



# **AIRLINE RESERVATION SYSTEM**

## **Software Quality Assurance (SQA) Plan**

**Date:** <January 27, 2022>

**Team Members:**

**UBAIDA WAHEED**

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## 1.0 Purpose

The purpose of this Software Quality Assurance (SQA) Plan is to establish the goals, processes, responsibilities and production of software according to the specified requirements required to implement effective quality assurance functions for the AIRLINE RESERVATION SYSTEM project.

This quality plan is established to ensure the high quality of the project and on time delivery of the project.

The Airline Reservation System Software Quality Assurance Plan provides the framework necessary to ensure a consistent approach to software quality assurance throughout the project life cycle.

The review checks of the planned documents for this project would be projected to the management of the project in order to track and access the progress being made on the project.

## 1.1 Scope

This plan covers SQA activities throughout the following phases of the Airline Reservation System Project.

This plan establishes the SQA activities performed during development and maintenance of the Online Airline reservation System.

This project has been passed through the following stages:

- Plan
- Development
- Check
- Act

In planning phase, the SRS document have been made in which requirements are elicited through different techniques. Then, after the requirements elicitation the checklist and inspection report have been made to ensure that no requirements have been overlapped with the existing requirements and the critical review of the experts helps to add or remove some of the requirements through the project.

Then after all these processes the development phase started in which the coding of our project starts in which different modules have been made with respect to the perspective of clients and managers in different programming languages and by using different software tools.

Then the checking phase is made in which all the modules have been crossed checked.

In the act phase the software that is being made is deployed.

The main purpose of this plan is that group will report the modules to the senior management with respect to the following documents Software Configuration Management, Software and System Test and Project Managers.

## **1.2 Project Summary**

The AIRLINE TICKET MANAGEMENT SYSTEM offers a lot of opportunities for the customers, who have a great deal of trouble to find their place in the advanced the required plane. This type of automated system and application software, provides passengers with the opportunity to view the flights and time and destination allotted to them. It will also provide an opportunity to save a ticket, or to change or cancel it, these are the specific terms and conditions that this system offers.

Furthermore, this software system can be used in any ticket managing system. The admin can also use this system to get updated with the track record of the passenger's feedback and choices.

This system is actually the updated version of paper-based system because paper-based system is very time taking and it is difficult to keep track record of each and every passenger and to search one passenger's record from the list of thousands of entries. So, online system has made it easier than manual system.

The system will provide the following screens to the users to get access to the next level:

- For accessing system, all of the users must have to face the Login screen at first. The login screen appears with the username and password. The forget password option has also provided through which the user can change the password.
- Different kind of screen appears if the user forgets his password for which he has to add his mobile phone number or email to confirm his identity
- At above different menus appears which help them to navigate what they want
- If user does not register on the page, then he can only have access to view the flight details
- In order to reserve the seat, user must have to login and get registered
- It keeps the record of the passengers and flights in the portal which have to be updated by the admin and passengers and passengers get notification automatically if any change occurred in flights
- The form for entering or registering new user in the portal will be provided to admin through which he enters the details and gives him access



- The account logout function allows account members to exit their account for security purposes. And prevent others from accessing it.
- The help function shall give the user an overview of how to use the different functions.

## 2.0 Reference Documents

The following documents were used or referenced in the development of this plan:

- IEEE STD 730-2002, IEEE Standard for Software Quality Assurance Plans
- Naveed Ali, Richard Lai, A method of software requirements specification and validation for global software development, June 2017, Volume 22, Issue 2, pp 191–214  
<https://link.springer.com/article/10.1007/s00766-015-0240-4>
- Luke Paireepinart, David Keyes, Jingtao Liu, Frank Medjo and Seth Orell, Software Requirements Specification for Airline Flight Booking System, February 2009  
[http://www.academia.edu/23567842/Software\\_Requirements\\_Specification\\_for\\_Airline\\_Flight\\_Booking\\_System\\_Software\\_Requirements\\_Specification\\_for\\_Airline\\_flight\\_booking\\_system](http://www.academia.edu/23567842/Software_Requirements_Specification_for_Airline_Flight_Booking_System_Software_Requirements_Specification_for_Airline_flight_booking_system)
- [Airline Reservation System](#) Software Requirement Specification
- [Airline Reservation System](#) Software Design and Development Document
- [Airline Reservation System](#) Software Implementation Document
- [Airline Reservation System](#) Software Requirement Specification Checklist
- [Airline Reservation System](#) Software Requirement Specification Inspection Report

### 3.0 Quality Goals and Expectations

The goal of the SQA program is to ensure that all software and documentation to be delivered meet all technical requirements and quality requirements. The SQA procedures defined here shall be used to examine all deliverable software's and documentation to determine compliance with technical and performance requirements.

The following table shows the Software Lifecycle Activities of the computer software to which this SQA plan applies:

#### SOFTWARE DEVELOPMENT LIFECYCLE

Software Lifecycle Activities
Project Planning and Oversight
Software Development Environment
System Requirements Analysis
System Design
Software implementation and Unit Testing
Unit Integration and Testing
Software Qualification Testing
Software Used Preparation
Software Deployment
Software Acceptance Testing

### 4.0 Software Reviews

#### 4.1 Purpose

This project will be made by three members. The team consist of Ubaida Waheed, Tayyba Salamat and Sana Akbar. The chart given below will define the SQA roles and responsibilities of the members of the project team and their respective functions.

If some person is unable to fulfill his/her responsibility or unable to do any task within time it will be the responsibility of the manager to tackle and oversee the situation and hire some alternative as soon as possible with desire skills and experiences.

Role	Name	Organization	SQA Responsibility
System Owner	Miss Mehreen Sirshar	Fatima Jinnah Women University	Helps define the project quality and expectations. Represents the requirements and final acceptance testing
Project Supervisor	Dr. Irum Matloob	Fatima Jinnah Women University	Manages the project progress and determines the work is according to the schedule
Project Manager	Sana Akbar	Fatima Jinnah Women University	Ensures implementation of quality activities. Coordinates the issues and resolve them for regular and timely communications
QA Manager	Ubaida Waheed	Fatima Jinnah Women University	Manages the QA functions.
QA Consultant	Tayyba Salamat	Fatima Jinnah Women University	Audits and approves the project according to the QA perspective. Checks the deliverables and applicable standards.

## 4.2 Review Schedule

The following table provides the review schedule of the certain documentation in the project and with the dates on which the documentation and deliverables have been provided.

Phase	Name	Deliverable	Submission date
I	Software Quality Assurance Plan	Vision Document 1.0 Project Plan 1.0	27-January-2022
II	Software Requirement Specification	Actions identified during phase I	05-February-2022



III	Software Design and Development	Architecture Design	7-April-2022
IV	Software Implementation Document	Test Plan Formal Technical Inspection Executable Prototype	7-June-2022
V	Dynamic Testing Document	User Manual Component Design Source Code Assessment Evaluation Test result	7-October-2022

#### 4.2.1 Artifact 1

The inspection report is made after the requirements elicitation and software requirement specification document is made and in inspection report the critical review of the functional and non-functional requirements have been made to ensure any kind of error or fault in the requirements taken through different sources.

After the inspection report the SRS document is reviewed and changes have been made through the checklist document.

The inspection report and checklist are referenced here References topic.

The overview of checklist and inspection report is as follows:

**CHECKLIST:**

**Correctness /Completeness/Consistency:**

1. Applicable software quality attributes (e.g. reliability, maintainability, testability) are identified?
2. Online system's requirements (marketing) are documented?
3. All functions are considered (startup, restart, modes of operation, shutdown, normal termination, and abnormal conditions etc.)
4. Requirements are traceable to requirements allocated to system?
5. Have algorithms intrinsic to the functional requirements been identified?
6. Do the requirements provide an adequate basis for design?
7. Are all requirements written at a consistent and appropriate level of detail?
8. Is each requirement in scope for the project?
9. Do any requirements conflict with or duplicate other requirements?
10. Is each object is referred to by a unique name?

**Quality Attributes:**

1. Are all performance objectives properly specified?
2. Are all security and safety considerations properly specified?

**Meets Standards:**

1. Terminology is understandable or not?
2. Glossary is adequate?
3. SRS adheres to required format?

**Traceability:**

1. Is each software functional requirement traceable to a higher-level requirement (e.g. system requirement, use case)?

**Testability:**

1. All requirements are specified against the software?
2. Test procedures can be written against all requirements, using existing or planned resources?

Review Report By:  
UBAIDA WAHEED  
TAYYBA SALAMAT  
SANA AKBAR

Checklist To Be Verified:

• Correctness /Completeness/Consistency:

Points To Be Reviewed	Status
➤ Applicable software quality attributes (e.g., reliability, maintainability, testability) are identified.	PASS
➤ Delivery requirements (marketing) are documented.	FAIL
<b>Correction</b> The AIRLINE RESERVATION SYSTEM will be present on the public website and every one can view and book their flight, so marketing of website should be necessary and should be documented.	
➤ All functions are considered (startup, restart, modes of operation, shutdown, normal termination, and abnormal conditions etc.)	PASS
➤ Requirements are traceable to requirements allocated to software	PASS
➤ Have algorithms intrinsic to the functional requirements been identified?	PASS
➤ Do the requirements provide an adequate basis for design?	PASS
➤ Are all requirements written at a consistent and appropriate level of detail?	PASS
➤ Is each requirement in scope for the project?	PASS
➤ Is each object is referred to by a unique name?	PASS
➤ Do any requirements conflict with or duplicate other requirements?	PASS

• Quality Attributes:

Points To Be Reviewed	Status
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➤ Are all performance objectives properly specified?	PASS
➤ Are all security and safety considerations properly specified?	PASS

• Meets Standards:

Points To Be Reviewed	Status
➤ Terminology is understandable or not?	PASS
➤ Glossary is adequate?	PASS
➤ SRS adheres to required format?	PASS

• Traceability:

Points To Be Reviewed	Status
➤ Is each software functional requirement traceable to a higher-level requirement (e.g., system requirement, use case)?	PASS

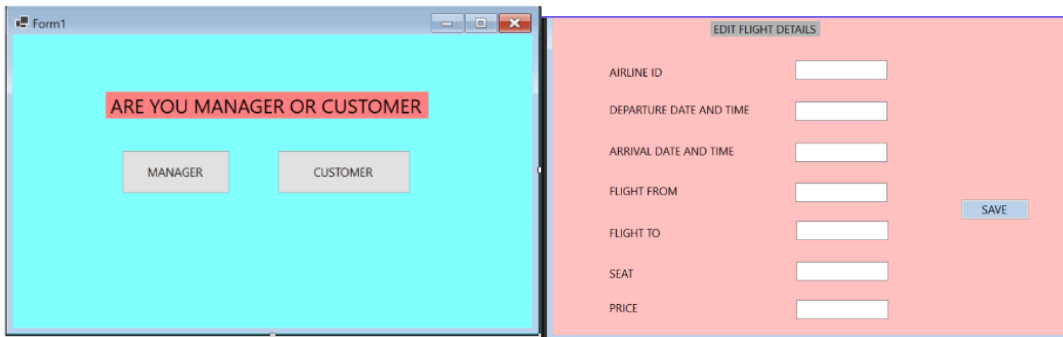
• Testability:

Points To Be Reviewed	Status
➤ All requirements are specified against the software?	PASS
➤ Test procedures can be written against all requirements, using existing or planned resources?	PASS

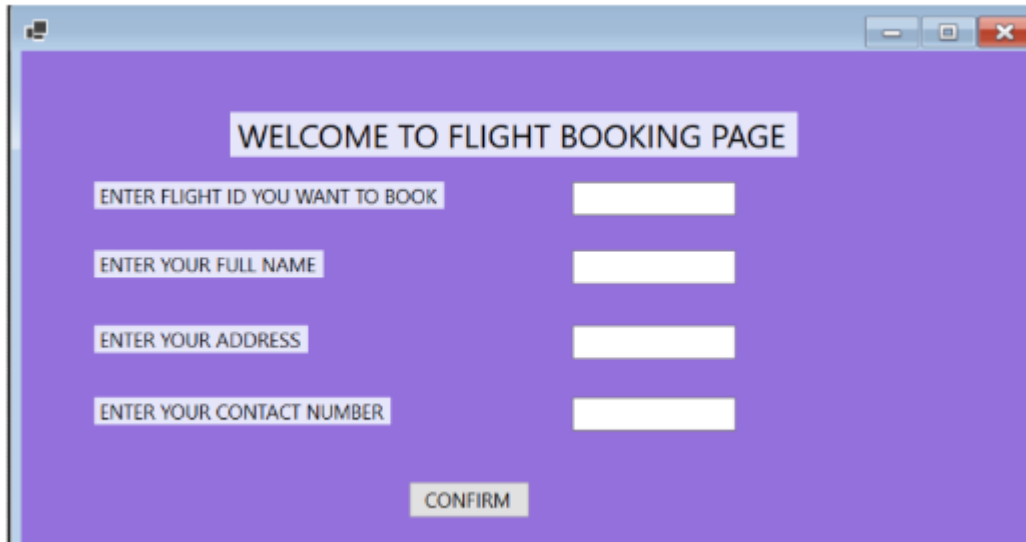
## 4.2.2 Artifact 2

In our design document there have been some changes made. In the first phase of design the basic functionality had been added in our application in which the Manager is able to set the flight details whenever he wants and the customer can book the ticket and then the result get stored in the database.

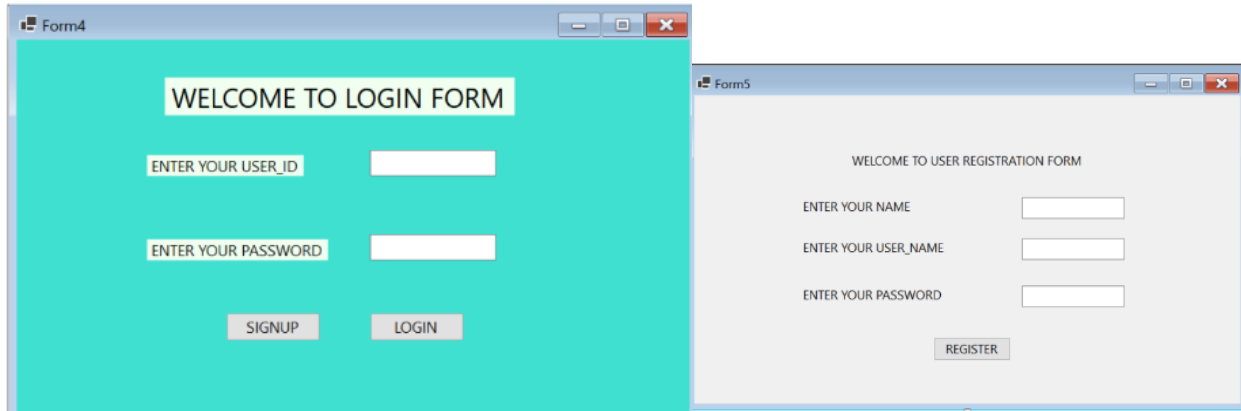
Then in the second version of our design we added some functionality like login page for already user of our application and signup page for the new users.



The screenshot displays two side-by-side windows from a flight booking application. The left window, titled 'Form1', has a light blue background and contains a red-bordered box with the text 'ARE YOU MANAGER OR CUSTOMER'. Below this box are two buttons: 'MANAGER' and 'CUSTOMER'. The right window, titled 'EDIT FLIGHT DETAILS', has a light pink background and contains a form with the following fields: 'AIRLINE ID', 'DEPARTURE DATE AND TIME', 'ARRIVAL DATE AND TIME', 'FLIGHT FROM', 'FLIGHT TO', 'SEAT', and 'PRICE'. Each field is accompanied by a white text input box. A 'SAVE' button is located to the right of the 'FLIGHT TO' field.



The screenshot shows a single window titled 'WELCOME TO FLIGHT BOOKING PAGE' with a purple background. The window contains a form with the following fields: 'ENTER FLIGHT ID YOU WANT TO BOOK', 'ENTER YOUR FULL NAME', 'ENTER YOUR ADDRESS', and 'ENTER YOUR CONTACT NUMBER'. Each field is accompanied by a white text input box. A 'CONFIRM' button is located at the bottom center of the form.



The image displays two side-by-side screenshots of web forms. The left form, titled 'Form4', is a login interface with a teal background. It features a title 'WELCOME TO LOGIN FORM', two input fields labeled 'ENTER YOUR USER\_ID' and 'ENTER YOUR PASSWORD', and two buttons labeled 'SIGNUP' and 'LOGIN'. The right form, titled 'Form5', is a registration interface with a light gray background. It features a title 'WELCOME TO USER REGISTRATION FORM', three input fields labeled 'ENTER YOUR NAME', 'ENTER YOUR USER\_NAME', and 'ENTER YOUR PASSWORD', and a single button labeled 'REGISTER'.

## 5.0 Test

<Airline Reservation System> Test plan Version 3.0

### 5.1 Purpose

The entire purpose of testing process of Online Airline Reservation System is as follow

- To recognize the functionality and features of the system that will be tested
- To find and describe all the actions required to prepare for and conduct the testing process on the Airline Reservation System
- To define the pass/fail criteria for each function and criteria that will be tested
- To classify the deliverables of the testing phase.
- To define any delay criteria and risk management techniques
- To discuss the testing techniques being used to test the Airline Reservation System.

#### 5.1.1 Testing Modules

Testing procedure is made to check the different modules of the project using different testing tools and techniques. The modules that to be tested are:

- Login to the system
- User Registration
- Check vacancy of the seat
- Book Seat
- Pay for the reserved seat
- Cancel ticket
- Check booking status
- Update flight schedules
- View passenger list

### 5.2 APPROACH

This division of the Software Quality Assurance plan describes the overall methodology for testing the Airline Reservation System project. All the testing will be done with the help Selenium, UFT (Unified Functional Testing) and ANTS (Advanced .NET Testing System). The testing would be carried out or done on the Airline Reservation System throughout on each stage and each module from registration till the booking as well as from unit to acceptance testing.

### 5.2.1 Unit Testing

The Unit Testing is a test that tests each single module of the software to check for errors and bugs. This is mainly done to discover errors in the code of the Airline Reservation System. The main goal of the unit testing would be to isolate each part of the program and to check the accuracy of the code. In the case of the Airline Reservation System, all the web forms along the SQL Database, PHP functions and the C++ classes along associated operations will be tested. There are many benefits for this unit testing:

- The unit testing facilitates change in the code.
- It allows testing to be done in a bottom up fashion.

This task will be done by QA manager and Testing Expert i.e. **Ubaida Waheed and Tayyba Salamat**.

### 5.2.2 Integration Testing

In Integration Testing, the individual Airline System modules are combined and tested as a whole unit. The main purpose of the integration testing is to test the functional and performance requirements on the major items of the online reservation system project.

All the modules of the project developed individually would be combined together and tested as a whole system in the integration testing. This would be done by the project manager along project supervisor i.e. **Sana Akbar and Dr. Irum Matloob**.

### 5.2.3 Regression Testing

Regression testing will be done when any changings and alteration will occur in our online airline reservation system.it will also be done when any update, any functional addition or any module increment will be introduced. The basic purpose of this testing will be that when any change will implemented into the computer program or system, it will not disturb or confuse the previous functionalities of the system.

So, before any new version of an online airline reservation project is released, the old test cases for the project will be run against the software with the changes made, to make sure that the old functionalities of the project still work. It would be done by QA manager, project manager, supervisor and testing expert team.

### 5.2.4 Acceptance Testing

This testing will be executed when the project is approaching its final stage. This test will aim to qualifies the project and decides if it will be accepted by the owner of the airline reservation system i.e. **Miss Mehreen Sirshar** along supervisor **Dr. Irum Matloob**. And this test will be done by the owner miss Mehreen.

### 5.2.5 System Testing

The system testing will be done on the whole integrated system to make assure that online airline reservation system project that has been made fulfils all the requirements and specifications. The test cases for the system testing will be the combination of unit and integration tests.

### 5.3 Test Cases

The succeeding are the test cases for our online Airline Reservation System:

Test Cases	Description
Test Case#1	Entering Incorrect email while login
Test Case#2	Incorrect format inserted in the input fields for the registration page.
Test Case#3	The data fields left out empty in the registration page
Test Case#4	Incorrect format of data or incorrect search entered into the data entry fields of the flight search and booking page.
Test Case#5	Entering incorrect account information for payment
Test Case#6	Entering incorrect information for checking seat status
Test Case#7	Try to book seat that is not existing

#### 5.3.1 TEST CASE 1 – User Login

**Incorrect Input:** Incorrect username, which is the email-id in the case of the Airline Reservation System.

- **Pass Criteria:** An appropriate message should be generated to indicate that an invalid username has been typed.



- **Correct Input:** The correct input would be a valid e-mail id of the user and a correct password associated with the email-id which he uses to log in.
- **Pass Criteria:** The user should be directed to the webpage that the customer is intended to go to after he logs into the system.

### 5.3.2 TEST CASE 2 – User Registration

- **Incorrect Input:** Incorrect format inserted in the input fields for the registration page.
- **Pass Criteria:** An appropriate message should be generated to the user saying that he has entered the incorrect format in the specific input field that is incompatible to desired format.
- **Correct Input:** The compatible and correct format entered by the user into the input fields of the registration page.
- **Pass Criteria:** The pass criteria for this test case would be a successful registration of the customer into the Airline Reservation System website. The system would log the user into the system after this.

### 5.3.3 TEST CASE 3 – User Registration

- **Incorrect Input:** The data fields left out empty in the registration page.
- **Pass Criteria:** An error message should be generated to the user saying that he has to fill out those fields in order to be registered into the system.
- **Correct Input:** The correct input in this case, would be that the customer would enter the data in all the fields in the registration form.
- **Pass Criteria:** The pass criteria for the system would be that it accepts all the customer details and then registers the customer and helps him log into the system.

#### 5.3.4 TEST CASE 4 – Search and Book Flights

- **Incorrect Input:** Incorrect input in this case, would be incorrect search criteria entered or incorrect format of data entered into the data entry fields of the flight search and booking page.
- **Pass criteria:** A message has to be generated to the user indicating the wrong entry that he has made in the fields.
- **Correct Input:** A correct input would be entering the data into the data entry fields in a correct format.
- **Pass Criteria:** The pass criteria for this test case would be that the search would return valid results and then when the customer made the booking, the system has to generate a confirmation to the customer and indicate that an e-mail has been sent to the customer.

#### 5.3.5 TEST CASE 5 – Payment

- **Incorrect Input:** Entering incorrect account details for the payment of booked seat
- **Pass criteria:** A message has to be generated to the user indicating the wrong entry that he has made in the account portion
- **Correct Input:** Entering correct account details for the payment of booked seat
- **Pass Criteria:** The pass criteria for this test case would be that the invoice of the user would be generated and will be confirmed by the system that your seat has been booked successfully.

#### 5.3.6 TEST CASE 6 – Checking status

- **Incorrect Input:** Entering incorrect information for checking the seat status either wrong seat number, aircraft number or destination.
- **Pass criteria:** An alert message has to be made to the user informing that sorry you have entered wrong seat details in order to check the status.

- **Correct Input:** Entering correct details in each field to check the status of the seat
- **Pass Criteria:** Detailed status of the seat would be shown to the user showing whether seat booked or vacant.

#### 5.3.7 TEST CASE 7 – Book seat

- **Incorrect Input:** entering the seat details to book that does not exist
- **Pass criteria:** An error message would be triggered which will show that seat booking failed the seat that you are trying to book does not exist.
- **Correct Input:** user will try to book the seat and enter the details of seat that exist
- **Pass Criteria:** the user get the notification that congratulations the seat that you want to book has been booked successfully

### 6.0 Problem Reporting and Corrective Action

This section defines the problem reporting process and corrective action procedure to be used during the Airline Reservation system project.

#### Problem no 01:

The first problem is to link the Microsoft Visual Studio with the SQL Management studio.

#### Corrective Measure:

The corrective measure taken in this regard is to install the latest version of both Visual Studio and Microsoft SQL Server Management and by doing that the connection got successfully made and database got connected.

#### Problem no 02:

The next problem during design is that some of the requirements of the customers is difficult to accommodate in the GUI phase and implementation phase.

#### Corrective Measure:

The corrective measure taken against it is that through inspection report and checklist some of the requirements are discussed with the client and then the design get updated accordingly.

#### Problem no 03:

The next problem faced is that the database is not accepting the null values and giving errors in it.

**Corrective Measure:**

The corrective measure taken against is that during the table creation the primary key is set as auto incremental and then during the query entering remove the column of primary key.

**Problem no 04:**

The SQL connection between the tables and database is not made.

**Corrective Measure:**

The nugets get installed after which the SQL connection works properly. The Nugets which installed are:

SQL.Data.Oledb

SQL.Data.SqlClient

## 7.0 Tools, Techniques and Methodologies

SQ personnel will require access to the following:

Tool Name	Version	Purpose
Microsoft Office tools (i.e., Word, Excel, and PowerPoint)	Microsoft 2019	General Documentation.
Visual Studio	2022	Window forms in C3 language, designing the GUI of the application
SQL Server Management Studio	2019	For tables, database creation and linking the SQL database with the Microsoft Visual Studio
Rational Rose Test Suite	2015	UML Diagrams like Use case Diagram, class Diagram, package Diagram, sequence Diagram etc.
Star UML	2018	UML Diagrams like sequence Diagram, timing diagram, activity diagram etc.
UFT One Runner Parallel UI	2019	Testing tool for our application

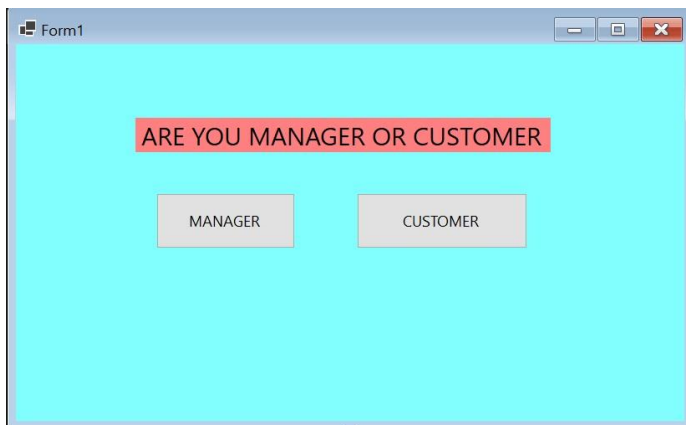
## 8.0 Configuration Management

Airline Reservations System (version 1.0) was first presented to the marketplace over a time ago. Since then many of new functionalities and abilities have been added to provide an improved product used by airlines worldwide. Pick and choose from traditional airline functions and innovative powerful tools to enable our users the freedom they need.

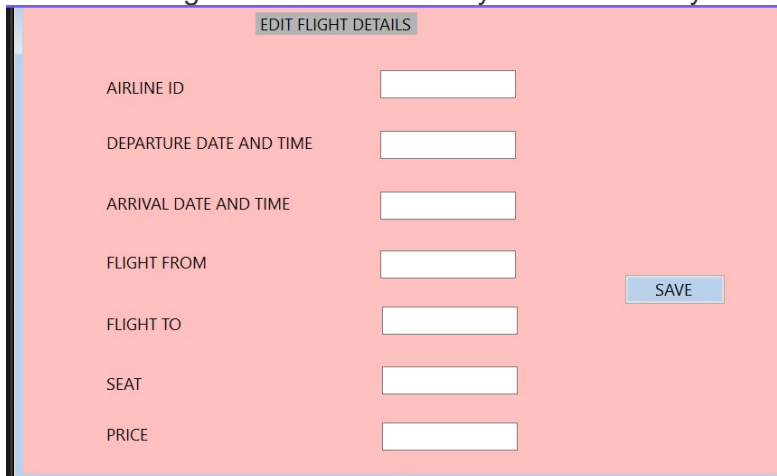
For direct to customer bookings the online automated booking engine (version 2.0) can be adapted to suite any airline in any market. Choose from different pricing structures and displays, online check-in and dynamic real time seat displays with chargeable seat allocation opportunities.

Furthermore, to provide enhanced functionalities to the user of Airline Reservation System (version 2.1) the additional number of web pages will also be produced. Initially our users are facilitated with the following listed pages/forms:

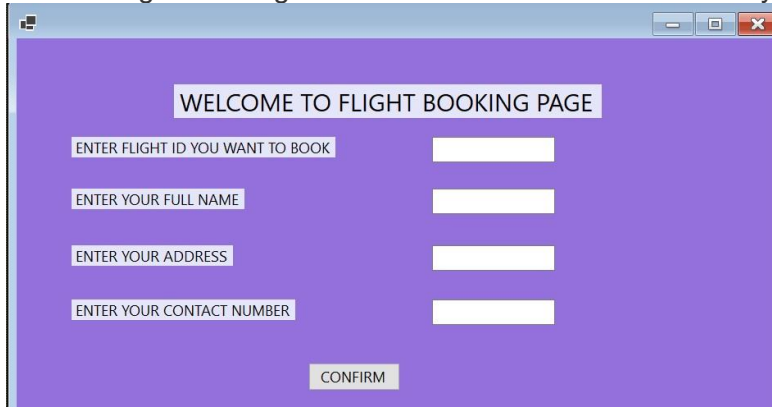
First main page



Form 2 edit flight details that can only be accessed by the manager of airline reservation system



Form 3 Flight booking for the user of Airline Reservation System:



WELCOME TO FLIGHT BOOKING PAGE

ENTER FLIGHT ID YOU WANT TO BOOK

ENTER YOUR FULL NAME

ENTER YOUR ADDRESS

ENTER YOUR CONTACT NUMBER

CONFIRM

Now in <Airline Reservation System>version 2.1, two more forms will be integrated with the existing automated software

First form for the login facility for the security of the user.



Form4


WELCOME TO LOGIN FORM

ENTER YOUR USER\_ID

ENTER YOUR PASSWORD

SIGNUP LOGIN

Second form for the user's online registration who uses the system for the first time:



Form5

WELCOME TO USER REGISTRATION FORM

ENTER YOUR NAME

ENTER YOUR USER\_NAME

ENTER YOUR PASSWORD

REGISTER



In <Online Airline Reservation System> version 2.2, page for the seat canceling for booked seat and status checking for the desired seat would be introduced.

In <Online Airline Reservation System> version 3.0 the user would also be able to pay the amount of the seat that he would have booked via any online media along invoice printing options. This would be done by integrating the system with the bank interface.