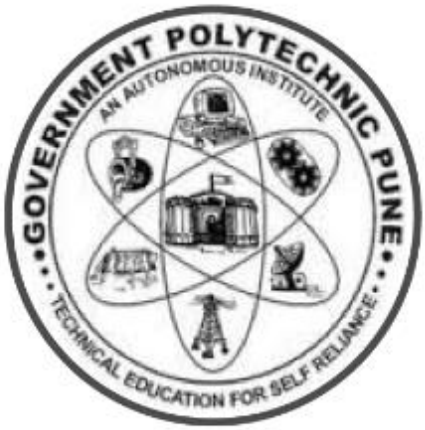
1. Introduction



College Automation System with an abbreviation as CAS is a system for automatic updating of records for the various Students in the College.

- **Purpose: -**

  Its purpose is to provide the students with automatic updates about the various happenings in the College. The intended audience for the system are the Students and the Teachers of the College.

- **Scope: -**

  The system is known as College Automation System, in short, **CAS**. The system is designed to give updates on four categories namely Attendance, Result, Notifications and Time-table. The System contains three entities namely the Administrator, Teachers and Students. Both the teachers as well as the students have access to the above four categories. The difference is that only the Teachers are able to update the information to the system. The Students are only allowed to view the information updated by the System. First both entities should login to their respective accounts. On both sides they will be provided with four options with respect to above categories. The Attendance and Result section shall contain textfields for the insertion of the data. Textfields will not be present in the student login.

  The Teachers are able to broadcast notices to students and shall contain textarea for the same. Whereas on student side, everyone is only able to see the notices sent by the teachers and will not contain textarea to communicate. Finally, the time-table section shall contain its dynamic updation which can be done only through the teacher login.

Any changes in teacher login shall dynamically reflect in to the database. The Administrator is core of the system and has full access to the database. His job is to add students and teachers and do any modifications to the database if required.

The objectives of the system are as follows:

- Handy System.
- Efficient Android Application.
- Anytime, Anywhere System.

2. Software Requirements Specifications

2.1 Definitions, Acronyms and Abbreviations: -

- CAS: College Automation System.
- Android: It is an effective mobile operating system based on the kernel of Linux.
- Database: A collection of various or similar type of data.

2.2 Overall Description: -

2.2.1 Product Perspective: -

- **System Interfaces:** The system interfaces with the database, classes in the android application.
- **User Interfaces:** The user interfaces include the login page, main page and couple of interfaces of each of the four categories (Attendance, Result, Notifications, Time-Table).
- **Hardware Interfaces:** It includes interfaces such as with the ram, storage space, android version, etc.
- **Software Interfaces:** This includes interfaces with the Database server (WAMP), Android Studio, Android KitKat version, etc.
- **Communications and Interfaces:** HTTP protocol is used for communicating to the Database.
- **Memory:** 10 MB
- **Operations:** Entering text, switching button on/off, viewing text, pushing button, validating data from Database, Updating the Database, retrieving from the Database, broadcasting messages.

2.2.2 Product Functions: -

Signing in, Updating and retrieval of Attendance and Result, Updation of the Time-table every day, broadcasting of messages, Signing Out.

2.2.3 User Characteristics: -

Three types of users are present in the System. Administrator and teachers are authorized users. Admin has direct access to the database whereas teachers has right to update the database, send notifications and update time-table. Students are non-authorized users and are only able to view the information.

2.2.4 Constraints: - WAMP Database, Android Studio, Android Development tools and Internet.

2.2.5 Assumptions and Dependencies: - Android operating system.

3. Modules

Modules are the various functionalities in the any project. However, the following modules are being incorporated into the College Automation System application: -

3.1 Students Side: -

- **Check Attendance Module**

The check attendance module for the students provides the functionality for the respective student to check his attendance. This module provides attendance for both the Theory as well as Practicals for each subject registered. In the last column the common attendance percentage by using both Theory and Practicals attendance is shown. The attendance is shown in tabular format.

- **View Result Module**

The view result module for the students provides the functionality for the respective student to check the updated results for various examination. This module provides result for various tests such as Unit Test 1, Unit Test 2, Orals, Practicals and Final Examination. The students are allowed to select the subject for whom the result needs to be viewed.

Only those results for respective subjects will be viewed whose marks are being entered by the teachers. For example, if orals marks are not entered by the teacher then those are not shown for that very subject. The result is shown on tabular format.

- **Time-table Module**

The timetable module for the students provides the functionality for each student in the class to view their timetable for the very specific day. However, they are also able to see the timetable for other days as well if the wish to do so by just selecting the day from the spinner (Drop-down menu).

3.2 Teachers Side: -

- **Add Attendance Module**

The add attendance module for teachers is designed for the entry of everyday attendance of the students in a class. However, the students are filtered depending upon the class, subject and type of lecture which includes Theory or Practicals. An activity before actual attendance includes the above filters in the form of spinners.

The next step is the actual attendance activity where the student's enrollment numbers are displayed which are the results for the above filter. Each enrollment number comes along with a couple of buttons for present and absent which send information to the database in the form of status. As each attendance is entered the record disappears from the current filtered list. We get the total present/absent count at the end of when all records disappear.

- **Add Result Module**

The add result module is very similar to the above module. It too has a filter but it includes class, subject, test type and an entry for maximum marks. With this filter is get the eligible student's enrollment numbers in next activity.

The next step is the actual marks entry activity where students' enrollment numbers are displayed along with the textfield to enter marks for each student. If entry is given the the respective marks are taken else the marks are set to 0. All these marks are taken and sent in one go on hitting the submit button.

- **Time-table Module**

The timetable module for the teachers provides the functionality for teacher in the organization to view their timetable for the very specific day. However they are also able to see the timetable for other days as well if the wish to do so by just selecting the day from the spinner (Drop-down menu).

- **Notifications Module**

The notifications module for the teachers provide the functionality for the teachers to send notices to the students. The notices will be sent to the all the students in the class via email. However, the notifications activity takes the inputs form the teacher logged in and on hitting send opens the share window.

This window has various options to share the message where the teacher needs to select Gmail option. On selecting the option, the inputs taken are

appropriately arranged in respective compose window components for Gmail. Then teacher just need to hit send for sending the notice.

- **Show Attendance Module**

The show attendance module at teachers' side provides the functionality of viewing the attendance of any student by the teacher. This module is designed so that teacher will be able to keep a track of students with less attendance with a threat for detention.

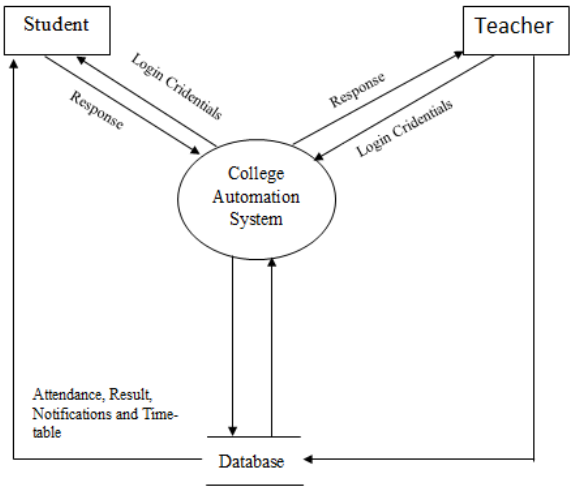
The teacher will be provided with a textfield to enter the enrollment number for the respective student to get the attendance on hitting submit button and take corrective actions.

4. System Analysis and Design

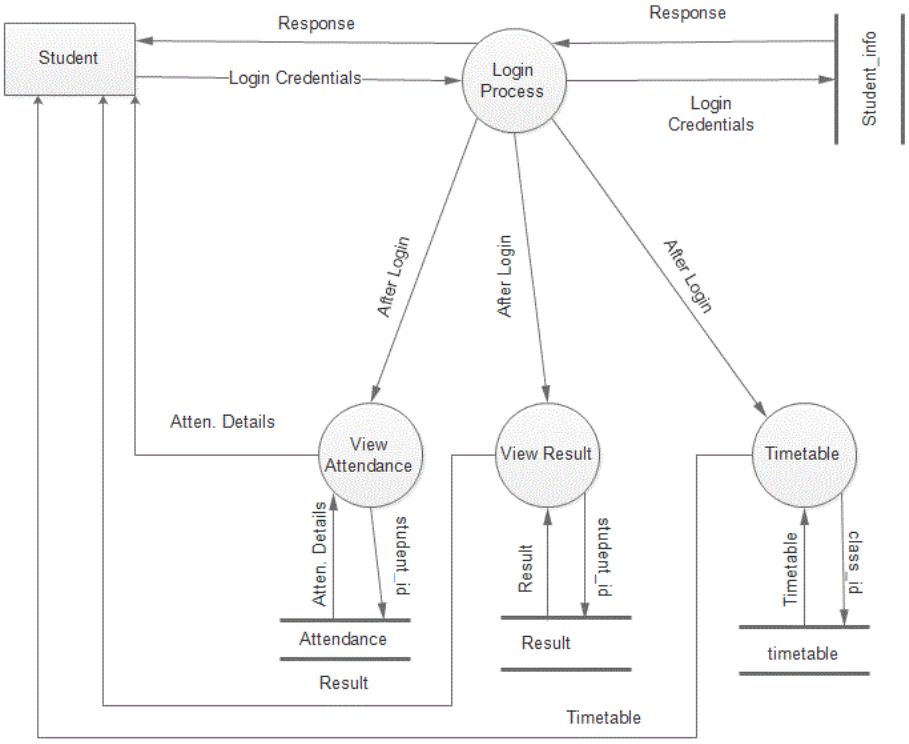
4.1 Use Case Diagram: -

4.2 Data Flow Diagram: -

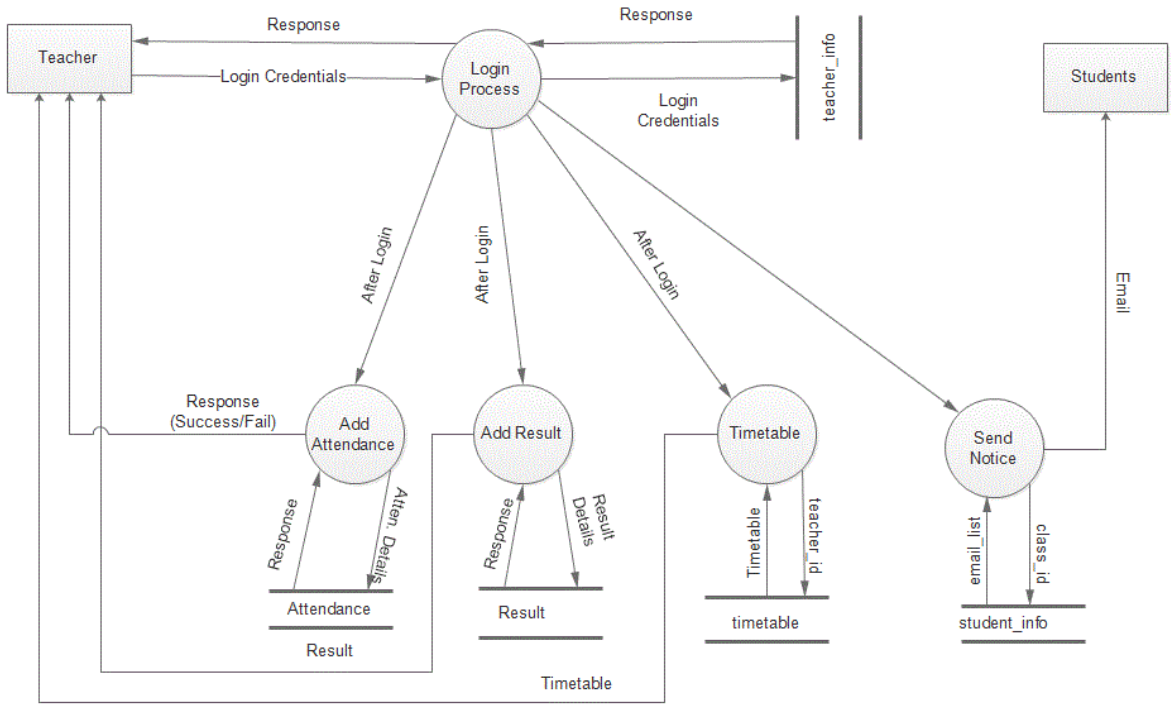
- **Level 0: -**



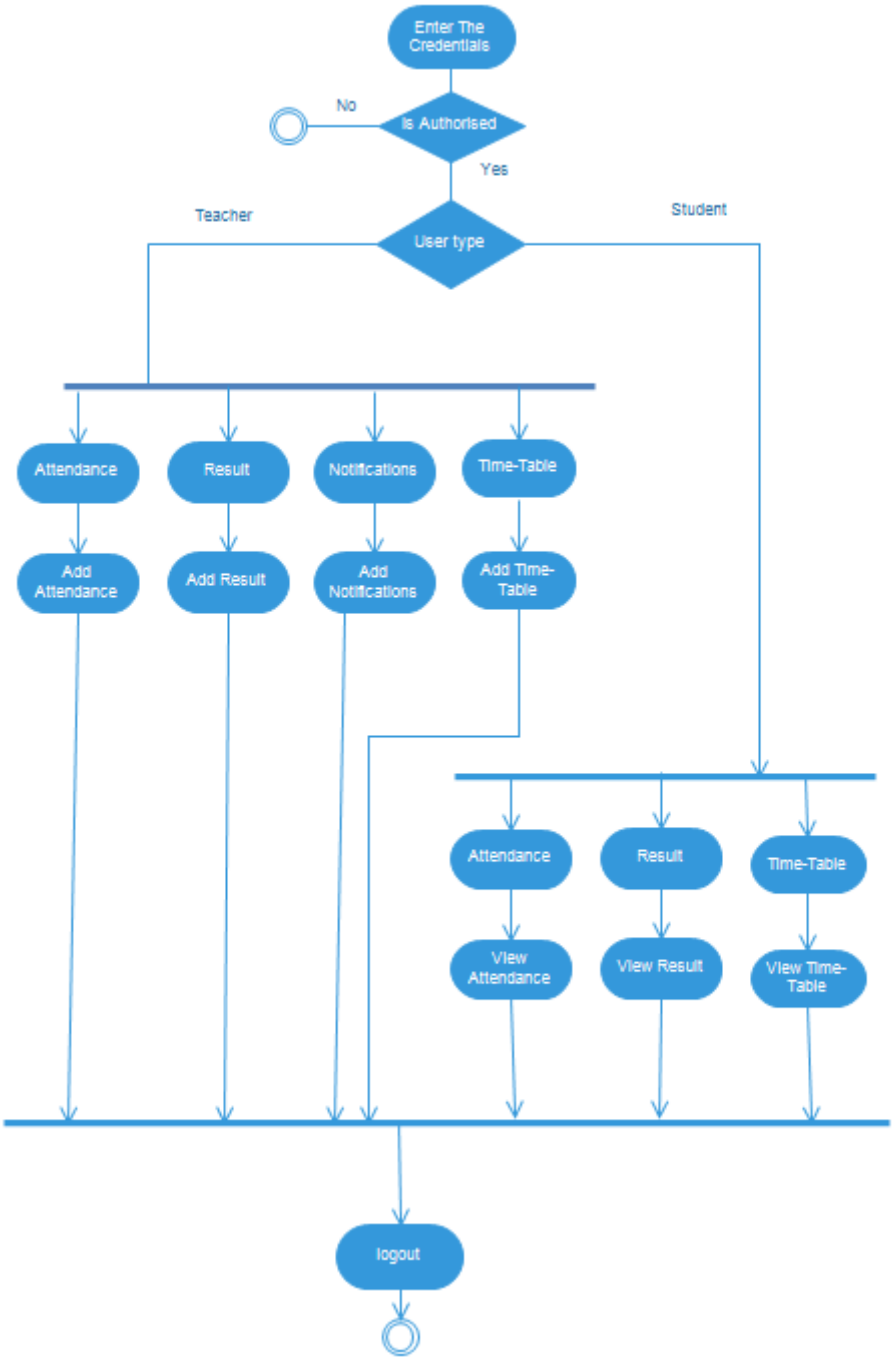
- **Level 1.1: -**



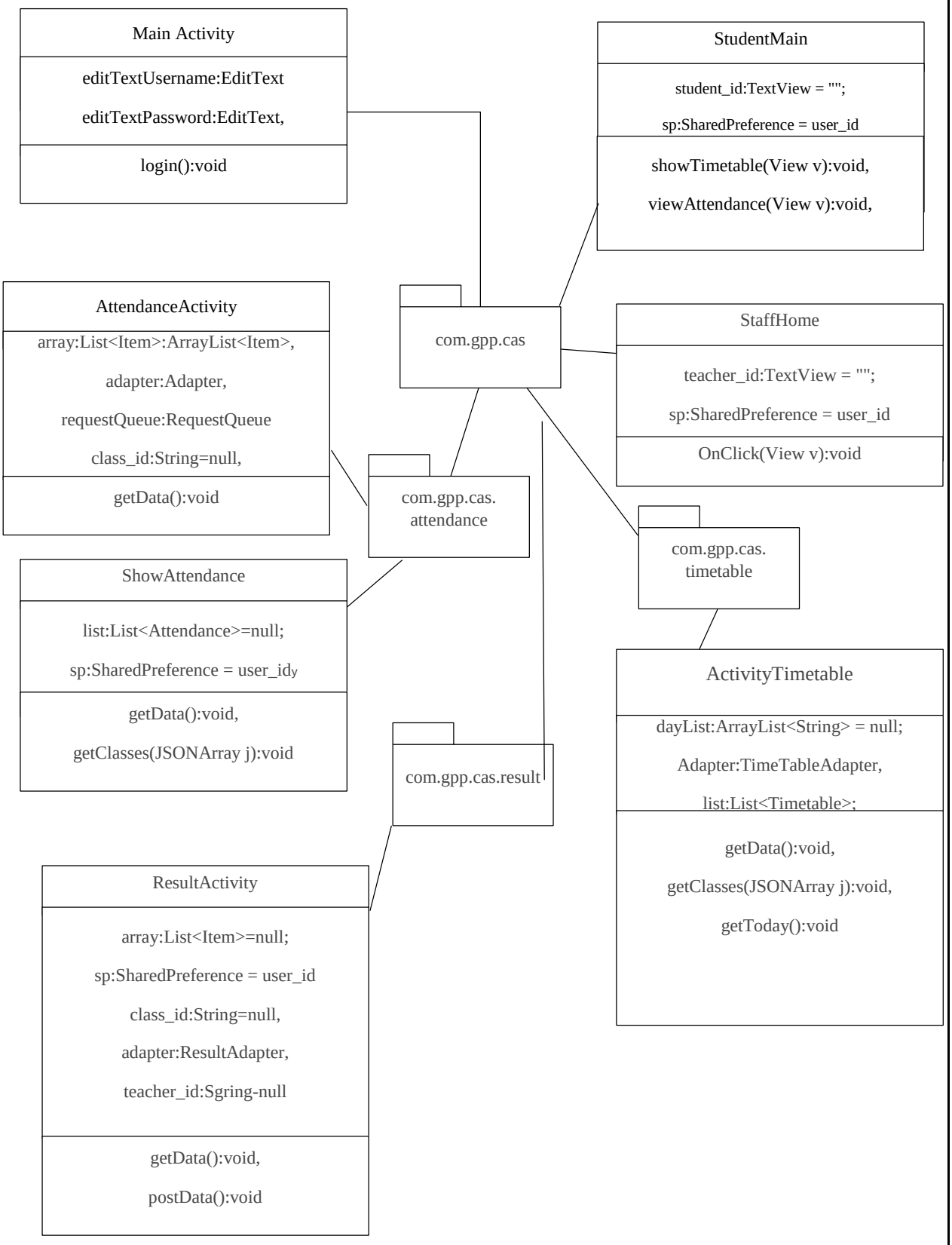
- **Level 1.2: -**


Teacher
Response
Login Credentials
Login Process
Response
Login Credentials
teacher_info
Students
After Login
After Login
After Login
Email
Response (Success/Fail)
Add Attendance
Add Result
Timetable
Send Notice
Response
Atten Details
Response
Result Details
Timetable
teacher_id
email_list
class_id
Attendance
Result
Result
timetable
student_info
Timetable

4.3 Activity Diagram: -

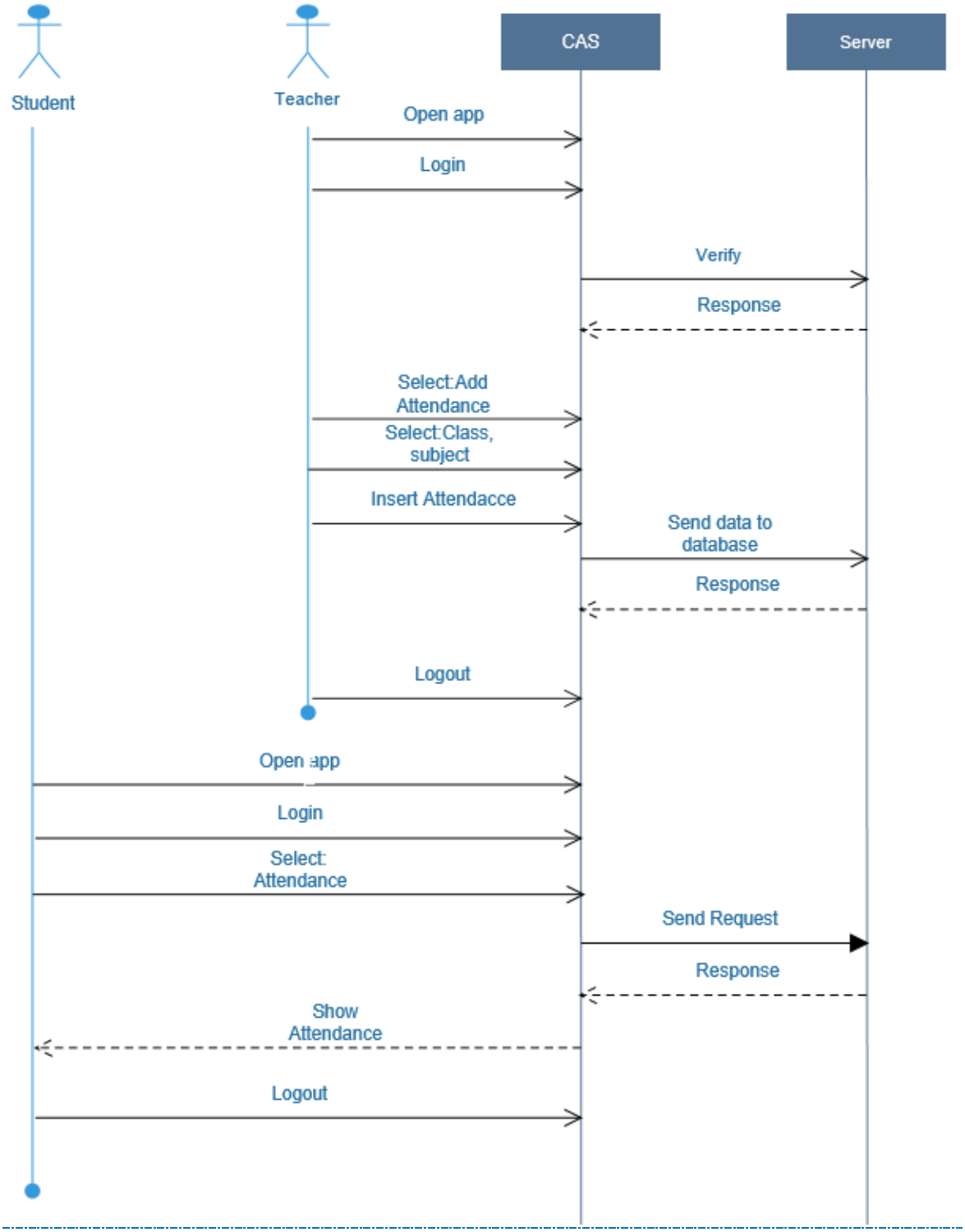


4.4 Class Diagram:-

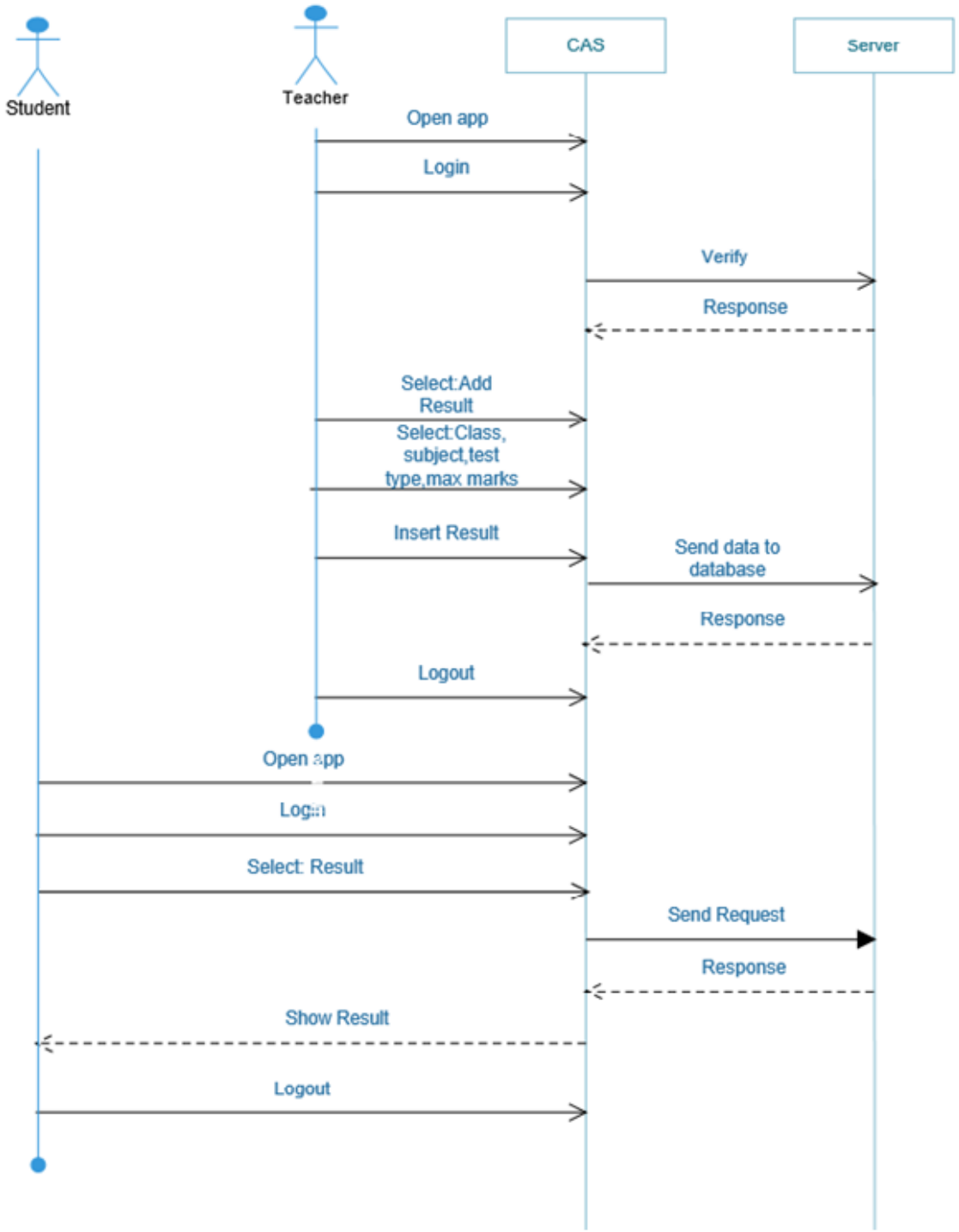


4.5 Sequence Diagram: -

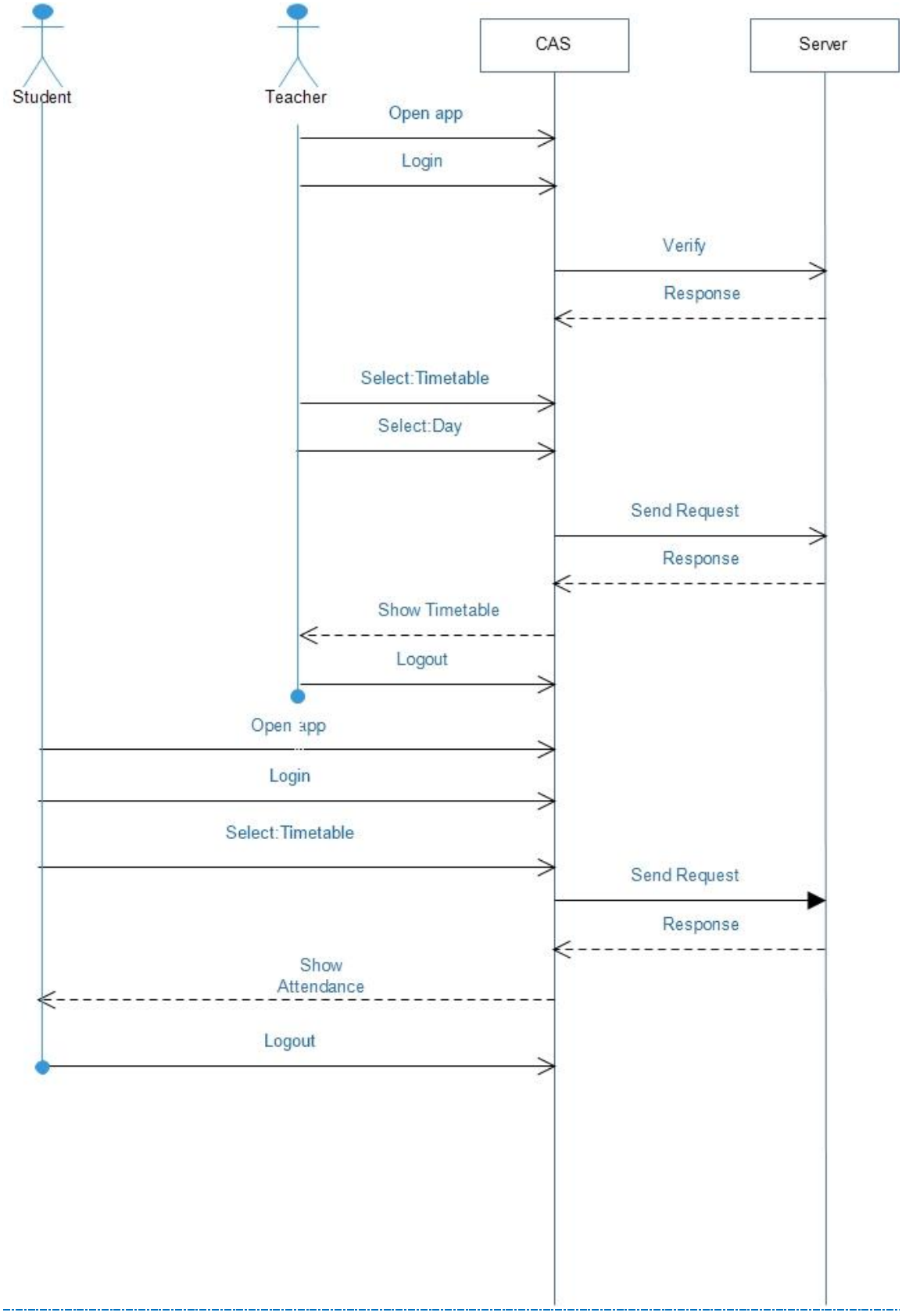
- **Attendance module: -**



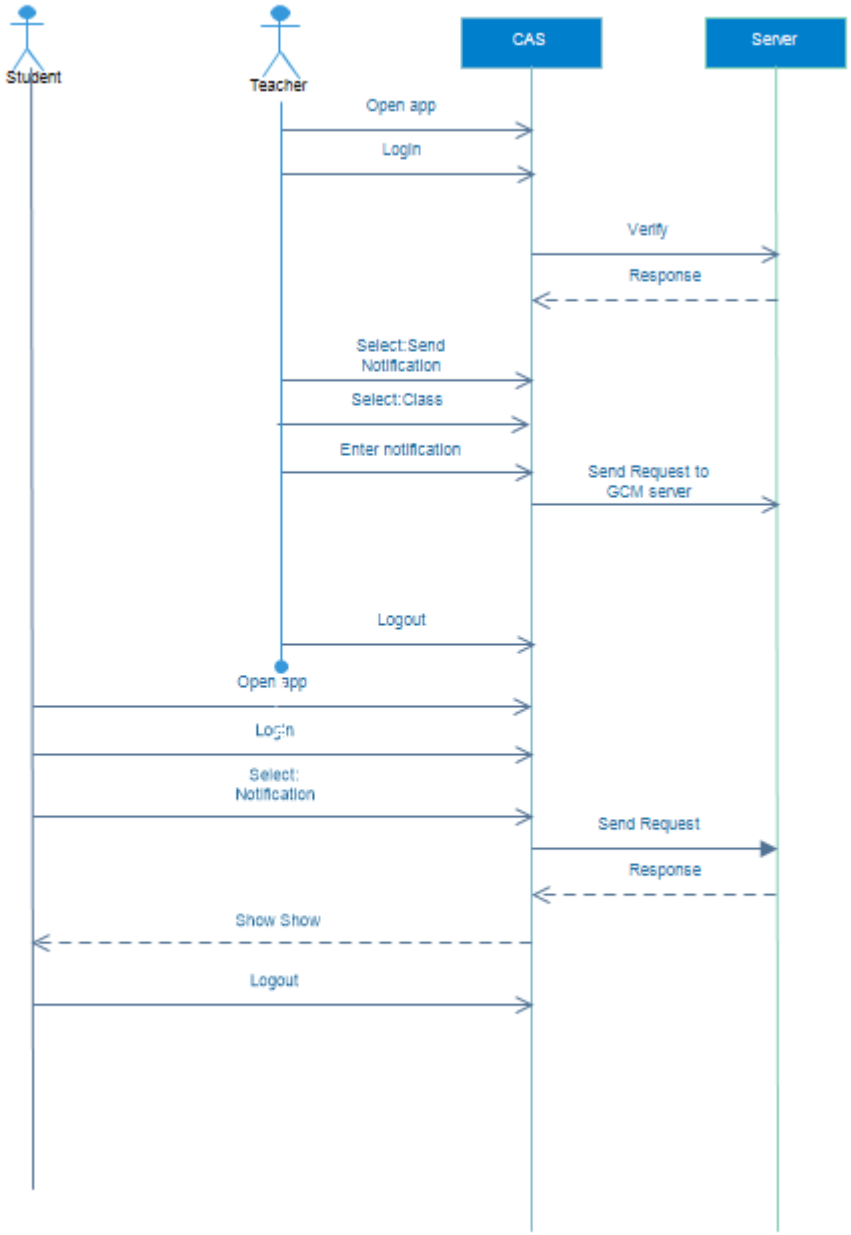
- **Result module: -**



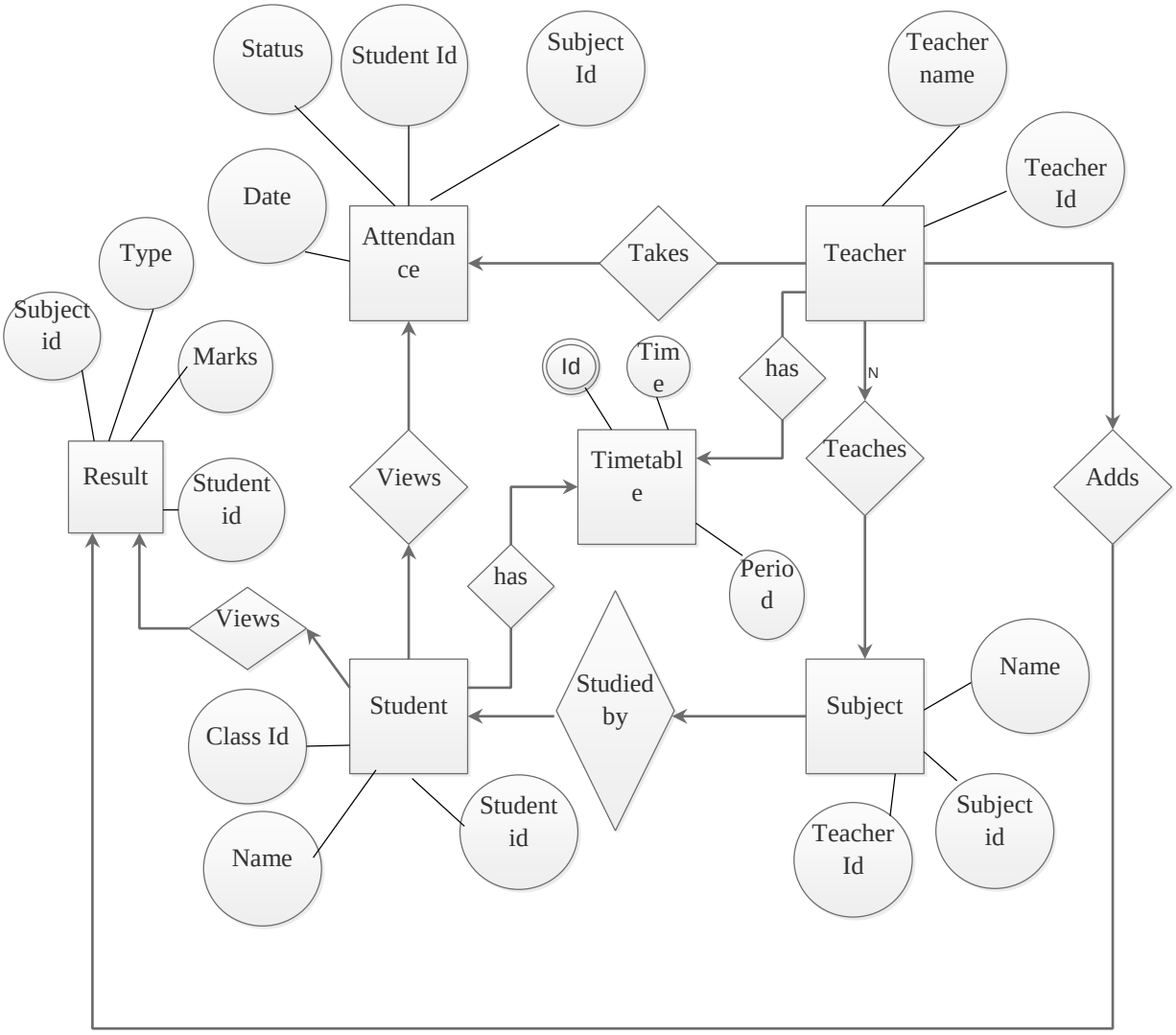
- **Time-table module: -**



- **Notifications module: -**



4.6 Entity-Relationship Diagram: -



5. Estimations

Function pointer	No of entities	Simple	Average	Complex	Total
No of user inputs		3	4	6	
1. Text fields	160	3			480
2. Buttons(I)	570	3			1710
3. Buttons(II)	7		4		28
4.Buttons(III)	1			6	6
No of user outputs		4	5	7	
1.Simple	15	4			60
2.Complex	120			7	840
No of user enquiries	0	3	4	6	0
No of files		7	10	15	
1. Simple	11	7			77
2. Average	14		10		140
3.Complex	42			15	630
No of external interfaces		5	7	10	
1. Database	1			10	10
2. Google cloud	1			10	10
				Total	3991

Type of project: - Semi-Detached

Function Points = Total UFP + (0.65 * (0.01 * TDI))

= 3991 * (0.65 + (0.01 * 40))

= 3991 * (0.65 + 0.4)

= 3991 * 1.05 = 4190.55 fp

Language factor for Java(LP): - 38

SLOC = FP * LP = 4190.55 * 38 =159240.9 SLOC

KLOC = SLOC/1000 = 159240.9/1000 =159.2409 KLOC

Efforts Applied(E) = 3.0 * $(KLOC)^{1.12}$

=3.0 * $(159.24)^{1.12}$

= 877.83

Development time = 2.5 * $(E)^{0.35}$

= 2.5 * $(877.83)^{0.35}$

= 26.775 PM

6. Risk Analysis and Management: -

- **Risk Analysis Table: -**

Risk ID	Risk	Category	Probability (%)	Priority (1-9)	Impact (1-4)
R101	Login intrusion	PS	20	1	1
R102	Inappropriate arrangement	CC	40	2	2
R103	Unfortunate Application Stops	BI	40	3	2
R104	Unsupported Application	DE	50	6	3
R105	Underestimation of resources	SSE	20	2	2
R106	Improvement in Technology	DE	20	8	4
R107	Change in Date	PS	40	1	1
R108	Lack of Developers	SSE	10	5	2
R109	Update of Information	PS	20	2	2
R110	Updation of Database	PS	10	1	1

PS	Project Specific Risk	DE	Development Environment Risk		
BI	Business Impact Risk	SSE	Staff size and Expertise Risk	CC	Customer Characteristics Risk

- **RMMM Plan: -**

Risk ID	Risk	RMMM Plan
R101	Login intrusion	1. Use Encryption of Data to avoid attacks 2.Give access of Database to authorized users only.
R102	Inappropriate arrangement	1. Make overall design simple and easy understandable. 2. Use proper font sizes and colors that are easily readable.
R103	Unfortunate Application Stops	1. Testing should be carried out for various devices. 2. According coding is done to support different devices.
R104	Unsupported Application	1. Decide the version of Android Studio and API to be used in project. 2. Share and Use this development environment for complete project.
R105	Underestimation of resources	1.Find the required resources. 2.Find alternatives to the required resources for the development
R106	Improvement in Technology	1. Learn new technology and use it to improve efficiency. 2. Test code to check compatibility with old system.
R107	Change in Date	1.Set the date to server time or any other authorized time.
R108	Lack of Developers	1. Give Training to all team Members for Technology used 2. Use known technology wherever possible.
R109	Updation of Information	1. Reduce Load on server. 2. Add Indexing to Data on Database to improve speed. 3.Use Proper Server Configuration.
R110	Updation of Database	1. Reduce Load on server. 2. Add Indexing to Data on Database to improve speed. 3.Use Proper Server Configuration.

7. Testing

The testing phase involves the testing of development system using various data. Preparation of the test data plays a vital role in system testing. After preparing the test data, the system under study was tested using those data. While testing the system, by using the test data, errors were found and corrected by using the following testing steps and corrections were also noted for future use. Thus, a series of testing is performed on the proposed system before the system is ready for implementation.

The College Automation System application has gone through various tests such as:-

7.1 White Box Testing

In White box testing we have used control structure of the procedural designs to derive test cases. As we are using a non-procedural language, there is very small scope for the white box testing. Whenever it is necessary, there the control structures are tested and successfully passed all the control structures with a very minimum errors..

7.2 Black Box Testing

Here we have focused on the functional requirements to the software. We have enabled to derive sets of input conditions that will fully exercise all functional requirements for a program. We have found almost all errors such as interface errors and errors in accessing the database and some performance errors. In Black box testing we have used two techniques: equivalence partitioning and the boundary value analysis technique..

7.3 Integration Testing

Testing the interaction between the modules and interaction with other systems externally is called Integration Testing. In this many tested modules are combined into subsystems, which were then tested. Test case data is prepared to check the control flow of all the modules and to exhaust all possible inputs to the program. Situations like treating the modules when there is no data entered in the test box is also tested

7.4 Performance Testing

This is done to determine how long it takes to accept and respond i.e., the total time for processing when it has to handle quite a large number of records. It is essential to check the exception speed of the system, which runs well with only a handful of test transactions. Such systems might be slow when fully loaded. So testing is done by providing large number of data for processing. A system testing is designed to uncover weaknesses that were not detected in the earlier tests.

7.5 Stress Testing

Stress testing is to find defects of the System capacity of handling large numbers of transactions during peak times.

7.6 User Acceptance testing

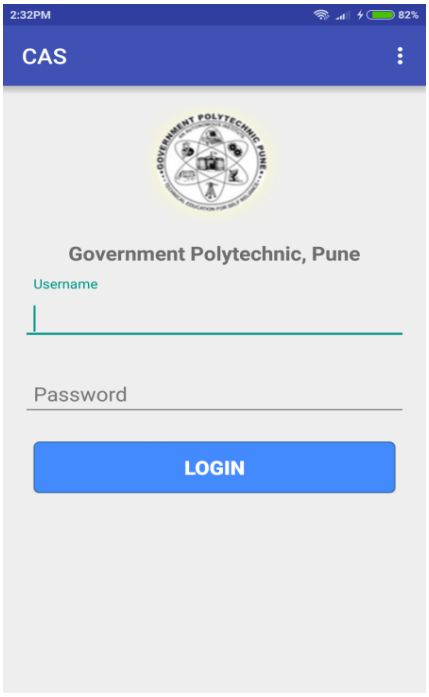
User Acceptance Testing is done as in-house testing in which the volunteers use the software by making the test version available for downloading and free trial over the Web.

Test Cases: -

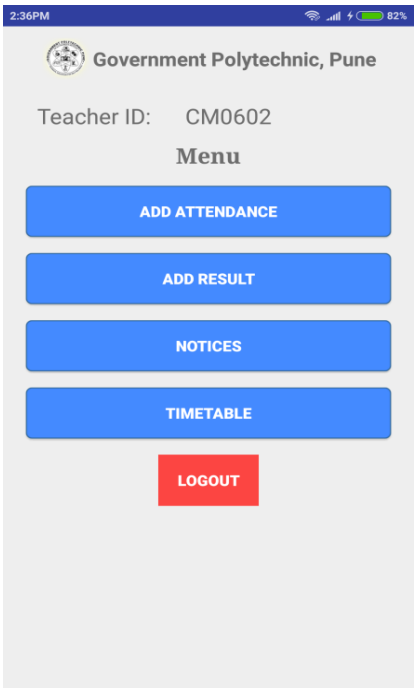
Sr. No	Input	Description	Expected Result	Actual Result	Status
1	Username: 1306062 Password: 1306062	Check the interface link between the Login and Student module	Directed to the Student's Home.	Directed to the Student's Home.	PASS
2	Username: CM0601 Pass: CM0601	Check the interface link between the Login and Teacher module	Directed to the Teacher's Home.	Directed to the Teacher's Home.	PASS
3	From Student's Home Select "View Attendance"	Check the link between home and attendance view module	Student's Attendance is displayed	Student's Attendance is displayed	PASS
4	From Student's Home Select "View Result"	Check the link between home and result view module	Student's Result is displayed	Student's Result is displayed	PASS
5	From Student's Home Select "Timetable"	Check the link between home and timetable module	Student's timetable is displayed	Student's timetable is displayed	PASS
6	From Teacher's Home Select "Timetable"	Check the link between home and timetable module	Teacher's timetable is displayed	Teacher's timetable is displayed	PASS
7	From Teacher's Home Select "Add Attendance"	Check the link Attendance between home and Attendance module	Selection page is displayed	Selection page is displayed	PASS
8	In Selection select: Class: COMPA1 Subject:SE Type:LECTURE	Check that selection page is working properly	Student's list of COMPA1 is displayed	Student's list of COMPA1 is displayed	PASS
9	From Teacher's Home Select "Post Notice"	Check that Post notice Activity is displayed	Activity for posting notice is displayed	Activity for posting notice is displayed	PASS

8. Screenshots

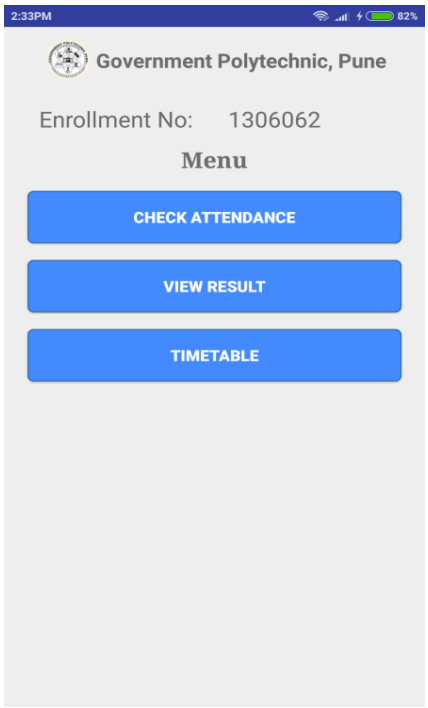
Main Login Page



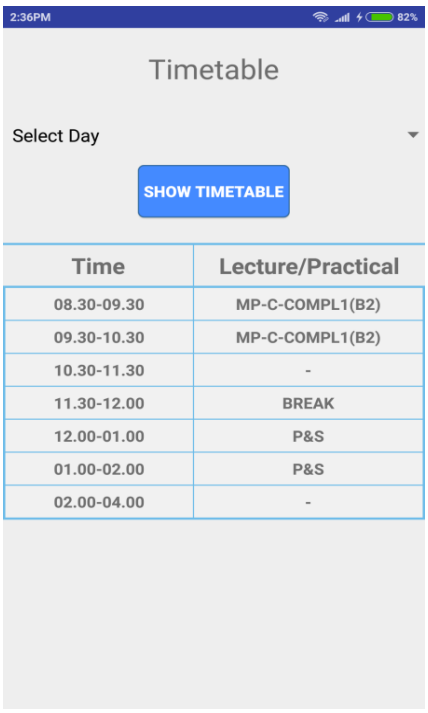
Teacher Login Page



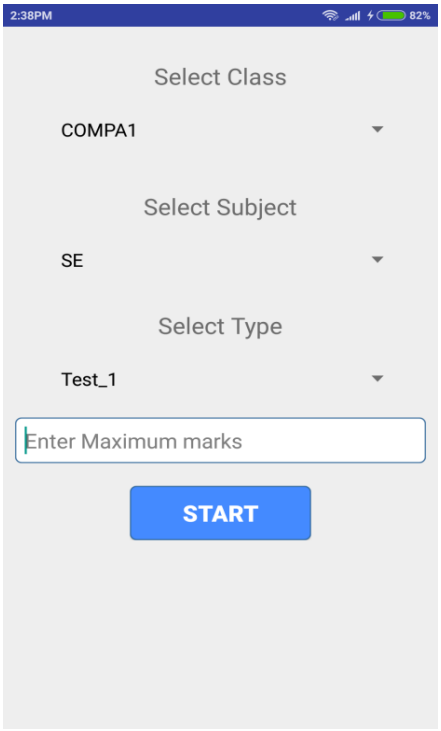
Student Login Page



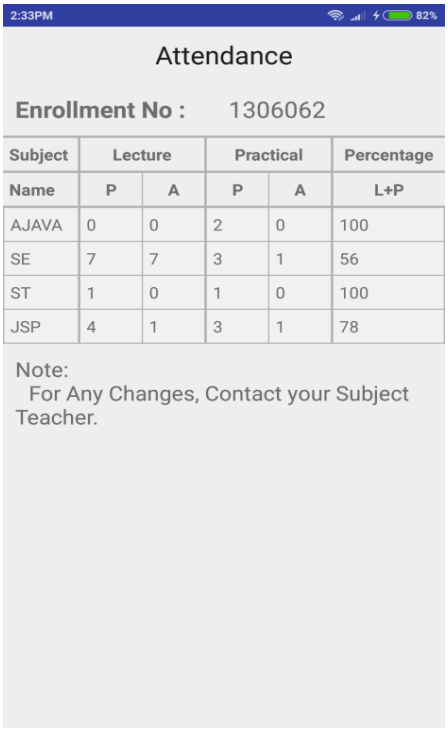
Timetable



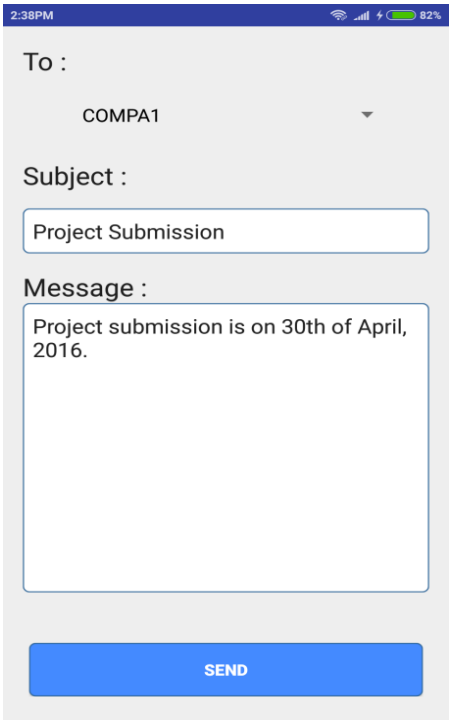
Result Filter Page



Student Attendance Page

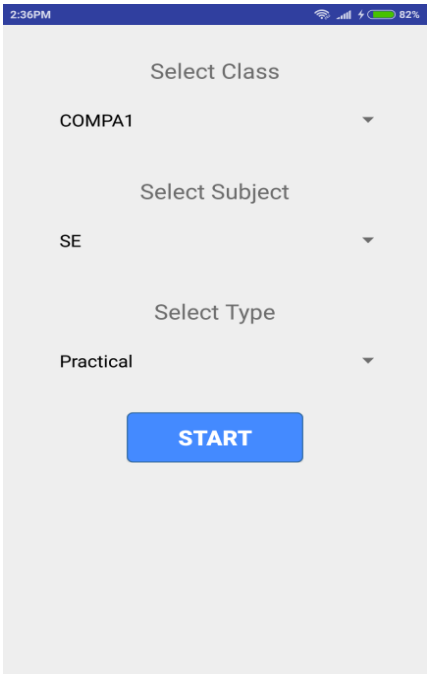


Notifications Page

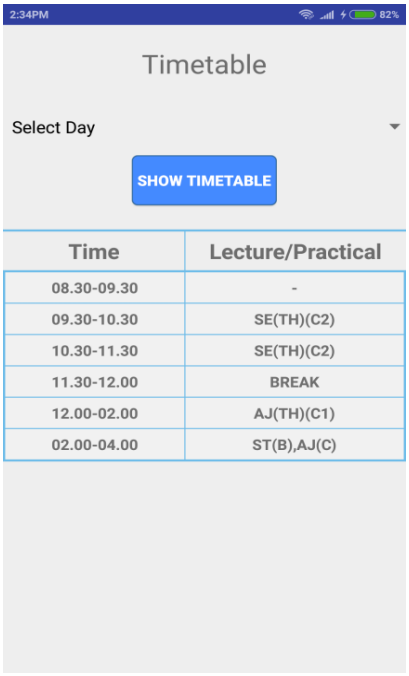


Teacher Attendance Page

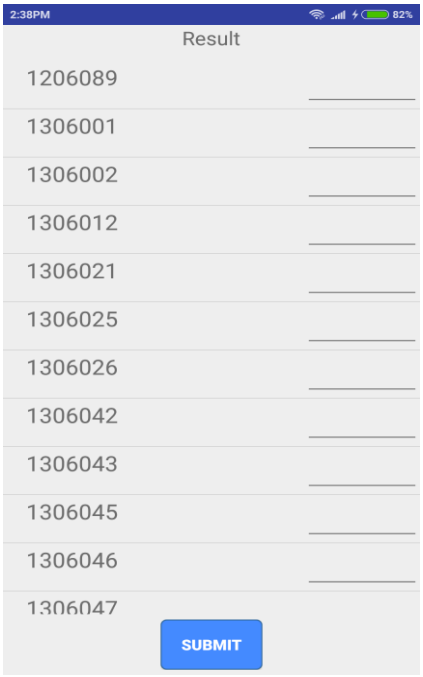
Attendance filter Page



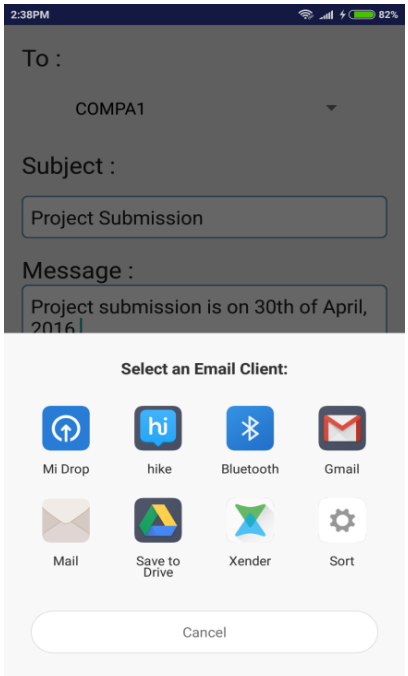
Student Time-table Page



Result Entry Page



Share via Options Page



9. Future Scope

The College Automation System has various future enhancements which will be provide here. They are as follows: -

- In accordance to the features provided up to date we may also provide a gallery where the memories of various events may be kept.
- It can also act as a guideline tool for the students.
- Students can upload assignments where teachers may review the assignments and guide them for the same.
- Students may also be able to download the syllabus and question papers for the various subjects as needed.
- They may also be provided with the fees transaction option to pay online fees or else download the receipt for the same.

10. Conclusion

The College Automation System has ability to organize and manage Students and Teacher information in a particular educational institution. It will help the teachers to update and view information directly from their Android smartphones. Students are also able to view the information such as daily time-table and their respective marks.

This application will help in easy access to information whenever necessary and saves time. This application uses database and will be handled by the institution for further use. This system is very productive and useful and can be used at various institutions and organizations at department levels.

11.References

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2. www.androidhive.com
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4. http://developer.android.com
5. http://design.google.com
6. www.youtube.com
7. www.google.com