

# **Programming Project Report: Team**

## **18**

### **Introduction**

This report presents a comprehensive overview of our group project, in which we were asked to construct an application to explore data relating to commercial flight from the US Bureau of Transportation Statistics. This report discusses the application's functionality, design decisions, implementation details, and personal contributions of each team member.

### **Project Overview**

As you will see in our video, our application interface comprises four main categories: flight information, data per airline, flights of the day, and airline reliability. These categories are displayed in the layout of signposts on the main page. Each category, when clicked, offers various panels that allows the user to see all aspects of the given data represented in multiple ways and allows the user to interact with the displayed data.

The "Airline Reliability" branch features data presented using three types of graphs - a bubble chart, a pie chart, and a line graph, showing how reliable each carrier is. The "Data Per Airlines" branch presents two separate bar charts showcasing the total number of flights and total distance travelled by each of the ten airlines. Our third branch, "Flights of the Day", allows the user to input an origin airport and a date and it then displays the relevant information for all flights that operate from that airport on that particular date.

The fourth branch, "Flight Information", comprises four screens: "Flight Path Map", "Flight Heat Map", "New Flight", and "Your Flight". In the "Your Flight" screen, the user will be prompted to provide the flight details and if the flight hasn't been cancelled, the details of the flight will be printed in a boarding pass format. If it has been cancelled, the user will be notified and they will be able to search for an alternative flight using the "New Flight" option on the second screen. The flight path map utilises an animation of a plane that flies over the two states and shows the distance between them while the heat map displays the inbound and outbound flights from each state using colour gradients, enabling the user to discern patterns in air traffic movement.

### **Individual Contribution of Team Members**

Each team member made significant individual contributions to our project, showing their dedication to teamwork.

Manon took charge of designing and implementing various interactive elements in our application. She was responsible for creating elements such as the bubble chart, the flight path map, the flight information page, the new flight screen, chyron, slider and the coding of the actions of the interactive widgets. Additionally, Manon undertook the crucial task designing the main screen layout, ensuring an organised and coherent yet visually appealing interface for users to navigate.

Theresa's contribution to this project primarily focused on data visualisation and functionality. She developed the pie chart class, enabling clear representation of vital information within our application. Furthermore, Theresa coded a function to retrieve data for specific airlines, enhancing the application's ability to provide targeted insights and analysis.

Maria Ceanuri's contribution to the project enhanced the application's analytical capabilities. By creating a line graph and coding numerous functions to obtain data for the line graph, she enabled a different way of representing trends in the data. And through her radio box class, she added to the user interaction feature in our application, enhancing the overall user experience by giving the user more choice on what data to be displayed

Maria Faro developed an inputBox class facilitating user input within the application. This was essential for many parts of our code, making sure that the users could easily interact with the application for information they want to see.

Nandana took charge of creating the bar chart class, which included the creation of two bar charts. This facilitated the clear and concise display of data in a graphical format, ensuring that users could easily interpret and analyse information.

Joel contributed to the project by creating a flight class for data point storage, checkbox class, and a heatmap widget page, which adds a visually engaging dimension to the application. Additionally, he integrated music and sound features, enriching the user experience and implemented threads to display the loading screen while loading the data more efficiently. The Flight class is designed for storing data from the CSV. It operates by taking in each row and creating a flight object. This flight object is then stored in an ArrayList. This makes it easier to access the data concerning the flights simply by calling the attribute. The limitation would be that it is quite CPU intensive and takes a little while to start.

## **Additional Features Beyond the Project Brief**

Our program goes beyond the original project brief in several ways:

- Implementation of advanced data visualisation techniques such as interactive graphs, flight path maps with animations and heat maps
- Addition of music and sound features to enrich the user interface and provide a more immersive experience
- Incorporation of a Threads feature to display an animation while the program is starting up, improving visual feedback during startup process, ensuring users are aware that the program is actively loading

In addition to our code, we have provided in our repository, documentation on each class in our program as well as sketches for each of the main components of our application. Our documentation provides useful information on the customizable features of all our classes as well as a short description.

## Documentation : Charts and Maps

Authors :

- Manon Galian

Editors :

- Joel Jojan
- Theresa James
- Maria Ceanuri
- Nandana Arun

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## Documentation: Screen, Gradient and FlightClass

Authors :

- Manon Galian
- Joel Jojan

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## Documentation: Charts and Maps

Authors :

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## Conclusion and Overall Assessment

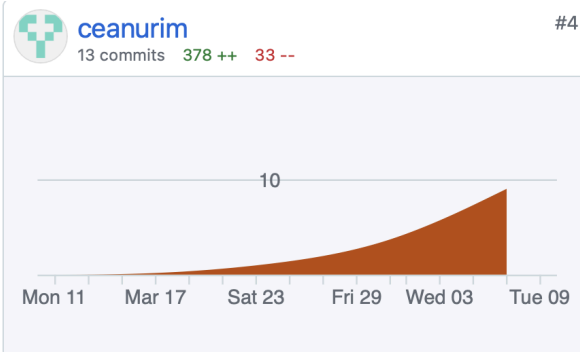
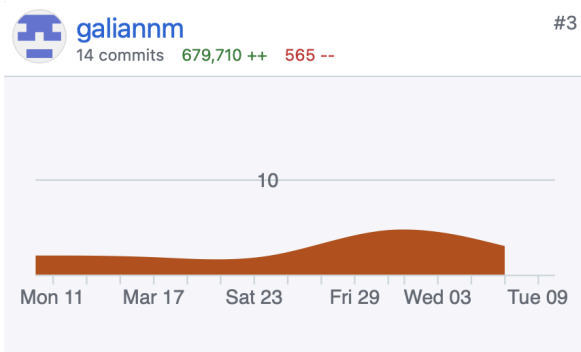
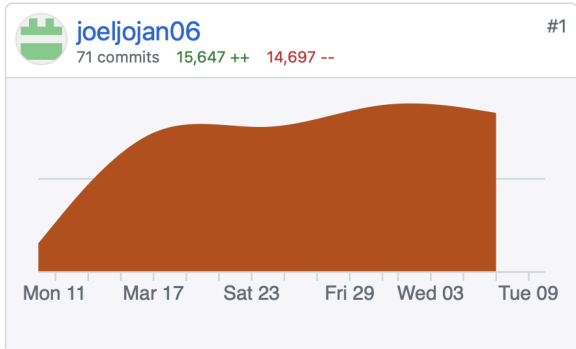
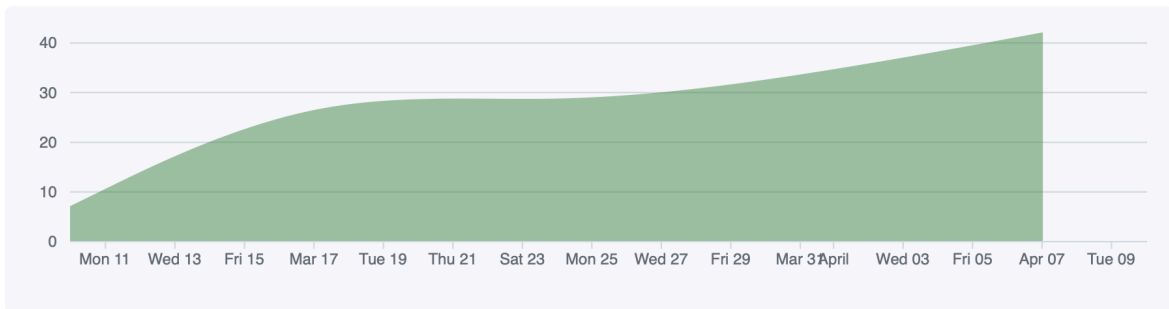
In conclusion, each team member's unique expertise and dedication were crucial in the successful development of our application. From designing interactive elements to implementing advanced data visualisation techniques, every contribution played a significant role in enhancing the functionality of the application. Through collaboration and a shared commitment to excellence, we were able to create a very useful tool which we believe turned out to be a success.

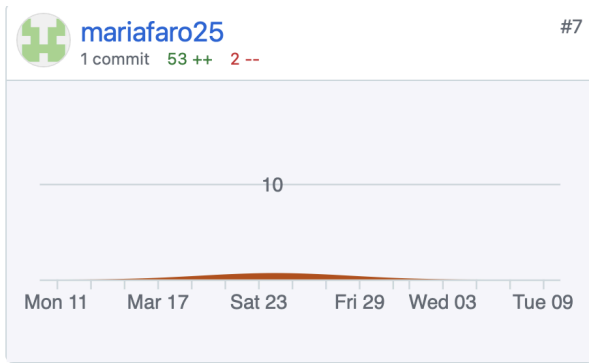
## Git History

Mar 10, 2024 – Apr 10, 2024

Contributions: Commits ▾

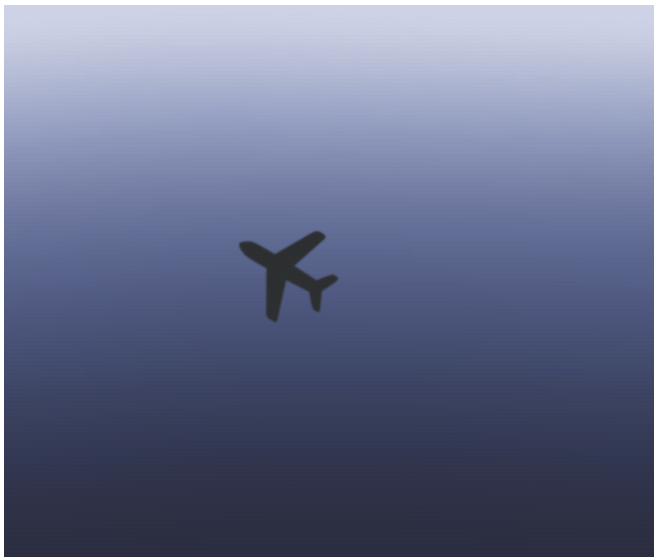
Contributions to main, excluding merge commits



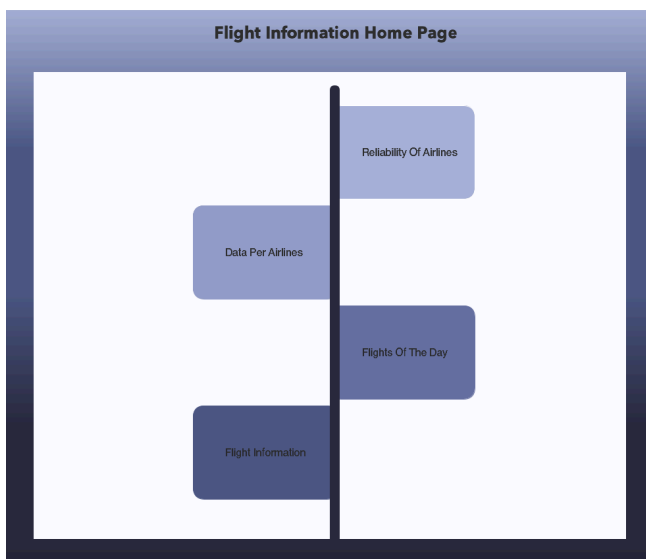


## Screenshots Of Individual Screens

Loading Page

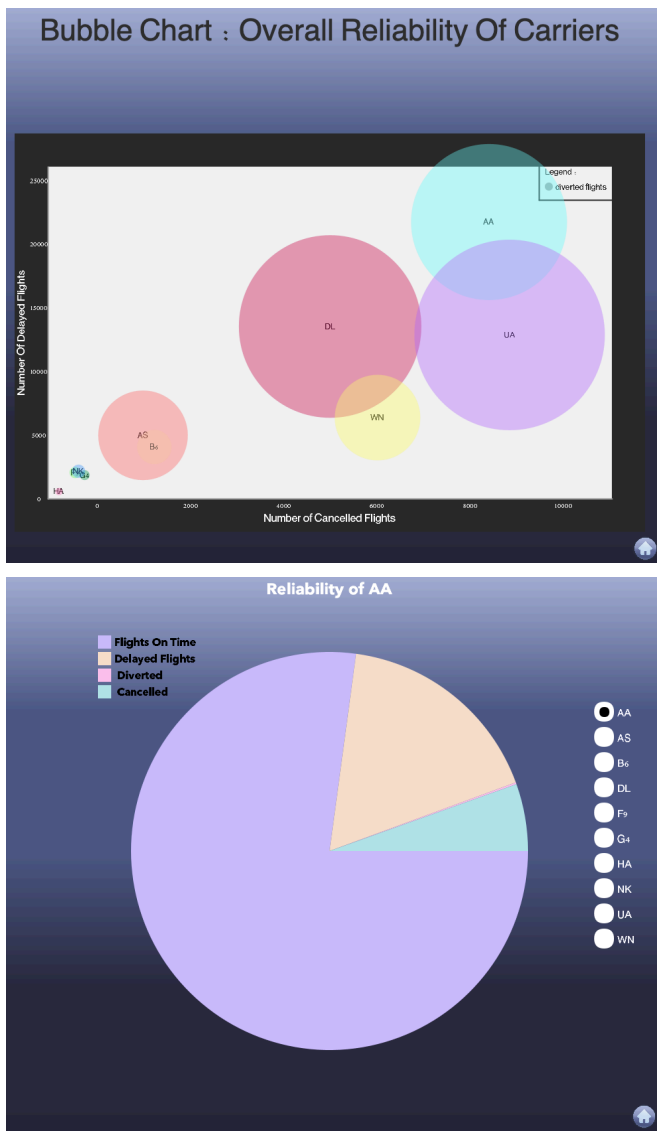


Main Screen



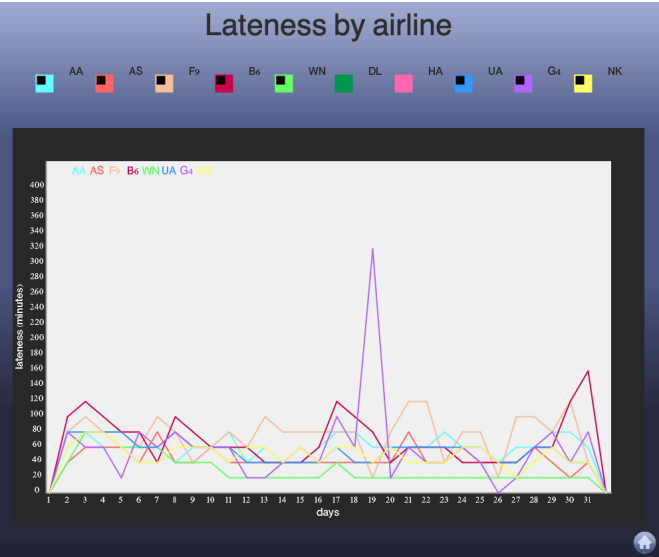
Bubble Chart : Reliability of airlines

Pie Chart : Reliability of airlines



Line Graph : Reliability of airlines

Chyron : Flights of the Day



### Flights Of The Day

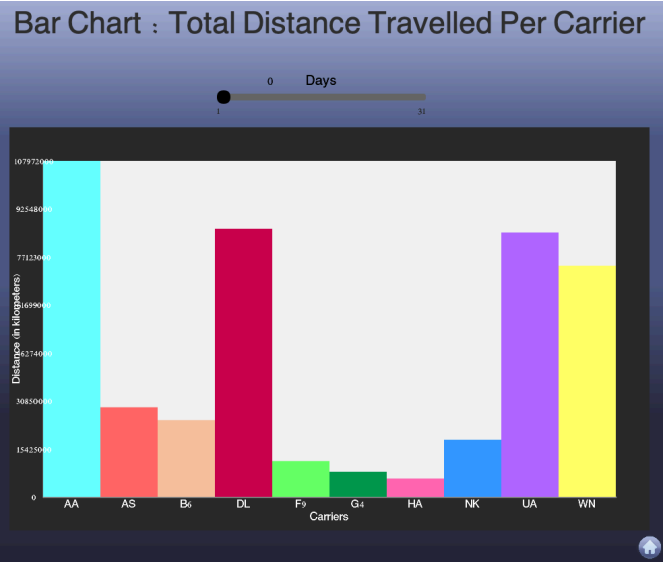
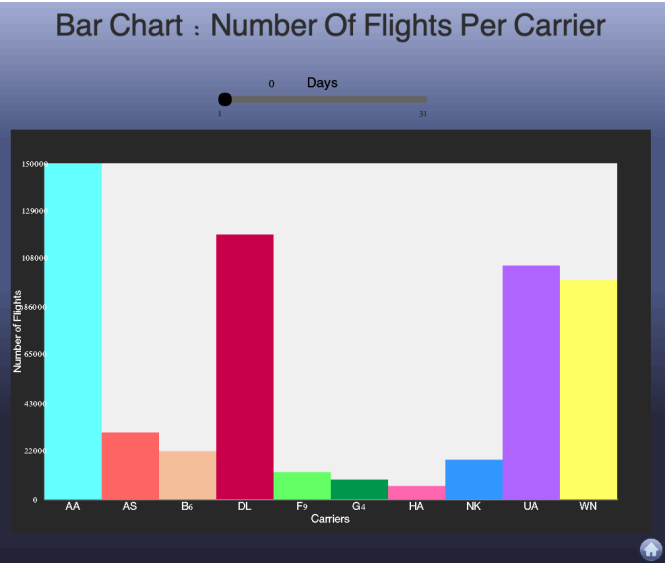
Enter: Date, Airport CLEAR

Carrier	Flight No.	Origin	Destination	Departure / Arrival Time
AA	342	LGA, New York NY	ORD, Chicago IL	14:30 / 16:19
AA	358	LGA, New York NY	ORD, Chicago IL	16:30 / 18:18
AA	367	LGA, New York NY	ORD, Chicago IL	12:29 / 14:18
AA	370	LGA, New York NY	ORD, Chicago IL	7:30 / 9:25
AA	3960	ROC, Rochester NY	MIA, Miami FL	6:12 / 9:49
AA	4084	SYR, Syracuse NY	ORD, Chicago IL	7:34 / 9:35
AA	4121	BUF, Buffalo NY	ORD, Chicago IL	11:11 / 14:20
AA	426	LGA, New York NY	ORD, Chicago IL	9:30 / 11:21
AA	428	LGA, New York NY	DFW, Dallas Fort Worth TX	6:30 / 9:43
AA	429	JFK, New York NY	SNA, Santa Ana CA	16:00 / 19:23
AA	440	ALB, Albany NY	CLT, Charlotte NC	5:15 / 7:45
AA	4500	ALB, Albany NY	MIA, Miami FL	7:34 / 11:00
AA	4510	SYR, Syracuse NY	MIA, Miami FL	7:00 / 10:48
AA	4512	LGA, New York NY	OMA, Omaha NE	17:59 / 20:32
AA	4513	LGA, New York NY	MSP, Minneapolis MN	8:35 / 10:54
AA	4520	JFK, New York NY	BNA, Nashville TN	18:15 / 20:00
AA	4531	JFK, New York NY	RDU, Raleigh/Durham NC	17:10 / 19:02
AA	455	LGA, New York NY	DCA, Washington VA	10:30 / 11:52
AA	4555	LGA, New York NY	ORF, Norfolk VA	9:57 / 11:22
AA	4557	LGA, New York NY	CMH, Columbus OH	12:00 / 14:01
AA	4559	LGA, New York NY	CMH, Columbus OH	13:58 / 16:02
AA	4562	LGA, New York NY	CMH, Columbus OH	17:15 / 19:16
AA	4565	LGA, New York NY	ATL, Atlanta GA	10:30 / 13:17
AA	4568	LGA, New York NY	CVG, Cincinnati KY	9:45 / 12:03
AA	4570	LGA, New York NY	CVG, Cincinnati KY	19:15 / 21:32
AA	4574	LGA, New York NY	GSO, Greensboro/High Point NC	15:45 / 17:35
AA	4575	LGA, New York NY	CLE, Cleveland OH	16:45 / 18:32
AA	4577	LGA, New York NY	GSO, Greensboro/High Point NC	16:30 / 19:10

Bar Chart : (Number of flights per airline)

Bar Chart (Total distance per airline)






Your Flight : Flight Information

New Flight : Flight Information

### Your Flight Information

Enter: FlightNo, Date, Airport, Carrier, DepDate, ArrDate



**FROM: JFK New York** **DATE: 1/1/2022**  
**TO: LAX Los Angeles** **DISTANCE: 2475**  
**FLIGHT No: 1** **DEPARTURE TIME: 7:00** **ARRIVAL TIME: 10:29**

**Would like the information for another flight ?**

☒ Yes 
 ☐ No (back to home screen)

### Search For Flights

Enter: D:arrDate, E:depDate, DepDate, ArrDate

Sort by : Date Carrier Dep Airport Arr Airport CLEAR

Date	Carrier	Origin	Destination	Departure / Arrival Time
1/7/2022	AA	JFK, New York NY	DFW, Dallas /Fort Worth TX	8:00 / 11:28
1/7/2022	AA	JFK, New York NY	AUS, Austin TX	17:29 / 20:53
1/7/2022	AA	JFK, New York NY	AUS, Austin TX	8:00 / 11:33
1/7/2022	B6	JFK, New York NY	AUS, Austin TX	20:40 / 0:09
1/7/2022	B6	JFK, New York NY	IAH, Houston TX	11:59 / 15:36
1/7/2022	B6	JFK, New York NY	AUS, Austin TX	13:44 / 17:13
1/7/2022	B6	JFK, New York NY	DFW, Dallas /Fort Worth TX	12:29 / 15:43
1/7/2022	B6	JFK, New York NY	SAT, San Antonio TX	9:45 / 13:24
1/7/2022	B6	JFK, New York NY	DFW, Dallas /Fort Worth TX	20:00 / 23:23
1/7/2022	DL	JFK, New York NY	DFW, Dallas /Fort Worth TX	8:15 / 11:35
1/7/2022	DL	JFK, New York NY	DFW, Dallas /Fort Worth TX	18:29 / 21:43
1/7/2022	DL	JFK, New York NY	AUS, Austin TX	13:03 / 16:24
1/7/2022	DL	JFK, New York NY	AUS, Austin TX	18:39 / 22:07
1/7/2022	DL	JFK, New York NY	AUS, Austin TX	8:30 / 12:06
1/7/2022	AA	LGA, New York NY	IAH, Houston TX	19:15 / 22:37
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	14:59 / 18:18
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	10:45 / 14:02
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	13:59 / 17:17
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	13:29 / 15:44
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	17:00 / 20:15
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	7:29 / 10:53
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	5:50 / 9:04
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	16:00 / 19:17
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	17:45 / 21:01
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	6:30 / 9:49
1/7/2022	AA	LGA, New York NY	IAH, Houston TX	7:00 / 10:24
1/7/2022	AA	LGA, New York NY	IAH, Houston TX	13:59 / 17:33
1/7/2022	AA	LGA, New York NY	DFW, Dallas /Fort Worth TX	18:30 / 21:44

Flight Path Map : Flight Information

Flights Heat Map : Flight Information

