Software Requirement Specification

Shilpa Web/Mobile Application

Version 1.0

7/24/19

VERSION AND APPROVALS

VERSION HISTORY

Version #	Date	Revised By	Reason for change
1.0	2019-07-24	Pabasara Mahindapala	

This document has been approved as the official Software Requirements Document for Shilpa Web/Mobile Application, and accurately reflects the current understanding of businessrequirements. Following approval of this document, requirement changes will be governed by the project's change management process, including impact analysis, appropriate reviews and approvals.

DOCUMENT APPROVALS

Approver Name	Project Role	Signature/Electronic Approval	Date

PROJECT DETAILS

Project Name	Shilpa Web/Mobile Application
Project Type	New Initiative
Project Start Date	2019-06-01
Project End Date	2019-08-20
Project Sponsor	Nenasa Educational Institute
Primary Driver	Efficiency
Secondary Driver	Cost Reduction
Division	
Project Manager/Dept	Nuwan Bandulasena

OVERVIEW

This document defines the high level requirements of Shilpa Web/Mobile Application. It will be used as the basis for the following activities:

- Creating solution designs
- Developing test plans, test scripts, and test cases
- Determining project completion
- Assessing project success

DOCUMENT RESOURCES

Name	Business Unit	Role
BNM Bandulasena	Shilpa Educational Software	Business Development Manager
Shalinda Rathugama	Nenasa Educational Institute	General Manager

GLOSSARY OF TERMS

Term/Acronym	Definition
ID	Identity
UPS	Uninterruptable Power Supply
RAM	Random Access Memory
SMS	Short Message System
TBD	To Be Determined

Contents

INTRODUCTION

1.1 Purpose

The purpose of this document is to give a detailed description of the requirements for the "SHILPA Web Application" software. It will illustrate the purpose and complete declaration for the development of system. It will also explain system constraints, interface and interactions with other external applications. This document is primarily intended to be proposed to a customer for its approval and a reference for developing the first version of the system for the development team.

1.2 Document Conventions

- Text with special significance is indicated in **bold**.
- Priorities for higher-level requirements are assumed to be inherited by detailed requirements.
- Functional requirements are stated in the descending order of their priorities.

1.3 Intended Audience and Reading Suggestions

This document is intended for developers, project managers, marketing staff, users, testers, and documentation writers.

Developers tend to create best outcome by avoiding requirement problems. Project managers and marketing staff able to collect more clients through this. Testers also able to get idea about testing areas and testing procedure that can identify through this document.

1.4 Product Scope

The "SHILPA" is a web application which helps people to find the details about tuition teachers and tuition classes based on the user's current position or other specification like subject, fees, learning outcomes and more. The application should be free to download from either a mobile phone application store or similar services. Institute owners or teachers can provide their information using the web-portal. This information will act as the bases for the search results displayed to the user. An administrator also uses the web-portal in order to administer the system and keep the information accurate. The administrator can, for instance, verify teachers and manage user information. Furthermore, the software needs Internet connection to fetch and display results. All system

information is maintained in a database, which is located on a web-server. The application also has the capability of representing both summary and detailed information about the teachers in different institutes.

1.5 References

[1] IEEE Software Engineering Standards Committee, "IEEE Std 830-1998, IEEE Recommended Practice for Software Requirements Specifications", October 20, 1998.

[2] *Canva*. [Online]. Available: http://www.canva.com/.

[3] "Online Diagram Software & Visual Solution," *Lucidchart*. [Online]. Available: http://www.lucidchart.com/.

[4] "UML 2 Tutorial - Sequence Diagram," *Sparx Systems*. [Online]. Available: https://www.sparxsystems.com/resources/tutorials/uml2/sequence-diagram.html.

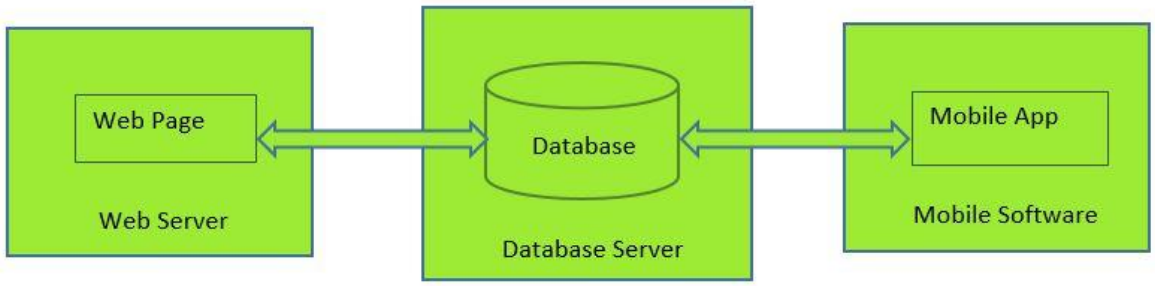
[5] R. Pettit, "Software Architecture," *YouTube*, 01-Feb-2016. [Online]. Available: https://www.youtube.com/watch?v=bClMoThLiwM.

[6] *Introduction to the Diagrams of UML 2.X*. [Online]. Available: http://www.agilemodeling.com/essays/umlDiagrams.htm.

OVERALL DESCRIPTION

2.1 Product Perspective

This system will consist of two parts: one mobile application and one web portal. These applications will be used to find tuition teachers and view information about them while the web portal will be used for managing the information about the system as a whole.



Since this is a data-centric product it will need somewhere to store the data. For that, a database will be used. Both the mobile application and web portal will communicate with the database, howeverin slightly different ways. The mobile application will only use the database to get data while the web portal will also add and modify data. All of the database communication will go over the Internet.

The mobile application has some restrictions about the resource allocation. To avoid problems with overloading the operating system the application is only allowed to use 20 megabytes of memory while running the application. The maximum amount of hard drive space is also 20 megabytes.

2.2 Product Functions

With the mobile application, the users will be able to search for tuition teachers. The result will be based on the criteria the user inputs. There are several search criteria and it will be possible for the administrator of the system to manage the options for those criteria that have that.

The result of the search will be viewed tuition teachers details, depending on what subject criteria included in the search. The list view will have one list item for each subjects the search criteria and show a small part of the tuition teacher's information so the user can identify the tuition teachers some characteristics.

If user registered as student or a parent then they will be able to view lecture materials, lecture attendance, payments and all of information those updated by tuition teachers.
The web portal will provide functionality to manage the system and the teacher's information. It will also provide information about the system, for example show when there is a new update.

2.3 User Classes and Characteristics

There are five types of users that interact with the system: guests of the application, teachers, parents, students and administrators. Each of these five types of users has different use of the system so each of them has their own requirements.

The guests of the application can only use the application to find details. This means that the user have to be able to search for tuition teachers, locations and time table of teachers and how join to it. In order for the users to get a relevant search result there are multiple criteria the users can specify and all results matches all of those.

The parents and students have same functions such as able to log with user name and password (parents can log with student id and username), view more details about classes, attendance, payments, lecture materials, add feedback and all information those teacher have updated.

The administrators also only interact with the web portal. They are managing the overall system so there is no incorrect information within it. The administrator can manage the information for each section as well as the options for both the mobile application users and the web application users.

2.4 Operating Environment

The web application will be hosted on one of the department's servers and connecting to one of the school Oracle Database server. The system is a web based application; clients are requiring using a modern web browser such as Mozilla Firefox 37, Internet Explorer 6 and Enable Cookies. The computer must have an Internet connection in order to be able to access the system.

The institute should use barcode scanner to record student attendance and students must be given cards with unique barcodes printed which contain their student ID.

Visual Studio 2017 and Visual Studio Code are used as development platforms. Technologies used are ASP.NET Core and ASP.NET Web API, Entity Framework, Angular and Bootstrap.

2.5 Design and Implementation Constraints

The Internet connection is also a constraint for the application. Since the application fetches data from the database over the Internet, it is crucial that there is an Internet connection for the application to function.

Both the web portal and the mobile application will be constrained by the capacity of the database. Since the database is shared between both application it may be forced to queue incoming requests and therefore increase the time it takes to fetch data.

Availability of a reasonably fast internet connection, Availability of a web browser (Google Chrome 42 or later, Mozilla Firefox 37 or later, Edge 13), Free hard disk space is required for data storage, Minimum 1GB of RAM is recommended for a windows operating system and Standard screen resolution is recommended (At least 1280*1024) are needed as hardware.

Some teachers and parents may not have proper technical knowledge to use this facility, Some students and parents have no access to use the internet facility, Inability to send SMS alerts to students and parents and Students cannot pay their tuition fees using an online payment method can categorized as limitations.

2.6 Project Dependencies

One assumption about the product is that it will always be used on mobile phones or device that have enough performance. If the phone does not have enough hardware resources available for the application, for example the users might have allocated them with other applications, there may be scenarios where the application does not work as intended or even at all. The institute should use barcode scanner to record student attendance and students must be given cards with unique barcodes printed which contain their student ID.

2.7 Stakeholders

The following comprises the internal and external stakeholders whose requirements arerepresented by this document:

	Stakeholders
1.	BNM Bandulasena, Business Development Manager, Shilpa Educational Software
2.	Project Development team
3.	Shalinda Rathugama, General Manager, Nenasa Educational Institute

2.8 User Documentation

Following documents will be provided with the product,

- Detailed Technical Document
- Terms and Conditions
- Users Help Guide
- Release Notes

Following helps and tutorials will be provided with the project,

- help.shilpa@gmail.com will supply technical and operational support in 24 × 7
- For quick support clients can contact 091 24 56 456
- Depending on your requirement a supporting team is available at Shilpa Educational Software

And also 2 hour training sessions can be conducted for up to 50 people according to the requirement of the client. These sessions will be conducted by specially trained employees from Shilpa Educational Software and will train the users to use the Shilpa Web Application effectively.

2.9 Assumptions and Dependencies

The Internet connection is also a constraint for the application. Since the application fetches data from the database over the Internet, it is crucial that there is an Internet connection for the application to function.

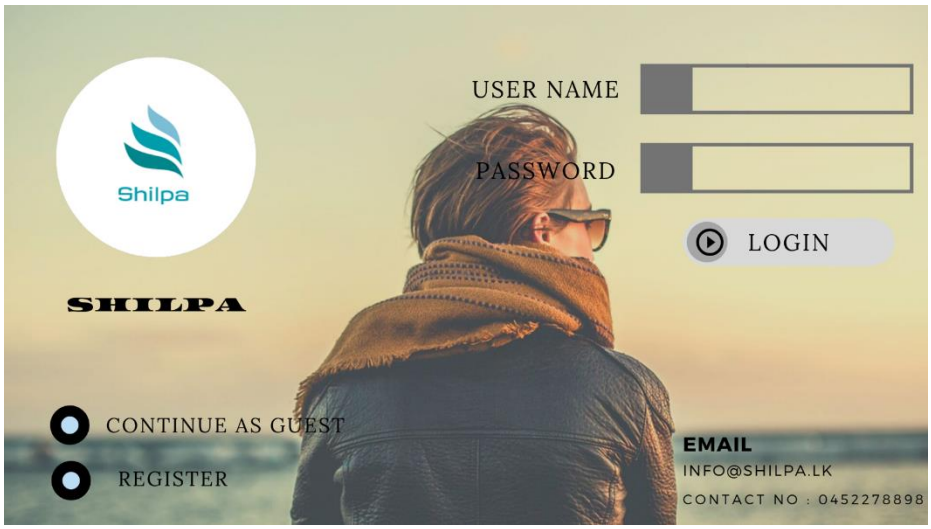
Both the web portal and the mobile application will be constrained by the capacity of the database. Since the database is shared between both application it may be forced to queue incoming requests and therefor increase the time it takes to fetch data.

#	**Assumptions**
	Used on mobile phones or device that have enough performance
	The institute should use barcode scanner
	Availability of a web browser
#	**Constraints**
	The Internet connection
	Capacity of the database

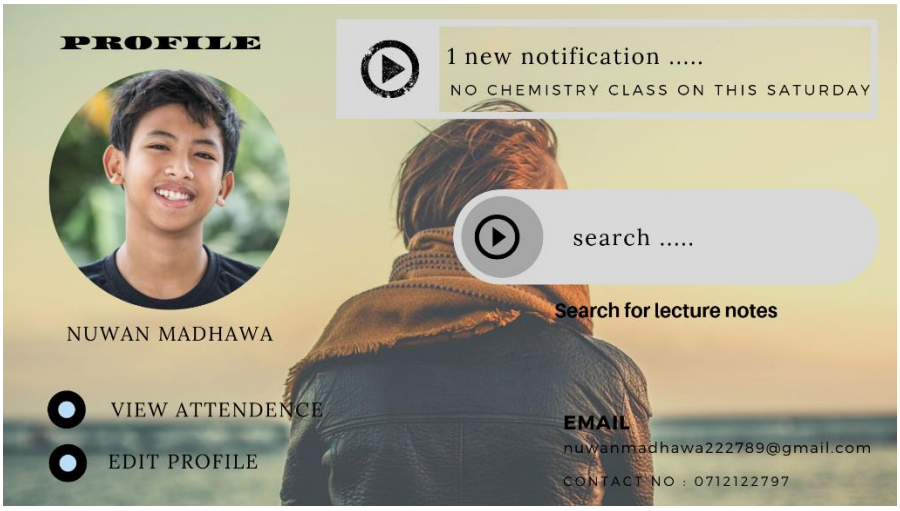
EXTERNAL INTERFACE REQUIREMENTS

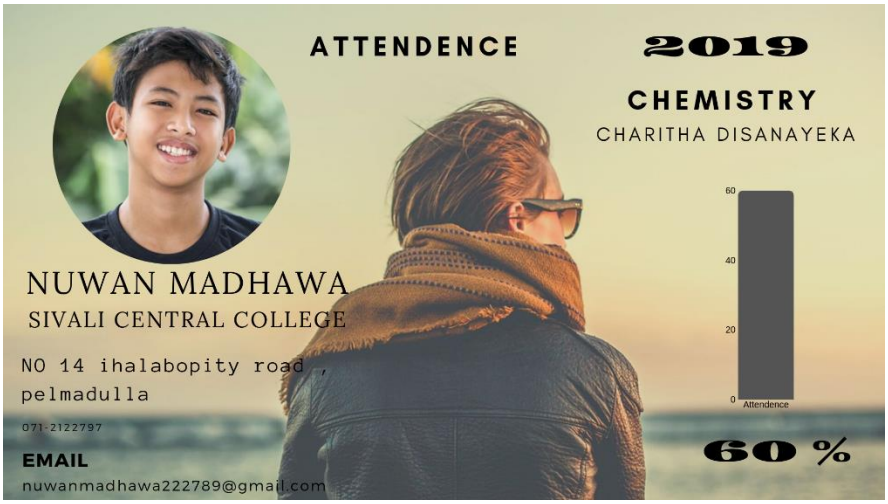
3.1 User Interfaces

A first time user for this web application should see the login page when the user enter the web address. Figure 01 shows the interface of the login page. If the user already registered the user can continue the process by entering the username and the password. If the user does not registered but the user need to registered, from this login page he/ she can create an account for this website. And also if the user does not need to register but the user needs to search the teacher or class details he/she can do it by login as a guest user. But the guest user cannot download the lecture materials.



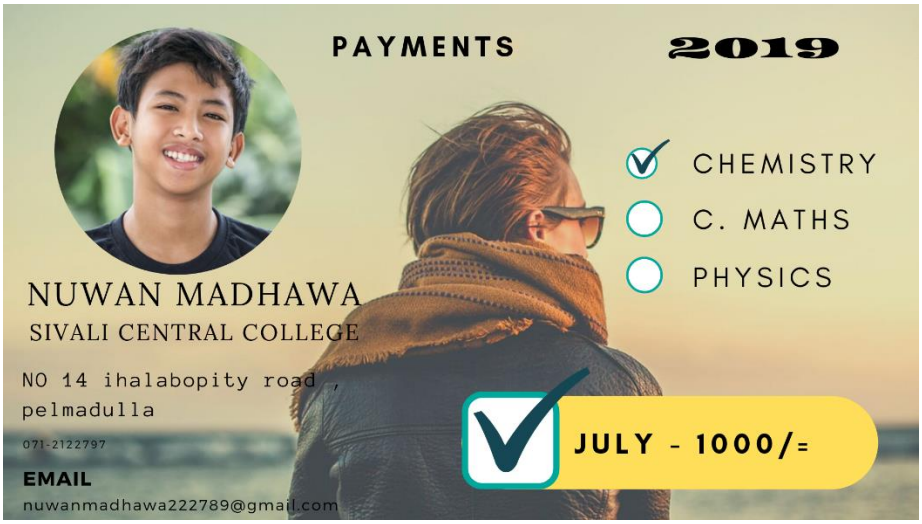
After the user log for this website he/she can change their email address, phone number and they can modify their profile as they wish. Also the student can check their attendance to the class. If there are any notifications there are display on the top right corner of the profile view. Figure 02 shows the profile view.





Also the guest users and registered users can search for teachers. From figure 03, it shows that the teacher profile. From this page the user can check the class details according to the teacher and the qualifications of the teacher.

The employee who enter the attendance to the students by using barcode reader also have an interface to check whether the student pay for the current month. If the student pay for the month employee can mark on the website. Below figure 05 show the relevant interface.



3.2 Hardware Interfaces

Since neither the mobile application nor the web portal have any designated hardware, it does not have any direct hardware interfaces. But for the attendance capturing we use a barcode reader machine. This the only hardware requirement which we have use except computers.

3.3 Software Interfaces

The mobile application and web portal communicates with the barcode reader in order to get information about the student attendance and the visual representation of it, and with the database in order to get the information about students, teachers and educational institutes. The communication between the database and the web portal consists of operation concerning both reading and modifying the data, while the communication between the database and the mobile application consists of only reading operations.

3.4 Communications Interfaces

This product is basically a communication system between user & admin .The communication between the different parts of the system is important since they depend on each other. The way that communication is achieved is important for the system and is therefore handled by the admin for both the mobile application and the web application. Parents are informed on the student's details through emails or SMS. Information & daily attendance is obtained through bar code reader by the institute. Communication protocols have to be agreed upon by the admin & user.

SYSTEM FEATURES / FUNCTIONS

4.1 Record Attendance

4.1.1 Description and Priority

When students are attending to classes their ID cards are scanned with a barcode reader by an employee of the institute. Then the student attendance is recorded in the database.

Priority: High

4.1.2 Stimulus/Response Sequences

Stimulus: Employee reads the barcode of student ID card
Response: Attendance of the student is recorded

4.1.3 Functional Requirements

REQ-1: Employees can record student attendance using the system by reading the barcode
REQ-2: The system allows the employee to identify students registered for a class

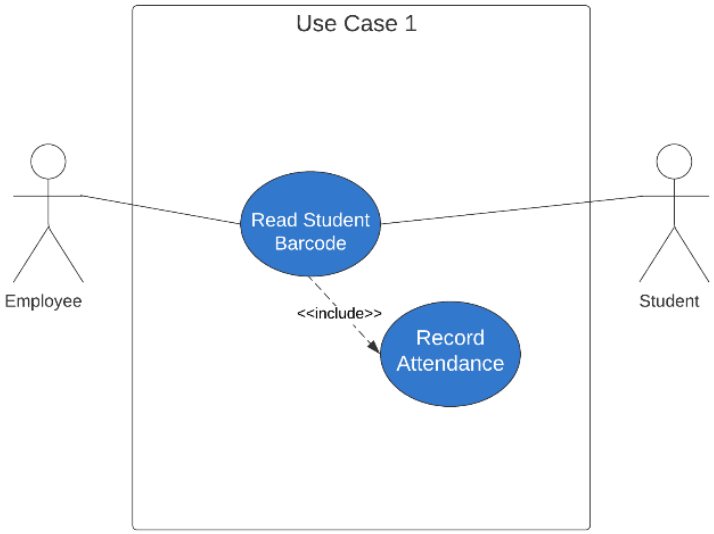
4.1.4 Use case diagram

Use Case ID:	1		
Use Case Name:	Record Attendance		
Created By:	Pabasara Mahindapala	Last Updated By:	Pabasara Mahindapala
Date Created:	2019-07-20	Date Last Updated:	2019-07-21

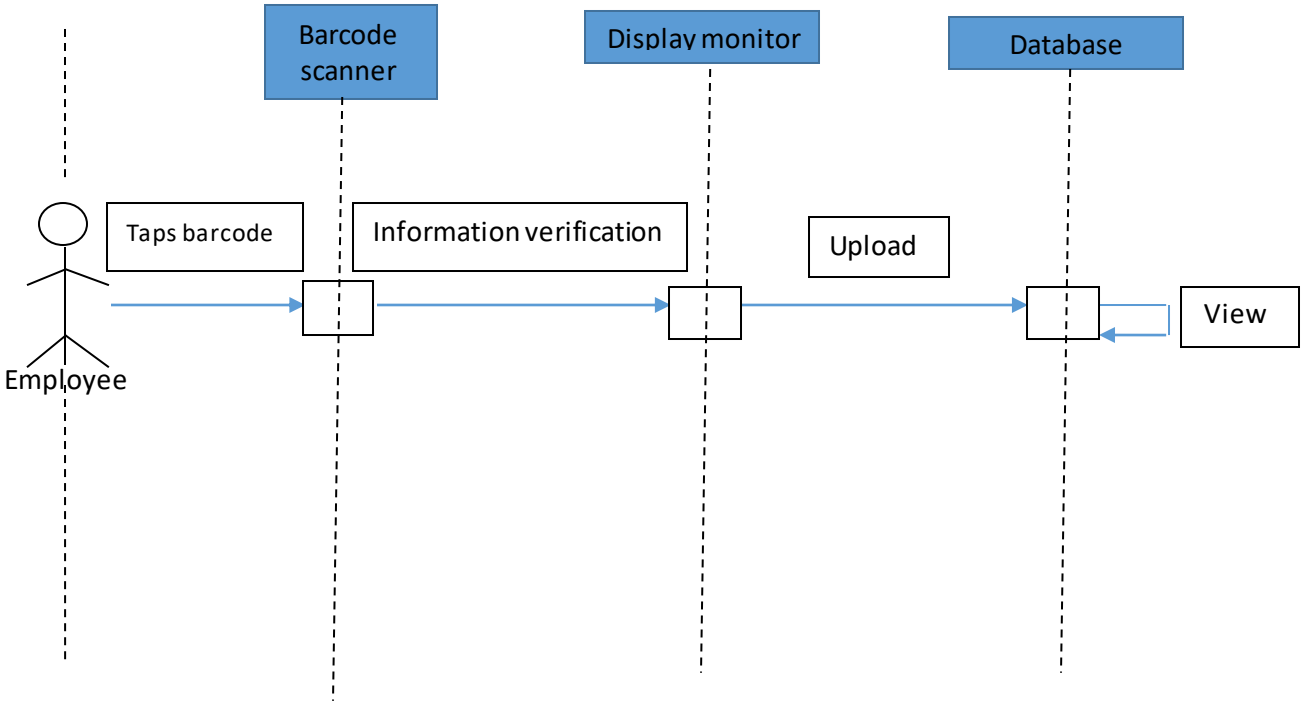
Actors:	Employee
Description:	Employees of the institute record student attendance by checking their ID cards when they attend classes. Student attendance is recorded when the identification is done.
Preconditions:	Student has a barcode printed ID card. Employee has a barcode reader
Postconditions:	Student is identified and attendance recorder in the database
Normal Course:	1. Read barcode of students ID card 2. Click the button to record 3. Move to the next student
Alternative Courses:	None
Exceptions:	None

Includes:	
Priority:	High
Frequency of Use:	Once per student in one class
Business Rules	TBD
Special Requirements:	24/7 access
Assumptions:	Barcode reader can correctly identify the student ID number and send it to the system by reading the card
Notes and Issues:	This feature depends on the reliability of the barcode reader

Use Case Graphic



4.1.5 Sequence Diagram



4.1.6 System Mock-up Screens

4.2 View Attendance

4.2.1 Description and Priority

Users (Parents, students and teachers) are able to login to the system and view student attendance according to class.

Priority: High

4.2.2 Stimulus/Response Sequences

Stimulus: User requests to view attendance of a certain student in a class
Response: System provides the attendance of the student

4.2.3 Functional Requirements

REQ-1: The application shall allow the users to view student attendance
REQ-2: Student attendance shall be stored in the database

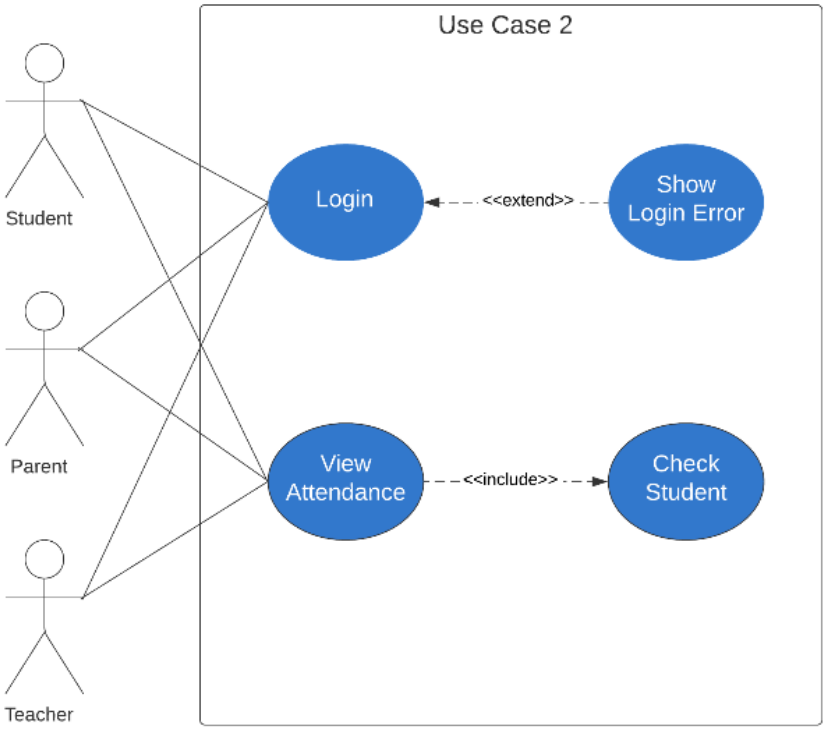
4.2.4 Use case diagram

Use Case ID:	2		
Use Case Name:	View Attendance		
Created By:	Pabasara Mahindapala	Last Updated By:	Pabasara Mahindapala
Date Created:	2019-07-20	Date Last Updated:	2019-07-21

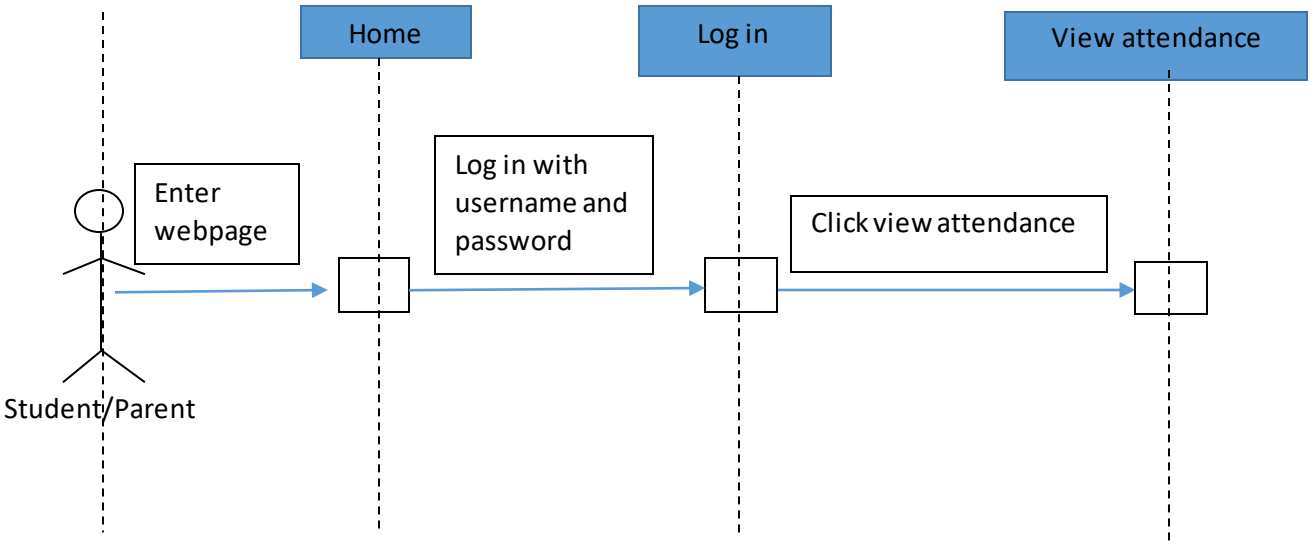
Actors:	Parent, Student, Teacher
Description:	Parents, students and teachers are able to login to the system and view attendance of students according to class.
Preconditions:	Web application is opened Student attendance is recorded in the database
Postconditions:	Users have viewed the student attendance
Normal Course:	1. Login to the system 2. Select the student and class to view attendance 3. View attendance
Alternative Courses:	Login to the system as a student and view own attendance for classes
Exceptions:	None
Includes:	
Priority:	High

Frequency of Use:	As per requirement of users
Business Rules	TBD
Special Requirements:	24/7 access
Assumptions:	Student attendance is recorded in the database
Notes and Issues:	

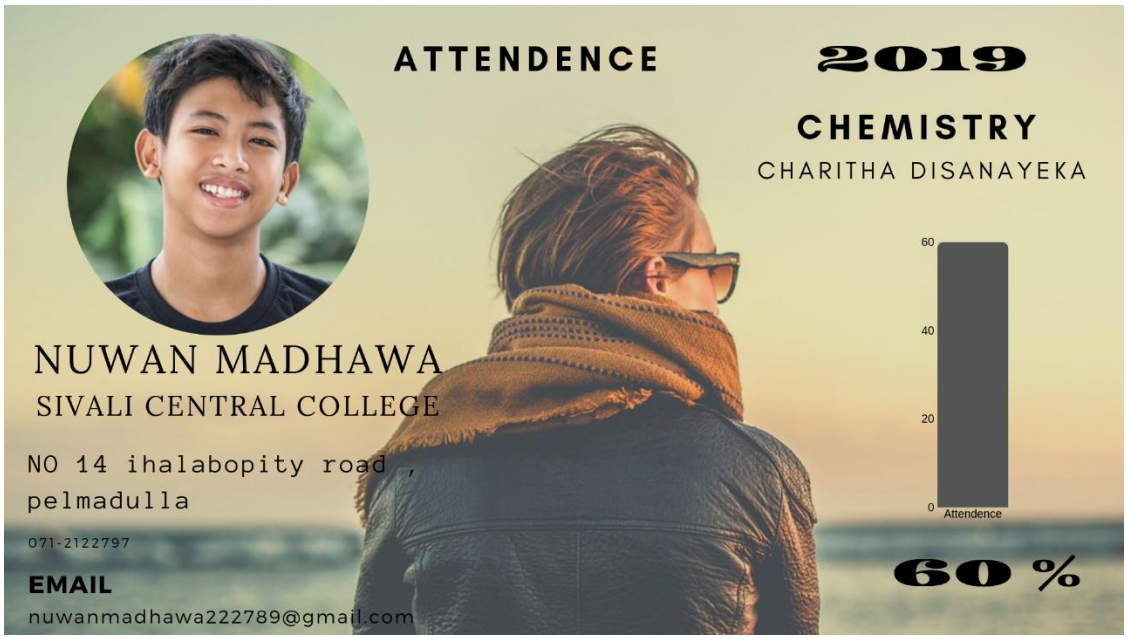
Use Case Graphic



4.2.5 Sequence Diagram



4.2.6 System Mock-up Screens



4.3 Search Teachers and Enroll

4.3.1 Description and Priority

Students and parents can use the application to search for teaches in different subjects and enroll to their classes.

Priority: High

4.3.2 Stimulus/Response Sequences

Stimulus: User searches for teachers and classes by giving keywords
Response: System provides the information about teachers according to the keywords

Stimulus: User requests to enroll for a class
Response: System shall enroll the user in the class and let the user to access class information

4.3.3 Functional Requirements

REQ-1: Teacher information shall be stored in the database
REQ-2: Users shall search and get information about teachers and enroll in classes

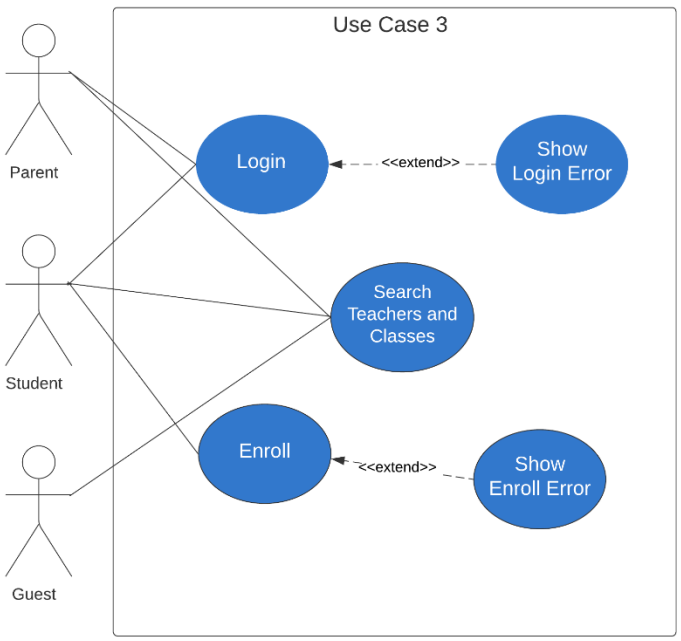
4.3.4 Use case diagram

Use Case ID:	3		
Use Case Name:	Search Teachers and Enroll		
Created By:	Pabasara Mahindapala	Last Updated By:	Pabasara Mahindapala
Date Created:	2019-07-20	Date Last Updated:	2019-07-21

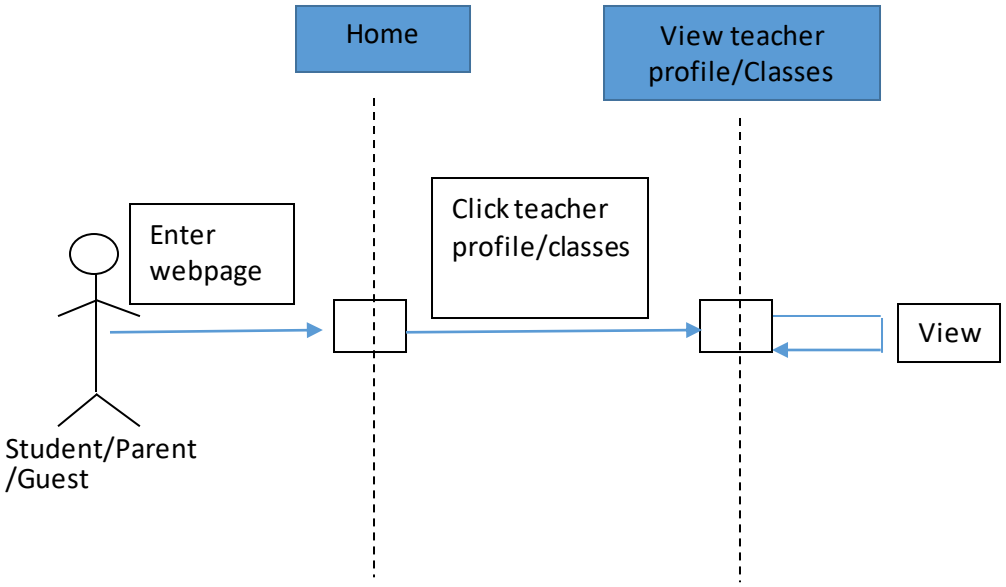
Actors:	Student, Parent, Guest
Description:	Students and parents can use the application to search for teaches in different subjects and enroll to their classes.
Preconditions:	Teacher information uploaded in the database and web application opened
Postconditions:	Users search and get information about teachers or enroll to a class
Normal Course:	1. Users search the application for teachers 2. Select a teacher and a class 3. Enroll in the class
Alternative Courses:	None
Exceptions:	None

Includes:	
Priority:	High
Frequency of Use:	As per requirement of users
Business Rules	TBD
Special Requirements:	24/7 access
Assumptions:	
Notes and Issues:	

Use Case Graphic



4.3.5 Sequence Diagram



4.3.6 System Mock-up Screens

4.4 Get Lecture Materials

4.4.1 Description and Priority

Students can download lecture materials uploaded by the teacher .through the web application. Lecture materials may be in document, picture or video format.

Priority: High

4.4.2 Stimulus/Response Sequences

Stimulus: Teacher uploads lecture materials to the system
Response: System saves the lecture materials to be downloaded later

Stimulus: Student requests to download lecture materials
Response: System downloads the lecture materials to the user's device

4.4.3 Functional Requirements

REQ-1: Lecture materials shall be uploaded and stored in the system
REQ-2: Students shall download lecture materials from enrolled classes

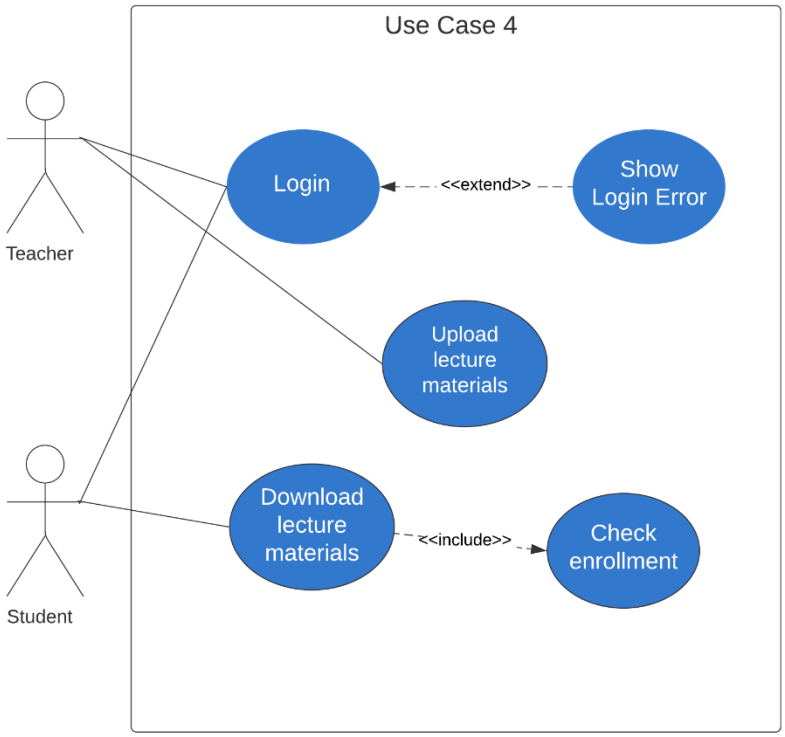
4.4.4 Use case diagram

Use Case ID:	4		
Use Case Name:	Get lecture materials		
Created By:	Pabasara Mahindapala	Last Updated By:	Pabasara Mahindapala
Date Created:	2019-07-20	Date Last Updated:	2019-07-21

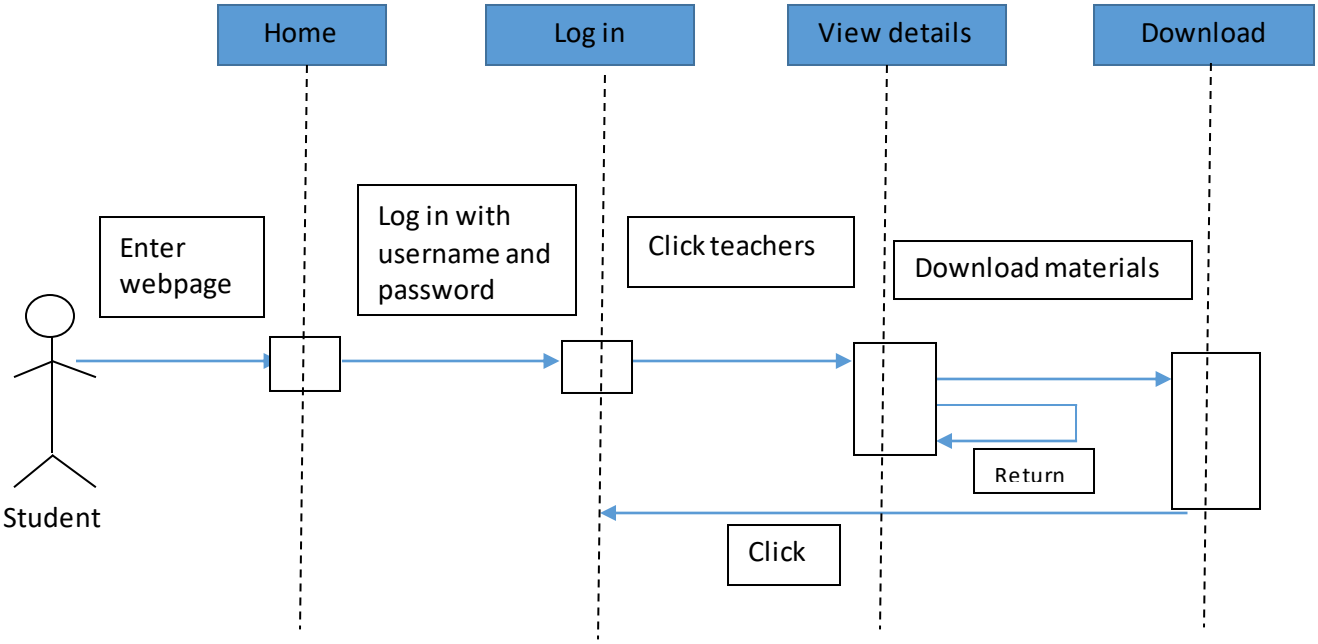
Actors:	Student, Teacher
Description:	Students can download lecture materials uploaded by the teacher .through the web application. Lecture materials may be in document, picture or video format.
Preconditions:	Lecture materials should be uploaded by the teacher Student should be enrolled to the relevant class
Postconditions:	Students have downloaded lecture materials according to class
Normal Course:	1. Students login to the system and visit the enrolled classes 2. Select the lecture materials to download 3. Download lecture materials
Alternative Courses:	None

Exceptions:	None
Includes:	
Priority:	High
Frequency of Use:	As per requirement of students
Business Rules	TBD
Special Requirements:	24/7 access
Assumptions:	
Notes and Issues:	

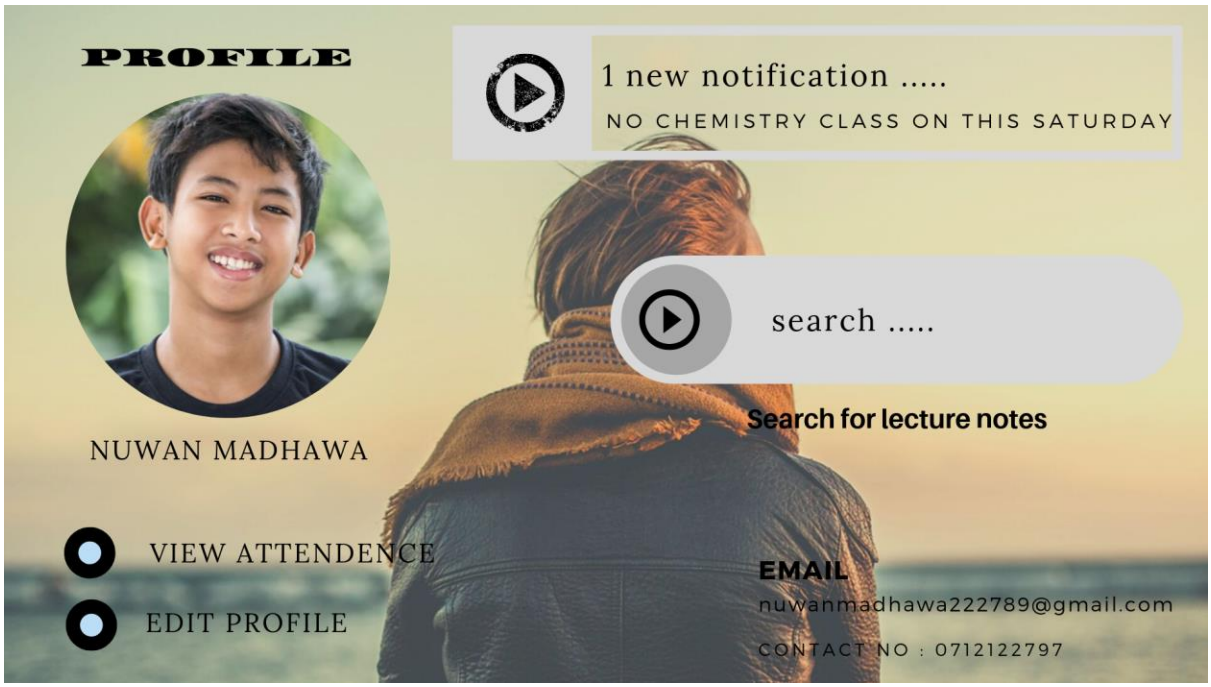
Use Case Graphic



4.4.5 Sequence Diagram



4.4.6 System Mock-up Screens



4.5 Notify Users

4.5.1 Description and Priority

Teachers can publish notifications for specific users by providing data. This helps the teachers to give information to students and parents.

Priority: Medium

4.5.2 Stimulus/Response Sequences

Stimulus: Teacher publishes a notification by providing data
Response: System shows the notification to the relevant users

4.5.3 Functional Requirements

REQ-1: System shall show real time notifications to logged in users
REQ-2: If the user is not logged in, the notifications will be shown in the notifications panel

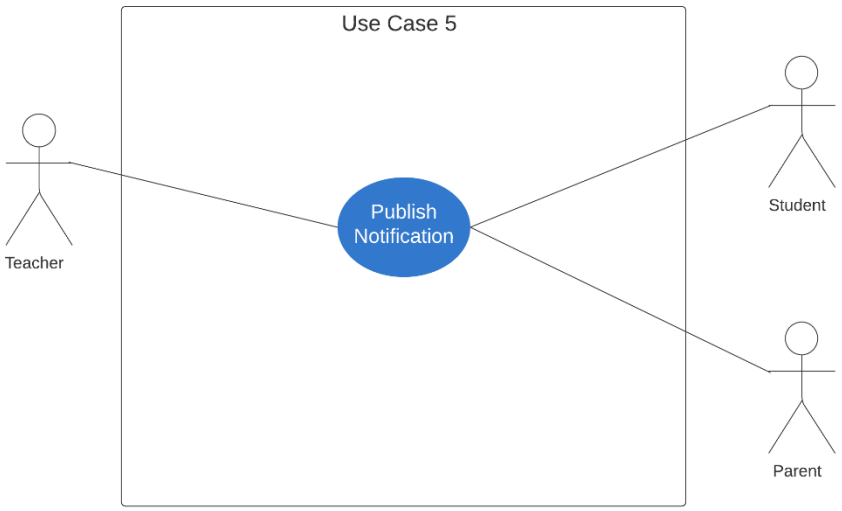
4.5.4 Use case diagram

Use Case ID:	5		
Use Case Name:	Notify Users		
Created By:	Pabasara Mahindapala	Last Updated By:	Pabasara Mahindapala
Date Created:	2019-07-20	Date Last Updated:	2019-07-21

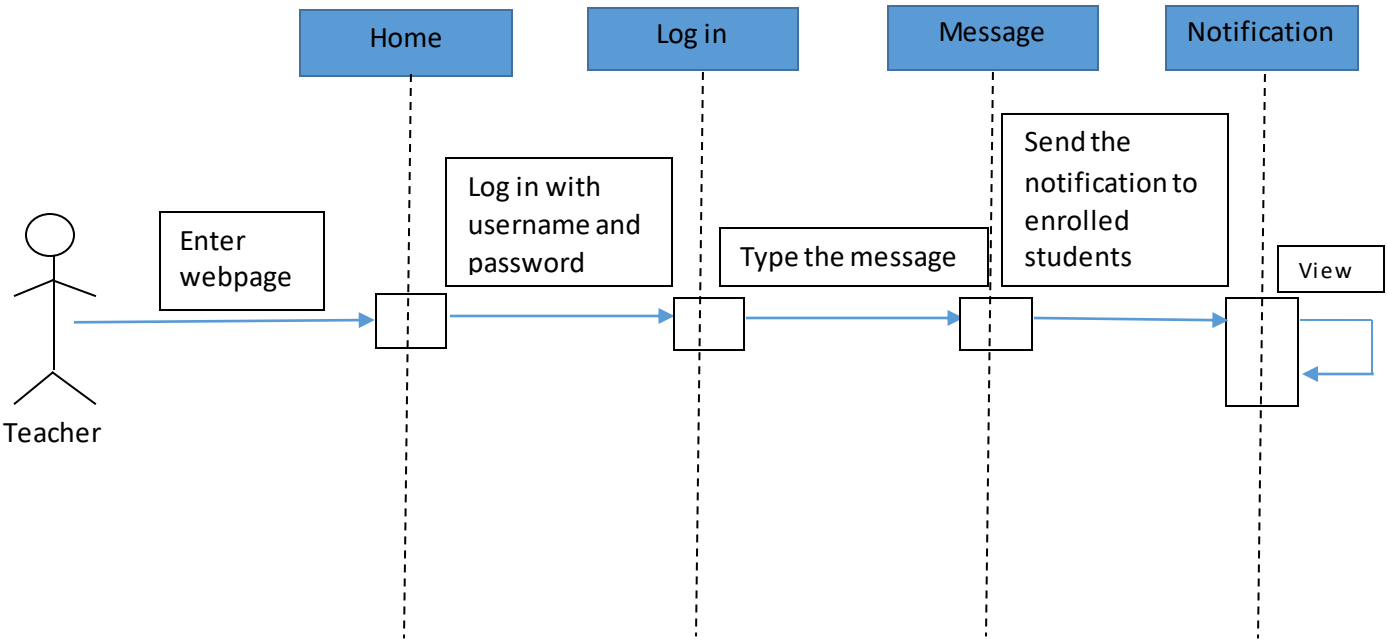
Actors:	Student, Teacher, Parents
Description:	Teachers can publish notifications for specific users by providing data. This helps the teachers to give information to students and parents.
Preconditions:	Teacher should publish the notification with relevant data When publishing the notification, users should be selected to receive notifications
Postconditions:	Students and Parents see useful information from teachers
Normal Course:	1. Teacher publishes a notification 2. Student or parent log in to the system 3. Student or parent read the notification
Alternative Courses:	None
Exceptions:	None
Includes:	

Priority:	Medium
Frequency of Use:	As per requirement of teacher
Business Rules	TBD
Special Requirements:	24/7 access
Assumptions:	
Notes and Issues:	

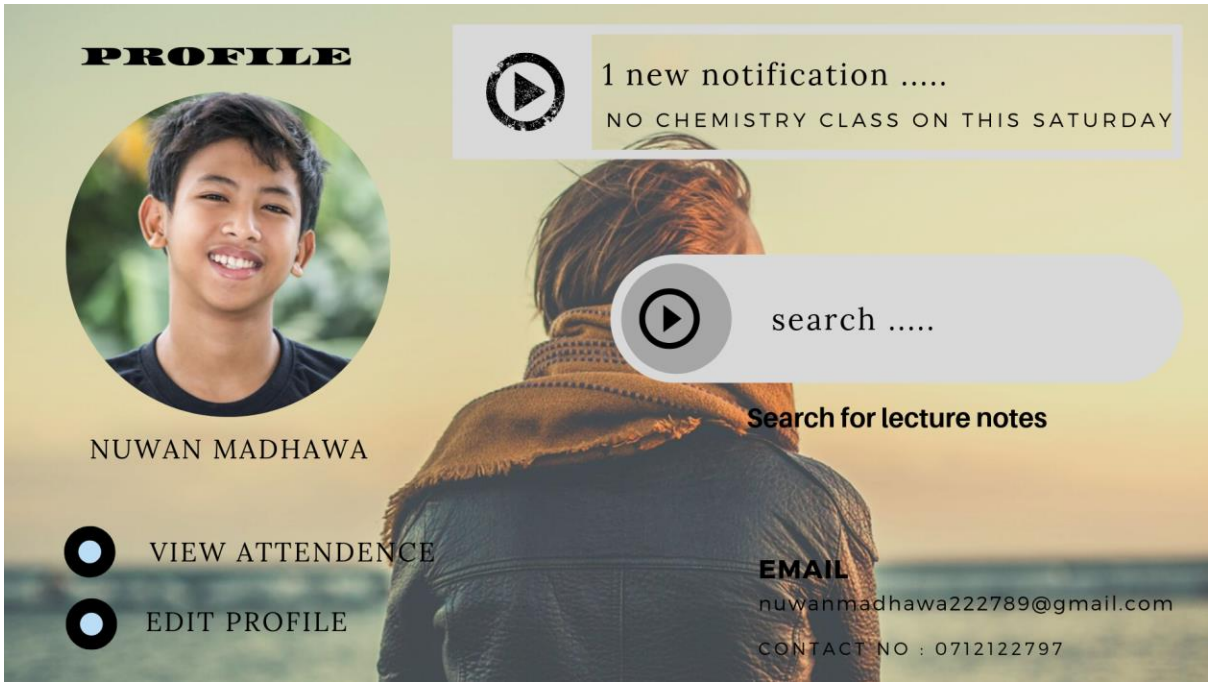
Use Case Graphic



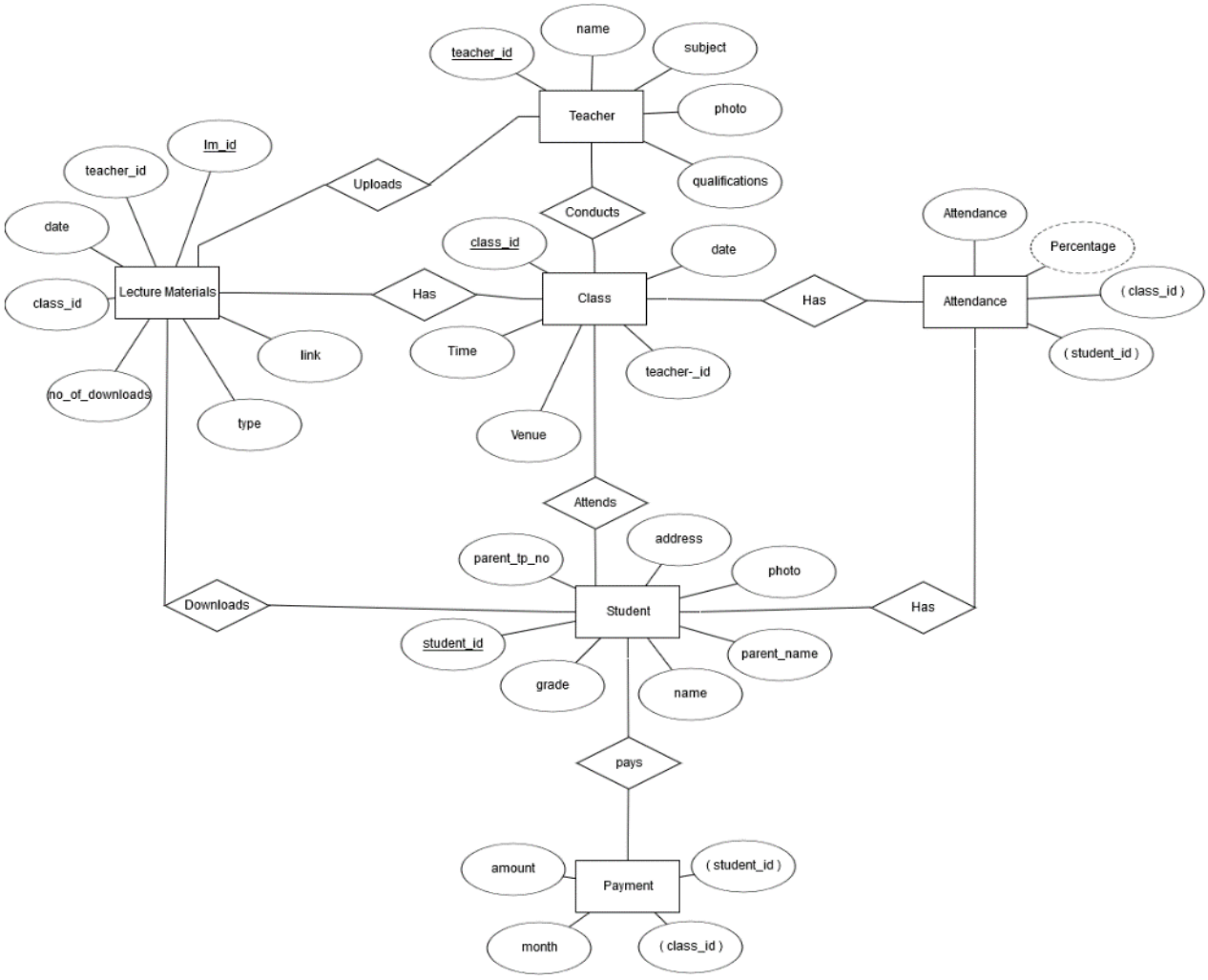
4.5.5 Sequence Diagram



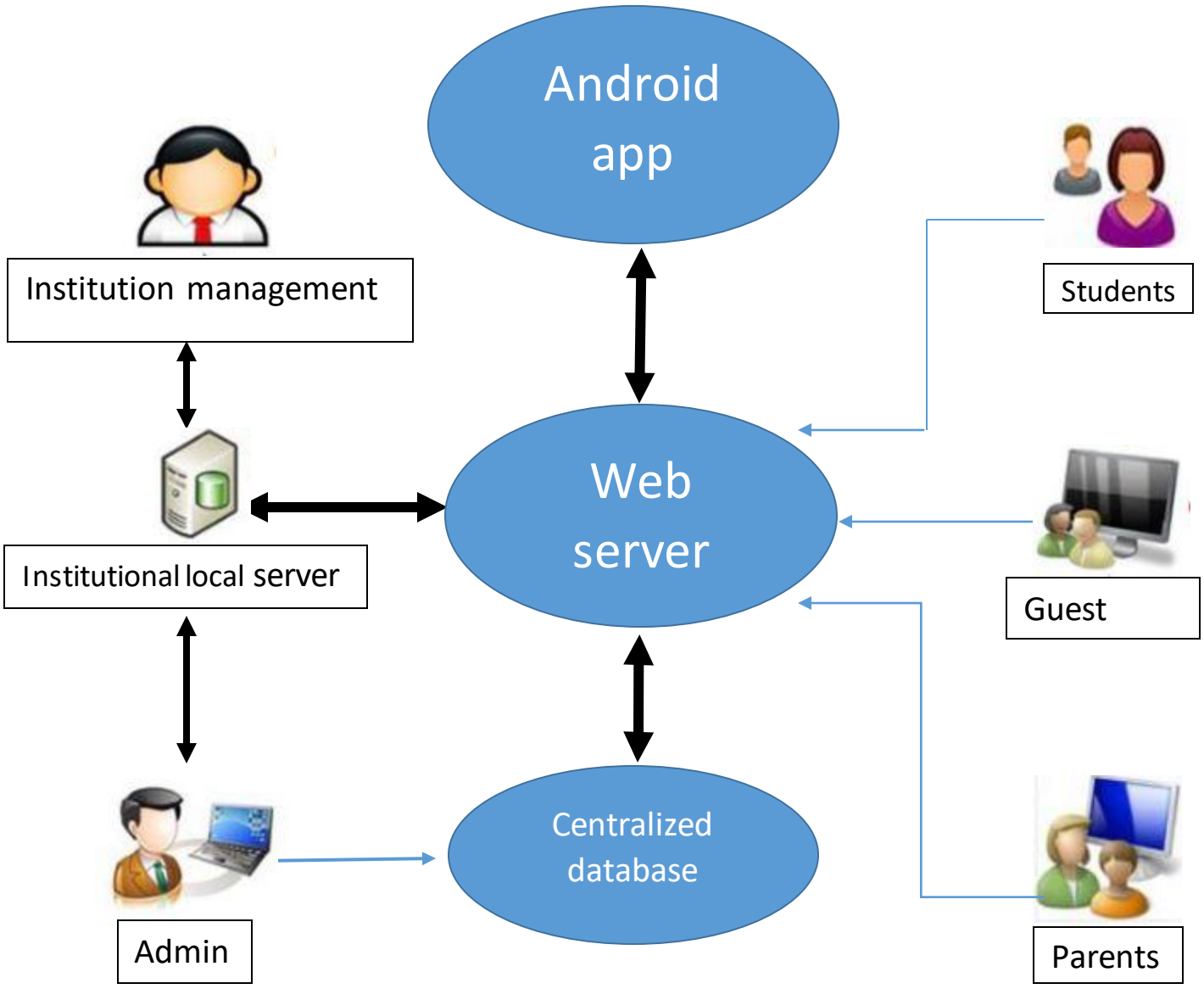
4.5.6 System Mock-up Screens



4.6 Database Design



4.7 System Architecture Modal



OTHER NONFUNCTIONAL REQUIREMENTS

5.1 Performance Requirements

The proposed system that we are going to develop will be used as the system in the Nenasa Educational Institute in a particular area. Therefore, it is expected that the database would perform functionally all the requirements that are specified by the company.

- The search feature should be prominent and easy to find for the user.
- The results displayed in the list view should be user friendly and easy to understand. Selecting an element in the result list should only take one click.
- The performance of the system should be fast and accurate
- This educational System shall handle expected and non-expected errors in ways that prevent loss in information and long downtime period. Thus it should have inbuilt error testing to identify invalid username/password
- The system should be able to handle large amount of data. Thus it should accommodate high number of searches.

5.2 Safety Requirements

- The failure of safety critical software functions shall be detected, isolated, and recovered from such that catastrophic and critical hazardous events are prevented from occurring.
- Software shall provide error handling to support safety critical functions.
- Software shall provide fault containment mechanisms to prevent error propagation.
- Software termination shall result in a safe system state.

The database may get crashed at any certain time due to virus or operating system failure. Therefore, it is required to take the database backup so that the database is not lost. Proper UPS/inverter facility should be there in case of power supply failure.

5.3 Security Requirements

- System will use secured database
- Normal users can just read information but they cannot edit or modify anything except their personal and some other information.
- System will have different types of users and every user has access constraints
- Proper user authentication should be provided
- No one should be able to hack users' password

- There should be separate accounts for admin and members such that no member can access the database and only admin has the rights to update the database.

5.4 Software Quality Attributes

Software quality requirements for this platform are:

- Availability: The system will be 7/24 available. Availability will be reported by web hosting company.
- Usability: System usability will be measured via user surveys.
- Performance: Performance of functions will be tested for timing adequately.
- Functionality: Functionality will be evaluated via user feedbacks from the system.
- Reliability: Security tests will be performed sufficiently.

5.5 Business Rules

- TBD -

OTHER REQUIREMENTS

- Students should be provided an ID card by the institution.
- Person that handles the bar code reader should have knowledge on database.
- After the fee payment it should provide students or parents with an online or reliable mode of payment.
- Everyone should integrate into a single frame to monitor closely each operation.
- Student performance also can be tracked.
- It can be send a reminder notification to pay fees to students and parents.

APPENDIX A: GLOSSARY

ID - Identity
UPS - Uninterruptable Power Supply
RAM - Random Access Memory
SMS - Short Message System
TBD - To Be Determined

APPENDIX B: ANALYSIS MODELS

APPENDIX C: TO BE DETERMINED LIST

1. Business rules - Constraints that included in the document which emphasize on the structure of the software and tends to persuade the various activities.