AIRLINE RESERVATION SYSTEM

SOFTWARE REQUIREMENT ENGINEERING

UNIVERSITY OF THE PUNJAB

(GUJRANWALA CAMPUS)

PROJECT: AIRLINE RESERVATIONS SYSTEM

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My parents for all the support. who's sounding advice helped me steer this project in the right direction, a work I will forever cherish.

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Abstract

This paper presents the design and implementation of an Airline Reservation System (ARS), a sophisticated and efficient application developed to streamline the process of booking and managing flight reservations. The ARS aims to enhance the user experience for both passengers and airline staff by providing a seamless, userfriendly interface and robust backend system. The system integrates various functionalities including flight search, seat selection, booking confirmation, payment processing, and itinerary management. It leverages modern technologies such as cloud computing, database management systems, and secure payment gateways to ensure reliability, scalability, and security. Additionally, the ARS incorporates real-time data processing to offer up-to-date information on flight schedules, availability, and pricing. This paper discusses the system architecture, design considerations, and implementation details, along with a thorough analysis of its performance and scalability. The ARS demonstrates significant improvements in operational efficiency and customer satisfaction, positioning it as a vital tool in the competitive airline industry.

Project outline

1.1 Purpose

There is name for this project which is Airline Reservation System. The software is providing options for viewing different flights available within a different timings for a specific day. That provide customers within facility to able to book ticket smoothly. The customers can modify and able to cancel the ticket for any reason. That prepare within a role and policies. A polices and role allow the customers modify the specific options. For example the customers can't modify the price or change in the prices. That is not allowed or changing in the time. The software should option for checking availability of the tickets. That is important for the customers to get message if the ticket unavailable. That will be displayed into customers. The customers should be noted when the change has been made or any further changes

1.2 Document Conventions

We have to document the deals about all the main feature for this software. The software will mainly function for each purpose. We describe these details for the interface within other products. That related functionality of each product.

ARS-Airline Reservation System

LAN-Local Area Network

GUI-Graphical User Interface

OS-Operating System

RAM-Random Access Memory

MB-Mega Bytes

GB-Giga Bytes

Mbps-Mega bits per second

HDD-Hard Disk Drive

1.3 Intended Audience and Reading Suggestions

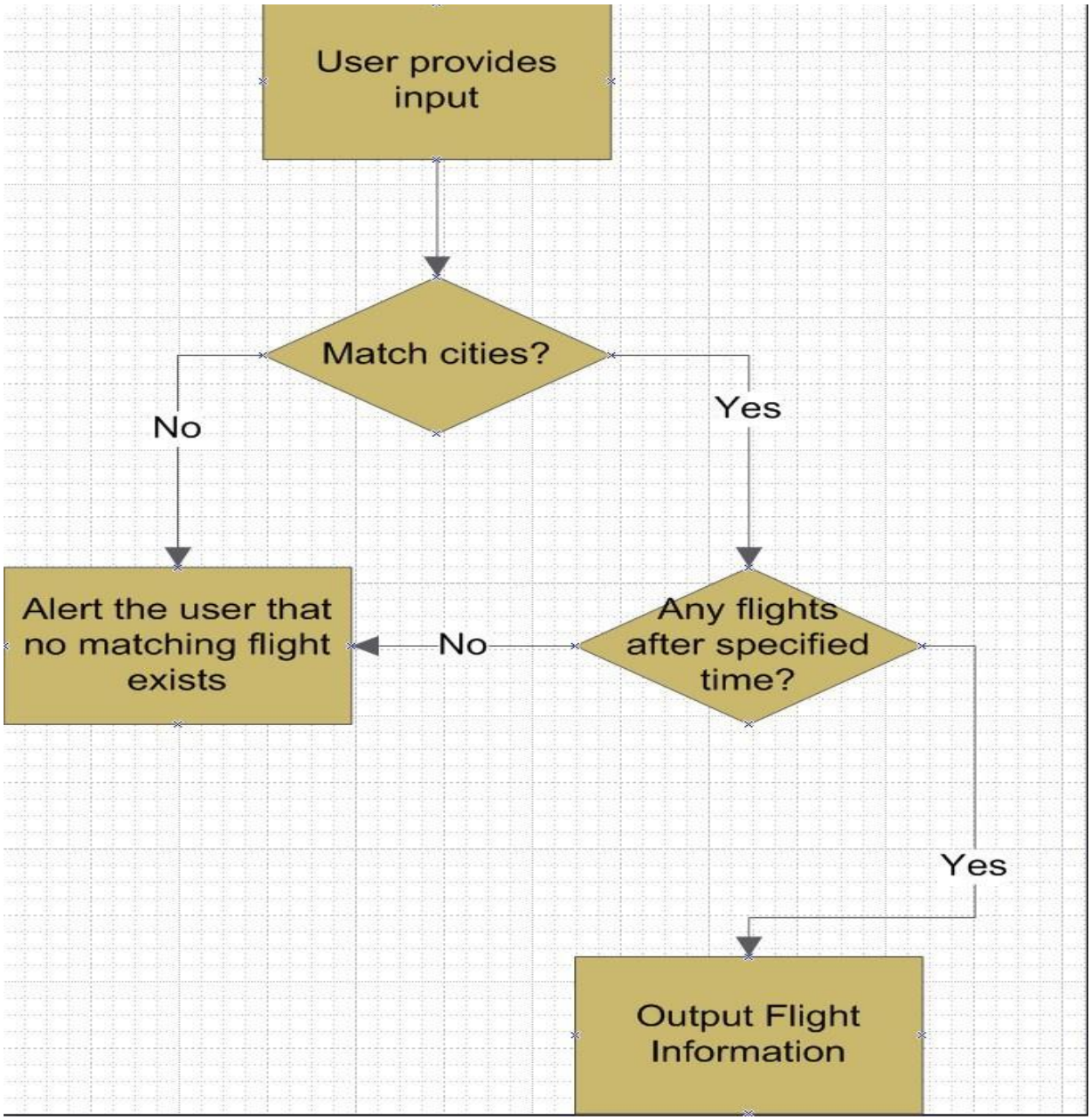
We are going to create software as independent application. That is a self-contained product. The system interfaces, hardware are defined follows.

1.4 Project Scope

The airline booking website is an application stored in the user server. The purpose of the website is to resolve the client to allow website users to perform tasks related to booking an airline flight. Requirements are the description of how the system

should behave, or of a system property or attribute. They are capabilities and objectives to which software must conform. Or in other words, they are constraints on the development process and describe.

1.5 system interface (BPMN diagram)



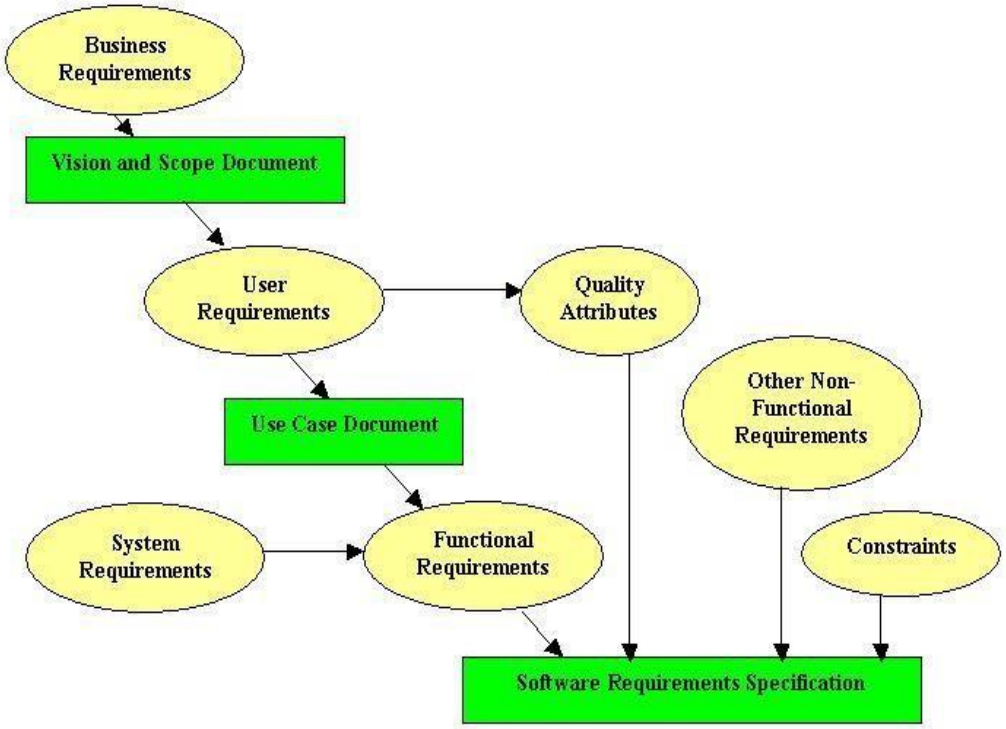
1.6 Specific requirements

1. The screen formats and organization. The interface should be easy to understand and user includes such as
2. The introductory screen will be the first t displayed which will allow the user to choose either of 2 options.
3. That view flight detail within booking a ticket.
4. Window format and organization when our customers chooses some other option, then the information pertaining to that choice will be displayed in new window.
5. That ensure multiple windows to be visible on the screen
6. The customers can switch among them.
7. The data format entered by the users will be alphanumeric.
8. The end message, when there were some exceptions raising error like entering invalid details, then error message will be displayed prompting the users to re-enter the details.
9. Hardware Interfaces

The system must basically support certain input and output devices. Their descriptions are as follows.

Name of Item	Description of Purpose	Source of Input/ Description of output

Key board	To accept data from user like pin code, personal details, flight details	Source of Input
Printer	To print the bookings mode E.g.: Destination chosen with date and timings	Destination of Output



1. User-level facilities

2. The screen format and menu structure should be in touch.

3. That shall user find it easy to use.

4. The product shall be use friendly and very inter active.

5. The functionality shall provide by the system which is displaying errors

6. The message shall adapt itself to different users of the software

1.7 User requirements

1. User properties like Name, Address, Age,
2. Associated with Flight Miles accumulated and Credit Card information. 3. Flight properties like Departing/Arriving City, Departure/Arrival dates and times, Miles, and an identifying Flight Number.
4. Flight Seat properties of identifying seat number, reserved and flight
5. Associated to Flight-by-flight number

1.8 List of Stakeholders

Passenger:

- Individuals who use the airline services for travel.

Airline Management:

- Executives and administrators who oversee the airline's operations, strategy, and overall performance.

Airline Staff:

- Ground staff, flight attendants, pilots, and maintenance crews responsible for day-to-day operations and customer service.

Travel Agents:

- Individuals or agencies that book flights and manage travel arrangements for customers.

Government and Regulatory Bodies:

- Entities like the Federal Aviation Administration (FAA) or the International Air Transport Association (IATA) that regulate airline operations, safety standards, and air traffic control.

Airport Authorities:

- Organizations managing airport facilities, including runways, terminals, and other infrastructure necessary for airline operations.

Suppliers and Service Providers:

- Companies providing goods and services to airlines, such as fuel suppliers, catering services, and maintenance providers.

Investors and Shareholders:

- Individuals or entities that invest in the airline company and have a financial interest in its performance.

Technology Providers:

- Vendors supplying IT infrastructure, reservation systems, and other technological solutions critical to the airline's operations.

Security Personnel:

- Staff responsible for ensuring the safety and security of passengers, crew, and aircraft**.**

Freight and Cargo Customers:

- Businesses or individuals using the airline's services for transporting goods and cargo.

Marketing and Sales Teams:

- Departments focused on promoting the airline, managing customer relationships, and increasing sales.

Customer Support and Service Centers:

- Teams handling inquiries, complaints, and support services for passengers.

Environmental Agencies:

- Organizations concerned with the environmental impact of airline operations, including noise pollution and carbon emissions.

Local Communities:

- Residents and businesses near airports who are affected by airline operations.

Alliances and Partner Airlines:

- Other airlines and partners that collaborate on codeshare agreements, joint ventures, and shared services.

Financial Institutions:

- Banks and financial entities involved in transactions, loans, and financial management for the airline.

1.9 Functional Requirements

FR1: Flight Search and Booking

- Allow users to search for flights based on various criteria (destination, date, time, etc.).
- Enable flight booking, including seat selection and confirmation.

FR2: User Registration and Authentication

- Provide user registration and login functionality.
- Allow profile management, including updating personal information and password changes.

FR3: Payment Processing

- Integrate with payment gateways for secure online transactions.
- Support multiple payment methods (credit card, debit card, e-wallets, etc.).

FR4: Itinerary Management

- Allow users to view, modify, and cancel bookings.
- Provide email and SMS notifications for booking confirmations and updates.

FR5: Flight Status and Updates

- Display real-time flight status, including delays and cancellations.
- Notify users of any changes to their flight schedule.

FR6: Check-in and Boarding Pass Generation

- Enable online check-in and boarding pass generation.

Provide options for mobile boarding passes and printing.

FR7: Customer Support

- Offer a helpdesk or customer service chat for user inquiries and support.
- Provide FAQs and troubleshooting guides.

FR8: Loyalty Program Management

- Manage frequent flyer programs, including points accumulation and redemption.
- Allow users to view their loyalty status and benefits.

FR9: Administrative Functions

- Allow administrators to manage flight schedules, pricing, and inventory.
- Enable reporting and analytics for monitoring system performance and usage.

FR10: Baggage Handling

- Allow passengers to add and pay for additional baggage.
- Provide baggage tracking information.

1.10 Non-Functional Requirements

NFR1: Performance

Ensure the system handles a high volume of concurrent users without performance degradation.

Optimize response time for flight search and booking processes.

NFR2: Scalability

Design the system to accommodate growing numbers of users, flights, and transactions.

Ensure the architecture supports horizontal scaling.

NFR3: Security

Implement robust security measures to protect user data and transactions.

Ensure compliance with relevant data protection regulations (e.g., GDPR, PCIDSS).

NFR4: Reliability

Ensure high availability and minimal downtime.

Implement failover mechanisms and data redundancy.

NFR5: Usability

Provide an intuitive and user-friendly interface.

Ensure accessibility for users with disabilities.

NFR6: Maintainability

Design the system for easy maintenance and updates.

Document all components and provide clear guidelines for troubleshooting.

NFR7: Compatibility

Ensure compatibility with various browsers and devices (desktop, mobile, tablets).

Support integration with third-party systems and APIs.

NFR8: Localization and Internationalization

Support multiple languages and currencies.

Ensure the system can handle international date and time formats.

NFR9: Data Integrity

Ensure accurate and consistent data throughout the system.

Implement validation and verification processes.

NFR10: Auditability

Maintain logs of all transactions and system activities.

Provide audit trails for regulatory compliance and troubleshooting.

1.11 Materials

Operating System, SQL Platform, Java Platform, NetBeans IDE and Microsoft Office

School Laptops

Printers

Memory stick.

Software Resources

MS Office

Internet

Explorer

Net Beans IDE 6.5

2. Requirements elicitation

2.1 Project Overview

We have to discover the requirements and control encompass all activities involved. The engineering and system developers are working in close relationship customer and end users to the problem to be solved. That can find out more around the project. We have to describe the functionality of the system. We have to performance of the system such as hardware constraints extra.

2.2 Requirements Elicitation process

We have to check more due to relevance and importance for some requirements could change. Could end user for example changing their job. There are process for many different elicitation that can be found.

2.2.1 Elicitation overview

The purpose process of the model's concentration on general that can change requirements and costs. the cost of the change in the standard software engineering will be going up but in the agile system would remain same or less cost.

2.2.2 Elicitation Requirements

Classify Requirements Elicitation

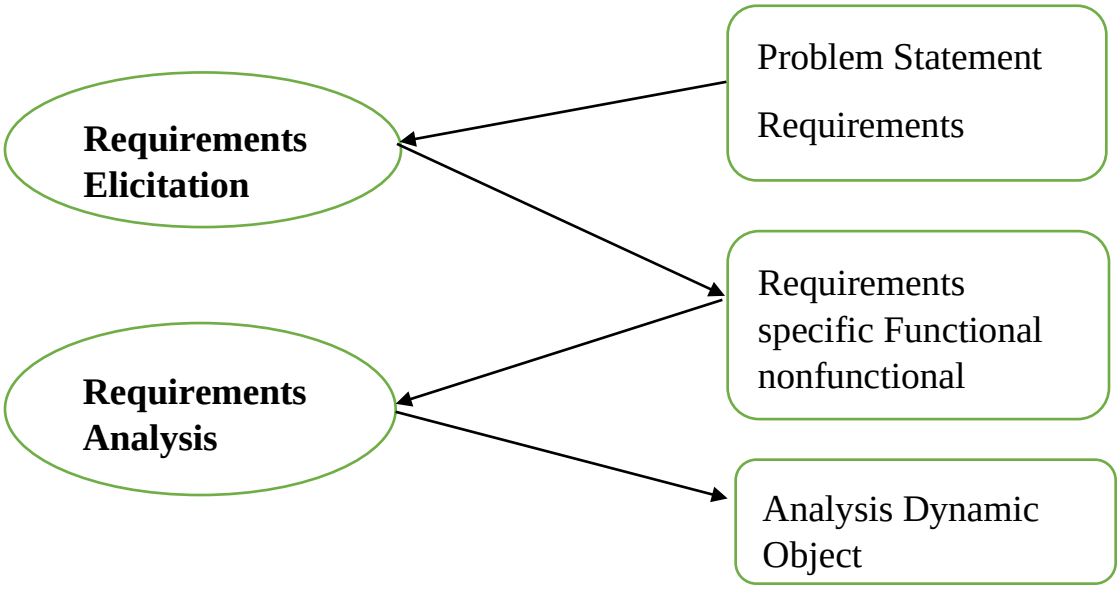
1. We have to set the object such as problem, budget, goal, constraints and schedule.

2. We shall focusing on the background knowledge acquisition such as structure, application domain, systems and existing.

3. We shall having knowledge of organization such as stakeholder, responsibilities, roles and stakeholders.

4. We have to collect stakeholder requirements such as users, organization requirement and domain

2.2.3 Elicitation Requirements Technique



We have to identify in this process as a key points of summary project.

1. We shall highly dependent on the context and the process of requirements elicitation.

2. We shall provide a little actual guidance for current process models of requirements elicitation.

3. We shall do the first step for the requirements elicitation to understand the domain is very important. That is including human stakeholders and requirements come from a variety of sources.

2.2.4 Group or team Technique

The requirements group focus on the market. That is a kind of group meeting. The focus group provide more natural conversation than would more defined group work approach.

2.2.4.1 Brainstorming

Shall drawing our thought for the process where participants from different a stakeholder groups engage in information discussion.

2.2.4.2 Workshops requirements

I worked with team as tester as automation using white and black boxes. I have good experience in database design and understanding it from the scratch into deployment.

2.2.4.3 Group focus

The group elicitation technique prepares to foster stakeholder agreement. That is exploiting team dynamics. We work together dynamically to generate ideas for specification that target directly into our system.

2.2.4.4 Group nominal

2.2.4.5Elicitation requirements approaches

We have to define as an arrangement of ideas that intended to deal with a problem or situation. The previous work such requirement elicitation approaches tend to be more specific to the actual task of eliciting requirements. That is development a specification for a system. There are literally dozens of approaches that have to use more specific.

2.2.5 Specific requirements approach

The model approaches to provide a specific model of the type of information. That gathered information to drive the process. The model can be different types such as mathematical, graphical and several approaches. The several approaches based on each of these type that has been

2.2.5.0 Goals

We prepare requirements elicitation that have become increasingly popular for both research and practice. We define the goal of modeling and goal-based approaches. That is high level goals. The sub goal is further refund incrementally expanded in the way. That is individual requirements are elicited.

2.2.5.1 Scenario

The requirements elicitation is specific description of current. That is future process to include action and interactions among the users. We have to do certain condition that describe the system for airline system reservation. We have to understanding the system and validating requirements. We have to test case development so the use of scenario in conjunction within goals to elicit requirements. That has attracted considerable attention.

2.2.5.2 Use Cases

The use of cases for eliciting requirements increased significantly in recent years. That is make them particular easy to understand. That flexible enough to accommodate context in the specific information. The use case can be reused later in the development especially with airline system reservation. That help development process to determine components. That is currently investigated Suring system design

2.2.5.3 Viewpoints

The viewpoint approach model and domain. That were different perspectives in order to develop a complete such as consistent description of the largest system. the system can be described in term of its operation, interface and implementation.

2.2.6 Combinational approaches

2.2.6.0 Zooming

The requirements elicitation technique for the time been. That effort should only a used selectively to examine in greater detail. That needs deemed especially important as referring to this approach as zooming. We have to take the individual weakness of otherwise effective technique. At the same time, we have to take advantage of their combine strength without increasing significant unnecessary increase in both effort and time.

2.2.6.1 Inquiry Cycle

We have approach inquiry cycle for the close integration of goal. The scenario in order to preform requirements elicitation. The approach would be based on a cyclical model that consist. That provide the stakeholder with understanding the system behavior would be. In this case what ever having problem please could be analysis to elicit requirements which we were checked against identified system goal to make surreal relevance and accuracy

2.2.6.2 Scram

The process we use in the early prototypes could called concept demonstrators together that design rationale in order to elicit a complete correct picture of the target system and clear we can walkthrough method in order to guide the process of requirements elicitation through 10 tines questioning of our customers. We have per study of preparation

1. We have all data collection 2. We

have to analyses them carefully

3. WA have ideation workshops.

2.2.6.3 Best practice

The approach airline reservation system is to study in particular and software engineering in general. That shall been based on the combination of multiple technique. The represent to recommended best practices. That can be selective dynamically applied in to different project types and situations.

3. Requirements Analysis

3.0 Introduction

We focus on the system that concerned within various factors. We investigate system require such as internal and external.

3.0.1 Why system analysis

The requirements analysis are activities to collect about everything related into the project directly or none directly. Directly and none direct are coming from users, employees, customers and managers. That can develop the system based on this data and update information.

3.0.2 Data Collection

The data is going to be around airline system reservation. That is depending

on current situation.

1. There is will be problem if we don't analyze the system.
2. We investigate each problem related into airline system reservation.
3. We have to make sure what does the system do for this requirement.
4. We have to make sure which specific require uncompleted.
5. What type of solution and conceptual can full this requirement.
6. We consider a problem domain from the perspective of project such airline system reservation in the real world
7. We can define the solution as collection of data for this software application.

3.0.3 Documented

We have to complete collection data and documented that will be manual files for airline system reservation. We have to upgrade the existing PC based on the system. If we want to computerize the existing manual system. In this

document. There are reports such as forms, memos, business plans, and policies and organismal chart. That provide all information about the system we want to build.

3.0.4 Reserve Seats

We have to gather information during the meeting such as gather information. The project team should interview within mangers, clients, suppliers, users, and competitors to collect the information about airline system reservation.

3.0.5 Flight Status

Description & Priority:	This section shall allow the user – whether enrolled or not – to view flight information that matches input criteria. The user will provide: a. A flight number and Date OR b. Departing/Arriving Cities and Date. The system will display matching flight information including the following fields: ○ Flight Number ○ Departure City ○
	Arrival City ○ Status (one of the following) • In Flight • At the Gate • Delayed • On Time

Inputs:	Departing city, Destination city, Departure date/time
Source:	All inputs are provided by the user.
Outputs:	Flight information including Flight Number, Departure City, Arrival City, and Flight Status.
Destination:	All outputs should display on the screen.
Pre- Conditions:	None
Post- Conditions:	User has flight status for any matching flight
Side-Effects: **3.1.6 Flight Schedule**	None
Description & Priority:	This section of the system shall allow a user to query flight

3.0.6 Flight Schedule

Description and Priority:	The user can use the *Book Flights* function to purchase seats for an airplane flight. The system shall present the user with
	information on all current flights. The user may then select a pair (departure and return) of flights on which to purchase seats. The user can indicate the number of seats and placement of such. Finally, the system shall guide the user completely through the checkout process.

Inputs:	User information – the user must already be logged in.
Source:	Inputs are from the user except flight information, which is retrieved from the system.
Output:	The purchased seats are tied to the user's account, so he/she can reserve seats later.
Destination:	The booked flights will be stored in the user's account information when the user finishes payment. The flight information shall also display on the screen.
Pre-Conditions:	The user must have an account with the website and must be logged in.
Post-Conditions:	Completion of this function guarantees that the user has seats on a specific flight. However, if the user wants particular seats, he/she must also complete the reserve seats function. Any successfully-booked flight from this function is assumed to have completed payment already.
Side-Effects:	User's account is charged. Flight is associated with user's

Stimulus/Response:

User Action	**System Application**

	1. The systems checks to see if the user is logged in, if not then the systems require the user to login. The system shows the user a list of their already booked flights and the available seats for those flights.
2. The user selects individual seats from a list of pre-booked flights. The	3. The system checks if the selected seats are still available. If they are
Seats are chosen in pairs so that the user's selects individual seats for the departing and returning flights.	Available then the seats are temporarily unavailable to other users to allow the user to confirm their selection. The seats and confirmation selection screen are displayed
4. The user confirms the seat selections on the screen.	5. Once confirmed, the seats are removed from available seats and are applied to the user account. The user is shown a final confirmation screen which displays selected seats and account information.

3.0.7 Account

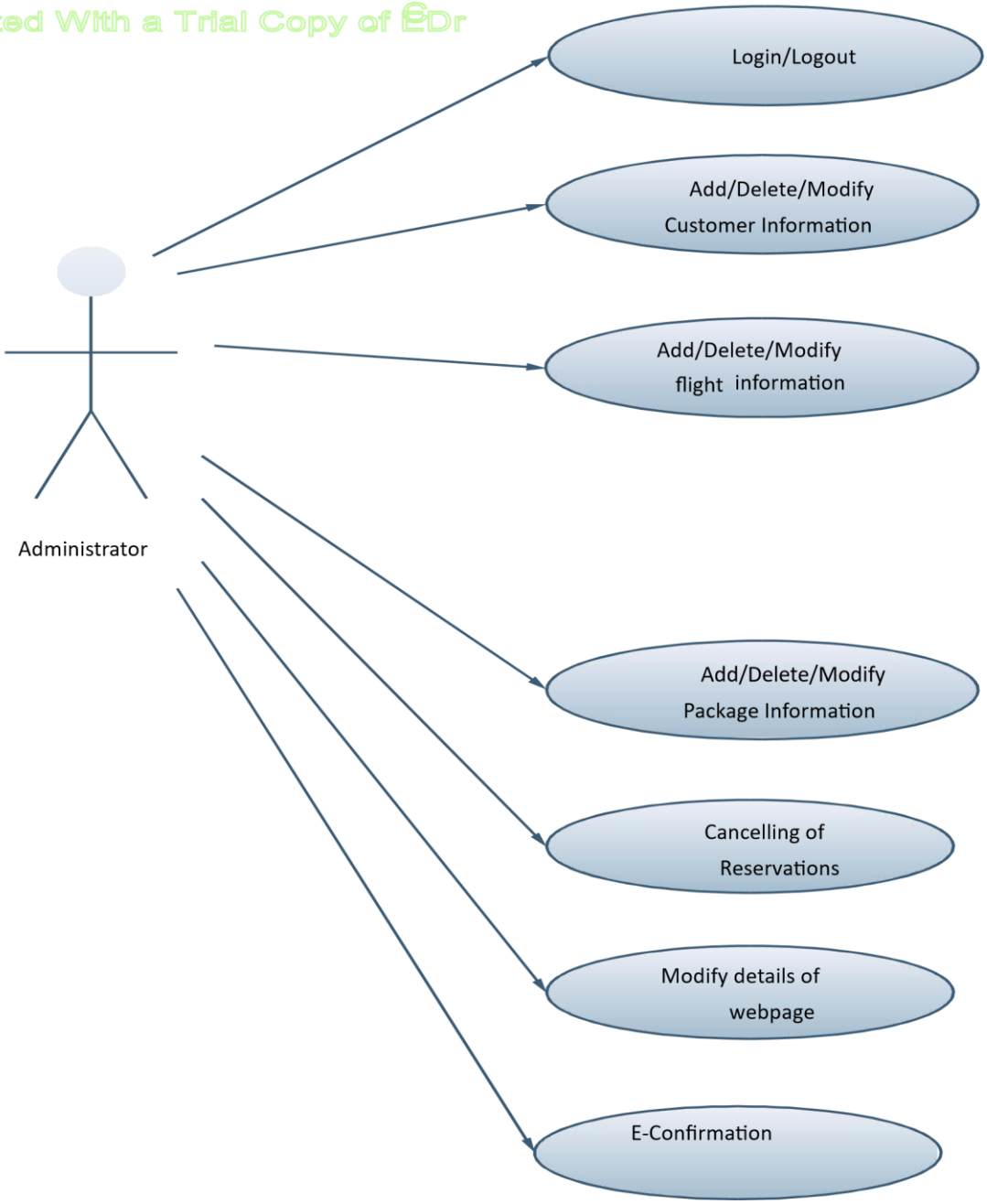
Description & Priority:	This section gives the user the power to view, save, edit or delete the information stored in his/her account. The user can
	check his/her accumulated points, look at the status of a flight that was booked, cancel a flight that was already booked (optional) and change his/her address, phone number, email or password. This feature is not available for non-registered user.
Inputs:	Account changes, if any, made by the user. Account changes include updates on first name, last name, and email address, mailing address, password or phone numbers.
Source:	All data are inputs from user.
Output:	None.
Destination:	The changes are committed on completion of the *My Account* function to account information.
Pre-Conditions:	The user must have an account with the website and must be logged in prior to access his/her account.
Post-Conditions:	All changes submitted by the user are applied to the user account on completion of the function.

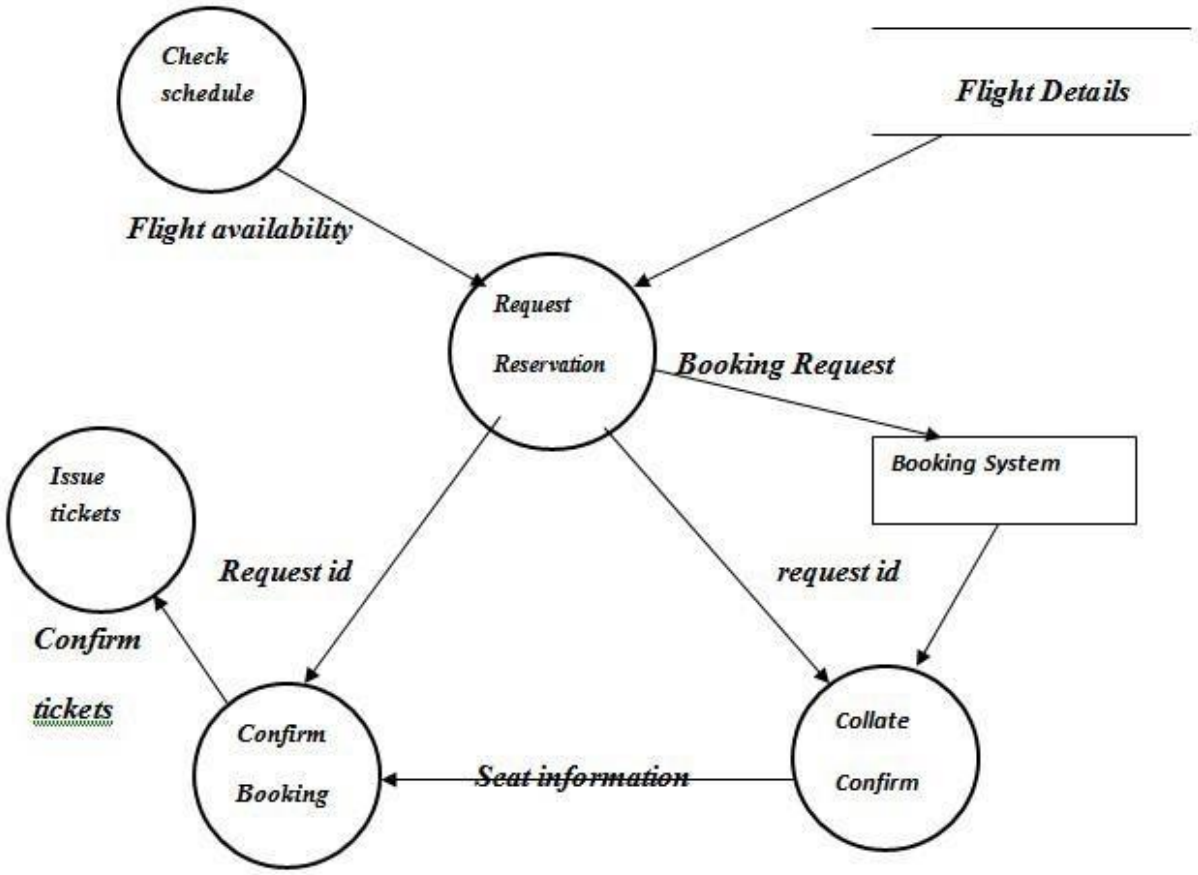
3.0.8 Account Log out

Description & Priority:	The *Logout* section provides a way for the user to securely log out of the system. This process will save all user operations when he/she exits the system. If a user wishes to continue accessing the website, he/she must log-in again to access user features.
Inputs:	None.
Source:	N/A
Outputs:	Notification that the user is logged out.
Destination:	User is notified by display to screen.
Pre-Conditions:	User is logged in to the system.
Post-Conditions:	User is logged out of the system.
Side-Effects:	The system clears the session state for the user once logout is

3.1 Data Analysis

3.1.0 Use Case





Administrative management system

Use Cases	Description
1. Homepage use case	The actors or customer can enter his inform in details that is going to be user name, password and security question
2. Logon and registration home page case	The customer after make login into the system then can enter personal information to make an account
3. The book flights case	The customers or actor can search for specific flight and reservation that place on the flight by purchasing a ticket.
4. Book a package case	The actors and customers can look up for specific touring packages available

5.Contact the company case	The actors and customers can contact the company if they have any concerns or any questions related into the booking that he has made it in online
6. The booking instructions case	The actors and customers can getting instructions to how they can book airline ticket.

3.1.1 Data Description

DATA	**DESSCRIPTION**
List of airports	Airport name, location, abbreviation such as City, State, time zone
Specific flight	Flight id, Airline Departure/arrival and Date/time
Verify departure and destination such as	Airport, Seats and total, vacant seat number.
Type of the seats	First class, Business class, second class and regulars
Information of reservations made	Flight idea, email, passenger name, credit card type/number, address and total price
User information	Email, password

3.2 Fact finding method

3.2.0 Interviewing

We met with the most users and organization members that can descript the application. We have to complete inconsistent for each step of project. We have to make sure all require discussed. We have to move for next level with complete structure so we can achieve our goal. We have to discuss if any arguments among team members and customers to finalize everything.

3.2.1 Questionnaires

We take the customers concern first and we work to make them happy with. Our product. We listen for all customers carefully for any question might be not clear. For my experience in the software understand the project well. That mean we did half of it.

3.2.2 Record view

We have to review everything in the project for all documents and each records. That is important to get finalize what we have to do for next level.

3.3 Conduct interview

1. We discuss most important points
2. Everyone should have the time of meeting what he/she have to do

3.3.0 Preparation for meeting

The interview should business and there objectives. Clear. The questions are around objects of the project.

3.3.1 Type of interview

We have to make sure how users and developer view each other. That is important for the quality of the project. The quality of project is depending on develops how can see users require of the specification. The purpose of this project is reviewing and auditing. That is to check the quality of the application as ready for development. We have review and audits conducted periodically. We have to make sure

inspections which will take the quality of the documentation. That is in compliance with the project.

3.3.2 Type of the topic question

3.3.3 Wording of the questions

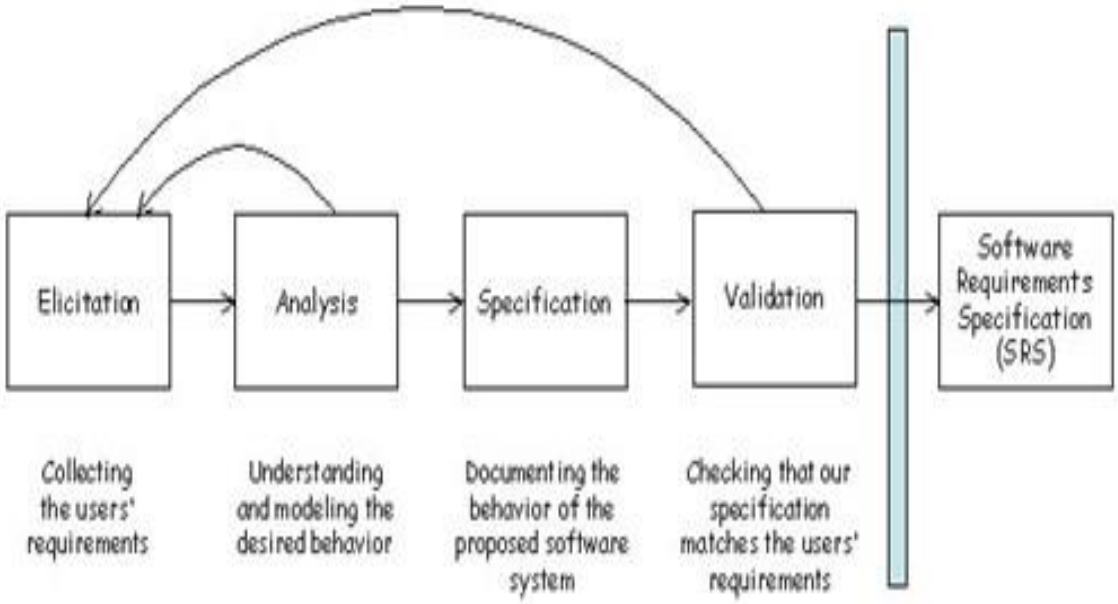
3.4 Observe and document business process

There are a rules and policies. That have to be addressed

3.4.0 Business analysis

We have to achieve our goal by creating project reduce cost, time and maximums services for our customers and our organization as well.

3.5 Roles of business analysis



3.5.0 Business process improvement

The problem of	Large manual guest registration process.
Affects	Staff, administration, customers.
The impact of which is	Dissatisfied customers and reservation system administration.
A successful solution would be	Improving the image of the reservation system and attract more customers. Staff responsibilities will also be made easy.

3.5.1 Goal of business analysis

The system should fit all requirements that apply into the system.

4. Requirements and Software quality

4.1 User Interfaces

The Users requirement reviewing	The developers' requirements reviewing
What our users want from the system, our users know or our users don't know yet	We have problem if developers don't understand what the customers' needs

Our users can search for his flight or they can't	We have to sure reviewing requirements that translate clearly stated needs into successful system. The developers understood this translate otherwise would be problem.
Users are unable to provide a usable statement of needs.	The developer could set unrealistic standard for this requirements definition
Our users can deal with too many needs of our users that motivated our system	Some the developers place too much emphasis on a technicality.
Our users can make a change for recent requirement	The developer can make change at anytime
Sometime our users want everything quickly.	Some the developer lazy or late
Our users can't remain on the schedule	Sometime the developer can't respond quickly into legitimated changing need.
Our users can't prioritize needs	The developers are all the time over budget.
Our users are unwilling to compromise.	Sometime the developers say no all the time
If our users refuse to take responsibility for the system.	Sometime the developers try to tell us how to do our jobs.
If our users are not committed for this development project.	Developers ask users for time and effort, even to the detriment

4.2 Communications Interfaces

4.2.0 Project overview

For measure system	Customers, staff and Airline system administration
Who	Register, update, administrate.
The (product name)	Airline system reservation
That	Enable online Customers registration system and generate user statistics.
Unlike	The current largely manual system.
Our product	Provides up-to-date information and the Customers and available flight.

4.2.1 Revising project

Revision Number	Revision Date	Summary of Changes	Author
01	04/18/2024	Reviewing requirements	Dr.Salman

4.3 Project measuring

A Help link will appear on every screen that describes the function of each page to the user. The implementation should be written so that blind users can still interact with the system (using a screen reader.)

4.3.0 Requirements specification
4.3.1 Quality control
4.3.2 Project testing

User/customer pages testing summary
TEST
CASE #
DESCRIPTION RESULTS/COMMENTS

TC # 1	User Login Passed
TC # 2	User Registration Passed
TC # 3	Search and Book Flights Passed
TC # 4	Search and Book Packages Passed
TC # 5	Search and Book Hotels Passed

The below table represents the summary of results of testing on the Administrator pages. The results have been explained in detail later in the document.
Administrator pages testing summary
Administrator pages testing summary

TEST

CASE #	DESCRIPTION RESULTS/COMMENTS
TC # 6	Administrator sign in Passed
TC # 7	New Flight/Package/ Passed
TC # 8	Updating Flight/Package/ Passed

4.3.3 Summary

To start with, I have performed manual testing on the Airline Reservation System Website. Manual Testing is one of the oldest and rigorous methods of software testing. This testing strategy gives the best opportunity to check every page thoroughly and make sure it works in the expected manner. Due to the complexity of the various automation tools and the time available for testing the entire web application, I preferred to use manual testing based on the fact that it is one of the best methods of testing suggested for a beginner. All the test cases mentioned in the Test Plan document of Phase II were tested here. The results of the manual testing are represented in the following tables.

5. Verification Requirements

Objectives:	Verify all Project Plan elements and validate if elements match with the Statement of Work.
Rationale:	In order to accomplish project objectives in the expected quality, time and cost, it is important to verify and validate all project elements.
Roles:	Project Manager

	Technical Leader
	Customer
Products:	Verification Results
	Acceptance Record
Artefacts:	*Project Plan*
	Statement of Work
Steps:	1. Verify the *Project Plan*
	2. Validate the Project Plan
	3. Document the results
	4. Make corrections
Step Description :	***Step 1.*** **Verify that all Project Plan** Verify that all *Project Plan* elements are viable and consistent ***Step 2.*** **Validate the Project Plan** Validate that the Project Plan elements definition match with the Statement of Work. ***Step 3.*** **Document the results** Document the results of verification in Verification Results ***Step 4.*** **Make corrections** Make corrections until the document is approved (by TL or CUS) Note: Very that the Project Plan including V&V tasks in order to assure the quality of work products.

5.1Verifaction Performance and Requirements

Essential tool for an effective review process

List common problem area and guide reviewers

There are general checklists and checklists for particular modeling and specification languages

Checklists are supposed to developed and maintained Requirements Review Checklists elements in requirements review checklist

- Understandability - can readers of the document understand what the requirements mean?
- Redundancy - is information unnecessarily repeated in the requirements document?
- Completeness - does the checker know of any missing requirements or is there any information missing from individual requirement descriptions?

✦ Requirements Review Checklists

- Ambiguity - are the requirements expressed using terms which are clearly defined? Could readers from different backgrounds make different interpretations of the requirements?
- Consistency - do the descriptions of different requirements include contradictions? Are there contradictions between individual requirements and overall system requirements? Requirements Review Checklists

5.2 Validation & Verification

- Effective (even after considering cost)
- Allow finding sources of errors (not only symptoms)
- Authors are more attentive when they know their work will be closely reviewed

5.3 Verification of design

Document	Project Validation Plan	Requirements Specifications	Functional Specification	Factory Acceptance Testing	Site Acceptance Testing	Installation Qualification	Operational Qualification	Performance Qualification	Security Plan	Business Continuity Plan	Protocol Final Reports	Project Validation Plan Final Report
Project Manager												
System Owner												
Operations												
Engineering												
Technical Support												
Validation												
Quality Assurance												
Technical Writer												
Add and subtract as required												

Traceability Matrix

6. Verification Requirements

6.1 Verify Software Construction

Facilitate accurate, appropriate, and complete responses from prospective contractors ○ Elicit multiple, competitive responses and allow for consideration of contractor suggestions for better ways to satisfy requirements ○ Facilitate easy and consistent evaluation of responses

6.2 Software Test for Integration

Objectives:	Verify Software functions using test cases
Rationale:	To assure that key functions identified in the Requirements Specifications have been implemented according to Software Design
Roles:	Programmer
Products:	Software Component
	Verification Results
Artefacts:	Software Design
	Software Component
	Test cases and Procedures
Steps:	1. Identify Software Component

	2. Apply unit test
Step Description :	• ***Step 1.*** Identify Software Component Identify unit of code and data to be tested ***Step 2.*** Apply Unit Test • Verify using *Test Cases* and Procedures if software component works according to *Software Design*

7. References

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