Cloud Nine Requirements

Team Name: Cloud Nine
Team Members: Jeremy Maas, Matt Burton, McHale Trotter, Kevin Sampson, Justin Chen, Ryan Hirscher

Deliverables

Cloud Nine will provide Comfort Airlines with software to view a timetable, simulate said timetable, and modify airport and aircraft data to allow for future expansion.

Expectations

Cloud Nine recognizes the ambitious scope of this feature list and as such have decided to focus on our fundamental deliverables first. We plan to provide a simple timetable, a simple simulation, and a user interface to operate these two features. Additional functionality and accuracy will be implemented once the core functionality has been developed and tested.

How to Access Features

NOTE: Features not implemented will be denoted with *NYI* and will be available to view under the **Non-Implemented Features Descriptions and Implementation Criteria** section along with an explanation as to why they were not implemented.

Run the **comfort_airlines.py** file. You then should be provided with a user menu displaying different options. All options are prompted in the terminal, to access a specific menu option, type and enter the corresponding number(or prompted value) in the terminal.

Example below:

```
Enter the number of your choice:

Enter the three letter abbreviation or "q" to quit:
```

These options include:

1. Timetable
    1. View
    2. Search routes (**NYI**)
        1. Sort by cost (**NYI**)
        2. Sort by number of stops (**NYI**)
        3. Sort by departure time (**NYI**)
        4. Back
    3. Edit (**NYI**)
        1. Add (**NYI**)

2. Remove (**NYI**)

        3. Upload (**NYI**)

        4. Back

    4. Download (**NYI**)

    5. Back

2. Simulation

    1. Run

    2. Configure

        1. Start date

        2. Duration

        3. Report frequency

        4. Costs

            1. Fuel

            2. Takeoff

            3. Landing

            4. Leasing

            5. Back

        5. Back

    3. Analyze (**NYI**)

        1. Follow aircraft (**NYI**)

        2. Download report(s) (**NYI**)

        3. Back

    4. Back

3. Airports

    1. View

    2. Edit

        1. Add

        2. Remove

        3. Back

    3. Back

4. Aircraft

    1. View

    2. Edit

        1. Add

        2. Remove

        3. Back

    3. Back

5. Exit

Detailed descriptions of each feature along with how to leverage them are present in the descriptions below.

Any item named "Back" just takes you to the previous page.

"Exit" quits the program.

Implemented Features Descriptions

Timetable

- **View**

  Allows user to viewing the timetable lists every flight and route available to potential flyers by selecting this option's corresponding number. This list will detail which aircraft are scheduled to fly between which airports and at what times.

Simulation

- **Run**

  Allows user to simulate the flights on the timetable by selecting this option's corresponding number. Reports will be generated to estimate the profitability of your business model and customer satisfaction.

- **Configure**

  This provides options for simulation configuration. The user would be able to select criteria such as start date, duration, report frequency, and cost adjustment.

  - **Set start date**: Set the start date of the simulation. By default the simulation would start on day one.

  - **Duration**: Define the duration of the simulation in days.

  - **Report frequency**: Specify how often the simulation generates reports. Options include daily, weekly, monthly, yearly, and final. By default the report frequency is set to final.

  - **Costs**: Adjust the cost of fuel, takeoffs, landing, and gate fees.

Airports

- **View**

  Allows user to list every airport in the simulation and all of their details. Details include: name, abbreviation, lattitude, longitude, time zone offset from UTC, metro population, number of available gates, and whether its a hub or not.

- **Edit**

The user can add or remove airports to our database, via prompting of an airport abbreviation.

- **Add**: Add an airport to the database. Includes input validation.

- **Remove**: Remove an airport from the database. An airport cannot be removed if timetable uses that airport.

Aircrafts

- **View**

Lists every aircraft in the simulation all of their details. Details include: tail number, name, model, maximum speed, maximum capacity, maximum fuel, cargo volume, and leasing cost.

- **Edit**

The user can add or remove aircrafts to our database.

- **Add**: Add an aircraft to the simulation.

- **Remove**: Remove an aircraft from the simulation. An aircraft cannot be removed from the simulation if the timetable uses that aircraft.

Non-Implemented Features Descriptions and Implementation Criteria

Timetable

- **Search routes**

This option would have the capability to search between routes. Due to time constraints, we were unable to implement this functionality by the deadline, although it's implementation is in future plans. The search criteria not implemented for the above reason are below:

- **Sort by cost**: Sorts routes from least expensive to most expensive.

- **Sort by number of stops**: Sorts routes from direct flights to most stops.

- **Sort by departure time**: Sorts routes from earliest departure time to latest.

- **Edit**

This option would allow you to add or remove routes and to upload your own timetable, overriding the current one. This would give flexibility to choose any routes you specifically desire if our algorithm did not generate them. Time restriction was our main obstacle here, as we prioritized proof-of-concept timetable generation. This would be relatively easy to implement, and do not expect it to take long.

- **Add**: Adds a new flight to the timetable with user defined details. This process will fail if the aircraft in unavailable or the flight is invalid.

- **Remove**: Removes a flight from the time table.

- **Upload**: Upload a .csv file to override the existing timetable.

- **Download**

  This would download a .csv file listing all flights and routes. Time restrictions came into effect here, but would be extremely easy to implement, requiring only a few lines of code.

- **French Timetable Translation**

  While not a present option in the menu, this would have been accesibile from the user menu. Due to time restrictions, we were focusing more on the functionality and accuracy of our timetable generation. A simple translation to French would be a rather easy task.

Simulation

- **Analyze**

  This option would allow the user to view an aicraft's flight path during a simulation as well as downloading the reports based on report frequency. Time restrictions prevented us from accomplishing this, however would be an easy future implementation.

  - **Follow aircraft**: Select an aircraft to view its travel history.

  - **Download report(s)**: Download a copy of every report from the previous simulation.