

ASA Hub



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**In the name of Allah, the Most Merciful,
the Most Kind.**



QUAID-I-AZAM UNIVERSITY

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Dated: _____

FINAL APPROVAL

This is to certify that we have read the final report submitted by Azmat Ullah and it is our judgment that this report is of sufficient standard to warrant its acceptance by the Quaid-i-Azam University, Islamabad for the degree of the Bachelor in Computer Science [BSCS].

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In the name of ALLAH, Most Beneficent, Most Merciful.

First, I thank a lot to almighty Allah for his blessings and grace in completing my project. At the start, it was looking very hard for me but with the passage of time things seems to be simple with the help of almighty Allah. I thank a lot to my Parents because without their support it was impossible for me to reach at this stage. I thanks to my all teachers Dr. M. Afzal Bhatti, Dr. Mudassir Azam Sindhu, Dr. Ghazanfar Farooq, Dr. Shuaib Karim, Sir S.M. Naqi, Dr. Mubasher Mushtaq, Dr. Akmal Khan Khattak, Dr. Khalid Saleem, Dr. Onaiza Maqbool, Dr. Rabeeh Ayaz Abbasi, Dr. Faiza Iqbal, Miss Ifrah Farrukh Khan, Miss Memona Afsheen and for their kind support and cooperation throughout my degree. Special thanks to my project supervisor Dr. Muhammad Usman, for their cooperation during implementation of my project. Continuous suggestions of teachers and supervisor enabled me to implement this project in better way. At the end, I thank to my friends and fellows who encouraged and motivated me throughout my degree.

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Abstract

Academic Staff Association Hub (ASA Hub) is an association for academic faculty of Quaid e Azam University Islamabad. In ASA, academic faculty is member of association. The working of association is to conduct meetings to discuss the different issues related to their services, send notifications to members about meeting, and keep records of meetings and members. ASA annually organize voting for president, vice president, secretary and general secretary to elect new committee of association. All members cast their vote to elect the committee. All members of organization give some amount for the working process of organization.

All these activities are performed manually because the organization has no any online forum or system. Therefore, in our project, we have implemented an online system for the association named as ASA Hub. This system performs all the activities for ASA in which members of the organization can discuss different matters online related to their services with each other. General Secretary of organization can add new notifications about meetings, keep the whole record of members and meeting records of the association. General Secretary creates the account for new members of the organization and sends them username and password through email. After receiving username and password members can manage their profiles according to their choice and can edit their profile.

President, vice president, secretary and general secretary of organization can be elected by the online voting system, in which members of the organization can cast their vote by online voting poll according to their choice. Librarian handles all the polling system and at the end announces the voting results. President of organization can preside the meetings online and members can join the meetings online. Meeting records about meeting topics can be saved for future.

As this project is large and has many modules so this project is divided into two groups. In my part, the modules are Profile management of users, E Voting, and meeting records, login, signup, password reset and in my partner's part; the modules are Discussion Forum, Notification Management, Virtual Meetings and Account Treasures. To implement this project freely available tools Visual studio for asp.net framework and sql server to store database are used. As this project is a web-based project, the framework used is ASP.Net with c# programming language. The server used is windows default server IIS (Internet Information Services) Manger to run the asp.net code. This project is implemented in professional way according to rules of software engineering and it is covering all the features required to ASA.

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Chapter 1

Software Project Management Plan

This chapter describes the introduction to Academic Staff Association Hub (ASA Hub) project and project management plan. Problem definition of project, its working and reasons to implement this project, proposed solution for problems, scope and objectives of ASA are described in detail. Project organization and project management plan is discussed for every task that in how much time a task could be completed. Timeline chart of each resource is shown at the end of this section.

1.1) Problem Definition

ASA Hub (Academic Staff Association Hub) is an association for the faculty members of QAU in which teachers are members of association. The working of association is that the members of association discuss different matters related to their services and send notifications to members about meetings or any announcement. Association arranges voting for president, vice president, secretary and general secretary. The problems faced by ASA are to keep the whole records of all members manually, there is no any proper system to join or leave the organization. Association has no any online platform for member's profiles and discussion forum. ASA has also problem in voting to elect their president, vice president, secretary and general secretary in manual system, because in manual system there is problem for gathering of all members at a time and cast their vote. Organization has also problems to gather all the members for meeting at same time and keep the meeting record manually for future use.

1.2) Proposed Solution

To resolve the problems faced by ASA a system has been proposed to be deployed for organization as named "ASA Hub" which is a web based application for ASA members and for the administrator who is general secretary. General Secretary adds new members in organization by creating their account through system and sends username and password through email to new members. The System provides facility of login to members with their accounts so that members can login with their account and manage their profile, get new notifications and keep up to date about the upcoming events through notification. System also provides facility of online voting so that members could cast vote online to elect president, vice president, secretary and general secretary. System stores all the records of members and meetings in the database that the members can access online. This system overcomes the burden of maintaining the whole record related to ASA manually.

1.3) Scope

This system adds new members by signup and provides login to members of organization. Through this system, members can manage their profiles, views the whole records of notifications and meetings of ASA and search the records. System provides online voting facility to cast votes and elect the committee. Stakeholders of this system are members of ASA and admin. Many users can use the system simultaneously. System allows only members of ASA to use this system to perform different tasks. Meetings records can be added by admin and only the librarian manages the voting process.

1.4) Objectives

The main objective of the systems is to facilitate the members of ASA with online system. Admin can create accounts for members by signup. Members can login with user name and password and manage their profiles. Members can elect president, vice president, secretary, general secretary by online voting system. Add new notifications, discussions and keep whole record of notifications, meetings and members of the organization.

1.5) Project Organization

Project organization describes the language in which project is implemented and during implementation of project which process model will be used and tools that will be used to implement the project.

1.5.1) Software Process Model

Rapid Application Development (RAD) software process model [1] is used in our project because Rapid application development is an incremental “software development process model” that emphasizes an extremely short development cycle. The RAD model is a “high-speed” adaptation of the linear sequential model in which rapid development is achieved by using component-based construction. Different components are independent of each other and are implemented by teams. It is used for medium projects those could be implemented in duration of 2-3 months and at the end, modules could be integrated with each other.

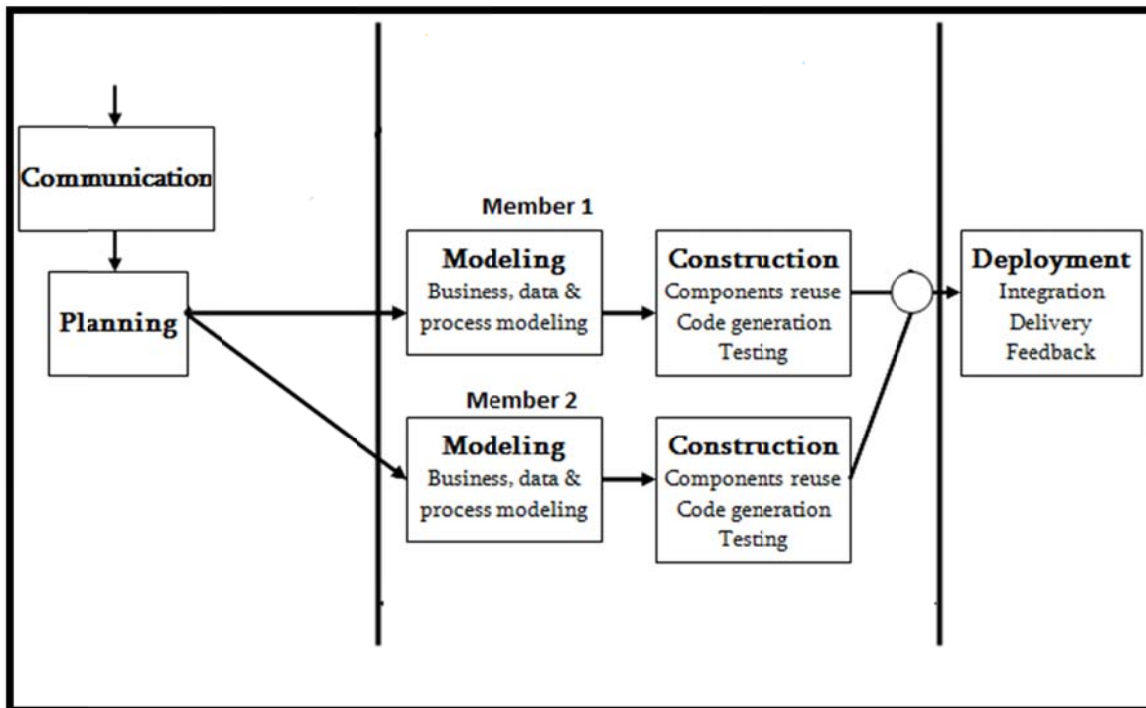


Figure 1.1: Process Model

1.5.2) Roles and Responsibilities

Administrator plays major role who sends notifications, creates sign up for new added members, stores the meetings record and keeps record of member in organization. There are also some privileged users like librarian, who manages the election, announce the polling record and president who presides the meetings online.

1.5.3) Tools and Techniques

Different Tools to implement this project are used as follows.

Table 1.1: Tools and Techniques

Tools	Use
Microsoft Visual Studio 2012	To implement project in asp.net framework.
Microsoft SQL Server	To manage database.
Microsoft Visio 2016	To draw different diagrams e.g. class diagram, sequence diagram etc.
Microsoft Word 2013	To write documentation.
IIS Server	To run asp.net code on server.
Argo UML	To draw diagrams.
Project Libre	For project management plan.

In ASP.Net, web forms approach is used to implement this project.

1.6) Project Management Plan

Project management plan is created in Project Libre. In project management plan resources name, start date, finish dates of every task are listed and Time line chart for every task with duration is shown.

	⊞	Name	Duration	Start	Finish	Predecessors
1	⊞	Documentation	77 days	9/20/16 8:00 AM	1/4/17 5:00 PM	
2	⊞	Chapter 1:Project Introduction	10 days	9/20/16 8:00 AM	10/3/16 5:00 PM	
3		Introduction	2 days	9/20/16 8:00 AM	9/21/16 5:00 PM	
4	⊞	Problem Definition	1 day	9/21/16 8:00 AM	9/21/16 5:00 PM	
5	⊞	Proposed Solution	1 day	9/22/16 8:00 AM	9/22/16 5:00 PM	
6	⊞	Scope	1 day	9/23/16 8:00 AM	9/23/16 5:00 PM	
7	⊞	Objective	1 day	9/24/16 8:00 AM	9/26/16 5:00 PM	
8	⊞	Project Organization	1 day	9/27/16 8:00 AM	9/27/16 5:00 PM	
9	⊞	Project Management Plan	4 days	9/28/16 8:00 AM	10/3/16 5:00 PM	
10	⊞	Chapter 2:Requirements Gathering and Analysis	20 days	10/4/16 8:00 AM	10/31/16 5:00 PM	2
11	⊞	Introduction	3.25 days	10/4/16 8:00 AM	10/7/16 10:00 AM	
12	⊞	Purpose	0.25 days	10/4/16 8:00 AM	10/4/16 10:00 AM	
13	⊞	Stakeholders	0.25 days	10/5/16 8:00 AM	10/5/16 10:00 AM	
14	⊞	Major Functions	0.25 days	10/6/16 8:00 AM	10/6/16 10:00 AM	
15	⊞	Supported Functions	0.25 days	10/7/16 8:00 AM	10/7/16 10:00 AM	
16	⊞	Major Inputs and Outputs	0.25 days	10/7/16 8:00 AM	10/7/16 10:00 AM	
17	⊞	Overview	3.25 days	10/10/16 8:00 AM	10/13/16 10:00 AM	11
18	⊞	Overall Discriptions	0.25 days	10/10/16 8:00 AM	10/10/16 10:00 AM	
19	⊞	Product Perspective	0.25 days	10/11/16 8:00 AM	10/11/16 10:00 AM	
20	⊞	Product Functions	0.25 days	10/11/16 8:00 AM	10/11/16 10:00 AM	
21	⊞	User Characteristics	0.125 days	10/11/16 8:00 AM	10/11/16 9:00 AM	
22	⊞	Constaints	0.25 days	10/12/16 8:00 AM	10/12/16 10:00 AM	
23	⊞	Assumptions and Dependencies	0.25 days	10/13/16 8:00 AM	10/13/16 10:00 AM	
24	⊞	Specific Requirements	12 days	10/14/16 8:00 AM	10/31/16 5:00 PM	17
25		Functional Requirements	1 day	10/14/16 8:00 AM	10/14/16 5:00 PM	
26	⊞	Non Functional Requirements	1 day	10/17/16 8:00 AM	10/17/16 5:00 PM	
27	⊞	Use Case Diagram	2 days	10/18/16 8:00 AM	10/19/16 5:00 PM	
28	⊞	Use Cases Description	8 days	10/20/16 8:00 AM	10/31/16 5:00 PM	
29	⊞	Chapter 3:System Design	18 days	11/10/16 8:00 AM	12/5/16 5:00 PM	10
30		Architectural Diagram	1 day	11/10/16 8:00 AM	11/10/16 5:00 PM	
31	⊞	Entity Relationship Diagram	5 days	11/11/16 8:00 AM	11/17/16 5:00 PM	
32	⊞	Class Diagram	2 days	11/18/16 8:00 AM	11/21/16 5:00 PM	
33	⊞	Sequence Diagrams	10 days	11/22/16 8:00 AM	12/5/16 5:00 PM	
34	⊞	Chapter 4: Implementation	4 days	12/6/16 8:00 AM	12/9/16 5:00 PM	29
35		Introduction	1 day	12/6/16 8:00 AM	12/6/16 5:00 PM	
36		Language Selecton	1 day	12/6/16 8:00 AM	12/6/16 5:00 PM	
37		Database Selectin	1 day	12/6/16 8:00 AM	12/6/16 5:00 PM	
38	⊞	Interfaces	4 days	12/6/16 8:00 AM	12/9/16 5:00 PM	
39	⊞	Chapter 5:Testing	5 days	12/12/16 8:00 AM	12/16/16 5:00 PM	34
40		Test cases	5 days	12/12/16 8:00 AM	12/16/16 5:00 PM	
41	⊞	Chapter 6	1 day	12/19/16 8:00 AM	12/19/16 5:00 PM	
42	⊞	Conclusion and Future Work	2 days	12/20/16 8:00 AM	12/21/16 5:00 PM	
43	⊞	Review	10 days	12/22/16 8:00 AM	1/4/17 5:00 PM	
44	⊞	Review 1	5 days	12/22/16 8:00 AM	12/28/16 5:00 PM	
45	⊞	Review 2	5 days	12/29/16 8:00 AM	1/4/17 5:00 PM	

Figure 1.2: Project Plan

Time line diagram of above resources is shown in which time required to each module is shown in the form of time line.

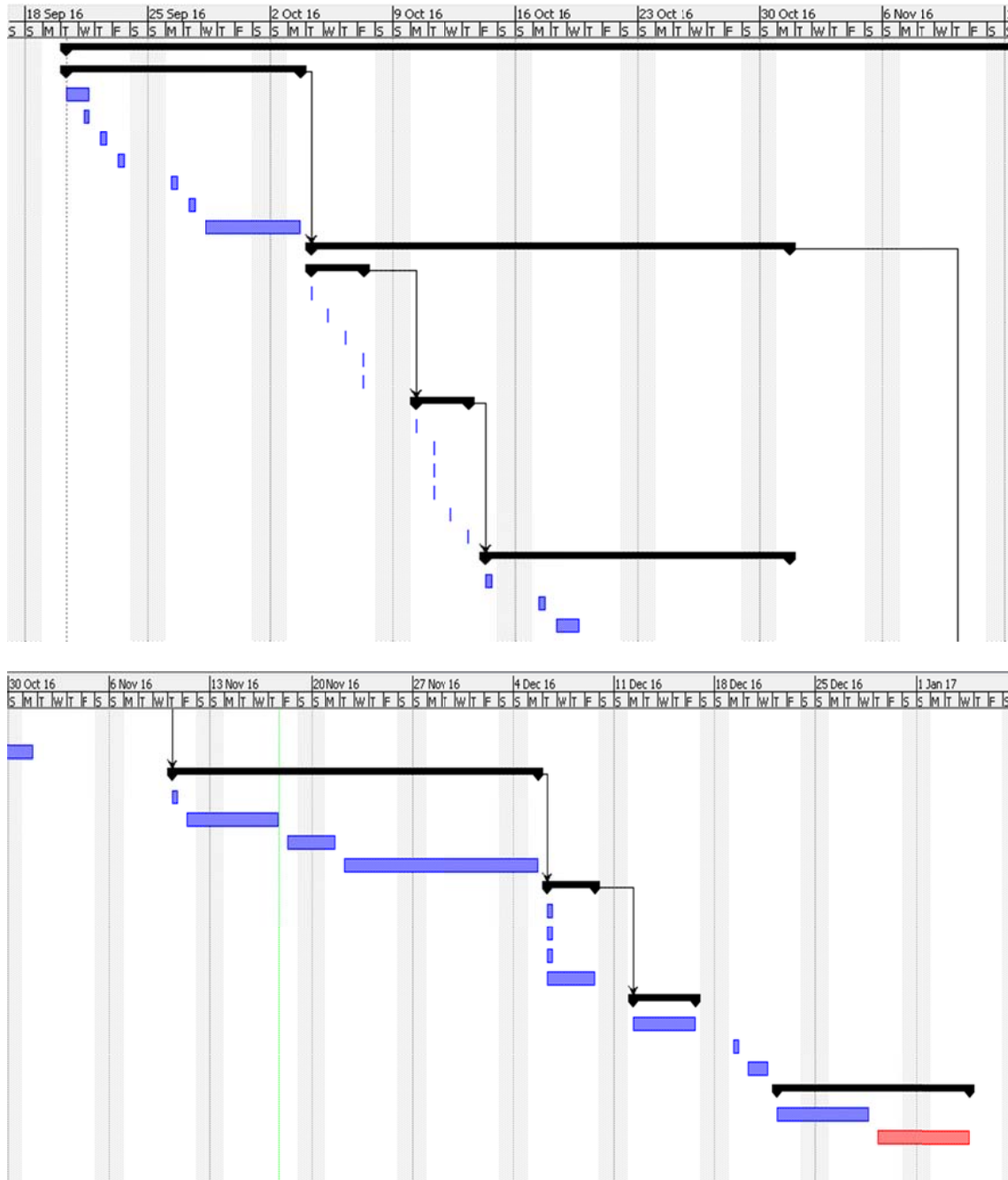


Figure 1.3: Time Line Diagram of project plan

1.7) Report Structure

In this report, all the tasks are shown in timeline chart with timings. There are six chapters in this document and structure of each chapters is summarized as: Chapter 1 is project management plan and introduction of project such as problem definition, proposed solution and scope of project. Chapter 2 is “System Requirements Specification” in which functional and non-functional requirements of system are described. Chapter 3 is about system design, in which ERD, sequence diagram, class diagram and interfaces of system are described. Chapter 4 is implementation of project. Chapter 5 is about system testing, in which test approach and test cases of system are described in detail. Chapter 6 is conclusions and future work related to project.

In this chapter introduction of ASA is described that what is working of ASA and what problem ASA is facing in their current manual system. A proposed solution is discussed, that is to design an online system in which ASA should have facilities like discussion forum, notification management, E voting and virtual meeting are included. System will overcome the problems of ASA’s manual system.

Next chapter is about “requirements gathering and analysis” and overall description about system.

Chapter 2

Software Requirements Specification

Software requirements specification (SRS) is a document that captures complete description about how the system is expected to perform. SRS describes the complete information about system that what end user wants. What would be inputs of users to system and what would be response of system corresponding to user's input. Functional and non-functional requirements of system are detailed completely in SRS document.

2.1) Overview

Requirements gathering and analysis clears the requirements before implementation of project. This chapter clears that what end users of project wants and what would be the output of system. So with different aspects requirements gathering and analysis is described below.

2.1.1) Purpose

The Purpose of this Requirement gathering and analysis is to clear the requirements of the system and to decide what the system should do and what the system should not do. Other purpose is to clear the requirements and analyze them that how those requirements would help in implementing the project with actual features that end users want.

2.1.2) Stakeholders

All teachers who are members of ASA are stakeholders. Admin who is general secretary of organization and librarian who handles voting are also stakeholders of this system.

2.1.3) Major Functions

Through gathering requirements from different members of ASA I analyzed that major functions are to register new members by providing them user name and password through email. Members could manage profile, discuss import issues online with each other, and pass comments on discussions to give their arguments. Online voting system to elect the president online by casting vote, manage meetings online, and keep the record of notifications and meetings.

2.1.4) Major Inputs and outputs

Major inputs and outputs are that what would be inputs of users to the system and what would be response of system to corresponding user input.

2.1.4.1) Major Inputs

Major inputs are different inputs that user gives to system to perform different activities. Admin enters the information of new user, User enters his user name and password to log in with his account, User manages their profiles, administrator can create voting poll and enters the record of Meetings about meeting dates, issues discussed in meeting etc.

2.1.4.2) Major Outputs

Major outputs of system are different outputs that system provides to user. Through System, admin sends account info to users through email. Admin sends notifications to users. Users search meeting records and system shows the voting results.

2.1.5) Acronyms and Abbreviations

Different acronyms and abbreviations are shown in table below.

Table 2.1: Acronyms and Abbreviation

ASA Hub	Academic Staff Association Hub
QAU	Quaid I Azam university
User	Teachers who are members of organization
Admin or Administrator	General Secretary who runs the whole organization
UC	Use Case
HTTP	Hyper Text Transfer Protocol to access the website
SMTP	Simple Mail Transfer Protocol.
ERD	Entity Relationship Diagram.

2.2) Overall Description

Overall description of system describes how the system would perform with different operations or provides features. Overall description of system is described as below

2.2.1) Product Perspective

ASA Hub is standalone application. This is a web-based application in which admin provides accounts to members of organization. Members can login with their accounts and manage their profiles, elect their president, vice president, secretary and general secretary through online voting poll system. Admin could keep the record of all previous meetings about meeting issue and results of meetings.

2.2.2) User Interfaces

This system is a web-based application for users. Different interfaces of system through which user can interact with system are as: System provides login interface through which users can login to system. Manage profile interface through which users can manage their profile according to their choice. Online voting interface through which users can cast their vote and admin can create voting poll with the names of different candidates and show the voting results. Meeting record interface through which admin adds meeting records and users can view and search meeting records.

2.2.3) Software Interfaces

Software interfaces are different software to implement and run an application. In this application, software interfaces for client and admin are web browser and any operating system. Software interfaces on developing side are visual studio for development environment and Internet Information Services Manager (IIS Manager) server for running and hosting the application and MySQL for storing database and perform different queries. Different libraries to handle bootstrap and JQuery would also be used in this application.

2.2.4) Communication Protocols

Communication protocols are different protocols used in application to communicate between clients and server. Therefore, in this application different protocols are http/https is used to access the website and SMTP to send email by admin to different members.

2.3) Product Functions

Product functions describe the functions or operations that a system will perform. Different functions with details are described below.

2.3.1) Signup User

System will provide signup function on the behalf of admin. When a new member joins the organization then admin creates account for the new user using his name and password then mail his account details to that new user.

2.3.2) Login User

When a user gets his username and password then he can login with his account and join the ASA Hub. Now he can perform different activities through system.

2.3.3) Manage Profile

When a new user gets his username, password, and login with his account then he could manage his profile as he can add his image his qualifications etc. User can also edit his information in his profile.

2.3.4) View Profile

Users can also view the profiles of other members of organization. User can view the CV and common information of members

2.3.5) Create Voting Poll

Administrator can create a voting poll for the election of president, vice president, secretary, and general secretary.

2.3.6) Cast Vote

Members of organization can cast vote to elect president, vice president, secretary and general secretary. Every member can cast vote only once for only one candidate of each rank.

2.3.7) Show Voting Results

When the voting time is ended, the system has calculated the voting results. Then the librarian has rights to show the results of voting and announce the winners.

2.3.8) Create Meeting Record

When a meeting is organized by organization then at the end admin adds the meeting record like the purpose of meeting, issues discussed in meeting and conclusion of meeting etc.

2.3.9) Search Meeting Records

Users can search the previous meeting record and view the all previous records for any purpose.

2.3.10) View Meeting Records

Users can also view all the previous meeting records one by one instead of searching any particular meeting record.

2.4) User Characteristics

This is assumed that the users know English language and can read and write it. User has laptop, computer or any smart phone to access the system through internet. Moreover, admin has knowledge of using computer etc.

2.4.1) Constraints

User should have internet connection and any computer/laptop device or smart phones to use the system. Only members of ASA can use the system with provided user accounts. System is implemented in English Language so the user should have proper knowledge of English to use the system.

2.4.2) Assumptions and Dependencies

It is assumed that the user and admin both have any computer/laptop or smart phone devices to access the system. All the system is dependent on internet to access the system online.

2.5) Specific Requirements

Some specific requirements of system are functional requirements and non-functional requirements. Both requirements of system are detailed below.

2.5.1) Functional Requirements

Functional requirements those that relate to function of system. So the functional requirements are that system should allow only to admin to create signup for users and users can login to their accounts with his username and password. User can manage their profiles, admin could create voting poll and users could cast their vote only once, show the voting results and search the meeting records.

2.5.2) Non-Functional Requirements

Non-functional requirements are those that do not directly relate to function of system. So some non-functional requirements are detailed as below.

2.5.2.1) Security

Security relates to how much the system is secure. Secure protocol https is used instead of http. In order to secure the system, a proper mechanism of user authentication is implemented to authenticate the users. Users are authenticated with their accounts. Used sql injection to secure the database.

2.5.2.2) Reliability

Reliability means how much a system is reliable. When user sends a query, then system properly response to user and system response is as expected. So in order to make the system

reliable users should not share their passwords to others. In addition, a proper mechanism of logout is implemented to leave the system so that other people cannot use the system.

2.5.2.3) Availability

Availability means to whom and when the system would be available. System will be available all the time for user's queries. In case of any database crash backup would be available to response the queries. So a proper mechanism of signup, login and logout is made so that the system should be only available to members of organization.

2.5.2.4) Performance

Performance means how much fast and better a system would perform. System will response the user's queries in mili seconds to enhance the system performance. So in order to get better performance database is will organized and normalized.

2.5.2.5) Maintainability

Maintainability means system should keep it maintained. A backup option of data is designed so that in case of any database failure system will maintain itself by using backup of data and give response to user queries.

2.5.2.6) Portability

Portability means either system could be used on different platforms or not. This system is a web-based application hosted on any server so this application can be accessed from any platforms or operating systems with having only web browser.

2.6) Use Case Diagram

Use Case diagram is graphical representation of user interaction with system. Use-case diagram represents that how different users interact with the components of system. So all use-cases are mentioned in diagram and how the users interact with use cases is shown by diagram.

Actors are as:

User: Users are all members of the organization.

Admin: Admin is elected general secretary of organization.

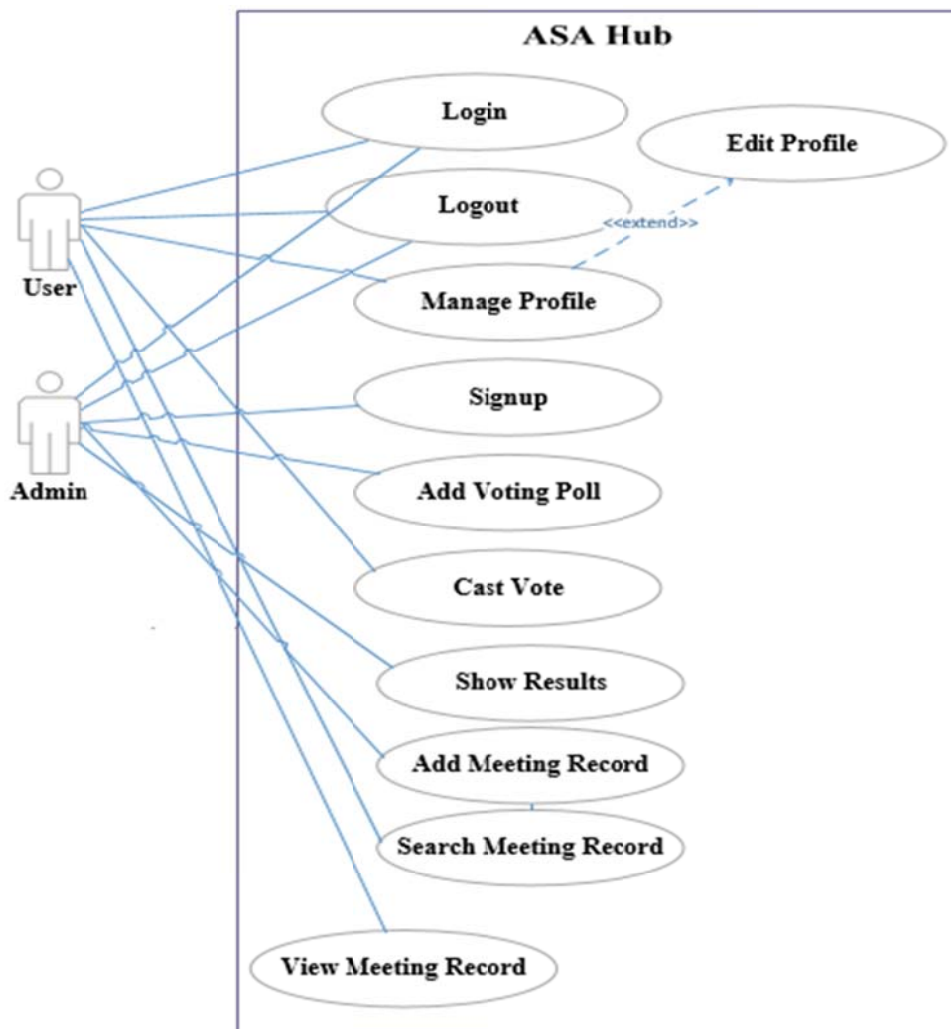


Figure 2.1: Use Case Diagram

2.7) Use Case Descriptions

Use case description describes each use case of system in detail. In use case description, all the features of system are described that what would be role of users in system and what will be response of system on user input. So the detail of each use case is thoroughly described as below.

2.7.1) Use Case 1: Signup

ID	UC:1
Name	Signup
Primary Actor	Admin
Stakeholders and Interests	Admin: wants to create account of new user who is member of organization. User: wants to get user account to use online system of ASA.
Input	New user's information
Pre-Conditions	User must be member of organization and admin is logged in.
Post-Conditions	Username and password of new user is sent by email
Main Success Scenario	<ol style="list-style-type: none"> 1. Admin opens the Sign up page of system. 2. System asks for required details. 3. Admin enters the user's name, password and email. 4. System validates the entered information.
Alternative flows or Extensions	<p>If internet is not available, then user cannot access to system</p> <p>4a. If username or email already exists, then system gives message that username or email already exists.</p> <p>4b. If any required field is null then the system will display that please Enter the complete details.</p>
Frequency of occurrence	When a new user joins the association.

When a new member joins the organization then he requests account to use the ASA Hub. So at the request of member admin creates his account to access the system and sends his username and password through email.

2.7.2) Use Case 2: Login

ID	UC:2
Name	Login
Primary Actor	User, Admin
Stakeholders and Interests	User: wants to login to system and perform his different activities. Admin: wants to login to system and perform his different activities.
Input	Username and password
Pre-Conditions	User is registered and its information is saved in the system.
Post-Conditions	User is logged in and system displays home screen.
Main Success Scenario	<ol style="list-style-type: none"> 1. User opens login page to login with his account 2. System asks for requested information. 3. User enters username and password. 4. System validates username and password.
Alternative flows or Extensions	<ol style="list-style-type: none"> 1. If internet is not available, then user cannot access to system. 4a. If username or password is incorrect then system gives message that please enter the correct details. 4b. If any required field is NULL, then system will display that please Enter the complete details. .
Frequency of occurrence	Many times a day.

When a user login to system then he has to provide his username and password. This mechanism is to authenticate the users because this system is only for members of ASA.

2.7.3) Use Case 3: Manage Profile

ID	UC:3
Name	Manage Profile
Primary Actor	User
Stakeholders and Interests	User: wants to manage his profile when he joins the system and enters all his information.
Input	User Enters all his information in given fields.
Pre-Conditions	User is logged in with his account.
Post-Conditions	User profile is added and displayed on system
Main Success Scenario	<ol style="list-style-type: none"> 1. User selects the profile. 2. System shows his profile. 3. System asks for requested information. 4. User enters all the information required for profile. 5. System validates the information.
Alternative flows or	If internet is not available, then user cannot access to system

Extensions	4a. If picture format is other than ‘.png’ or ‘.jpg’ then system gives message to add only these two formats. 3a. If any required field is null then the system will display that please Enter the complete details. 3b.If format of entered information is incorrect then system display message please enter the correct details.
Frequency of occurrence	When a user is first time logged in with his account.

When a user gets his account from admin then he has to add his profile like his picture, resume, qualifications etc. so that other members could also interact with new member.

2.7.4) Use Case 4: Edit Profile

ID	UC:4
Name	Edit Profile
Primary Actor	User
Stakeholders and Interests	User: wants to edit his profile when he has to change his information on system or update some fields.
Input	User Enters new information at the place of old information.
Pre-Conditions	User is logged in with his account.
Post-Conditions	User profile is edited and displayed on system
Main Success Scenario	<ol style="list-style-type: none"> 1. User selects the profile. 2. System display his profile 3. User edits his profile and submits. 4. System validates the information. 5. System asks for confirmation. 6. User confirms.
Alternative flows or Extensions	<p>If internet is not available, then user cannot access to system</p> <p>4a. If any required field is null then the system will display that please Enter the complete details.</p> <p>4b. If format of entered information is incorrect then system display message, please enter the correct details.</p>
Frequency of occurrence	Whenever a user wants to edit his profile.

When a user wants to change his already provided profile then he edits his profile with new things that he wants to show in his profile on the system.

2.7.5) Use Case 5: Add Voting Poll

ID	UC:5
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Name	Add Voting Poll
Primary Actor	Admin
Stakeholders and Interests	Admin: wants to create new voting poll at the eve of election. User: Users who are candidates of election wants a poll online with their name so that user could cast vote to them.
Input	Admin enters the names of election candidates.
Pre-Conditions	Admin is logged in with his account.
Post-Conditions	Candidates' names are added to voting poll Voting poll with candidates' names is created
Main Success Scenario	<ol style="list-style-type: none"> 1. Admin select Add voting poll. 2. System shows the “add voting poll” and asks for polling details. 3. Admin enters the name of election candidates on system. 4. Admin enters the all polling timing limits. 5. System displays all entered details. 6. Admin submits the information. 7. System validates and asks for confirmation. 8. Admin confirms.
Alternative flows or Extensions	6a. If entered candidates are not members of association or not members of association then will inform candidate information is incorrect.
Frequency of occurrence	Only at voting time.

System gives facility of E-Voting to organization. So at time of election admin creates voting poll with the names of candidates of election so that members could cast their vote to any candidate according to their choice. Member cannot cast their more than once.

2.7.6) Use Case 6: Cast Vote

ID	UC:6
Name	Cast Vote
Primary Actor	User
Stakeholders and Interests	User: wants to cast vote to elect candidate of their choice.
Input	Select the candidates of user's own choice.
Pre-Conditions	User is logged in with his account.
Post-Conditions	Vote is casted by member.
Main Success Scenario	<ol style="list-style-type: none"> 1. User opens the page of voting poll 2. System shows the “Cast Vote” and asks for details. 3. User can select one candidate from each category like president, vice president, secretary and general secretary. 4. System displays the user's entered information. 5. User submits the information

	<ol style="list-style-type: none"> 6. System validate and asks for confirmation 7. User confirms the information again.
Alternative flows or Extensions	<ol style="list-style-type: none"> 3a. User cannot select more than one candidate from each category. 5a. User cannot repeat his vote once he has casted his vote. 5b. User cannot cast vote after time deadline.
Frequency of occurrence	Only during voting time.

Users can cast their vote through E-Voting facility to elect candidates. Users can cast vote to one candidate of each category like president, vice president, secretary and general secretary. User cannot repeat his vote, cannot cast vote after time deadline and cannot cast vote to more than one candidate from each category.

2.7.7) Use Case 7: Show Results

ID	UC:7
Name	Show Results
Primary Actor	Admin
Stakeholders and Interests	<p>Admin: wants to show result to users when the election time is ended.</p> <p>User: wants to view the results that which candidate is selected.</p>
Pre-Conditions	Admin is logged in with his account. Voting time is ended.
Post-Conditions	Results are shown to members.
Main Success Scenario	<ol style="list-style-type: none"> 1. Admin opens the page of show results. 2. System calculates and shows the voting results for each candidate. 3. Admin displays the voting results to users.
Alternative flows or Extensions	2a. System does not count the vote in case any vote is repeated by user.
Frequency of occurrence	Only after voting time.

When voting time is ended then admin gives command to system to calculate the voting results. System counts all the votes casted by users and shows all the results to users. Winning candidates is declared through voting results.

2.7.8) Use Case 8: Add Meeting Record

ID	UC:8
Name	Add Meeting Record
Primary Actor	Admin

Stakeholders and Interests	Admin: wants to add meeting information to system for future use.
Input	Admin enters all the information about meeting.
Pre-Conditions	Admin is logged in with his account.
Post-Conditions	Meeting record is added.
Main Success Scenario	<ol style="list-style-type: none"> 1. Admin opens the page of “add meeting record”. 2. System displays the “add meeting record” and asks for required information. 3. Admin adds all the information about meeting record and submits the information. 4. System shows all the entered information and asks for confirmation to submit entered information. 5. Admin confirms then record is saved on the system.
Alternative flows or Extensions	4a. If admin enters meeting date that is forward from current date then system gives option or invalid date.
Frequency of occurrence	After any meeting presided.

When a meeting is presided then it is necessary to add meeting record so that in future, if there is any query from previous record then that record should be available. So this system provides feature of add meeting record like meeting purpose, issues discussed in meeting record, conclusions of meeting and meeting date so that those results could be saved and could be used in future.

2.7.9) Use Case 9: View Meeting Records

ID	UC:9
Name	View Meeting Record
Primary Actor	User
Stakeholders and Interests	Users: wants to view the previous records about meetings.
Pre-Conditions	User is logged in with his account. Meeting records are added by admin.
Post-Conditions	Meeting records are viewed.
Main Success Scenario	<ol style="list-style-type: none"> 1. User opens the page of Search meeting records and wants to views previous records. 2. System displays the all the previous records about meeting. 3. User views all the records.
Alternative flows or Extensions	2a. If no any meeting record is available, then system gives option that no any record is found.
Frequency of occurrence	When a user wants to view the previous records about meeting.

System provides facility of searching and viewing meeting records to users. So if any user wants to view previous record then user clicks on view meeting record then all previous records of meeting are shown to user.

2.7.10) Use Case 10: Search Meeting Records

ID	UC:10
Name	Search Meeting Record
Primary Actor	User
Stakeholders and Interests	User: wants to search the previous records of meeting
Pre-Conditions	User is logged in with his account. Meeting records are added by admin.
Post-Conditions	Meeting records are viewed.
Main Success Scenario	<ol style="list-style-type: none"> 1. User opens the page of Search meeting records. 2. System displays the “Search meeting record” and asks for required details. 3. User enters the record date or record name that he wants to search. 4. System searches and displays the record that user wants.
Alternative flows or Extensions	<p>4a If user enters the date that is forward from current date then system gives option of invalid date.</p> <p>3a. If no any meeting record is available about that date, then system gives option that no any record is found.</p>
Frequency of occurrence	When a user wants to search the meeting record.

System provides facility of searching and viewing meeting records to users. So if any user wants to search some specific record then user enters the date of that meeting then meeting record of that date is shown to user.

2.7.11) Use Case 11: Logout

ID	UC:11
Name	Logout

Primary Actor	User, Admin
Stakeholders and Interests	User: wants to leave the system the logout from system. Admin: wants to leave the system the logout from system.
Pre-Conditions	User is logged in with his account.
Post-Conditions	User is logged out from system
Main Success Scenario	<ol style="list-style-type: none"> 1. User selects the logout. 2. System closes the user's account.
Alternative flows or Extensions	2a If user tries to use the system then system asks for login to continue.
Frequency of occurrence	When a user wants to leave the system.

Whenever a user wants to leave the system then he logout from system so that others cannot use the system due to some security risks. After logout from system user has to login again to use the system

2.8) Database Requirements

ASA Hub is a web-based application in which different records are saved. Different records stored in database are: records of users who are members of ASA, meeting records, records of user's profile and voting polls records in which different candidates records are stored and member's votes records are stored. Entities with their relationships used in database are shown by Entity Relationship Diagram (ERD).

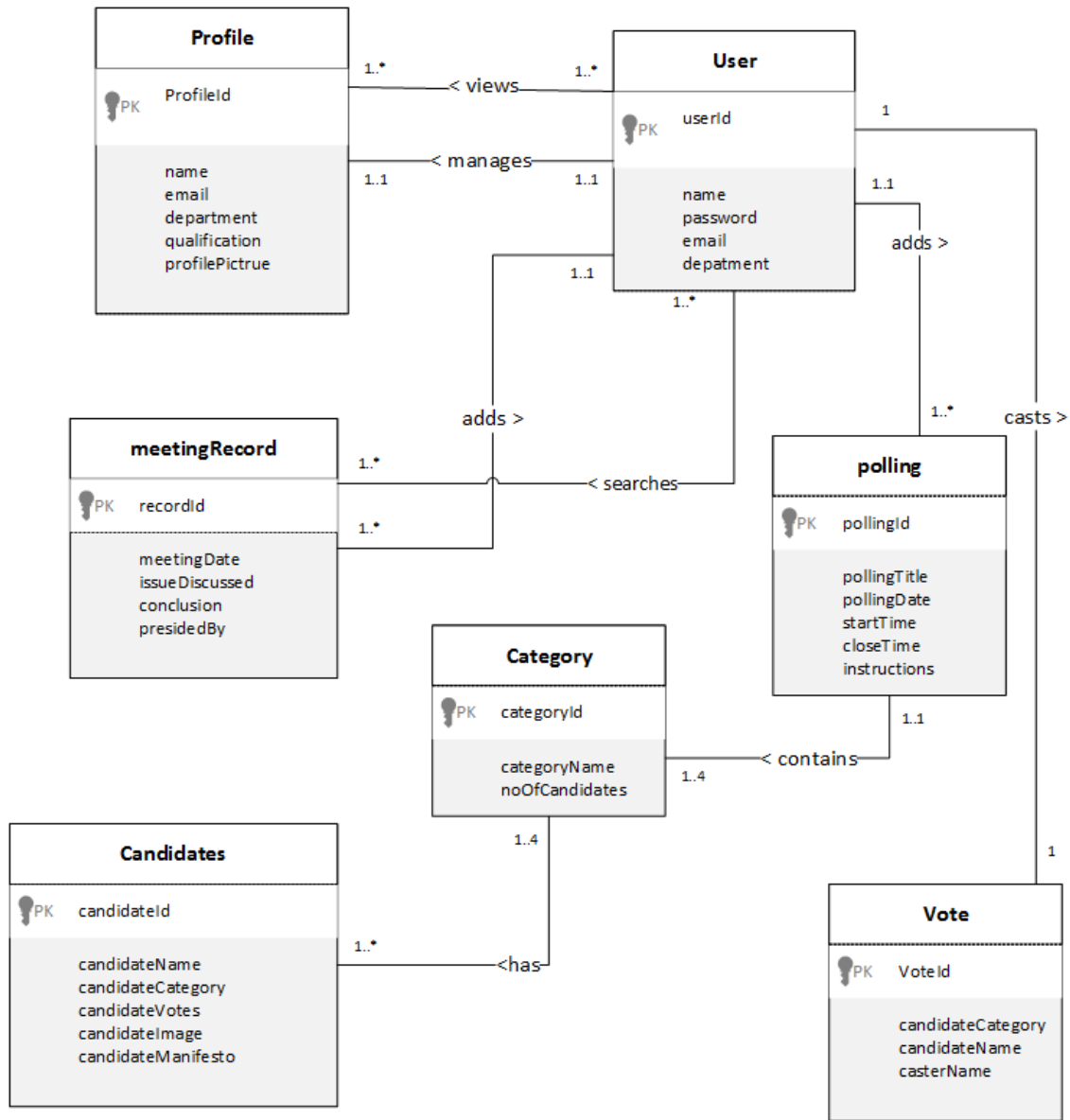


Figure 2.2: ERD

In this chapter, system requirements and specifications are discussed. Complete system descriptions, product features, use cases of system with description and representation and at the end domain model of system are explained in detail.

Next chapter is about system design, in which sequence diagram, ERD, class diagram, domain model and system interfaces are explained.

Chapter 3

System Design Description

This chapter reviews the design description for the system of Academic Staff Association Hub (ASA Hub). In this chapter introduction of system design description, system architecture design, detailed description of components and user interfaces are described in detail. Sequence diagrams and class diagram of system are also designed in this chapter.

3.1) Design Overview

System design describes the system at architecture level, services of system, data management of system and complete structure of system. In design phase of system, user interfaces or screen images of system are designed. In addition, sequence diagram that is an interaction diagram, which shows sequence of messages interacting with objects, Class diagram of system is designed that describes structure of system by showing the system's classes, their attributes, operation and relationship among objects.

3.1.1) Requirements Traceability Matrix

Requirements traceability matrix is a matrix in which we describe that which requirement is mapping with which sequence diagram, test case, and method of class diagram. The purpose of traceability matrix is that when requirements are to be updated then one can update that requirement using traceability matrix instead of going through the whole document. Traceability matrix of this system is shown below.

Table 3.1: Traceability Matrix

Requirement Id	Sequence Diagram	Test Case	Interface	Domain Model	Class Diagram
UC:1	SD 1	TC 1	UI 4: Signup screen	Account	Account
UC:2	SD 2	TC 2	UI 2: Login screen	Account	Account
UC:3	SD 3	TC 3	UI 3: Manage profile	Profile	Profile
UC:4	SD 4	TC 4	UI 4: Add voting poll	VotingPoll	VotingPoll
UC:5	SD 5	TC 5	UI 5: Cast Vote	Vote	Vote
UC:6	SD 6	TC 6	UI 6: Show voting result	VotingResult	Vote
UC:7	SD 7	TC 7	UI 7: Add meeting record	MeetingRecord	MeetingRecord
UC:8	SD 8	TC 8	UI 8: Search meeting record	MeetingRecord	MeetingRecord
UC:9	SD 9	TC 9	UI 9: View meeting record	MeetingRecord	MeetingRecord
UC:10	SD 10	TC 10	---	---	Logout

3.2) System Architecture Design

Architectural design[3] is a creative process where we design a system organization that will satisfy the functional and non-functional requirements of a system. System architecture design is the set of significant decisions about the organization of a software system, the selection of the structural elements and their interfaces by which the system is composed. System architecture describes organization, styles, patterns, responsibilities, collaborations, connections, and motivations of a system and major subsystems.

3.2.1) Chosen System Architecture

The chosen architecture for this system is “Layered Architecture”[2] because layered architecture pattern is another way of achieving separation and independence. This layered approach supports the incremental development of systems. As a layer is developed, some of the services provided by that layer may be made available to users. In layered architecture “3 Tier” architecture is used. Topmost layer is user interface layer or presentation layer through which different users interact with system. Second layer is application logic, in which different modules of system are implemented that how to treat with different actions of users through user interface. Third layer is database layer and each layer is interacting with other layers.

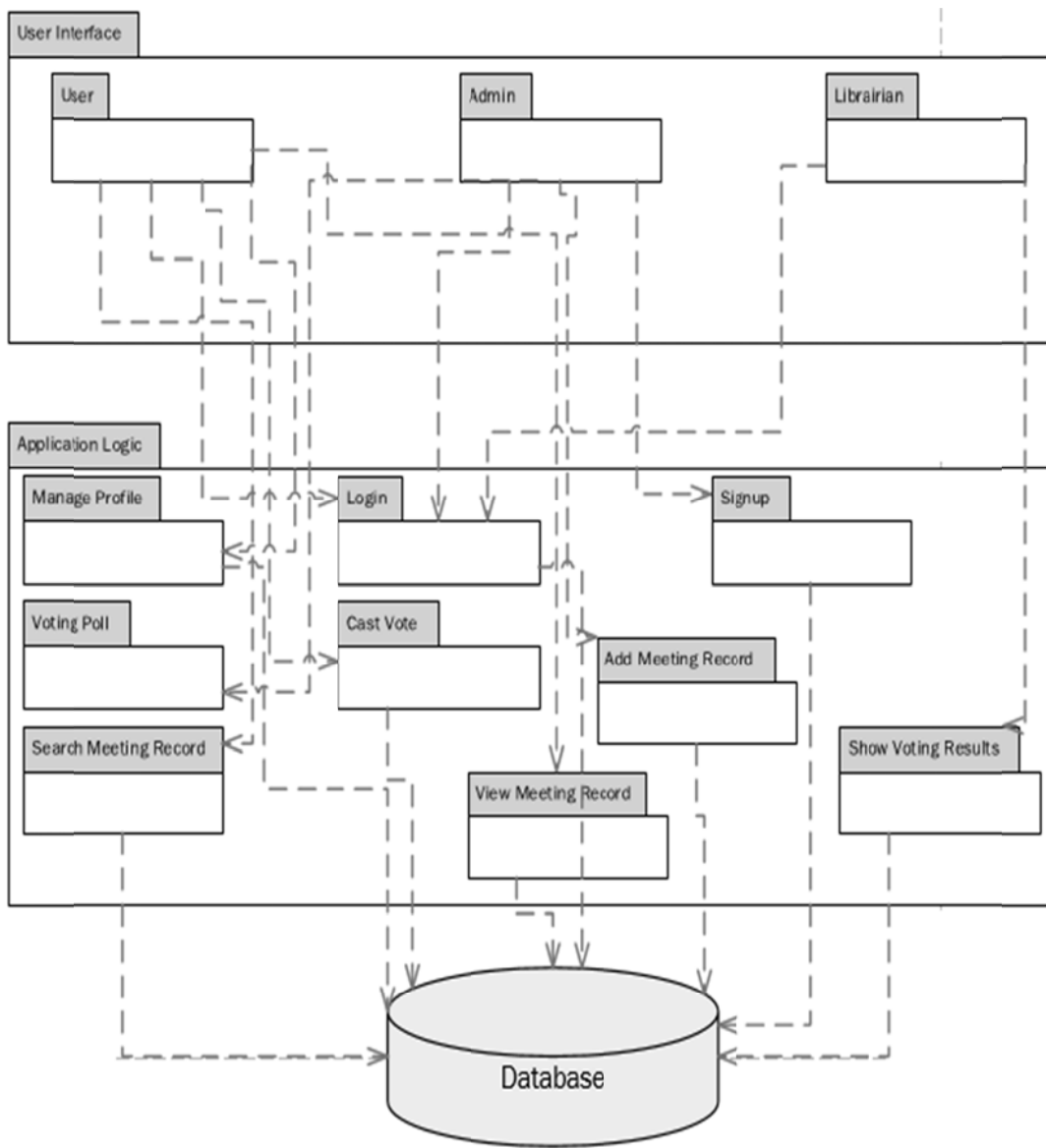


Figure 3.1: Architecture Diagram

3.3) Domain Model

Domain model is a visual representation of conceptual classes or real-world objects in a domain of interest. So different entities with their relationships are shown below.

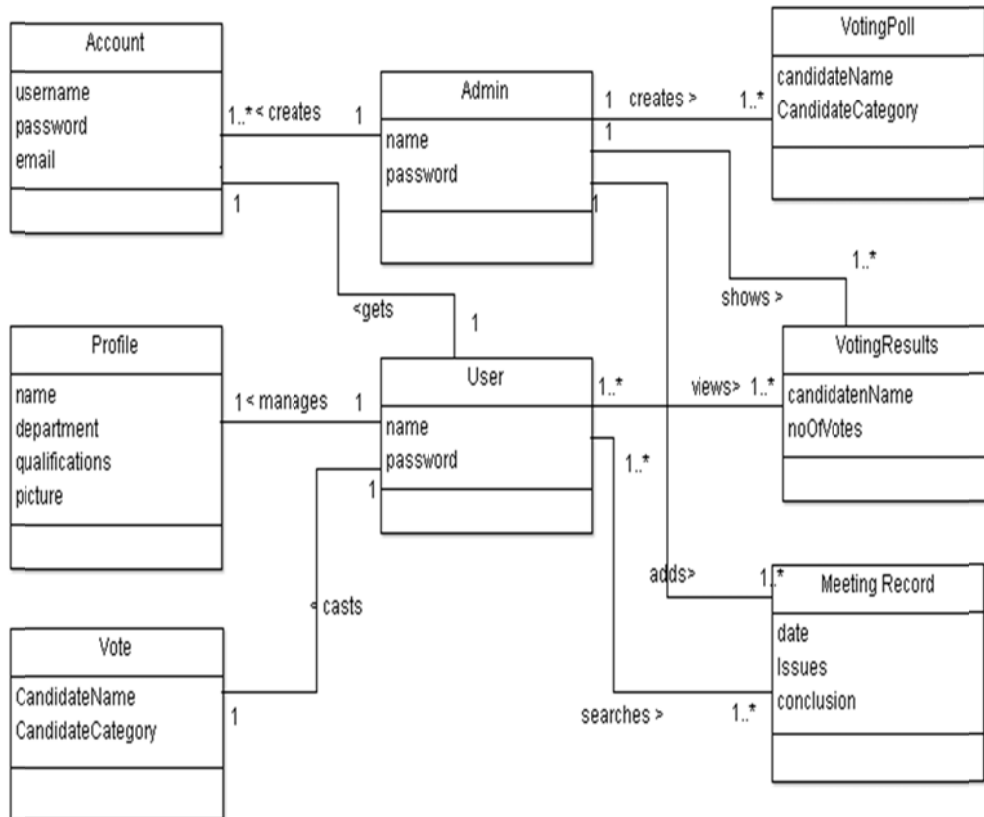
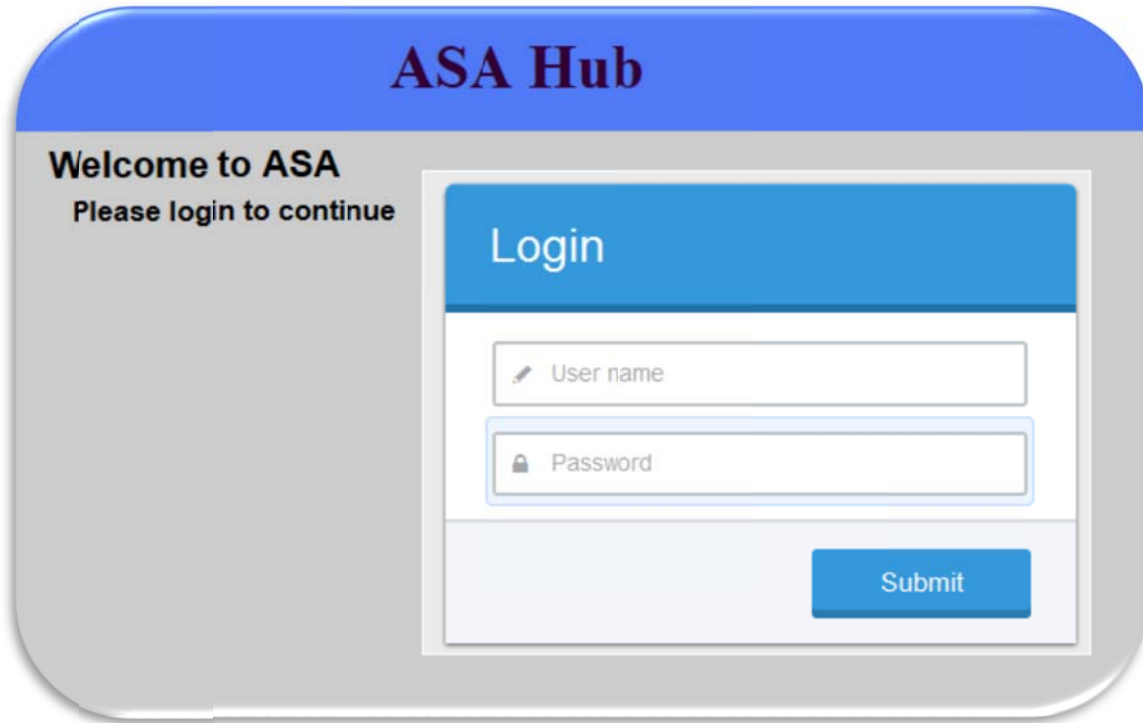


Figure 3.2: Domain Model

3.4) Description of User Interfaces

Screen images are interfaces through which user interacts with system. In this section simple prototypes according to analysis of system are drawn. In implementation of the system, following prototypes of system will be used.

3.4.1) UI:1 Login



The image shows a login interface for 'ASA Hub'. The interface has a blue header with the text 'ASA Hub'. Below the header, on the left, it says 'Welcome to ASA' and 'Please login to continue'. On the right, there is a 'Login' form with a blue header. The form contains two input fields: 'User name' and 'Password'. Below the input fields is a blue 'Submit' button.

Figure 3.3: User Interface (Login)

When user wants to use the system he has to login to system. User can login to system with his correct username and password only. If user enters invalid username or password, then system give him/her message of “Username or password is incorrect”. If username and password are correct then user redirects to main page from which he/she can perform all the desired activities.

3.4.2) UI 2: Main Page

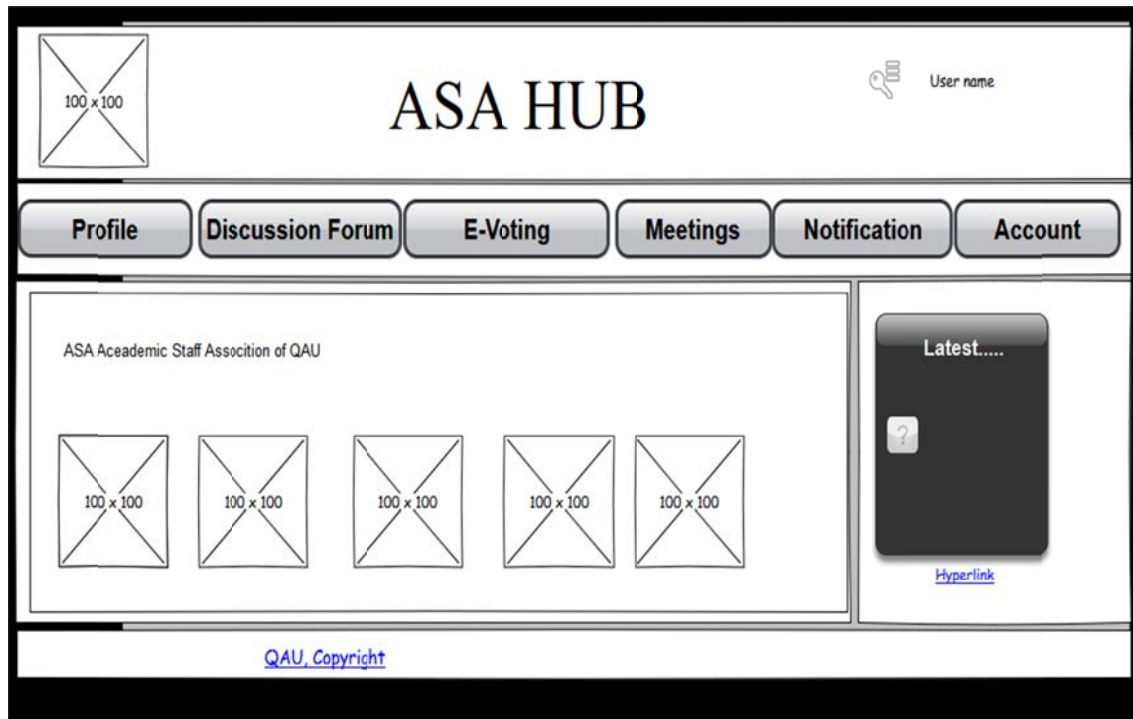


Figure 3.4: User Interface (Main Page)

This interface is main page of system from which users can perform all the desired activities. At main page, there are five images of elected committee. On right side, there is latest news about organization. At top corner, there is logo of organization.

3.4.3) UI 3: Manage Profile

Figure 3.5: User Interface (Manage Profile)

This interface is when user first time logins to system then system asks him to manage his profile. In profile user enters all the required fields and his profile picture.

3.4.4) UI 4: Signup

Figure 3.6: User Interface (Signup)

In this interface, admin creates account for user. When admin enters all the required fields then clicks on “Create Account” then account is created. System automatically sends email with username and password at his entered email.

3.4.5) UI 5: Add Voting Poll

The screenshot displays the ASA HUB user interface. At the top, there is a header with the ASA HUB logo, a search icon, and a user name field. Below the header, there are three main navigation buttons: "Add Votting Poll" (green), "Cast Vote" (grey), and "Show Results" (grey). The "Add Votting Poll" section is active, showing a form with the following fields:

- Candidate Name:
- Category:
- Submit button:

To the right of the form, there is a preview of the "Votting Poll" interface. It shows the category "President" and a list of candidates with radio buttons:

- Mr Ali (selected)
- Mr Raza
- Mr Ayub

Below the candidates is a "Submit Vote" button. At the bottom of the interface, there is a copyright notice: [QAU, Copyright](#).

Figure 3.7: User Interface (Add Voting Poll)

In this user interface, admin creates voting poll. In voting poll, there are names of all the candidates grouped in categories. Voting poll with all candidates is shown to users then user can cast vote to their desires candidates.

3.4.6) UI 6: Cast Vote



Figure 3.8: User Interface (Cast Vote)

This user interface is to cast vote to any candidate of a category. User casts his vote and system validates the vote so that user could not repeat his vote.

3.4.7) UI 7: Show Voting Results



Figure 3.9: User Interface (Show System Results)

This user interface shows the voting results. When voting time is ended then admin shows the voting results of each candidate as shown in above image.

3.4.8) UI 8: Add Meeting Record

100 x 100

ASA HUB

User name

Add Meeting Record Search Meeting Record View Meeting Record

Add Meeting Records

Meeting Date 8-5-2106

Issue Discussed teaching more than 6 credit hours

Presided By Dr Asif Ali

Conclusions make protest

Submit Record

Record Added Successfully

[QAU, Copyright](#)

Figure 3.10: User Interface (Add Meeting Record)

When a meeting is conducted by organization then admin adds the meeting record to system in case of any use in future. Admin enters meeting date, issue discussed, presides by and conclusions of meeting.

3.4.9) UI 9: Search Meeting Record

Figure 3.11: User Interface (Search Meeting Record)

This interface is to search the meeting record. User enters the date of required meeting record then system displays all the records of that date as shown in above image.

#

3.5) Sequence Diagram

A Sequence diagram is an interaction diagram that shows how objects operate with one another and in what order. It is a construct of a message sequence chart. A sequence diagram shows object interactions arranged in time sequence. It depicts the objects and classes involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development.

3.5.1) SD 1: Signup

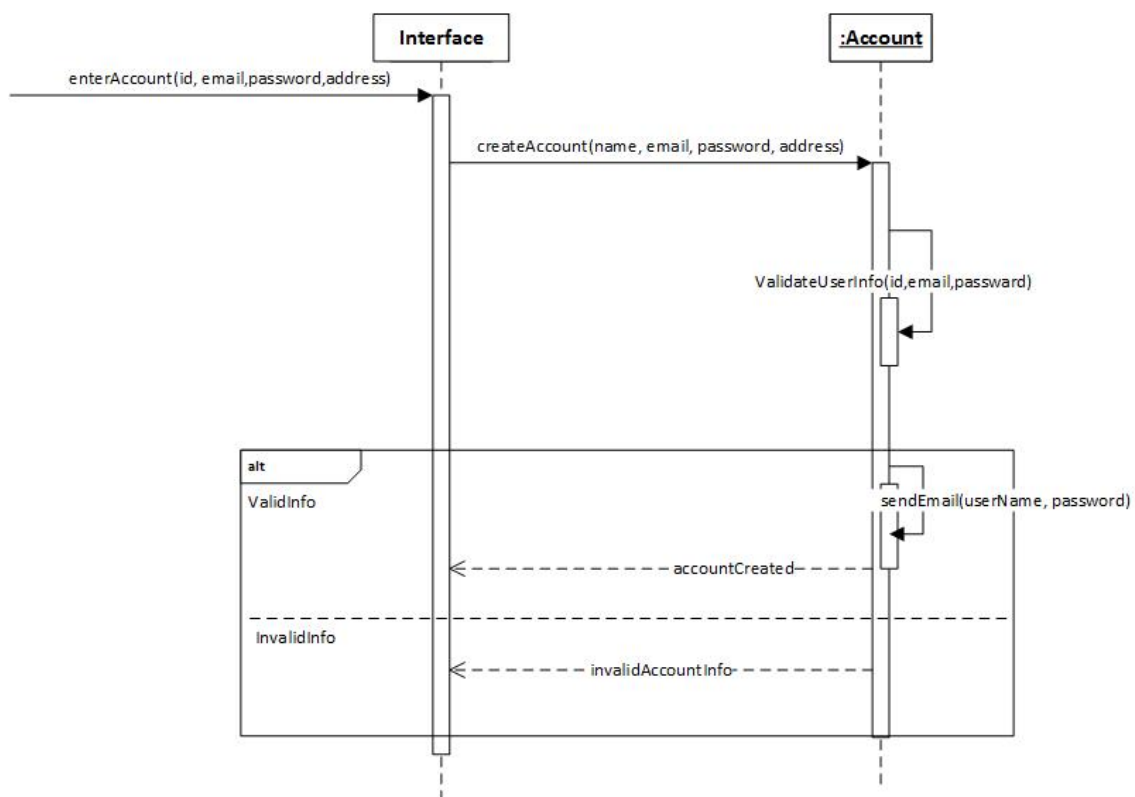


Figure 3.12: Sequence Diagram (Signup)

This sequence diagram show objects and action when admin creates account foe new member of organization. If account is created successfully then automatically mail is sent to new member by mail method of system.

3.5.2) SD 2: Login

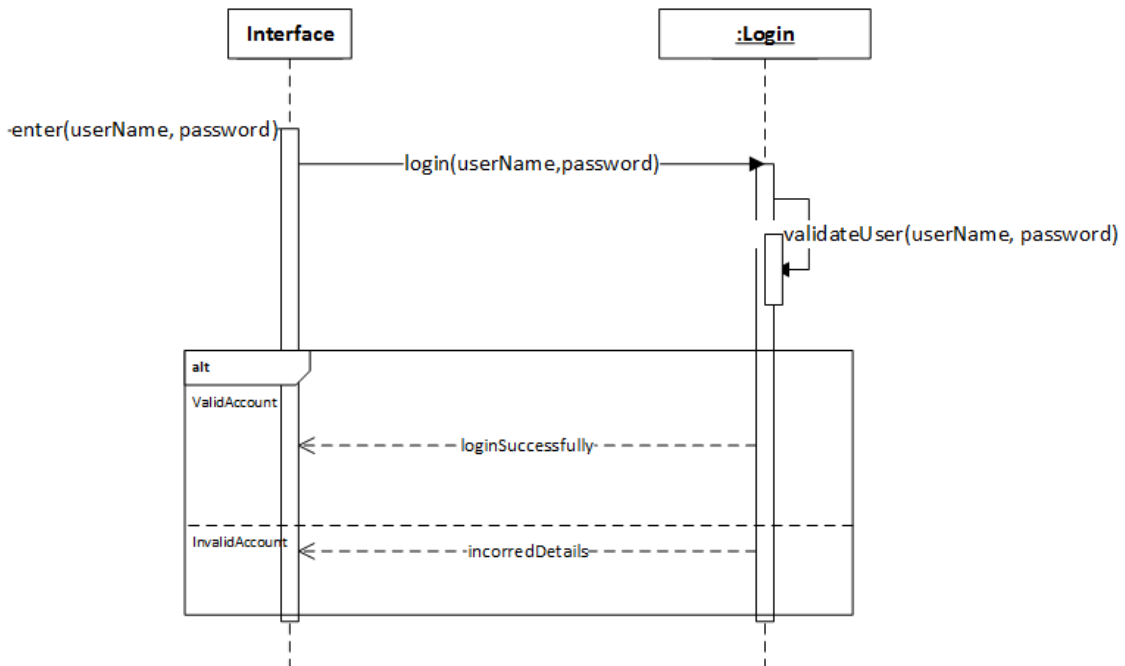


Figure 3.13 : Sequence Diagram (Login)

When a user wants to use the system then first he logs in to system. User enters his id and password then if his account credentials are correct according to system then he logs in to system successfully else system gives message of incorrect message.

3.5.3) SD 3: Manage Profile

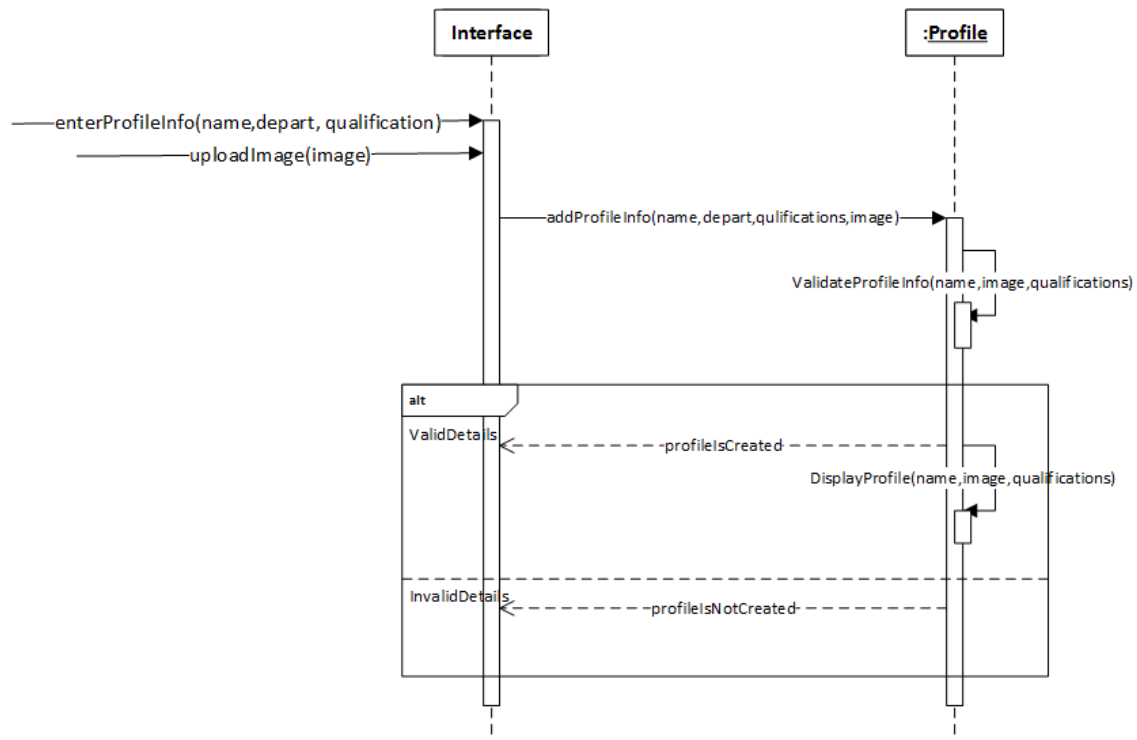


Figure 3.14: Sequence Diagram (Manage Profile)

When user first time logins to system then system asks him to add his profile. User enters all the required details for profile as shown in screen image of “manage profile”. System validates the user input and keeps the record of profiles in database.

3.5.4) SD 4: Edit Profile

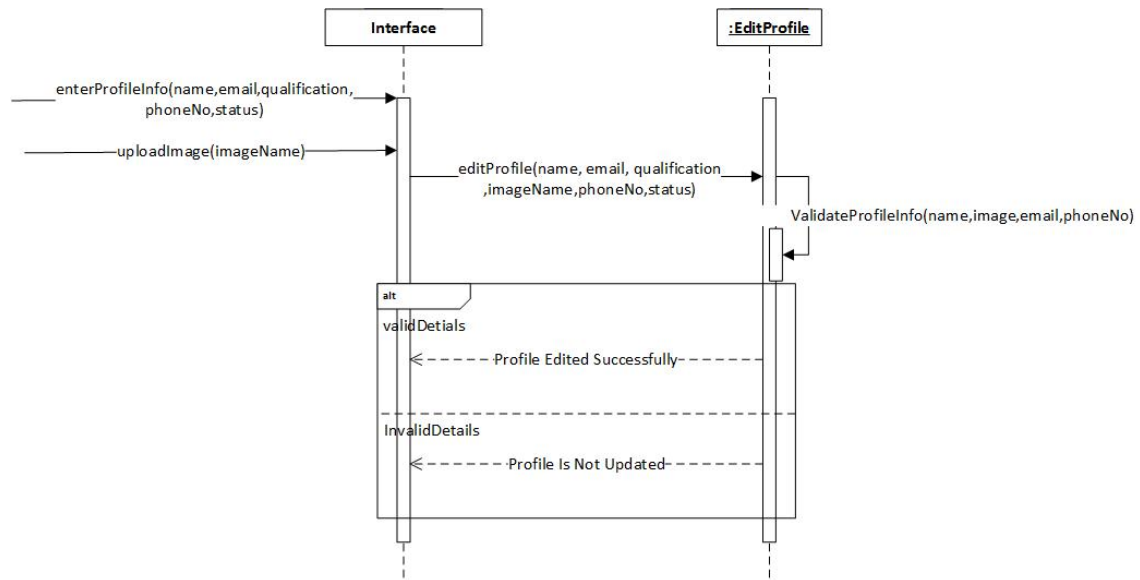


Figure 3.15: Sequence Diagram (Edit Profile)

User creates his profile when he first time logs in to system. After that, he can edit his profile. User edits the fields that he wants to update. System validates the user input and keeps the record of profile in database.

3.5.5) SD 5: Add Voting Poll

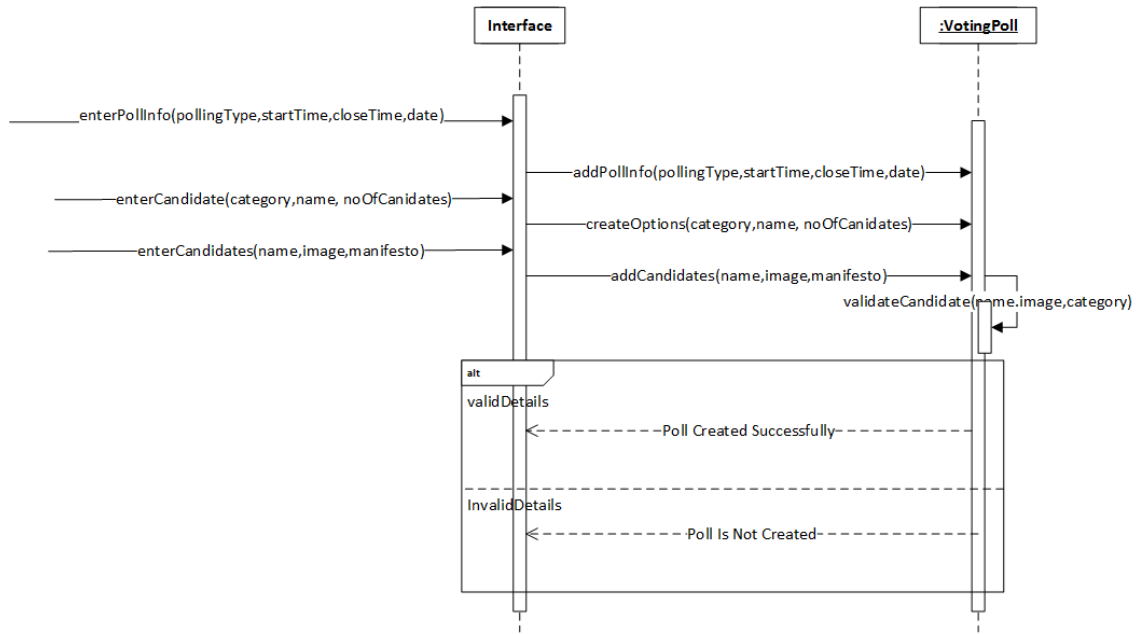


Figure 3.16: Sequence Diagram (Add Voting Poll)

At the eve of election, admin creates voting poll for candidates of election with their name and category like president secretary etc. Admin can create as many fields of poll as many candidate are for election. After creating the fields, complete poll with candidates' names and category is displayed on screen.

3.5.6) SD 6: Cast Vote

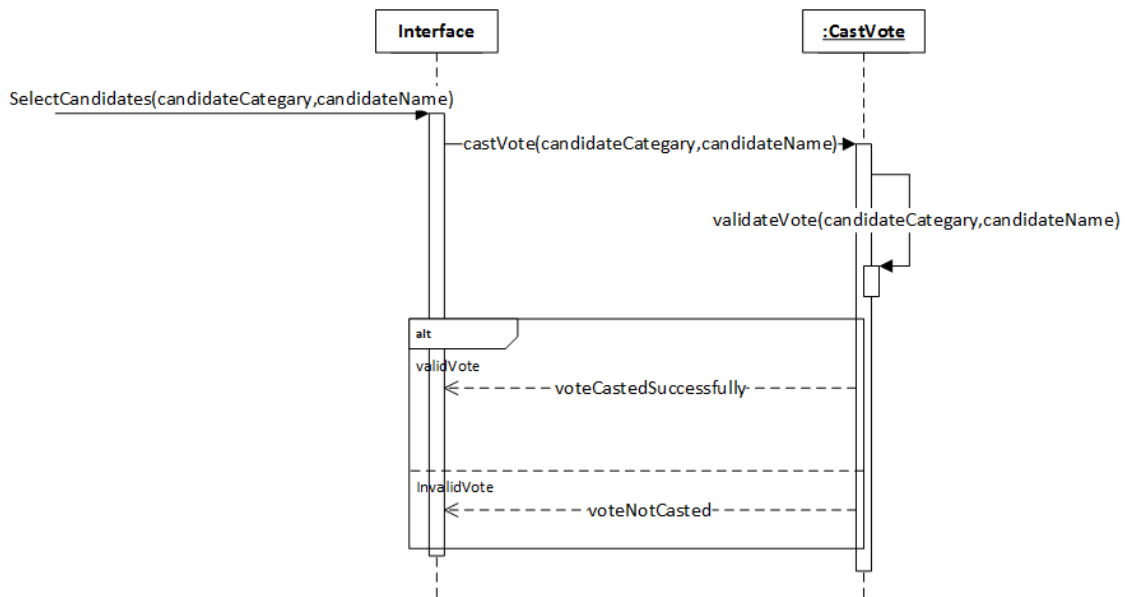


Figure 3.17: Sequence Diagram (Cast Vote)

At time of election, users can cast their votes to desired candidates of election. System validates the user’s votes so that a user can cast one vote to only one candidate of single category of election. Users cannot repeat his vote for single category of candidates.

3.5.7) SD 7: Show Voting Results

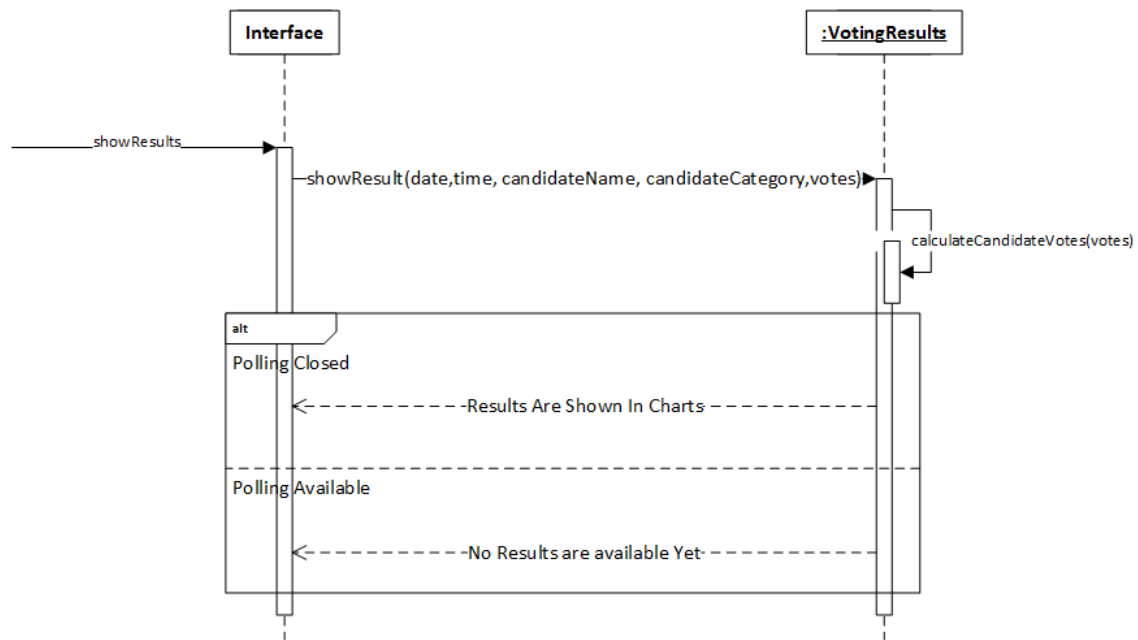


Figure 3.18: Sequence Diagram (Show Voting Results)

When voting time is ended then admin can show the voting results. The system calculates the voting results for every candidate and shows the voting results. All users can see the voting results.

3.5.8) SD 8: Add Meeting Record

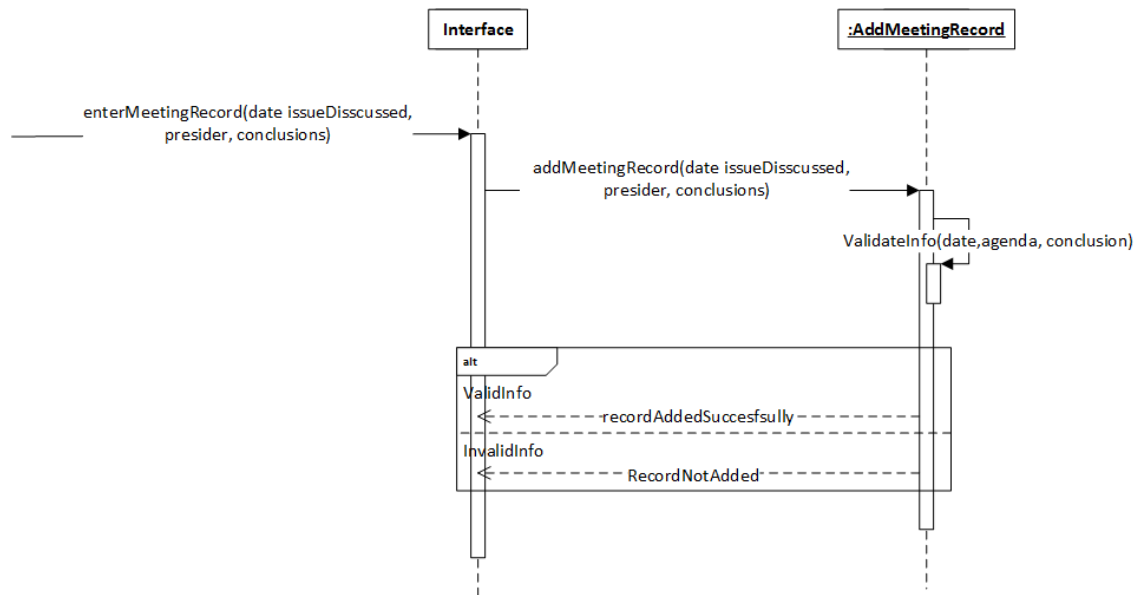


Figure 3.19: Sequence Diagram (Add Meeting Record)

After the end of every meeting, admin stores the record of meeting for any case of use in future. Admin enters meeting date, the topic discussed in meeting and conclusion of the meeting. The System validates the record info if record info is valid then system gives a message of successfully added else record is not added.

3.5.9) SD 9: Search Meeting Record

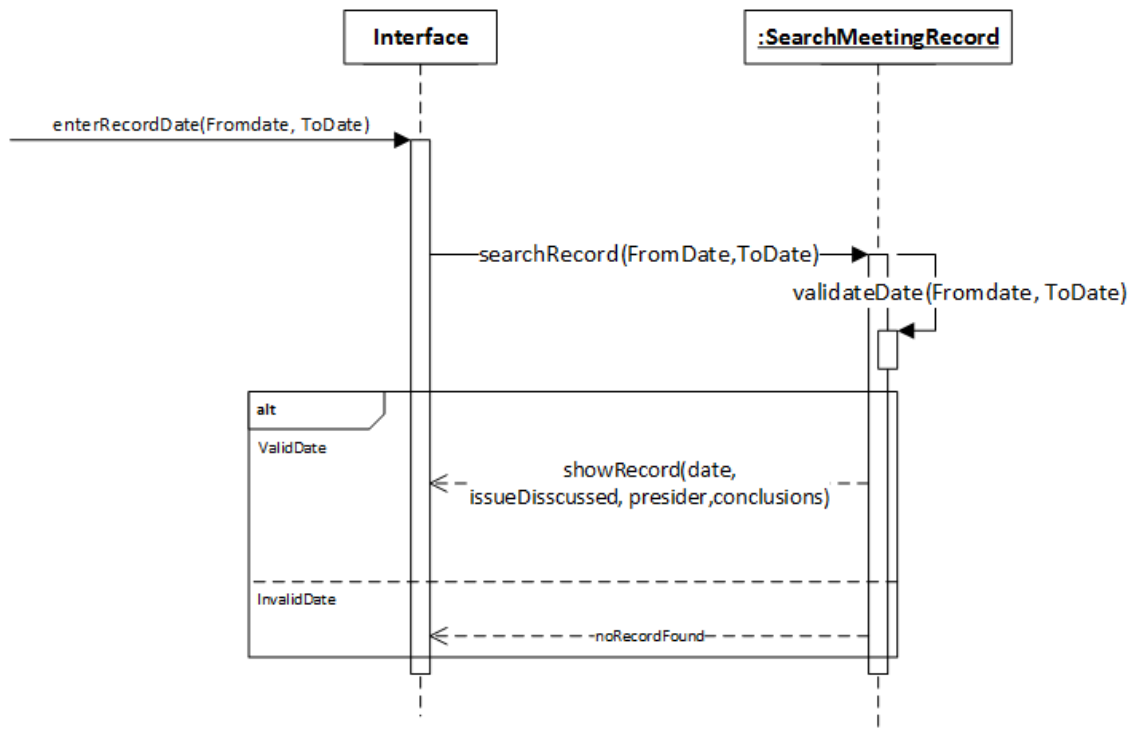


Figure 3.20: Sequence Diagram (Search Meeting Record)

Users' can search the previous record of meetings. User enters date of meeting to get the particular records of about that meeting. If date is forward from current date, or at that date there is no any meeting conducted then system gives error message that no record is found.

3.5.10) SD 10: View Meetings Record

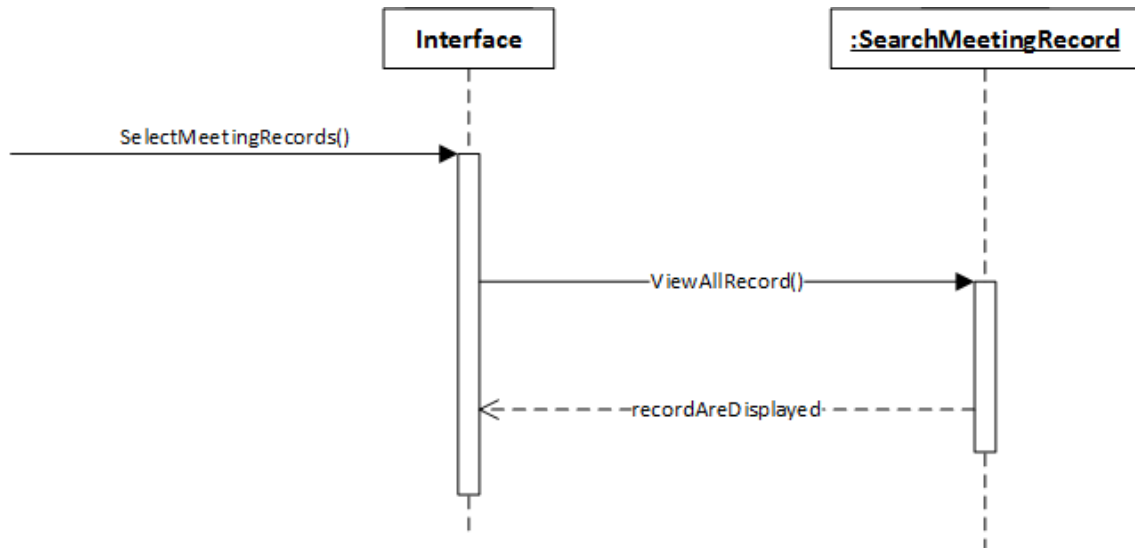


Figure 3.21: Sequence Diagram (View Meeting Record)

If user wants to view all the records of meeting instead of searching any particular meeting record then system provides the facility of viewing all the previous meeting records.

3.5.11) SD 11: Logout

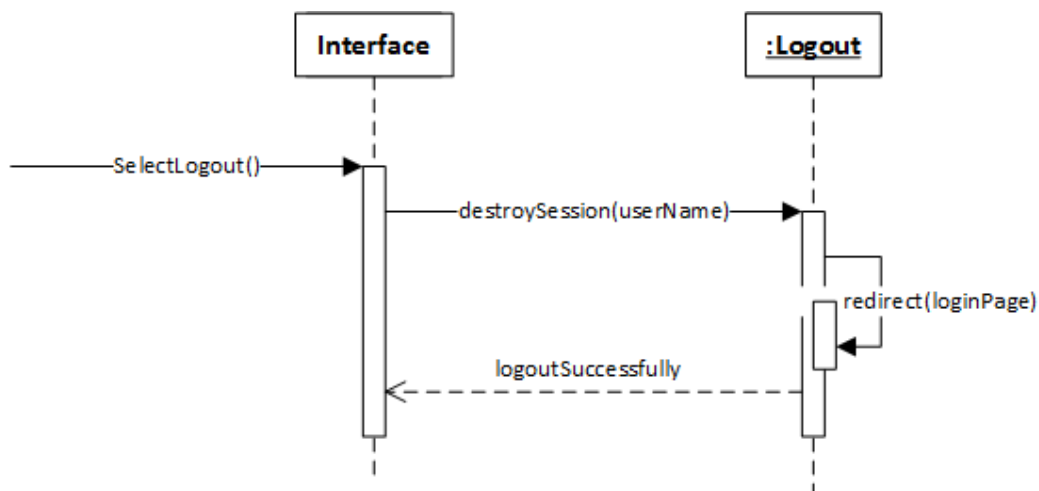


Figure 3.22: Sequence Diagram (Logout)

If user wants to leaves the system the he logout from system. In logout, system ends the current session of user the user redirect to login page of system and user cannot use the system until he logins again to use the system.

3.6) Class Diagram

A class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects. The class diagram of this system with different classes, attributes and operations is shown below.

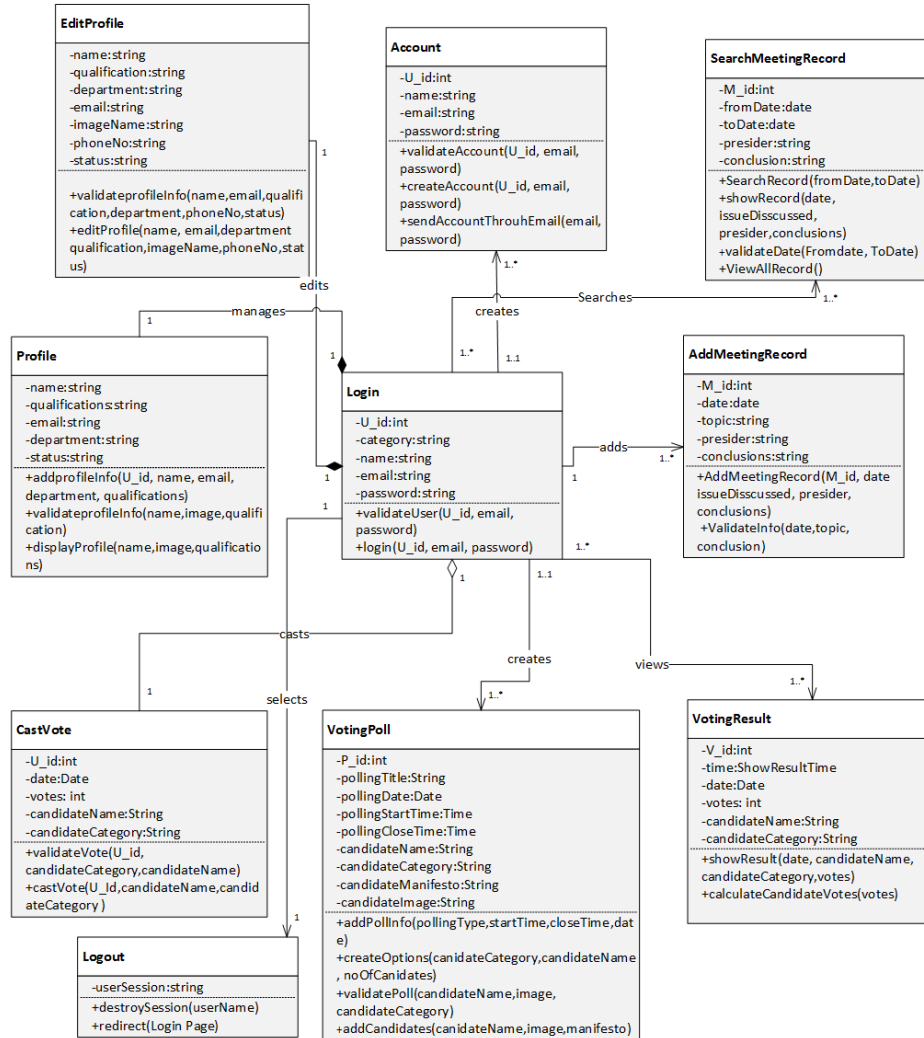


Figure 3.23: Class Diagram

3.7) Detailed Description of components

A component is a self-contained autonomous unit. The "black-box" view of a component shows how it looks from the outside, without revealing anything about its internal structure. The functionality of the component can only be accessed via the interfaces it provides. If the component must use the services of another component in order to carry out its duties, it will require the component providing those services to provide a suitable interface. We can show the interfaces that a component provides, and those it requires as illustrated below.

Each provided interface is shown as a circle (the ball), connected to the component icon by a solid line, and labelled with the name of the interface. Each required interface is shown as a half-circle (the socket), also connected to the component icon by a solid line and labelled with the name of the interface [4].

3.7.1) Component Diagram

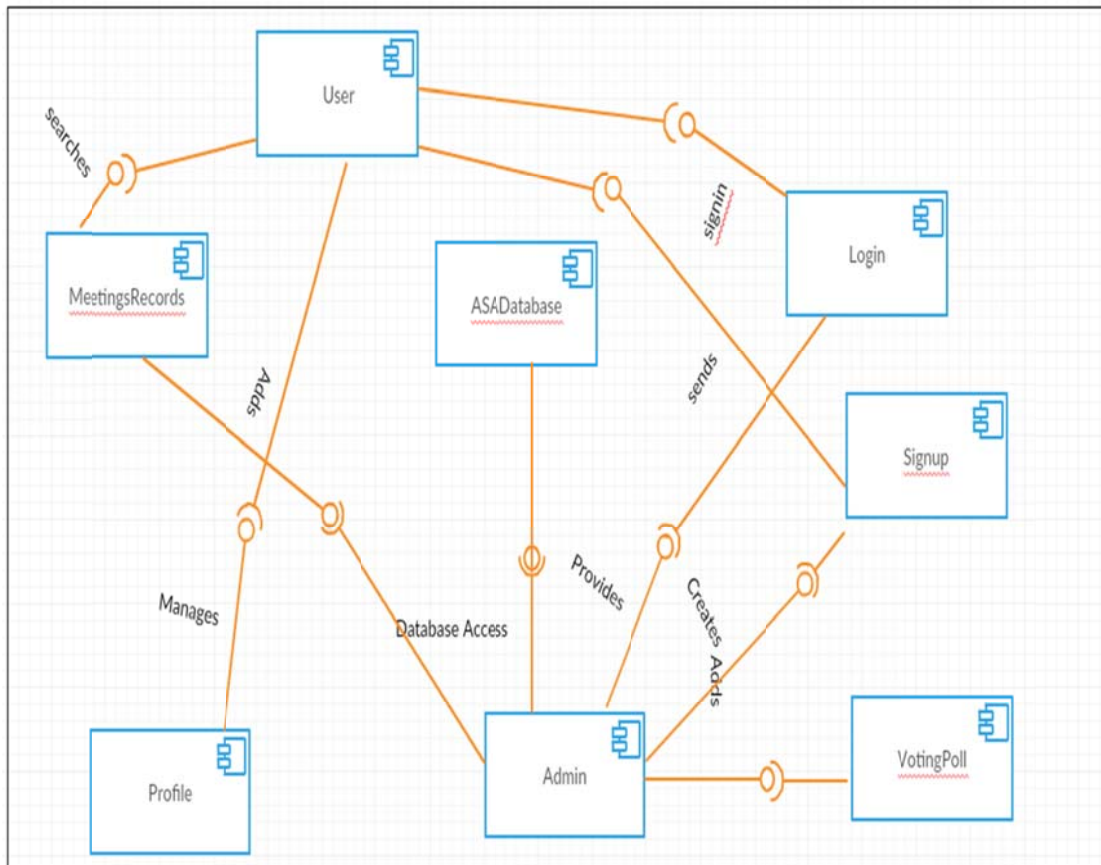


Figure 3.24: Component Diagram

Component diagram of system is shown in which different components of system are using interfaces of other components to interact with them. Components interfaces are using interfaces of other components.

In this chapter, system design is described. In system design, domain model of system, user interfaces and sequence diagram of system are designed and described in detail. User interfaces, sequence and class diagram will help a lot in implementing the system.

Next chapter is about system implementation.

Chapter 4

Implementation

This chapter is about the implementation of system. In this chapter selected framework, language and database for the implementation of this project are described in detail.

4.1) Selected Framework

.NET Framework 4.5 is used to develop this project. The .NET Framework 4.5 is a highly compatible, in-place update to the .NET Framework 4. By using the .NET Framework 4.5 together with the C #programming language, we can write windows apps, desktop and web applications. The .NET Framework 4.5 adds substantial improvements to other functional areas such as ASP.NET and Windows Communication Foundation. The .NET Framework 4.5 delivers better performance, reliability, and security.

ASP.NET is used in .NET Framework 4.5 to implement this project. ASP.NET is an open source web framework for building modern web apps and services with .NET. ASP.NET creates websites based on HTML5, CSS, and JavaScript that are simple, fast, and can scale easily.

4.2) Selected Language

C# (pronounced "C sharp") programming language is selected in ASP.NET to implement this project. C# is designed for building a variety of applications that run on the .NET Framework. C# is simple, powerful, type-safe, and object-oriented. The many innovations in C# enable rapid application development while retaining the expressiveness and elegance of C-style languages.

4.3) Selected Database

SQL Server 2014 Management Studio is used to store and transaction of data. Microsoft SQL Server 2014 is a powerful and reliable free data management system that delivers a rich and reliable data store for lightweight Web Sites and desktop applications.

4.4) Tools

Tools used to implement this application are as described below.

4.4.1) Internet Information Services

Internet Information Services (IIS) is used to run and host application. IIS for Windows Server is a flexible, secure and manageable Web server for hosting anything on the Web. From media streaming to web applications, IIS's scalable and open architecture is ready to handle the most demanding tasks.

4.4.2) Visual Studio 2012 IDE

Visual Studio 2012 is used to code this application. Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works as both source-level debugger and a machine-level debugger.

4.4.3) SQL Server 2014 Management Studio

SQL Server 2014 Management Studio is used to store and transaction of data. Microsoft SQL Server 2014 is a powerful and reliable free data management system that delivers a rich and reliable data store for lightweight Web Sites and desktop applications.

4.5) APIs Used

Following APIs are used in this project.

These APIs are used for bootstrap.

- <https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css>
- <https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js>
- <https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/js/bootstrap.min.js>

Google charts API is used to draw charts in voting results.

- <https://www.google.com/jsapi>

Jcrop is used to crop images in user profile.

- <https://ajax.googleapis.com/ajax/libs/jquery/3.1.1/jquery.min.js>

4.6) Interfaces

Final Interfaces of system when the system is implemented completely are shown as below.

4.6.1) Login

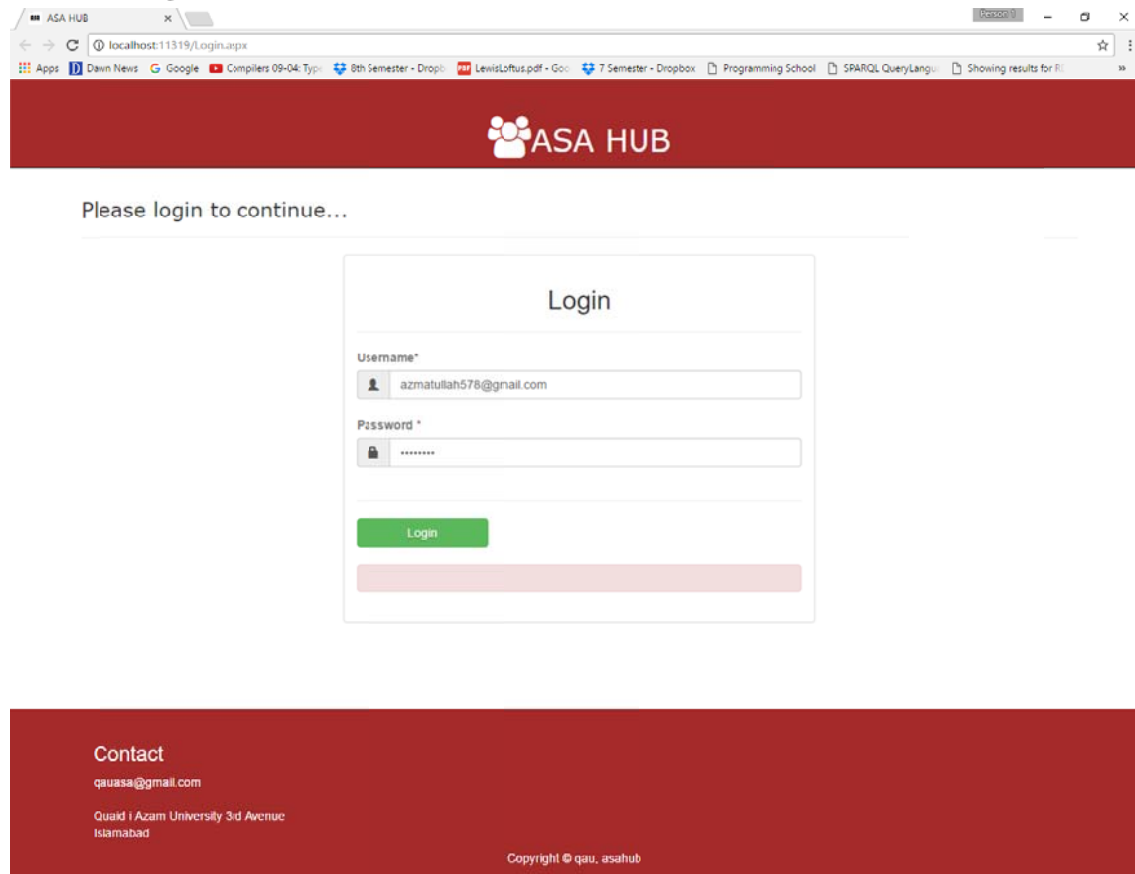


Figure 4.1: Login Interface

Users can login to system from Login Interface. If user enters username and password correctly then he redirects to main page else he gets message of “incorrect username or password”. When user first time logs in to system then he has to manage his profile. After entering all the profile details, he redirects to main page.

4.6.2) Main Page

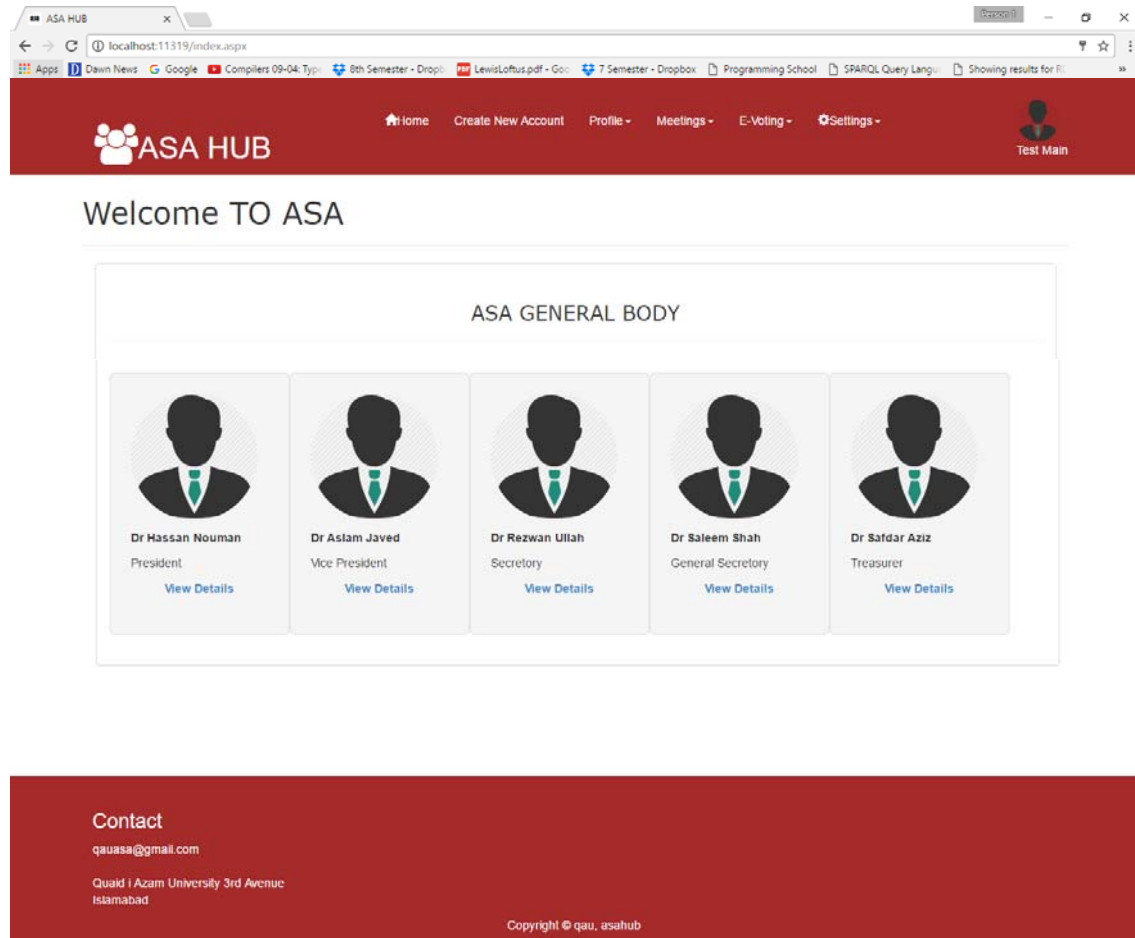
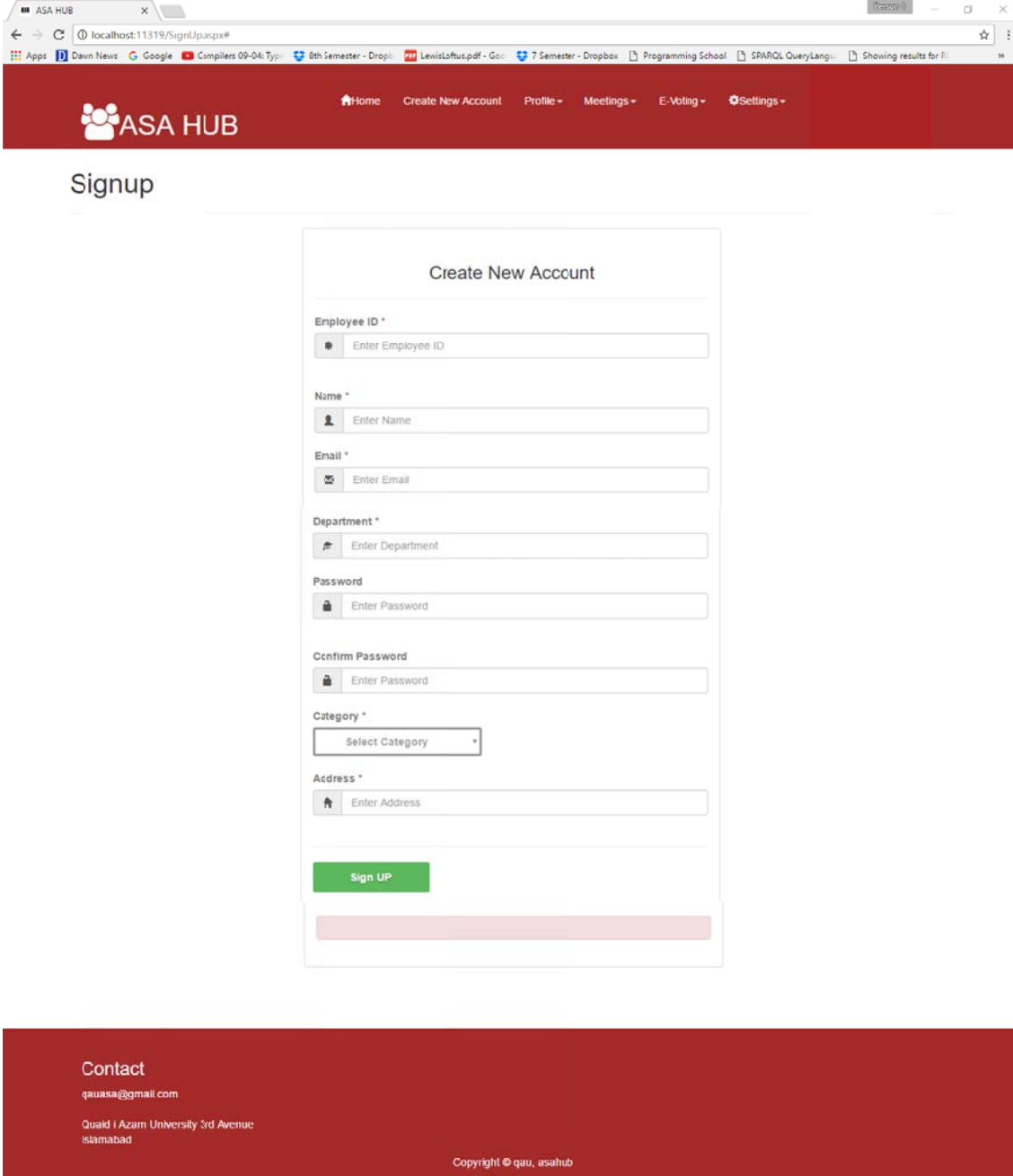


Figure 4.2: Main Page Interface

This is the main page of system. When user logs in successfully then he redirects to this page. From this page user can perform different activities as shown in navigation bar of interface.

4.6.3) Signup



The screenshot displays the ASA HUB web application interface. At the top, there is a navigation bar with the ASA HUB logo and links for Home, Create New Account, Profile, Meetings, E-Voting, and Settings. Below the navigation bar, the page title is "Signup". The main content area features a "Create New Account" form with the following fields:

- Employee ID * (text input)
- Name * (text input)
- Email * (text input)
- Department * (text input)
- Password (text input)
- Confirm Password (text input)
- Category * (dropdown menu)
- Address * (text input)

A green "Sign UP" button is located at the bottom of the form. Below the form, there is a red footer section containing contact information:

Contact
qauasa@gmail.com
Quaid I Azam University 3rd Avenue
Islamabad
Copyright © qau, asahub

Figure 4.3: Signup Interface

Admin can create user's account. When admin create new account then email with account details is sent to that user for which account is being created. Only Admin has access to this page, other users cannot access this page.

4.6.4) Members Profile

The screenshot shows the ASA HUB website interface. The header is red with the ASA HUB logo and navigation links: Home, Create New Account, Profile, Meetings, E-Voting, and Settings. The main content area is titled 'Profiles' and contains a section 'ASA Members's Profiles' with four member profiles:

- Dr Hassan Nouman**
Department: Physics
Designation: Professor
Status: On Job
Contact: Email: hassan@gmail.com, Phone: 32445
- Dr Safdar Aziz**
Department: Electronics
Designation: Professor
Status: On Job
Contact: Email: safdar@qau.edu.pk, Phone: 32445
- Azmat Ullah**
Department: Maths
Designation: Professor
Status: On Job
Contact: Email: test6@gmail.com, Phone: 4245
- Dr Saleem Shah**
Department: Geo Physics
Designation: Professor
Status: On Job
Contact: Email: saleem@qau.edu.pk, Phone: 3234

The footer is red and contains the following information:

Contact
qauasa@gmail.com
Quaid I Azam University 3rd Avenue
Islamabad
Copyright © qau, asahub

Figure 4.4: Candidates Profile Interface

Users can view all members profiles from this interface.

4.6.5) Add Meeting Record

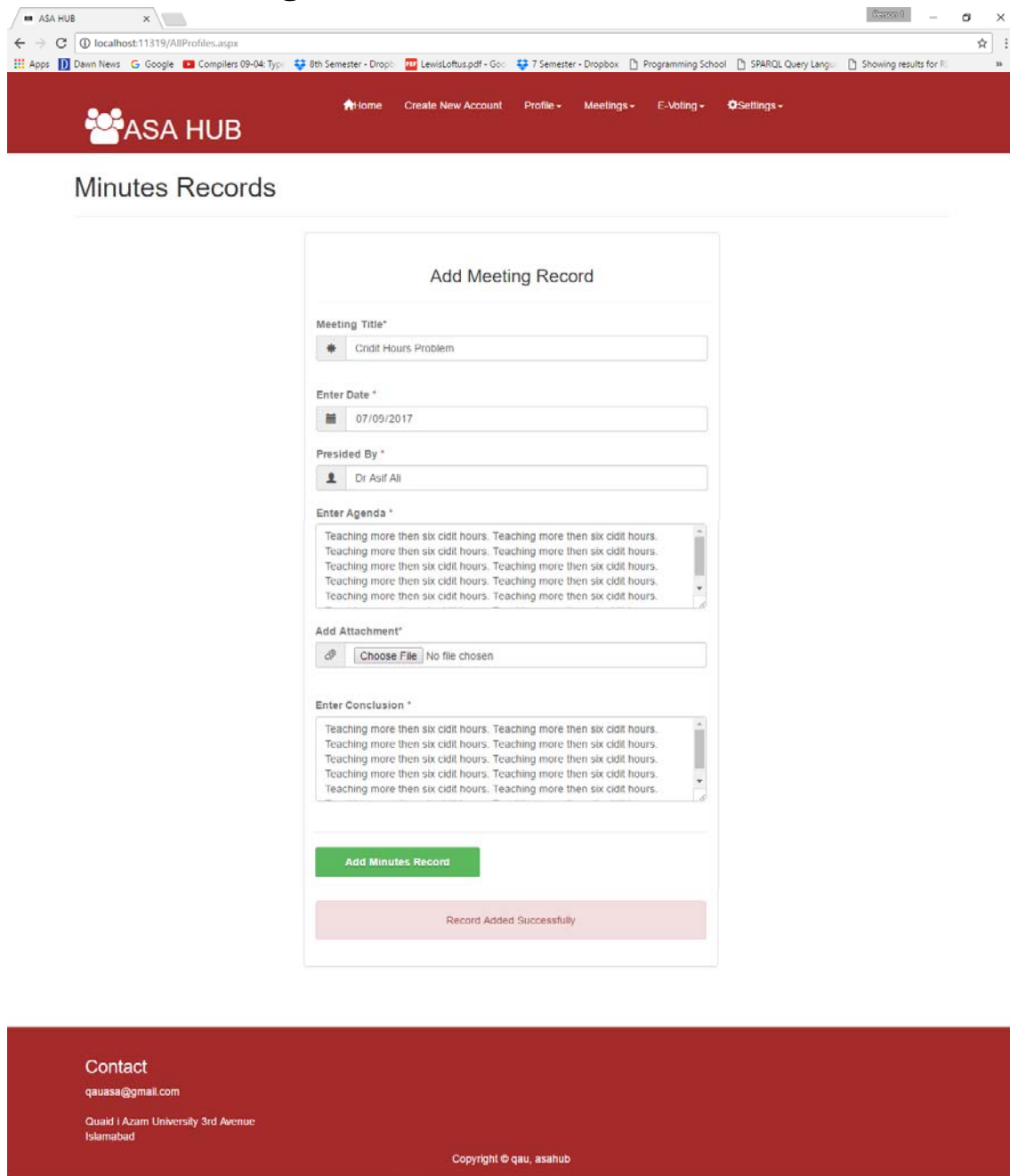


Figure 4.5: Add Meeting Record Interface

When a meeting is organized then admin saves the meeting records to system for future use. Admin can save meeting details and attachment to system that can be searched and viewed by ASA members.

4.6.6) Search Meeting Record

ASA HUB

Home Create New Account Profile Meetings E-Voting Settings

Minutes Records

Search Meeting Record

Search From Date *
07/09/2017

Search To Date *
07/09/2017

Search Record

ASA

Date
7/6/2017 12:00:00 AM
Presided By
CS

[View Agenda](#)

[View Conclusions](#) [Download Attachment](#)

Cridit Hours Problem

Date
7/9/2017 12:00:00 AM
Presided By
Dr Asif Ali

[View Agenda](#)

[View Conclusions](#) [Download Attachment](#)

Available Records are:

Contact
qauasa@gmail.com
Quaid I Azam University 3rd Avenue
Islamabad
Copyright © qau, asahub

Figure 4.6: Search Meeting Record Interface

Members of ASA can search meeting by entering “From” and “To” dates. System shows all the records between these two dates.

4.6.7) Edit Profile

The screenshot displays the 'Edit Profile' interface within the ASA HUB application. The page title is 'Manage Profile' and the sub-header is 'Edit Profile'. The form contains the following fields and values:

- First Name*: Test
- Last Name*: Main
- Gender*: Male (selected), Female
- Designation*: Professor
- Phone No*: 32445
- Department*: CS
- Status*: On Job
- Upload Image*: Choose File customer-avatar.png

A green 'Edit' button is located at the bottom of the form. The footer of the page includes contact information for qauasa@gmail.com, the address 'Quaid I Azam University 3rd Avenue Islamabad', and the copyright notice 'Copyright © qau, asahub'.

Figure 4.7: Edit Profile Interface

Users can edit their profile. System first shows all the previous data, which can be edited and saved.

After clicking “Edit Profile”, system asks for cropping the image with proper look, so that it looks better as shown below.

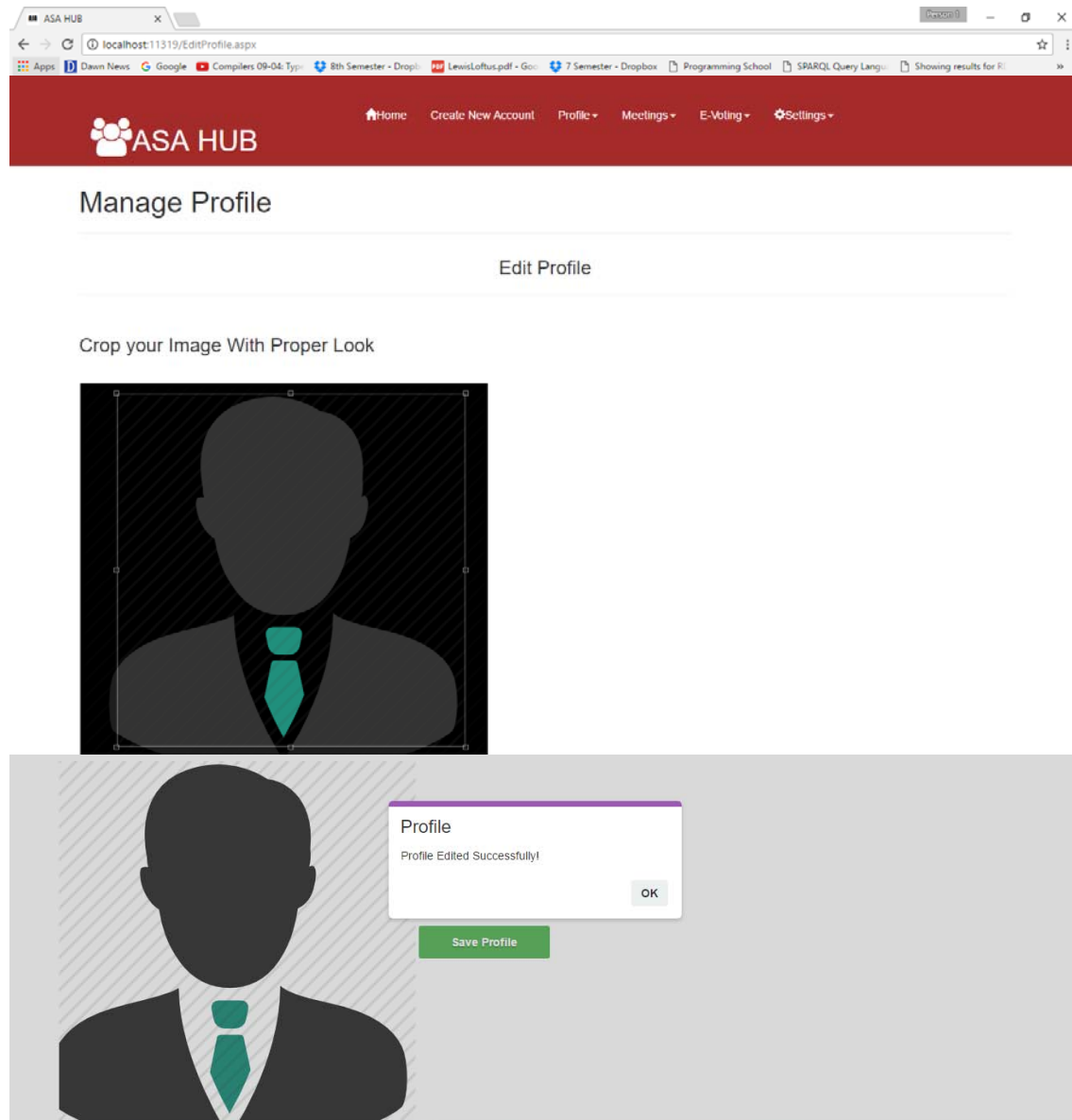


Figure 4.8: Crop Image Interface

Now cropped image shown as above and user click on save then system gives message of profile edited successfully.

4.6.8) Add Polling Info

ASA HUB

Home Create New Account Profile Meetings E-Voting Settings

Voting Poll

Add Polling Info

Select Polling Category *
General Body Election

Polling Title *
ASA General Body Election

Polling Date *
07/09/2017

Polling Start Time *
07:16 PM

Polling Close Time *
08:00 PM

Voting Instructions *
Cast your vote to your desired candidate. After polling time you would not able to cast vote.

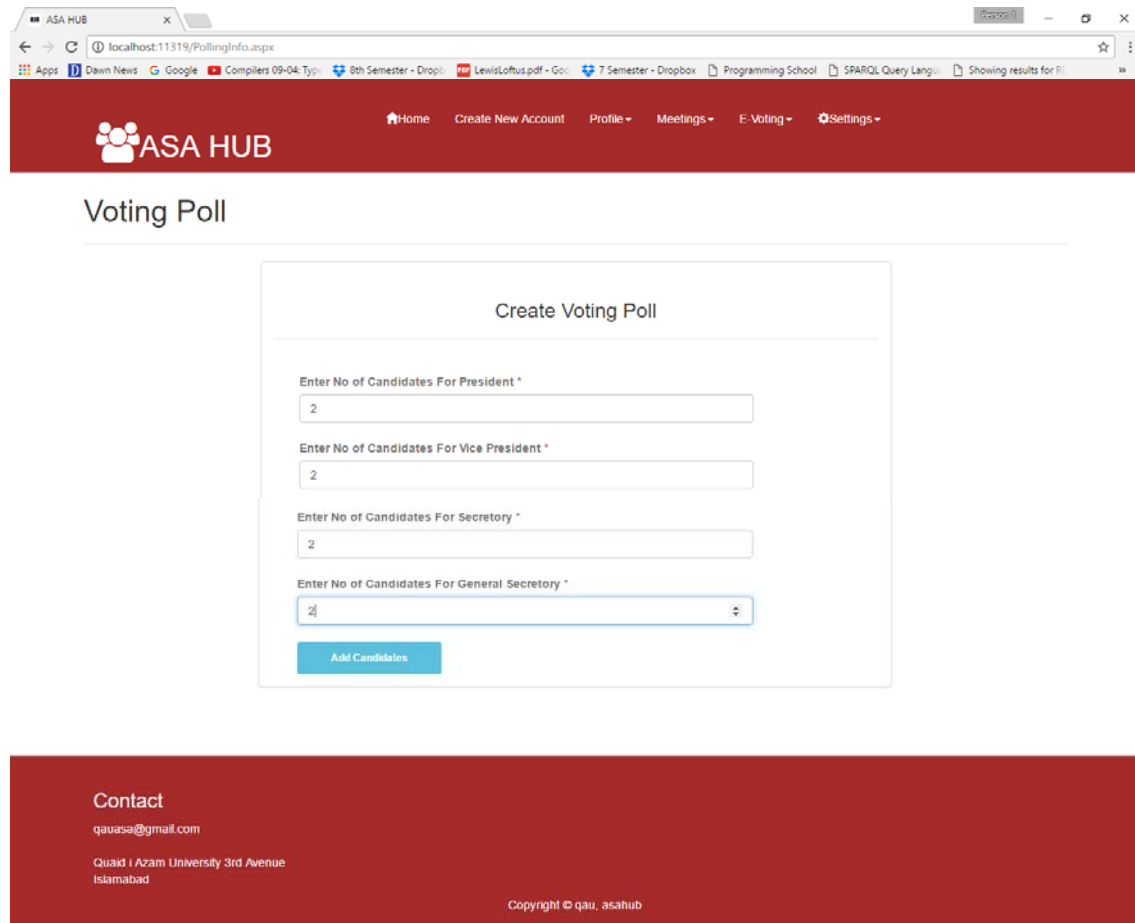
Create Poll

Contact
qauasa@gmail.com
Quaid I Azam University 3rd Avenue
Islamabad
Copyright © qau, asahub

Figure 4.9: Add Polling Info Interface

Librarian can create new poll. New poll can be created by entering polling date, start time, close time and other details about polling. Poll can be created by librarian only, other users have not access to this page.

After entering polling information system asks for entering number of candidates for each category president, vice president, secretary, general secretary as shown below.



The screenshot shows a web browser window with the URL localhost:11319/PollingInfo.aspx. The page title is "ASA HUB" and the main heading is "Voting Poll". The central form is titled "Create Voting Poll" and contains four input fields for candidate counts:

- Enter No of Candidates For President * (Input: 2)
- Enter No of Candidates For Vice President * (Input: 2)
- Enter No of Candidates For Secretary * (Input: 2)
- Enter No of Candidates For General Secretary * (Input: 2)

Below the input fields is a blue button labeled "Add Candidates". The footer of the page includes contact information for qauasa@gmail.com and the address: Quaid I Azam University 3rd Avenue Islamabad. Copyright © qau, asahiub.

Figure 4.10: Enter Candidates Interface

After entering number of candidates for each category then user redirects to other page to add candidate's details as shown in next interface. When user click on "Add Poll" button as shown in next page then poll is created successfully. A poll is shown to candidates at which users can cast their vote.

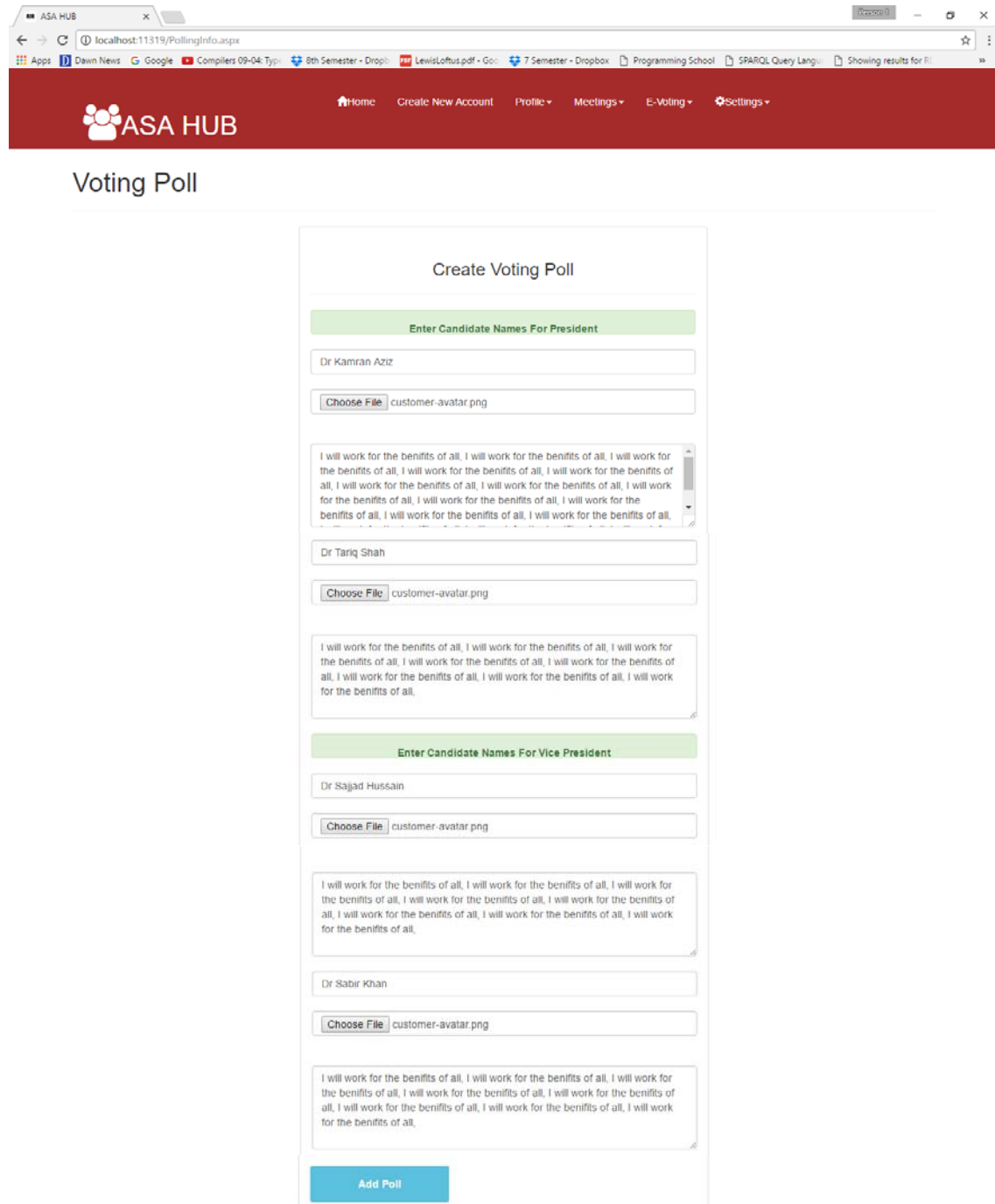
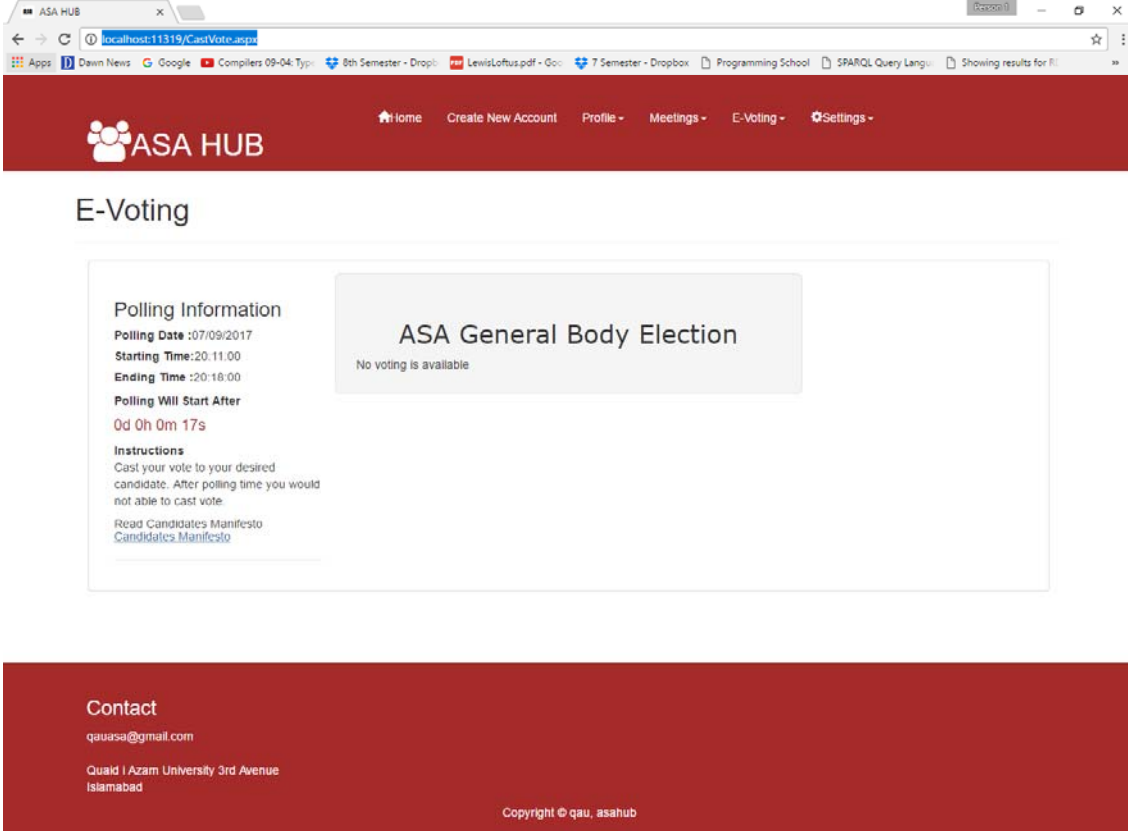


Figure 4.11: Add Candidates Interface

When user clicks on add poll then poll is created successfully. According to polling information, polling is started at “Start Time” and closed at “Closed Time” automatically. When polling time is ended then voting results are shown automatically.

4.6.9) Cast Vote



The screenshot shows a web browser window with the URL `localhost:11319/CastVote.aspx`. The page features a dark red header with the ASA HUB logo and navigation links: Home, Create New Account, Profile, Meetings, E-Voting, and Settings. Below the header, the page is titled "E-Voting".

The main content area is divided into two sections. On the left, under "Polling Information", the following details are listed:

- Polling Date** :07/09/2017
- Starting Time**:20:11:00
- Ending Time** :20:18:00
- Polling Will Start After**
- 0d 0h 0m 17s**

Below this information, there are "Instructions" and a link to "Read Candidates Manifesto".

On the right, a grey box displays the text "ASA General Body Election" and "No voting is available".

The footer of the page, on a dark red background, includes contact information: "Contact", "qauasa@gmail.com", and "Quaid I Azam University 3rd Avenue Islamabad". A copyright notice "Copyright © qau, asahub" is also present.

Figure 4.12: Cast Vote Interface (Polling Not Available)

As shown in above interface polling is not available yet. 17 seconds are remaining from start of polling.

The screenshot displays the ASA HUB E-Voting interface. At the top, there is a navigation bar with the ASA HUB logo and links for Home, Create New Account, Profile, Meetings, E-Voting, and Settings. Below the navigation bar, the page title is "E-Voting". The main content area is divided into two sections. On the left, the "Polling Information" sidebar shows the polling date as 07/09/2017, starting time as 20:11:00, and ending time as 20:18:00. It also indicates that the polling will close after 0d 0h 1m 19s. Instructions state that users should cast their vote to their desired candidate before the polling time ends. On the right, the "ASA General Body Election" section lists candidates for four positions: President, Vice President, Secretary, and General Secretary. Each position has a list of candidates with radio buttons for selection. Below the candidate lists, there is a text input field containing the number "198562" and a link "Click Here To get Voting Key". At the bottom of this section is a blue "Cast Vote" button. At the bottom of the page, there is a red footer section containing contact information for qauasa@gmail.com, the address of Quaid-i-Azam University, and a copyright notice for qau, asahub.

Figure 4.13: Cast Vote Interface (Polling Available)

User casts vote to his desired candidates as shown in above interface. User can cast vote before polling is closed. As shown in above interface 1m 19s are remaining to cast vote, after that polling will be closed automatically. To cast vote user has required voting key, which is sent to him by email. User gets key form email and pastes in “Get Key” interface as shown in next page.

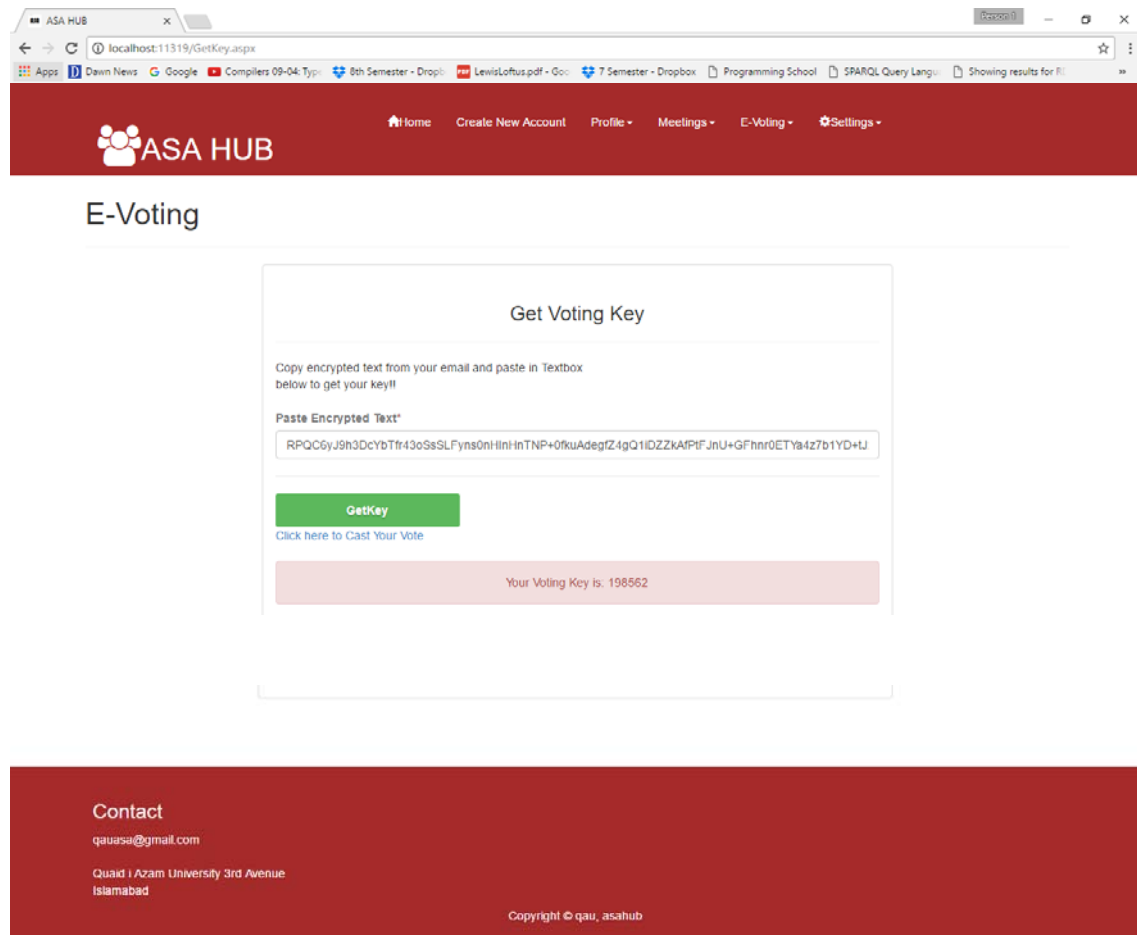


Figure 4.14: Get Key Interface

Form this interface user gets decrypted key to cast his vote. Users can also read candidates manifesto to decide whome they should cast vote.

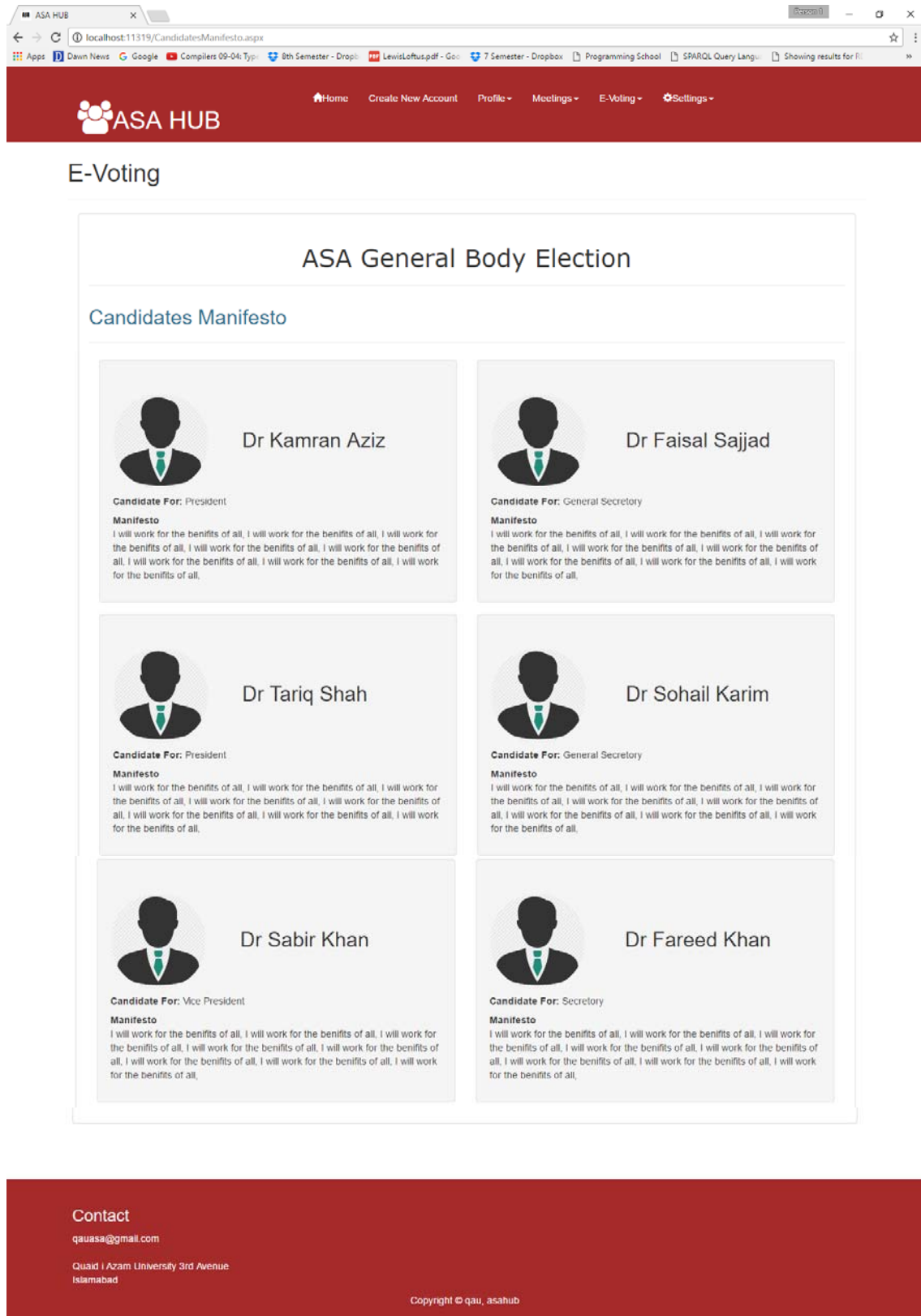


Figure 4.15: Candidates Manifesto Interface

4.6.10) Voting Results

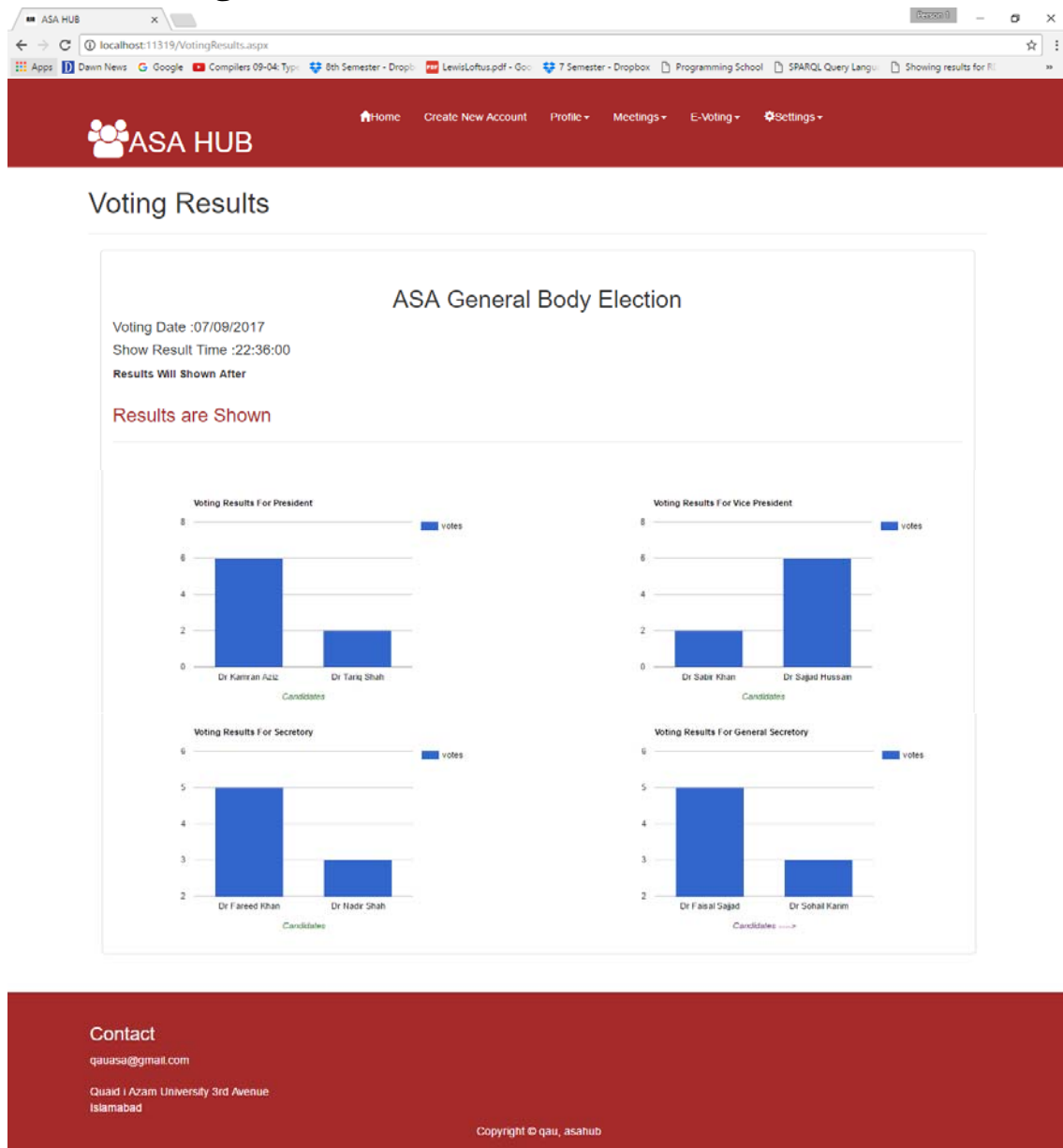


Figure 4.16: Voting Results Interface

Voting results are shown in charts with the number of votes for each candidates as shown in above interface.

E-Voting shown in above is for General Body Election. In same way E-Voting for any issue voting can be performed.

4.6.11) Password Reset

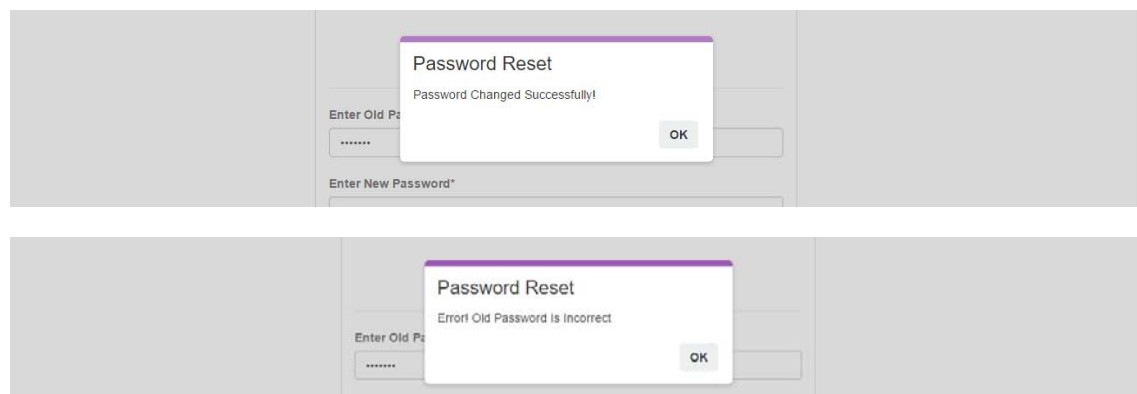
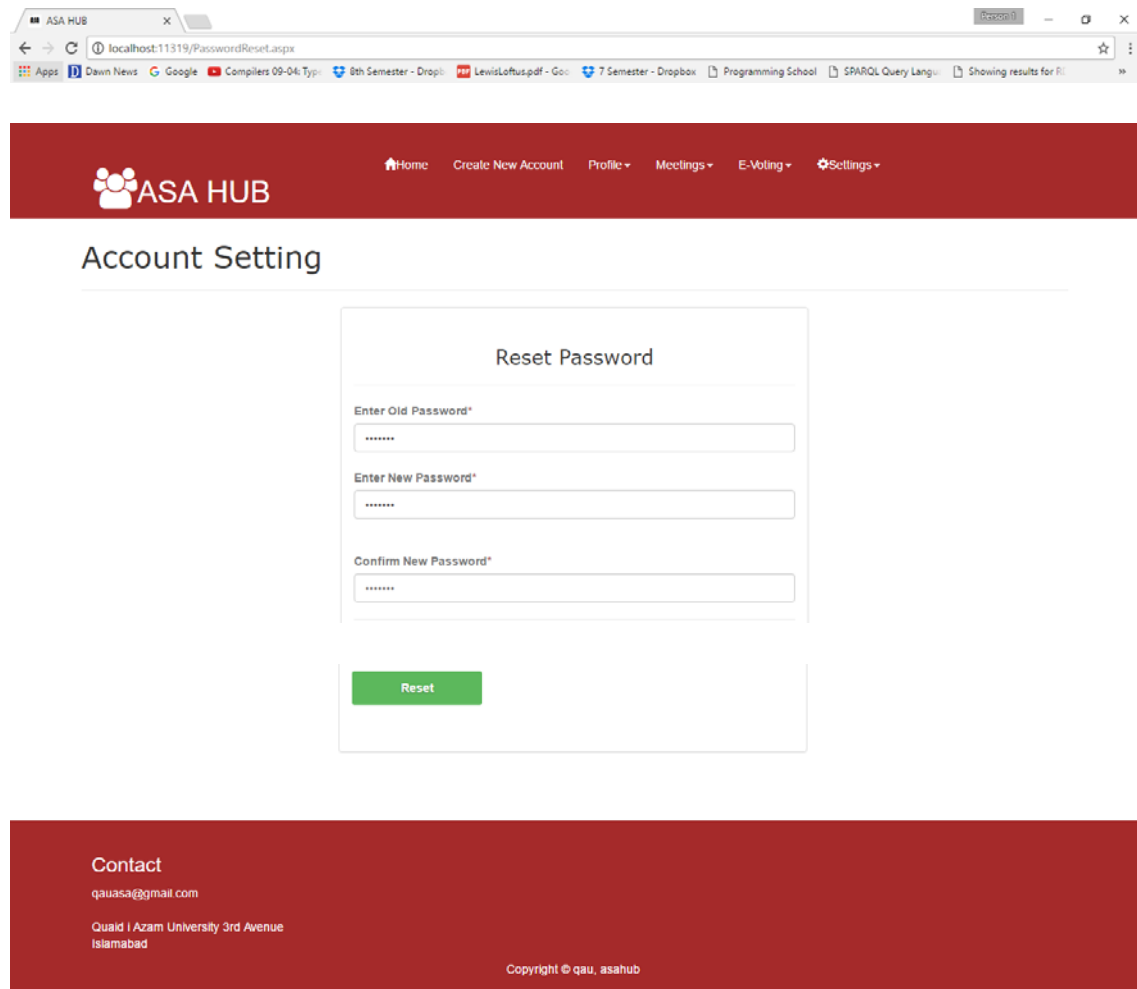


Figure 4.17: Password Reset Interface

User can reset his password. If old password is correct, new password is of length greater than 7 and confirms password is matched, then “Password Changed Successfully” message is

shown as shown in above interface. If old password is incorrect then system gives message that “Old Password Is Incorrect”.

This chapter was about project Implementation. In this chapter selected language, selected database, framework used and APIs, which are used in implementation of this project are discussed in detail. At the end of this chapter, interfaces of system are shown and described. Next chapter is about system testing.

Chapter 5

Testing

This chapter reviews the Testing for the system of Academic Staff Association Hub (ASA Hub). In this chapter approach of testing, test plan and test cases for all requirements are described in detail.

5.1) Testing Overview

Testing is the process of evaluating a system or its components with the intent to find whether it satisfies the specified requirements or not. In simple words, testing is executing a system in order to identify any gaps, errors, or missing requirements in contrary to the actual requirements.

5.1.1) Test Approach

Test approach to test this system is Unit Testing. Unit testing is a testing technique in which individual modules are tested by the developer himself to determine either there are any issues or not. It is concerned with functional correctness of the standalone modules. After integration of system integration testing will be performed. After integration testing, system testing and acceptance testing will be performed. The main aim is to isolate each unit of the system to identify, analyze and fix the defects. There are further different techniques of unit testing. Two techniques I have used to test the system are as follow:

- **Black Box Testing**
In black box testing, inputs and output are tested through interfaces.
- **White Box Testing**
In white box testing, the behavior of each function is tested.

5.2) Test Plan

Test plan describes that which approach is used for testing, which features are to be tested and which features need not to be tested. Different testing plan and environments are used to test the system.

5.2.1) Features to be Tested

Different features of system will be tested. Testing checks that what is behavior of system on correct and incorrect inputs to system. If system performs correctly on all the inputs and system is responding with correct output then system is working fine. If on any input system crashes or invalid response is given by system then there are some problems in system, so system is not working fine. Different features to be test are as follows.

- **Signup**
- **Login**
- **Manage Profile**
- **Add Voting Poll**
- **Cast Vote**
- **Show Voting Results**
- **Add Meeting Record**
- **Search Meeting Record**
- **View Meeting Record**
- **Logout**

5.2.2) Features not to be Tested

Some features do not affect behavior of system. In this system, all the features will be tested. As all the features are performing input and output, then users can give invalid input. Therefore, system will be tested well so that there should not be any issue after deploying the system.

5.3) Test Cases

A test case is a set of conditions or variables under which a tester will determine whether a system under test satisfies requirements or works correctly. The process of developing test cases can also help find problems in the requirements or design of an application.

5.3.1) Test Case 1: User Signup

ID	TC:1
Test Case Name	User Signup
Actor	Admin
Test Description	Admin creates account for members of organization. Admin Enters username, email, password to creates account of new user. Mail is sent to user with his username and password if his account is created successfully. If account with entered username or email already exists then system gives message of invalid username or password.
Setup	<ol style="list-style-type: none"> 1. Create user account with following credentials: Username: abcd. Password: ***** Email: abc@gmail.com 2. Create user account with following credentials: Username: abcd Password: ***** Email: xyz@gmail.com
Input	<ol style="list-style-type: none"> 1. Enter username: abcd, password: ***** and email: abc@gmail.com. 2. Click on create account button. 3. Create next account with username:abcd, password: ***** , email: xyz@gmail.com . 4. Click on create account button.
Expected Results	<ol style="list-style-type: none"> 1. First time account with username: abcd should be created successfully and mail would be sent to user. 2. Second time account with username: abcd should not be created because account with username: abcd already exists. System Should give message that “Username is not available”.
Observed Output	<ol style="list-style-type: none"> 1. First time account with username: abcd is created successfully and mail is sent to user. 2. Second time account with username: abcd is not created because account with username: abcd already exists. System gives message that “Username is not available”.
Frequency	This use case is tested four times, first time failed and corrected then other three times passed.

Pass/Fail	PASSED
------------------	---------------

5.3.2) Test Case 2: User Login

ID	TC:2
Test Case Name	User Login
Actor	User
Test Description	In this test case “login” functionality of system is tested. User can login to system only with correct username and password. This test case validates that user can login to system only with correct username and password only.
Setup	<ol style="list-style-type: none"> 1. User login with following credentials: Username: abcd Password: ***** 2. User login with following credentials: Username: abed Password: *****
Input	<ol style="list-style-type: none"> 1. Enter username: abcd and password: ***** 2. Click on login button. 3. Click on logout. 4. Login again with username: abed and password: *****. 5. Click on login button.
Expected Results	<ol style="list-style-type: none"> 1. User with username “abcd” should logon to system successfully as this username exists in system. 2. User with username “abed” should fail to login as no account matched with username.
Observed output	<ol style="list-style-type: none"> 1. User with username “abcd” is logon to system successfully as this username exists in system. User redirects to home page. 2. User with username “abed” is failed to login as no account matched with username.
Frequency	This use case is tested five times. All the times this test case is passed.
Pass/Fail	PASSED

5.3.3) Test Case 3: Manage Profile

ID	TC: 3
Test Case Name	Manage Profile
Actor	User
Test Description	In this test case, “manage profile” module of system is tested. When a user first time login to system then he has to manage his profile. In his profile user enters his name, department,

	qualifications and his profile picture. When user enters all the fields then his profile is created.
Setup	<ol style="list-style-type: none"> 1. Manage Profile with following credentials: Name: abc. Department: Math Qualifications: MPhil, PHD Email:abc@gmail.com. Upload Picture: abc.PNG.
Input	<ol style="list-style-type: none"> 1. Enter all the required fields and upload profile picture. 2. Click on “Add Profile” button. 3. Enter all the fields but miss to upload the picture. 4. Click on “Add Profile” button.
Expected Results	<ol style="list-style-type: none"> 1. When user enters all the fields and uploads his profile picture then his account should be created. User should redirects to main page and his profile is shown on the system 2. When user misses any field and tries to click on “Add Profile” then system should ask him\her to enter all the required fields for profile.
Observed Output	<ol style="list-style-type: none"> 1. When user enters all the fields and uploads his profile picture then his account is created. User redirects to main page and his profile is shown on the system 2. When user misses any field and tries to click on “Add Profile” then system asks him to enter all the required fields for profile.
Frequency	This use case is tested five times, first two times some fields were missing but system was accepting them. Corrected the problems then other three times system behaved accordingly
Pass/Fail	PASSED

5.3.4) Test Case 4: Create Voting Poll

ID	TC:4
Test Case Name	Add Voting Poll
Actor	Admin
Test Description	Admin creates voting poll at the eve of elections. Admin creates voting poll with the names of candidates and categories of candidates. Adds instructions about voting and gives permissions to users to cast their votes.
Setup	<ol style="list-style-type: none"> 1. Create voting poll with following credentials: Candidate Name: abc. Candidate Category: President Timing: 7 am to 5 pm. 2. Create voting poll with following credentials: Candidate Name: xyz. Candidate Category: Secretary Timing:

Input	<ol style="list-style-type: none"> 1. Enter candidate name: “abc”, candidate category: “President”, and timing: “7am to 5pm” 2. Click on “Create Poll” button. 3. Enter required data but miss some fields like Timing or any other required field. 4. Click on “Create Poll” button.
Expected Results	<ol style="list-style-type: none"> 1. When admin enters all the required fields correctly, then voting poll should be created successfully. 2. When any field is missed, then poll should not be created and system should ask for entering that field.
Observed Output	<ol style="list-style-type: none"> 1. When admin enters all the required fields correctly, then voting poll is created successfully. 2. When any field is missed, then poll is not created and system asks for entering that field.
Frequency	This use case tested 4 times first time some fields were missing but system was accepting them. Corrected the problem then system behaved correctly.
Pass/Fail	PASSED

5.3.5) Test Case 5: Cast Vote

ID	TC:5
Test Case Name	Cast Vote
Actor	User
Test Description	Users can cast vote to their desired candidate using voting poll. A user can cast only one vote and to one candidate of single category. User cannot repeat his vote to two candidates of single category.
Setup	<ol style="list-style-type: none"> 1. Cast vote to a candidate with following credentials: Candidate Name: abc. Candidate Category: President. 2. Cast vote to candidate with following credentials: Candidate Name: bcd. Candidate Category: President. 3. Cate vote to candidate with following credentials: Candidate Name: cdf. Candidate Category: Secretary.
Input	<ol style="list-style-type: none"> 1. Select candidate name: abc and candidate category: President. 2. Click on “Cast Vote” to cast the vote. 3. Select candidate name: bcd and candidate category: President. 4. Click on “Cast Vote” to cast the vote. 5. Select candidate name: cdf and candidate category: Secretary. 6. Click on “Cast Vote” to cast the vote.

Expected Results	<ol style="list-style-type: none"> 1. When a user first time casts vote to “abc” and who is candidate for president then vote should be casted successfully. 2. Again, if same user casts vote to another candidate “bcd” who is also candidate for president, then vote should not be casted because a user can casts vote to one candidate of single category. 3. If same user casts vote to a candidate of different category “Secretary” then vote should be casted successfully.
Observed Output	<ol style="list-style-type: none"> 1. When a user first time casts vote to “abc” and who is candidate for president then vote is casted successfully. 2. Again, if same user casts vote to another candidate “bcd” who is also candidate for president, then vote is not casted because a user can casts vote to one candidate of single category. 3. If same user casts vote to a candidate of different category “Secretary” then vote is casted successfully.
	<p>This use case tested six time. First, three times user was able to cast vote to two candidates of same category and repeat the votes. Corrected the problem, after that all the times system passed and users cannot repeat their votes.</p>
Pass/Fail	PASSED

5.3.6) Test Case 6: Show Voting Results

ID	TC:6
Test Case Name	Show Voting Results
Actor	Admin
Test Description	When voting time is ended then admin shows the voting results of candidates to all users. In voting results, there are results of all the votes gained by candidate of each category. The leading candidates are elected for posts.
Setup	<ol style="list-style-type: none"> 1. Show voting results after ending time of casting vote is 7:00 pm.
Input	<ol style="list-style-type: none"> 1. Show voting result when voting time is ended. 2. Show voting results when voting time is not ended.
Expected Results	<ol style="list-style-type: none"> 1. Showing voting results when time of casting vote is ended then voting results should be shown to users successfully 2. Showing voting results before the ending time of vote casting then voting results should not be shown because users are currently casting their votes.
Observed Output	<ol style="list-style-type: none"> 1. Showing voting results when time of casting vote is ended then voting results are shown to users successfully 2. Showing voting results before the ending time of vote casting then voting results are not shown because users are currently casting their votes

Frequency	This use case is tested three times. All the times it behaved accordingly.
Pass/Fail	PASSED

5.3.7) Test Case 7: Add Meeting Record

ID	TC:7
Test Case Name	Add Meeting Record
Actor	Admin
Test Description	When meeting is ended then admin adds the meeting record about meeting date, topic discussed and conclusions about meeting.
Setup	<ol style="list-style-type: none"> 1. Add meeting record with following credentials: Meeting Date: 8/5/2016. Issue Discussed: teaching more than 6 credit hours. Conclusion: Make strike. 2. Add meeting record with following credentials: Meeting Date: 8/5/2017. Issue Discussed: teaching more than 6 credit hours. Conclusion: Make strike.
Input	<ol style="list-style-type: none"> 1. Enter meeting record with following credentials: Meeting Date: 8/5/2016. Issue Discussed: teaching more than 6 credit hours. Conclusion: Make strike. 2. Click on “Add Meeting Record” to add the meeting record 3. Enter meeting record with following credentials: Meeting Date: 8/5/2017. Issue Discussed: teaching more than 6 credit hours. Conclusion: Make strike. 4. Click on “Add Meeting Record” to add the meeting record
Expected Results	<ol style="list-style-type: none"> 1. First time when admin adds the meeting record with date that is previous or current date then meeting record should be added successfully. 2. Second time when admin adds the meeting record with date that is forward from current date then meeting record should not added. As the date is forward from current date then it means record is invalid.
Observed Output	<ol style="list-style-type: none"> 1. First time when admin adds the meeting record with date that is previous or current date then meeting record is added successfully. 2. Second time when admin adds the meeting record with date that is forward from current date then meeting record is not added. As the date is forward from current date then it means record is invalid.
Frequency	This use case tested four times. First time when date is forward from current date then record then record added successfully, which should not be happen. When corrected the problem other three times it behaved accordingly.

Pass/Fail	PASSED
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5.3.8) Test Case 8: Search Meeting Record

ID	TC:8
Test Case Name	Search Meeting Record
Actor	User
Test Description	User can search the previous records of meetings. User can search the previous records of meetings with date.
Setup	<ol style="list-style-type: none"> 1. Search meeting record of date 9/1/2017. 2. Search meeting record of date 9/1/2018.
Input	<ol style="list-style-type: none"> 1. Enter the date 9/1/2017. 2. Click on “Search Record” to search the records of that date. 3. Enter the date 9/1/2018. 4. Click on “Search Record” to search the records of that date.
Expected Results	<ol style="list-style-type: none"> 1. When user enter the date 9/1/2017 the records of that date should be shown to user successfully. 2. When user enter the date 9/1/2018 then no records should be found because that date is forward from current date or no record is available about date.
Observed Output	<ol style="list-style-type: none"> 1. When user enter the date 9/1/2017 the records of that date are shown to user successfully. 2. When user enter the date 9/1/2018 then no records are found because that date is forward from current date or no record is available about date.
Frequency	This use case tested three times, all the times it behaved correctly.
Pass/Fail	PASSED

5.3.9) Test Case 9: View Meeting Record

ID	TC:9
Test Case Name	View Meeting Record
Actor	User
Test Description	Users view the all the previous records about meetings.
Setup	View meeting records to view the meeting records.
Input	Open page of “Meeting Records” and then click on “View Meeting Records”
Expected Results	All the previous meeting records should be shown to user.
Observed Output	All the previous meeting records are shown to user.
Pass/Fail	PASSED

5.3.10) Test Case 10: Logout

ID	TC:10
Test Case Name	Logout
Actor	User
Test Description	User can logout from system when he wants to leave the system
Setup	Logout from system
Input	Click on “logout”.
Expected Results	User should logged out from system and he should redirect to login page. User would not be able use the system until again logins to system.
Observed Output	User is logged out from system and he redirects to login page. User is not able use the system until again logins to system.
Frequency	This use case is tested six times. First three times user was able to use the system again when he is logged out form system. When corrected the problems other three times system behaved properly.
Pass/Fail	PASSED

In this chapter, test plan, test approach and test cases of different requirements are described. In test cases, behavior of system on different inputs is checked. All the test cases are successfully passed on successful and alternative flows of system, so system is working fine.

Next chapter is about conclusions and future work of this project.

Chapter 6

Conclusion

This system is implemented for Academic Staff Association of Quaid i Azam University Islamabad. By using this system, ASA can perform their activities in better way. The burden of manual processing of ASA would be reduced due to digitized. System provides facility of E-Voting instead of manual voting, in which members have to gather at same place. System provides user's profile, so that members can manage their own profile and view member's profile. System provides facility of storing and searching meeting records, so that users can add, view and search meeting records. User can upload download attachments related to meetings. Voting results are shown in the form of charts to look intractable. Users can crop their images in profile creation and when they edit their profile.

This system provides better security mechanism. E-Voting can be performed in secure way by two-factor user's authentication. Voting key is send to users by mail, which is required for casting their vote. Key is encrypted and decrypted with special security algorithm known as RSA. So only candidates with that key can cast their vote.

Two types of polling can be performed in E-Voting like general body election and any issue voting. General body election is for organizing voting for selection of president, vice president, secretary and general secretary. Issue voting is used vote for any related to ASA.

Future Work

In future work following functionalities can be added

- Fingers print or thumb verification of users to login and cast vote can be used to improve the security of system.
- Interfaces and layouts of this system can be improved.
- Tagging can be implemented in meeting records to search based on tags.

References

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