Project 3a: Proposal

Team Name: Flight Attendants
Team Members: Grecia Tragodara, Hunter Becker, Jeremy Sanchez
Project Title: DelayCalc

Problem:

Statistics show that the annual cost of airplane delays was approximately 28 billion dollars in 2018 [1]. Direct correlations of this cost would be the loss of fuel, crew salaries, and miscellaneous. Indirectly, delays have been shown to negatively impact the economy [2]. These delays are not only expensive to airlines, but are also costly for its passengers. Besides burning daylight, companies and employers lose morale and patience when expecting to be on time for business related meetings. All of the reasons above justify optimizing the decision making in finding the most reliable flights.

Motivation:

There are many people across the United States who are traveling by plane many times per week for business reasons. The companies which employ them have an interest in knowing which airports and air carriers are least likely to experience delays, so that travel can be as safe and efficient as possible. Airplane delays and overtime can be costly to companies who need their employees to fly often. The goal of this program is to minimize costs related to airplane delays.

Features:

- Input company name: determines the average delay time, most common delay issue, percentage of flights that are delayed, average travel time, and number of planes delayed out of launched planes.
- Input location: determines the average delay time at this location, most common delay issue, percentage of flights that are delayed, average taxi-out time, and most common arrival locations.
- Input two locations, departure and arrival: chance of it being delayed, average time delayed by location, and number of flights delayed by location out of the number launched.
- Input an airport: determines the average delay time, commonly flown plane companies, average delay type, chance of plane being delayed, number of trips to this airport, and number of delayed flights to/from airport.
- Input type of delay: determines the highest percentage of airports or companies affected by these delays, and what airport is best to go to for avoiding such a delay.
- Input departure time: best airport to use if you want to leave at the given time, and worst airport with delays for leaving at a certain time.

Data: Below is the link to the public data set we will be using:
https://www.kaggle.com/kerneler/starter-airline-delay-analysis-f068d017-d/notebook#Conclusion
Airline Delay Analysis f068d017-d, which consists of a list of flights with departure and arrival locations, information about their delays, and the type of delay issues each flight was having.

Tools: C++, GitHub, and various IDE's including Visual Studio and CLion, RStudio for data manipulation.

Visuals:

Strategy:

We will solve this problem using two different approaches.

- *Heaps:* We will have a min-heap, arranged by flight ID, of Plane objects.
- *Maps:* We will have a map with a key equal to flight ID, and the value being a Plane object.

Distribution of Responsibility and Roles:

- **We will all be collaborating on the implementation of the heap and map data structures.**
- Grecia Tragodara: Data Structure coordinator, code organizer, backend developer
- Jeremy Sanchez: Data manipulation and preparation, backend developer
- Hunter Becker: Team leader/project coordinator, menu developer, frontend developer

References:

[1] https://www.airlines.org/dataset/per-minute-cost-of-delays-to-u-s-airlines/#

[2] https://news.berkeley.edu/2010/10/18/flight_delays/#:~:text=Nearly%20half%20this%20cost%20is,because%20the%20airlines%20anticipated%20them.&text=The%20authors%20noted%20that%20inefficiency,the%20associated%20businesses%20less%20productive.

[3] https://airlinecodes.info/search

[4] https://www.kaggle.com/kerneler/starter-airline-delay-analysis-f068d017-d/notebook#Conclusion

[5] https://www.geeksforgeeks.org/implement-min-heap-using-stl/

[6] https://www.geeksforgeeks.org/binary-heap/