container img {
            display: inline-block;
        }

        .button-container {
            margin-left: 250px;
        }
    </style>

    <script>
        // Function to change image, caption, and alt text
        function showImage(imageSource, captionText, altText) {
            // Get the image and caption elements
            const imageElement = document.getElementById('visualizationImage');
            const captionElement = document.getElementById('imageCaption');

            // Change the image source, alt text, and caption
            imageElement.src = imageSource;
            imageElement.alt = altText;
            captionElement.innerHTML = captionText;
        }
    </script>

</head>

<body>

    <h1>Title of Article about Interesting Visualisation</h1>
    <h2>Author of Interesting Article</h2>
    <p>
        Pets and the Pandemic

        A report from Animal Medicines Australia (AMA) has found that many
Australians took the opportunity to introduce
        a pet
        into their household during the pandemic. <b>Their survey indicated that
there was a significant increase in the
            percent of
            households taking in a new dog, fish or bird.</b> Their research also
indicated that pets had a number of
        positive
        influences on their lives such as:

    <ul>
```

```
        <li>companionship</li>
        <li>better mental health</li>
        <li>joy and happiness</li>
    </ul>
    </p>

    <p>With the increase in pet ownership the AMA are encouraging <i>policy
makers</i> to consider the needs of
        companion
        animals and their owners when considering rental, strata and body
corporate regulations are well as accepting
        animals in
        <i>public places and transport.</i>
    </p>

    <!-- Buttons to switch between images -->
    <div class="button-container">
        <button type="button" class="button button1"
            onclick="showImage('Screenshot 2024-09-09 154209.png', 'Fig 1.
Percent of pets owned by Australians in 2019', 'Fig 1. Percent of pets owned by
Australians in 2019')">2019</button>
        <button type="button" class="button button2"
            onclick="showImage('Screenshot 2024-09-09 154116.png', 'Fig 2.
Percent of pets owned by Australians in 2021', 'Fig 2. Percent of pets owned by
Australians in 2021')">2021</button>
        <button type="button" class="button button3"
            onclick="showImage('Screenshot 2024-09-09 154707.png', 'Fig 3.
Percent of pets owned by Australians in 2019 and 2021', 'Fig 3. Percent of pets
owned by Australians in 2019 and 2021')">Both</button>
    </div>



    <figure id="imageContainer">
        <img id="visualizationImage" src="/Screenshot 2024-09-09 154209.png"
alt="Fig 1. Percent of pets owned by Australians in 2019" style="width:70%">
        <figcaption id="imageCaption">Fig 1. Percent of pets owned by Australians
in 2019</figcaption>
    </figure>



    <div class="image-container">
        <img src="cat.jpg" alt="cat in Australia">
        <img src="dog.png" alt="dog in Australia">
```

```
        <img src="fish.jpg" alt="fish in Australia">
    </div>


    <footer>COS30045 Data Visualisation</footer>

</body>

</html>
```



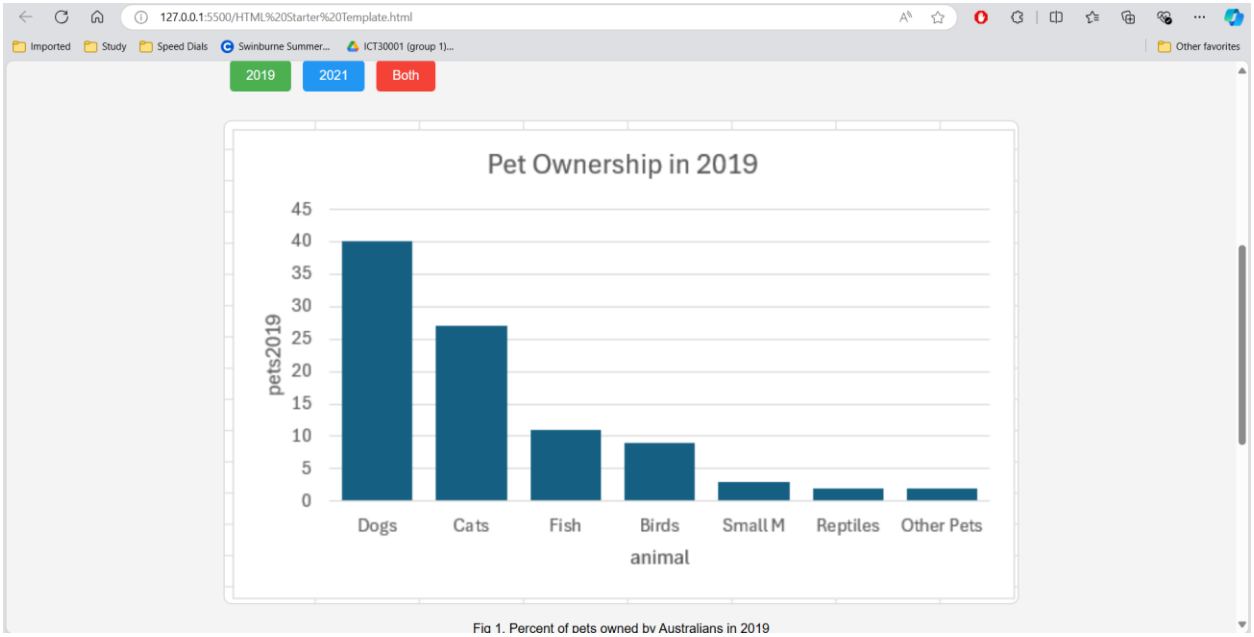


Fig 1. Percent of pets owned by Australians in 2019

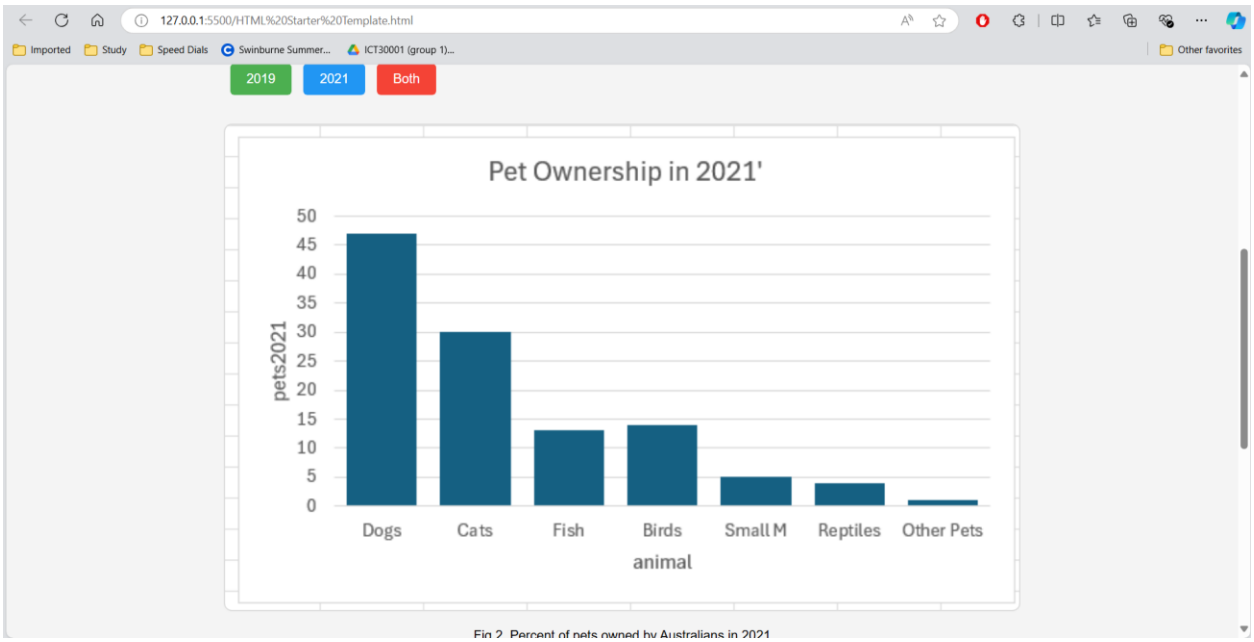


Fig 2. Percent of pets owned by Australians in 2021

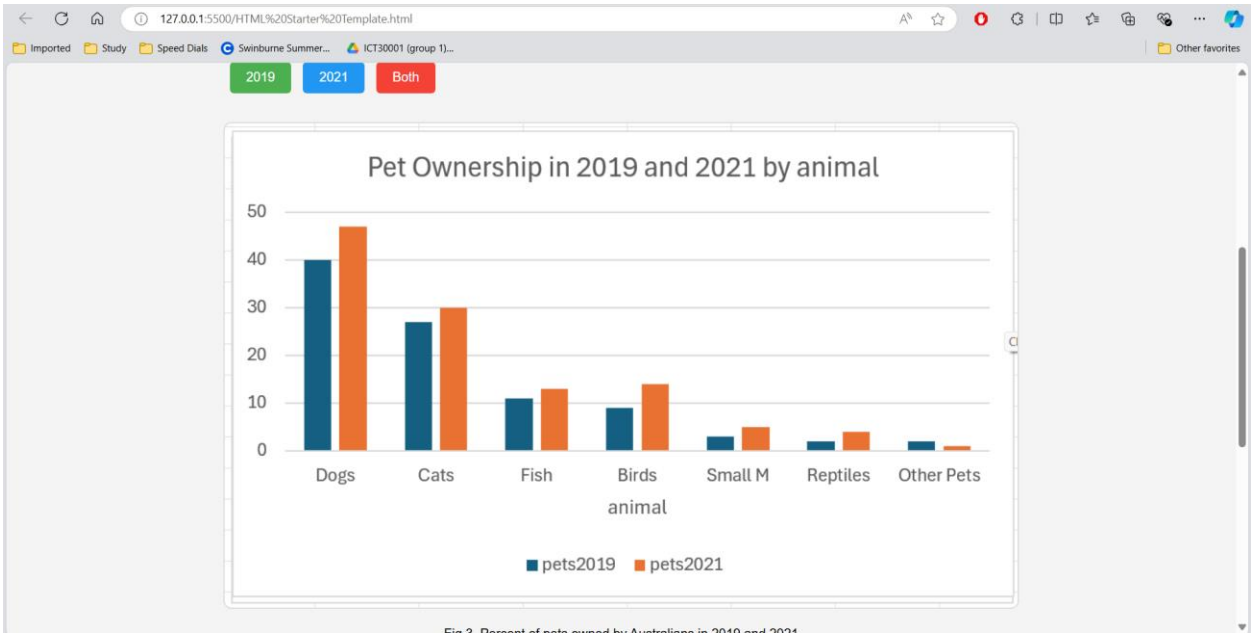
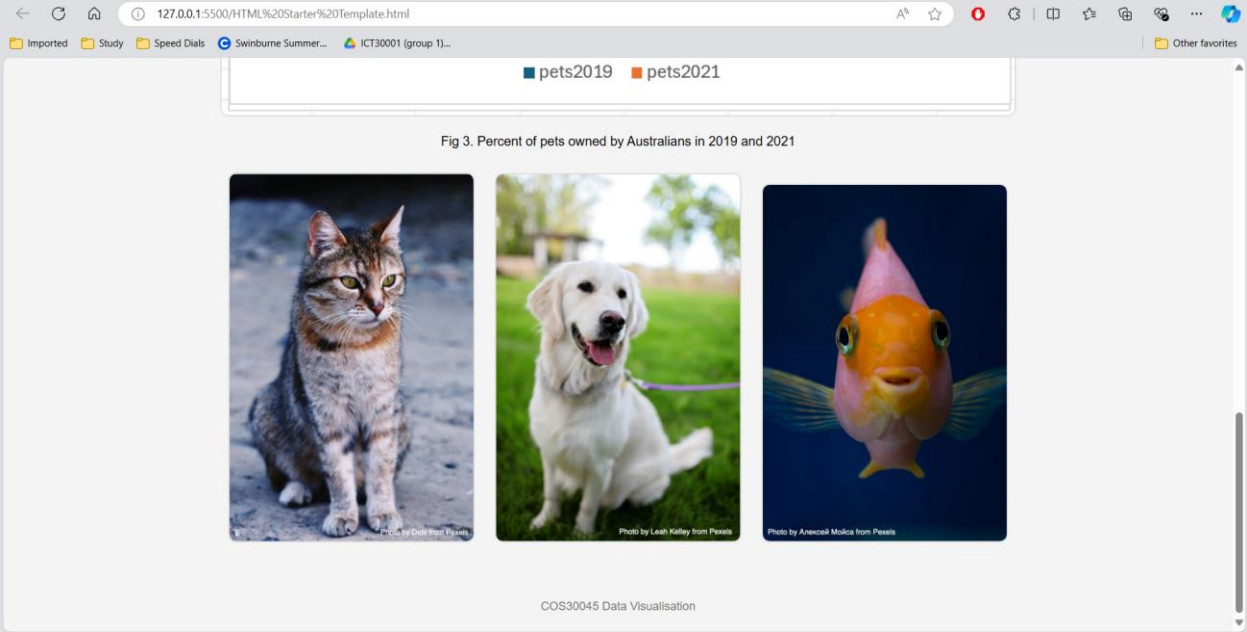


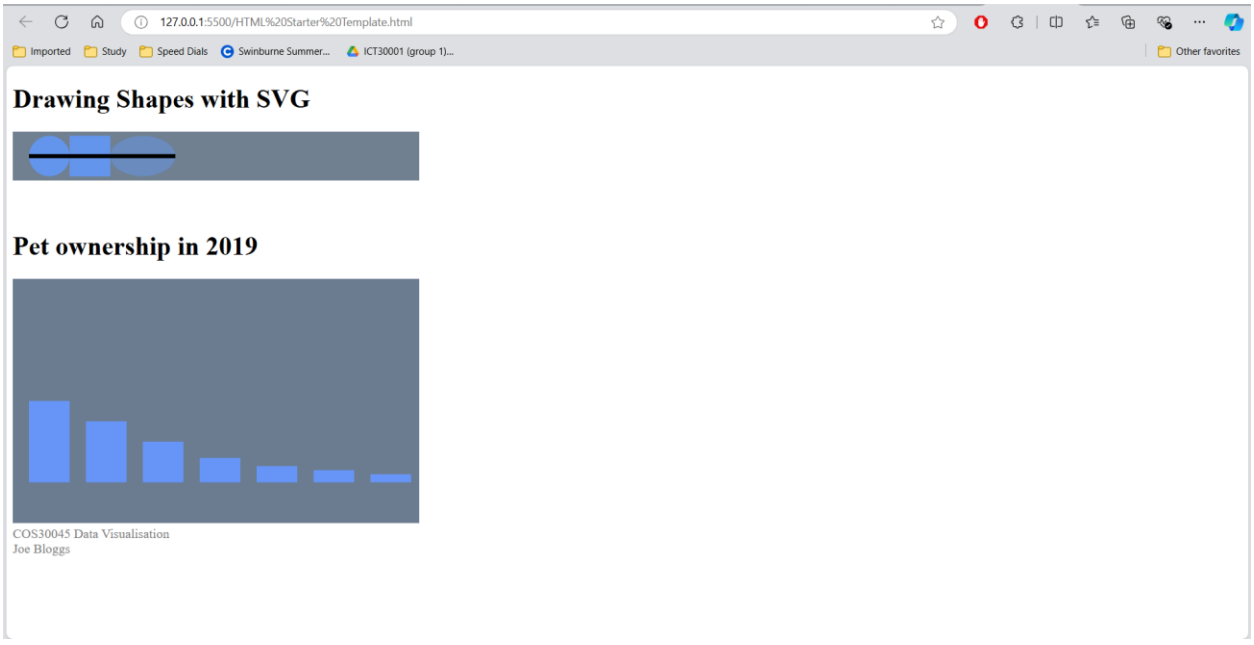
Fig 3. Percent of pets owned by Australians in 2019 and 2021



Lab 1.3

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <meta name="description" content="Data Visualisation Exercise 1" />
    <meta name="keywords" content="HTML, CSS" />
    <meta name="author" content="Your name here" />

    <title>Task 1.3 SVG Drawings</title>
    <!--Insert description of exercise  -->



</head>

<body>

    <h1>Drawing Shapes with SVG</h1>

    <svg width="500" height="60" style="background-color:slategrey;">
        <g transform="translate(20, 0)">
            <circle cx="25" cy="30" r="25" fill="cornflowerblue" />
            <rect x="50" y="5" width="50" height="50" fill="rgb(100, 149, 237)"
/>
```

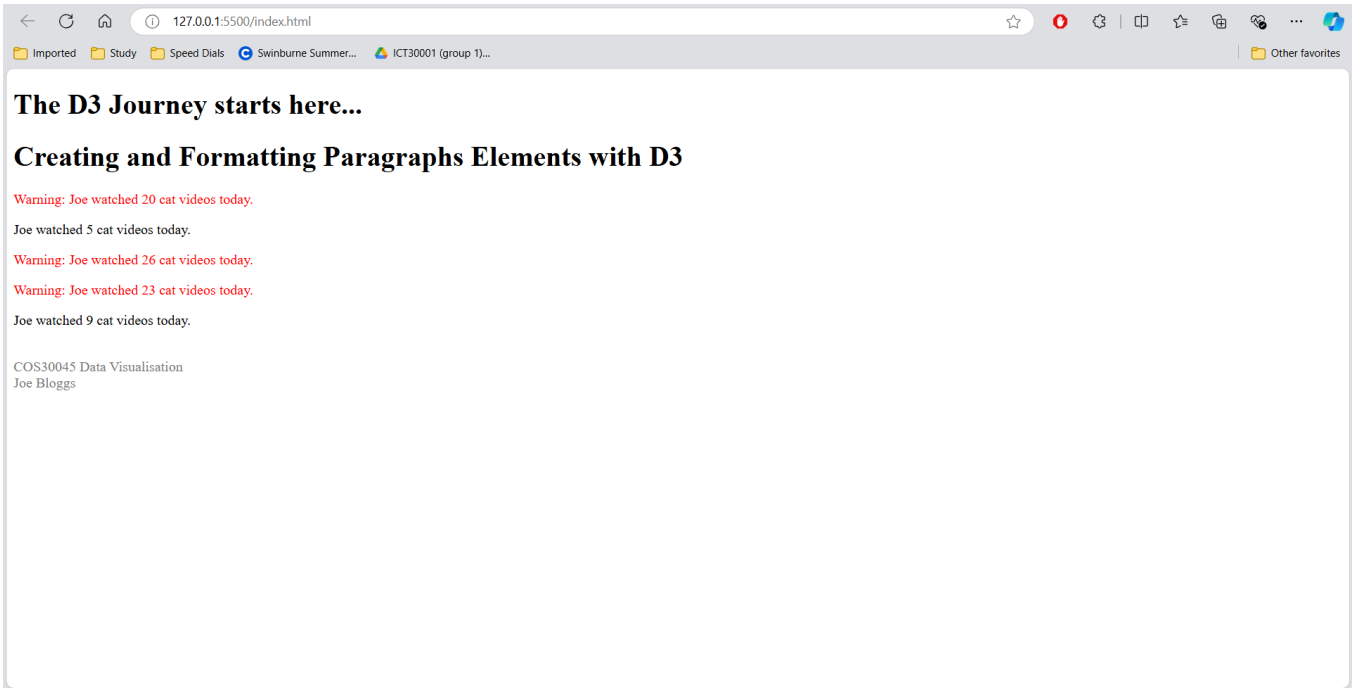
```
            <ellipse cx="140" cy="30" rx="40" ry="25" fill="rgba(100, 149, 237,
0.5)" />
            <line x1="0" y1="30" x2="180" y2="30" stroke="black" stroke-width="5"
/>
        </g>
    </svg>
    <br><br><br>

    <h1>Pet ownership in 2019</h1>
    <svg width="500" height="300" style="background-color:#6b7c91;">
        <rect x="20" y="150" width="50" height="100" fill="#6795f7" />
        <rect x="90" y="175" width="50" height="75" fill="#6795f7" />
        <rect x="160" y="200" width="50" height="50" fill="#6795f7" />
        <rect x="230" y="220" width="50" height="30" fill="#6795f7" />
        <rect x="300" y="230" width="50" height="20" fill="#6795f7" />
        <rect x="370" y="235" width="50" height="15" fill="#6795f7" />
        <rect x="440" y="240" width="50" height="10" fill="#6795f7" />
    </svg>

    <footer style="color:grey">COS30045 Data Visualisation<br>Joe Bloggs</footer>

</body>


</html>
```



Lab 2.1

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <meta name="description" content="Data Visualisation Exercise 1" />
    <meta name="keywords" content="HTML, CSS" />
    <meta name="author" content="Your name here" />

    <title>Task 2.1 D3 Drawing with Data - Bindings</title>
    <!--Insert description of exercise  -->
    <script src="https://d3js.org/d3.v7.min.js"></script>


</head>

<body>

    <h1>The D3 Journey starts here...</h1>
    <!-- <script>
        d3.select("body")
            .append("p")
            .text("New paragraph!");
    </script> -->

    <!-- <h1>Creating and Formatting Paragraphs Elements with D3</h1>
    <script>
        var dataset = [20, 5, 26, 23, 9];

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

    <h1>Creating and Formatting Paragraphs Elements with D3</h1>
    <script>
        // example from Murray
        var dataset = [20, 5, 26, 23, 9];

        d3.select("body").selectAll("p")
```

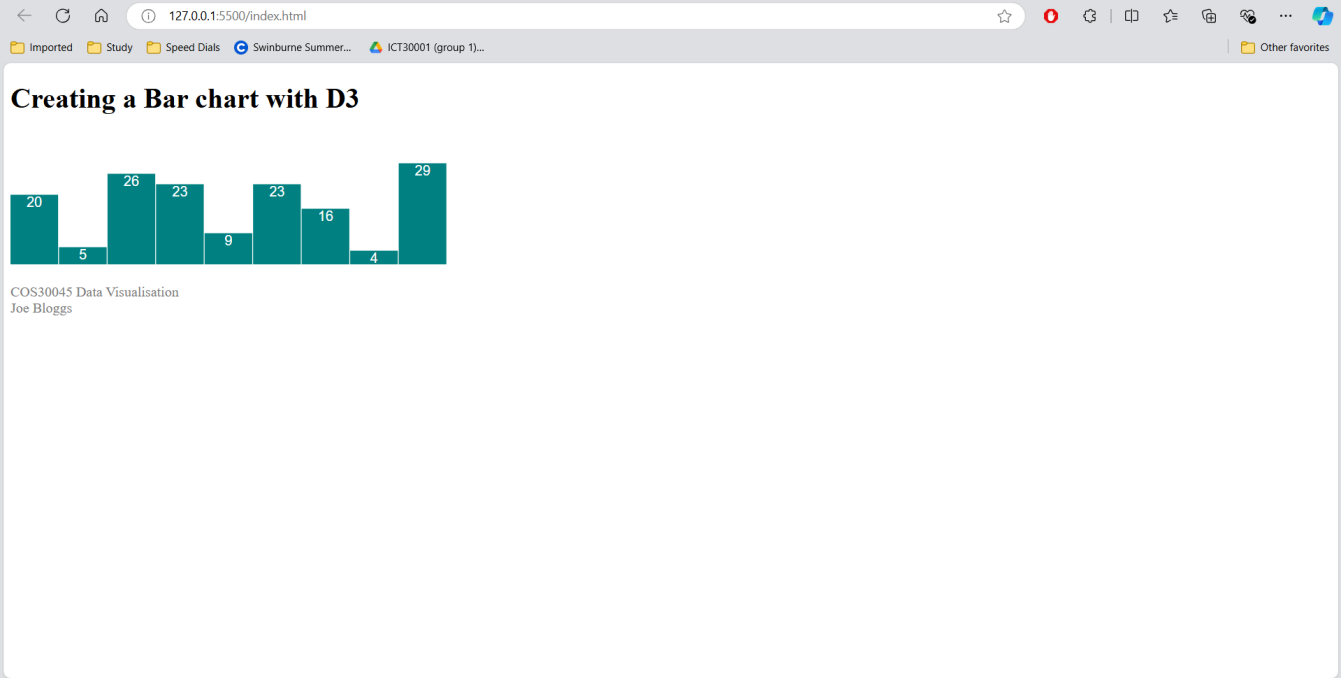
```
            .data(dataset)
            .enter()
            .append("p")
            .text(function (d) {
                if (d > 10) {
                    return "Warning: Joe watched " + d + " cat videos today.";
                } else
                return "Joe watched " + d + " cat videos today.";
            })
            .style("color", function (d) {
                return d > 10 ? "red" : "black";
            });
    </script>


    <br>
    <footer style="color:grey">COS30045 Data Visualisation<br>Joe Bloggs</footer>

</body>



</html>
```



Lab 2.2

```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <meta name="description" content="Data Visualisation Exercise 1" />
    <meta name="keywords" content="HTML, CSS" />
    <meta name="author" content="Your name here" />

    <title>Task 2.2 D3 Drawing with Data - Bar Chart</title>
    <!--Insert description of exercise  -->
    <script src="https://d3js.org/d3.v7.min.js"></script>


</head>

<body>



    <h1>Creating a Bar chart with D3</h1>
    <script>
        // example from Murray
        var dataset = [20, 5, 26, 23, 9, 23, 16, 4, 29];
        var w = 500;
        var h = 150;
        var padding = 1;


        var svg = d3.select("body")
            .append("svg")
            .attr("width", w)
            .attr("height", h);

        svg.selectAll("rect")
        .data(dataset)
        .enter()
        .append("rect")
        .attr("x", function(d, i) {
            return i * (w / dataset.length) ;
        })
        .attr("y", function(d) {
            return h - (d* 4);
        })
```

```
        .attr("width", w / dataset.length - padding)
        .attr("height", function(d) {
            return d * 4;
        })
        .attr("fill", "teal")


        svg.selectAll("text")
        .data(dataset)
            .enter()
            .append("text")
            .text(function (d) {
                return d;
            })
            .attr("x", function (d, i) { return i * (w / dataset.length) + (w /
dataset.length - padding) / 2; })
            .attr("y", function (d) {
                return h - (d * 4) + 14;
            })
            .attr("fill", "white")
            .attr("font-family", "sans-serif")
            .attr("text-anchor", "middle")

    </script>


    <br><br>
    <footer style="color:grey">COS30045 Data Visualisation<br>Joe Bloggs</footer>

</body>



</html>
```

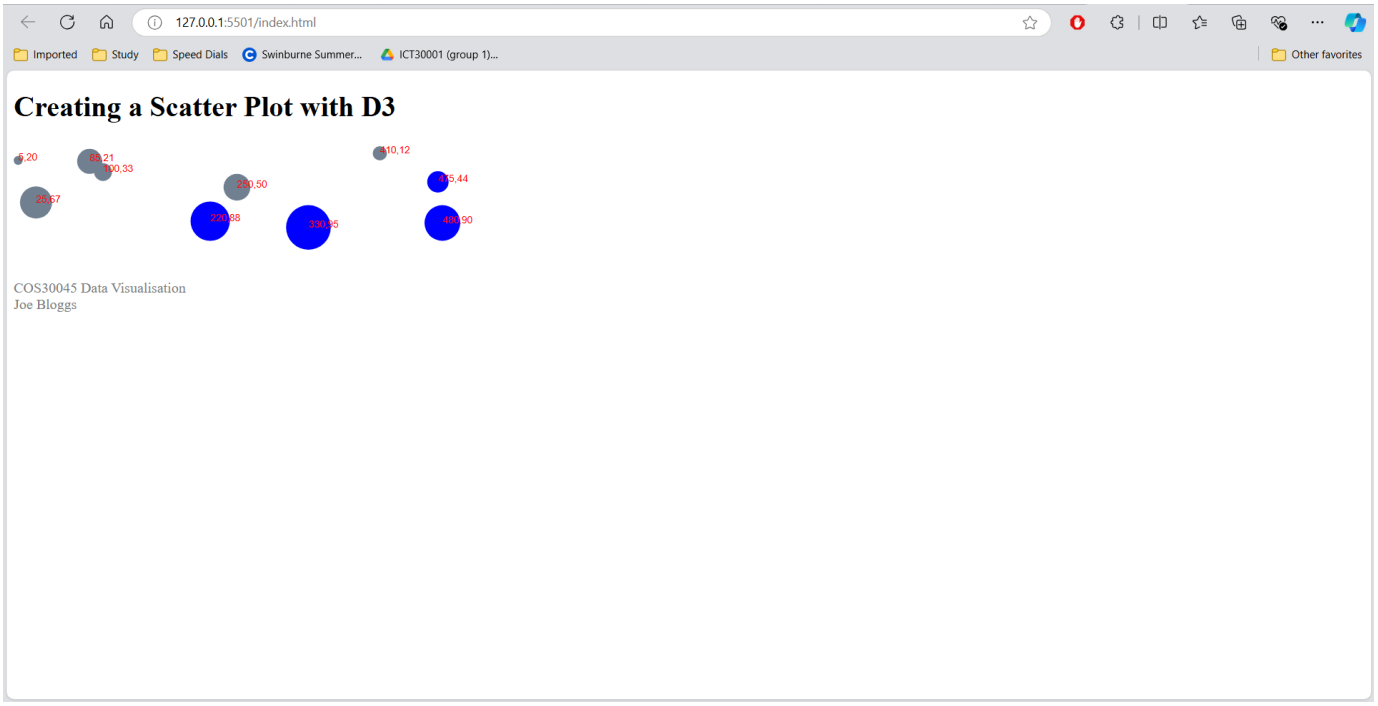


Lab 2.3

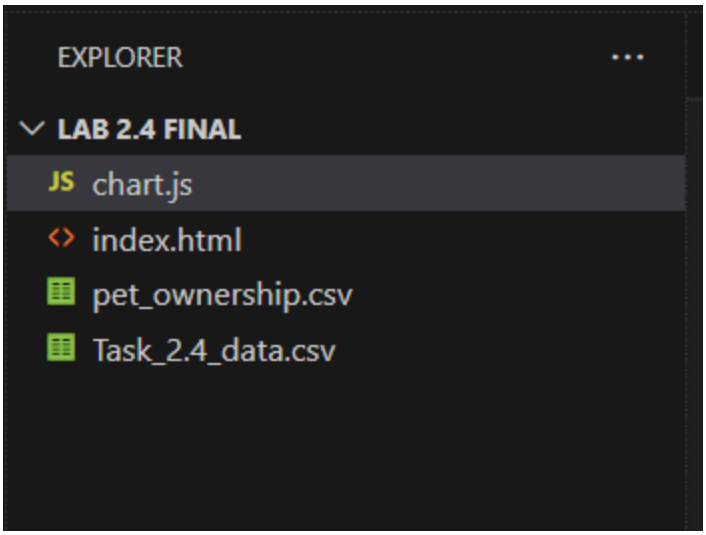
```
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <meta name="description" content="Data Visualisation Exercise 1" />
    <meta name="keywords" content="HTML, CSS" />
    <meta name="author" content="Your name here" />

    <title>Task 2.3 D3 Drawing with Data - Scatter Plot</title>
    <!--Insert description of exercise  -->
    <script src="https://d3js.org/d3.v7.min.js"></script>


</head>

<body>



    <h1>Creating a Scatter Plot with D3</h1>
    <script>
        // example from Murray
```

```
 var dataset = [
        [5, 20, 5], [480, 90, 20], [250, 50, 15], [100, 33, 10],
        [330, 95, 25], [410, 12, 8], [475, 44, 12], [25, 67, 18],
        [85, 21, 14], [220, 88, 22]
    ];

var w = 600;
var h = 150;
var padding = 1;


var svg = d3.select("body")
    .append("svg")
    .attr("width", w)
    .attr("height", h);

svg.selectAll("circle")
    .data(dataset)
    .enter()
    .append("circle")
    .attr("cx", function (d, i) {
        return d[0];
    })
    .attr("cy", function (d) {
        return d[1];
    })
    .attr("r", function (d) {
        return d[2];
    })
    .attr("fill", function (d) {
        if ((d[0] > 410) | (d[1] > 80)) {
            return "blue";  // Red color for some points
        } else {
            return "slategrey"; // Default color
        }
    });


svg.selectAll("text")
    .data(dataset)
    .enter()
    .append("text")
    .text(function (d) {
        return d[0] + "," + d[1];
    })
```

```
            .attr("x", function (d) { return d[0]; })
            .attr("y", function (d) {
                return d[1];
            })
            .attr("fill", "red")
            .attr("font-family", "sans-serif")
            .attr("font-size", "11px")

    </script>


    <br>
    <footer style="color:grey">COS30045 Data Visualisation<br>Joe Bloggs</footer>

</body>



</html>
```



Lab 2.4



Index.html :

```html
<!DOCTYPE html>
<html lang="en">

<head>
    <meta charset="UTF-8" />
    <meta name="description" content="Data Visualisation Exercise 1" />
    <meta name="keywords" content="HTML, CSS" />
    <meta name="author" content="Your name here" />

    <title>Task 2.4 D3 Loading Data from CSV</title>
    <script src="https://d3js.org/d3.v7.min.js"></script>
    <script src="/chart.js"></script>


</head>

<body>
    <h1>D3 - Loading Data from CSV</h1>
    <p id="chart"></p>
    <br>
    <h1>Charts drawn from CSV file</h1>
    <p id="chart2"></p>
    <p>Fig 1: Pet Ownership in 2019</p>
    <br>
    <p id="chart3"></p>
    <p>Fig 2: Pet Ownership in 2021</p>
    <br>
</body>
```

```
<footer style="color:grey">COS30045 Data Visualisation<br>Joe Bloggs</footer>

</html>
```

Chart.js :

```
function init() {
    d3.csv("Task_2.4_data.csv").then(function (data) {
        console.log(data);
        wombatSightings = data;

        barChart(wombatSightings);
    })

    function barChart() {
        var w = 600;
        var h = 150;
        var padding = 1;

        var colorScale = d3.scaleLinear()
            .domain([d3.max(wombatSightings, function (d) { return d.wombats; }),
d3.min(wombatSightings, function (d) { return d.wombats; })])
            .range(["yellow", "orange"]); // Map values to a color from YELLOW to
orange



        var svg = d3.select("#chart")
            .append("svg")
            .attr("width", w)
            .attr("height", h);

        svg.selectAll("rect")
            .data(wombatSightings)
            .enter()
            .append("rect")
            .attr("x", function (d, i) {
                return i * (w / wombatSightings.length);
            })
            .attr("y", function (d) {
                return h - (d.wombats * 4);
            })
            .attr("width", w / wombatSightings.length - padding)
            .attr("height", function (d) {
                return d.wombats * 4;
```

```
            })
            .attr("fill", function (d) {
                return colorScale(d.wombats);  // Apply the color scale based on
data value
            })

        svg.selectAll("text")
            .data(wombatSightings)
            .enter()
            .append("text")
            .text(function (d) {
                return d.wombats;
            })
            .attr("x", function (d, i) { return i * (w / wombatSightings.length)
+ (w / wombatSightings.length - padding) / 2; })
            .attr("y", function (d) {
                return h - (d.wombats * 4) + 14;
            })
            .attr("fill", "white")
            .attr("font-family", "sans-serif")
            .attr("text-anchor", "middle")
    }

    d3.csv("pet_ownership.csv").then(function (data2) {
        console.log(data2);
        data2019 = data2;

        barChart2(data2019);
    })

    function barChart2() {
        var w = 600;
        var h = 200;
        var padding = 1;

        var colorScale = d3.scaleLinear()
            .domain([d3.max(data2019, function (d) { return d.pets2019; }),
d3.min(data2019, function (d) { return d.pets2019; })])
            .range(["blue", "navy"]);



        var svg = d3.select("#chart2")
            .append("svg")
            .attr("width", w)
```

```
            .attr("height", h);

        svg.selectAll("rect")
            .data(data2019)
            .enter()
            .append("rect")
            .attr("x", function (d, i) {
                return i * (w / data2019.length);
            })
            .attr("y", function (d) {
                return h - (d.pets2019 * 4) - 40;
            })
            .attr("width", w / data2019.length - padding)
            .attr("height", function (d) {
                return d.pets2019 * 4;
            })
            .attr("fill", function (d) {
                return colorScale(d.pets2019);  // Apply the color scale based on
data value
            })

        svg.selectAll("text")
            .data(data2019)
            .enter()
            .append("text")
            .text(function (d) {
                return d.animal;
            })
            .attr("x", function (d, i) { return i * (w / data2019.length) + (w /
data2019.length - padding) / 2; })
            .attr("y", function (d) {
                return h - 12;
            })
            .attr("fill", "green")
            .attr("font-family", "sans-serif")
            .attr("font-size", "15px")
            .attr("text-anchor", "middle")
    }

    d3.csv("pet_ownership.csv").then(function (data3) {
        console.log(data3);
        data2021 = data3;

        barChart3(data2021);
    })
```

```
    function barChart3() {
        var w = 600;
        var h = 200;
        var padding = 1;

        var colorScale = d3.scaleLinear()
            .domain([d3.max(data2021, function (d) { return d.pets2021; }),
d3.min(data2021, function (d) { return d.pets2021; })])
            .range(["blue", "navy"]);



        var svg = d3.select("#chart3")
            .append("svg")
            .attr("width", w)
            .attr("height", h);

        svg.selectAll("rect")
            .data(data2021)
            .enter()
            .append("rect")
            .attr("x", function (d, i) {
                return i * (w / data2021.length);
            })
            .attr("y", function (d) {
                return h - (d.pets2021 * 4) - 40;
            })
            .attr("width", w / data2021.length - padding)
            .attr("height", function (d) {
                return d.pets2021 * 4;
            })
            .attr("fill", function (d) {
                return colorScale(d.pets2021);  // Apply the color scale based on
data value
            })

        svg.selectAll("text")
            .data(data2021)
            .enter()
            .append("text")
            .text(function (d) {
                return d.animal;
            })
```

```
            .attr("x", function (d, i) { return i * (w / data2021.length) + (w /
data2021.length - padding) / 2; })
            .attr("y", function (d) {
                return h - 12;
            })
            .attr("fill", "green")
            .attr("font-family", "sans-serif")
            .attr("font-size", "15px")
            .attr("text-anchor", "middle")
    }

}

window.onload = init;
```

Fig 1: Pet Ownership in 2019

Fig 2: Pet Ownership in 2021

COS30045 Data Visualisation
Joe Bloggs