Q2:   
The first extension with modifications is “Tech Diversity: Race”, where I implemented two enhancements, the first introduces a dynamic animation that changes the proportion of the pie chart to a new value upon selection of another company, while the second introduces a hover-over functionality that allows the selected slice to enlarge and pop-up, enlarging the corresponding legend as well.

The second extension with modifications is “Tech Diversity: Gender”, where I implemented two enhancements, the first introduces a dynamic animation where the stacked bar chart is drawn procedurally from the left of the layout till it fills the width of the layout. The second introduces a hover-over functionality that shows the individual percentage of the gender for each company.

The third extension with modifications is “Pay gap by job: 2017”, where I labelled both axes of the graph, as well as map the ‘temperature’ of the colour to the size of the bubble.

The next extension implemented was the waffle chart, where I made a few enhancements to the Coursera template. A title, labels for each of the waffle as well as a randomising the colours generated were added. I also added the delete function to prevent multiple waffle charts from stacking upon multiple selection of the visualisation as well as creating a script that creates custom data to be used in the chart.

Another extension implemented was the dynamic bubble chart, where I made a few enhancements to the Coursera template. I removed the year selection buttons and replaced it with a slider, as well as adding a title and year count display to show users the year currently displayed. I introduced a text-wrap function such that the texts will not exceed out of the bubbles, a hover over function displaying the mass value has also been added.

These modifications to the original 5 extensions along with the 2 additional extensions provided follow the consistencies and the modularity of the original template’s design, without much deviation. The provided helper functions were used extensively instead of creating new functions.

The last extension was independently implemented without templates, it is the stacked area chart. It displays multiple categories of data, stacking each category’s data on top of the previous, where a colour difference separates each category. I have also implemented an enhancement that allows users to view individual categories data by clicking on the legend.

I used Object Oriented Programming principles to structure the code, with proper encapsulation of each individual extension along with their respective functions, along with proper commenting and documentation throughout the codes. I have also ensured consistent variable naming throughout the codes.

Q3:  
I was able to effectively stick to my schedule, where I was able to implement the enhancements within the time period allocated to each extension based on the previous Gnatt Chart.

Looking back at the Gnatt Chart, I believe that the time itself was relatively well segmented, albeit with a few oversights. One of which was the lack of inclusion of the watching of Coursera videos within the chart itself, there was a lack of time dedicated to it after the midterm submissions. I however managed to incorporate this into my existing schedule, watching the videos on my commute to and from school. Another oversight was in the conducting of User Acceptance Testing (UAT), I did not initially plan for the UAT in the Gnatt chart. As I was on track according to the coding segments of the chart, I had an extra week to spend on designing the UAT and subsequently hitting the streets to gather feedback.

Another unexpected challenge was the want to implement additional enhancements and modifications to the extensions, as well as the removal of certain planned modifications. The Gnatt chart did not cater for much flexibility to this endeavour and had to be changed occasionally to fit the new situation, deviating from the original plan.

Q4:

During the planning for the next project, some time should be segmented without any concrete plans to allow for degree of flexibility. Variables not accounted, such as conducting the UAT and watching of Coursera videos, should be accounted within the project planning process in the future.

I performed both system testing and user testing. For system testing, I managed to uncover an error related to the stacked area chart, where the mousePressed functionality to view each individual category was triggering outside of the legend, I managed to fix the issues before proceeding with user testing.

For the user acceptance testing, I created an excel that included the scenario, steps to be taken and the expected output, I required users to respond the actual output as well as whether the extension passed or failed. The users all responded positively to the application, some of them provided feedback on certain extensions which I subsequently compiled into a single sheet.

By analysing the qualitative data provided by the users, I uncovered a few errors within the “Climate Change” and dynamic bubble chart. For “Climate Change”, the left slider can’t "push" the right slider to the left while the right slider can “push” the left slider to the right. For the dynamic bubble chart, upon scrolling, the bubbles stay in their spread-out position instead of joining back together.

I will rectify these errors by first identifying which part of the codes are causing these issues, before subsequently using debugging tools such as “console.log” to modify the codes and rectify the errors.

Q5:

* P5.JS

p5.js (no date) home | p5.js. Available at: https://p5js.org/ (Accessed: 17 July 2023).

* W3Schools

Javascript string indexof() (no da te) JavaScript String indexOf() Method. Available at: https://www.w3schools.com/jsref/jsref\_indexof.asp (Accessed: 17 July 2023).

JavaScript Callbacks (no date) JavaScript callbacks. Available at: https://www.w3schools.com/js/js\_callback.asp (Accessed: 18 September 2023).

* Mozilla Developer Network

MozDevNet (no date) Datatransfer: Setdata() method - web apis: MDN, Web APIs | MDN. Available at: https://developer.mozilla.org/en-US/docs/Web/API/DataTransfer/setData (Accessed: 17 July 2023).

* Coursera

Coursera (no date) Coursera. Available at:https://www.coursera.org/degrees/bachelor-of-science-computer-sciencelondon/home (Accessed: 17 July 2023).

* Geeks for Geeks

P5.js Lerp() function (2023) GeeksforGeeks. Available at: https://www.geeksforgeeks.org/p5-js-lerp-function/ (Accessed: 18 September 2023).

* Singstat

Singapore External Debt Statistics (no date) Tablebuilder.singstat.gov.sg. Available at: https://tablebuilder.singstat.gov.sg/table/TS/M060221 (Accessed: 18 September 2023).