**1. Outline your project and which extensions you are building on to the template. (400 words)**

In my work as a data analyst, I have experience with data visualization tools. Thus, I'm choosing to extend the Data template. My interest lies in learning the backend processes to deepen my understanding of the visuals and ultimately to be more effective at work. Moreover, my constant exposure to these types of programs provides me with ideas on how to improve the template, focusing on the following:

1. Creating a bar chart visual tracking various Air Quality metrics in G20 countries.

* + Implementation will involve creating a new constructor function, similar in complexity to the pie chart constructor. I will need to create a simple array of objects to build a colour coded legend.

2. Creating a heat map visual of drug seizures across the UK.

* + This involves working with different libraries than previously. I expect this to be challenging as I will need to read up on documentation of other libraries and attempt to do something I have not yet done. The data structures for this I expect to be simple. I also plan to build a tooltip to allow the user to see the name of the region when they hover the mouse over the area.

3. Improving the Line Chart (Nutrients): Adding a table of statistics for each nutrient across the years. Using a selector object, users can decide for which nutrients they would like to see the statistics.

* + Implementation will involve creating new methods with nested loops and complex 2D arrays of Objects to calculate and then draw the statistics to the visual. I expect the correct implementation of these methods to be challenging, specially making sure I am properly accessing the properties nested within the layers of the data structure.

4. Improving the Scatter Plot (Pay Gap by Job): By colour coding the ellipses depending on distance away from the parity line. I will also add indicators to make results more easily understandable. Finally, I will add a tooltip whereby when the user hovers over an ellipse, the job category, the pay gap and the proportion of is displayed.

* + Implementation will involve creating methods for checking if the mouse is over the ellipse and will involve the creation of a complex array of objects.

5. Improving the pie chart visual on a dataset about the breakdown of substances seized in the UK. I will add a tooltip to provide the percentage information and name of substance when hovering over a piece of the pie.

* + Implementation will involve similar elements to the scatter plot hover tooltip.

**2. Discuss the progress you have made on your project so far. (400 words)**

During the brainstorming phase, I began by searching for inspiration by searching through different datasets. Once I identified datasets I liked, it was quite clear to me which visuals they would be best suited for, and I decided to create a heat map and build a bar chart. I roughly sketched the intended interface (See Visuals Diagrams PDF)

I also kept notes on what needed to be completed for each visual as well as other tasks I wanted to complete as part of extending the data visualisation template. (See To Do PDF).

As of this point, I have completed around 70-75% of the coding required for the visuals I planned to build or improve. This is before I conduct ay usability and stability testing which could involve making changes to the code I have written and potentially adding some more in order to make certain visuals more user friendly.

I have finished the improvements planned for both the Line chart and the Scatter Plot. The line chart now includes useful statistics for users based on a selected nutrient. The scatter plot provides much more value to the user now that it is complete. The ellipses are colour coded and provide information in the form of a tooltip when the user hovers over a specific data point.

I have built the constructor for the Bar Chart and implemented the first new instance of this visual using a dataset comparing Air Quality across countries of the G20. This includes a functioning colour coded index for each bar, a selector to choose a list of air quality metrics and an average line dynamically calculated for each metric.

Moreover, I found another dataset for the pie chart visual that I am planning on improving. I have successfully implemented it as a new gallery visual. I also made any aesthetic changes to the overall application and to other visuals to make the whole data visualisation tool more understandable.

I have begun building the heat map visual. I have created the base map layer and am on track to finish this visual in the next week. My next steps include working on the heatmap layer of the visual, the hovering tooltip and any other controls I may want to allow the user to have.

For the pie chart visual, the tooltip for each slice of the pie is the final step remaining. Beyond the coding of my remaining two visuals, I will do some user testing and stability. Finally, I will allocate some time to go over the results and make any final changes to the data visualisation app.

**3. Discuss how you will organise you time for the rest of the project. (200 words)**

To organise my time, I used a simple GANTT chart in Excel. This was a simple method to plan and keep track of my workflow while allowing me to quickly get to work. The first two columns show the planed schedule, the next three show the actual progress.

I first considered how much time I spent on the case studies and the extensions from the lectures. Based on how much time these took, I was in a better position to estimate how long it would take to improve and create visuals.

My plan was to allocate one week for each visual I was improving, two for the creation of the bar chart visual, and three for the heat map as this was new territory for me. I perceived the complexity of improvements to be less than that of creating new visuals and therefore allocated more time to creating. As you can see in the chart (See GANTT chart files), I kept one visual improvement for last. This decision was made to prioritize the bigger pieces in case I ran out of time.

Finally, I allocated plenty of time for testing and feedback to have a time cushion in case I fall behind schedule and to get good feedback from users once the template is complete.

**4.**

**List any external sources that you have actively utilised in your project.** This should include:

* any code you have used from external sources directly
* any code that you have taken inspiration from but adapted and refined for the project (such as pseudocode algorithms or code pens)
* any online help forums you have taken code from (i.e. StackOverflow or library documentation)
* any third-party libraries you are using.

You do not need to include everything you have read or that has helped you. Only where you have used or adapted code that appears in your project.

For creating an Algorithm that allows me to return the median of an array I adapted this code.

function findMedian(arr) {  
 arr.sort((a, b) => a - b);  
 const middleIndex = Math.floor(arr.length / 2);  
  
 if (arr.length % 2 === 0) {  
 return (arr[middleIndex - 1] + arr[middleIndex]) / 2;  
 } else {  
 return arr[middleIndex];  
 }  
}

<https://blog.stackademic.com/finding-the-median-of-an-array-in-javascript-82ff31b3f544>

I used W3 schools to learn to use Switch Statements in JavaScript to improve code readability.

<https://www.w3schools.com/js/js_switch.asp>

Documentation I used to get started on my heat map visual using leaflet to embed a map layer:

<https://leafletjs.com/examples/quick-start/>

Documentation and adapted coded used/will be using from the heatmap.js library

<https://www.patrick-wied.at/static/heatmapjs/docs.html>

<https://www.patrick-wied.at/static/heatmapjs/example-heatmap-leaflet.html>

**7. Discuss how your project will be original and unique (100 words).**

My originality involves introducing useful features to enhance the user experience. I am implementing a colour-coded legend for tracking air quality, utilizing constructors and complex arrays. The creation of a heat map involves delving into new libraries. Heat maps excel in visualizing spatial data patterns, making them invaluable for geographical analysis, where trends and variations across regions are crucial. For the Line Chart, I'm innovating by incorporating user-selectable statistics using complex 2D arrays and nested loops to incorporate user-selectable statistics. Enhancing the Scatter Plot involves intricate data structures, providing a value-added visual representation. The improved pie chart applies similar complexity to allow users to better interpret the results.