Project Report

Group B Team 9

April 10, 2024

1 Overall Introduction

This Processing program is designed to visualize and interact with a dataset of flight information. It effectively combines graphical user interface (GUI) components, data visualization techniques, and object-oriented programming to offer users insights into flight data through various interactive elements and visualizations. The program initiates with setting up the environment, including the window size and initial configurations for text and rectangles. It uses buffered reader to load flight data from a CSV file, interpreting each line as a `Datapoint` object representing individual flights.

Key features of the program include displaying flights on a map, visualizing flight data through pie charts and bar charts, and enabling users to filter and search for specific flights based on various criteria like origin, destination, carrier, and status (e.g., diverted or cancelled). These functionalities are implemented through classes like `Query`, `Map`, `PieChart`, and `TheBarChart`, each responsible for handling different aspects of the data processing and visualization.

The program's GUI is enriched with widgets and interactive elements such as buttons, checkboxes, and sliders, facilitating user interaction with the data. Users can navigate through different screens displaying the map, pie chart, or bar chart visualizations by clicking sidebar buttons. The `Screen` class manages these screens, updating the display based on user input.

A `Query` class which plays a central role in filtering the dataset according to user-specified criteria, enabling dynamic updates to the visualizations. It makes use of Map, Collections, plus Java8's stream API to ensure the codes runs efficiently and are easy to maintain. This allows for real-time interaction and exploration of the flight data, making the application both informative and engaging.

2 Individual Contribution

2.1 Aryan

At the project's onset, I played a crucial role in developing essential components, notably integrating USA time zones for origin and destination flights. This feature forms the backbone of all time-related queries within the program, facilitating accurate data analysis and visualization. Additionally, I implemented a slider bar to filter flights based on departure time, enhancing user interaction and data exploration capabilities. As part of the initial design, I created three clickable buttons linked to vital functions in the bar chart, providing an intuitive interface for users to access key features efficiently. These contributions were instrumental in enhancing the program's functionality and usability, laying a solid foundation for further development and refinement.

2.2 Daniel

I started contributing to the team project by creating a bar chart class that would directly display data of our choosing from a query, a library was used for this (gicentreUtils). I then worked on initializing checkboxes that was used for user interaction, the user can pick what he would like to see on screen by ticking the different boxes, a library was also used to for this (G4P). I implemented buttons for the bar chart that would allow the user to change the data presented, and finally I fixed smaller issues regarding the front end of the project. Overall happy to have worked on a programming project with a team.

2.3 Muireann

I was designated the pi chart as my main task, and in its basic form completed it.The pi chart part of the program features, including legends - which Mark out what the data means as well as the corresponding amounts, the legends will change depending on the displayed data; widgets - which work as buttons to change the data displayed;the main display - the pie chart which displays the data, the colour of which can be changed to suit the data;finally a unit converter - converting data into radiant form as well as percentages(percentage converter is functional however not connected to a widget)

Outside of the pi chart I worked on the overall appearance of the project involving colour scheme and the button appearance. As well as the initial code for the widgets which was improved upon and completed by Oliver.

I worked and finished on a Text box for the project which would function as a search bar for users, however it might not be implemented due to bugs that interfered with the main program.

2.4 Neil

In our Group 9 programming project, I took on a role in the Data Organization and Display component. My main task involved the handling of flight data, ensuring that it was organized into an easily navigable and user-friendly table format. Given the massive volume of data we were dealing with, the challenge was not about presenting numbers and information but making them accessible and meaningful for a wide range of users.

A key aspect of my work was developing an interactive interface to enhance user experience significantly. Aware of the potential difficulties users might face when sifting through a large dataset, I crafted a set of intuitive controls positioned at the top right corner of the table. These controls were carefully designed to facilitate smooth navigation across the dataset, allowing users to effortlessly move the table in all directions. Moreover, recognizing the diverse needs of our audience, I added features to zoom in and out of the text, making it easier for users to read the data according to their preference.

2.5 Oliver

At the start of the project, my main focus was on the switching between displays. To do this I made a Screen class that would have an integer value to decide what would be displayed. This integer value would then be put into a switch statement. All anyone had to do was put whatever draw function into one of the cases. The integer value could be changed by a widget class that I made. These widgets at first were just placeholders until the others finished their classes. This creation of the widgets and a display led to the need of a basic layout for our screen, which was also done promptly.

After that, my focus was entirely on creating a heat map. Thanks to the help of the others, I was able to create it. However, when I tried to put the airports on it, I hit a roadblock and couldn't finish it in time. Thus it was scrapped for just the heat map.

2.6 Zicheng

In our backend development, I was tasked with key functionalities: developing the `Query` class, refactoring code for efficiency, managing our GitHub repository for streamlined collaboration, and enhancing data loading mechanisms. Additionally, I designed the `Datapoint` class, crucial for structuring the flight data effectively. The `Query` class, a central piece of our application, facilitates dynamic filtering, thereby significantly improving user interaction by allowing customized queries. Through careful refactoring, I ensured our code was not only more readable but also performed optimally. My contributions aimed at bolstering the program's core functionality and facilitating a smooth development process within our team.