ARMY UMRAH AUTOMATION SYSTEM

(AUAS)

By

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Submitted to the Faculty of Computer Science, Military College of Signals National University of Sciences and Technology, Islamabad in partial fulfilment for the requirements of a B.E Degree in Computer Software Engineering

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CERTIFICATE OF CORRECTNESS AND APPROVAL

This is to officially state that the thesis work contained in this report

"Army Umrah Automation System (AUAS)"

is carried out by

Muhammad Mudassir, Zeshan Ali, and Hamza Naseer

under my supervision and that in my judgement, it is fully ample, in scope and excellence, for the degree of Bachelors of Computer Software Engineering from National University of Sciences and Technology (NUST), Islamabad.

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ABSTRACT

With every upcoming year, Pakistan Army repeats a complete process of manual selection of candidates for Umrah based on laid criteria. Applicants apply through traditional mailing system. Complete process including application reception, short listing of ineligible candidates and final selection of candidates based on their merit along with necessary correspondence is done manually with the help of clerks. The faculty and staff try to manage this heap of data by generating results, but the output is still error prone.

Considering the requirements of Pakistan Army, Army Umrah Automation System (AUAS) is a web application that provides its three categories of users: staff, manager and administrator; a simplified and automated Umrah selection system. We can also call these users as representatives at Unit, Corps and GHQ. Its extensive scope features task like viewing dashboard, managing pilgrim records, pilgrims lists, booking records, viewing and updating booking status, hotel management, selection of travelling agency, voucher generation and printing etc. AUAS is looked forward to as an app that provides its users with the services which they need in order to perform all the work with ease and more accuracy. With a simple and elegant user interface and constant online availability, AUAS is a successful replacement for the traditional Umrah selection system.

DECLARATION OF ORIGINALITY

We certify that the work contained in the following report and the intellectual content of this report are the product of the sole effort of our group, comprising of Muhammad Mudassir, Zeshan Ali, and Hamza Naseer. No portion of the work presented in this dissertation has been submitted in support of another award or qualification either at this institution or elsewhere, nor does it include any verbatim of the published resources which could be treated as a violation of the international copyright decree. We also affirm that we do recognize the terms 'plagiarism' and 'copyright' and that in case of any copyright infringement or plagiarism established in this thesis, we will be held fully accountable of the consequences of any such violation.

Dedicated to all those

who lead us on the journey

from ignorance to knowledge.

ACKNOWLEDGEMENTS

All of our gratitude is extended to Almighty Allah, the most beneficent, whose blessings empowered us to tread this journey.

We feel indebted to the benign faculty of Department of Computer Software Engineering, who raised us to these standards of knowledge; and especially to Lec Ayesha Naseer, whose unending support, motivation and guidance made us capable of turning the concept of this project into reality.

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KEY TO SYMBOLS OR ABBREVIATIONS

AUAS	Army Umrah Automation System
CSE Dept	Computer Software Engineering Department
DB	Database
GHQ	General Headquarters
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
JS	JavaScript
JCO	Junior Commissioned Officer
Mac	Macintosh
MCS	Military College of Signals
MIT	Massachusetts Institute of Technology
NUST	National University of Sciences and Technology
OE	Operating Environment
PHP	Hypertext Preprocessor
REQ	Functional Requirement
REP	Representative
SDS	Software Design Specification
SE	Security Requirements
SF	Safety Requirements
SQL	Structured Query Language

SRS	Software Requirements Specification
STP	Software Test Plan
UD	User Documentation
UI	User Interface
URL	Uniform Resource Locator

CHAPTER 1

Introduction

1. Introduction

Motivation

Web Application of Army Umrah Automation System is projected as a platform for helping the managers and owner of the Pakistan Army Umrah Automation Scheme in selection of deserving candidates from Pakistan Army who are willing to perform Umrah. Selection of candidates will be done on the criterion laid down by GHQ. The system will improve the Umrah selection process which is formerly being done manually, by automating it. This would prove to be fit the owner and all managers of the Umrah Scheme that interact with the candidates from complete army for collection of relevant documents and select deserving candidates.

The managers usually keep record of all the documents and achievements of the candidate and as a matter of fact, they do a decent job at displaying individual statistics, but the information that can be accessed by analyzing and evaluating these records is lost between the pages.

It therefore urges the use of modern and systematic technology to develop a system that can analyze the performance of candidates, the Army Umrah Automation System.

Problem Statement

To develop an automated system that can analyze the data of Umrah applicants for every year, enable the authorities at different levels to validate and scrutinize the data, and help in smooth and efficient and fair working of Umrah Scheme at Army Level. Currently, the entire procedure is being performed by the Clerks in the ARMY through correspondence. This not only takes a lot of time, but also increases the workload. The applicants have to undergo a lot of hassle in the procedures of selection in Umrah schemes. Keeping in view the requirements of ARMY, AUAS will automate the entire data evaluation procedure for whole ARMY. Data will be fed into the system according to SOPs of Army at Corps and Division level. The authorities at GHQ will be

able to analyze the data on the basis of availability of seats and laid down procedures of Army, and selected candidates will be intimated through the same system.

The results will be analyzed and the system will develop detailed lists of people for UMRAH. This list could be accessed by the authorities and administration as well as the applicants. The project will be implemented in the form of a Web Application.

Project Scope

AUAS will be a Web-based Application that shall help the users to view their merit and evaluate user's standing. The owner and managers can use the system to see which candidates meet the desired standards and are fit for selection keeping in view all aspects. It will offer the users to view the complete bio data and achievements of the candidates. The system is being developed to automate the entire procedure, which is currently being performed manually.

External Scope

The scope of the project can be increased in the future to be implemented for Pakistan Navy and Air force as well. Similarly, it can be sold to private Umrah agencies after slight modifications according to their own requirements..

Project Objectives

Academic Objectives

- To understand the process of Requirement gathering and elicitation process
- To go through the process of professional software development
- To have detailed insight of the concepts of Database Management
- To understand the Web development in detail
- To learn the programming on server side

Application/End-Goal Objectives

The Application Objectives are as under:

- The details of all candidates from Army will be fed into AUAS.
- System will handle the complete bio data of the candidates from different formations.
- Authorities in GHQ will be able to see the performance of all candidates and select them as per criterion of Pakistan Army.
- System will support automatic front end form submission for visa sales, ticket reservations/bookings and hotel booking.
- Accounts and Finance status Functionalities.
- System will be extandable to have integration with other system
- Custom based Umrah packages for different ranks
- Capability to mould the Umrah as per the user requirements
- Registration based upon the liabilities and Islamic requirements for going on Umrah
- System will show the status of each applicant

- Options of additional Ziaraat in Saudi Arabia will be available which will be integrated with extensive research on the matter
- Voucher generation with all details of selected candidate regarding stay time, booking and travelling.

Document Organization

The document looks at all the aspects of development and usage of AUAS since its initial stage to its completion. Starting with Chapter 1 and 2 covering an introduction and literature review of the topic, Chapter 3 and 4 further discusses the process of requirement elicitation and design development. After completion of these stages, Chapter 5 and 6 of the document covers details regarding implementation and testing of the system.

Intended Audience and Reading Suggestions

The document is meant for the following stakeholders.

- **Project Supervisor:** to assist in project supervision and guiding the team in a better way.
- **Development Team:** to help in the development of product and trace-back of functional requirements.
- **Testing Team:** to help the testers to understand the applicable constraints.
- **Users:** The potential stakeholders of the system.
- **UG Project Evaluation Team:** to assist the evaluation committee in evaluating the progress of UG Projects.
- **Staff:** to understand the process of data entry into the system's database.

Summary

Above mentioned chapter concisely briefs the system and its functionalities, as well as this document, which covers all of the essential details regarding AUAS. This chapter also covers details regarding the scope and objectives of the system.

CHAPTER 2

Literature Review

2. Literature Review

Introduction

Every year in Army, candidates are selected for UMRAH on the basis of a specific criteria laid down by GHQ on the yearly basis. This involves gathering of data, their categorization and implementation. All this work and generation of lists is being done manually. So, for the convenience we are going to automate this whole manual work.

Product Perspective

Currently, when AUAS managers or owner wants to view the bio data, formation, achievement records, overall performance of the candidates and number of candidates from each formation, they need to do a lot of paper work to get the required information. There is no way, except manual work and calculations, to finalize the selection. Similarly, after different intervals of time, the staff as well as owner has to analyze the complete performance of different formations after going through loads of paperwork. Moreover, when they have to asses a particular individual, they do not have its complete record at one place as there is no centralized database.

This is where the AUAS comes in to play. It aims to eliminate the need for the manual analysis for the scheme and also provides a central database for complete army. The semantics of the project will make it easier to keep an eye on the performance of the formations and individuals. Furthermore, it will be a new, standalone product

It follows the Client-Server architecture technique as mentioned in the diagram below:

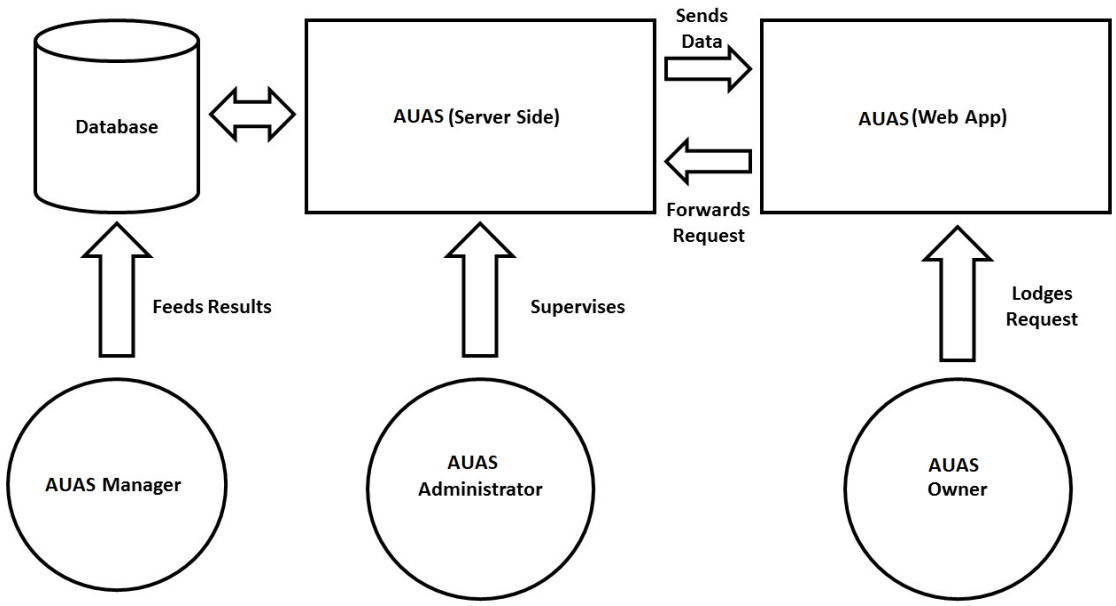

Figure 2-1 - Client-Server Architecture

Product Features

Following are the major functions of the Army Umrah Automation System (AUAS):

- Every user will be registered with AUAS, and get classified as Owner, Formation Manager or candidate which will be approved by the administrator.
- The data will be fed into the system database by staff or manager, and it will be updated on weekly basis.
- The system will enable the users to login into AUAS(by providing unique ID and password) and perform authorized functionalities.
- AUAS will permit the owner to view list of all managers along with their bio data and other required details.
- System will maintain a dashboard with some general information.

- The system will also maintain a record of all pilgrims such as passport number, booking id, mahram etc.
- The system will keep record of different available packages along with the all details of stay, budget, hotel etc.
- Reports will be generated showing complete bio data of the candidates, their pictures and their performance.
- System will be able to show list of all candidates throughout army along with their merit and selection status. System will also maintain record of successful candidates who got selected in previous years.
- Total expenses along with money collected by selected candidates (if any) will be maintained by the system.
- System will assign different umrah packages to successful candidates based on their categories.
- System will display status of ongoing umrah process e.g. visa in process, arrangements completed etc. to inform selected candidates about the proceedings.
- System after completion of process will generate a voucher with all details i.e. airline, hotel, living etc.
- Candidate will be able to show his voucher at different places and get the required facilities hence providing convenience to candidates.
- AUAS will permit the users to sign out of the system for termination of the session

User Classes and Characteristics

The software has three types of users: Administrator, Owner and Farm Manager. These users can perform functions assigned to their respective roles.

AUAS Administrator

The administrator will look after the server side and will be responsible for the smooth functioning of system and provisioning of backup of the complete data.

AUAS Owner

The owner will use the web based interface of the AUAS in order to view the records and give final approval of selection of candidates. Owner can also observe candidates meeting desired criteria, and see which areas a formation needs to improve for its performance in order to get its more candidates selected.

AUAS Manager

The manager can update candidates as well as respective formation information. They can also create new data entities for new candidates.

Operating Environment

OE-1

AUAS back-end utility i.e. server owned by Pakistan army and database can be maintained there. All the data will be accessed on the server and data manipulation can be done on the same server.

OE-2

The Web based system of AUAS shall run on the computer system with following specifications:

- Core i5 computer or higher
- 4 GB RAM
- At least 1 Giga Byte of free storage capacity
- Windows 7 or later operating system
- AUAS web application
- Color monitor and a working intra-net connection that can only be accessed by related individuals from Pakistan army.

OE-3

AUAS should be managed with My SQL database management system.

OE-4

AUAS will be able to run on any tablet or computer with a working intra-net connection using AUAS web application.

Design and Implementation Constraints

CO-1: Web compatible platform, should allow JavaScript es6 support is needed for end user.

CO-2: Front end styling should use Semantic UI.

CO-3: Laravel framework will be used.

CO-4: Web app front end will be implemented with Twitter Bootstrap and Chart JS.

CO-5: User authentication is controlled with Passport Js with iwt.

CO-6: Application backend will be implemented in express.

CO-7: My Sql is used for database system.

CO-8: For object-relational mapping (ORM), Sequelize will be used.

CO-9: Army intra-net connection needed.

CO-10: Use of English language as the only means of communication in the system.

CO-11: MCS CSE Department will be responsible for delivery of software in given deadline.

User Documentation

UD-1: End document along with an online user guide will be available to help the users in order to use Army Umrah Automation System (AUAS). User documentation that would be delivered along with the final product

- Online User Manual
- SRS Document
- SDS Document
- Test Plan Document
- Final Report

Assumptions and Dependencies

AS-1: Basic assumption for development of AUAS is that system should be available 24x7 since a user can access the Umrah scheme data at any time.

AS-2: The Owner and Managers of AUAS will be honest and not alter the records of candidates.

AS-3: The Owner and Managers of AUAS are willing to take the time to keep the database and records updated.

AS-4: Users of Army Umrah Automation System (AUAS) should be assumed to have access to a computer with intra-net access.

D-1: There will be a permanent dependency on the intra-net, as without this, the requests can’t be processed.

D-2: System is dependent on server for full access 24x7 as the database will reside on that server.

CHAPTER 3

Requirements

3. Requirements

Introduction

This chapter gives full description of the Army Umrah Automation System. It will explain the purpose, features, interfaces, functionality, entire process, constraints and the application's reaction to external stimuli. It is intended for stakeholders and the system developers.

External Interface Requirements

User Interfaces

AUAS consists of same interface for all the stakeholders with very minor changes in available options based on the access rights of the individual using the system. The learning curve for this interface will be gradual, so as to make the users of the application feel at ease while learning about the options available to them.

Hardware Interfaces

Computer System

The system shall have:

- Keyboard input.
- Mouse input.
- A monitor.
- A working internet connection and the hardware requirements that come with it (Network card, Ethernet Port, Modem etc.)

Intra-net and Database Server

- To process requests and retrieve/store data.

Software Interfaces

- AUAS shall run on latest versions of AUAS web application.
- Primary Operating System supported by AUAS Interface will be Windows 10.
- AUAS shall run on army intra-net server configured in a stable Linux/Unix/MAC/Windows machine.
- AUAS should work in combination My SQL database management system.

Communications Interfaces

- System shall be able to be connected to Amazon Web Services (AWS) it provides secure inexpensive scalable cloud computing services server.
- Connection between the Web Interface and the server will be through HTTP over a web browser.
- AUAS permits the users to sign out when they want to terminate the session.

Functional Requirements

Account creation

Description and Priority

AUAS allows the staff to create the user accounts for all AUAS Managers, while providing them with the access rights based on their hierarchy. This feature has high priority.

Stimulus/Response Sequences

Input: The owner will provide credentials to create a user account.

Output: The account with specific rights to each person will be created.

Functional Requirements

REQ-1: The AUAS allows the Administrator to create and manage accounts for users.

REQ-2: The AUAS shall enable the Administrator to remove access rights of AUAS Manager who've left the A U A S .

Login / access rights

Description and Priority

AUAS enables all account holders to login who will provide their unique ID and password to access their account. Users will be able to manage specific things based on their hierarchy and rights accordingly.

Stimulus/Response Sequences

Input: Login credentials.

Output: AUAS grants the valid user, access to the features according to his access rights.

Functional Requirements

REQ-3: Only legitimate users shall be authorized to login into their account.

REQ-4: Logged in user must have access to the specific system features.

Update Database

Description and Priority

This requirement allows the AUAS managers to update the database based on requirements after different intervals of time.

Stimulus/Response Sequences

Input: Staff will submit the data into the database.

Output: The records of individuals from different formation will be updated in the database.

Functional Requirements

REQ-5: Managers must be able to enter the data into the database

REQ-6: Users must be authorized to update the data of candidates in database.

Managers Records

Description and Priority

AUAS owner has the right to view list of all managers and other faculty members along with their bio data, booking done by managers, and other related details. This information can only be viewed and is available with the owner.

Stimulus/Response Sequences

Input: The owner will log in the AUAS App.

Output: The owner will request for accessing the records related to managers from database and system will display them to owner.

Functional Requirements

REQ-7: AUAS shall display records of managers to the owner.

Dashboard

Description and Priority

Dashboard shows different packages and candidates booking with help of pie-charts, graphs or other shapes. Dashboard will help the users to get an overview of main features of AUAS.

Stimulus/Response Sequence

Input: User will request to display pilgrim data from the system.

Output: The pilgrim data will be displayed depending upon access rights.

Functional Requirements

REQ-8: The pilgrim data will be displayed depending upon access rights.

REQ-9: The AUAS Authorities will be able to view and monitor the pilgrim records entered by different managers from formations.

Formation wise Records

Description and Priority

The complete pilgrim applications record at a specific formation will be displayed.

Stimulus/Response Sequences

Input: The AUAS Authorities will log in and request the formation specific records of applicants/ pilgrims.

Output: The formation wise record will be displayed to the AUAS Authorities.

Functional Requirements

REQ-10: Users can view progress of each formation in terms of applicants as well as individual pilgrim's status.

Booking Records

Description and Priority

The details and status of the selection/ registration process will be displayed to the users. This will be done on individual basis for each pilgrim.

Stimulus/Response Sequences

Input: User will request to display the individual status of the applicants.

Output: The system will display the complete data about the applicants such as package chosen, status confirmations, hotels, residences and payment

Functional Requirements

REQ-11: AUAS will display the package of the applicants.

REQ-12: AUAS will display the payments status and hotel bookings.

REQ-13: AUAS will show the information about bio data of the individual.

Pilgrims Records

Description and Priority

The system will generate complete bio data of pilgrims.

Stimulus/Response Sequences

Input: AUAS managers will maintain bio data sheets of the pilgrims.

Output: The System will generate the complete bio data of the applicants.

Functional Requirements

REQ-14: AUAS users must have the right to view details of applicants.

REQ-15: AUAS users must have the right to view the complete relations of the selected pilgrims who will form part of the group.

REQ-16: AUAS users shall have the access to update pilgrims record.

Package Selection

Description and Priority

AUAS shows the packages to the individuals. Each individual will be able to select a package as per requirement.

Stimulus/Response Sequences

Input: The user will request the pre-defined as well as custom based package.

Output: The System will generate the packages for the pilgrims and maintain their list.

Functional Requirements

REQ-13: The AUAS will display the list of individuals in the specified packages.

REQ-13: The AUAS will allow the applicants to select a custom based package.

Log out

Description and Priority

AUAS permits the users to log out of the system by slecting log out button when they want to terminate the session.

Stimulus/Response Sequences

Input: The user will click the sign out button.

Output: The system will log them out and update their login status in the database.

Functional Requirements

REQ-18: System users must be able to sign out from the application.

Other Nonfunctional Requirements

Performance Requirements

Certain functionalities will be required, based on the performance and response of AUAS. AUAS will take less than 15 seconds to send data to the server. Up to 50 users can lodge the requests simultaneously.

Safety Requirements

SF-1: In situation of data loss, AUAS will back up the data and will restore it as per demand.

SF-2: System will be deployed on army intra-net server with inherent fault-tolerance capabilities.

Security Requirements

SE-1: Users must need to sign in to AUAS for their own accreditation data.

SE-2: AUAS shall permit just approved users to perform administrator's functionalities.

SE-3: The system shall allow candidates to see only their own profile and data in detail that are intended for them.

SE-4: Candidates may be able to look for merit of other candidates only so that there are very less chances of complaints and forged results.

SE-4: The system must perform an encoding technique such as hashing to save all passwords securely.

SE-5: The System will provide confidentiality and integrity.

Software Quality Attributes

Quality attributes of AUAS are described below. By following these attributes, the quality of AUAS will be improved.

Runtime System Qualities

At runtime AUAS has to provide its users with functionalities so that they can publish and search for the desired services. Some of the runtime qualities that should be considered in the development of AUAS are described here.

Functionality

AUAS must provide functions to publish and search the different services. AUAS must provide the functions of authentication of user.

Availability

AUAS should be available 24/7 since the complaint can be lodged at any time.

Usability

Usability is an important criterion in the development of AUAS. The system should present all functionalities in such a way that nothing is missed by the user. The graphical UI of web application is to be planned with convenience as the main need. The application will be introduced and composed in a way that is both outwardly engaging and simple for the user to explore.

Non-Runtime System Qualities

These are qualities of AUAS which are required to make this software useful for further enhancements. It will also be helpful in future development as well as extending system to different environments.

Modifiability

AUAS must support modifiability so any further improvements or features are easy to incorporate.

Portability

AUAS should be able to run in different computer environments. The AUAS server should be a platform-independent and should support interoperability.

Testability

Different quality tests should be performed so that AUAS is free from faults and perform according to requirements.

CHAPTER 4

Design

4. Design

Introduction

This section covers all the functional requirements and demonstrates how they interrelate with each other abstractly. The low-level design also illustrates as to how all of these requirements have been implemented. This low-level design does not address any non-functional requirements that the system has and that has been mentioned in the SRS Document.

Overview of the Modules

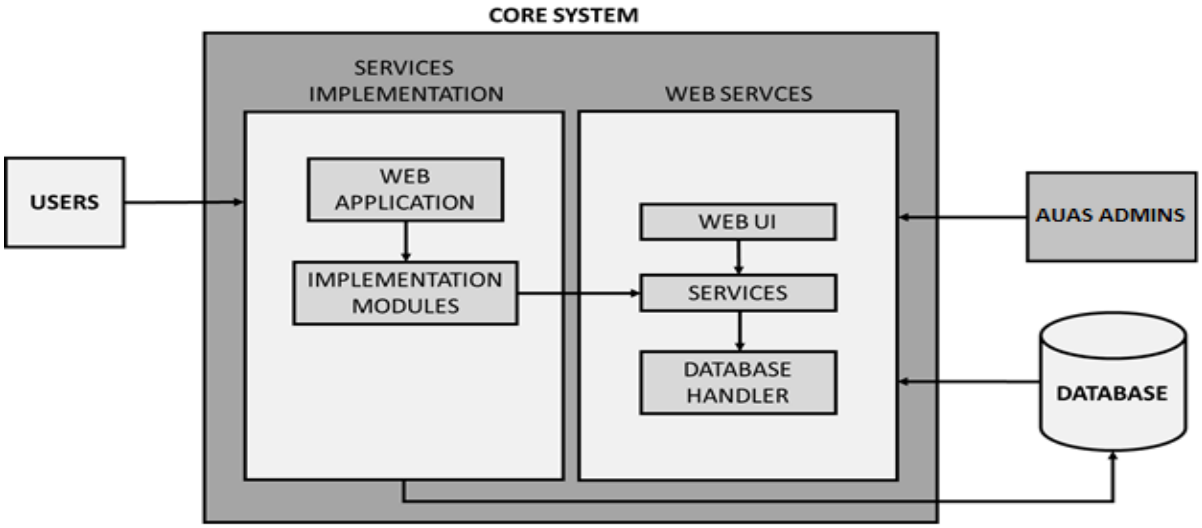

Figure 4-1 - Abstract Diagram

Explanation of Abstract Diagram

The system will be architected mainly in four fundamental modules "Users", "Core system", "AUAS Administration", and the "Database". It will further be having sub modules as shown in the abstract diagram above. The conceptual chart gives an outline the system, from users getting to the system till the handling in databases. The sub modules of the Abstract diagram further elaborated below.

Users

Users of the AUAS will access the web app and then choose functionality according to the requirement. Users consist of staff, system managers and higher officials at GHQ. The user interacts with the app that further accesses the services provided by the app.

Web Application

Web app is the platform to access the system and having different functionalities like viewing dashboard, viewing and approving applicants and pilgrim's credentials, creating custom packages etc.

Application Modules

It consists of the modules that will be responsible for all the processes including pilgrims' bookings and Umrah packages.

Services

These are the functionalities provided by the AUAS. The services for different kind of users are different. As a restricted user i.e. at unit level, the services provided by the AUAS are forwarding applicants credentials and viewing successful candidates and their process status. But more privileges are for system managers, administrators and higher officials at GHQ.

Web User Interface

Web interface provides services to the users. Web interface provides a platform to handle the bookings, selection of packages, users and pilgrim's information etc. Web user interface is dependent upon the services that are further handled by database handler which in turn interacts with the actual database where all the data about candidates and their selection is stored.

Administration

System Administration interacts with the web user interface for managing users and pilgrim's data, dealing with the whole functionality of the system by handling all the provided services by AUAS.

Database Handler

Database handler provides a connection between the services (that are displayed on the web interface) and the databases where all the data of users, all applicants and pilgrims regarding provided services is stored. Database hander basically handles inputs and outputs of some action that needs database access. It's a gateway to the actual databases.

Databases

A database stores all the data about the web application, users and pilgrim's records, selection criteria, booking and package allocation details and all the related processing happens there.

Structure and Relationships

Layered Architecture **3-Tiers** will be used to implement AUAS. From a high level perspective, an administration based arrangement can be believed to actualize the web interface. This will be made out of numerous administrations, each speaking with the others by passing messages. Reasonably, the administrations can be viewed as parts of the general arrangement. In any case, inside every administration made up of programming segments, much the same as some other application, and these parts can be intelligently assembled into introduction, business, and information layers. Different applications can utilize the administrations without monitoring the manner in which they are actualized.

Layers Details (Web Interface)

Presentation Layer

It gives a stage to the cooperation of the client with the framework. It shows information to the client and acknowledges contribution from the client. This is the part which gets the HTTP solicitation and returns the HTML reaction. The Presentation layer can just get demands from, and return reactions to, an outside specialist. This is typically an individual, yet perhaps another bit of programming.

It can just send solicitations to, and get reactions from, the Business layer. It can't have direct access to either the database or the Data Access layer.

Business Logic (Web Service)

At the point when an application must give administrations to different applications, just as actualizing highlights to help customers legitimately, a typical methodology is to utilize an administration layer that uncovered the business usefulness of the application. The administrations layer viably gives an elective view that enables customers to utilize an alternate channel to get to the application.

Data Access Layer

This layer gets a request from the Service Layer and sends back data after querying it from the database server.

Architecture Diagram

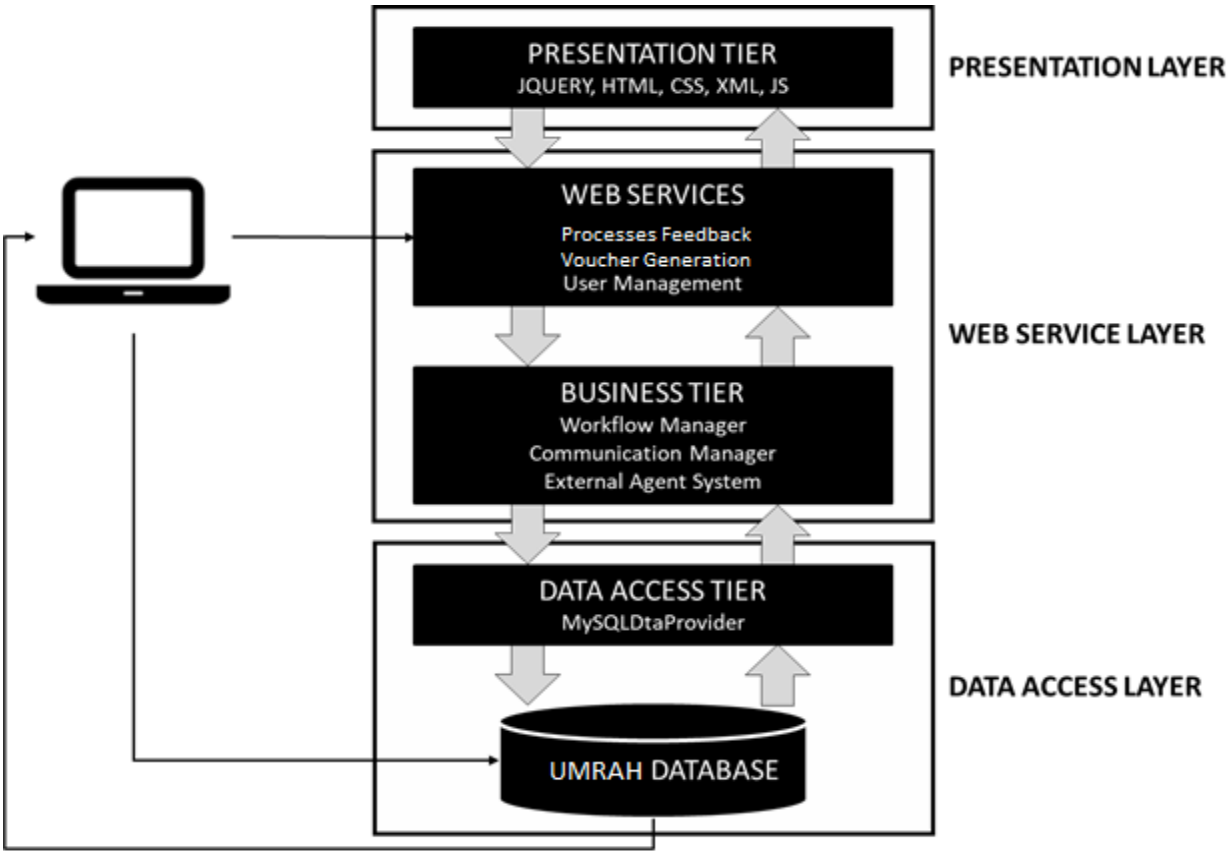

Figure 4-2 - Architecture Diagram

After signing in to the AUAS user is granted access according to his category. Every category of users is allowed access of specific features of the system. These features access their data from a central database. This database will be managed by an administrator, who will be supervising the entry of all staff members and applicant.

Following is a detail of the tiers and their components.

Processes Feedback

After selection of applicant's data, forms of successful candidates are processed for completing a legal process in order to perform Umrah. System gives feedback by informing the status of candidate's application such as booking done, booking verified, visa requested,

passport requested, passport verifies, voucher generated, flight booking confirmed etc.

Voucher Generation

After completion and confirmation of all processes a voucher is generated at the end of the process which shows all the details of the travelling airline, timings, Makkah and Madina nights, hoteling etc. All managers can use this service.

User Management Service

User Management Service is a web service which provides functionality for system login/access so that only authorized personnel of the AUAS can access the interface.

Workflow Manager

This component contains classes which generate a workflow for the project. The work flow tasks are then assigned resources and forwarded to respective individuals.

Communication Manager

This component contains classes which handles communication between different categories of individuals which are dealing with the same project. It provides functions to send notifications to the respective users.

External Agency System

This component contains classes which handle project related information. This package's classes are accessed by web methods defined in User Management Service.

Database

This is the database of the whole system. Data of all the user and Umrah details is maintained in this database. It has been designed by keeping data integrity and confidentiality principles in mind. Also database normalization principles are applied during database design data integrity and confidentiality principles in mind. Also, database normalization principles are applied

during database design.

Use Cases

A use case is a philosophy utilized in framework examination to distinguish, clear up, and arrange framework necessities. The use case is comprised of a lot of potential successions of cooperations among frameworks and users in a specific situation and identified with a specific objective.

The different client classes distinguished the accompanying use cases and essential entertainers for the AUAS :

Actors	**Use Cases**
Applicant	• Apply
Rep at corps	• Login • View Dashboard • Manages Package • Manages Hotel • Manages Booking • Manages Passport • Manages Visa • View Progress • Flight Booking • Print Voucher • Logout
Rep at unit	• Login • View Dashboard • Manage Booking • Manage Pilgrims • View Progress • View Selected Candidates • View Hotel Details • View Pilgrims Details • Print Voucher • Logout

Table 4-1 - Use Cases

Use Case Diagram

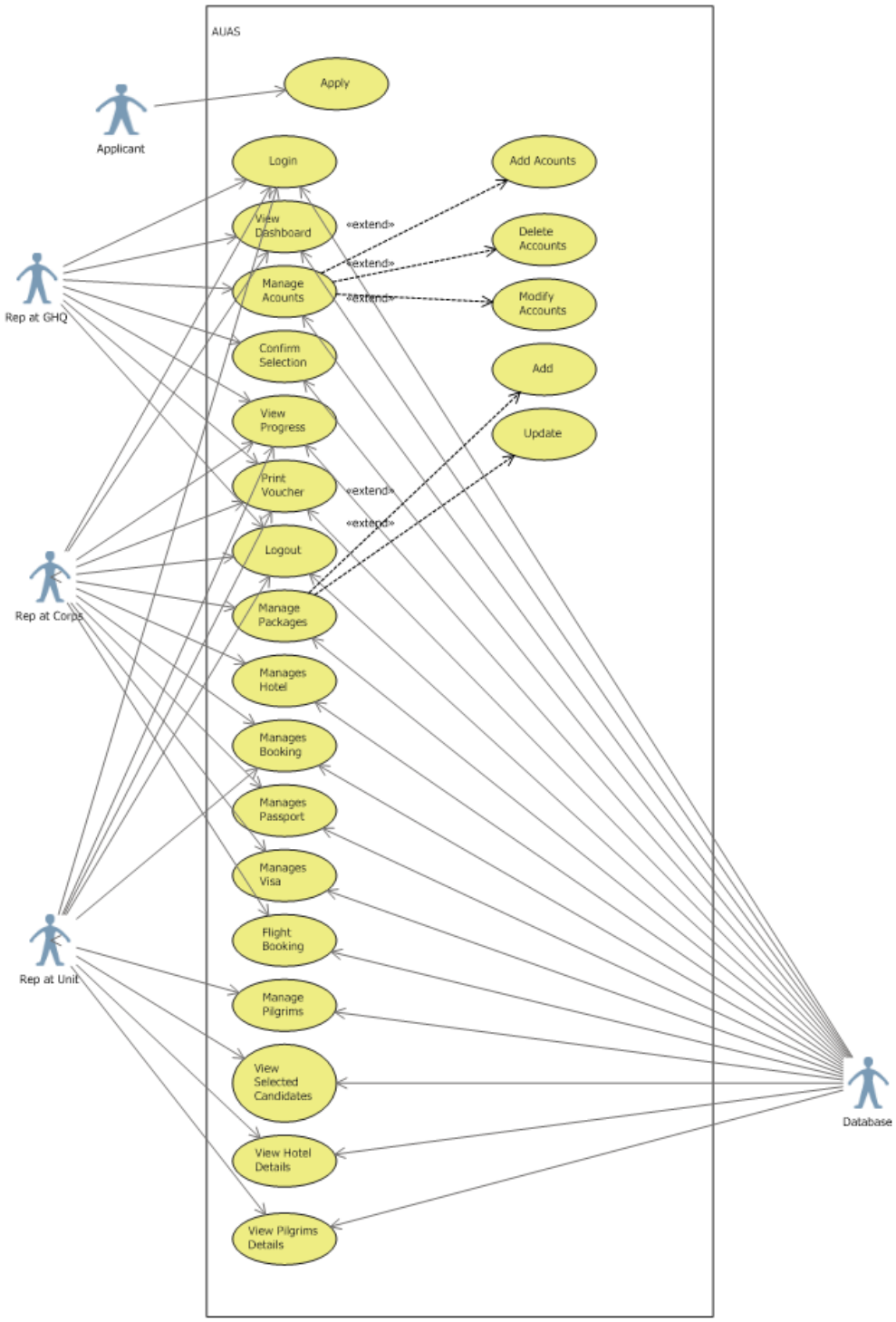

Figure 4-3 - Use Case Diagram

Use Cases Description

Use Case ID:	1		
Use Case Name:	Login		
Actors:	Representative at GHQ, Corps and unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	A user tries to login to the system.		
Preconditions:	User has to open the login page first.		
Post conditions:	If the use case was successful, the actor is now logged into the system. If not, the system state remains unchanged.		
Normal Flow (Primary Scenario):	1. The framework demands the on-screen character to enter his/her name and secret phrase. 2. The on-screen character enters his/her name and secret phrase. 3. The framework approves the entered name and secret phrase and logs the on-screen character into the framework.		
Alternative Flows:	In the event that in the Basic Flow, the on-screen character enters an invalid name or potentially secret word, the framework shows a mistake message. The entertainer can decide to either come back to the start of the Basic Flow or drop the login, so, all in all the utilization case closes.		

Table 4-2 - Login Use Case

Use Case ID:	2		
Use Case Name:	View Dashboard		
Actors:	Representative at GHQ, Corps and unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	19/12/2018	Date Last Updated:	19/12/2018

Description:	Dashboard can be viewed after logging in and shows general information about the system which is important.
Preconditions:	User has to log in.
Post conditions:	Dashboard information viewed
Normal Flow (Primary Scenario):	1. The user will provide credentials and request for logging into the system. 2. Dashboard on homepage will be displayed. 3. User can get required information from dashboard.
Alternative Flows:	1. An error is encountered during the authentication from database. 2. Proper functionality of the database will be checked. 3. If internet connection error occurs then user may refresh the page or login again.

Table 4-3 – View Dashboard Use Case

Use Case ID:	3		
Use Case Name:	View Progress		
Actors:	Representative at GHQ, Corps and unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Progress of ongoing process is shown step by step in a proper sequence. Respective representative can log in and see the progress i.e. status of applicants of Umrah such as booking submitted, booking verified, passports dispatched etc.		
Preconditions:	Representative has to log in and get access to bookings.		
Post conditions:	Respective representative and authorities are updated with respect to ongoing process.		
Normal Flow (Primary Scenario):	1. User will request by clicking on booking option. 2. All booking record will be displayed. 3. User will open a specific booking to see its status/progress.		
Alternative Flows:	1. An error is encountered lodging the request. 2. Proper functionality of the database will be checked. 3. Internet connection will be checked and page will be refreshed.		

Table 4-4 – View Progress Use Case

Use Case ID:	4		
Use Case Name:	Print Voucher		
Actors:	Representative at GHQ, Corps and unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	After the completion of ongoing process for performing Umrah respective Representative can print a voucher with all details mentioned on it such as booking id, name, contact, transportation details and hoteling details.		
Preconditions:	1. User has to log in. 2. All process must be completed in order to get a voucher.		
Post conditions:	Voucher with all the details will be printed.		
Normal Flow (Primary Scenario):	1. The user will login to the profile. 2. Request for voucher after completion of all process.		
Alternative Flows:	1. In case if process is pending this option will not be useable. 2. In case of any issue user might need to login again or refresh page.		

Table 4-5 – Print Voucher Use Case

Use Case ID:	5		
Use Case Name:	Manage Accounts		
Actors:	Representative at GHQ		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	User at GHQ can also be termed as super user who has the authority to manage the accounts of all other users. He can add, delete, modify and update accounts of other users according to needs.		
Preconditions:	User has to log in.		
Post conditions:	Changes in accounts must be updated.		

Normal Flow (Primary Scenario):	1. The staff will enter details, modify or delete the accounts for the students. 2. Changes will be updated in the database.
Alternative Flows:	1. An error is encountered during the modification of database. 2. Proper functionality of the database will be checked.

Table 4-6 – Manage Accounts Use Case

Use Case ID:	6		
Use Case Name:	Confirm Selection		
Actors:	Representative at GHQ		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	User at GHQ can also be termed as super user who has the authority to confirm or give approval of final selection of candidates.		
Preconditions:	1. Representative at GHQ has to login. 2. List must be forwarded by junior authorities to head for approval.		
Post conditions:	1. Candidates are selected based on laid merit. 2. List is finalized.		
Normal Flow (Primary Scenario):	1. Head logs into the system and checks for list of candidates. 2. Approves the list.		
Alternative Flows:	If list is not yet forwarded to head sitting in GHQ, no list will be shown and blank page will be displayed only.		

Table 4-7 – Confirm Selection Use Case

Use Case ID:	7		
Use Case Name:	Flight Booking		
Actors:	Representative at Corps		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager at corps level after selection of candidates and finalization of other process selects the travelling agency and applies for the booking of candidates in a travel agency.		
Preconditions:	1. User at corps has to login. 2. User must request for booking.		
Post conditions:	Booking verified by travel agency.		
Normal Flow (Primary Scenario):	1. The user will login to the profile and check for expenses and timings of different travel agencies. 2. Based on requirement airline will be chosen and booking request will be initiated.		
Alternative Flows:	None of the travelling agency will be requested for booking if it does not match the required needs.		

Table 4-8 – Flight Booking Use Case

Use Case ID:	8		
Use Case Name:	Manage Packages		
Actors:	Representative at Corps		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager assigns different packages based on the ranks of the candidates. There are different packages for different categories such as soldiers, JCO's, junior officers and senior officers. Any user can pay extra amount to get package other than his own category.		

Preconditions:	1. Manager has to login. 2. Look if any individual wants to pay extra amount and get his package updated.
Post conditions:	Packages allotted to all applicants.
Normal Flow (Primary Scenario):	1. The manager will login to the profile. Applicants along with available packages for each category will be displayed on his profile. 2. Manager will update anyone's package who has paid extra amount for up gradation of package.
Alternative Flows:	Automatic selection of packages in case no one requires up gradation of package.

Table 4-9 – Manage Packages Use Case

Use Case ID:	9		
Use Case Name:	Manage Hotel		
Actors:	Representative at Corps		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager sitting in corps has the authority and responsibility to manage living in hotels. Different sharing rooms and separate rooms for single individuals are available. One room can be shared by two, three or four individuals.		
Preconditions:	1. Manager has to login. 2. Manager has to open hoteling details.		
Post conditions:	Hoteling and living requirements are updated in database if any.		
Normal Flow (Primary Scenario):	1. The manager will login to the profile and select Makkah or Madina hotels for viewing details and making amendments if any. 2. Manager makes required changes and updates hoteling record in		

	database.
Alternative Flows:	1. In case of any issue while updating or accessing information user may need to login again or refresh page. 2. Proper functionality of the database will be checked.

Table 4-10 – Manage Hotel Use Case

Use Case ID:	10		
Use Case Name:	Manage Booking		
Actors:	Representative at Corps		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager at corps level manages bookings of all candidates by adding details (mainly pilgrim details), deleting details, updating and modifying them.		
Preconditions:	User has to be logged in first.		
Post conditions:	Changes are made in DB.		
Normal Flow (Primary Scenario):	1. Manager at corps logs in first. 2. Opens the booking option by clicking on it and performs required action.		
Alternative Flows:	1. Blank page is displayed if no booking is done. 2. In case of any issue while updating or accessing information user may need to login again or refresh page. 3. Proper functionality of the database will be checked.		

Table 4-11 – Manage Booking Use Case

Use Case ID:	11		
Use Case Name:	Manage Visa		
Actors:	Representative at Corps		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018

Description:	Manager at corps level manages visa processing of all candidates.
Preconditions:	User has to be logged in first.
Post conditions:	Changes are made in DB.
Normal Flow (Primary Scenario):	1. Manager at corps logs in first. 2. Opens the visa management option by clicking on it and performs required action.
Alternative Flows:	1. Blank page is displayed if no visa is under processing. 2. In case of any issue while updating or accessing information user may need to login again or refresh page. 3. Proper functionality of the database will be checked.

Table 4-12 – Manage Visa Use Case

Use Case ID:	12		
Use Case Name:	Manage Passport		
Actors:	Representative at Corps		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager at corps level manages passport's processing of all candidates.		
Preconditions:	User has to be logged in first.		
Post conditions:	Changes are made in DB.		
Normal Flow (Primary Scenario):	1. Manager at corps logs in first. 2. Opens the passport management option by clicking on it and performs required action.		
Alternative Flows:	1. Blank page is displayed if no passport is under processing. 2. In case of any issue while updating or accessing information user may need to login again or refresh page. 3. Proper functionality of the database will be checked.		

Table 4-13 – Manage Passport Use Case

Use Case ID:	13
Use Case Name:	View Selected Candidates

Actors:	Representative at unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager at unit level checks the list of selected candidates after final approval by head of AUAS.		
Preconditions:	User has to be logged in first.		
Post conditions:	List of selected candidates viewed.		
Normal Flow (Primary Scenario):	1. Manager at unit logs in first. 2. Opens the list of selected candidates by clicking on it.		
Alternative Flows:	1. Blank page is displayed if no list is uploaded. 2. In case of any issue while accessing list user may need to login again or refresh page. 3. Proper functionality of the database will be checked.		

Table 4-14 – View Selected Candidates Use Case

Use Case ID:	14		
Use Case Name:	Log Out		
Actors:	Representative at GHQ, Corps and unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	User tries to sign out from AUAS.		
Preconditions:	Account shall be logged in.		
Post conditions:	AUAS will sign out its user.		
Normal Flow (Primary Scenario):	1. Sign Out button is clicked by user. 2. AUAS signs out the intended user and returns back to log in screen.		
Alternative Flows:	-		

Table 4-15 – Logout Use Case

Use Case ID:	15		
Use Case Name:	Manage Pilgrims		
Actors:	Representative at unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager at unit level manages pilgrims of a booking by adding, deleting, updating and modifying them.		
Preconditions:	User has to be logged in first.		
Post conditions:	Database is ammended.		
Normal Flow (Primary Scenario):	1. Manager at unit logs in first. 2. Opens the pilgrims option by clicking on it and performs required action.		
Alternative Flows:	1. Blank page is displayed if no booking is done and there is no pilgrim. 2. In case of any issue while updating or accessing information user may need to login again or refresh page. 3. Proper functionality of the database will be checked.		

Table 4-16 – Manage Pilgrims Use Case

Use Case ID:	16		
Use Case Name:	View Pilgrim Details		
Actors:	Representative at unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager at unit level manages pilgrims and view their details.		
Preconditions:	User has to be logged in first.		
Post conditions:	Pilgrims details viewed.		

Normal Flow (Primary Scenario):	1. Manager at unit logs in first. 2. Opens the pilgrim option by clicking on it and see their details.
Alternative Flows:	1. Blank page is displayed if no pilgrim exists. 2. In case of any issue while viewing information user may need to login again or refresh page. 3. Proper functionality of the database will be checked.

Table 4-17 – View Pilgrims Details Use Case

Use Case ID:	17		
Use Case Name:	Apply		
Actors:	Applicant		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Applicant can apply for selection in Umrah scheme via representative at unit.		
Preconditions:	Applicant must be from Pakistan Army.		
Post conditions:	Applicant's application submitted.		
Normal Flow (Primary Scenario):	1. Applicant contacts representative of AUAS at unit level. 2. Respective representative entertains applicant by accepting application and entering applicant's data in system.		
Alternative Flows:	In case unit's representative is not available applicant may have to wait or forward his request via alternative representative.		

Table 4-18 – Apply Use Case

Use Case ID:	18		
Use Case Name:	View Hotel Details		
Actors:	Representative at unit		
Created by:	Mudassir	Last Updated by:	Mudassir
Date Created:	24/12/2018	Date Last Updated:	24/12/2018
Description:	Manager at unit level view hotel details such as distance , facilities available etc.		
Preconditions:	User has to be logged in first.		
Post conditions:	Hotel details viewed.		
Normal Flow (Primary Scenario):	3. Manager at unit logs in first. 4. Opens the hotel option by clicking on Makkah hotels and Madina hotels and see their details.		
Alternative Flows:	1. In case of any issue while viewing information user may need to login again or refresh page. 2. Proper functionality of the database will be checked.		

Table 4-19 – View Hotel Details Use Case

4.3.4 Class Diagram with Description

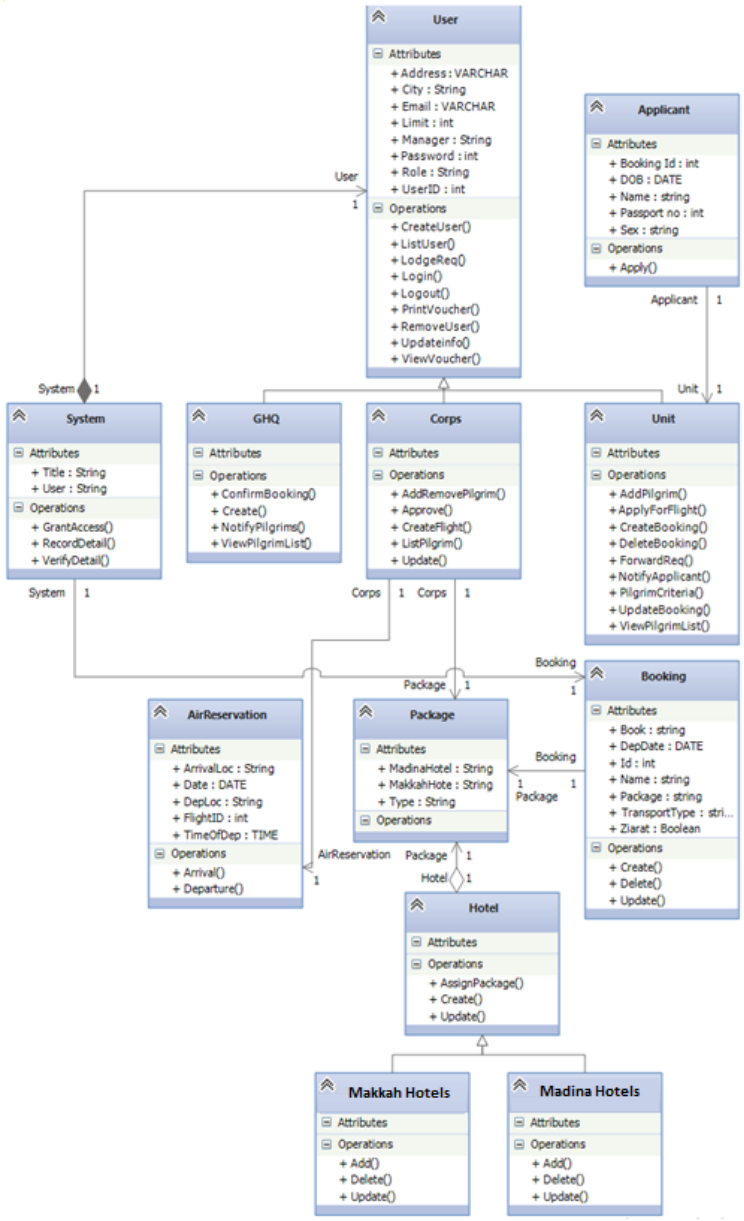

Figure 4-4 - Class Diagram

Class Name	Description
System	System class contains the origin for the functions AUAS has to perform. It is the main class which will be acting as a gateway to all the other classes
User	User class contains all the information related to user management. It has aggregation with other classes of user categorization and the functions that performs all the user management functions. Users may include representatives from GHQ, corps and unit.
Unit	Unit class contains all the information and functions that can be performed by representative of the system sitting in unit. It has generalization relationship with user class.
Corps	Corps class performs further processing and management of the applicants forwarded to it by subordinate units. It has different relationships with other classes in order to perform required functions.
GHQ	This contains the access to core functionalities of the system. User in the GHQ acts as super user.
Booking	Booking class caters for the management of booking.
Applicant	Applicant Class stores the data about the applicant. It also stores passport file of the applicant.
Package	Package class contains all the information related to available packages. Custom packages can also be generated on demand. Every category has a predefined package.
Air Reservation	This class caters for reservation of air tickets. Best suitable flight is selected based on date, time, arrival and departure location.
Hotel	Hotel class has two further subclasses “Makkah” and “Madina” and it deals with hoteling and living of pilgrims.
Makkah	It is subclass of class “Hotel” and deals with hoteling and living in city “Makkah”

Madina	It is subclass of class “Hotel” and deals with hoteling and living in city “Madina”.
Applicant	Applicant can apply for registration in Army Umrah Scheme via unit representative.

Table 4-20 - Class Diagram Description

User Interface Issues

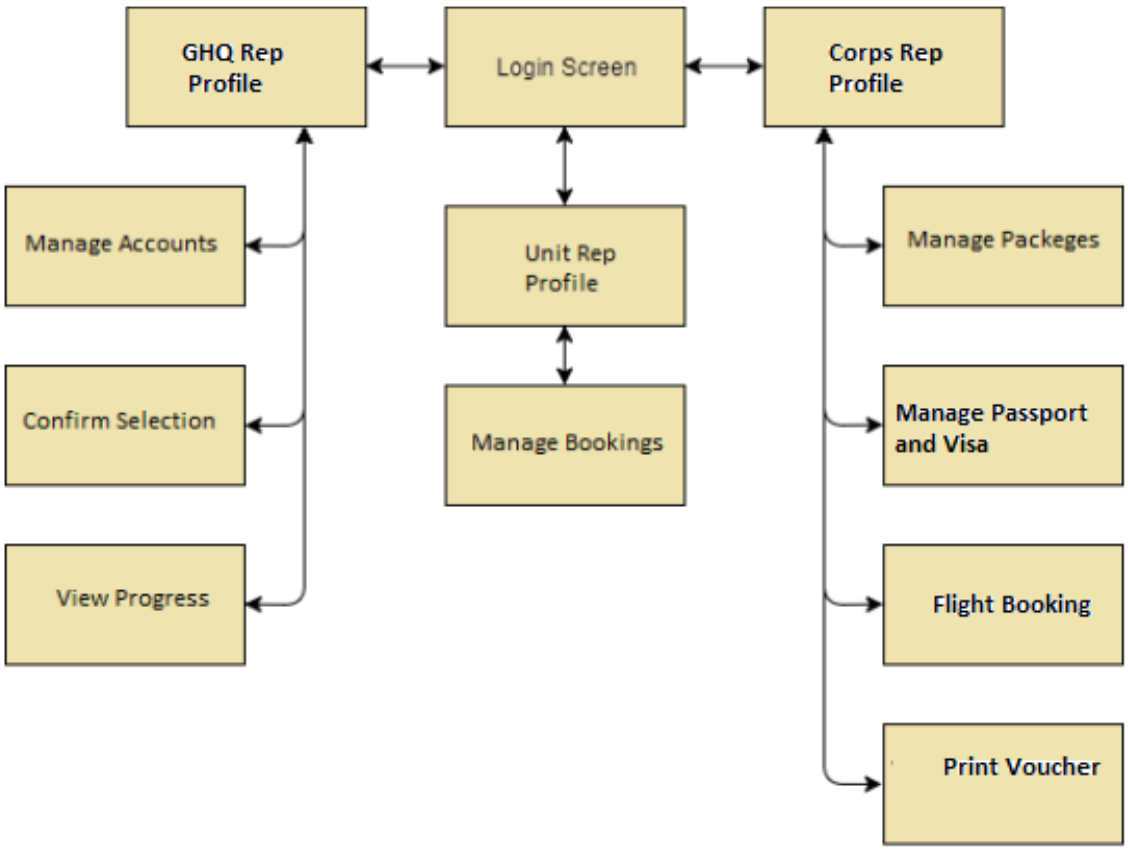

Figure 4-5 - Interface Diagram

Description of the Diagram

Login Screen

AUAS's login screen, takes username and password as input. After a successful login, the user is sent to the interface specified for his or her category.

GHQ Representative Profile

If the logged in user is a GHQ representative, the options for managing accounts of other users , confirm selection, viewing progress and dashboard are displayed.

Manage Accounts

It allows the representative at GHQ to add accounts for new users, modify existing ones, update and delete accounts.

Confirm Selection

It allows the staff at GHQ to confirm and give approval of final selection of candidates.

View Progress

This interface provides the representative the opportunity to view progress i.e. step by step procedure and status of the processed application.

Unit Representative Profile

If the logged in user is a unit representative, unit representative's profile is displayed. Unit representative has the options to manage bookings of applicants, manage pilgrims and view dashboard.

Manage Booking

Applicant's booking process begins after final selection. User at unit level manages all bookings and its details such as entry of credentials and requirement of additional resources.

Corps Representative Profile

It allows the representative at corps to manage packages, passport, visa, book flight and print voucher after completion of complete process.

Manage Packages

Using specific rights representative at corps level allots Umrah packages to individuals and has the rights to manage and provide extra facilities to a candidate who pays extra amount of money for getting better services.

Manage Passport and Visa

The interface enables the representative at corps to carry out all proceedings required for passport and visa approval.

Flight Booking

This interface provides the rights of booking with travel agency for travelling of candidates including booking request, payment and final departure and arrival date and time.

Print Voucher

Rights of final voucher generation and printing are reserved with managers of the AUAS sitting at different levels. Voucher has all the details including booking id, names of pilgrims, address, visa and passport number, hotel details, route and travelling location along with dates and time.

Activity Diagrams

User Management

The diagram below displays how the users are logged into the system and displayed specific interfaces according to their category.

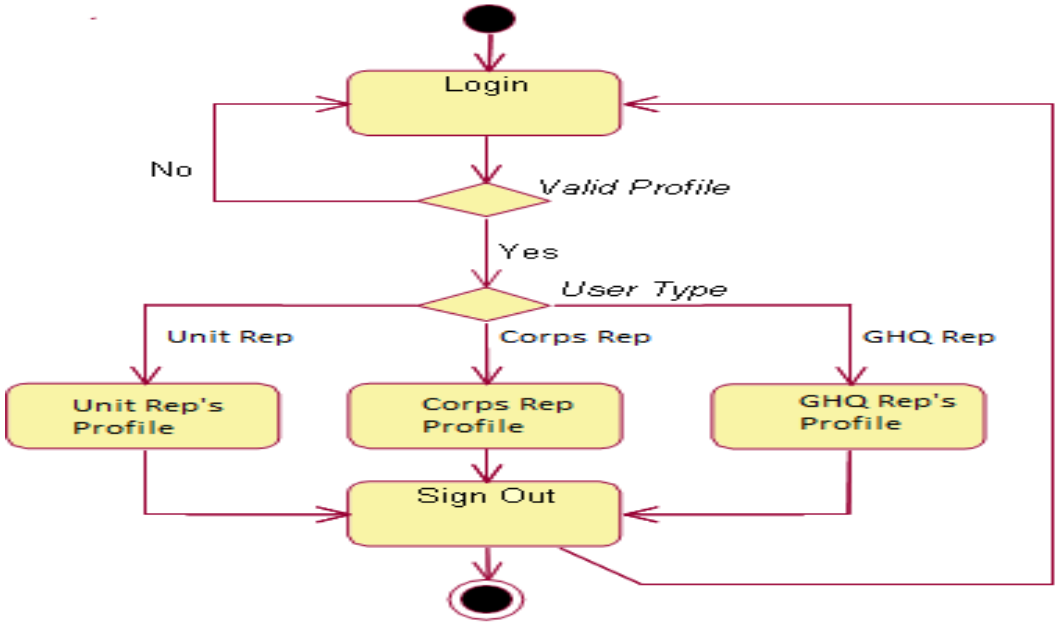

Figure 4-6 - User Management – Activity Diagram

GHQ Usage

Figure 5-7 displays the basic features that are available after a GHQ member successfully logs into his account. These include management of users, final approval of selected candidates, viewing dashboard and printing vouchers

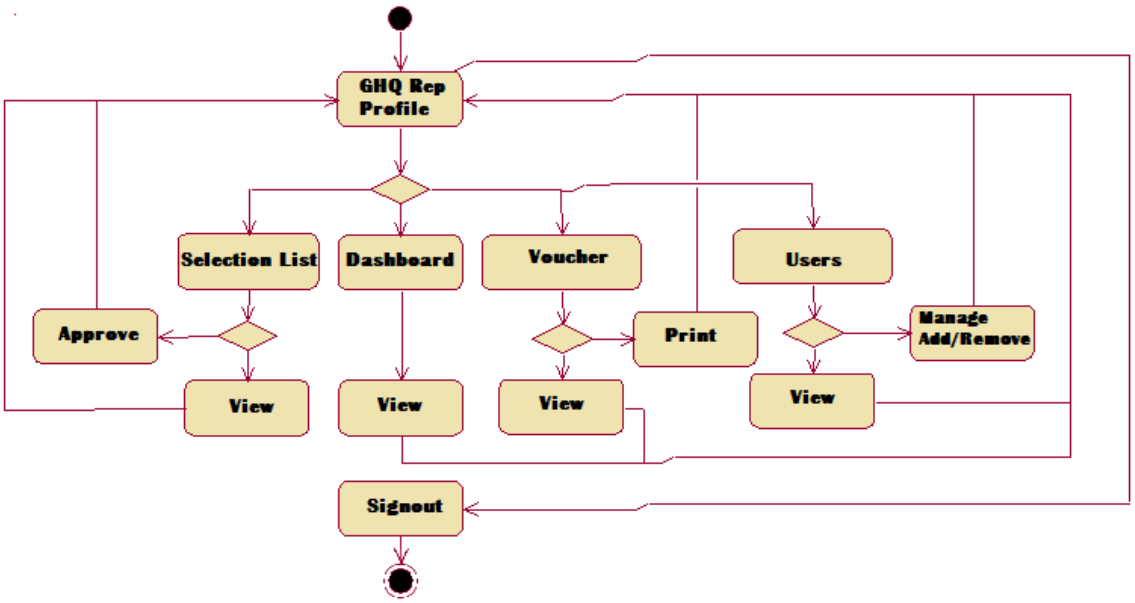

Figure 4-7 – GHQ's Usage – Activity Diagram

Corps' Usage

The diagram below describes the features that are displayed after logging in as a corps representative. All the basic data is displayed on the main profile page, with a further feature enabling the representative to perform the required actions and management.

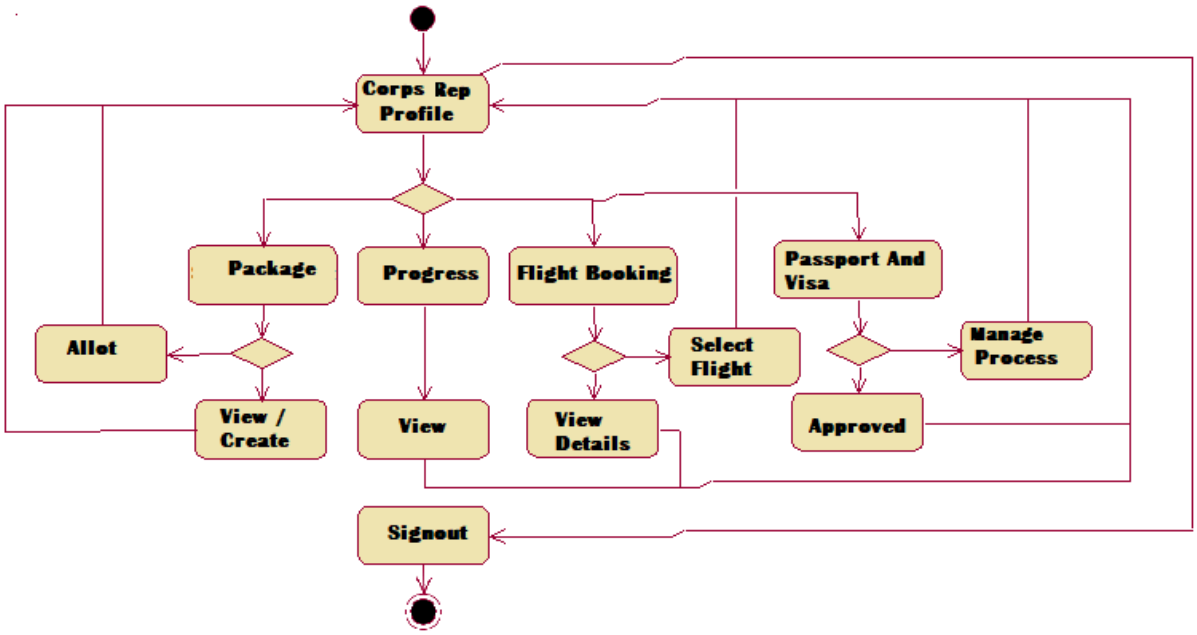

Figure 4-8 - Corps' Usage – Activity Diagram

Unit's Usage

If in case the logged in user belongs to the unit, the following features can be available, which are portrayed in the form of an activity diagram.

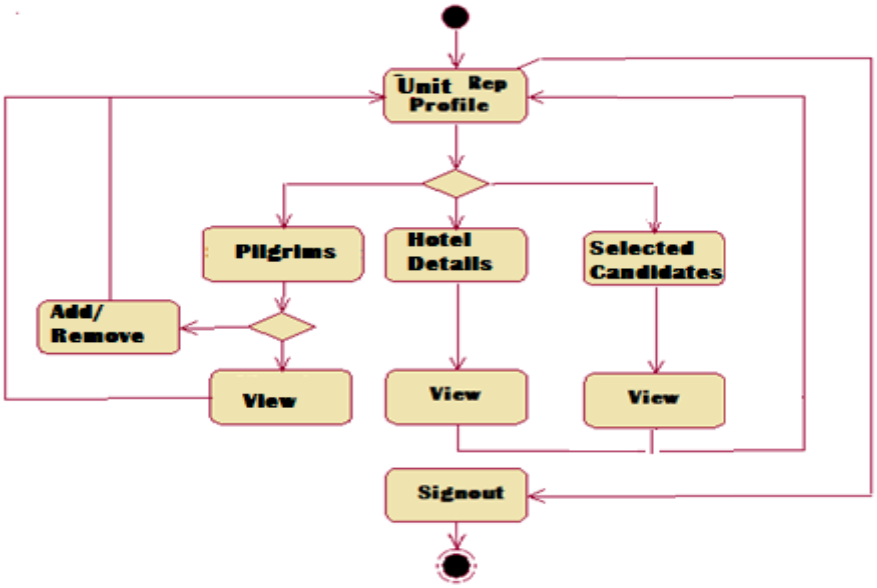

Figure 4-9 - Unit's Usage – Activity Diagram

Sequence Diagrams

View Booking

The following diagram displays the happenings within the system in an order that occur when a user views booking and it statuses.

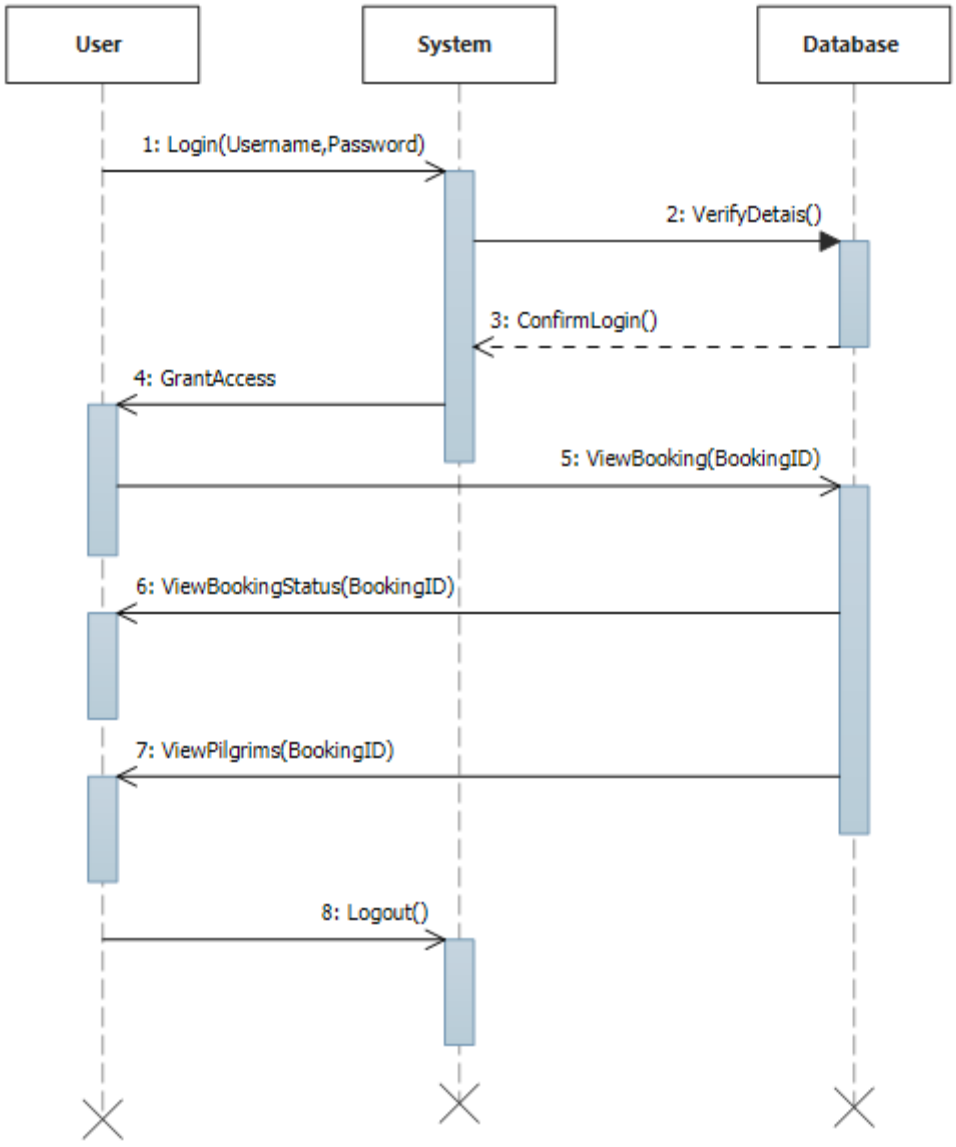

Figure 4-10 - View Booking - Sequence Diagram

New Booking

This sequence diagram displays the procedure of lodging of new booking , by the system managers.

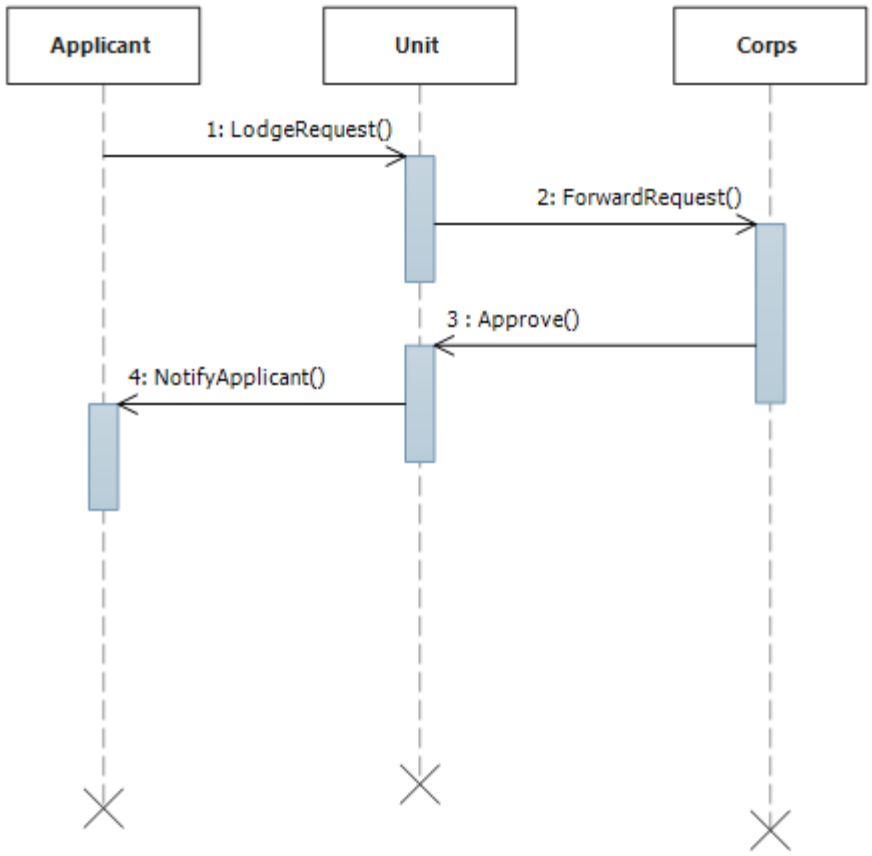

Figure 4-11 – New Booking - Sequence Diagram

Create and Assign Packages

Different Umrah packages are defined for different category of army personnel's such as soldiers, JCO's, officers and senior officers. New package can also be created according to the requirements. This concept is portrayed in this sequence diagram

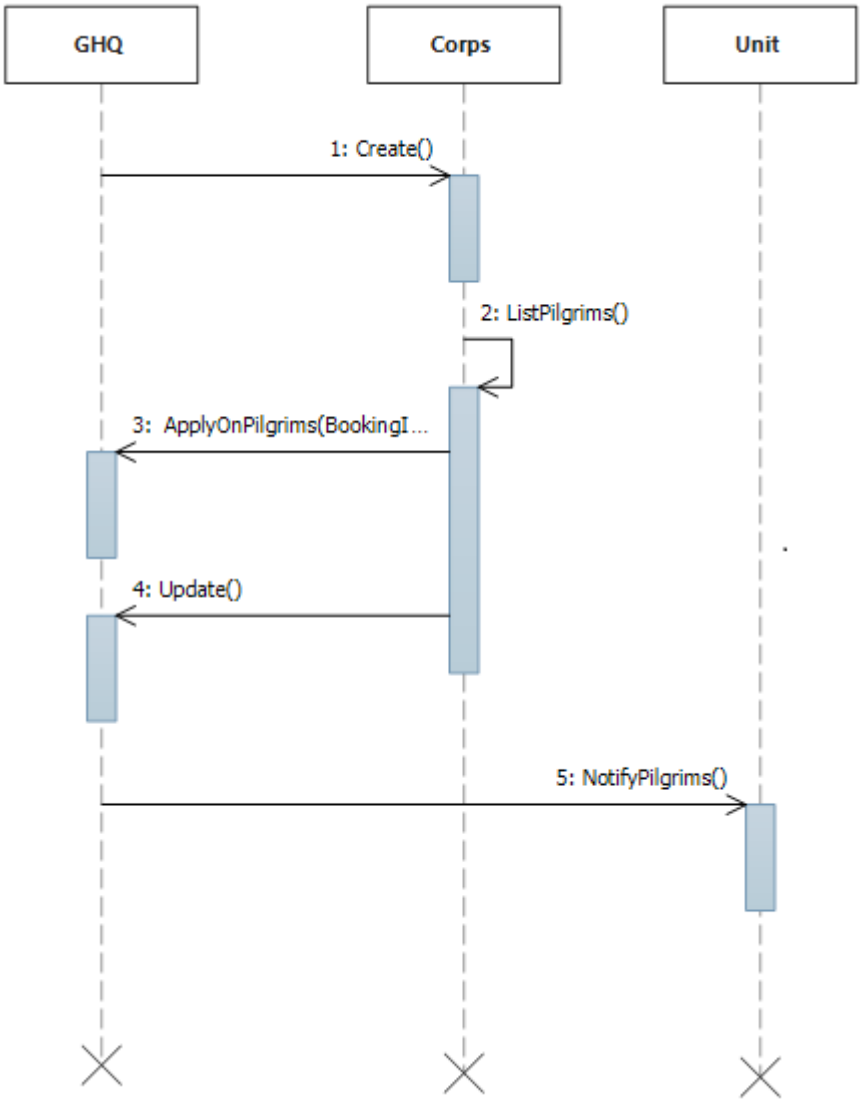

Figure 4-12 – Create and assign Packages - Sequence Diagram

Verification of Pilgrims in Booking

When entry of all pilgrims with respect to a booking is over the next step is the verification of pilgrims. Verification checks that whether all pilgrims fulfill the criteria or not. This is portrayed in the following sequence diagram.

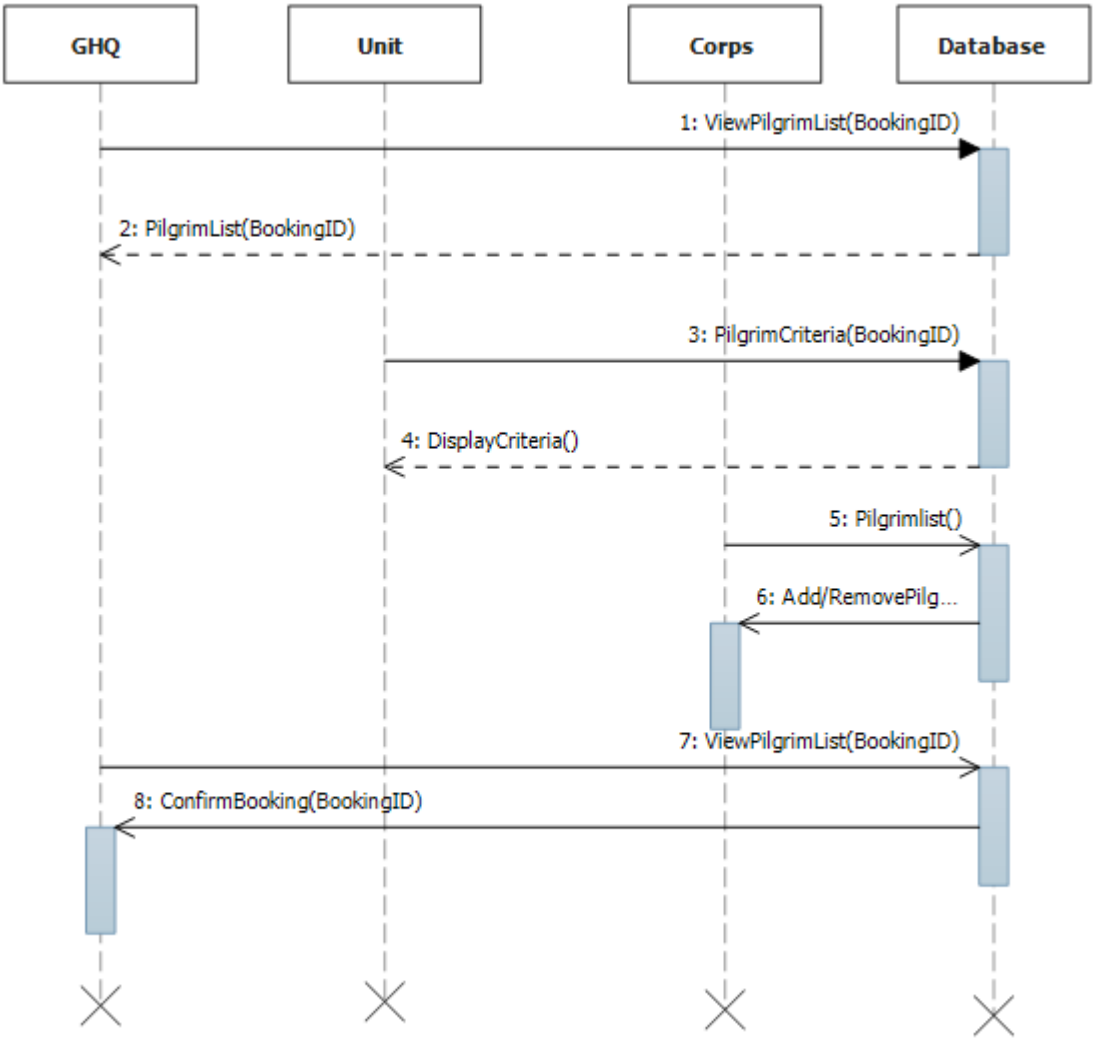

Figure 4-13 – Verification of Pilgrims in Booking - Sequence Diagram

Flight Management

The following diagram presents the sequence in which various users interact to manage flight related operations.

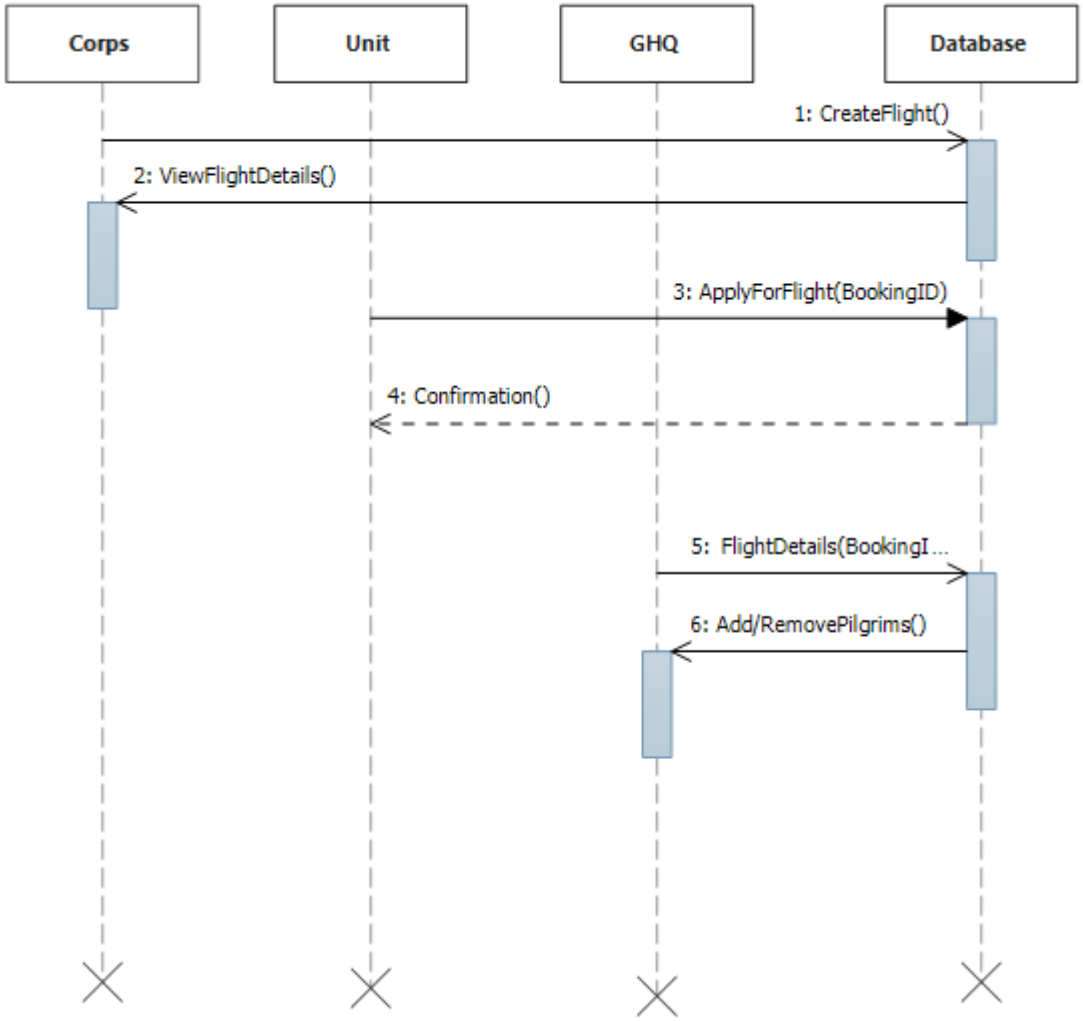

Figure 4-14 – Flight Management - Sequence Diagram

Manage Users

AUAS puts the responsibility of managing the users on the head of AUAS system. This includes addition of new users, deletion of previous ones etc. This information requires update over the passage of time. Moreover, when some users have left the system, their access can be removed. All these tasks are represented in the form of following sequence diagram.

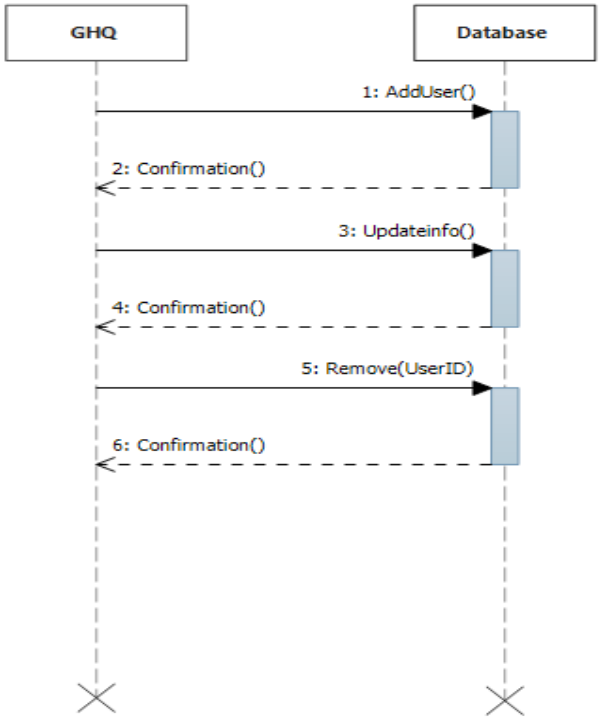

Figure 4-15 - Manage Users - Sequence Diagram

Complete Procedure

For the AUAS to function properly there is a sequence of steps which are to be followed. The following diagram shows the sequence of activities that make this possible.

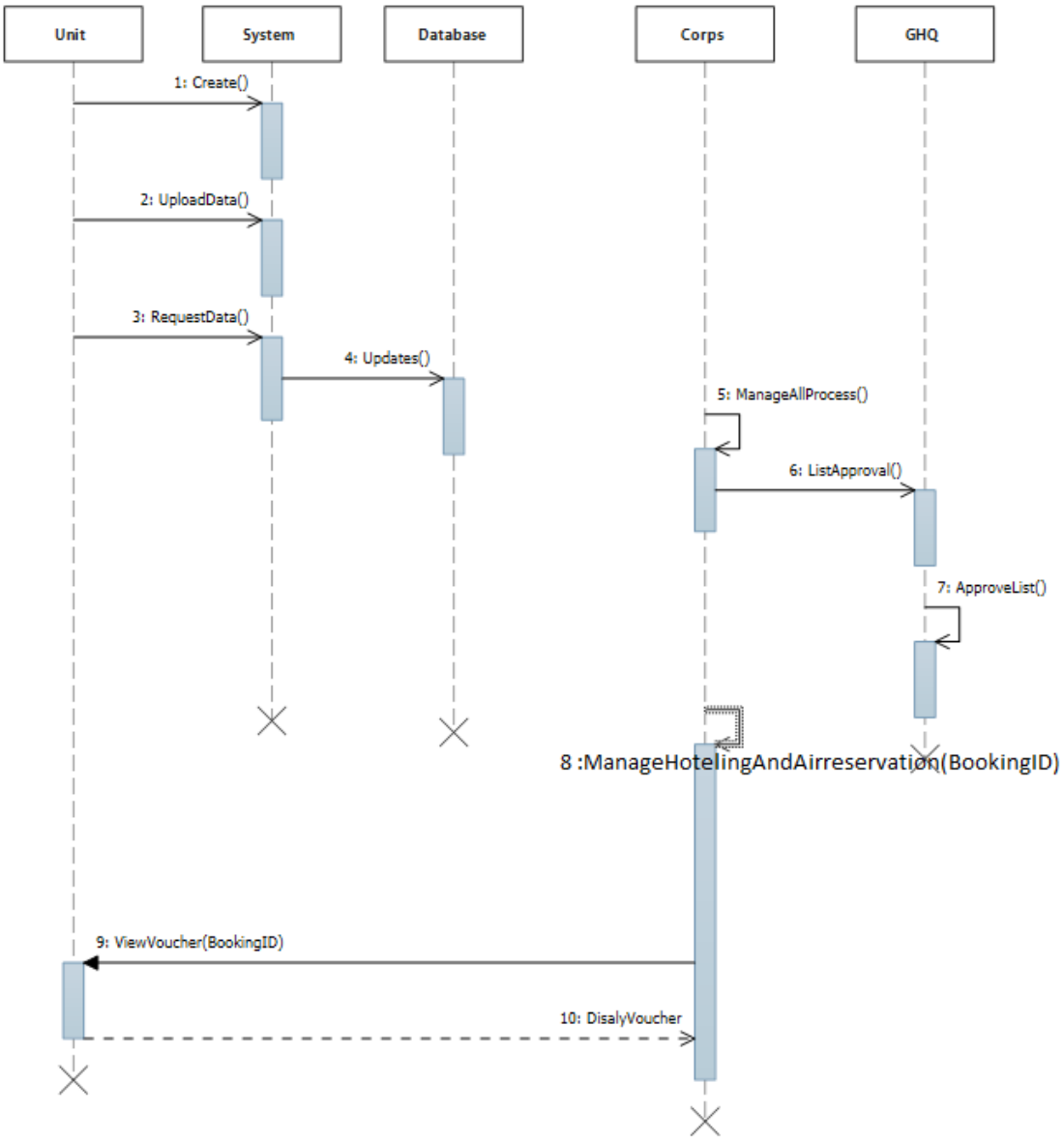

Figure 4-16 – Complete Procedure - Sequence Diagram

Detailed Description of Components

User Management

Identification	**User Management**
Type	Component
Purpose	• To manage a set of users (Corps Representative, Unit Representative and GHQ Representative). It will manage the user credential database and validation of user credentials in case of login activity. • All of this functionality is hidden from the user - the nitty-gritty details of managing the users are the job of the System class.
Function	• Login(Username, Password) • Logout() • Verify Details() • Grants Access()
Subordinates	User database will be used to hold the user records.
Dependencies	All user management functions depend on it.
Interfaces	Represents user management options to the user • Login(button) • Logout(button)
Resources	User Database
Processing	• Login(username, password) logs in the user • Logout(user) logs out the user • Verify Details() verify user credentials from the user database • Grants Access() grants user access in the user database

Data	Graphics for interface support. Database repository for maintaining the user record.

Table 4-21 - User Management Component

User Access Rights

Identification	**User Access Rights**
Type	Component
Purpose	• To classify the users into categories on the basis of privileges assigned to each user category. • The privileges contain user rights of interacting the app.
Function	• Categorize(User) • Grant Access()
Subordinates	User database will be used to hold the user records.
Dependencies	All user management functions depend on it.
Interfaces	Sends user to the profile specified for its category
Resources	User Database
Processing	• Categorize (User) is used to categorize the user into one of the defined categories. • Grant Access () grants access according to that category.
Data	Database repository for maintaining the user record, based on their individual access rights.

Table 4-22 – User Access Rights Component

Button

Identification	**Button**
Type	Component
Purpose	• Class to enable client to pick different Menu choices • Graphic UI portrayal
Function	• Represents different alternatives accessible to the user • Button Callback(button) – a Callback function, used when the button is clicked in order to call the requisite function related to that button.
Subordinates	A graphical picture will be used for the button's graphic.
Dependencies	Depends on the menu class
Interfaces	• button->text() [text overlay on the button] • button->bitmap() [graphic for the button] • button->screen X(), button->screen Y() [screen coordinates for the button]
Resources	Nil
Processing	• Button Callback(button) • Callback functions for the button.
Data	A graphical picture to hold the visual graphic of the button.

Table 4-23 - Button Component

Menu Component

Identification	**Menu Component**
Type	Component
Purpose	• User interface to get to various highlights of the Application • Separate menu class examples for every menu screen
Function	• Show buttons representing different choices of menu in a window. • For every single choice in menu, function display(button) will be called by class "menu" to display button on screen.
Subordinates	For each single option in menu, different buttons will be held in array.
Dependencies	Invokes button class instances.
Interfaces	UI's show them as menus
Resources	Nil
Processing	Function display(button) shows the button on screen
Data	An array of classes of button

Table 4-24 - Menu Component

System

Identification	**System Class**
Type	Class
Purpose	• To manage user's login and logout • To provide imports from Excel files and exports to PDF files
Function	• Works along with the login screen • Imports and Exports can be used for data entry or reports
Subordinates	Main System User

Dependencies	Composition with Users, requires data from database for authentication
Interfaces	Login Screen, as well as UIs for import and export of data
Resources	Database, Online Server
Processing	GetListToPDF() generates PDF files of final list of selected users UploadDataInExcel() takes excel files as input and stores in DB UpdateSysAdmin() used to manage the Administrator Login(Username, Password), VerifyDetails(), GrantAccess() and Logout() used for User Management
Data	Data about System Administrator

Table 4-25 - System Class Component

Unit Representative

Identification	**Unit Representative Class**
Type	Class
Purpose	Provides UI for pilgrims and store data before sending it to database
Function	• Gets data of pilgrims • Assigns them packages etc. • Includes all functions for displaying data on profile
Subordinates	All functions that deal directly with candidates or applicants. It includes those for input of data in database, and those for output, both.
Dependencies	Stores data in database. Has a composition relationship with System Class.
Interfaces	Unit Representative's Profile

Resources	Constant connection with database
Processing	• AddPilgrims(), Update(BookingID), JoinPackage(BookingID), All these functions edit or update data of pilgrims in database. • ViewBooking(BookingID),ViewPilgrims(BookingID), ViewPilgrimslist(BookingID),PackegeCriteria(BookingID) Accesses data from database and displays it to student
Data	Pilgrims' Data from Database

Table 4-26 – Unit Representative Component

Users

Identification	**Users Class**
Type	Class
Purpose	• To provide interface for Corps, GHQ& Unit representative and store their data before sending it to database
Function	• Gets data of users • Performs the managerial functions that users has to perform
Subordinates	All functions that deal directly with administrative tasks of pilgrims.
Dependencies	Stores data in database. Has a composition relationship with System Class.
Interfaces	User's profile
Resources	Constant connection with database

Processing	• Create(), Remove(UserID), UpdateInfo(), ListUsers(), RemoveUsers(UserID): Deals with user management • ForwardRequest(), Approve(), Notifyapplicants(): Involves notifications and complaints • ViewPilgrimsList(), ViewPackages(), Packages(BookingId): Managerial roles for Users
Data	Pilgrim's Data from Database

Table 4-27 - Users Class Component

Hotel

Identification	**Hotels Class**
Type	Class
Purpose	• To store data regarding hotels being offered
Function	• Keeps track of all hotels that are being, or can be offered. This data can come in handy for calculation of packages. • Manages a list of prerequisites, to avoid applicants applying a hotel they haven't qualified for.
Subordinates	It only comprises of data of hotels offered in AUAS.
Dependencies	On Packages and Applicants
Interfaces	Displayed as hotels for application to applicants and staff
Resources	Database

Processing	• Create(), UpdateHotel(): tracks hotel's data • AssignPackages()
Data	Packages' Data

Table 4-28 - Hotel Class Component

Package

Identification	**Package Class**
Type	Class
Purpose	• To manage data of packages that are being held
Function	• Keeps track that which course or individuals applied in which package • Keeps track on which facilities are being offered in which package
Subordinates	Includes data regarding booking's starting and ending date, facilities offered etc.
Dependencies	On Users and facilities
Interfaces	Packages Data being displayed at students' profile. Data management from Corps Representative's profile
Resources	Database
Processing	• Create(), UpdateInfo(): tracks Package's data • AddHotels(): adds hotels that are making up the package
Data	Package's Data

Table 4-29 - Package Class Component

4.6 Summary

The reason for this section was to convey a depiction of the plan of the framework sufficiently appropriate to take into consideration programming advancement, with a comprehension of what is constructed and how it is created. It gives data fundamental to getting a depiction of the subtleties for the product and the framework to be fabricated. It presents a design view and detailed description of AUAS. It explains the purpose, features, interfaces, what the system do, its entire processes in detail, the imperatives under which it must work and how the system reacts to inputs and what will be its outputs.

CHAPTER 5

Implementation

5. Implementation

Introduction

Preceding chapter discoursed comprehensive design of the AUAS. This design is converted into an application by utilizing numerous technologies and tools. The implementation details are conferred in the subsequent divisions providing minutiae of the system's inner functioning.

Tools & Technologies

PHP

Hypertext Preprocessor (PHP) is a server-side scripting language designed for Web development but also used as a general-purpose programming language.

Atom

Atom is a free and open-source text and source code editor for mac OS, Linux, and Microsoft Windows with support for plug-ins written in Node.js, and embedded Git Control, developed by GitHub.

Laravel Framework

Laravel is an open-source PHP framework, which is robust and easy to understand. It follows a model-view-controller design pattern. Laravel reuses the existing components of different frameworks which helps in creating a web application. The web application thus designed is more structured and pragmatic.

HTML5

HTML5 is a markup language used for structuring and presenting content on the World

Wide Web. It is the fifth and current major version of the HTML standard.

SQL

SQL is a domain-specific language used in programming and designed for managing data held in a relational database management system, or for stream processing in a relational data stream management system.

MySQL

MySQL is an open-source relational database management system. Its name is a combination of "My", the name of co-founder Michael Widenius's daughter, and "SQL", the abbreviation for Structured Query Language.

JS

JavaScript, often abbreviated as JS, is a high-level, interpreted programming language. It is a language which is also characterized as dynamic, weakly typed, prototype-based and multi-paradigm.

jQuery

jQuery is a cross-platform JavaScript library designed to simplify the client-side scripting of HTML. It is free, open-source software using the permissive MIT License.

Apache Server

The Apache HTTP Server, colloquially called Apache, is a free and open-source cross-platform web server, released under the terms of Apache License 2.0.

UI Design

The system under development shall support an intuitive and easy to use UI that will have an

extremely shallow learning curve and require minimum training to be operated at maximum efficiency. In this way, users of the web application won't feel reluctant to use the application. Representative at GHQ, corps and unit won't feel reluctant to adopt the new system as means of Umrah management.

Login Screen

Following are the sketches of a possible UI implementation for AUAS. This will be the first screen that the user sees upon opening the AUAS. The user shall be presented with a form to enter username and password for login. As visible, the interface is simple and self-explanatory.

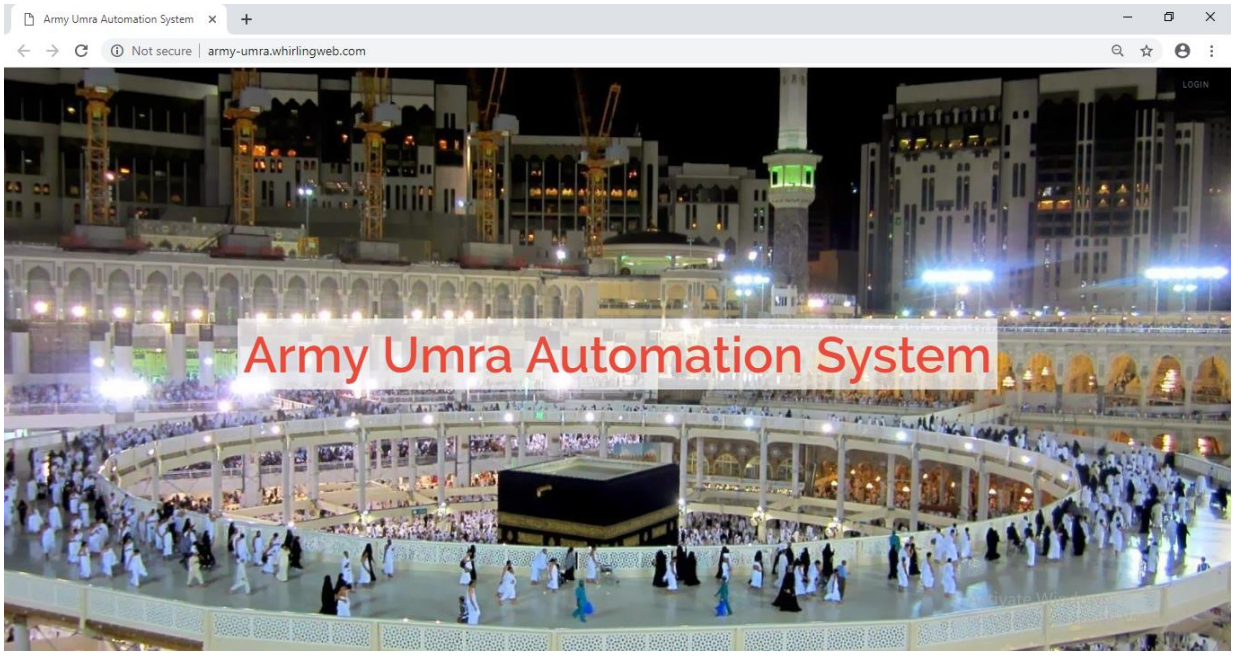

Figure 5-1 – Main Login Screen UI

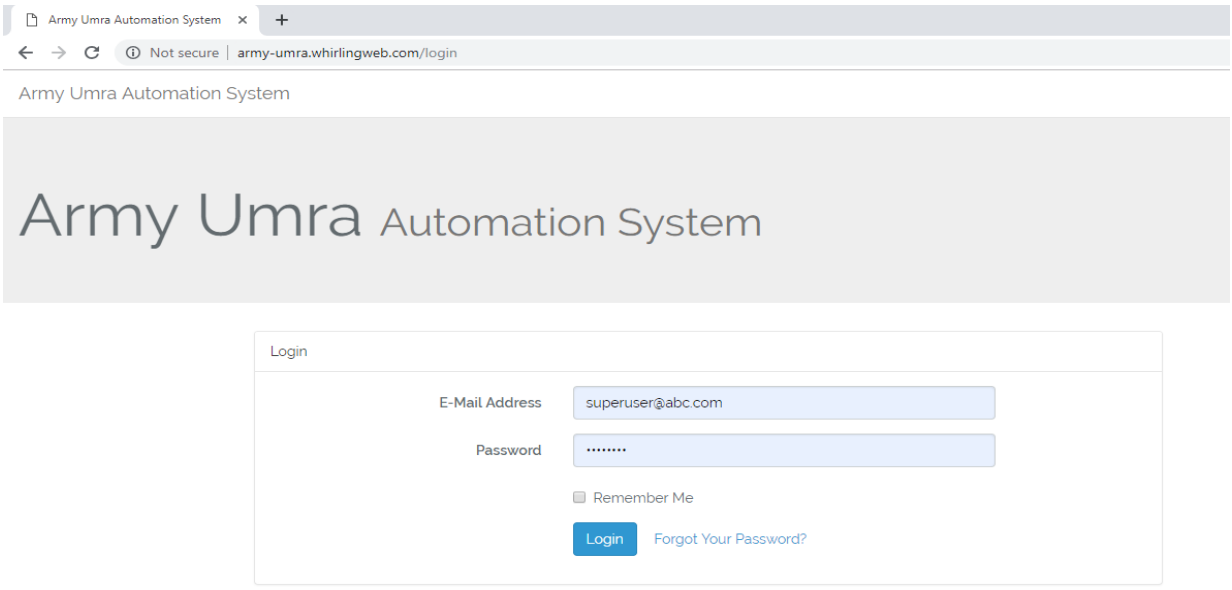

Figure 5-2 - Login Screen UI

Dashboard

Dashboard appears as the first screen right after successful login attempt as dashboard can be seen by any type of the user. As shown in diagram it shoes the basic and important details of the system. Screen is very simple and easy to understand and interpret. It shows packages along with their popularity and top booking users.

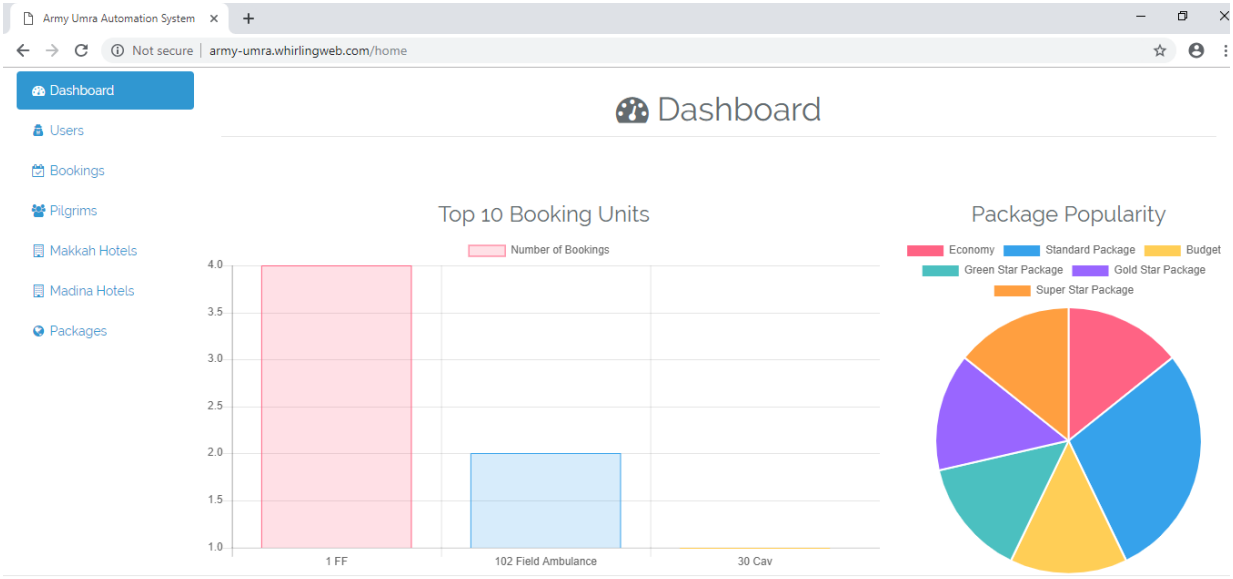

Figure 5-3 - Dashboard UI

Unit Representative Profile

If a representative of AUAS at unit logs in to the system, this will be the screen that is presented to him or her. It provides a minimalist, yet explanatory UI which covers all required aspects on one screen without need for further explanation. User can perform all the tasks and actions according to the rights such as pilgrim management, view and manage booking etc.

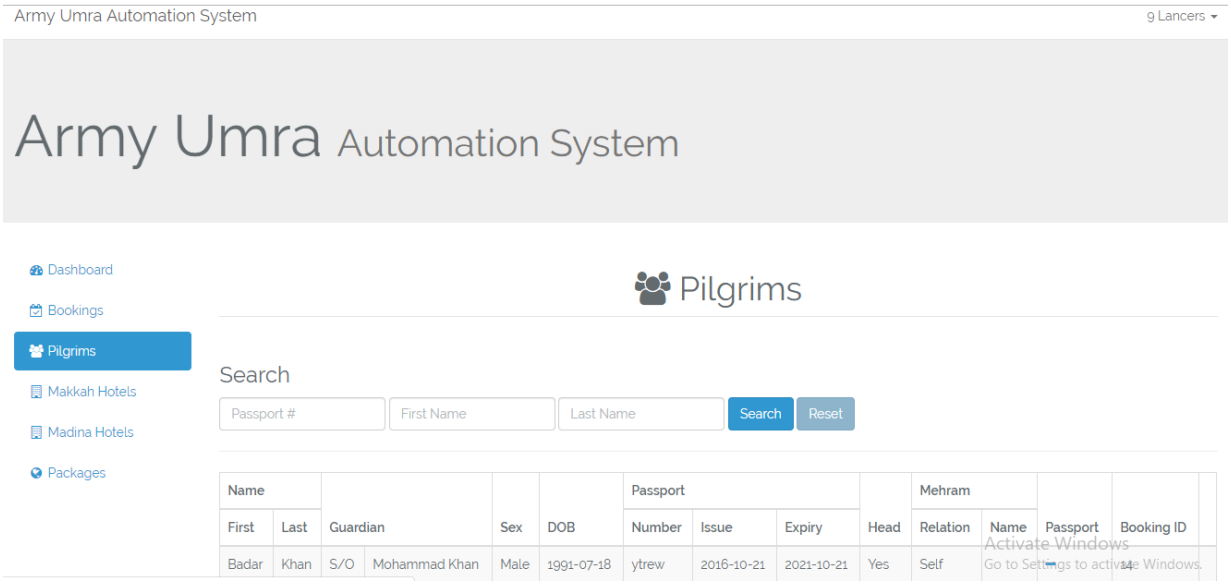

Figure 5-4 – Unit Representative main Profile UI

Corps Representative Profile

The easy-to-understand basic screen for the faculty will look like the following image.

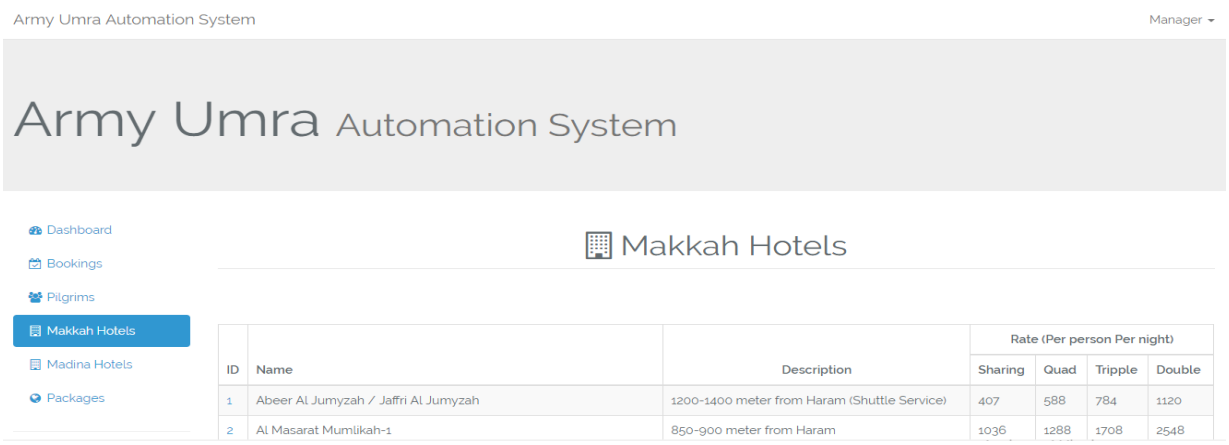

Figure 5-5 – Corps Representative Profile UI

GHQ Representative Profile

As the usage of the application by the users had been made clear above with the Use Case Diagram, the following interface can be proposed for usage by the representative sitting in GHQ.

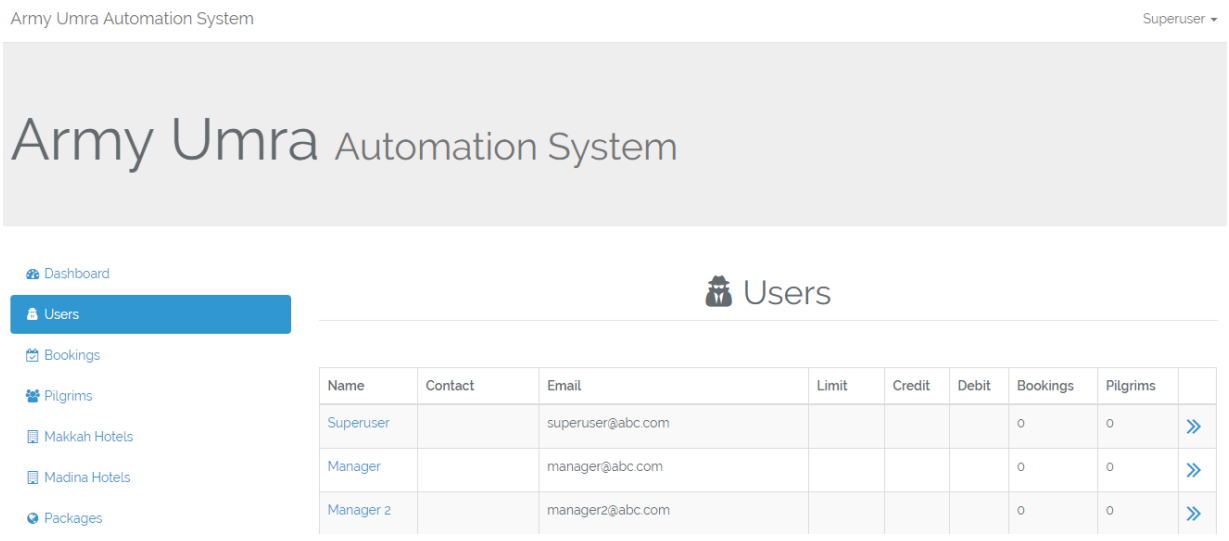

Figure 5-6 - GHQ Representative Profile UI

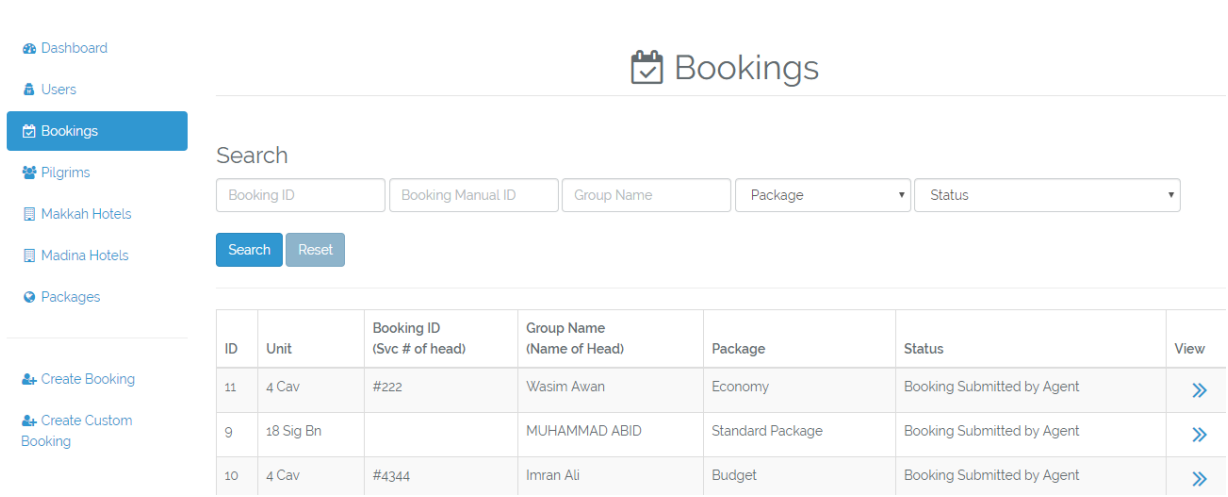

Figure 5-7 – GHQ Representative Profile UI

5.4 Summary

Implementation details of AAS are discussed in this chapter. Different functionalities and strategies to develop the system have also been pondered upon. A brief introduction to different tools and technologies employed is also given.

CHAPTER 6

Testing

6. Testing

Introduction

The purpose of this chapter is to elicit all material that is essential to plan and control the test efforts for the development of this project. It specifies the test plan for AUAS application during the development phase and provides a rationale behind the necessity of these tests. This report gives an outline of the tests which were implemented, the items that were targeted by the tests, along with the testing approach that was deployed. This testing is being done according to the elicited requirements in Software Requirements Specification Document for AUAS.

Test Items

- Account Management
- Pilgrims Record
- Progress Up gradation
- Flight Booking
- Selected Candidates Lists
- Voucher Generation
- Hotel Management
- Managing Passport and Visa
- Packages Selection
- Dashboard

Tested Features

- Login
- Create Accounts
- Manage Accounts
- Remove System Users
- Adding new system users
- Pilgrims Booked By A User
- Adding New Umrah Packages
- Printing Voucher
- Hotel Selection
- Search Pilgrims
- Design Custom Packages On Demand
- Booking Status Notification
- Changing Password By Email
- Visa Status Up gradation
- Uploading Picture
- System User Booking Limit

Features not to be tested

Security testing will not be done on the system since it is out of the scope of this project.

Approach

The system is working in modules so the testing phase was initiated by testing each module separately i.e. unit testing, and then step by step integrating modules to test them with each other i.e. integration testing, followed by the testing of the complete application as a whole.

Item Pass/Fail Criteria

- Tests will be passed by items if the actual output of each of the test case is same as the desired output of the system.
- Any transfer of data between any modules is updated in the database.

Suspension Criteria and Resumption Requirements

Suspension Criteria

- The assemble contains numerous genuine deformities which truly limit testing progress.
- Software/hardware problem
- Assigned assets are not accessible when should have been tried.

Resumption Requirements

- Resumption will possibly happen when the issues that caused the suspension have been settled.

Testing Tasks

- Development of test cases
- Execution of tests based on the developed test cases

- Report defects from the executed test cases, if any
- Provision of complete test report
- Incorporate changes later in the stage of the project development

Staffing and Training Needs

- A 1-hour training session can be arranged to guide the staff and faculty that will be managing this application.
- The portfolio for staff is self-explanatory and doesn't require any special training.

Test Cases

Test Case Name	Application Startup Testing
Test Case ID	1
Description	This feature sends the user to the login screen of the web application when he/she enters the website **http://army-umra.whirlingweb.com/**in the browser.
Testing Technique Used	Black Box Testing
Preconditions	The computer is on and is connected to the internet, and a web browser is running.
Input Values	URL: **http://army-umra.whirlingweb.com/**
Valid Inputs	The specified URL address
Invalid Inputs	Numeric Input, any mistake in specified URL
Steps	1. Enter URL in browser. 2. Press Enter
Expected Output	The user will be sent to the login screen of AUAS.
Actual Output	Successful opening of the application
Status	PASS

Table 6-1 - Application Startup Testing

Test Case Name	Login Feature Testing
Test Case ID	2
Description	This feature asks the user to enter his/her credentials for login. This test case is aimed to check that feature works according to user requirement.
Testing Technique Used	Black Box Testing
Preconditions	System is running and connected to database. User has opened the login webpage.
Input Values	1. Email Address 2. Password
Valid Inputs	1. Valid and authorized email address 2. Valid and authorized password
Invalid Inputs	1. Invalid email address e.g. missing @ sign in email address 2. Invalid password
Steps	1. Enter username 2. Enter password. 3. Click "Login"
Expected Output	The user credentials will be passed to the server for verification. The valid users will be directed to their dashboard after login.
Actual Output	Successful login. User is directed to the profile dashboard.
Status	PASS

Table 6-2 - Login Feature Testing

Test Case Name	Resetting User Password
Test Case ID	3
Description	User of the system may forget his/her account password. This feature facilitates the users to reset their password by entering their email address. Further email is validated and user is provided access to his/her account, hence proving the compatibility and user friendliness of AUAS.
Testing Technique Used	Black Box Testing
Preconditions	User must have a pre-existing AUAS account
Input Values	User email that is already saved in database of AUAS.
Valid Inputs	Registered email of a user.
Invalid Inputs	1. Wrong email address 2. Email address that is not stored in database.
Steps	1. User must click “Forgot Your Password” option 2. Enter email address in the displayed dialogue box. 3. Click “Send Password Reset Link” option
Expected Output	Password recovery link is sent to the entered email for resetting password.
Actual Output	System displayed “Swift_Transport Exception” error that is to be corrected in white box testing.
Status	FAIL

Table 6-3 – Resetting Your Password Testing

Test Case Name	Search Pilgrims Testing
Test Case ID	4
Description	Manager at unit level manages pilgrims and view their details. This test case checks whether AUAS user can view details of pilgrims or not.
Testing Technique Used	Black Box Testing
Preconditions	User has to be logged in first.
Input Values	1. After pressing "Pilgrims" option enter Name or Passport ID of the pilgrim to be searched. 2. If name or ID is not known then one can find the concerned pilgrim from the given list of all pilgrims
Valid Inputs	1. Alphanumeric characters for passport number 2. Alphabets for name
Invalid Inputs	1. Numeric input, alphanumeric input or special characters input for name. 2. Special characters, only numeric or alphabetic characters input for passport number.
Steps	1. User at Unit must login. 2. Click on "Pilgrims" option. 3. Enter the ID or name of pilgrim in case of a specific search. 4. Complete list of all pilgrims is viewed.
Expected Output	Complete list of all pilgrims is viewed.
Actual Output	Complete detail of pilgrim appears on screen.
Status	PASS

Table 6-4 – Search Pilgrims Testing

Test Case Name	Voucher Generation Testing
Test Case ID	5
Description	After completion of all booking steps a complete voucher can be viewed before printing it. In case , if all processes are not complete voucher with empty fields will be shown. Voucher contains all details of a pilgrim. This test case validates AUAS user rights to print voucher in case of desired output
Testing Technique Used	Black Box Testing
Preconditions	User must be logged in and must have the rights to perform required function.

Input Values	Mouse Click
Valid Inputs	Mouse Click
Invalid Inputs	1. Selecting a wrong option from side panel. 2. Right clicking on the correct option.
Steps	1. Click on “Bookings” from the side panel. 2. View details of a specific booking. 3. Click on “View Voucher ” option displayed on the left side of screen
Expected Output	Voucher must be displayed.
Actual Output	Voucher with all details is displayed.
Status	PASS

Table 6-5 – Voucher Generation Testing

Test Case Name	Custom Package Creation Testing
Test Case ID	6
Description	This test case checks that the AUAS user can create new custom packages as per the requirement, so new packages can be added according to demand.
Testing Technique Used	Black Box Testing
Preconditions	Manager of AUAS is logged into the system.
Input Values	Required data fields such as name, hotel location, stay duration etc.
Valid Inputs	Alphanumeric, numeric characters, selecting hotel from drop down menu
Invalid Inputs	1. Entering negative number in stay duration. 2. Data field left empty
Steps	1. Click on “Packages” option from the side panel. 2. Click on “Create Package”. 3. Enter the required data in the displayed data fields and click on “Add Package” option.
Expected Output	New custom package will be added in database and list of packages.
Actual Output	The database and list of packages is updated with the new custom package..
Status	PASS

Table 6-6 – Custom Package Creation Testing

Test Case Name	Create System User's Account
Test Case ID	7
Description	This test case checks whether manager at GHQ can create accounts for new users or not.
Testing Technique Used	Black Box Testing
Preconditions	User must be logged into AUAS and he/she must have the authority to create accounts for new users i.e. manager at GHQ.
Input Values	Mouse Click and entry of data in all required fields.
Valid Inputs	Alphanumeric, numeric characters.
Invalid Inputs	1. Data field left empty 2. Entering a wrong email address e.g. missing @ sign.
Steps	1. Click on "Users" option from the side panel. 2. Click on "Create User" option on the displayed screen showing list of all registered users.
Expected Output	A new screen with different data fields, "Reset" and "Add User" option will appear.
Actual Output	Output is as expected.
Status	PASS

Table 6-7 – Create System Users' Account Testing

Test Case Name	Delete System User Testing
Test Case ID	8
Description	This test case checks whether manager at GHQ can delete accounts of AUAS users or not.
Testing Technique Used	Black Box Testing
Preconditions	User must be logged into AUAS and he/she must have the authority to create accounts for new users i.e. manager at GHQ.

Input Values	Mouse Click
Valid Inputs	Mouse Click
Invalid Inputs	1. Selecting a wrong option from side panel. 2. Right clicking on the correct option.
Steps	1. Click on "Users" option from the side panel. 2. Select the AUAS user to be deleted. 3. Click on "Delete User" option from the panel on left side.
Expected Output	User will be deleted from the database of AUAS.
Actual Output	User is along with his/her all record is deleted.
Status	PASS

Table 6-8 – Delete System Users' Testing

Test Case Name	Up gradation of AUAS user's account
Test Case ID	9
Description	This test case checks the process of adding missing data, upgrading data in different fields of the already registered users.
Testing Technique Used	Black Box Testing
Preconditions	AUAS manager at GHQ must be logged into the system.
Input Values	Name, Address, city, Owner, Limit
Valid Inputs	Alphanumeric characters
Invalid Inputs	1. Entering limit less than 10,000. 2. Entering limit more than specified range. 3. Data field left empty
Steps	1. Click on "Users" option from the side panel. 2. Select specific user. 3. Click "Edit User". 4. Enter/ Upgrade data in required fields. 5. Click "Update User" option.
Expected Output	The result will be updated in database. It will now be shown in the details/information of the AUAS user.

Actual Output	Same as expected
Status	PASS

Table 6-9 – Up gradation of AUAS user's account Testing

Test Case Name	Uploading Pilgrim's Picture
Test Case ID	10
Description	This test case validates the AUAS manager's rights to upload picture of the pilgrim for displaying on pilgrim's passport.
Testing Technique Used	Black Box Testing
Preconditions	AUAS manager is logged into the account, and is currently viewing the dashboard.
Input Values	Mouse Click and Picture
Valid Inputs	Mouse Click and Picture
Invalid Inputs	1. Pressing a wrong option. 2. Selecting any file other than picture.
Steps	1. Click on "pilgrims" option and then choose a specific pilgrim. 2. Click on sign indicating editing of pilgrim's data. 3. Click on "choose file" option and upload picture. 4. Click "Update Pilgrim" option.
Expected Output	Picture of the user is uploaded for passport's use.
Actual Output	Picture is uploaded.
Status	PASS

Table 6-10 - Uploading Pilgrim's Picture Testing

Test Case Name	Booking Status Up gradation
Test Case ID	11
Description	This test case checks whether booking status is upgraded and does the pointer points the correct status of ongoing booking application.
Testing Technique Used	Black Box Testing

Preconditions	AUAS manager is logged into the system.
Input Values	Mouse Click
Valid Inputs	Mouse Click
Invalid Inputs	1. Pressing a wrong option. 2. Not selecting any option from drop down menu.
Steps	1. Select "Booking" option from the side panel. 2. Select a specific booking.
Expected Output	A list of all the steps of booking along with the current step pointed with an arrow will be shown.
Actual Output	Output is as expected.
Status	PASS

Table 6-11 - Booking Status Upgradation Testing

Test Case Name	Pilgrims And Bookings Booked By A User
Test Case ID	12
Description	This test case checks the number of pilgrims and bookings booked by a user.
Testing Technique Used	Black Box Testing
Preconditions	AUAS manager at GHQ is logged into the account, and is currently viewing the dashboard.
Input Values	Mouse Click
Valid Inputs	Mouse Click
Invalid Inputs	1. Selecting a wrong option from side panel. 2. Right clicking on the correct option.
Steps	1. Select "Users" option from the side panel. 2. Select a specific AUAS user. 3. Click on "View Pilgrims" and "View Bookings" option.

Expected Output	A list of all the pilgrims and bookings booked by AUAS user will be displayed.
Actual Output	Same as expected.
Status	PASS

Table 6-12 - Pilgrims And Bookings Booked By A User Testing

Test Case Name	Hotel Creation Testing
Test Case ID	13
Description	This test case checks if the AUAS user capable of entering a new hotel or not.
Testing Technique Used	Black Box Testing
Preconditions	AUAS manager is logged into the account, and is currently viewing the dashboard.
Input Values	Name, Description, Sharing rates
Valid Inputs	Alphanumeric Characters.
Invalid Inputs	1. Entering negative rates. 2. Entering rate more than specified range. 3. Data field left empty
Steps	1. Select “Makkah Hotels” or “Madina Hotels” option from the panel.(Select the option based on the city in which a new hotel will be affiliated with AUAS booking system). 2. Select “Create Hotel” option.
Expected Output	A dialogue box/screen will appear with some data fields (related to hotel information) to be entered.
Actual Output	Same as expected.
Status	PASS

Table 6-13 - Hotel Creation Testing Testing

Test Case Name	Dashboard Up gradation Testing
Test Case ID	14
Description	Dashboard shows top booking units. This test case checks whether dashboard automatically updates itself if the number of bookings done by a unit increase from a unit which was previously among top booking units.
Testing Technique Used	Black Box Testing
Preconditions	Any user, manager of AUAS must be logged into the system.
Input Values	None
Valid Inputs	None
Invalid Inputs	None
Steps	1. Student logs into his profile with the provided credentials.
Expected Output	Dashboard must be updated automatically.
Actual Output	Same as expected.
Status	PASS

Table 6-14 - Dashboard Up gradation Testing

Test Case Name	Booking Creation Testing
Test Case ID	15
Description	This test case checks the feature which enables the user of AUAS at unit to successfully create a new booking for new pilgrims.
Testing Technique Used	Black Box Testing
Preconditions	AUAS user at unit level must be logged into the system.
Input Values	Package, Booking ID, Group Name, Room Type, Ziarat, Route
Valid Inputs	Alphanumeric characters and selection from dropdown lists.
Invalid Inputs	1. Not selecting option from drop down list. 2. Data field left empty.

Steps	1. Select “Bookings” option from the side panel. 2. Select “Create Booking ” option.
Expected Output	Create booking screen with some data fields to be entered will be displayed.
Actual Output	As per expected.
Status	PASS

Table 6-15 - Booking Creation Testing

Test Case Name	Log Out Testing
Test Case ID	16
Description	This test case checks for the log out feature for the users.
Testing Technique Used	Black Box Testing
Preconditions	User must be logged into the system.
Input Values	Mouse Click
Valid Inputs	Mouse Click
Invalid Inputs	1. Selecting a wrong option. 2. Right clicking on the correct option.
Steps	1. Click on “Log Out” button. 2. Confirm the logout.
Expected Output	Logs out of system.
Actual Output	Same as expected
Status	PASS

Table 6-16 - Logout Testing

Summary

From the extensive black box testing, it can be concluded that the system is working fine and in accordance with the functional requirements stated in the SRS document. The system can be further improved and enhanced during maintenance and upgrade phase. A detailed white box testing can also highlight the errors and bugs, if present, in the code of the application.

CHAPTER 7

Conclusion and Future Work

7. Conclusion & Future Work

Conclusion

Various applications exist that perform the functions of Umrah management in commercial sector, but there will be very few applications that analyze the data of applicants and find meaningful reports out of it i.e. selection based on a specific criteria. AUAS shares the burden which was previously being performed manually.

In Pakistan Army no software related to Umrah management is in use yet there are some other software in use of Army whose some of the basic functions are same as AUAS. AUAS is enriched by lots of features and is easy-to-learn and easy-to-use. AUAS looks forward to being an application that not only addresses these issues, but also offer modifiability for future implementations.

Design Decisions & Tradeoffs

We have kept the user interface simple and friendly so even a user with only basic knowledge of web applications can use it effectively.

We had to eliminate the need for the details of the applicants being entered by them. This is done to ensure that the sign in only requires a user name and password, which is provided to the users by an administrative authority. This, however, can result in slight rigidity in this regard.

The current entry of credentials of applicants is done by representative at unit which is a bit inefficient method because Army already has an OS system where accounts of army personals

already exist. AUAS can be linked with OS system of Pakistan Army in order to make process and make it less error prone. Doing so requires more safety of information because data can be compromised easily.

The system keeps record of all the applicants who have applied and all those who got selected as a single individual is allowed to perform Umrah through Army only once. This results into load on database and might slow down the system may be in microseconds or seconds after a huge amount of entries in database. Firstly it will take a lot of time to reach this stage but AUAS is modifiable so any suitable solution can be implemented to tackle this small issue.

Since this application is a new development effort for implementation in Army, our focus was to develop an application that is simple enough for an average user to use, while still providing the required features along with.

Future Work

As specified in the external scope of the product, in the coming years, this software can be modified and implemented in Pakistan Navy and Air force. After slight modifications it can also be sold to commercial Umrah agencies.

The project can be further enhanced by incorporating confidentiality and shifting it over to HTTPS server. A survey can be conducted among the users of the application, and considering their reviews, changes can be made in the application on annual basis.

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