National College of Ireland

Project Submission Sheet – 2021/2022

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Programme:	MSc Cybersecurity	**Year:**	2021
Module:	Secure Programming for Web		
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Submission Due Date:	22/12/2021		
Project Title:	Secured Student Management System		
Word Count:	3706		

I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
ALL internet material must be referenced in the references section. Students are encouraged to use the Harvard Referencing Standard supplied by the Library. To use other author's written or electronic work is illegal (plagiarism) and may result in disciplinary action. Students may be required to undergo a viva (oral examination) if there is suspicion about the validity of their submitted work.

Signature:	Abdulgafar, Waleed
Date:	17/12/2021

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1. Please attach a completed copy of this sheet to each project (including multiple copies).
2. Projects should be submitted to your Programme Coordinator.
3. **You must ensure that you retain a HARD COPY of ALL projects**, both for your own reference and in case a project is lost or mislaid. It is not sufficient to keep a copy on computer. Please do not bind projects or place in covers unless specifically requested.
4. You must ensure that all projects are submitted to your Programme Coordinator on or before the required submission date. **Late submissions will incur penalties.**
5. All projects must be submitted and passed in order to successfully complete the year. **Any project/assignment not submitted will be marked as a fail.**

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ABBREVIATIONS

SRS	Software Require Specification
SMS	Student Management System
PC	Personal Computer

Table of Contents

EXECUTIVE SUMMARY

PRECISELY, the contemporary era is dominated by the latest technology development and invention highlighting the importance of IT in both our personal as well as professional lives. As we see the current grim scenario of pandemic COVID 19, we all saw how quickly the world shifted from a traditional lifestyle to an extremely IT develop phenomenon. Hence, we cannot overlook and even underestimate the significance of IT in our lives.

In fact, like every other professional sector of almost every country in the world choose the online methods of communication. However, our educational system also developed itself to the latest procedures of teaching and exams online. As consequences of that our educational systems also require to ensure that their methodology regarding monitoring system should be sturdy and robust to avoid all sorts of cheating, glitches, and errors while conducting the exams and security of the student management system Many smart students seek to do illegal activities for passing their exams like changing their marks on SMS. Many schools and colleges have a rule of minimum attendance like if the attendance of a student is less than 80%, he will not be able to give the exam.

For changing attendance or marks and give fake remarks they try to do some unethical hacking tricks on their SMS which leads to account takeover and many other bugs like XSS, SQL injection, etc. On the other hand, even if a student is caught in cheating and deception acts; due to lack of strong evidence and validation, they escape unpunished. This issue has the power to easily corrupt the integrity of our educational system. Moreover, we decided to create an SMS enough secure that no script kiddie can hack our SMS and do unethical things.

In summary, it is observed that everything in this world has pros and cons. That is also regarded as IT technology. We see it almost every day that hackers and cybercriminals can easily breach of system and can alter the software according to their preferences. However, we make sure that this sort of attack doesn't sweep our SMS at all. For this purpose, we constantly tend to update our software to protect it from breaches and invasion of hackers. The SMS which will be created by our team has security against SQL Injection, XSS, Directory traversal, Email disclosure, Command Injection, File input Available CSRF and SSRF. Then, the security and feasibility of this software can easily be adopted by the educational sector. In this project, the team members will discuss to provide solutions and defining problems.

Chapter 1: Introduction

Summary

We develop a student management system. The same type of systems already exists but they are not very efficient, we will make this system more accurate and efficient. The skills we expect to learn from this project are ethical hacking, penetration testing and web system development. Most students from many different academic levels are now studying online, due to the global pandemic known as COVID-19. And since most people take their exams at home, online, this has caused a major problem regarding the integrity of the exams. In addition, some system exam lagging during the test and complicated access because of weakness of the currently system.

Significance

Our Project are related to courses like Programming Fundamental, Object Oriented Programming, Ethical hacking and Software Engineering that are useful in documentation techniques.

Project Background

This product necessity particular record is expressing the nitty-gritty clarification of the design, functionalities, and determinations of the student management system and making it more secure for students, teachers and admin to keep the personal data and record safe. This document is going to serve as a guideline for the users as well the development team that how to detect the vulnerabilities from the system and to cover the vulnerabilities to make it secure so the stakeholders of an application are safe from the hackers that can cause any harm

Literature

Hacking is an endeavour to misuse a PC framework or a private organization inside a PC organization. Being hacked means that someone (or something) has gained access to your website files without your permission. Now a days many vulnerabilities exit in most of the websites. Which cause black hats to hack personal information of peoples. For removing these vulnerabilities, we have developed a student management system using Django, HTML and CSS. We will make it more secure to use and keep safe the personal data by applying Ethical hacking and Pen testing on it. We already make this system secure from vulnerabilities like SQL Injection, XSS, email disclosure, command injection, directory Traversal, file Input Available and CSRF.

Methodology

We use agile Model to make this project. The agile SDLC model is a mix of iterative and consistent cycle models with revolve around measure flexibility and buyer devotion by quick transport of working programming things.

Chapter 2: Problem Description

Problem Description

Our system will solve the problems of vulnerability and system hacking from websites. We are developing secured student management system. The same type of systems already exists but they are not very efficient, we will make this system more accurate and efficient. The skills we expect to learn from this project are ethical hacking, penetration testing and web system development.

Results and Development Imperatives

This product necessity particular record is expressing the nitty-gritty clarification of the design, functionalities, and determinations of the student management system and making it more secure for students, teachers and admin to keep the personal data and record safe. This document is going to serve as a guideline for the users as well the development team that how to detect the vulnerabilities from the system and to cover the vulnerabilities to make it secure so the stakeholders of an application are safe from the hackers that can cause any harm.

Our Answer:

In the proposed project we aim to develop secured SMS. We will make our SMS secure by using penetration testing and secure coding to help the education system.

Objectives:

Objective of our project is to provide secure SMS

Benefits:

- Provide secure environment to all users
- There is no identity theft
- There is no data tempering
- There is no lag in system
- There is no iniquity to brilliant students

Chapter 3: Requirement Evaluation

Use Cases Diagram

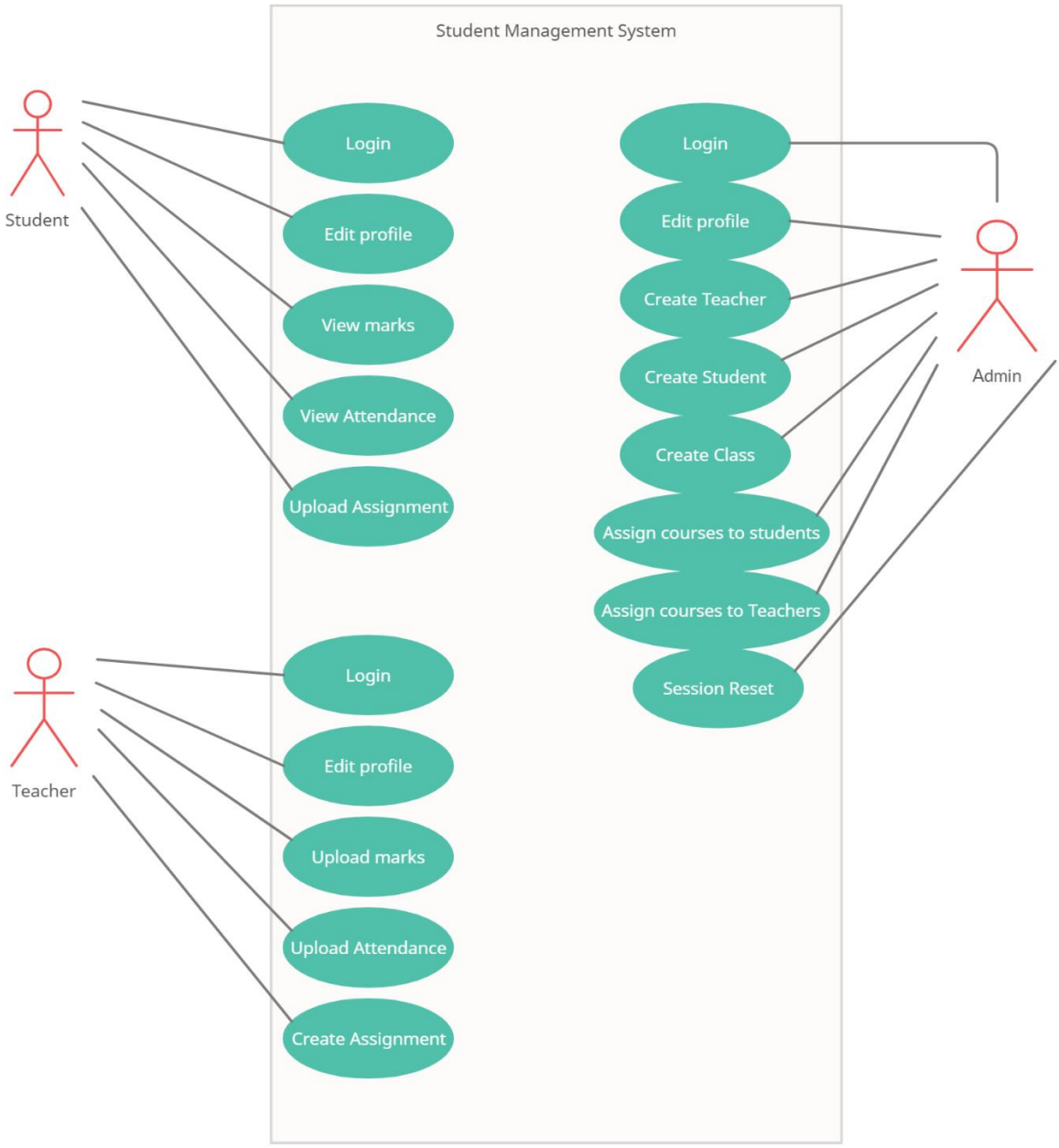

Figure 3.1 Use Case Diagram

Use Case(s)

Table 3.1 UC001

Use Case Id	UC001
Use Case Name	Login
Actors	Student
Description	The student can Login with provided username and password from the admin
Trigger	A Student wants to login
Pre-conditions	Student must enter login credentials.
Post-conditions	Successfully logged in
Normal Flow	Student enters the System UI and click on login. Fill the credentials and proceed.
Alternative Flow	Student enters invalid password.
Exceptions	Invalid Id/Password.
Assumptions	Nil
Use Case Id	UC002
Use Case Name	Profile update
Actors	Student
Description	Student can edit their profile. Add, remove or update their portfolio.
Trigger	Student can edit profile
Pre-conditions	Student must have logged in
Post-conditions	Student must save the changes.
Normal Flow	Student saves the changes.
Alternative Flow	Student quits page without saving.
Exceptions	Changes not saved.
Assumptions	*Nil.*

Table 3.2 UC003

Use Case Id	UC003
Use Case Name	View Attendance
Actors	Student
Description	Student will check for attendance uploaded by Teacher.
Trigger	Students want to check the attendance percentage.
Pre-conditions	Student will check the whole attendance in all class.
Post-conditions	Student will also check the lab attendance
Normal Flow	List of attendance according to the lectures
Alternative Flow	Attendance locked.
Exceptions	Server Error
Assumptions	Nil

Table 3.3 UC004

Use Case Id	UC004
Use Case Name	View marks
Actors	Student
Description	Student can check his/her marks of the course uploaded by the teacher.
Trigger	Student wants to check the marks uploaded or not.
Pre-conditions	Student will check the marks of Assignments and quizzes
Post-conditions	Student will check the CGPA.
Normal Flow	Marks of finals and sessional
Alternative Flow	Mark haven't uploaded yet
Exceptions	Not available
Assumptions	Nil

Table 3.4 UC005

Use Case Id	UC005
Use Case Name	Upload Assignment
Actors	Student
Description	Student will upload the assignment before the due date
Trigger	Student wants to upload the Assignment
Pre-conditions	The bigger size of the assignment
Post-conditions	Network issues
Normal Flow	Once submitted and cannot be changed
Alternative Flow	Student submitted late
Exceptions	Server error
Assumptions	Nil

Table 3.5 UC006

Use Case Id	UC006
Use Case Name	Login
Actors	Admin
Description	Admin wants to login to the system and manages the work
Trigger	Admin wants to login
Pre-conditions	Admin must enter the login id and password
Post-conditions	Admin logins successfully
Normal Flow	Admin enters the System UI and click on login. Fill the credentials and proceed.
Alternative Flow	Enters the wrong id or password
Exceptions	Nil
Assumptions	Nil

Table 3.6 UC007

Use Case Id	UC007
Use Case Name	Session reset
Actors	Admin
Description	Admin can reset
Trigger	Student can Reset the session
Pre-conditions	After resetting the session no marks or attendance will be available
Post-conditions	Admin must have to enter the phrase
Normal Flow	Admin enters the invalid phrase
Alternative Flow	Invalid phrase
Exceptions	Server error
Assumptions	Nil

Table 3.7 UC008

Use Case Id	UC008
Use Case Name	Assign Class
Actors	Admin
Description	Admin have to assign the classes to student and teachers.
Trigger	Assign the classes and divide the sections
Pre-conditions	Class timetable according to the courses and teachers
Post-conditions	Dividing the class into sections
Normal Flow	Allotting timetable and classrooms
Alternative Flow	Timetable clashes
Exceptions	Nil
Assumptions	Nil

Table 3.8 UC009

Use Case Id	UC009
Use Case Name	Assign Courses
Actors	Admin
Description	Admin have to assign courses to students
Trigger	Assign course to the students according to the semester schedule
Pre-conditions	Courses according to the semester schedule
Post-conditions	Assign courses to the teachers
Normal Flow	Assign repeating courses
Alternative Flow	Already Assigned courses
Exceptions	Repeating courses and fulfilling the credit hours
Assumptions	Nil

Table 3.9 UC010

Use Case Id	UC010
Use Case Name	Login
Actors	Teacher
Description	Teacher wants to login to the system
Trigger	Teacher wants to login
Pre-conditions	Teacher must have to enter the login credentials
Post-conditions	Teachers enters the System UI and click on login. Fill the credentials and proceed.
Normal Flow	Must have to fulfill the login credentials
Alternative Flow	Teacher enters invalid id
Exceptions	Invalid id/password
Assumptions	Nil

Table 3.10 UC011

Use Case Id	UC011
Use Case Name	Update profile
Actors	Teacher
Description	Teacher can edit their profile. Add, remove or update their portfolio.
Trigger	Teacher can edit the profile and save changes
Pre-conditions	Teacher must have to login in
Post-conditions	Teacher must have to save changes
Normal Flow	Teacher save changes
Alternative Flow	Leaves the page without save the changes
Exceptions	Server Error
Assumptions	Nil.

Table 3.11 UC012

Use Case Id	UC012
Use Case Name	Upload Attendance
Actors	Teacher
Description	Teacher can upload the attendance according to the lecture's
Trigger	Teacher can upload the attendance percentage
Pre-conditions	Teacher can upload the attendance according to the students present
Post-conditions	Teacher can also upload the lab attendance
Normal Flow	List of attendance according to the lectures
Alternative Flow	Attendance locked.
Exceptions	Server Error
Assumptions	Nil

Table 3.12 UC013

Use Case Id	UC013
Use Case Name	Create Assignment
Actors	Teacher
Description	Teacher can create the assignment and give the due date
Trigger	Teacher wants the assignment before due time
Pre-conditions	The size of the file must be less than 1MB
Post-conditions	After the due time assignment will be marked zero
Normal Flow	Once submitted and can't be changed
Alternative Flow	Nil
Exceptions	Server error
Assumptions	Nil

Table 3.13 UC014

Use Case Id	UC014
Use Case Name	Upload marks
Actors	Teacher
Description	Teacher can upload the marks accordingly before the due date of totaling
Trigger	Teacher uploads marks of each assignment quiz and finals
Pre-conditions	Marks uploaded before the due date
Post-conditions	Marks cannot be changed after the due date
Normal Flow	Marks of finals and sessional
Alternative Flow	Mark haven't uploaded yet
Exceptions	Not available
Assumptions	Nil

Functional Demands

Table 3.14 FR001

Id	FR001
Title	Login
Requirement	Student must be able to login
Source	Student
Rationale	Profile as a portfolio for student
Business Role (if required)	Nil
Dependency	Nil
Priority	High.

Table 3.15 FR002

Id	FR002
Title	Able to view to marks
Requirement	Students must be able to view his/her courses details
Source	Students
Rationale	Can be able to see marks accordingly
Business Role (if required)	Nil
Dependency	Marks upload by teacher
Priority	High

Table 3.16 FR003

Id	FR003
Title	Get Attendance details
Requirement	User must be able to get attendance detail according to the lectures
Source	Students
Rationale	Show details for classes and labs attendance percentage
Business Role (if required)	Nil
Dependency	According to the lectures students present
Priority	High

Table 3.17 FR004

Id	FR004
Title	Uploads Assignment
Requirement	Students must be able to upload the assignment file before due date
Source	Students
Rationale	Allow Students to upload assignment
Business Role (if required)	Nil
Dependency	Nil
Priority	High

Table 3.18 FR005

Id	FR005
Title	Edit Profile
Requirement	Student must be able to edit their profile
Source	Students
Rationale	Allow students to edit their profile
Business Role (if required)	Nil
Dependency	Nil
Priority	High

Non-Functional Demands

Usability

USE-1: The Management system allows the students to review their marks and attendance with simple click.

USE-2: The Management system shows the attendance percentage and lectures wise when the students want to see.

USE-3: The Student Management System works on python and provides a bound between students and teachers.

USE-4: The Student management system should be user friendly and ease of use.

Performance

PER-1: We used Django which have a best performance and gives response to Query within 5 seconds.

PER-2: we used PostgreSQL database it is intended to deal with a scope of jobs, from single machines to information stockrooms or Web administrations with numerous simultaneous clients.

Chapter 4: Design and Structure

System Structure

The student management system is decomposed into 7 major modules which are:

- Sign Up module
- Log In module
- Upload Assignment module
- Attendance Module
- Marks Module
- Manage Teacher Module
- Manage Student Module

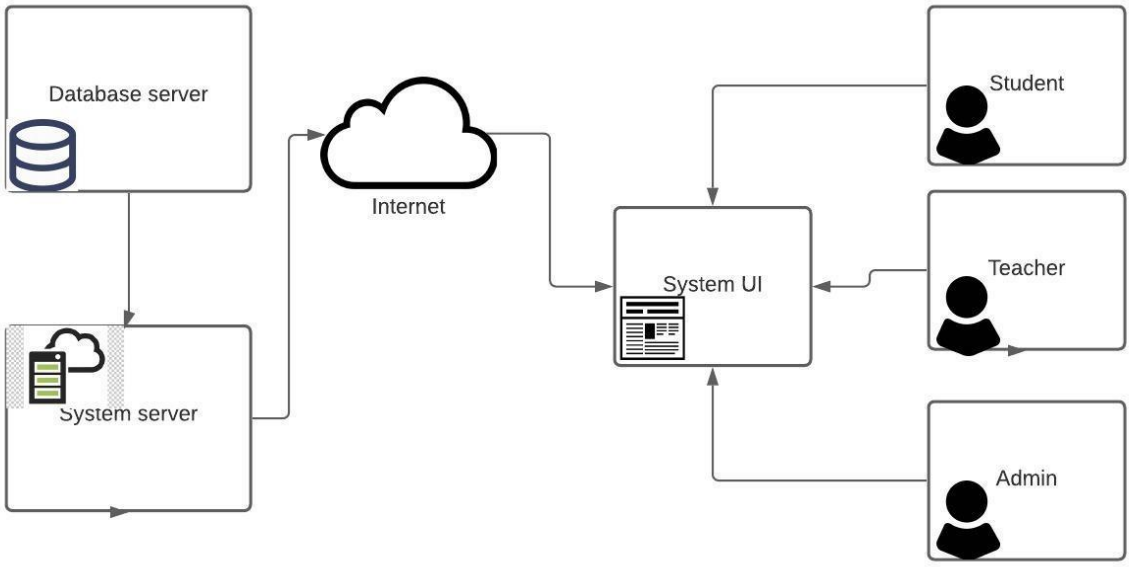

Figure 4.1 System Architecture

Process Flow/Representation

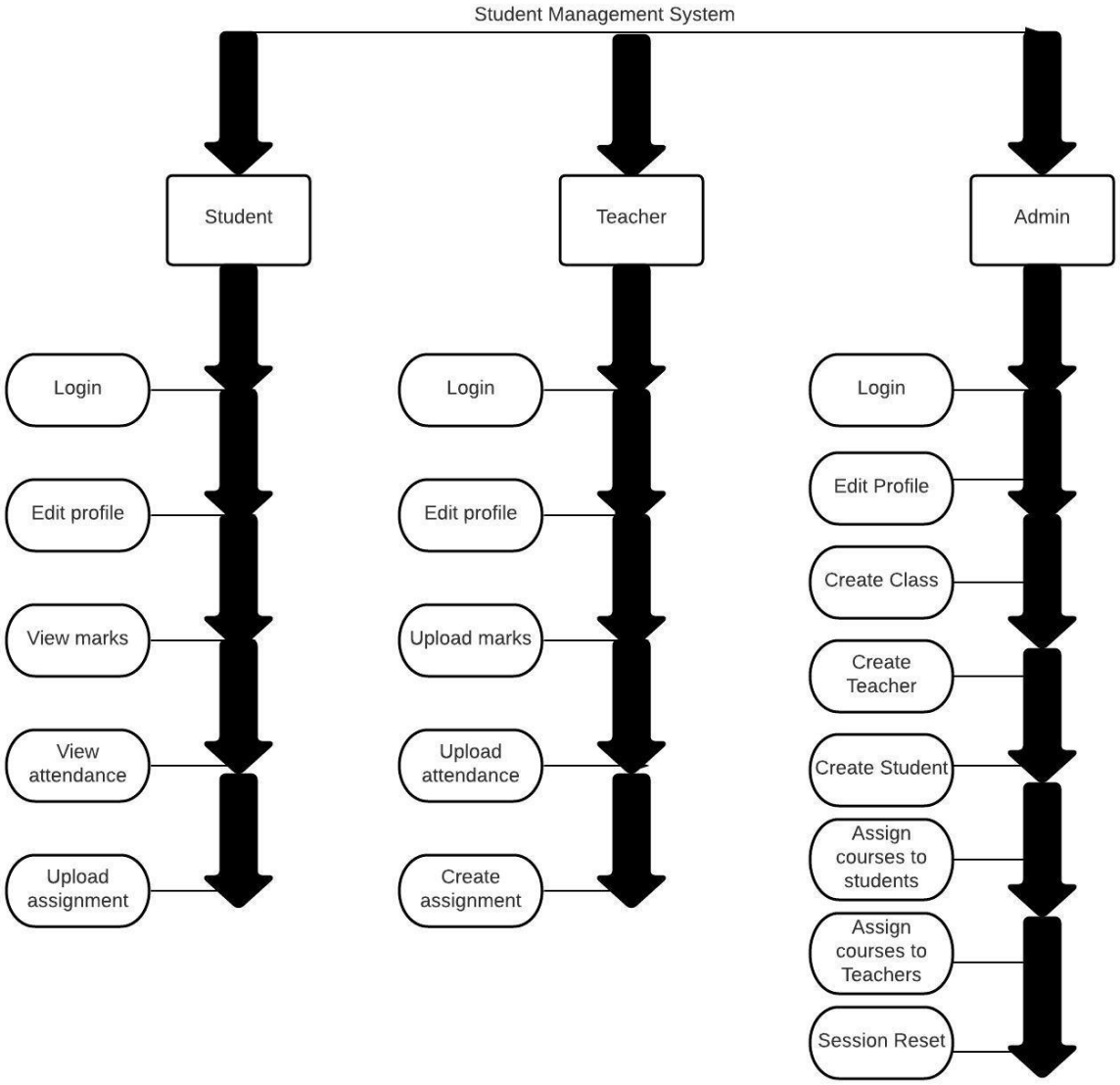

Figure 4.2 Data flow

In this application, the object-oriented methodology is utilized as a planning technique. Subsequently, it is simpler to execute the venture and add conceivable future highlights. Besides, a multifaceted framework design is utilized. Layers will help measure the quality, security, and versatility of the product. With an object-situated plan and diverse design and convenience between parts will be improved.

To store User profile information, we have attached PostgreSQL database with the system. PostgreSQL is intended to deal with a scope of jobs, from single machines to information stockrooms or Web administrations with numerous simultaneous clients.

Design Patterns

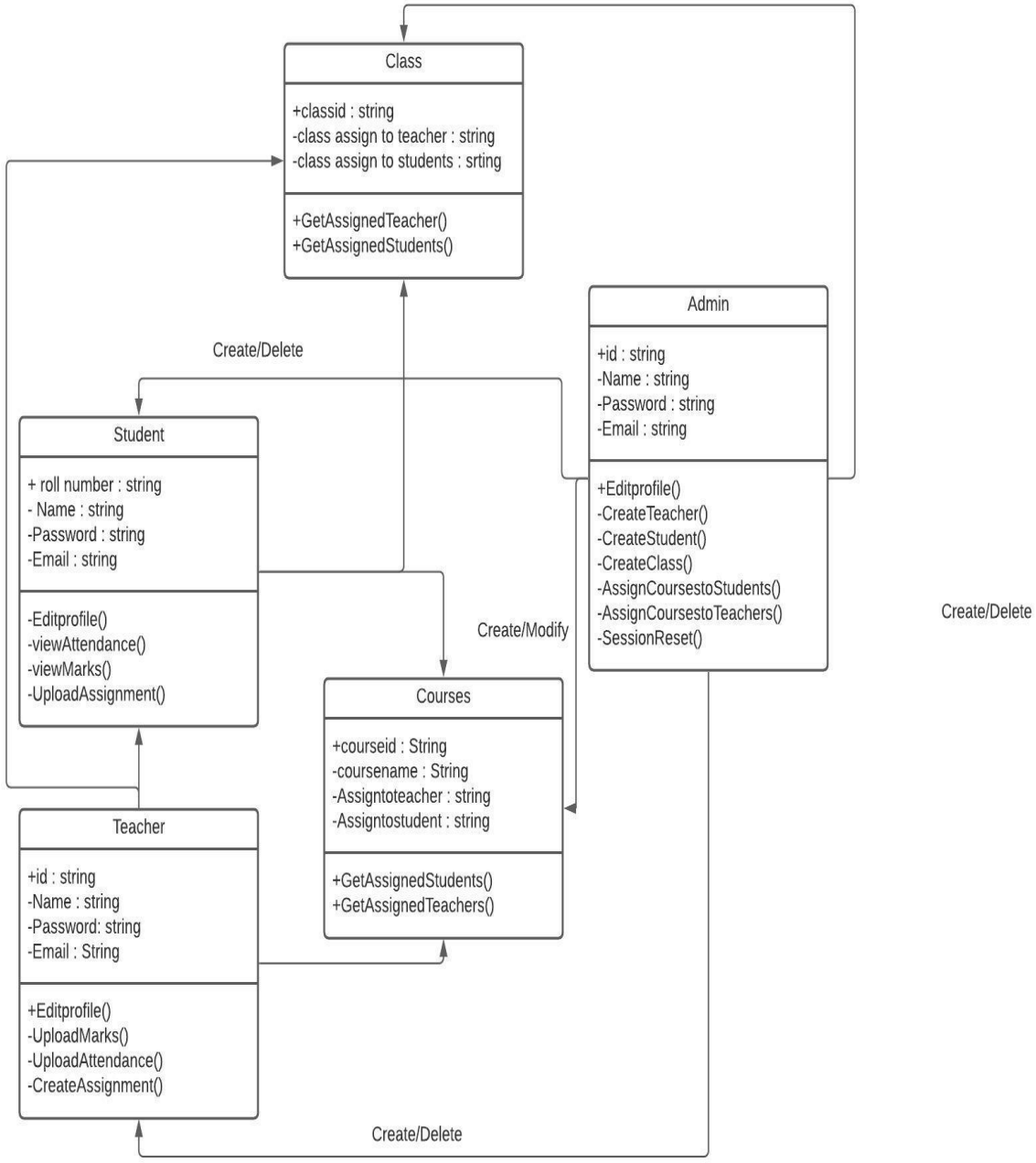

Figure 4.5 Class Diagram

Chapter 5: Execution

External APIs

Table 5.1 Details of APIs used in the project

API	Description	Purpose	List down the class name in which it is used
Google g-recaptcha api	reCAPTCHA is a free service from Google that protects sites from spam and misuse. A "Manual human test" is a Turing test to tell humans and bots apart. By adding reCAPTCHA to a site, you can impede robotized programming while at the same time assisting your welcome clients with entering easily.	We use g-recaptcha in all of our login and forgot password pages to protect our SMS from no rate limit attacks	Student Teacher Admin

User Interface

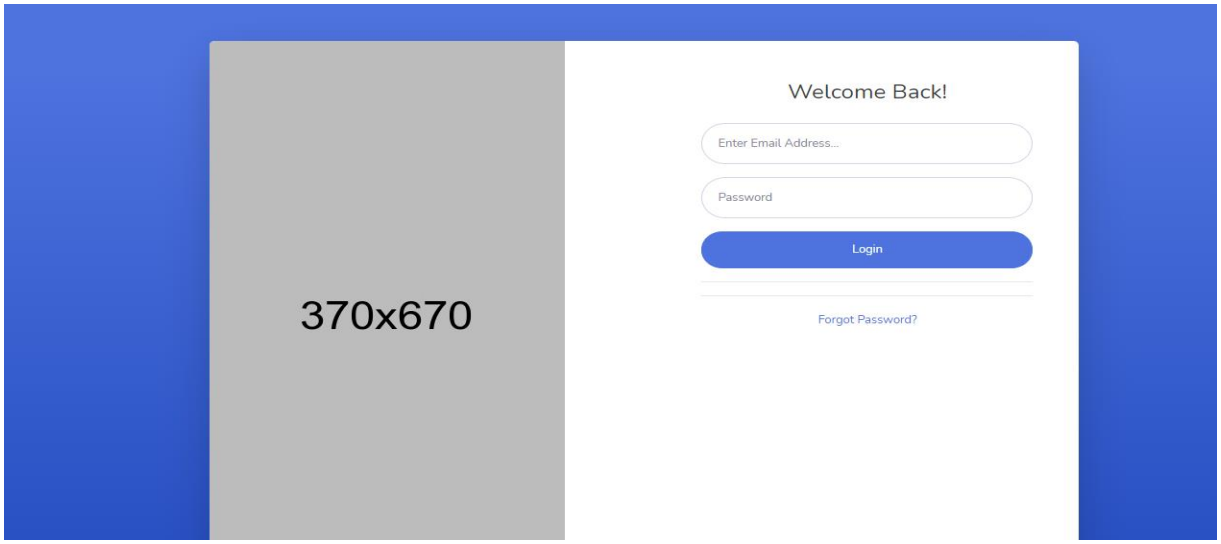

Figure 5.1 Login page

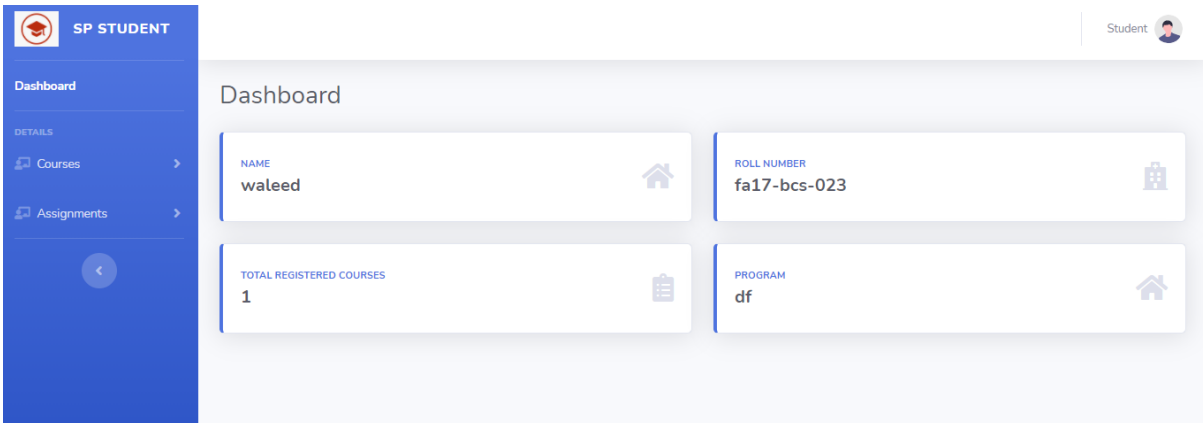

Figure 5.2 Student Dashboard

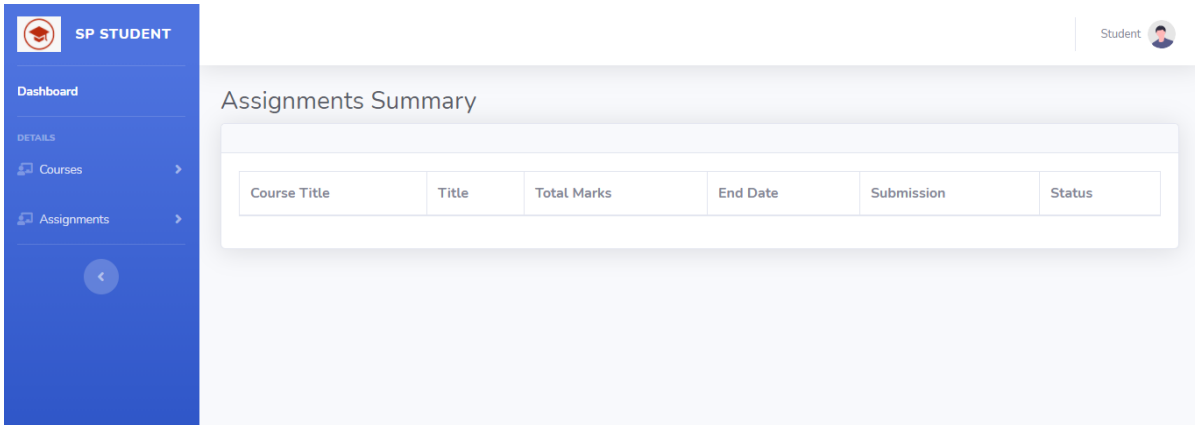

Figure 5.3 Student Courses

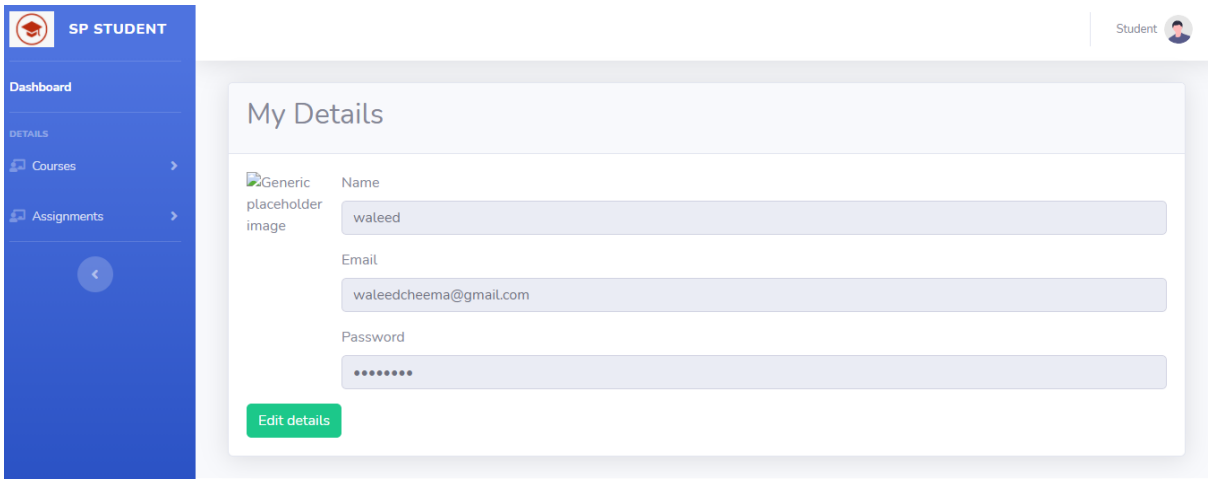

Figure 5.4 Student Profile

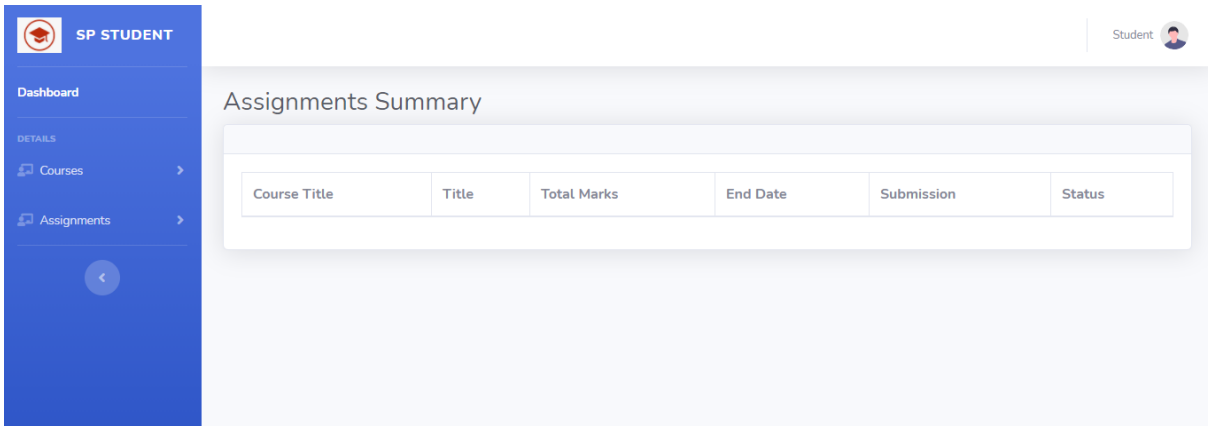

Figure 5.5 Student Assignment

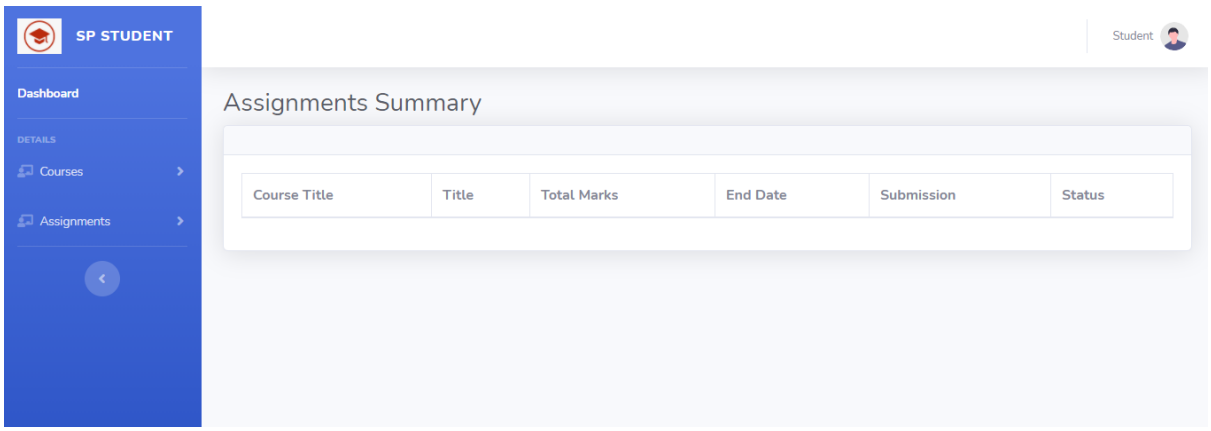

Figure 5.6 Student Attendance

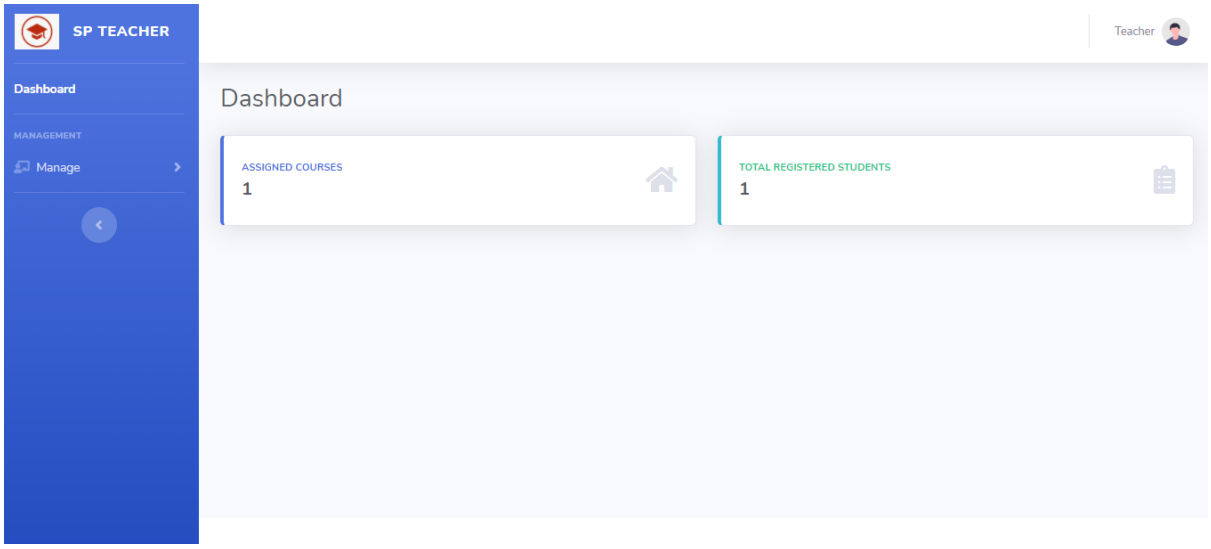

Figure 5.7 Teacher Dashboard

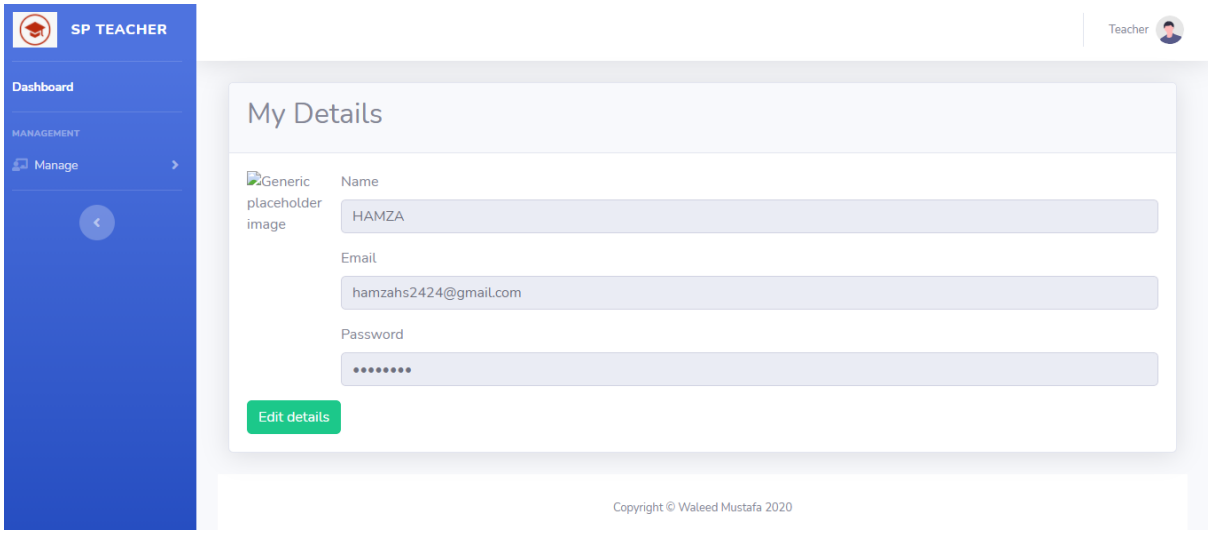

Figure 5.8 Teacher Profile

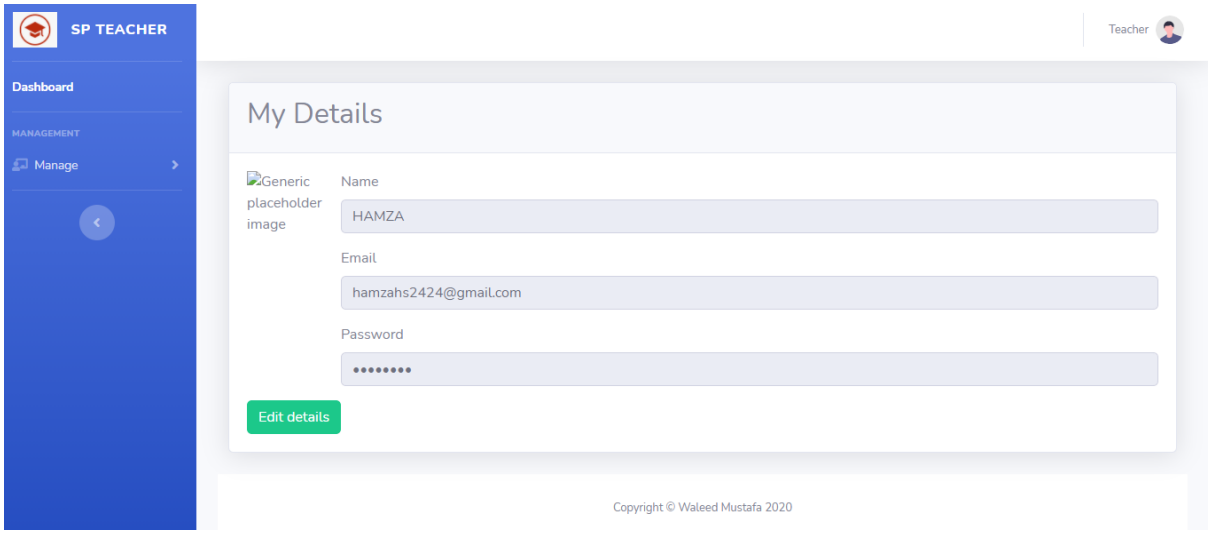

Figure 5.9 Teacher Courses

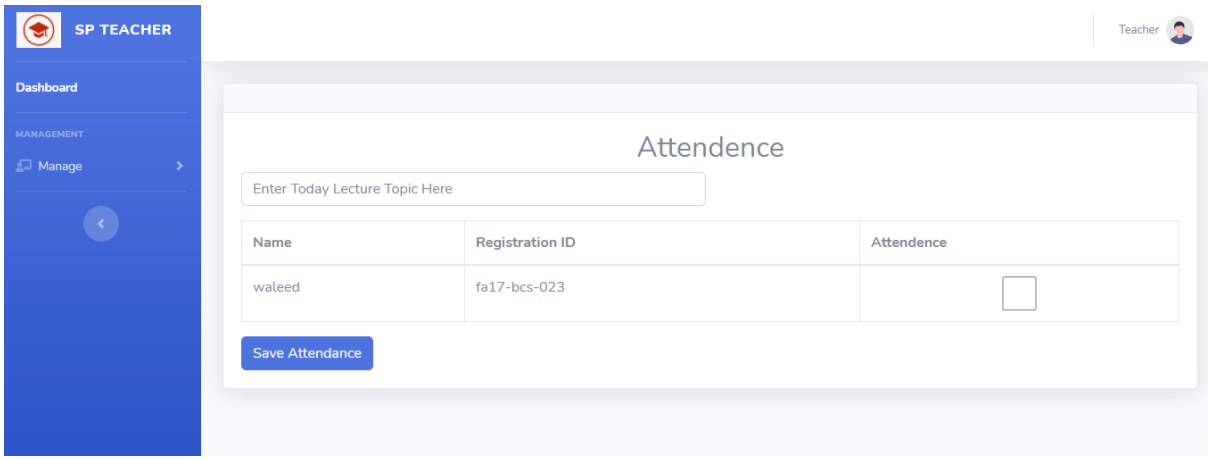

Figure 5.10 Teacher Mark Attendance

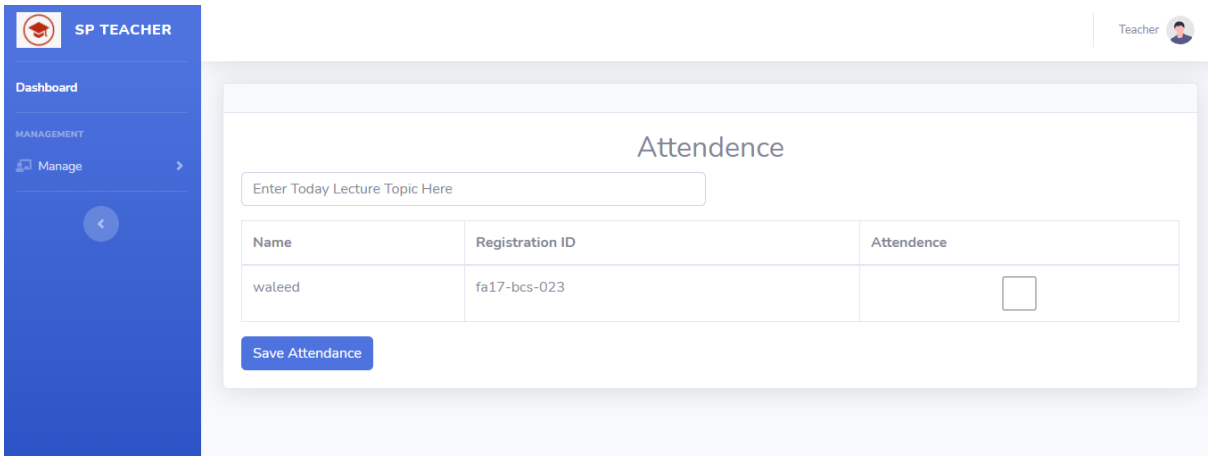

Figure 5.11 Admin Dashboard

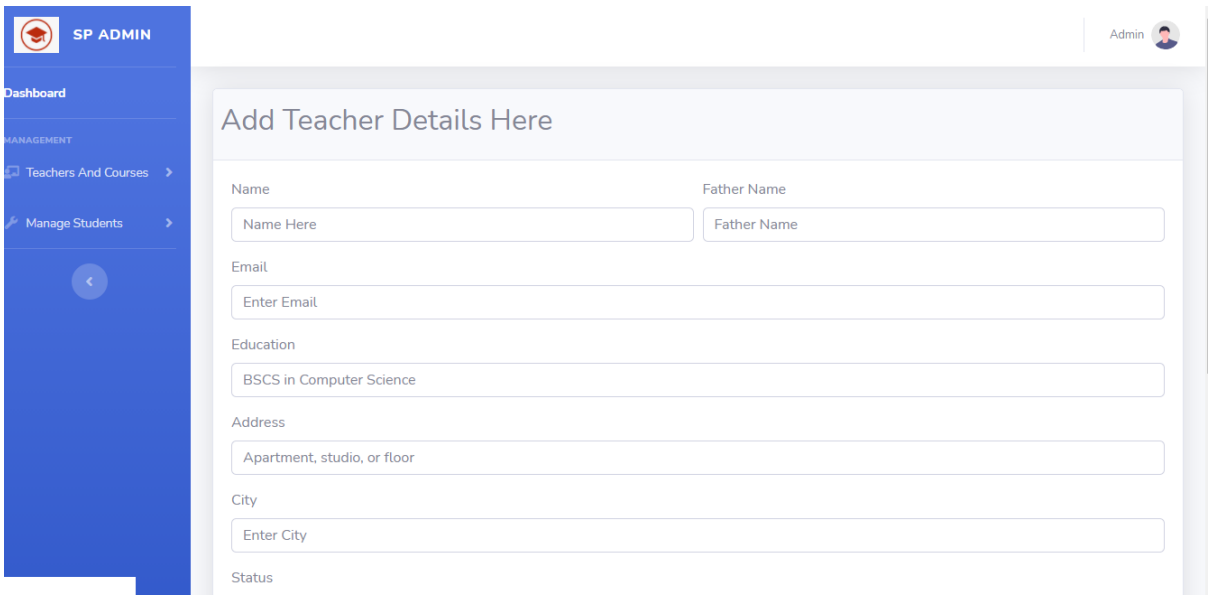

Figure 5.12 Admin Create Teacher

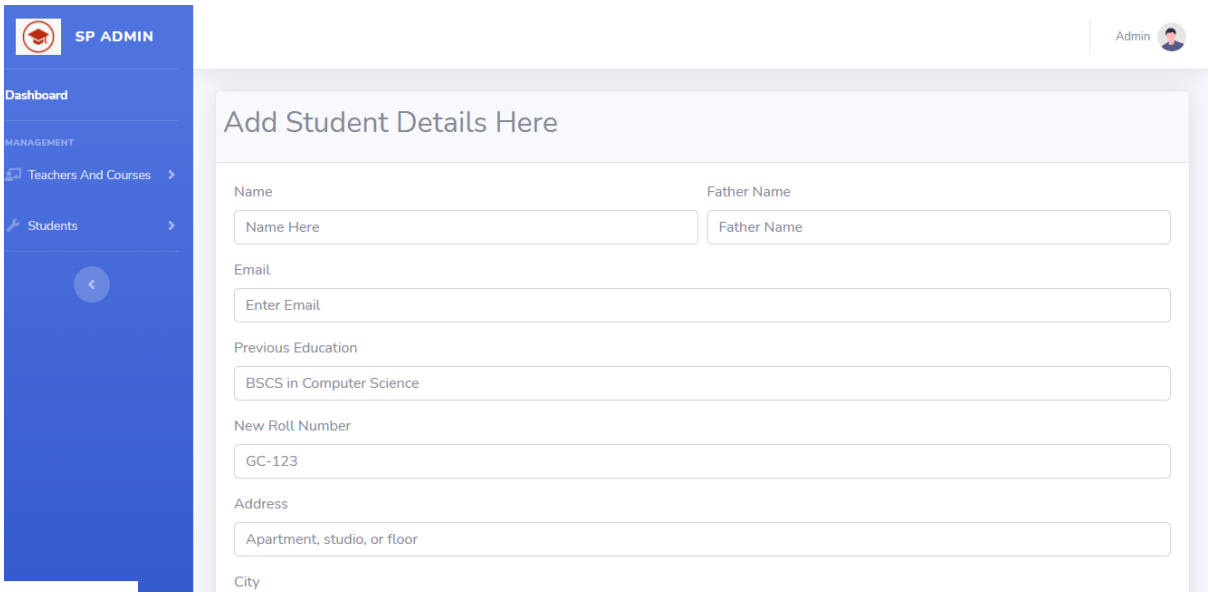

Figure 5.13 Admin Create Student

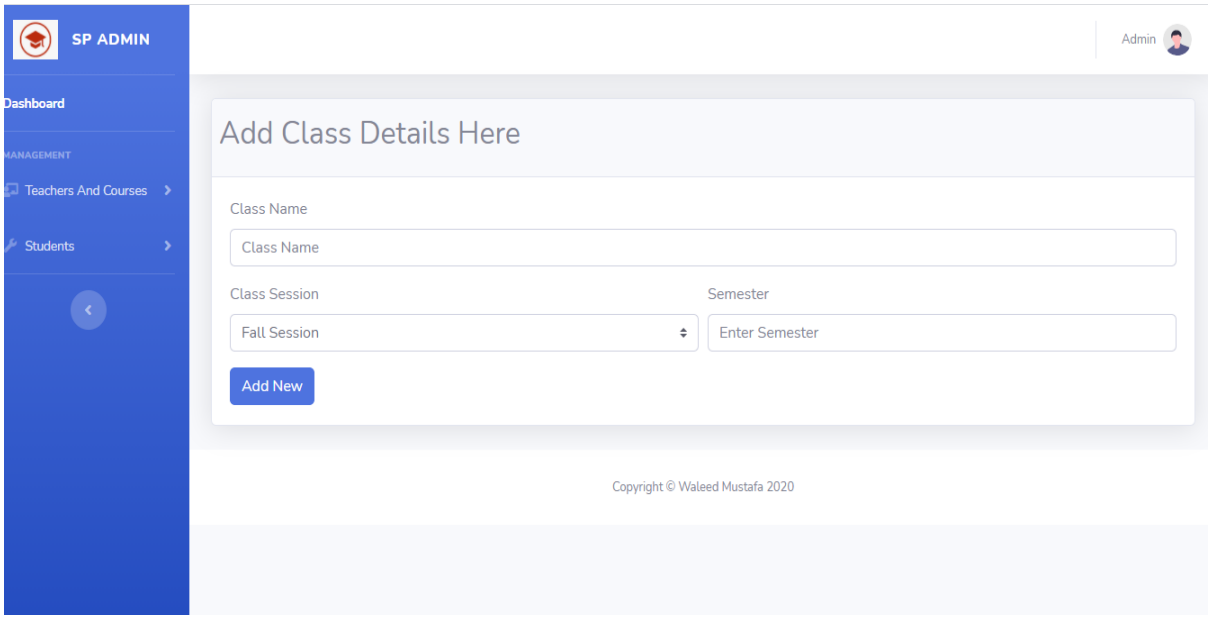

Figure 5.14 Admin create class

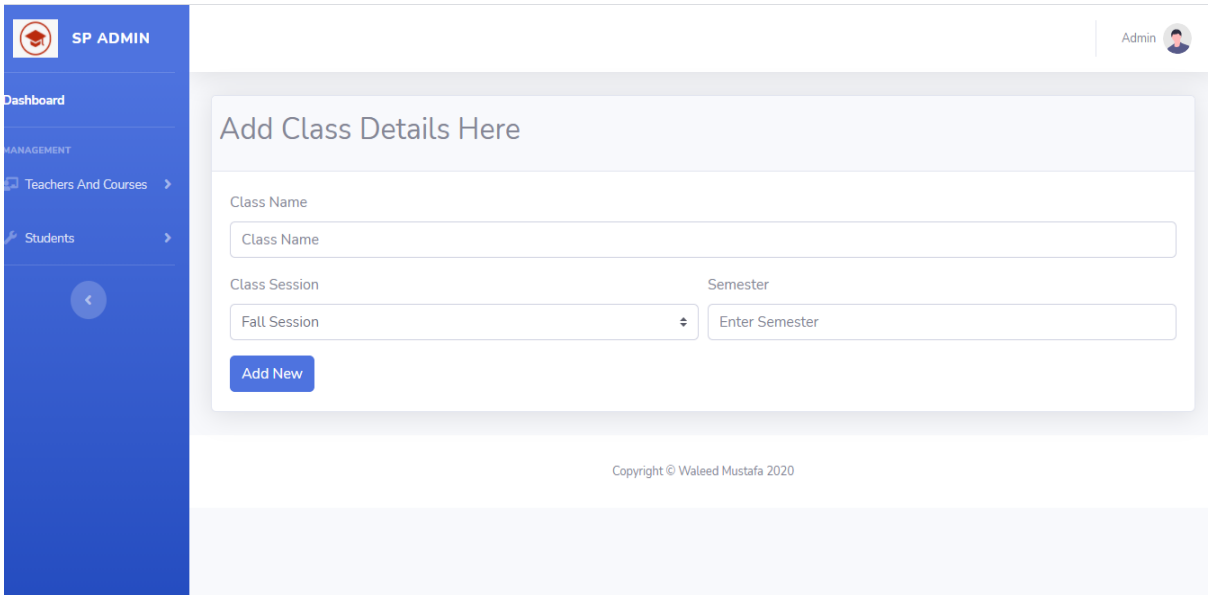

Figure 5.15 Admin Assign Courses (Teacher)

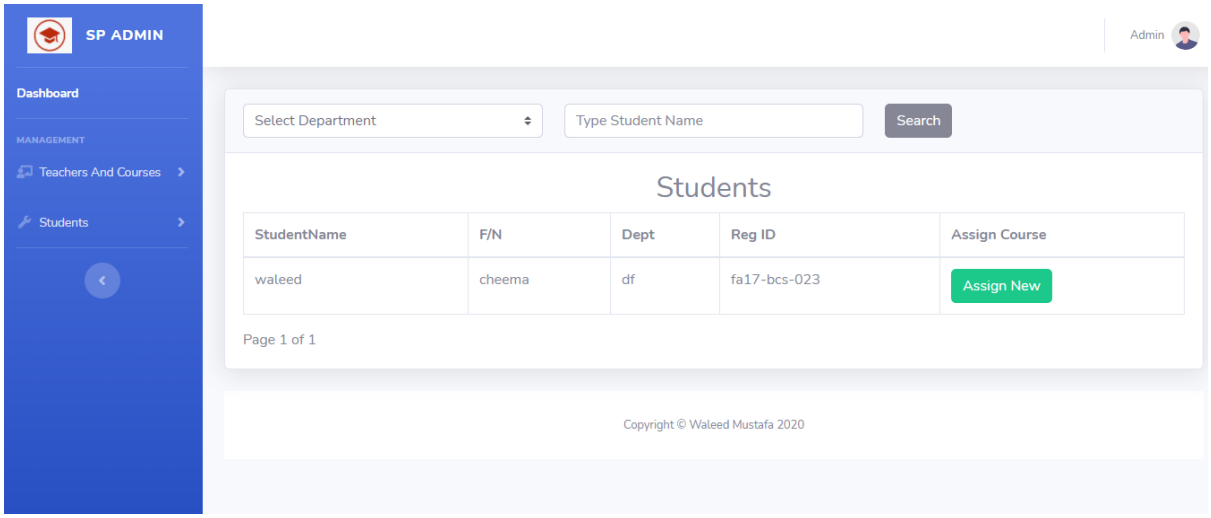

Figure 5.16 Admin Assign Courses (Student)

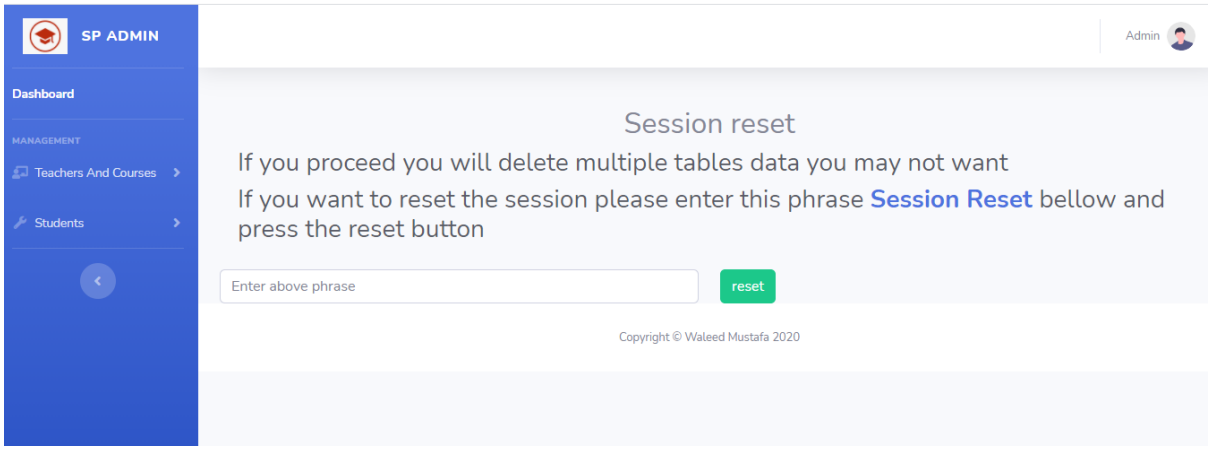

Figure 5.17 Admin Reset Session

Chapter 6: Testing and Examination

There are various trying apparatuses and methods that the group could utilize and perform, and examination should be possible either materially or by utilizing a robotized testing machine. In manual testing, item analyzer prepares tests for different regions and levels of the code, executes the tests, and reports the result to the manager. The robotized testing system is finished with the guide of computerized testing devices and the restrictions with manual testing can be defeated utilizing these devices.

There are two different testing approaches:

Functionality testing → Black box testing.

Implementation testing → White box testing.

Manual Examination

System examination

At the point when the structure has been viably advanced, testing should be performed to ensure that the system working true to form. This is also to watch that the system meets the requirements communicated previously. Other than that, structure testing will help in finding the goofs that may be stowed away from the customer. There are very few kinds of testing which join unit testing, utilitarian testing, and compromise testing. The testing ought to be done before it is being passed on for the customer to use.

Unit Examination

Table 6.1 Student Login

SL.NO	TEST CASE	EXPECTED OUTCOME	TEST OUTCOME
1	Student Enter valid name and password & click on login button	website should display main page	Successful
2	Student enter invalid	website should not display main page	Successful

Table 6.2 Teacher login

SL.NO	TEST CASE	EXPECTED OUTCOME	TEST OUTCOME
1	Teacher Enter valid name and password & click on login button	website should display main page	Successful
2	Teacher enter invalid	website should not display main page	Successful

Table 6.3 Admin Login

SL.NO	TEST CASE	EXPECTED OUTCOME	TEST OUTCOME
1	Admin Enter valid name and password & click on login button	website should display main page	Successful
2	Admin enter invalid	website should not display main page	Successful

Table 6.4 Student Dashboard

SL.NO	TEST CASE	EXPECTED OUTCOME	TEST OUTCOME
1	Student wants to edit profile and click on edit profile button	Website should show the edit page and allows student to edit profile	Successful
2	Student wants to view marks and clicks on the view marks button	Website should show the page where the marks are listed	Successful
3	Student wants to view Attendance and clicks on the view Attendance button Student wants to upload the Assignment click on upload Assignment button	Website should show the page where the Attendance is listed	Successful
4	Student wants to upload the	Website should show the menu for	Successful

	Assignment click on upload Assignment button	uploading the file from the system and checks the file format	

Table 6.5 Teacher Dashboard

SL.NO	TEST CASE	EXPECTED OUTCOME	TEST OUTCOME
1	Teacher wants to edit profile and click on edit profile button	Website should show the edit page and allows Teacher to edit profile	Successful
2	Teacher wants to mark Attendance and clicks on Button	Website should display the page and Allows teacher to add lecture and mark the Attendance	Successful
3	Teacher wants to upload the marks and clicks on upload marks	Website should display the page and allows teacher to upload the marks	Successful
4	Teacher wants to create the assignment and clicks on create Assignment button	Website should show the page where teacher can add details of assignment and create assignment	Successful

Table 6.6 Admin Dashboard

SL.NO	TEST CASE	EXPECTED OUTCOME	TEST OUTCOME
1	Admin wants to edit profile and click on edit profile button	Website should show the edit page and allows Admin to edit profile	Successful
2	Admin wants to create student and clicks on create student button	Website should show page where admin enter details of a student and create student	Successful

3	Admin wants to create Teacher and clicks on create Teacher button	Website should show page where admin enter details of a teacher and create teacher	Successful
4	Admin clicks on assign courses to students' button	Website should show page admin can assign courses to students	Successful
5	Admin clicks on assign courses to Teacher button	Website should show page admin can assign courses to Teacher	Successful
6	Admin wants to reset the session and clicks on reset session button	Website should show the page where admin can enter the phrase and reset the session	Successful

Chapter 7: Result and Later Work

Result

This project of developing the SMS. The main purpose of this project is to build and create an SMS to prevent and eliminate cheating of any sorts. The SMS is secure from unethical hackers. The team chose to adopt the agile methodology. The agile SDLC model is a mix of iterative and consistent cycle models with revolve around measure flexibility and buyer devotion by quick transport of working programming things. The tasks will be managed and distributed based on each member's own skill. Each member of the team was managing a certain part of the project such as the feasibility study where the team discussed the technical feasibility and the operational feasibility, cost management, time management and risk management. In the time management, the team managed the time spent and progress made on different activities and tasks during the project as well as created the work breakdown structure for the needed activities of the project. For the risk management the team detected the risks that they might face in this project and the risk strategies that they would use to mitigate them.

Later Work

We will constantly work on our SMS and more module as many as possible in it try to make it more reliable and secure, so it has less chances to be hacked. In this way we try to make education error and hacked free