PIA Seat Reservation System

Project 1

Deadline: Tuesday, 8^{th} May 2018, **11:59 PM**

Instructions

Note: This is an individual project. You MUST use Object Oriented Programming techniques. Read the following description VERY CAREFULLY.

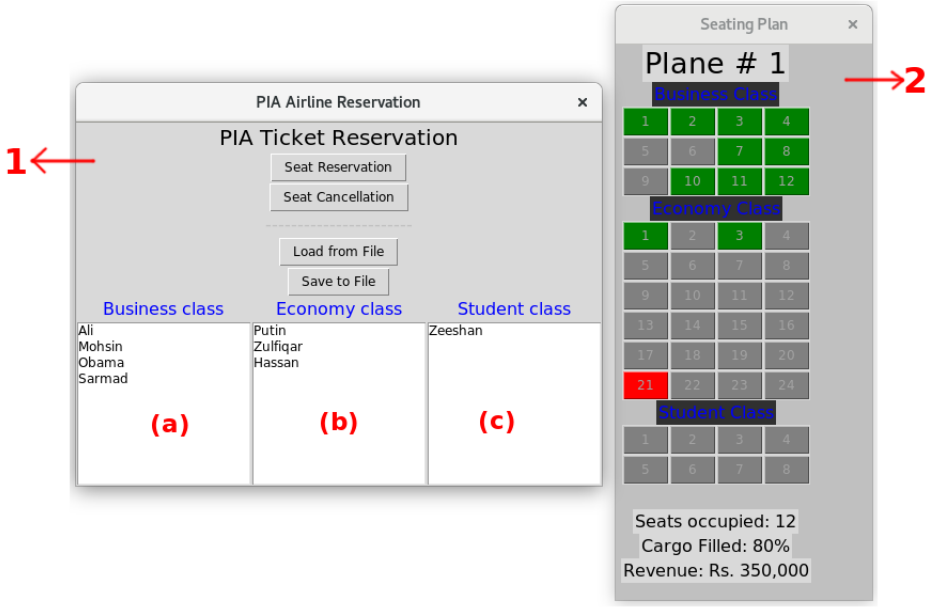
The accompanied starter package contains `isidata.txt` file and `gencitizens.py` script file. You can use this script to generate new isi data or you can use the accompanied one, your choice.

Background Information

We all know that the PIA is taking a nose dive. As programmers let's try to save PIA from its early demise by improving some of its modules. One such system that needs immediate attention is the seat reservation system. Efficiently allocating seats will give a big boost to the company economy.

Project requirements

This will be a GUI application implemented in `python 3` using the `tkinter` library. There are two windows as shown in the figure below:



1. This (main) window is the main control panel of the application. You can reserve seats and cancel seats on the plane. You can also save and load entire state of the application. There are three classes of seats in a plane:

   (a) business

   (b) economy

   (c) student

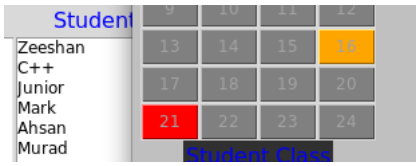
   These are seat classes are represented as list boxes. Whenever you add a passenger to one of the seat class then that passenger shows up in the list box AND the seat corresponding to him also turns green.

2. This window shows the state of the plane. As mentioned above each plane has three classes of seats i.e business, economy and student. Each class has 4 columns. Business class has maximum of 12 seats. Economy class has 24 seats while student class has 8 seats.

   The seats are represented by disabled buttons. *Note: DO NOT draw buttons one by one, you will lose marks. Use loops to generate the seat plan.*

   Empty seats are gray. All of the passengers who have boarded the seats are shown in green. Notice seat number 21 in the economy class. It is marked as red because that passenger is a potential terrorist.

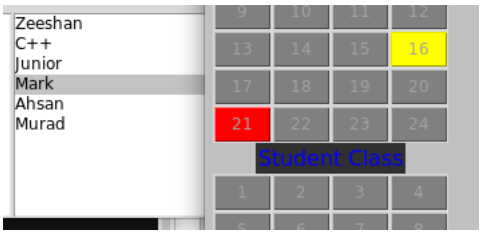
   At the very beginning of your application you are required to read the `isidata.txt` file. If the passenger is clean then you mark his seat with green color. If the passenger is a terrorist you still add the passenger in the listbox but mark his seat as red. IF the passenger is NOT found in the database then mark his seat as orange.



The `isidata.txt` contains records of citizens. Each row contains the id of the citizen followed by his status as `CLEAN` or `TERRORIST`:

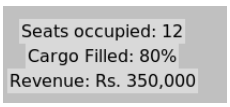
```
...
5180363     CLEAN
8278676     CLEAN
6350957     TERRORIST
5483923     CLEAN
...
```

If you click on any entry in the list box, that will also result in the seat being highlighted as yellow:



Since Mark was sitting on seat 16 of the economy class, selecting Mark would also highlight his seat as yellow. Note that if you select some other passenger then Mark's seat will return to its previous color and the newly selected passenger's seat will turn yellow.

At the bottom of the plane window you see three labels:



The first label shows total number of seats occupied.

The second label shows the percentage of cargo currently filled. The plane has a cargo limit of 2000 kg. Each passenger can bring maximum of 100 kg of luggage. As soon as this limit is reached the system will not allow anymore passengers to carry luggage.

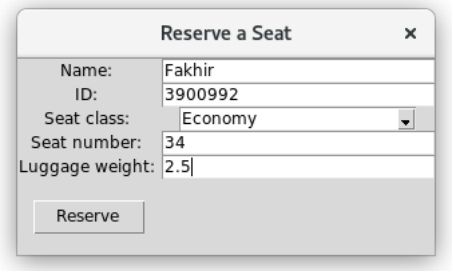
The third label is the total revenue generated by the airline. Each seating class has a different rate.

Following table summarizes the essential figures:

Business class seats	12
Business ticket price	Rs. 200,000
Economy class seats	24
Economy ticket price	Rs. 100,000
Student class seats	8
Student ticket price	Rs. 40,000
Passenger luggage limit	100 kg Max
Plane cargo capacity	2000 kg Max

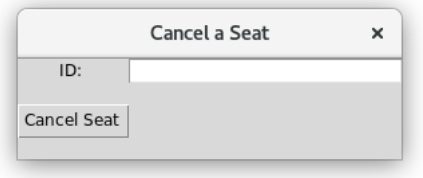
Seat reservation

When you click the seat reservation button on the main window, a seat reservation window will appear:



Here you can enter the data related to a passenger and then save that passenger to the passenger list. Note that you must do proper error checking. For example you need to check before adding whether a passenger already has a reserved seat by matching his (7-digit) ID. The ID must also be 7 digit and composed of numerical digits. In case of any wrong input or other errors display an appropriate message box.

Similarly the cancel reservation button opens up a cancel seat window:



If a passenger doesn't exist then you should display a message box with the error message.

Objects and Classes

You are free to design your own object oriented system. Recommended classes include the "`PIAManagement`", "`Plane`", "`SeatingClass`", "`Seat`" and "`Passenger`" classes.

The `PIAManagement` class has-a list of `Plane`s *(one plane for the normal project and multiple planes for the bonus part).*

The `Plane` has-a list of `Passenger`s. Plane also has different types of seating classes. Plane has a maximum cargo limit.

The `SeatingClass` has-a list of `Seats`. It also has a string variable to hold its type *(business or passenger or student)*. Extra variables to hold number of seats per row, total seats in this class and price per seat.

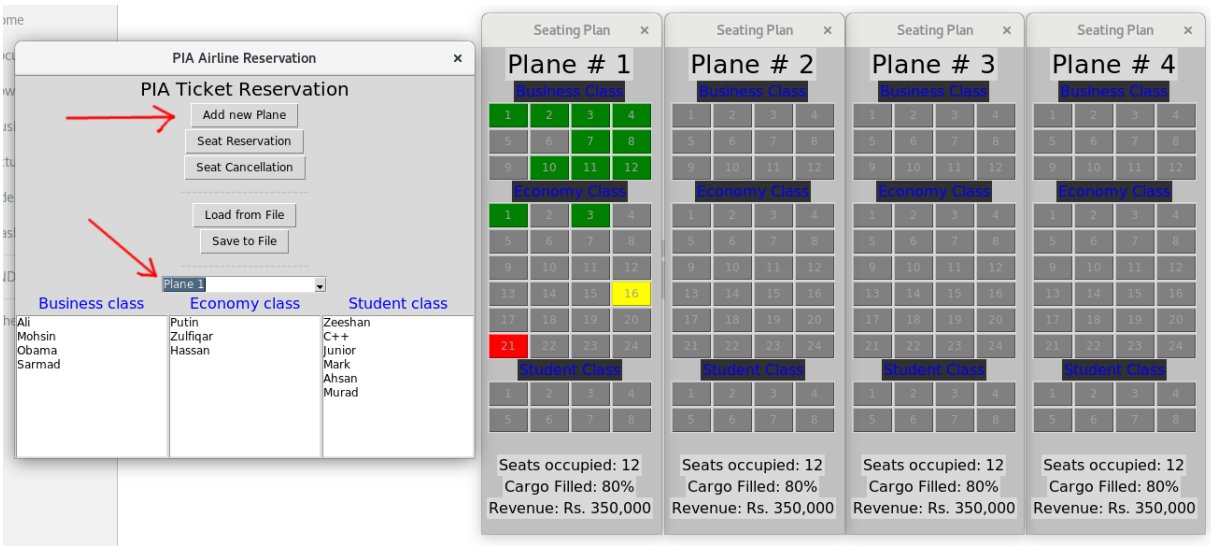
The `Seat` has a reference to a `Passenger`. The seat also has a number which is a $+ve$ integer.

The `Passenger` has a name, 7 digit ID, sat class, seat number and luggage in kilograms.

You are recommended to implement the windows using classes (maybe as separate files). You are also allowed to add/remove classes or any other attributes from the above mentioned list of recommended classes.

Bonus

1. Implement the support for multiple planes. Add a button somewhere on the main window to add a new plane. Also add a `combobox` to let the user select the plane he wants to display information of in the list boxes:



2. Make the plane window generic so that the user can specify number of seats in each of the seating class when he is adding a new plane. Also he should be able to specify number of seats per row.

3. Submit 1 day (24 hours) before the deadline. It should be a fully functional project (maybe excluding other bonus) to qualify for early submission bonus marks.

Marks Distribution

Total marks: *[150 marks]*

- Main control panel *[35 marks]*
  - Layout design *[15 marks]*
    (visual decoration such as the colors, placement, font size and shapes etc can be different for any of the windows for this project, sure!. But please don't make it uglier than it already is !!!)
  - Logic and programming *[20 marks]*
- Plane seating window *[35 marks]*
  - Layout design *[15 marks]*
  - Logic and programming *[20 marks]*
- Seat reservation dialog window *[20 marks]*
  - Layout design *[10 marks]*
  - Logic and programming *[5 marks]*
  - Proper error checking *[5 marks]*
- Seat cancellation dialog window *[10 marks]*
  - Layout design *[5 marks]*
  - Logic and programming *[3 marks]*
  - Proper error checking *[2 marks]*
- Save / Load information to file *[20 marks]*
- Fully functional, error free, bug free program *[30 marks]*
- Bonus *[60 marks]*
  - *[30 marks]* Multiple planes
  - *[20 marks]* Generic plane seating window
  - *[10 marks]* Submit early

Submission Instructions

Compress your assignment in a zip file named "`rollnumber_proj1.zip`". For example if your roll number is `13-10883`, then you will compress your assignment as `1310883_proj1.zip`. Email your assignment to fakhir.fcc@gmail.com. The subject of your email must be **"P2 Project1"**.

If you don't follow this format then you will lose marks.

Good Luck !!!