AIRLINE RESERVATION SYSTEM

Team Name: AIRGO

Team Members:

Akhilesh A
Divya Uthaman
Devika S
Dincy Francis
Swalih T

Software Requirements Specification

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1. Introduction

***Airline reservation systems** (**ARS**) are systems that allow an airline to sell their inventory (seats). It contains information on schedules and fares and contains a database of reservations (or passenger name records) and of tickets issued . ARSs are part of passenger service systems , which are applications supporting the direct contact with the passenger.*

ARS eventually evolved into the computer reservations system. A computer reservation system is used for the reservations of a particular airline and interfaces with a global distribution system which supports travel agencies and other distribution channels in making reservations for most major airlines in a single system.

1.1 Purpose

Airline Reservation System aims to automate the flight ticketing/seat booking and confirmation system of an Airline company. The software is providing options for viewing different flights available at different timing for a specific day. That provides customers within the facility with the ability to book tickets smoothly. The customers can modify and are able to cancel the ticket for any reason. That prepares within a role and policies. The software should provide an option for checking the availability of the tickets. That is important for the customers to get messages if the ticket is unavailable. That will be displayed to customers. The customers should be noted when the change has been made or any further changes.

1.2 Need/Motivation

The name of the software is "AIRLINE RESERVATION SYSTEM". This software provides options for viewing different flights available with different timings for a particular date and provides customers with the facility to book a ticket and cancel a particular reservation. He or she can book accommodation if required.

2. Literature Survey

Airline Reservations System

(ARS) is a computerized system used to store and retrieve information and conduct transactions related to air travel. The system was originally designed and operated by airlines, but were later extended for the use of travel agencies. Major ARS operations that book and sell tickets for multiple airlines are known as Global Distribution Systems (GDS). Airlines have divested most of their direct holdings to dedicated GDS companies, who make their systems accessible to consumers through Internet gateways. Modern GDSes typically allow users to book hotel rooms and rental cars as well as airline tickets.
Global Distribution Systems (GDS) are subsystems connected to Airline Reservation Systems (ARS) which allows users access to information on flight scheduling and reservation stored in the Airline Reservation System (ARS) database

American Airlines was the first to establish an automated booking system in 1946. Using a system to track information and improve efficiency was a highly appealing aim in the industry, and drew the attention of other airlines worldwide. The system endured years of development and alterations. Trans-Canada Airlines developed a computer-based system with remote terminals that eventually took over operations in 1953. The same year, American Airlines worked closely with IBM to develop an improved system, and the Airline Reservation System (ARS) and the Semi-Automatic Business Research System (SABRE) launched thereafter in 1960. The network completed its set-up in 1964, and it was recognized as the largest data processing system in existence. Later, other airlines invested more in research and development to launch improved systems, and through the late 1960s and early 1970s, airlines established their own systems. United Airlines developed the Apollo Reservation System, and shortly after allowed travel agents access.

The Apollo system was the foundation for many further developments, which spread from just US airlines to European airlines as well. The research and development of the Airline Reservation System became a significant aspect of the industry and all its air carrier companies, and partnerships between airlines and technology gurus emerged. (Morrison, Winston 1995) Other airlines soon established their own systems. Delta Air Lines launched the Delta Automated Travel Account System (DATAS) in 1968. United Airlines and Trans World Airlines followed in 1971 with the Apollo Reservation System and Programmed Airline Reservation System (PARS), respectively. Soon, travel agents began pushing for a system that could automate their side of the process by accessing the various ARSes directly to make reservations. Fearful this would place too much power in the hands of agents, American Airlines executive Robert Crandall proposed creating an industry-wide Computer Reservation System to be a central clearinghouse for U.S. travel.

3. Requirements

3.1 Functional Requirements

An airline reservation system has been designed and developed to manage the process of the customer reservation. In order to make a reservation, the customer must be a member else the customer has to register. After that, the system obtains journey details from the customer. Based on the flight information provided by the customer, the system then determines a suitable flight for the customer. It then finds the availability of seats on the flight. If the seats are available, then the system presents the flight information along with the fares to the customer. The system initiates the process of making a reservation which requires updating the flight status in the database and obtaining payment from the user. Once the database is updated and payment received from the customer, a ticket is issued to the user. This whole process of reservation can be done only by the administrators of the airline company.

Admin/superior user plays a vital role in the airline reservation system as only he is allowed to add or delete flights.

Functional Components

I.DRIVER MODULES(MAIN MENU)

MAIN MENU

1. ADMIN APPLICATION
2. CUSTOMER APPLICATION
3. Exit

1. LOGIN

"USER NAME"*, "PASSWORD"*

1.1 Correct but customer

1.2Correct but administrator

Incorrect

Alert

Note: "admin.dat" the file will have the administrators login details

1.1"Customer Application"

1.1.1 Book Tickets

1.1.2 Cancellation

1.1.3 Status of tickets

1.1.4 Exit

1.1.1 Book Tickets

1.1.1.1 One Way Trip

All / Low Fare

"Starting point"*,"Destination point"*, "Date"*, "No of passengers"*

Flight Lists

Flight 1	Rs.5000/seat
Flight 2	Rs.3000/seat
Flight 3	Rs.3000/seat

Your Option: Flight 1
System will check the seat availability
If seat is available
You can proceed y/n?
"Details"*
"Any Accomodation"+
Details:
No of days:
No. of Rooms
Total accommodation charge: no of rooms x fare per room
Note: fare per room will be loaded from database "air_room_fare.dat"
Display the Total Charges
Payment: Mode (Card/UPI/Netbanking)

1.1.1.2 Round Trip
All / Low Fare
One Way Trip + Return Date

1.1.1.3 Package Trip
Package Type: Honeymoon, Adventure
All / Low Fare
Round Trip +- Accommodation
Fare is calculated for discount based on the no of persons
Record actual fare, ticket fare, the discount given

"book.dat"

1.1.2 Cancellation

Mark the ticket "canceled"
"Reason for cancellation"
Cancellation charges [Apply rule]
If flight is not started, the seats has to be available for further bookings

"cancel_ticket.dat"

1.1.3 Status of tickets

Title: View Ticket Details with Status
See the ticket details
See the further details from airlines such as flight is going to be run etc
See the refund status if ticket is canceled
"ticket_status.dat"

1.2 Administrator Application

1.2.1 Add Flight Details

1.2.3 Modify Flight Details

For example: fare, departure time etc

Status of the flight - is running like that

2.REGISTER

Title: "Customer Registration"

"CUSTOMER NAME"*, "USER NAME"*, "PASSWORD"*

Rule:

DB: "air_customer.dat"

3.Exit

-Exit from the program

3.2 Hardware Requirements

Intel i3 or higher

Microsoft Windows 7/8/8.1/10

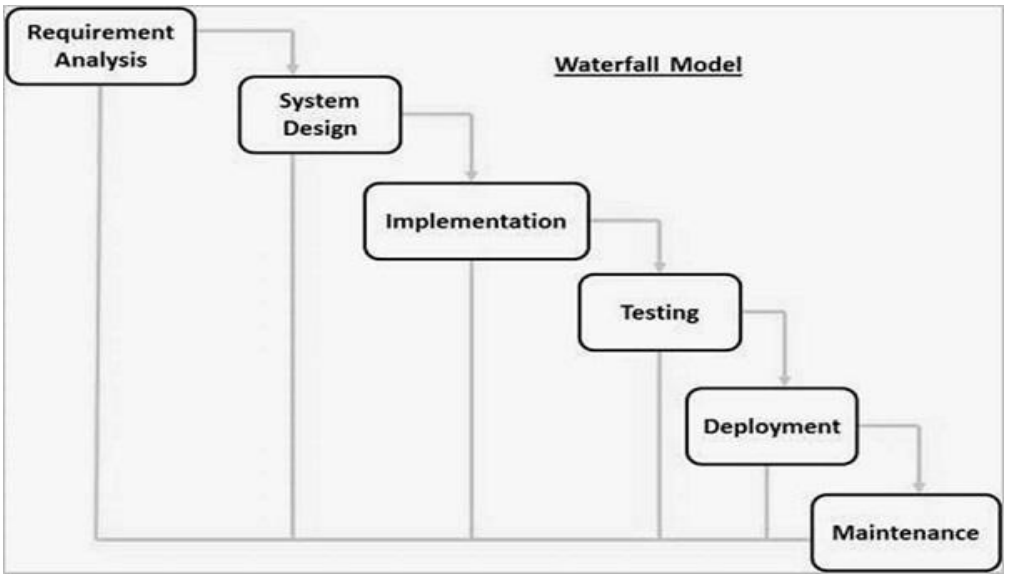
Access to Linux using Virtual box

4GB of RAM (1GB for Linux in vbox)

3.3 Software Requirements

Visual studio/ notepad++/ text editor, vi editor (To write code using C).

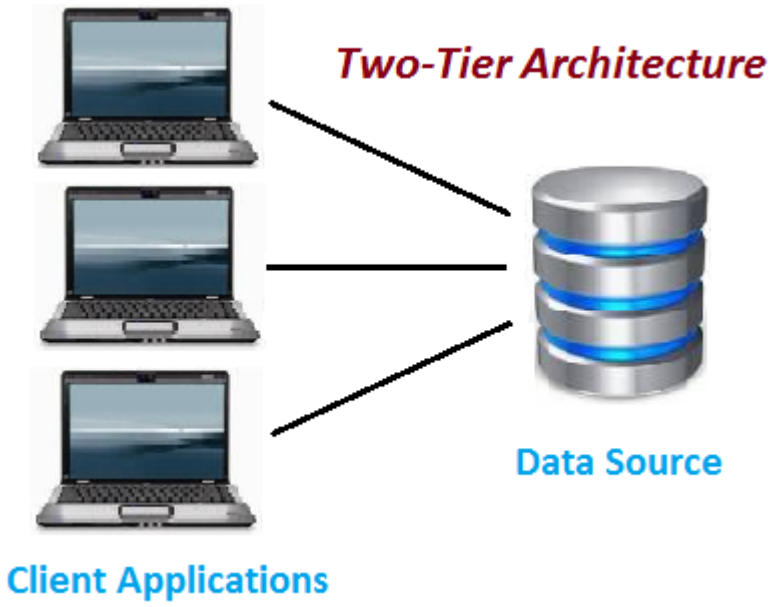
3.4 Waterfall Model



4. System Architecture

4.1 Two-Tier Architecture

A two-tier architecture either buries the application logic inside a UI (User interface) of the concerned client or the database of a given server or both of them. One can feasibly locate the user's system interface in the desktop environment of the user with a two-tier architecture of a server/client. The DB management system usually resides in a server that hosts more powerful machines capable of providing service to many clients.



5. Design and Implementation

5.1 Product Features

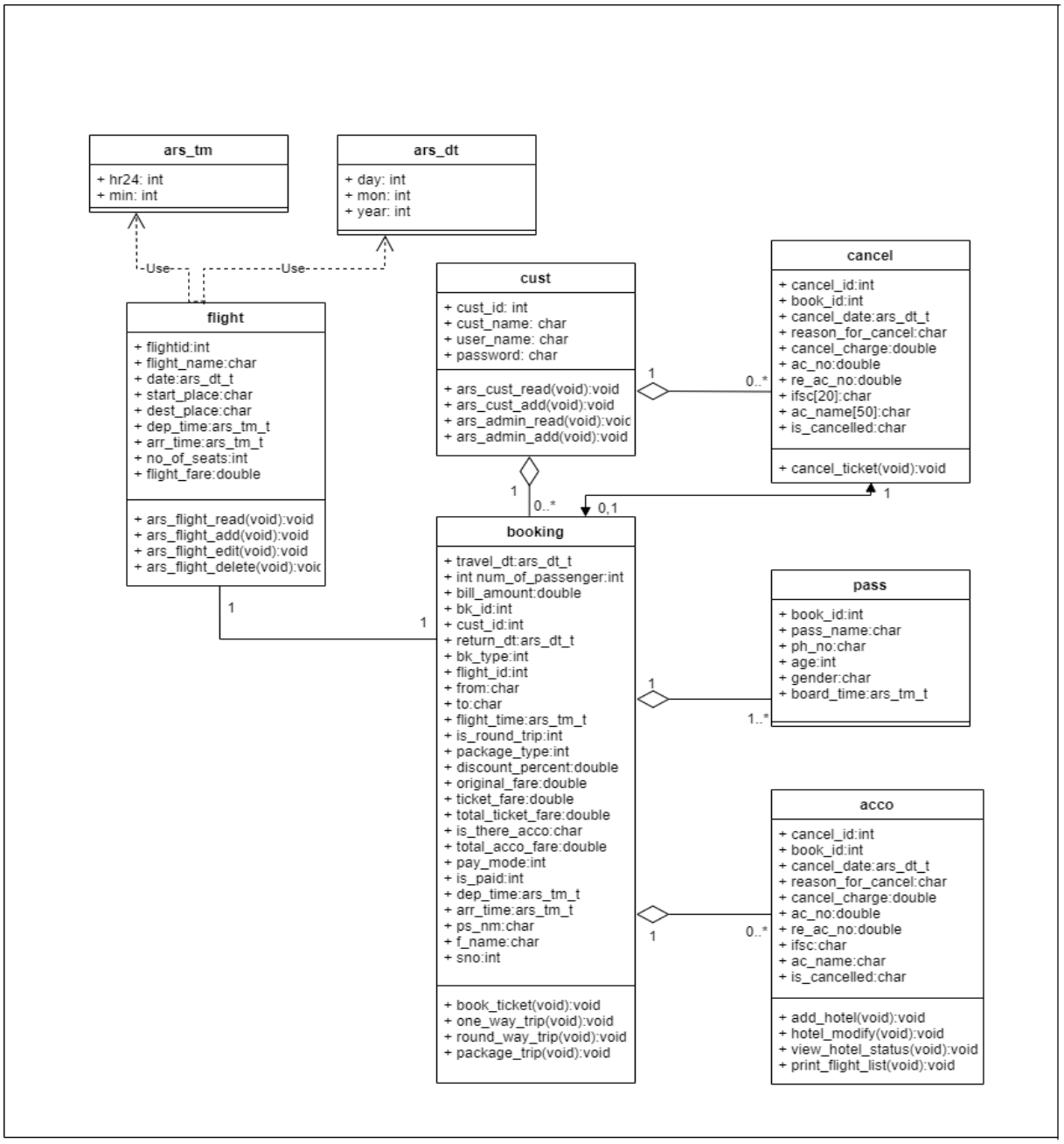
i. The ability of the application is to provide the details of the flights available and allow the customers to choose a particular destination and make a reservation.

ii.The application allows the user to modify an already existing reservation made by the customer if there are any changes that are to be modified in the reservations of the ticket.

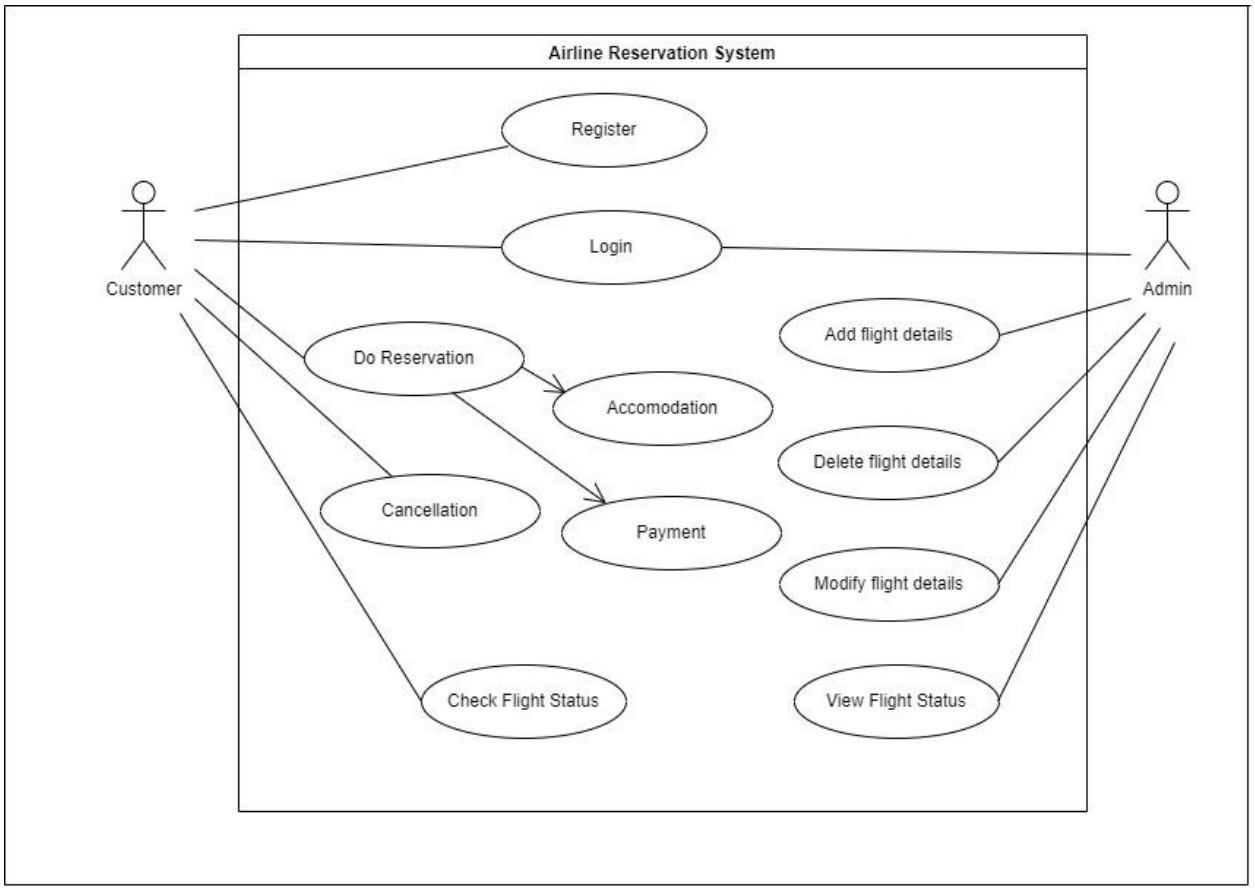
iii.The application allows the user to cancel an already existing reservation made by the customer who has booked the ticket

iv.The application allows the user to see the status of the reservation .

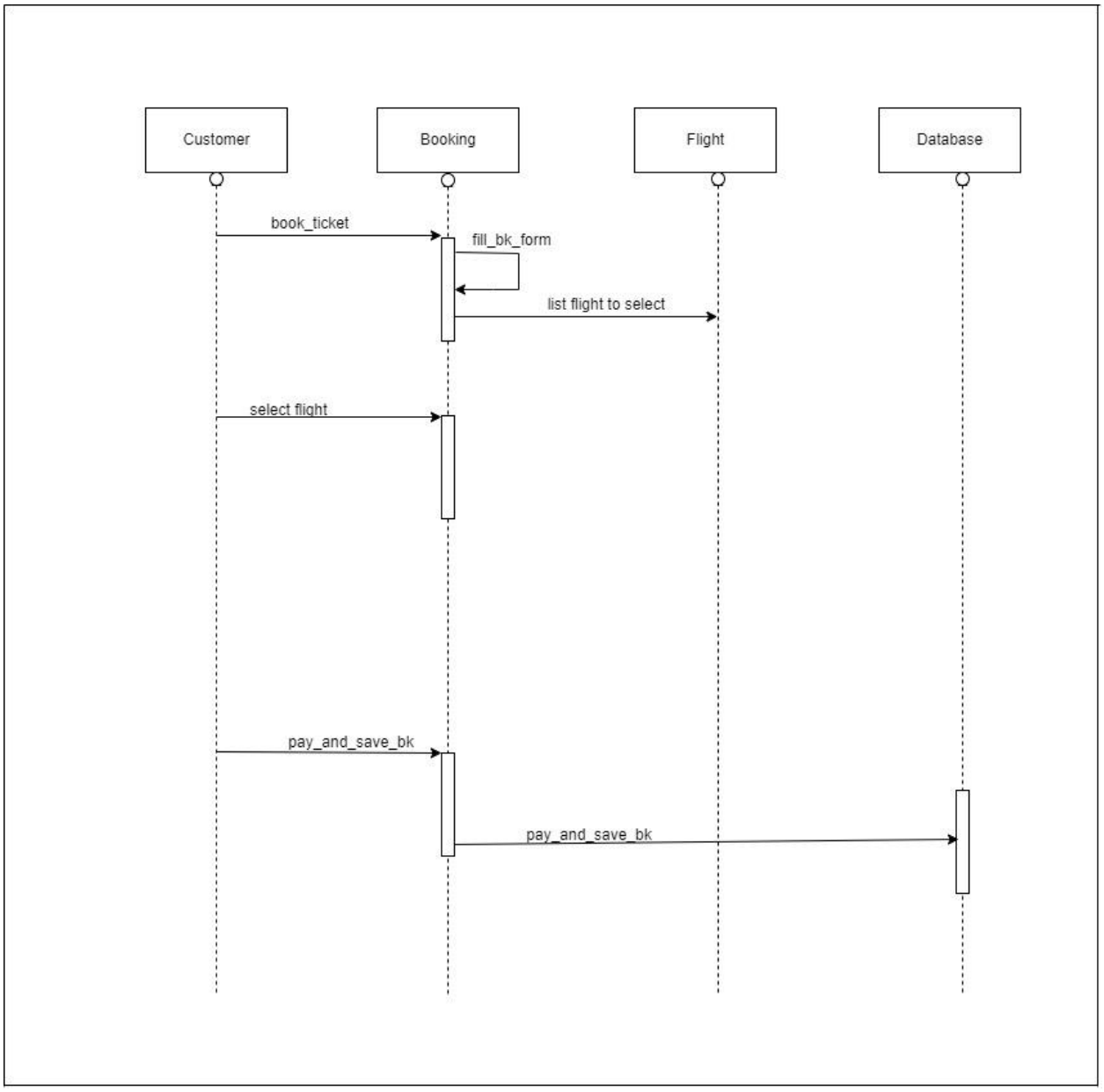
5.2 Class diagram design



5.3 Use case diagram

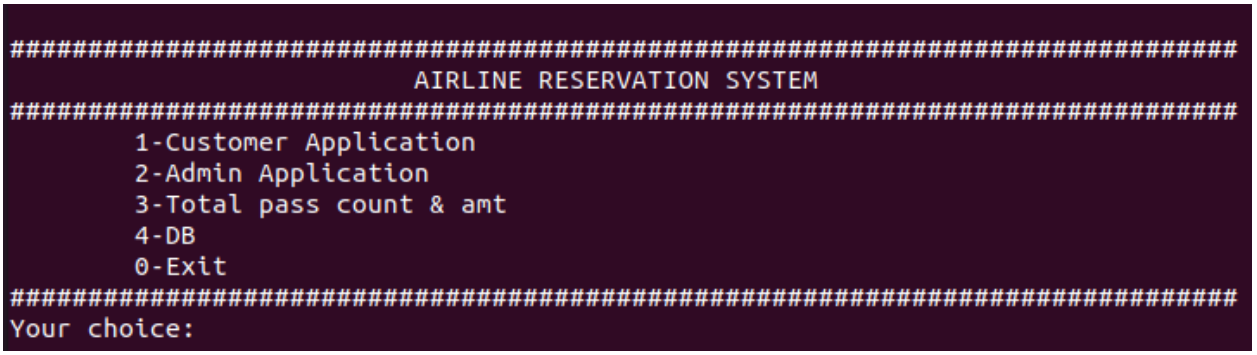


5.4 Sequence diagram



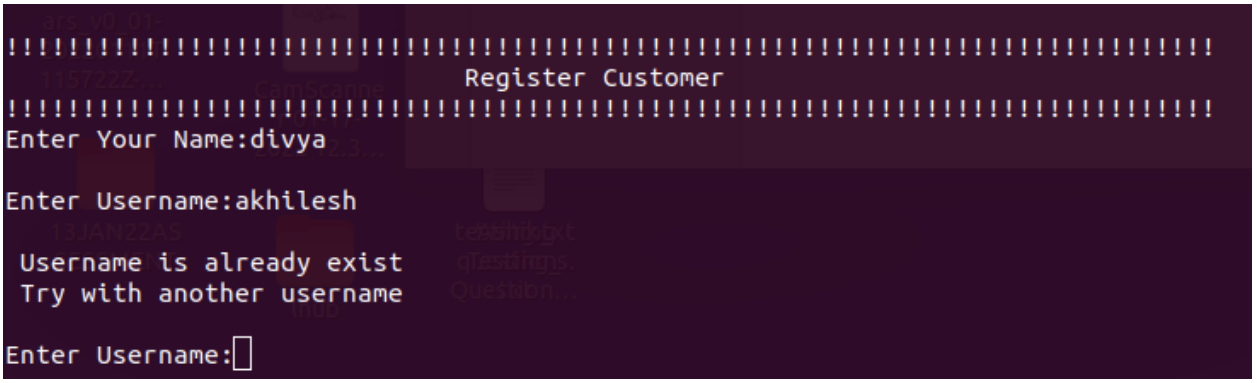
6. Snapshots

6.1 Main Menu



6.2 Customer Registration With Valid Data

6.3 Customer Registration With Invalid Data



6.4 Customer Login With Valid Data

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                CUSTOMER LOGIN
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Username :akhilesh

Password :akhilesh12

 You have successfully logged in
```

6.5 Customer Login With Invalid Data

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                CUSTOMER LOGIN
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Username :dincy

Password :akhilesh12

 Invalid Username or Password

Username :
```

6.6 Admin Login With Valid Data

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                 ADMIN LOGIN
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Username :dincy

Password :1234

 You have successfully logged in
```

6.7 Admin Login With Invalid Data

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                            ADMIN LOGIN
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Username :akhil

Password :1234

 Invalid Username or Password

Username :
```

6.8 Book Ticket

```
################################################################################
                                BOOKING MODULE
################################################################################
        1-One way trip
        2-Round way trip
        3-Package trip
################################################################################
Your choice:
```

6.9 One Way Trip

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                 ONE WAY TRIP
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Enter Starting Point:trivandrum

Enter Destination Point:kochi

Enter Travel date(dd-mm-yyyy):22-01-2022



^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                 Flight list
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  2.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,04:00 ,02:00 ,50 ,5000.000000],
  3.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,05:00 ,03:00 ,50 ,5000.000000],
  7.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,07:00 ,05:00 ,60 ,5000.000000],
  9.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,05:00 ,03:00 ,40 ,5000.000000],
Enter sno to select the flight:2

Enter No.of Passengers:1



^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                PASSENGER FORM
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
          1:Detials of Passenger   1 :
 Passenger name:swalih

 Passenger phone number:8767675687

 Passenger age:22

 Passenger gender(M-Male , F-Female T-Trans):M

Is Accommodation required (y=yes/n=no):n


################################################################################
                                  TOTAL BILL
################################################################################
 The Total bill amount = 5000.000000
Payment Mode (1.Card 2.UPI 3.NetBanking):
1

         Successfully Booked
         Your booking id is 1163
```

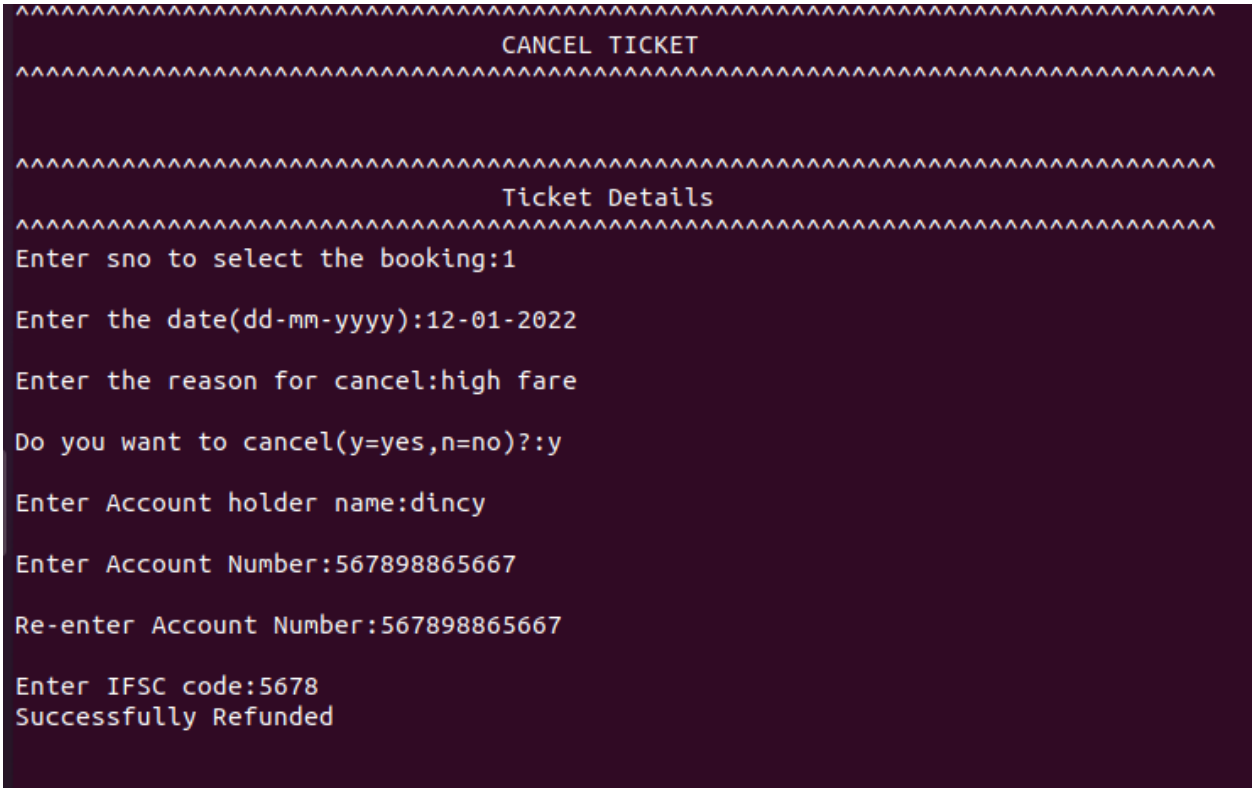
6.10 Round Way Trip

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                ROUND WAY TRIP
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Enter Starting Point:trivandrum

Enter Destination Point:kochi

Enter Travel date(dd-mm-yyyy):22-01-2022

Enter Return date(dd-mm-yyyy):22-01-2022



^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                 Flight list
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  2.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,04:00 ,02:00 ,50 ,5000.000000],
  3.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,05:00 ,03:00 ,50 ,5000.000000],
  7.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,07:00 ,05:00 ,60 ,5000.000000],
  9.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,05:00 ,03:00 ,40 ,5000.000000],
Enter sno to select the flight:3

Enter No.of Passengers:1



^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                PASSENGER FORM
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
          1:Detials of Passenger   1 :
 Passenger name:dincy

 Passenger phone number:8978678958

 Passenger age:23

 Passenger gender(M-Male , F-Female T-Trans):F

Is Accommodation required (y=yes/n=no):n


##############################################################################
                                 TOTAL BILL
##############################################################################
 The Total bill amount = 9000.000000
Payment Mode (1.Card 2.UPI 3.NetBanking):1

         Successfully Booked
         Your booking id is 1164
```

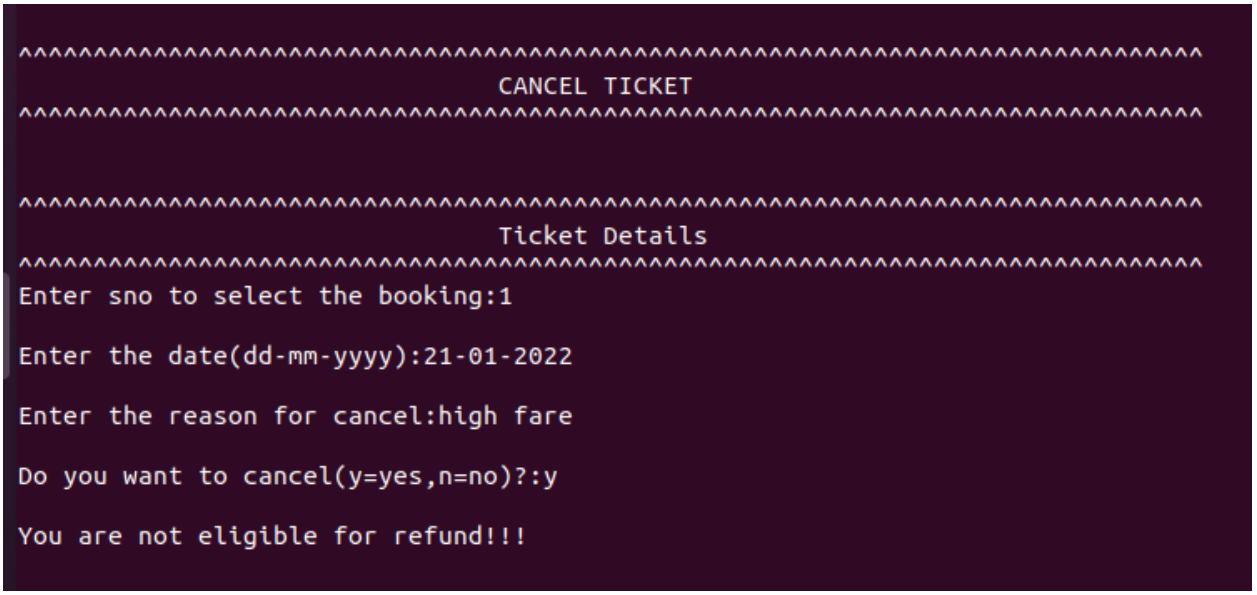
6.11 Package Trip

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                 PACKAGE TRIP
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Pckage Type (1.HONEYMOON 2.ADVENTURE):1

Enter Starting Point:trivandrum

Enter Destination Point:kochi

Enter Travel date(dd-mm-yyyy):22-01-2022

Enter Return date(dd-mm-yyyy):22-01-2022



^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                 Flight list
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
  2.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,04:00 ,02:00 ,50 ,5000.000000],
  3.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,05:00 ,03:00 ,50 ,5000.000000],
  7.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,07:00 ,05:00 ,60 ,5000.000000],
  9.flight[121, airindia, trivandrum ,kochi ,22-01-2022 ,05:00 ,03:00 ,40 ,5000.000000],
Enter sno to select the flight:2

Enter No.of Passengers:1



^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                PASSENGER FORM
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
          1:Detials of Passenger   1 :
 Passenger name:devika

 Passenger phone number:9878675856

 Passenger age:22

 Passenger gender(M-Male , F-Female T-Trans):F

Is Accommodation required (y=yes/n=no):n


################################################################################
                                  TOTAL BILL
################################################################################
 The Total bill amount = 9000.000000
Payment Mode (1.Card 2.UPI 3.NetBanking):1

         Successfully Booked
         Your booking id is 1164
```

6.12 Ticket Cancellation with refund



6.13 Ticket Cancellation without refund



6.14 Ticket Status

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                Ticket Details
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
          1.---Booking_Details---
 Flight_Name:airindia
 Passenger Name:ashik
 From:kochi      To:trivandrum
 Flight_Id:101   Date:21-01-2022
 Departure_Time:02:00
```

6.15 Add Flight

```
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
                              Add flight details
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
Enter flight id:1001

Enter flight name:airindia

Enter travel date (dd-mm-yyyy):21-01-2022

Enter the starting place:kochi

Enter the destination place:trivandrum

Enter the depature time(HH:mm):02:00

Enter the arrival time(HH:mm):03:00

Enter no.of seats:50

Enter Fare:4000

flight Added successfully.
```

6.16 Flight Modify

```
List of flight for edit
        flightid  flight name  start place  destination place  travel date    arr time      dep time      no.ofseats     flight fare
  1.flight[1001,         airindia,       kochi ,         trivandrum ,    21-01-2022 ,     3: 0 ,          2: 0 ,         50 ,    4000.000000],
  2.flight[2002,         indigo,         trivandrum ,    chennai ,       12-01-2022 ,     2: 0 ,         12: 0 ,        100 ,    7000.000000],
  3.flight[3003,         spicejet,       trivandrum ,    dubai ,         15-01-2022 ,     8: 0 ,          4: 0 ,         70 ,    25000.000000],
Enter sno where the 'flight being modified' is associated:3


################################################################################
                    Select flight modify option
################################################################################
       1-Flight name
       2-Flight date
       4-Starting place
       8-Destination place
       16-Depature time
       32-Arrival time
       64-Seat number
       128-Flight fare
################################################################################
Your choice:1

Enter flight name:emirates

flight Modified successfully.
```

6.17 View Flight Details

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                          FLIGHT DETAILS
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
       flightid  flight name  start place  destination place  travel date    arr time      dep time      no.ofseats     flight fare
 1.flight[101,  spicejet,       trivandrum ,    kochi ,         22-01-2022 ,     4: 0 ,          2: 0 ,         50 ,    5000.000000],
 2.flight[121,  airindia,       trivandrum ,    kochi ,         22-01-2022 ,     4: 0 ,          2: 0 ,         50 ,    5000.000000],
 3.flight[121,  airindia,       trivandrum ,    kochi ,         22-01-2022 ,     5: 0 ,          3: 0 ,         50 ,    5000.000000],
 4.flight[121,  airindia,       trivandrum ,    delhi ,         22-01-2022 ,    12: 0 ,         10: 0 ,         50 ,    6000.000000],
 5.flight[121,  airindia,       trivandrum ,    goa ,   22-01-2022 ,     5: 0 ,          3: 0 ,         40 ,    4000.000000],
 6.flight[121,  airindia,       goa ,   trivandrum ,    22-01-2022 ,    12: 0 ,          9: 0 ,         50 ,    6000.000000],
 7.flight[121,  airindia,       trivandrum ,    kochi ,         22-01-2022 ,     7: 0 ,          5: 0 ,         60 ,    5000.000000],
 8.flight[101,  airindia,       trivandrum ,    kochi ,         22-02-2022 ,     5: 0 ,          3: 0 ,         50 ,    5000.000000],
 9.flight[121,  airindia,       trivandrum ,    kochi ,         22-01-2022 ,     5: 0 ,          3: 0 ,         40 ,    5000.000000],
10.flight[121,  airindia,       trivandrum ,    delhi ,         23-01-2022 ,     5: 0 ,          2: 0 ,         40 ,    4000.000000],
```

6.18 Add Hotel

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                ADD HOTEL
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
Enter Hotel Name:paradise

Enter Hotel place:trivandrum

Enter the Room Fare/Day:2000

Enter the No.of Rooms:25

hotel added successfully.
```

6.19 Modify Hotel

```
List of hotel for edit
         hotel place    hotel name    no.of rooms        room fare
  1.hotel[ trivandrum,   paradise,              25,             2000.000000],
  2.hotel[ chennai,      cormental,             50,             4000.000000],
  3.hotel[ dubai,        stalion,               100,            10000.000000],
Enter sno where the 'hotel being modified' is associated:1



################################################################################
                          Select Hotel Modify option
################################################################################
        1-Hotel Name
        2-Hotel place
        4-No.of Rooms
        8-room fare
        0-Exit
################################################################################
Your choice:1

Enter Hotel Name:taj

hotel modified successfully.
```

6.20 View Hotel Details

```
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
                                HOTEL DETAILS
^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
         hotel place    hotel name    no.of rooms        room fare
  1.hotel[ kochi,        taj,            3,              3000.000000],
  2.hotel[ delhi,        taj,            3,              3000.000000],
  3.hotel[ delhi,        taj,            2,              4000.000000],
  4.hotel[ trivandrum,   paradise,               25,             2000.000000],
```

7. Testing And Results

7.1 Unit Testing

Primary test performed on the software is unit testing to see if the standalone module is working as per the requirement.

Testing done on a single, standalone module or unit of code to ensure correctness of the particular module

Focuses on implementation logic, so the idea is to write test cases for every method in the module.

The aim of unit testing is to segregate each part of the program and prove that each of them is correct

Four main benefits which accrue due to this testing are:

• Flexibility when changes are required

• Facilitates integration

• Ensures documentation of the code

• Separation of interface from implementation

This type of testing is predominantly undertaken by the developers .

7.2 Black Box Testing

A testing method where the application under test is viewed as a black box and the internal behavior of the program is completely ignored. Testing occurs based upon the requirement specifications.

• Black box testing is conducted more from a user's perspective.

• It focuses on the features and not the implementation.

• Provides a big picture approach.

• Black box testing techniques can be applied once unit and integration testing are completed

Black box testing techniques

Equivalent partitioning - The whole range of input is split into a set of equivalence classes, such that a single value acts as a sample for each equivalence class. Exhaustive testing is not required in this case.

Boundary value analysis: this technique consists of developing test cases and data that focus on the input and output boundaries of a given function as these are more prone to errors.

Advantages of Black box testing

• Simulates actual system usage

• Makes no assumption about the system structure

Disadvantages of Black box testing

• May miss out logical errors

• Chances of redundant testing is there

• Cannot decide which part of code is not getting executed.

7.3 White Box Testing

This testing technique takes into account the internal structure of a system or component.

Complete access to the object's source code is needed for white-box testing .This is known as 'white box' testing because the tester gets to see the internal working of the code.

White box testing helps to:

• Achieve high code coverage

• Test program logic

• Eliminate redundant code

• Traverse complicated loop structures and subroutines

• Evaluate different execution paths

Unit testing and some part of integration testing fall under white box testing category.

White box testing techniques

• Statement coverage

• Decision Coverage

• Data flow testing

Advantages of White box testing

• Logic of the system tested

• Those parts which could have been omitted in black box testing are also getting covered

• Redundant code eliminated

• Cost effective when appropriate techniques are used.

Disadvantages of White box testing

• Does not ensure that all requirements are met

• May not simulate real-time situation

• Programming knowledge is needed

7.4 Integration Testing

In this testing individual software modules are combined and tested as a group; it is done after unit testing and before system testing.

It takes the unit tested module as the input, groups them in larger aggregates, and applies tests defined in an integration test plan. An integrated system which is ready for system testing is then delivered as the output.

Data transfer between the modules are thoroughly tested

Dummy modules interface viz.Stubs and Drivers are used in integration testing.

• Drivers are programs designed exclusively for testing the calls to lower layers.it provides emerging low-level modules with simulated inputs and the necessary resources to function.

• Stubs are dummy software components used to simulate the behavior of a real component. They do not perform any real computation or data manipulation .It can be defined as a small program routine that is used in place of a longer program.to be loaded later to that is located remotely.

Two methods of integration are

• Incremental

• Big bang

Incremental:

- *It involves adding unit tested modules one by one and checking each resultant combination. This process repeats till all modules are integrated and tested .*

- *Correction is easy as the source and cause of error could be easily detected.*

Big bang:

- *Modules unit tested at isolation are integrated at one go and the integration is tested.*
- *Correction is difficult because isolation of causes is complicated.*

Three strategies of integration are:

Bottom up strategy

- *Process starts with low level modules of the program hierarchy in the application architecture.*
- *Test drivers are used*

Top down strategy

- *Starts at the top of the program hierarchy in the application architecture and travels down its branches*
- *Stubs are used until the actual program is ready.*

Sandwich strategy

- *Also referred to as the umbrella approach*
- *Integration of top-down and bottom up method*
- *Instead of completely going for top down or bottom up, a layer is identified in between.*
- *It helps to minimize the need for stubs and drivers*

7.5 Validation Testing

The process of evaluating software during the development process or at the end of the development process to determine whether it satisfies specified business requirements.

Validation Testing ensures that the product actually meets the client's needs. It can also be defined as to demonstrate that the product fulfills its intended use when deployed in an appropriate environment.

7.6 Acceptance Testing

One of the test phases of testing is acceptance testing.it is typically done at the customer place. Generally users performing these tests are ideally derived from user requirement

specification. This test is carried out to perform final verification of the required business function in a simulated environment . These tests often enable the customer to determine whether the system should be accepted or rejected. Planning for this should be done during the requirement analysis phase. Which will help to identify the gaps in requirements and to verify the testability of the requirements.Acceptance testing will be carried out when the test team has completed the system testing.

Types of UAT:

• Alpha testing: Simulated or actual operational testing performed by end users within a company but outside the core group which was involved in development.

• Beta testing: Simulated or actual operational testing which is done by a small subset of actual customers outside the company.

Importance of UAT:

To protect an organization from any trouble and in order to address various risks involved during a change to an organization, UAT is important .The following are the factors which can relate to the risks faced by the company:

• Reputation: The customers, suppliers or legal authorities decide not to use it based on the perception that problems exist in the organization.

• Legal: It is possible that the system could break laws letting the stakeholder to legal proceedings.

• Resource: Not understanding of the system could lead to adding more cost in terms of human,software,hardware resources.

8.Conclusion

The Airline reservation system is designed for users to book, cancel, display status and exit the system. Our system focuses on the management of ticket booking and cancellation.User can book or cancel flight tickets with ease from anywhere.Admin can do his functionalities with ease.The system eases the tedious task of Airline Reservation System.

From this assignment, We have learnt to implement a few C concepts in the future projects such as functions, switch statement and do…while statement, arrays, pointers, and structures, etc in the program.

9. Bibliography

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TESTING

1. NUMBER OF UNITS : 15

Unit Names:

Customer Register
Customer Login
Admin Login
Book Ticket
One Way Trip
Round Way Trip
Package Trip
Ticket Cancellation
Ticket Status
Add Flight
Modify Flight
View Flight Details
Add Hotel
Modify Hotel
View Hotel Details

2. UNIT NO.OF TEST CASE: 19

3. TEST CASE OF EACH UNIT:

Customer Register:

- *Valid Customer Registration*
- *Invalid Customer Registration*

Customer Login:

- *Valid Customer Login*
- *Invalid Customer Login*

Admin Login:

- *Valid Customer Login*
- *Invalid Customer Login*

Book Ticket:

- *Customer can view and select the type of trip*

One Way Trip:

- *Customers can give the details like Starting Point , Destination Point ,Travel Date, Flight , No.of Passengers and Details of Passengers like Name, Phone Number , Age and Gender.*
- *If Accommodation is not Required ,total bill will be displayed .Also Customers can select the payment mode.*
- *If Accommodation is Required ,Customer can select the hotel and give details like No.of days and No.of rooms.Then Total bill will be displayed including hotel fare.Also Customer can select the payment mode.*

Round Way Trip:

- *Customers can give the details like Starting Point , Destination Point ,Travel Date,Return Date, Flight , No.of Passengers and Details of Passengers like Name, Phone Number , Age and Gender.*
- *If Accommodation is not Required ,total bill will be displayed .Also Customers can select the payment mode.*
- *If Accommodation is Required ,Customer can select the hotel and give details like No.of days and No.of rooms.Then Total bill will be displayed including hotel fare.Also Customer can select the payment mode.*

Package Trip:

- *Customers can select the package type and give the details like Starting Point , Destination Point ,Travel Date,Return Date, Flight , No.of Passengers and Details of Passengers like Name, Phone Number , Age and Gender.*
- *If Accommodation is not Required ,total bill will be displayed .Also Customers can select the payment mode.*
- *If Accommodation is Required ,Customer can select the hotel and give details like No.of days and No.of rooms.Then Total bill will be displayed including hotel fare.Also Customer can select the payment mode*

Ticket Cancellation:

- *Booking details will be displayed and customers can give the details like sno.of the booking ,date,reason for cancellation.*
- *If yes, Customer can give bank details like account holder name ,account number and IFSC code for refund of the amount*

Ticket Status

- *Status of the Ticket will be displayed*

Add Flight

- *Admin can add the flight by entering the flight details.*

Modify Flight:

- *Admin can modify the flight details by entering the sno.of the flight , which we want to modify.*

View Flight Details:

- *Flight details will be displayed.*

Add Hotel:

- *Admin can add the hotel by giving the details of the hotel.*

Modify Hotel:

- *Admin can modify the hotel details by entering the sno.of the hotel which we want to modify.*

View Hotel Details:

- *Hotel details will be displayed.*

TEST CASES

Test case ID: 101	**Test Case Description:** Verify the functionality of "Customer Registration" with valid data		
Prerequisites:		**Test case (Pass/Fail):** Pass	
Test Data:		Name: akhilesh	
		Username: akhilesh	
		Password: akhilesh12	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to customer registration page	Registration screen should be opened	As expected
2	Enter name, username, password	Credentials can be entered	As expected
3	Press Enter key	A message will be displayed as "Welcome akhilesh!!! You are reigstered with our AIRLINE RESERVATION SYSTEM." and also customer id will be displayed.	As expected

Test case ID: 102	**Test Case Description:** Verify the functionality of "Customer Registration" with invalid data		
Prerequisites:		**Test case (Pass/Fail):** Fail	
Test Data:		Name: divya	
		Username: akhilesh	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to registration page	Registration screen should be opened	As expected
2	Enter name, username	Credentials can be entered	As expected
3	Press Enter Key	A message should be displayed as "Username is already exist	As expected

		Try with another username”	

Test case ID: 103	**Test Case Description:** Verify the functionality of “Customer login” with valid data		
Prerequisites:		**Test case (Pass/Fail):** Pass	
Test Data:		Username: akhilesh	
		Password: akhilesh12	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to customer login page	Login screen should be opened	As expected
2	Enter username, password	Credentials can be entered	As expected
3	Press Enter key	A message will be displayed as “you have successfully logged in” and Customer Module screen should be opened	As expected

Test case ID: 104	**Test Case Description:** Verify the functionality of “Customer login” with invalid data		
Prerequisites:		**Test case (Pass/Fail):** Fail	
Test Data:		Username: dincy	
		Password: akhilesh12	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to customer login screen	Login screen should be opened	As expected
2	Enter username, password	Credentials can be entered	As expected
3	Press Enter key	A message should be displayed as “Invalid Username or Password”	As expected

Test case ID: 105	**Test Case Description:** Verify the functionality of “Admin login” with valid data		
Prerequisites:		**Test case (Pass/Fail):** Pass	
Test Data:		Username: dincy	
		Password: 1234	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to admin login screen	Login screen should be opened	As expected
2	Enter username, password	Credentials can be entered	As expected

3	Press Enter key	A message should be displayed as " you have successfully logged in" and Admin Module screen should be displayed	As expected

Test case ID: 106	**Test Case Description:** Verify the functionality of "Admin login" with invalid data		
Prerequisites:		**Test case (Pass/Fail):** Fail	
Test Data:		Username: akhil	
		Password: 1234	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to admin login screen	Login screen should be opened	As expected
2	Enter username, password	Credentials can be entered	As expected
3	Press Enter key	A message should be displayed as "Invalid Username or Password"	As expected

Test case ID: 107	**Test Case Description:** Verify the functionality of "Book Ticket"		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		NA	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to "Book Ticket" screen	Booking module screen should be displayed	As expected

Test case ID: 108	**Test Case Description:** Verify the functionality of “One Way Trip”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		Starting Point:kochi	
		Destination Point:trivandrum	
		Travel date(dd-mm-yyyy):21 -01-2022	
		sno to select the flight:1	
		No.of Passengers:1	
		Passenger name:ashik	
		Passenger phone number:9945678756	
		Passenger age:25	
		Passenger gender(M-Male , F-Female ,T-Trans):m	
		Is Accommodation required (y=yes/n=no):y	
		sno to select the hotel:1	
		No.of Days:2	
		No.of Rooms:1	
		Payment Mode (1.Card 2.UPI 3.NetBanking):1	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to Booking Module screen	Booking Module screen should be displayed	As expected
2	Select one way trip and press enter key	should navigate to one way trip screen	As expected
3	Enter Starting Point , Destination Point , Travel date , sno to select the flight , No.of Passengers ,and details of passengers like Passenger name , Passenger phone number , Passenger age , Passenger gender , Is Accommodation required ,sno to select the hotel , No.of Days , No.of Rooms ,Payment Mode	Total bill amount should be displayed and A message should be displayed as “Successfully Booked “along with booking id	As expected

Test case ID: 109	**Test Case Description:** Verify the functionality of “Round Way Trip”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		Starting Point:kochi	
		Destination Point:trivandrum	
		Travel date(dd-mm-yyyy):21-01-2022	
		Return date(dd-mm-yyyy):22-01-2022	
		sno to select the flight:2	
		No.of Passengers:1	
		Passenger name:devika	
		Passenger phone number:9445566788	
		Passenger age:25	
		Passenger gender(M-Male , F-Female , T-trans):F	
		Is Accommodation required (y=yes/n=no):n	
		Payment Mode (1.Card 2.UPI 3.NetBanking):1	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to Booking Module screen	Booking Module screen should be displayed	As expected
2	Select round way trip and press enter key	Should navigate to round way trip screen	As expected
3	Enter Starting Point , Destination Point , Travel date ,Return date , sno to select the flight , No.of Passengers ,and details of passengers like Passenger name , Passenger phone number , Passenger age , Passenger gender , Is Accommodation required ,sno to select the hotel , No.of Days , No.of Rooms ,Payment Mode	Total bill amount should be displayed and A message should be displayed as “Successfully Booked “along with booking id	As expected

Test case ID: 110	**Test Case Description:** Verify the functionality of “Package Trip”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		Package Type (1.HONEYMOON 2.ADVENTURE):2	
		Starting Point:kochi	
		Destination Point:trivandrum	
		Travel date(dd-mm-yyyy):21-01-2022	
		Return date(dd-mm-yyyy):25-01-2022	
		sno to select the flight:1	
		No.of Passengers:1	
		Passenger name:ananthu	
		Passenger phone number:9464567889	
		Passenger age:24	
		Passenger gender(M-Male , F-Female , T-trans):m	
		Is Accommodation required (y=yes/n=no):n	
		Payment Mode (1.Card 2.UPI 3.NetBanking):1	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to Booking Module screen	Booking Module screen should be displayed	As expected
2	Select “Package trip” and press enter key	Should navigate to Package trip screen	As expected
3	Enter Package type , Starting Point , Destination Point , Travel date ,Return date , sno to select the flight , No.of Passengers ,and details of passengers like Passenger name , Passenger phone number , Passenger age , Passenger gender , Is Accommodation required ,sno to select the hotel , No.of Days , No.of Rooms ,Payment Mode	Total bill amount should be displayed and A message should be displayed as “Successfully Booked “along with booking id	As expected

Test case ID: 111	**Test Case Description:** Verify the functionality of “Ticket Cancellation”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		sno to select the booking:1	
		the date(dd-mm-yyyy):12-01-2022	
		the reason for cancel:high fare	
		Do you want to cancel(y=yes,n=no)?:y	
		Account holder name:dincy	
		Account Number:567898865667	
		Re-enter Account Number:567898865667	
		IFSC code:5678	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to Ticket cancellation screen	Cancel Ticket screen should be displayed and details of latest booking should be displayed	As expected
2	Enter the sno to select the booking , the date , the reason for cancel , Do you want to cancel , Account holder name , Account Number , Re-enter Account Number , IFSC code	A message should be displayed as “Successfully Refunded”	As expected

Test case ID: 112	**Test Case Description:** Verify the functionality of “Ticket Cancellation”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		sno to select the booking:1	
		the date(dd-mm-yyyy):21-01-2022	
		the reason for cancel:high fare	
		Do you want to cancel(y=yes,n=no)?:y	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to Ticket cancellation screen	Cancel Ticket screen should be displayed and details of latest booking should be displayed	As expected

2	Enter the sno to select the booking , the date , the reason for cancel , Do you want to cancel .	A message should be displayed as “you are not eligible for refund !!!”	As expected

Test case ID: 113	**Test Case Description:** Verify the functionality of “Ticket Status”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		NA	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to Ticket Status screen	Ticket Details of latest booking should be displayed.	As expected

Test case ID: 114	**Test Case Description:** Verify the functionality of “Add Flight”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		Flight id:1001	
		Flight name:air India	
		date (dd-mm-yyyy):21-01-2022	
		starting place:kochi	
		destination place:trivandrum	
		depature time(HH:mm):02:00	
		arrival time(HH:mm):03:00	
		no of seats:50	
		Fare:4000	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to Add Flight Screen	Add Flight Details screen should be opened	As expected
2	Enter flight id , flight name , date , starting place , destination place , depature time , arrival time , no of seats , Fare	A message should be displayed as “flight Added successfully.”	As expected

Test case ID: 115	**Test Case Description:** Verify the functionality of “Modify Flight”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		sno where the 'flight being modified' is associated:1	
		Enter flight name:spice jet	
Step No.	**Step details**	**Expected Result**	**Actual Result**

1	Navigate to Modify Flight screen	List of flights for edit should be displayed	As expected
2	Enter sno where the 'flight being modified' is associated	List of attributes should be displayed	As expected
3	Select the attributes to modify and Press Enter key	Admin should be able to enter the details	As expected
4	Enter the data	A message should be displayed as" Flight Modified successfully".	As expected

Test case ID: 116	**Test Case Description:** Verify the functionality of "View Flight Details"		
Prerequisites:		**Test case (Pass/Fail):** pass	
		NA	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to "View Flight Details" Screen	Flight Details should be displayed	As expected

Test case ID: 117	**Test Case Description:** Verify the functionality of "Add Hotel"		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		Hotel Name:paradise	
		Hotel place:trivandrum	
		Room Fare/Day:2000	
		No.of Rooms:25	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to "Add Hotel" screen	Add Hotel screen should be opened	As expected
2	Enter Hotel Name , Enter Hotel place , Room Fare/Day , No.of Rooms	A message should be displayed as "hotel added successfully."	As expected

Test case ID: 118	**Test Case Description:** Verify the functionality of "Modify Hotel"		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		sno where the 'hotel being modified' is associated:1	
		Hotel name:Taj	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to Modify Hotel screen	List of hotels for edit should be displayed	As expected
2	Enter sno where the 'hotel being modified' is associated	List of fields should be displayed	As expected
3	Select the attribute to modify and Press Enter key	Admin should be able to enter the details	As expected

4	Enter the data	A message should be displayed as “Hotel Modified Successfully”	As expected

Test case ID: 119	**Test Case Description:** Verify functionality of “View Hotel Details”		
Prerequisites:		**Test case (Pass/Fail):** pass	
Test Data:		NA	
Step No.	**Step details**	**Expected Result**	**Actual Result**
1	Navigate to “View Hotel Details” screen	Hotel Details should be displayed	As expected