SMART CAMPUS COMMUNICATION AND MANAGEMENT SYSTEM

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CERTIFICATE OF APPROVAL

This is to officially state that the thesis work contained in this report **"Smart Campus Communication and Management System"**

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

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ABSTRACT

We have been directed to develop an online communication system to facilitate the students and teachers. The said project is to be developed for the 'WESTMINISTER SCHOOL And COLLEGE ISLAMABAD' and will be deployed also once completed. Smart Campus Communication and Management System is proposed as a medium that will serve as a communication platform between teachers, students and the parents. The system will help the users to communicate effectively through the mobile application which is built for the same purpose. The stakeholders will be able to perform their tasks through mobile application as well as the web application.

As the system previously used in schools and colleges is not automated and most of the official work is carried out manually. SCCMS will provide a handy and effective solution to the teachers and the students also. Faculty members will be able to mark the attendance of the students and upload course material , whereas the students, on the other hand cam view their attendance, can have access to the course material uploaded by the teacher, view their results, can view the time table etc. Parents' portfolio have also been introduced in the system where they can view the attendance and results of their child.

DECLARATION OF ORIGINALITY

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DEDICATED WITH LOVE AND RESPECT TO MY BELOVED PARENTS, RESPECTED TEACHERS AND DEAR FRIENDS

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All glory goes to Almighty ALLAH who led us to this extent. May all glory, honor and Adoration be unto thy Name.

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At last I am thankful to my family, specially and my friends who helped me with management issues and emotional support.

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Chapter 1

1 Introduction

Smart Campus Communication & Management System (SCCMS) is proposed as a platform for enabling the students , parents and faculty members to efficiently monitor all the academic activities being done in the Westminister School and College.

The system will introduce a check and balance mechanism for all the above mentioned users. The institution requires an online management system to overcome the manpower which requires a lot of paper work and to provide an efficient way of communication between administration and the parents. The system necessitates the use of technology to minimize the effect of this current disparity by building a web portal and an android-based app.

1.1 Intended Audience and Reading Suggestions

The thesis report of Mobile App for Metropolitan Complaint Management System is meant for all the stake holders.

- **Project Supervisor:** It will help to supervise the project and guide the team in a better way.
- **Development Team:** It will help the developer to develop the product and to trace back the functional requirements.
- **Students:** The potential stakeholders of the system who are studying in this campus and who need to access their concerned material on the API.
- **UG Project Evaluation Team:** Evaluation committee which will evaluate the progress of UG Projects.
- **Administration:** The intended audience is both admin and the faculty , who will update the portal.
- **Parents:** It can be used as reference or a user manual for the parents also who wish to use the mobile application for their concerned purpose.

1.2 Project Scope

Smart Campus Communication & Management System will be used by all the stakeholders. The admin will authenticate the users to signup and will be able to notify about the important announcements on daily basis. After registration the faculty members will be able to upload course material and students attendance while the students can check their results and their financial matters related to the institution. It requires front–end design and implementation for web and android API and synchronizing with the data base at the back-end. The attendance will be marked through RFID modules. Moreover the security is maintained by installing an active RFID module at the entrance of the campus to ensure the presence of students within the premises of campus.

1.3 Project Vision

For	Users, who wish to complaint about the metropolitan problems and the CB staff who are responsible for resolution of the complaints can keep track of the metropolitan problems through MCMS.
What	The MCMS is an android-based application that provides the users with interface to lodge metropolitan complaints, and while allowing the CB staff to get to know about it and respond to each complaint
The	Metropolitan Complaint Management System
Is	The product that is mainly categorized as a system for managing metropolitan complaints, and is planned to assist both the complainers and CB staff in swift resolution of civic-complaints.

Those	Complainers do not have to lodge the complaints of the metropolitan problems manually.
Unlike	In the existing practice of physical visit to CB or make telephone call to the CB Office.
Our Product	By using MCMS, user can not only save time by swift complaint-lodging and onward resolution followed by the feedback; but also bring their complaints into the notice of the higher officials of CB.

Table 1 Project Vision

1.4 Project Objective

PRIMARY OBJECTIVES

1. Mobile platform for facilitating the students.
2. To minimize the communication gap between students, teachers and the parents.
3. Minimized time & effort to get the updates of the school, access the course material and view attendance and the results of the students.
4. Minimal paper work to be maintained by the administration.

Application / End – goal objectives:

1. To facilitate the stake holders to access whatever they require, remotely.
2. To enable the concerned admin staff to effectively handle the class related and faculty related issues, like class schedule, course material, attendance etc.
3. To save the precious time and resources by minimizing the paper work..

1.5 Deliverables

1. Complete working project
2. Android application
3. Documentation

Chapter 2

2 Literature Review

2.1 Introduction

The efforts of limiting the paperwork and introducing the technology to lessen the work load goes back to many years. In the beginning some of the basic softwares were used for this purpose for example the use of technology to present the facts and figures. This included making of table, introducing the concepts of spreadsheets to present data more efficiently and the use of tools to draw charts and graphs. However as the technology has advanced, more and more work is being done on the computers and we are becoming more dependent on the internet and computer which as a result minimizes our efforts to organize and present data. Now the stage has arrived where we can fully rely on the computer systems for our everyday tasks. In offices , the registers are replaced by the computer programs that can be used as an alternative of a register for the recording of data. We have now complete working environment available which can automate the structure of a working organization.

2.2 Problem Domain

As per the procedure in vogue, a lot of paper work has to be maintained and which results in the excessive utilization of time and resources. Everything has to be maintained manually which is an excessive use of time and resources. Administration

staff has to either maintain bulks of paper for this purpose or excessive manpower and time is used which of course is not an efficient solution to this problem.

This process inherits many problems including:

1. Excessive use of manpower. And the system totally relies on manual work which is not efficient is every case.
2. The communication gap between teachers and the parents.
3. Wastage of precious time and efforts in manual works.
4. The communication gap between teachers and parents.

   It necessitates the use of technology to minimize the effects of this current disparity by building an android–based application to enable the students, teachers and the parents to efficiently perform their duties using minimized efforts and using less manpower.

2.3 Shortcomings/limitations

1. Internet connection is mandatory to access the Smart Campus Communication and Management System.

2. Any complaint/feedback can only be launched by the parents or the students themselves.

3. The contents of the application will be in English language only.

4. The server will be unavailable in case of maintenance and testing issues. No backup server configuration is provided.

2.4 Proposed Project

Smart Campus Communication & Management System will be used by all the stakeholders. The admin will authenticate the users to signup and will be able to notify about the important announcements/notifications on daily basis. After

registration the faculty members will be able to upload course material and students' attendance while the students can check their results and their financial matters related to the institution. It requires front–end design and implementation for web and android API and synchronizing with the data base at the back-end.

2.5 Deliverables

Software Requirement Specification (SRS)

The purpose of the document is to present a detailed description of the Smart Campus Communication and Management System. It will explain the purpose and features of the system, the interfaces of the system, what the system will do, its entire process, the constraints under which it must operate and how the system will react to external stimuli. This document is intended for both the stakeholders and the developers of the system.

Software Design document

The design document captures all our functional requirements and shows how they interact with each other conceptually. The low level design also shows as to how we have been implementing how we are going to implement all of these requirements.

Implementation code Document

The implementation code document provides details about the pseudo code for the application and project prototype.

Software Testing Document

This document has testing modules in which there are certain test cases which depicts the correctness and accuracy of the project.

Final Project Report

This is the thesis report which compiles all the previous and current working for the project. Thesis report provides the whole summary for the project and also give details about each and every aspect of the project starting from introduction of the project, literature review, requirements leading to design discussions then testing and lastly future work and conclusion.

done

2.6 Technological Requirements

Smart Campus Communication and Management System (SCCMS) requires following software and hardware requirements.

Software Interfaces

1. SCCMS should be able to run on any version of the following Web browsers: Microsoft Internet Explorer, Mozilla Firefox, Opera, Safari and Google Chrome.
2. Primary Operating System supported by SCCMS Interface will be Windows 10.
3. SCCMS should be able to run on Apache Web server configured in a stable Linux/Unix/MAC/Windows machine.
4. SCCMS should be work with MySQL database management system.
5. SCCMS app should be able to run on all android devices with basic hardware requirements fulfilled that run Android OS 1.6 or above.
6. The app will require access to the device GPS, and request permission for location tracking via the Android OS.

Hardware Interfaces

2.6.1.1 Computer System

1. System shall have keyboard input.
2. System shall have mouse input.
3. System shall have a monitor.
4. System shall have a working internet connection and the hardware requirements that come with it (Network card, Ethernet Port, Modem etc.)

2.6.1.2 Mobile Device

1. Android Device (Cellphone or Tablet) running Android 1.6 or later, color display.
2. Device running on Qualcomm Snapdragon or Exynos Soc.
3. Touch Screen with haptic feedback on key presses (Android Keyboard).
4. Global Positioning System (optional).

2.6.1.3 Web and Database Server

1. To process requests and retrieve/store data.

Communications Interfaces

1. System shall be connected to the web services that we will create.
2. To access the online data, SOAP (simple object access protocol) can be used.
3. Communication between the Web Interface and the server will be through HTTP over a web browser.
4. Communication between the Android application and the server will be through HTTP as well.

Programming Interface

Programming interfaces for project are:

1. NetBeans

2. Eclipse

3. Visual Studio

Chapter 3

3 Overall Description

3.1 Product Perspective

The product is prepared to launch an effective and cheap solution to the problems faced in the concerned sector. The product aims to minimize the paperwork and to fully automate the system being currently used in the schools and colleges.

The product is specifically designed to be used for small scale, particularly schools and intermediate colleges. The product completely fulfills the requirements provided by the Westminister Schools and Colleges.

3.2 Product Functions

- Authenticate the users
- Login/signup
- Notification of the announcements of the important issues
- Update of course material, student attendance , results
- Attendance marking through RFID cards
- Notification of the students to their parents while entering and leaving the campus
- Feedback system
- View of announcements for the students

3.3 User Classes and Characteristics

The software has different types of users, admin, faculty members, students and parents. All the types of users have different access level to the system and its data and can perform functions assigned to their respective roles.

- **System Administrator User:-** The admin user can create new user with prior permission of Organization user. It can also deem a user as active or inactive based on some policy.
- **Faculty Member :-** The faculty member user will be able to update academic records and update the students attendance.
- **Student User:-** The students will be able to view their academic performance and their attendance, download their course material and give feedback to the teachers.
- **Parents:-** Parents will be able to view attendance, results and other notification from the administration of the school.

There are certain jobs or rights of each and every user.

End user	Job rights
Students	1. Login 2. View Profile 3. Download course material
Administration Staff	1. Registration 2. Login 3. Edit/View Profile 4. Manage users
Teachers	1. Login 2. Update course material 3. Update attendance
Parents	1. Login 2. View attendance

	3. View course material

Table 2 Users and Characteristics

3.4 Operating Environment

OE-1: The Web based system of SCCMS shall run on the computer system with following specifications:

- Pentium 4 or Higher CPU
- At least 1GB of RAM
- At least 1 GB of free disk space
- Windows XP or later operating system
- Chrome, Firefox or Internet Explorer
- Color monitor and a working internet connection.

OE-2: SCCMS should be managed with Mongo database management system.

OE-3: SCCMS will be able to run on any Android cellular phone with a working internet connection.

Technology Platform:

3.4.1.1 Android-Based Front End:

Applications Front-end would be developed for android-based phones, providing the users with the interface to get registered on the cloud-based server, and lodge their complaints. Android development tools (eclipse) and Java development kit (version: 8.40) would be used as the development environment.

3.4.1.2 Programming languages:

1. Java

3.4.1.3 Programming Environment

1. NetBeans
2. Eclipse
3. Visual Studio

3.4.1.4 Web Languages

1. HTML
2. CSS

3.4.1.5 Database

1. MySql

3.5 Design and Implementation Constraints

CO-1: Android compatible platform, Java based, is needed for the end-user.
CO-2: All HTML code should conform to the HTML 5 standard.
CO-3: Lack of user-expertise in using the applications on Android cellular device.
CO-4: Internet connection needed.

3.6 User Documentation

UD-1: Final release will be accompanied with a user guide to inform users how to use Smart Campus Communication & Management System (SCCMS). User documentation that would be delivered along with the final product

- User manual

3.7 Assumptions and Dependencies

AS-1: Basic assumption for development of SCCMS is that system should be available 24x7 since the student can access the system any time
AS-2: The users will not misuse the application to and gain access to parents account.

AS-3:The RFID module linked with the server will mark the attendance correctly.

AS-4: The administration official will be honest and responsible for the duties assigned to him.

D: There will be permanent dependency on internet connection and electricity.

Chapter 4

4 Software Requirements Specification

4.1 System Features

4.1.1 Account creation

4.1.1.1 Description and Priority

The system will enable the campus staff to create their user account, while providing them with the access rights based on their hierarchy. This account will enable them to login and process the working they are interested in. The priority of this system feature is high.

4.1.1.2 Stimulus/Response Sequence

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

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

4.1.1.3 Functional Requirements

REQ-1: The SCCMS shall precede the requests of account-creation to the system administrator.

REQ-2: The SCCMS shall allow the Administrator to create the accounts of stakeholders.

4.1.2 Login/access rights

4.1.2.1 Description and Priority

The system will enable the CB staff to login. The staff will provide their unique ID and password to access their account so that they would be able to manage the complaints that are lodged.

4.1.2.2 Stimulus/Response Sequences

Input: User will enter login credentials to the system.

Output: The system will grant the valid user, the access to the features according to his access rights

4.1.2.3 Functional Requirements

REQ-1: The MCMS shall allow the CB staff to login to their account.
REQ-2: The MCMS shall grant the logged in user, the access to the system features.

4.1.3 User credentials entry

4.1.3.1 Description and Priority

The system will require the stakeholders to enter their certain credentials for their identification purposes, including username, password and code.

4.1.3.2 Stimulus/Response Sequences

Input The user will enter his credentials in the SCCMS App.

Output: The system will accept the provided credentials and allow the user to perform required action.

4.1.3.3 Functional Requirements

REQ-1: The SCCMS shall enable the user to enter his credentials.

4.2 Other Non functional Requirements

Performance Requirements

Certain functionalities will be required, based on the performance and response of SCCMS. SCCMS has to be efficient in its response and operation. The product domain requires that the software is optimized in terms of performance. The data flow should happen in the most efficient way.

Safety Requirements

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

Security Requirements

SE-1: Users shall be required to log in to the SCCMS for their own credential information.

SE-2: The system shall permit only authorized members to do administrator's task.

SE-3: The system shall permit users to view only their own profile and data that are intended for them.

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

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

4.3 Software Quality Attributes

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

4.3.1 Runtime System Qualities

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

4.3.2.3 Functionality

MCMS must provide functions to publish and search the community service. MCMS must provide the functions of authentication of user.

4.3.2.4 Availability

MCMS should be available 24x7 since the complaint can be lodged at any time.

4.3.2.5 Usability

Usability is an important criterion in the development of MCMS. The system should present all functionalities in such a way that nothing is missed by the user.

4.3.2 Non-Runtime System Qualities

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

4.3.2.1 Modifiability

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

4.3.2.2 Portability

The system should work on WIFI as well as 3G network.

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

4.3.2.3 Interoperability

Mobile app will be interoperable with Google app engine.

4.3.2.4 Testability

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

4.4 Other Requirements

The system will be providing a scalable solution with expected increase in the number of users.

Chapter 5

5. System Design Specifications

5.1 Overview of the module

5.1.1 Client

Client is the user of the SCCMS system who accesses the Mobile app and then chooses functionality according to the requirement. Clients consist of teacher, student or parents. Client interacts with the web app that further accesses the services provided by the app.

5.1.2 Services

These are the functionalities provided by the SCCMS. The services for different kind of users are different as a viewer(student, parent) the services provided by the SCCMS are viewing attendance/course material, downloading course material, viewing updates/news, if any, in the school. But more privileges are for teachers and system administrators.

5.1.3 Web User Interface

Web interface provides services to the users which include teachers , parents, students and the administrator. Web interface provides a platform to view, update or download the course material, as per the requirement of the concerned user and it provides platform for the administrator to manage the users accessing the system.

5.1.4 Administration

System Administration interacts with the web user interface for managing user accounts, dealing with the whole functionality of the system by handling all the provided services by SCCMS.

5.1.5 Database handler

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

5.1.6 Databases

A database stores all the data about the web interface, users records, files or any other format of course being uploaded by the teacher, and data being downloaded by the student , and all the related processing happens there.

5.2 Brief Description of the components

Following is a brief overview of the major modules / components of the system, mentioned in the above diagram:

Module name/ components	**Purpose**
Menu	Menu has buttons having links of other menus.
Button	Touch buttons as input class. To select a particular category
User management	All types of users are managed in this via login names and password according to their access

	rights.
Viewer	Viewer is the focal entity of the user management class involves all the users who are supposed to view the particulars available for on their account(students and parents).
Teacher	Teacher is involved in the overall handling of the material provided to the students and the parents for viewing purpose and for download purpose as well.
Administrator	Administrator is involved in managing users managing accounts, also a main entity of the user class.
Information mapping	Information mapping module gets and stores the info related to teacher, student and parents.
Graphics	It is a module to draw and display everything on the screen.
App	Stores the information about the app such as all the complaints resolved complaints, current and pending complaints.
Notify	It provides the notification to the users about updates in their respective domain.

Table 3 Components and purpose

5.3 Class Diagram

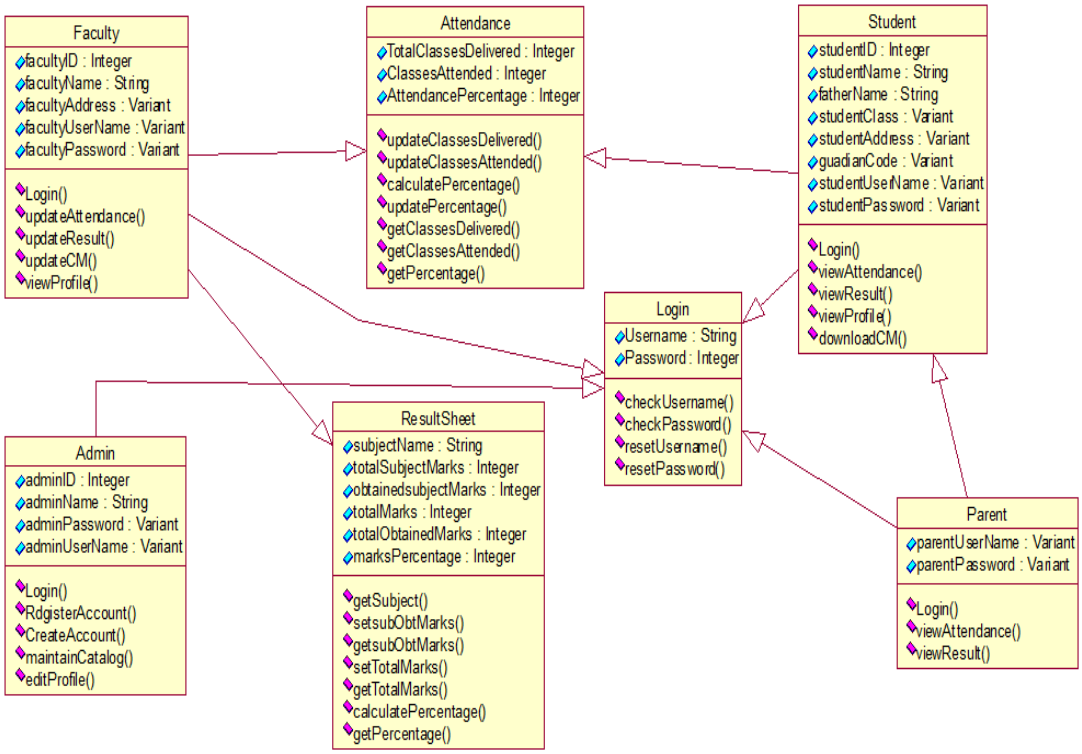


Figure 1 Class Diagram

5.4 Use Case Diagram

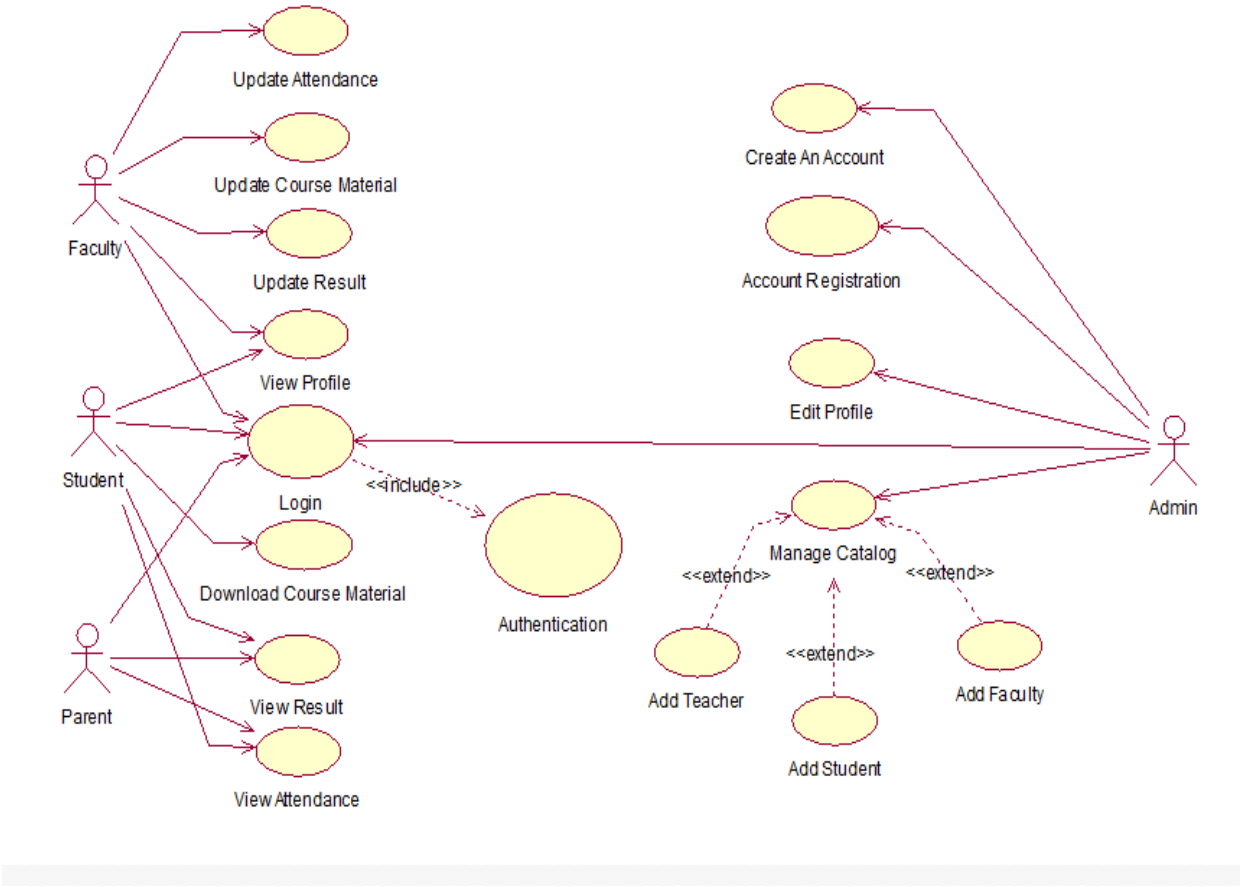


Figure 2 Use Case

5.5 Use Cases Description

Manage Users

Use Case ID:	1
Use Case Name:	Manage Users
Actors:	Administrator

Created By:	Fahad	Last Updated By:	Fahad
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	1. Admin has to login to the system to manage users i.e. create, read, update and delete user profiles.		
Preconditions:	1. Admin has to login.		
Post conditions:	1. The System must record the change.		
Normal Flow (primary scenario):	1. The actor creates, reads, updates and deletes the user details. 2. Click on create or read or update or delete button as required.		
Alternative Flows:	1. The actor will contact the system maintenance team to check if there is some error with database systems and has to resolve the error.		

Login

Use Case ID:	2		
Use Case Name:	Login		
Actors:	Administrator, Teacher, Student, Parent		
Created By:	Fahad	Last Updated By:	Fahad
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	A user tries to login to the system.		
Preconditions:	1. User has to open the login page first.		
Post conditions:	1. If the use case was successful, the actor is now logged into the system. If not the system state remains unchanged.		

Normal Flow (primary scenario):	This use case starts when an actor wishes to log into the System. 1. The system requests that the actor enter his/her name and password. 2. The actor enters his/her name and password. 3. The system validates the entered name and password and logs the actor into the system.
Alternative Flows:	1. **Invalid Name / Password** If in the *Basic Flow* the actor enters an invalid name and/or password, the system displays an error message. The actor can choose to either return to the beginning of the *Basic Flow* or cancel the login, at which point the use case ends.

Registration of an account

Use Case ID:	3		
Use Case Name:	Registration of account		
Actors:	Administration		
Created By:	Abdullah	Last Updated By:	Abdullah
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	A user tries to sign up in to the system.		
Preconditions:	1. User has to open the sign up page first.		
Post conditions:	1. The System must record the membership information of the new member.		

Normal Flow (primary scenario):	1. The member enters the membership details on the screen and clicks the sign up button. 2. The system checks for the availability of the username. 3. The system generates the membership ID. 4. The system records the membership information of the new member, in the database.
Alternative Flows:	1. The member enters the membership details on the screen and clicks the sign up button. 2. The system checks for the availability of the username. 3. The system displays an error report if the username is not available.
Non-functional Requirements	The system must perform an encoding technique such as hashing to save all passwords securely.

Edit/View Profile

Use Case ID:	4		
Use Case Name:	Edit/View Profile		
Actors:	Administration Staff		
Created By:	Abdullah	Last Updated By:	Abdullah
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	A user tries to edit/view his profile.		
Preconditions:	1. User has to open the sign up page first.		
Post conditions:	1. The System must show the profile and record the changes made therein.		

Normal Flow (primary scenario):	1. The user login credentials and signs in to the system. 2. The user clicks profile options. 3. The system enables the user to view or modify his profile information. 4. The system records the changes made in the profile.
Alternative Flows:	1. The user tries to modify his profile name. 2. The system throws error message, mentioning that user cannot change his profile name.

View attendance

Use Case ID:	5		
Use Case Name:	View attendance		
Actors:	Parents , Students		
Created By:	Abdullah	Last Updated By:	Abdullah
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	A user has to login to the system to check the status of the complaint.		
Preconditions:	1. User has to open Check attendance page first.		
Post conditions:	1. The System shows the attendance of the student		
Normal Flow (primary scenario):	1. User will access the system 2. User will open the check attendance page. 3. System shows the attendance of the student		

Alternative Flows:	Attendance Not marked 1. User will access the system 2. User checks attendance of the student 3. Attendance for the upcoming days has to be updated.

Create account

Use Case ID:	6		
Use Case Name:	Create account		
Actors:	Student, Parent, Teacher		
Created By:	Wasim	Last Updated By:	Wasim
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	The system will enable the actors to enter their credentials and create an account		
Preconditions:	1. User has to enter its credentials provided by the school.		
Post conditions:	1. The system will create corresponding to the credentials entered.		
Normal Flow (primary scenario):	1. The actor will click the create account button. 2. The system creates an account for the actor.		
Alternative Flows:	1. The credentials entered are incorrect. 2. The system returns error message, mentioning that no account created.		

View marks and result

Use Case ID:	7		
Use Case Name:	View marks and result		
Actors:	Parent, Student		
Created By:	Wasim	Last Updated By:	Wasim
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	The system will enable the concerned actor to view marks and result.		
Preconditions:	1. User has to login to the system. 2. User has to view result and view marks page.		
Post conditions:	1. The system will show the result and marks of the student.		
Normal Flow (primary scenario):	1. User will access the system 2. The user will select the view result or view marks. 3. The system will display the marks and result of the student.		
Alternative Flows:	**No marks shown** 1. User will access the system 2. The marks has not been updated yet.		

Update attendance and marks

Use Case ID:	8		
Use Case Name:	Update attendance and marks		
Actors:	Teacher		
Created By:	Abdullah	Last Updated By:	Abdullah

Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	The teacher will update the marks and attendance of the students.		
Preconditions:	1. Teacher will login to the its account.		
Post conditions:	1. Marks and attendance will be updated.		
Normal Flow (primary scenario):	1. Teacher will access the system 2. The teacher will enter marks or mark the attendance after log in. 3. Marks and attendance will be updated.		
Alternative Flows:	**Marks or attendance not updated** 1. Teacher will access the system 2. The system returns error message, the input in incorrect please enter the correct input.		

Upload the course material

Use Case ID:	9		
Use Case Name:	Upload the course material		
Actors:	Teacher		
Created By:	Abdullah	Last Updated By:	Abdullah
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	The teacher will upload the course material e.g. file , picture, video.		
Preconditions:	1. Teacher has to log in into the system.		
Post conditions:	1. The course material is uploaded successfully.		

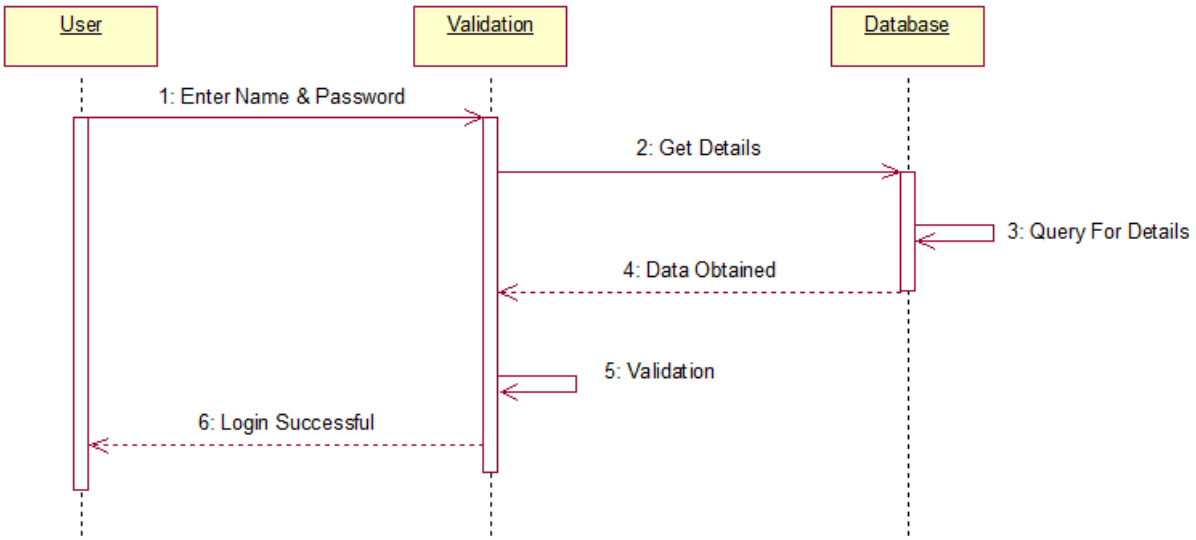
Normal Flow (primary scenario):	1. Teacher will access the system 2. Teacher will upload the course material. 3. Course material is uploaded successfully.
Alternative Flows:	**File not uploaded** 1. Teacher will access the system 2. No file selected, please select a file first.

Download the course material

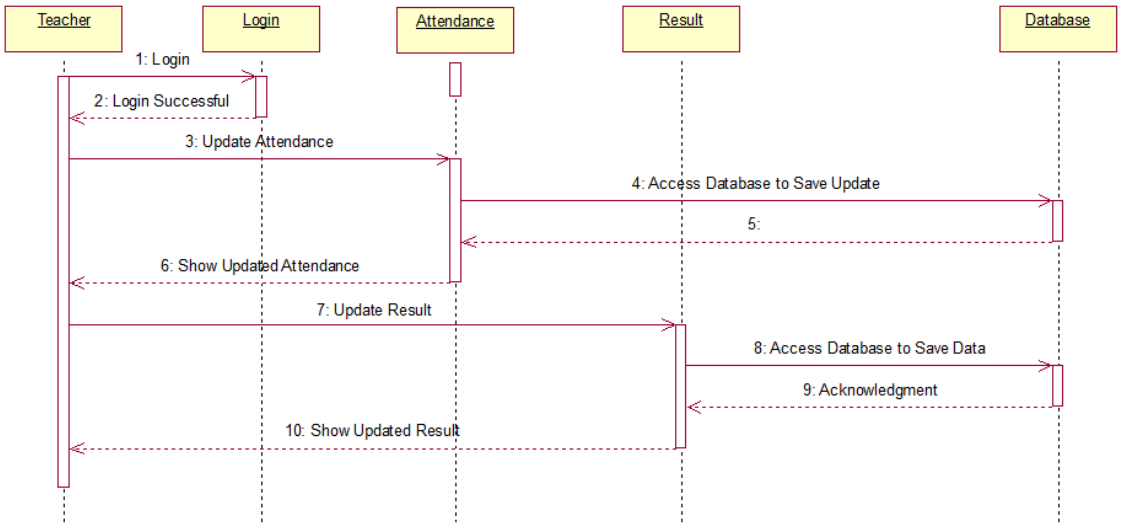
Use Case ID:	10		
Use Case Name:	Download the course material		
Actors:	Student		
Created By:	Fahad	Last Updated By:	Fahad
Date Created:	22/12/2018	Date Last Updated:	22/12/2018
Description:	The student will able to download the course material from system.		
Preconditions:	1. The student should log in into the system.		
Post conditions:	1. The course material will be downloaded successfully.		
Normal Flow (primary scenario):	1. Student will access the system 2. Student will download the course material		
Alternative Flows:	1. User access the system. 2. The file is no longer available.		

5.6 Sequence Diagrams

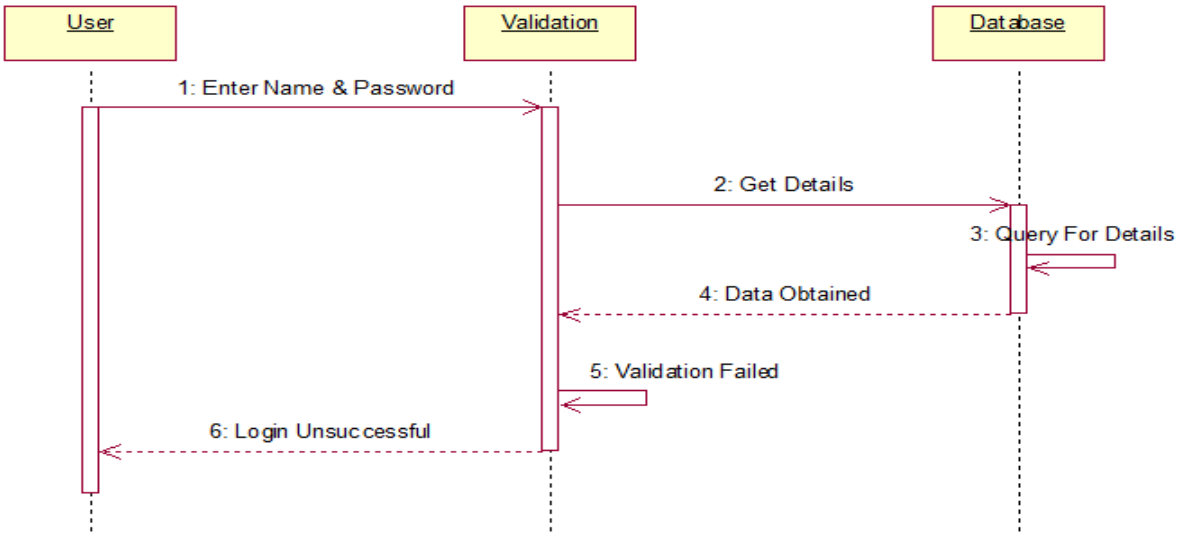
LOGIN



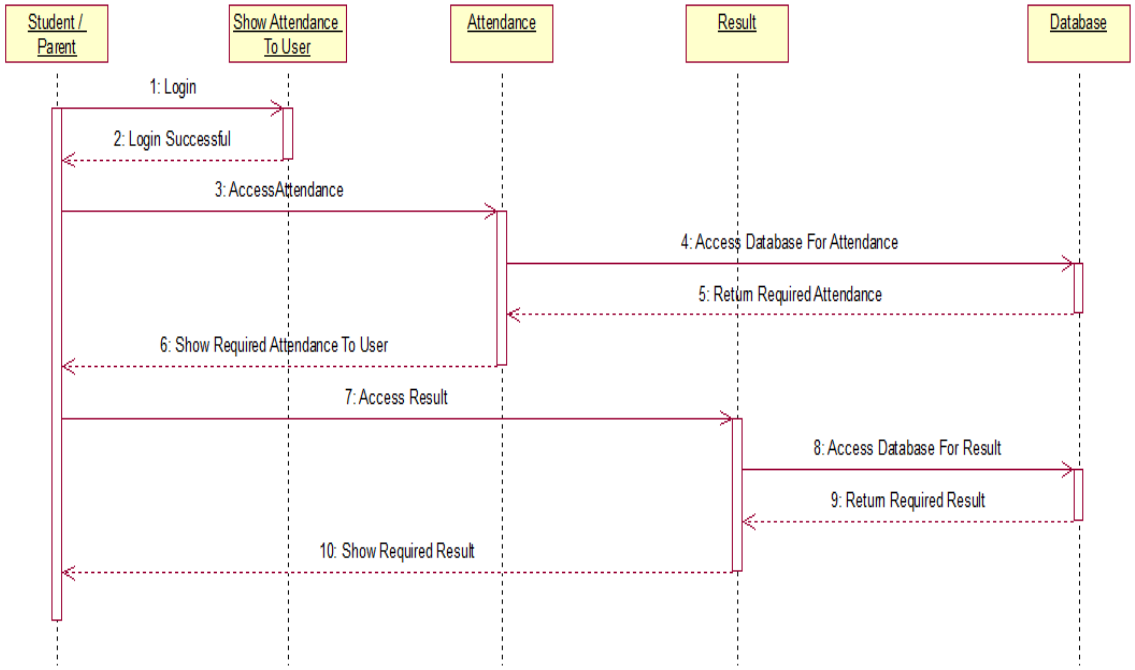
FACULTY



FAILED LOGIN



STUDENTS AND PARENTS



Chapter 6

6 System Implementation

6.1 Technology Used

Programming Language Used

The Web Interface of the system was built using ASP.net, with PHP used as a side scripting language. MySQL was used for managing all the data that was to be stored by the system. The android application for the project was written using Java.

Development Tools

Android Studio was used for creating the Android application, whereas phcomp, html5rt were used in the development of the Web Interface. Microsoft Visual Studio 2012 was used as well for ASP.net.

Database

The systems Database was developed and managed using MySQL

Operating System

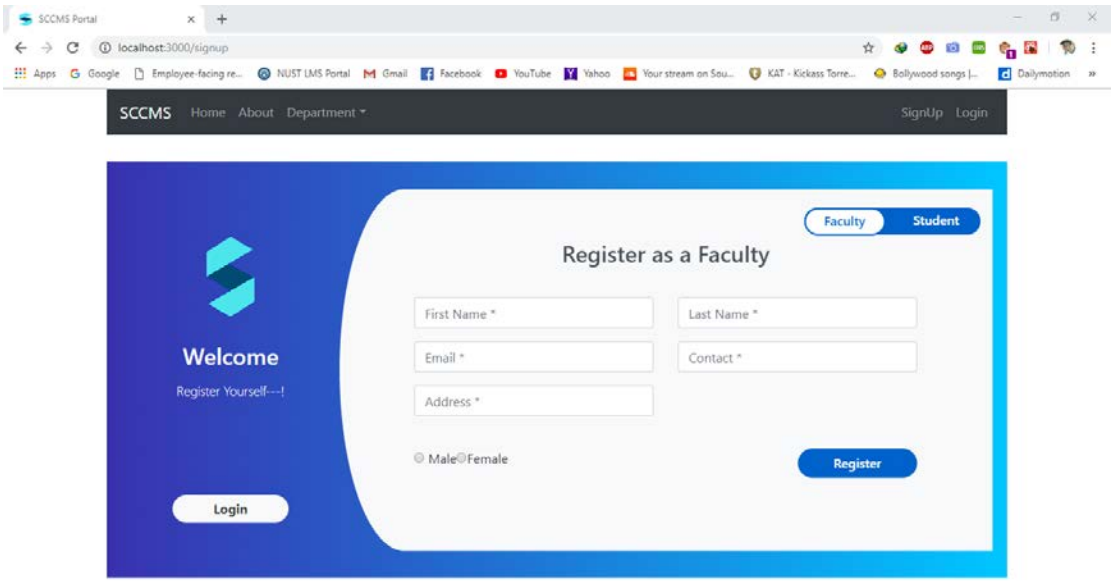
The Web Interface will be running on Microsoft Windows and can run on Windows XP and all future iterations of it. The Android application will be running on Android, and works on versions later than 2.3 Gingerbread.

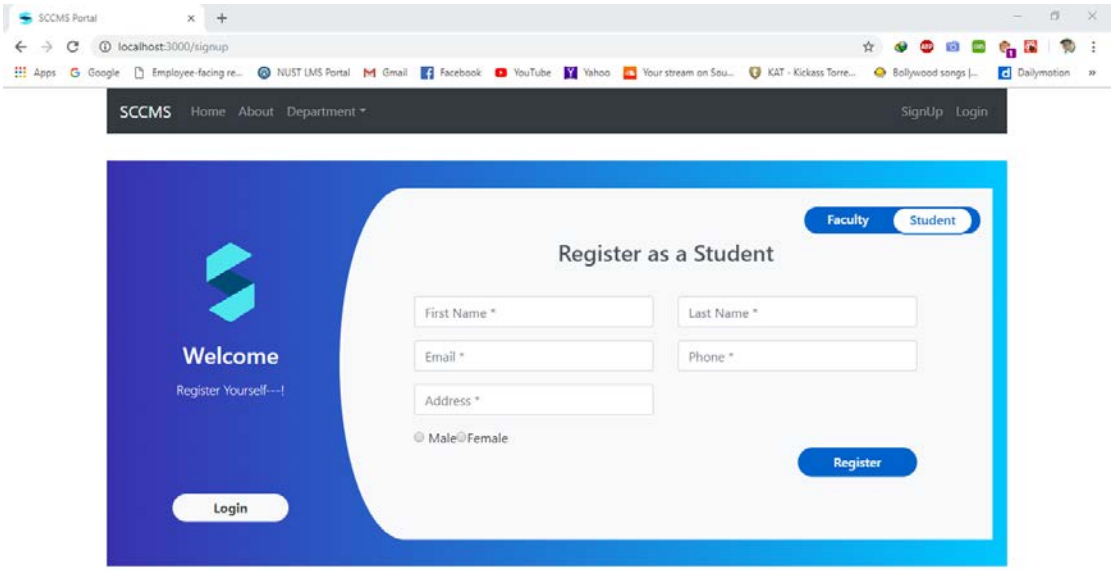
6.2 Complete System Implementation

The system contains of two main components. An android application which the users will use to perform the tasks they are allowed to and a web interface used by the administration staff to respond to the data retrieving requests, register users, manage user access rights etc.

Registration Module

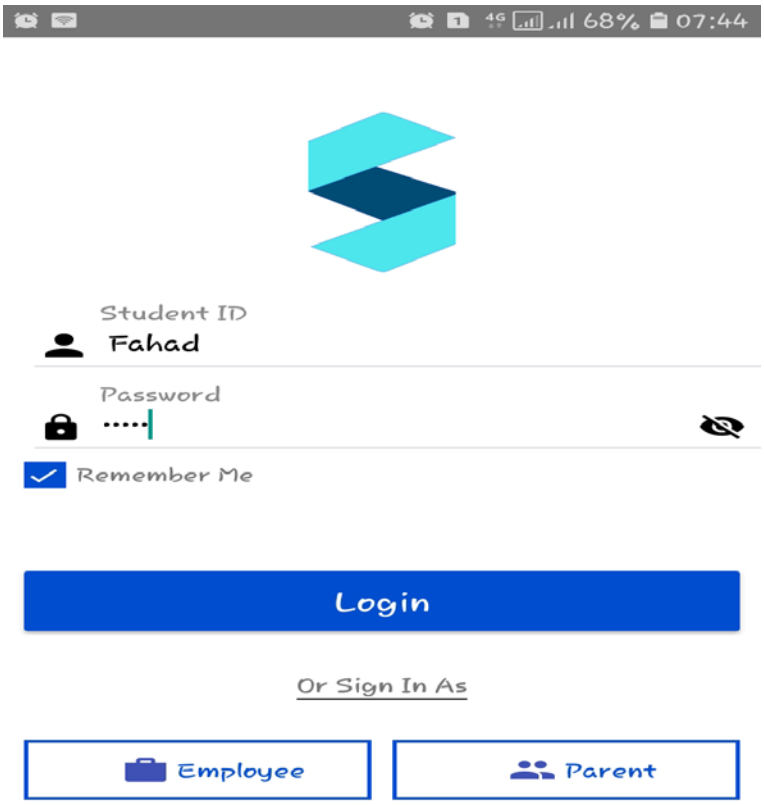
The module is handled by the admin and only he is able to register the users depending upon the request of the user i.e. student or teacher. Upon registering successfully through the web application, the user will be able to use the mobile app using the username and the password provided by the admin.

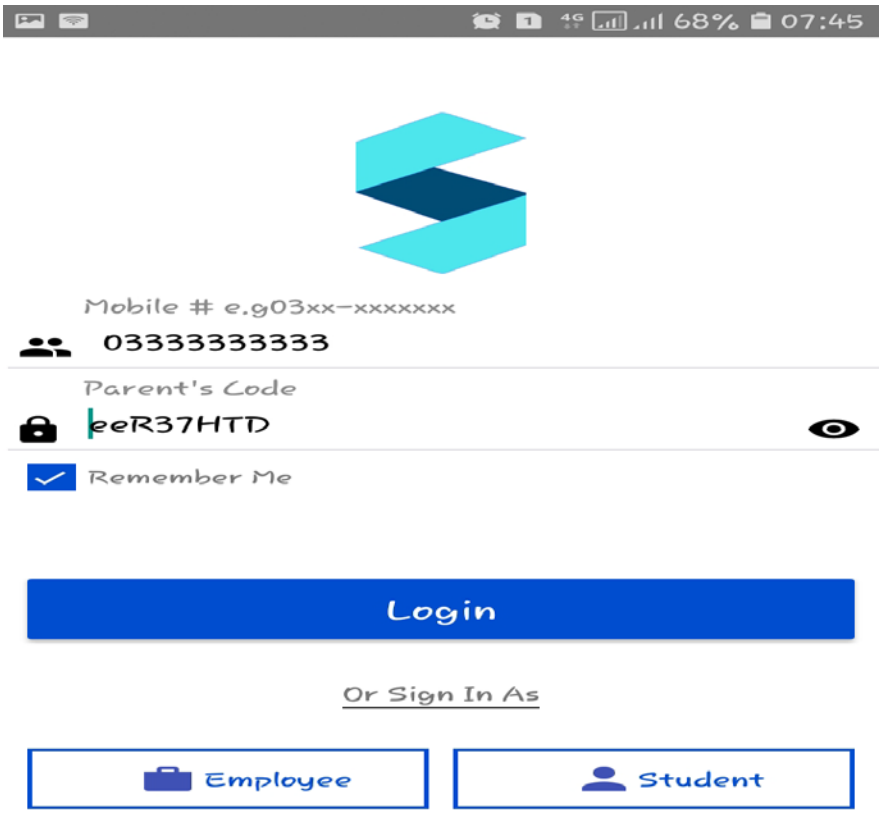




Login Module

Module is linked with the database and forms the data access layer of the application. Usernames and Passwords stored in the database are compared with Username and Password entered by the user. Upon successful login of the user, home screen is available to the user.


68% 07:44
Student ID
Fahad
Password
Remember Me
Login
Or Sign In As
Employee
Parent


68% 07:45
Mobile # e.g03xx-xxxxxxx
03333333333
Parent's Code
eeR37HTD
Remember Me
Login
Or Sign In As
Employee
Student

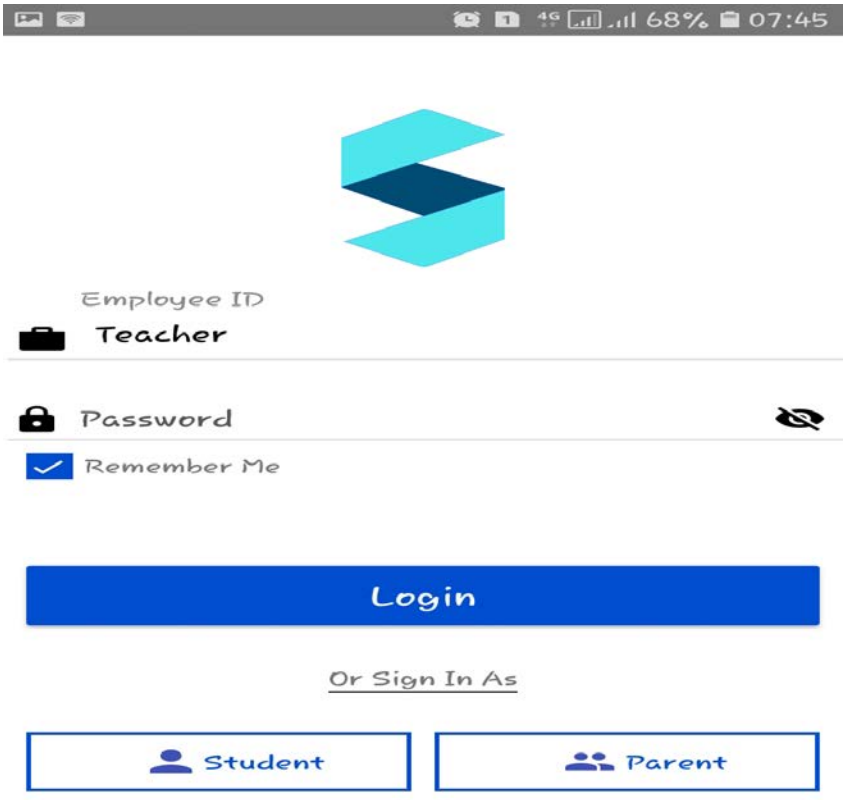

68% 07:45
Employee ID
Teacher
Password
Remember Me
Login
Or Sign In As
Student
Parent

Figure 3 Login Module

Home Module

This is the main module, which greets the user following successful login. This is used to access all the different functionality of the application and can be considered as a main menu. It can be used to go to course material, view results, view attendance, view enrolled courses, view timetable and upload attendance and course material(in case of teachers).

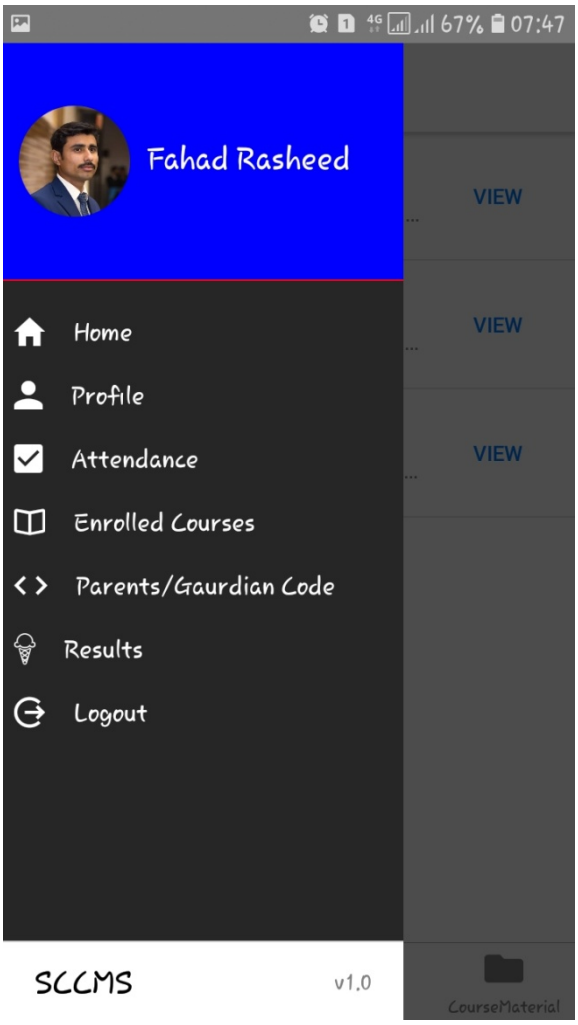
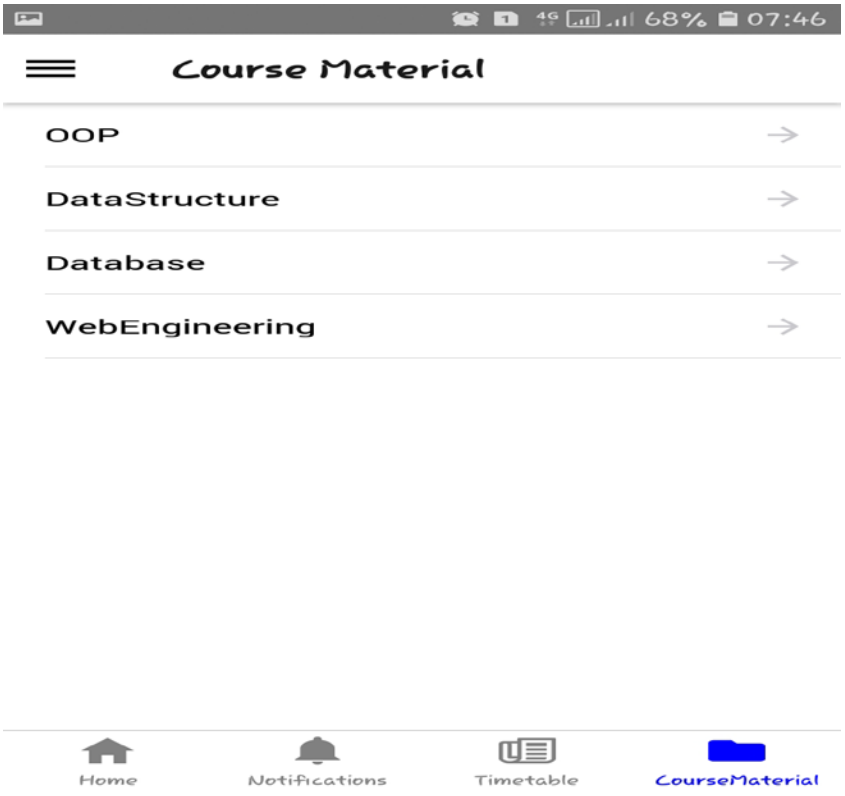
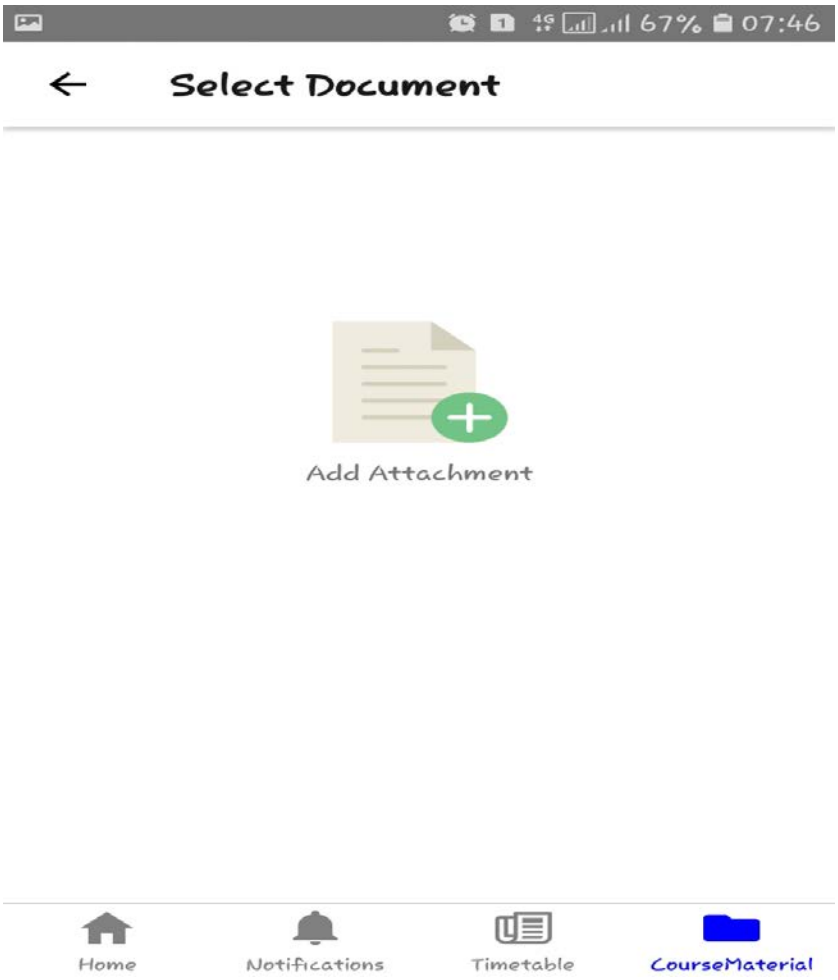


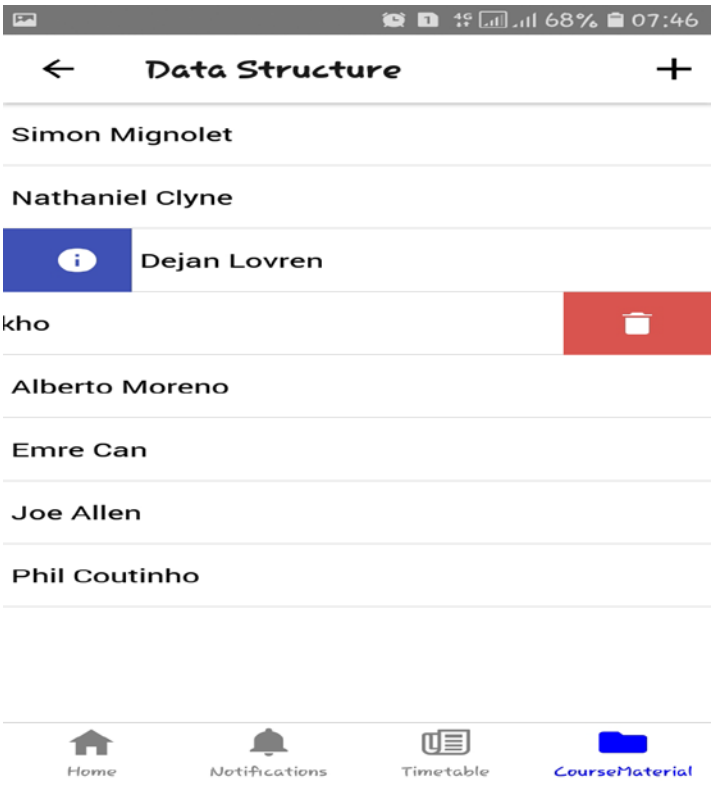
Figure 4 Home Module

Upload/ view course material module

This is the module which contains the functionality related to the course material. The students are able to view and download course material whereas the teachers can upload the course material and delete the file also, if needed.

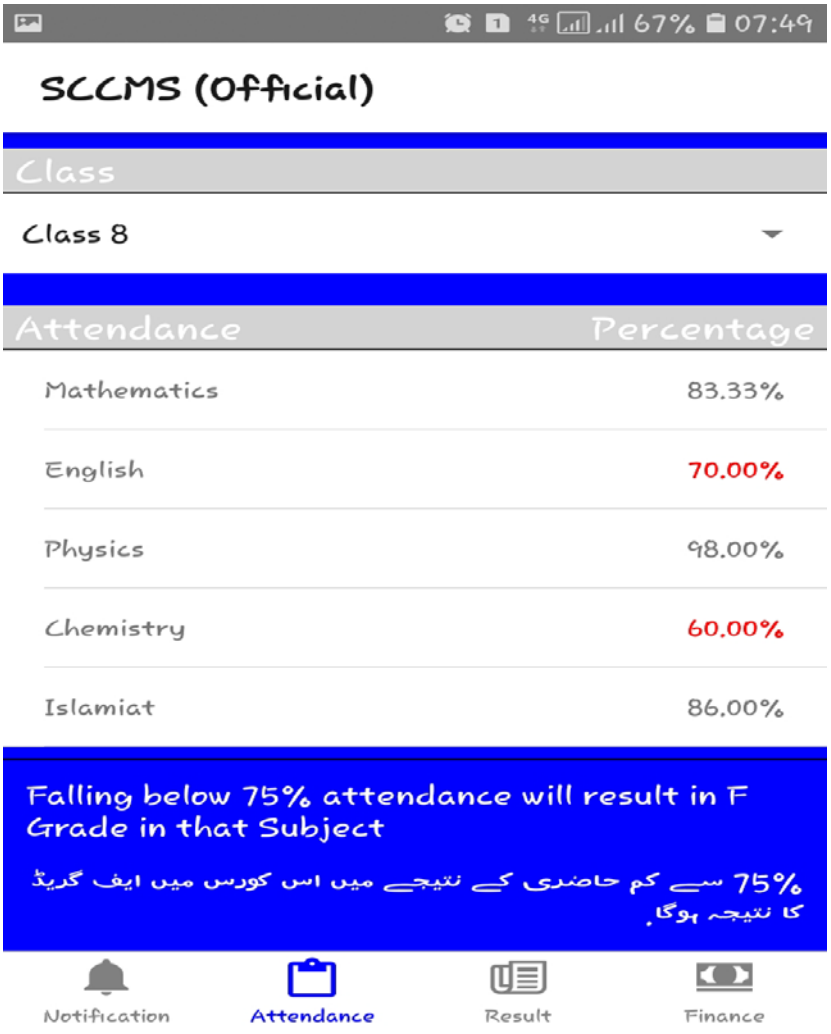


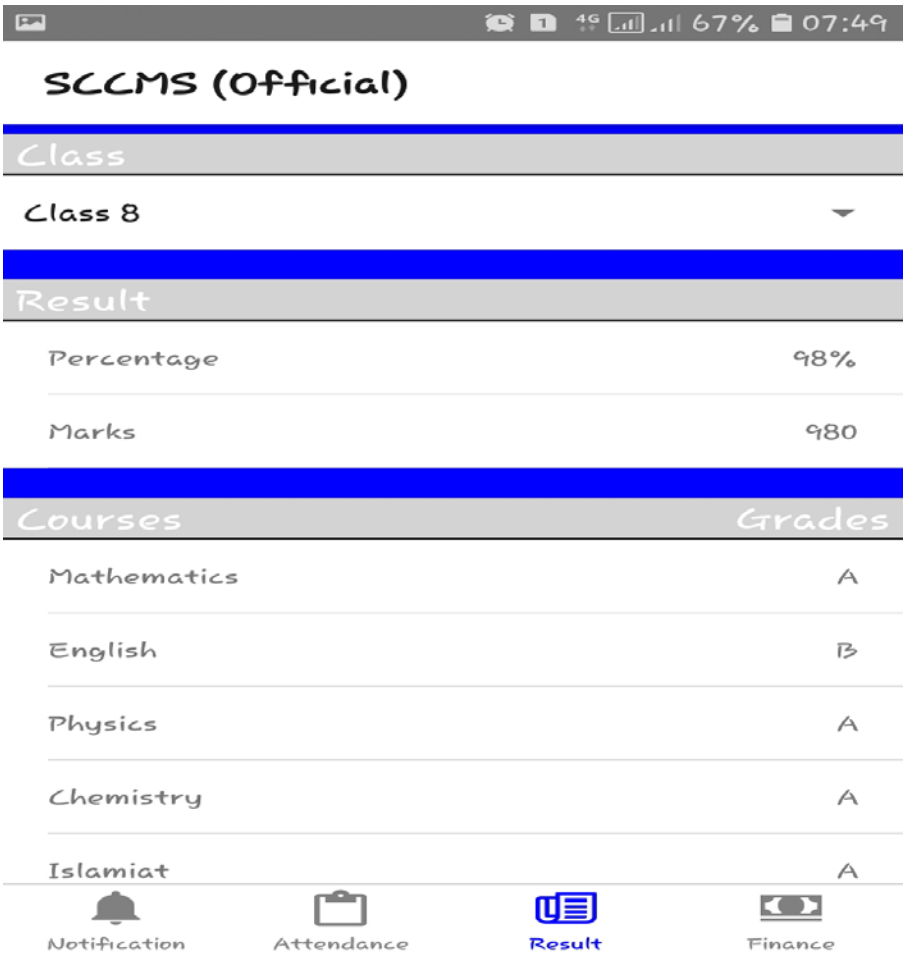

67% 07:46
Select Document
Add Attachment
Home
Notifications
Timetable
CourseMaterial



View attendance and result Module

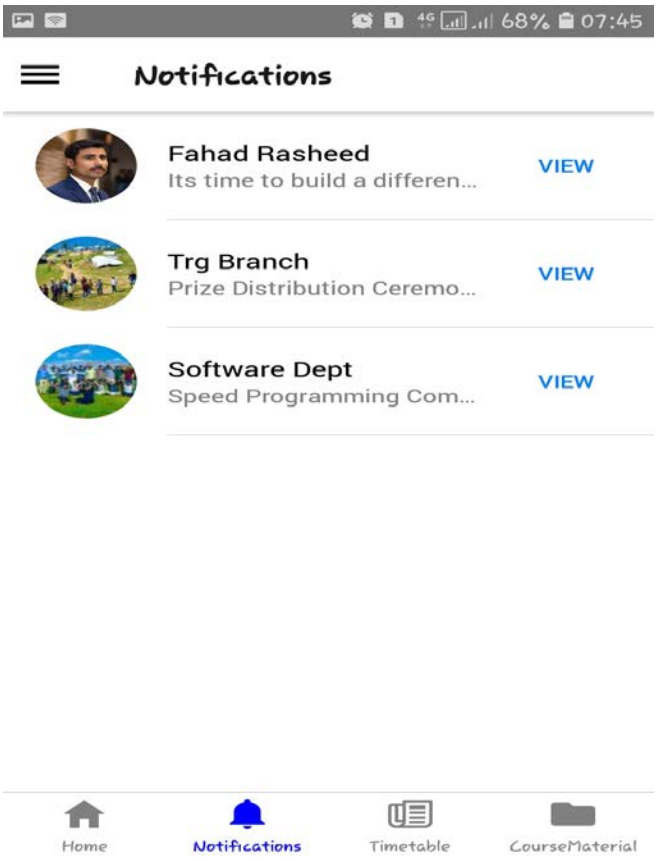
This module enables logged in users to view their attendance and results for the courses they are enrolled. ‘Attendance’ and ‘Result’ button is shown on the home screen, clicking this module takes the student to the updated attendance sheet and result sheet respectively, displayed course wise on the screen.


67% 07:49
SCCMS (Official)
Class
Class 8
Attendance
Percentage
Mathematics
83.33%
English
70.00%
Physics
98.00%
Chemistry
60.00%
Islamiat
86.00%
Falling below 75% attendance will result in F Grade in that Subject
75% سے کم حاضری کے نتیجے میں اس کورس میں ایف گریڈ کا نتیجہ ہوگا۔
Notification
Attendance
Result
Finance



View notification module

This module enables the user to view notification on the mobile application which is sent by the admin. Teachers, students and parents all are able to view notifications from their logged in menu.



Chapter 7

7 System Implementation

7.1 Over View

Testing of software projects involve different levels of testing to make sure that the software which is being developed is error and fault free. The different levels at which testing was done is discussed here.

7.2 Unit Testing

It involves the testing of each module at completion.

Login Feature Testing

Test Case Name:	Login Feature testing
Test Case ID:	1
Description:	This feature asks the user to enter his/her credentials for login. If not already signed up, user can sign up. This test case aimed to check that feature works according to user requirement
Testing technique used:	Black Box Testing
Preconditions:	System is running and connected to database.
Input values:	Username String Password string
Valid Inputs:	Valid or authorized username Valid or authorized password
Steps	1. Enter username 2. Enter password 3. Tap login button

Expected Output	The user credentials will be passed to the server for verification. The valid users will be directed to home screen after login.
Actual Output	Successful login. User is directed to home screen.
Status	PASS

Table 4Login Feature Testing

User Registration Testing

Test Case Name:	User Registration
Test Case ID:	2
Description:	This feature asks the user to enter his/her credentials for signup. This test case is used to check the registration of a new user.
Testing technique used:	Black Box Testing
Preconditions:	System is running and connected to database.
Input values:	Username Password Email Address Contact number
Valid Inputs:	Alphanumeric username

	Alphanumeric password Email id in the format: abc@xyz.com
Steps	1. Enter username 2. Enter password 3. Tap signup button
Expected Output	User data is stored in the database.
Actual Output	User data is stored in the database.
Status	PASS

Table 5 User Registration Testing

Data Insertion Testing

Test Case Name:	Data Insertion
Test Case ID:	3
Description:	This feature is used to test the data input feature.
Testing technique used:	White Box Testing
Preconditions:	System is running and connected to database.
Input values:	Valid insertion string.

Valid Inputs:	Valid insertion string.
Steps	Run the application and debug mode. Input in every text field.
Expected Output	Insertion string in local variables will have some valid values and same insertion values as given inputs.
Actual Output	Insertion string values are same as given inputs.
Status	PASS

Table 6 Data Insertion Table

Input Display Testing

Test Case Name :	Input Display
Test Case ID:	4
Description:	This feature asks the user to input in the data/text fields. This test case aims to check that the feature works according to user requirement.
Testing technique used:	Black Box Testing

Preconditions:	System is running and connected to database. User is logged in.
Input values:	User input.
Valid Inputs:	User input.
Steps	User types usernames User types password User types description
Expected Output	Input text appears
Actual Output	Input text appears
Status	PASS

Table 7Input Display Testing

Chapter 8

8 Conclusion and Future Work

8.1 Conclusion

Our team set out to develop a system that would find an innovative and creative solution to a problem many of us face daily. We did so by creating a system that enables common people to lodge complaints in a formalized manner, while enabling

the concerned authorities to receive these complaints and respond to them in a systematic and organized way.

We achieved our objectives, successfully developing an Android Application that enables users to lodge complaints wherever they are, whenever they want as long as they have a data connection, alongside a web interface that enables concerned authorities to receive these complaints and respond to them accordingly while updating the progress for the complainer to view.

Due to limitations in time and team size, the scope of the project was kept small. However, in the future the Project can be expanded to work on multiple smartphone / Desktop operating systems. It could also be employed to take in complaints of more varying types that are to be solved by different organizations.

If used correctly and adopted sincerely by the relevant authorities, we believe our project could genuinely benefit the society.

8.2 Future work

Due to certain inherent limitations in terms of project development time and team size, a lot of things had to be excluded from the scope of this project. However, this leaves room for a multitude of enhancements, expansions and functionality add-on’s.

First of all, at the moment the Project only caters for the Rawalpindi Cantonment Board Administration, therefore the user base for the system will be extremely limited. In the future however, functionality could be expanded to include all major cities of Pakistan.

At the moment, the system only caters for limited categories i.e. road works, sanitation and plumbing, waste disposal. In the future this could be extended to other fields, such as reporting electricity theft, gas problems etc. The program might be expanded to entertain complaints of other kinds, for example a similar system could

be developed for the police for users to report criminal/suspicious activity. A system could be developed for the Public Transport agency to register complaints with railway, busses etc.

Currently, the application only works on Android devices, further limiting its potential user base. In the future, an application can be developed for iOS, Windows Mobile, Ubuntu Mobile and Firefox OS. This would enable smartphone users on all major platforms to benefit from the application.

Among minor changes, the application's User Interface could be modified to be even more user friendly and the application could be optimized to run faster and improve performance on lower end devices. Functionality could be added to allow for prioritization of complaints, or filtration and merging of similar complaints.

Glossary

API	Application Programming Interface
App	Application
AS	Assumption
Black box Testing	Testing emphasizes on the external behavior of the software entity
CO	Constraints
DBMS	Database Management System
DEP	Dependency
FRs	Functional Requirements
GUI	Graphical User Interface
HTML	Hyper Text Markup Language

HTTP	Hypertext Transfer Protocol (HTTP) is a widely used communications protocol for communication over a computer network, with especially wide deployment on the Internet
IDE	Integrated Development Environment
SCCMS	Smart Campus Communication and Management System
MCS	Military College of Signals
NFRs	Non Functional Requirements
NUST	National University of Science and Technology
OE	Operating Environment
OS	Operating System
REQ	Requirement
SQL	Structured Query Language
SE	Security Requirements
SR	Safety Requirements
SRS	Software Requirements Specification
UD	User Documentation
UML	Unified Modeling Language
White Box Testing	Testing emphasizes on the internal behavior of the software entity

Table 8 Glossary

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