CS166 Final Project Phase 3

Languages / Frameworks used:

- PostgreSQL
- Java
- Bash

Assumptions

- Plane make and model do not necessarily have to be strictly alphabetical
- Plane age cannot be zero or greater than 30, or else the plane will be retired
- Number of seats on the plane cannot be zero, negative, or greater than 853 (highest capacity for commercial aircraft right now)
- Pilot fullname does not necessarily have to be strictly alphabetical
- Pilot nationality does not necessarily have to be strictly alphabetical
- Technician fullname does not necessarily have to be strictly alphabetical
- Airport code should be 5 long.
- Departure date should be come before arrival date.
- Library java.time.LocalDate, java.lang.Object, java.time.format.DateTimeFormatter added to manipulate date type data.
- Reservation status should be capital letter. E.g. C, W, R. Not c, w, r.
- For BookFlight, you can edit status if flight number and customer ID are matched.
- If flight number and customer ID are not matched, you are making a new reservation with new reservation number and customer status.
- For ListNumberOfAvailableSeats, date is not considered as variable. It will list only with flight number and (Plane seat - number of sold seats).
-

Installation

- Mac OS X
- Ubuntu
- Windows
- PostgreSQL
- Text editor (VS Code, emacs, etc.)

Getting started

- Navigate to the postgresql folder in your terminal
- Run the “startPostgreSQL.sh” script using the command “source ./startPostgreSQL.sh”
- Run the “createPostgreDB.sh” script using the command “source ./createPostgreSQL.sh”
- Navigate to the “java” folder
- Run the “compile.sh” script using the command “./compile.sh”
- Run the “run.sh” script using the command “./run.sh $USER_DB $PGPORT $USER”
- Input menu number and check the result
- Input 10 to exit

Complete Functionalities / Work Division

- **[Adrian] Add plane:** Ask the user for details of a plane and add it to the DB
- **[Adrian] Add pilot:** Ask the user for details of a pilot and add it to the DB
- **[Minwhan] Add Flight:** Ask the user for details of a flight and add it to the DB
- **[Adrian] Add Technician:** Ask user for details of a technician and add it to the DB
- **[Adrian] Book flight:** Given a customer and flight that he/she wants to book, determine the status of the reservation (Waitlisted/Confirmed/Reserved) and add the reservation to the database with appropriate status.
- **[Minwhan] List number of available seats for a given flight:** Given a flight number and a departure date, find the number of available seats in the flight.
- **[Minwhan] List total number of repairs per plane in descending order:** Return the list of planes in decreasing order of number of repairs that have been made on the planes.
- **[Adrian] List total number of repairs per year in ascending order:** Return the years with the number of repairs made in those years in ascending order of number of repairs per year
- **[Adrian] Find total number of passengers with a given status:** For a given flight and passenger status, return the number of passengers with the given status.
- **[Adrian, Minwhan] Documentation of the project**
- **[Minwhan] Physical DB Design (DB performance tuning indexes)**

Team

- Adrian Tran
- Minwhan Oh

DB Performance

- Each attribute is indexed using B+ tree.
- Performance is measured with “\timing” using DB sql.
- Each measured indexed performance is recorded in DBproject.java, and also not indexed performance is recorded to compare both different design.
- Each recorded time is averaged with 10 times execution.

Implementation

1. **Add Plane**

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 1
Please input Plane ID: 3994
Please input Plane Model: F-22
Please input Plane Make: Lockheed
Please input Plane Age: 2
Please input Number of Seats on the Plane: 2
```

2. Add Pilot

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 2
Please input Pilot ID Number: 437
Please input Pilot fullname: Lincoln
Please input Pilot Nationality: NorthKorea
MAIN MENU
```

3. Add Flight

i)Flight number duplicated

```
Please make your choice: 3
Please input Flight number: 288
Please input the cost: 200
Please input the seats sold: 33
Please input number of stops: 2
Please input actual departure date: 2019-06-14 06:42
Please input actual arrival date: 2019-06-15 12:22
Please input arrival_airport code: LAX01
Please input departure airport code: ICN00
Query failed: ERROR: duplicate key value violates unique constraint "flight_pkey
"
  Detail: Key (fnum)=(288) already exists.
MAIN MENU
```

ii)Flight number is not duplicated (Flight number > 1999)

```
Please make your choice: 3
Please input Flight number: 2000
Please input the cost: 200
Please input the seats sold: 33
Please input number of stops: 2
Please input actual departure date: 2019-06-14 06:42
Please input actual arrival date: 2019-06-15 12:22
Please input arrival_airport code: LAX01
Please input departure airport code: ICN00
```

4. Add Technician

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 4
Please input Technician ID Number: 250
Please input Technician fullname: Lincoln Oh
```

5. Book Flight

i)flight number and customer id matched

```
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 5
Please input Customer ID: 94
Please input Flight Number: 769
status
W
We found your reservation! Would you like to update it? (y/n)
y
Please input new Reservation Status: C
```

ii)flight number and customer id NOT matched

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 5
Please input Customer ID: 22
Please input Flight Number: 40
Your reservation is not in our database. Would you like to book one? (y/n):
y
Please input Reservation Number: 10000
Please input Reservation Status(W/R/C): W
```

iii)flight number, customer id not matched, but don't want to make a new reservation.

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 5
Please input Customer ID: 33
Please input Flight Number: 033
Your reservation is not in our database. Would you like to book one? (y/n):
n
MAIN MENU
```

iv)same, but new reservation number already exists

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 5
Please input Customer ID: 94
Please input Flight Number: 229
Your reservation is not in our database. Would you like to book one? (y/n):
y
Please input Reservation Number: 288
Please input Reservation Status(W/R/C): W
MAIN MENU
```

Add customer to that flight number.

6. List number of available seats for a given flight

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 6
fnum    ?column?
1798    165
1489    201
1269    143
652     201
273     150
1560    183
51      170
951     164
```

7. List total number of repairs per plane in descending order

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 7
id      count
56      17
63      16
50      16
32      14
46      13
8       13
65      13
35      12
24      12
```

8. List total number of repairs per year in ascending order

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 8
Year    count
2016    128
2014    131
2013    132
2015    159
```

9. Find total number of passengers with a given status

```
MAIN MENU
---------
1. Add Plane
2. Add Pilot
3. Add Flight
4. Add Technician
5. Book Flight
6. List number of available seats for a given flight.
7. List total number of repairs per plane in descending order
8. List total number of repairs per year in ascending order
9. Find total number of passengers with a given status
10. < EXIT
Please make your choice: 9
Please input Passenger Status (W, C, R):
C
Please input flight number:
0
count
3
```