Making sure of students' attendance and the system of mark management by using mobile applications.

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Abstract

Marking attendance in the class meeting session and recording the marks of the students are the prime tasks of the subject handlers, but current methods are time consuming and hectic. To avoid these problems, this paper aims to present a mobile application for student attendance and mark management system. This application is mainly designed for the faculties and other staff members of the organization who maintain attendance and marks regularly. Using this system, the subject handlers, staff or the authorities can verify the number of students present or absent in the class meeting sessions. This application allows the users to mark attendance through mobile devices and to keep in touch with students. It also gives a prior intimation to students as soon as their attendance goes below the specified percentage through an alert message.

Keywords: attendance; mobile applications; manual; student management, student attendance

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1. Introduction

In every school environment, discipline must be maintained in order to keep students focused on their studies [1]. Apart from the advantage of focusing on education that discipline provides to students in school, it also ensures personal improvement in student's social life and in their attitude towards life in general. To maintain discipline in Schools, it is essential to put measures in place, such that students face a consequence if they do not follow the laid-down procedure for conducting themselves in schools.

To maintain discipline in schools, most schools in the past have implemented student attendance registers and academic report system, which records students' attendance to schools and their performance in their courses of Studies [1]. These manual methods of recording students' attendance and performance have however proved to be stressful over the years. Apart from the stress that comes with the manual system, there is room for errors. As a result of these major disadvantages, stakeholders of education have advocated for the implementation of better student management systems that can solve the challenges presented by the manual system [1,2].

The attendance management system is one of the upgrades necessary for effectively managing students with ease. "Attendance Management System" is a software developed for maintaining the attendance of students on the daily basis in school. Here, the staff, who are handling the subjects, will be responsible to mark the attendance of the students. Each staff will be given a separate username and password based on the subject they handle [3]. An accurate report based on the student attendance is generated using the software developed. This system will also help in evaluating attendance eligibility criteria of a student. Report of the student's attendance on weekly and monthly basis is generated.

1.1. Existing System

The existing system is the manual entry for the students' attendance and report. In this system, the attendance is carried out in the handwritten registers. It is tedious to maintain the record for the user. The human effort is mostly used in this system [4]. The retrieval of the information is not as easy as the records are maintained in the handwritten registers. This application requires correct feed on input into the respective field. Suppose the wrong inputs are entered, the application resist to work. So, the user finds it difficult to use.

1.2. Proposed System

To overcome the drawbacks of the existing system, the proposed system has been evolved. This project aims to reduce the paperwork and saving time to generate accurate results from the student's attendance [4,5]. The system comes with the best user interface. Advantages of Proposed System includes the fact that: It is trouble-free to use; It is a relatively fast approach to enter attendance; Is highly reliable, approximate result from user; Best user Interface.

The objectives of developing Student Attendance Management System are identified based on the review of the problem statements. The purposes are listed as below:

1.2.1.   To store, access and manage student attendance data for every lecture.

All the student attendance data will be stored and managed through Student Attendance Management System. This system enables lecturer to add, view, make changes or delete on subjects,

classes, students, and attendance accordingly [4]. Moreover, saving attendance records into the system will be more secured as compared to paper-based records.*1.2.2. To calculate absences and the percentage of present of the students.*

Student Attendance Management System enhances calculation process to be more accurate and faster. This system by default will do the analysis, which are counting the number of absences and presence of all the students based on the input data. Hence, the calculated value can be ascertained and trusted as the calculation process is developed to run automatically within the system [5,6].

1.3. Purpose of study

Marking attendance in the class meeting session and recording the marks of the students are the prime tasks of the subject handlers, since marking the attendance can regulate the students to attend the classes. Moreover, it verifies the number of students present in the conducted classes. The purpose of recording the marks is to analyse the performance of the students in terms of curricular activities. Earlier, the tasks of marking attendance and recording the marks are handled manually by pen and paper method. This method consumes more time and adds more workload to the subject handlers and sometimes the data may be prone to error. To avoid these problems, this paper aims to present a mobile application for student attendance and mark management system.

2. Methods

This study presents a step-by-step explanation of what the learning management system software consists of, how it operates and how it is different from the manual system.

2.1. Data collection

The data for this research was secondary data which was collected from available resources online.

2.2. Research procedure

The study first analyses the current system of student management. After that, the research proceeds to discuss the proposed system of student management system and how it can improve the overall students' performance.

2.3. System Analysis

Analysis can be defined as breaking up of any whole, so as to find out their nature, function among others. It defines design as making preliminary sketches; to sketch a pattern or outline for plan. To plan and carry out especially by artistic arrangement or in a skilful wall [5-7]. System analysis and design can be characterized as a set of techniques and processes, a community of interests, a culture, and an intellectual orientation. The various tasks in the system analysis include the following:

1 Planning.

2 Scheduling.

3 Developing candidate solutions.

4 Performing trade studies.

5 Performing cost benefit analysis.

6 Recommending alternative solutions.

7 Selling of the system.

8 Supervising, installing, and maintaining the system.

This system manages the analysis of the report creation and develops manual entry of the student attendance. First design the student's entry form, staff allocation and timetable allocation forms. This project will help the attendance system for the department calculate percentage and reports for eligibility criteria of examination [8]. The application attendance entry system will provide flexible report or all students.

The research also conducted a feasibility study.

2.4. Feasibility Study

Feasibility analysis begins once the goals are defined. It starts by generating broad possible solutions, which are possible to give an indication of what the new system should look like. This is where creativity and imagination are used. Analysts must think up new ways of doing things- generate new ideas. There is no need to go into the detailed system operation yet. The solution should provide enough information to make reasonable estimates about project cost and give users an indication of how the new system will fit into the organization. It is important not to exert considerable effort at this stage only to find out that the project is not worthwhile or that there is a need significantly change the original goal. Feasibility of a new system means ensuring that the new system, which we are going to implement, is efficient and affordable. There are various types of feasibility to be determined.

2.4.1. Economically Feasibility

Development of this application is highly economically feasible. The only thing to be done is making an environment with an effective supervision. It is cost effective in the sense that has elimina0ted the paperwork completely. The system is also time effective because the calculations are automated which are made at the end of the month or as per the user requirement.

2.4.2. Technical feasibility

The technical requirement for the system is economic and it does not use any other additional Hardware and software. Technical evaluation must also assess whether the existing systems can be upgraded to use the new technology and whether the organization has the expertise to use it. Install all upgrades framework into the Net package supported widows-based application. This application depends on Microsoft office and intranet service database. Enter their attendance and generate report to excel sheet.

2.4.3. Operational Feasibility

The system working is quite easy to use and learn due to its simple but attractive interface. User requires no special training for operating the system. Technical performance includes issues such as determining whether the system can provide the right information for the Department personnel, student details, and whether the system can be organized so that it always delivers this information at

the right place and on time using intranet services. Acceptance revolves around the current system and its personal.
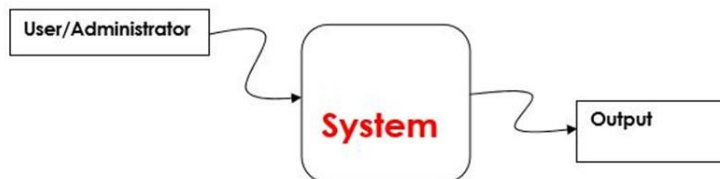
3. Results

3.1. Designing the system

Figure **1:** system design

3.2. Data Flow Diagram
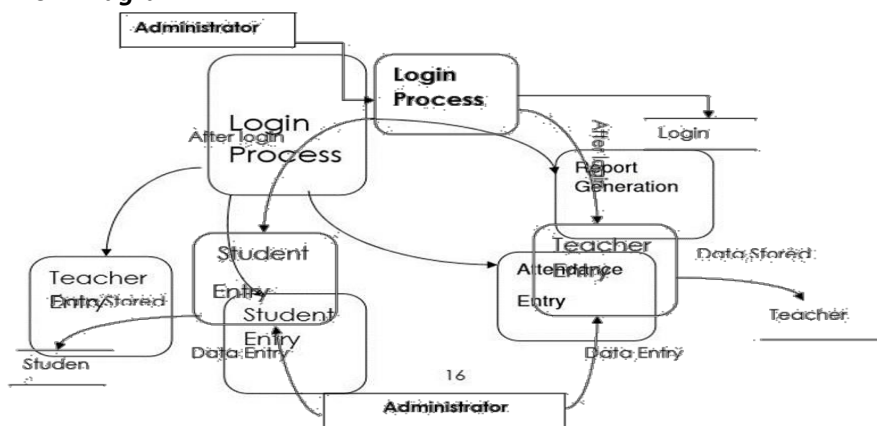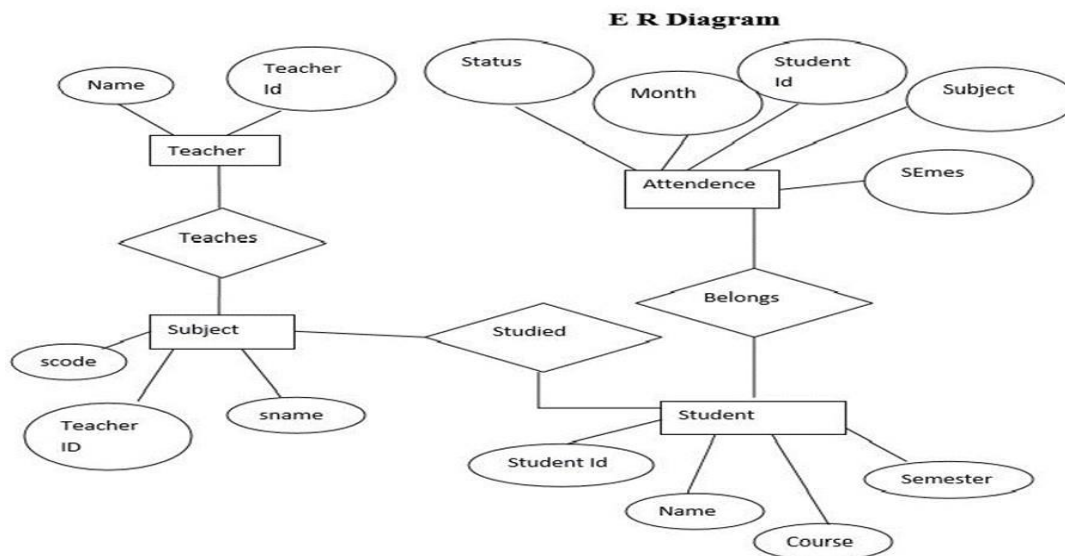

Figure 2: Data flow diagram

Figure 3: ER Diagram

3.3. Input Design

Figure 3: ER Diagram Input design is part of overall system design that requires special attention designing input data is to make the data entered easy and free from errors [9]. The input forms are designed using the controls available in NET framework. Validation is made for each and every data that is entered. Help information is provided for the users during when the customer feels difficult.

Input design is the process of converting the user originated inputs to a computer-based format. A system user interacting through a workstation must be able to tell the system whether to accept the input to produce reports [10]. The collection of input data is considered to be most expensive part of the system design. Since the input has to be planned in such a manner so as to get relevant information, extreme care is taken to obtain pertinent information

This project will first have to be entered in the input of allocation forms. It will be created on student details form, subject entry form, and timetable form. It will help to calculate subject-wise attendance. Also, any verification needed is available in details on the forms. This project gives the opportunity to enter in attendance of single subject-wise or all subject-wise attendance data.

3.4. Output Design

Output design of this application "Student Attendance App", generally refers to the results and information that are generated by the system for many end-users [11]. Output is the main reason for developing the system and the basis on which they evaluate the usefulness of the application. The output is designed in such a way that it is attractive, convenient, and informative. Forms are designed with various features, which make the console output more pleasing. As the outputs are the most important sources of information to the users, better design should improve the system's relationships with us and also will help in decision making. Form design elaborates the way output is presented and the layout available for capturing information. One of the most important factors of the

system is the output it produces. This system refers to the results and information generated. Basically, the output from a computer system is used to communicate the result of processing to the user.

3.5. Project Description

3.5.1. Problem Definition

This developed system will reduce the manual work and avoid redundant data. By maintaining the attendance manually, efficient reports could not be generated. The system can generate efficient weekly consolidated report, based on the attendance. As the attendance is maintained in registers it has been a tough task for administrators and staff to maintain it for a long time. Instead, the software can store data for a long period and can retrieve the information when needed.

3.5.2. Project Overview

Attendance Management System basically has two main modules for proper functioning. Admin module has rights for creating any new entry of faculty and student details. User has rights of making daily attendance, generating report. Attendance report can be taken by given details of student details, date, and class.

3.5.3. Module Description

The system should be designed in such a way that only authorized people should be allowed to access some particular modules. The records should be modified by only administrators and no one else. The user should always be in control of the application and not the vice versa. The user interface should be consistent so that the user can handle the application with ease and speed. The application should be visually and conceptually clear.

3.6. Administrator Module

3.6.1 Teacher Details

It helps to allot the subject and the subject code to the particular staff. It provides the facility to have a username and password to the staff.

3.6.2 Attendance details

This module allows lecturer to manage and alter the attendance data efficiently. Lecturer adds new attendance based on week, which is from week 1 to week 14. After that, the system will prompt for date of the attendance before a new attendance data is successfully completed. This module by default assigns all the students to be present as the number of students who are present will be more than absent. Thereafter, the lecturer can manipulate and change the absentees' attendance status to absent, absent with notice or absent with medical certificate based on the reason given. Different colour code will be shown in this module based on student attendance status to ease lecturer readability.

Salama, R. & Zaid, M. (2021). Making sure of Students Attendance and the system of Mark Management by Using Mobile Applications. Global Journal of Computer Sciences: Theory and Research. 11(1), 01-21. https://doi.org/10.18844/gjcs.v11i1. Salama, R. &

3.7. Teacher Module

3.7.1. Attendance details

It assists the staff to mark attendance to the students for their subject. This will authenticate the staff before making the entry.

3.7.2 Student Module

This module provides convenience in managing student details. This module enables lecturer to add students into the attendance one by one. Student data will be deleted when the student does not belong to any of the classes. In addition, this module provides a multiple checkbox which enables lecturer to check on which student to be removed. It can be multiple or single deletion. If none of the checkbox is checked and lecturer clicked on delete button Overall, this module provides lecturer with a lot of alternatives in altering student data.

3.8. Project Outlook:

GUI 1: Main provides the basic navigation access to the user allowing him to choose his login type as Administrator, Faculty or Student.

GUI 2: Based on the users' selection on the first screen he is navigated to the other screen on the basis of selection he/she made.

GUI 3: This screen is the users' main work area from the navigation menu the user selects for the operation to be performed and is taken to the respective domain of the project.

3.9. Use Case Diagram

A use case diagram in the Unified Modelling Language (UML) is a type of behavioural diagram defined by and created from a Use-case analysis. Its purpose is to present a graphical overview of the functionality provided by a system in terms of actors, their goals (represented as use cases), and any dependencies between those use cases.

The main purpose of a use case diagram is to show what system functions are performed for which actor. Roles of the actors in the system can be depicted. Use Case diagrams are formally included in two modelling languages defined by the OMG: The Unified Modelling Language (UML) and the Systems Modelling Language (SysML).
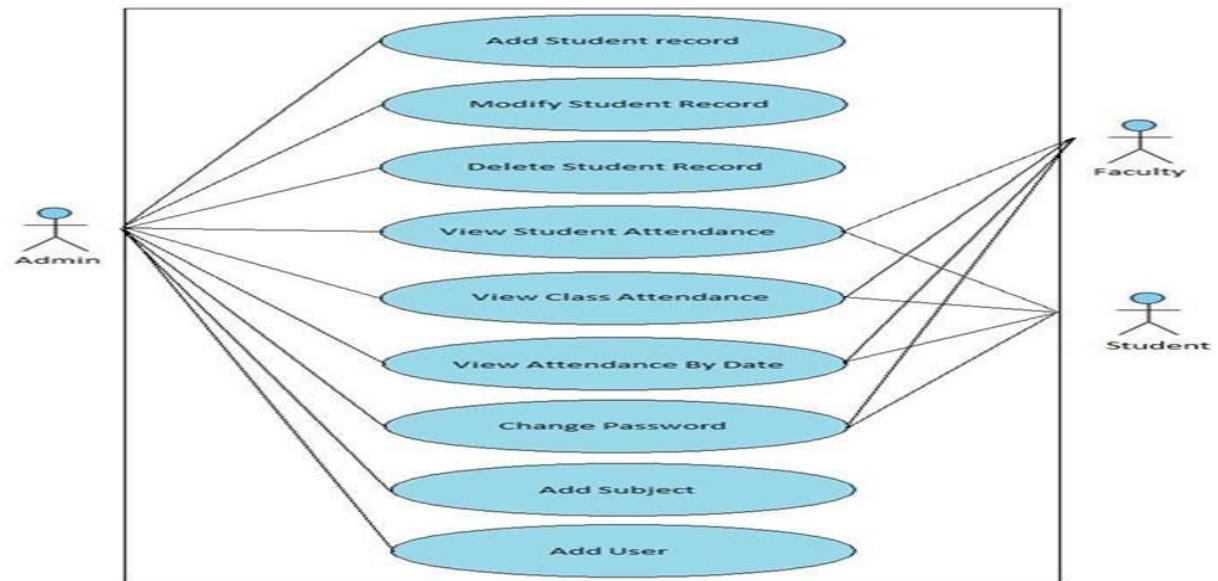
Figure 1: Use Case Diagram

3.10. Data Flow Diagram

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system. It differs from the system flowchart as it shows the flow of data through processes instead of hardware. The DFD, which is a way of expressing the system in a graphical format in a modular design, was developed by Larry Constrains. This DFD , also known as "Bubble Chart", has the purpose of classifying the system requirement and identifying the major information that will be a program in system design. A Data Flow Diagram is a logical model of the system, and shows the flow of the data and the flow of logic. So this describes what takes place in a proposed system, not how the activities are accomplished. We have noted that the DFD describes what the flow is, rather than how they are processed, so it means the DFD does not depend on the hardware, software, data structure or file organization. DFD consist of a series of symbols joined together by a line.

There may be a single DFD for the entire system or it may be exploded into various levels.

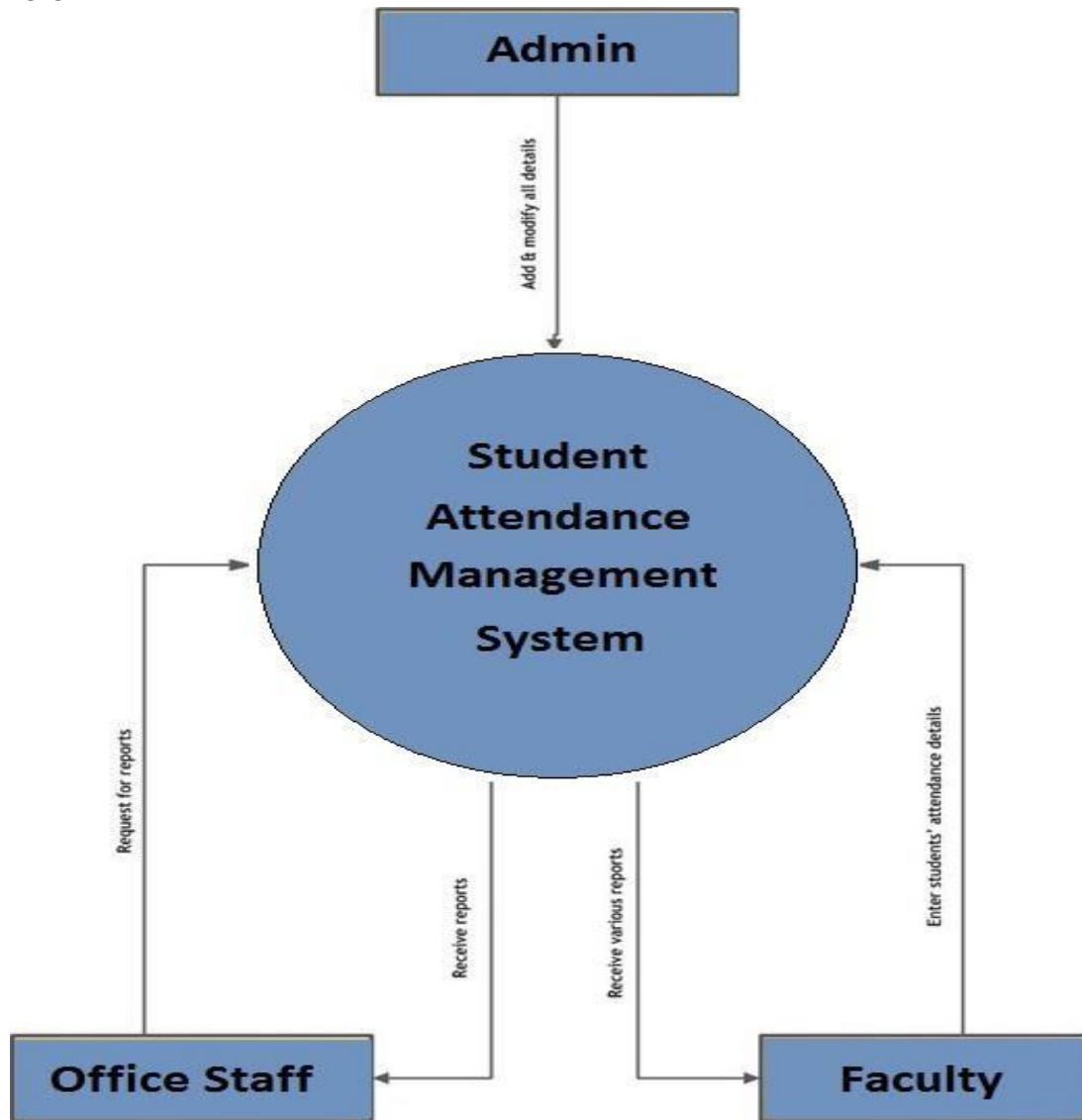• Context Free Diagram

• First Level DFD
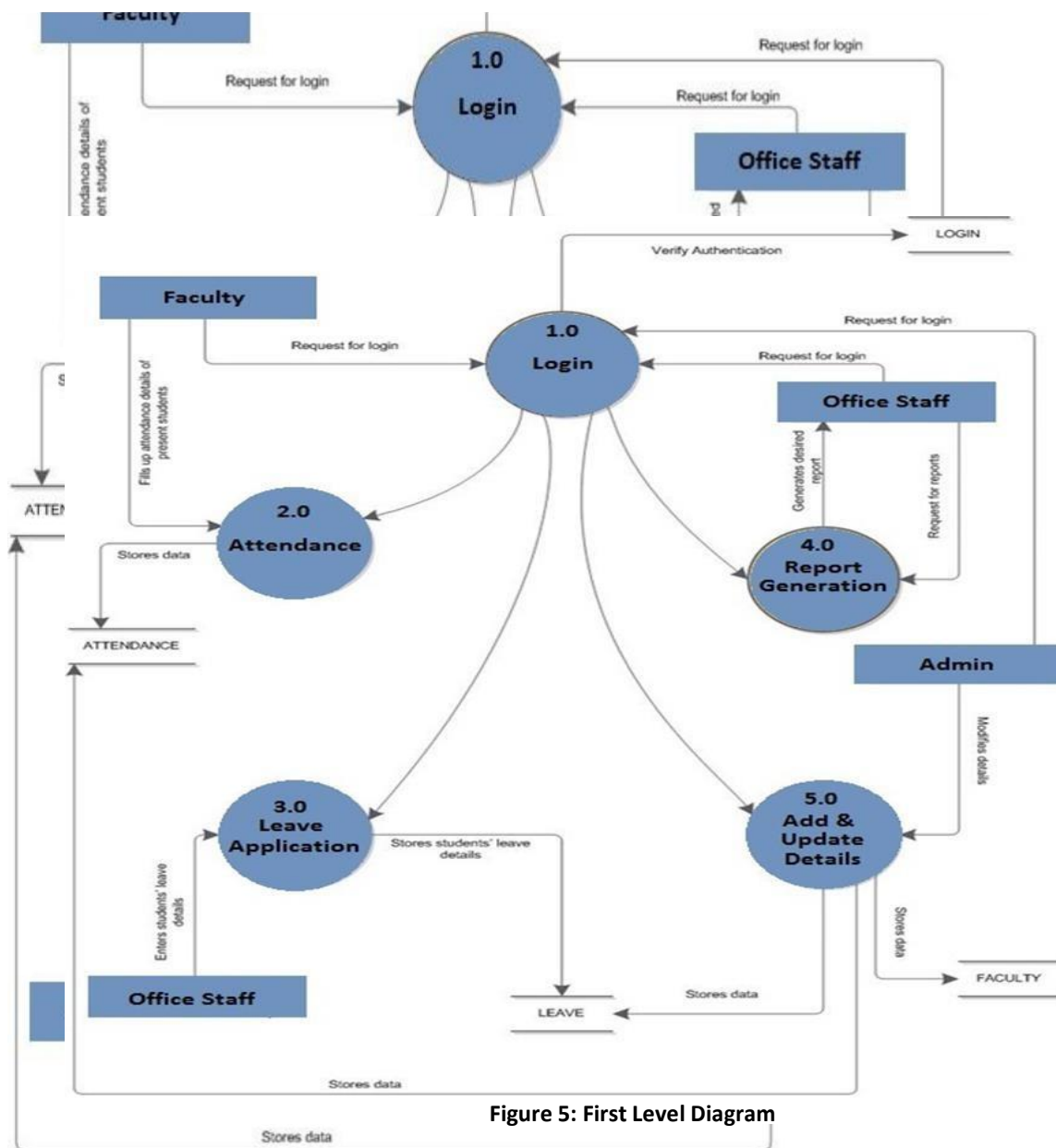
- Second Level DFD

Figure 4: Context Free

pplications.

Figure 5: First Level Diagram

3.11. Entity Relationship Diagram: -

An entity-relationship diagram is a data modelling technique that creates a graphical representation of the entities, and the relationships between entities, within an information system. The three main components of an ERD are:

- The *entity* is a person, object, place, or event for which data is collected. For example, if you consider the information system for a business, entities will include not only customers, but the customer's address, and orders as well. The entity is represented by a rectangle and labelled with a singular noun.

- The *relationship* is the interaction between the entities. In the example above, the customer *places* an order, so the word "places" defines the relationship between that instance of a customer and the order or orders that they place. A relationship may be represented by a diamond shape, or more simply, by the line connecting the entities. In either case, verbs are used to label the relationships.
- The *cardinality* defines the relationship between the entities in terms of numbers. An entity may be *optional*: for example, a sales rep could have no customers or could have one or many customers; or *mandatory*
- The steps involved in creating an ERD are: Identify the entities, Determine all significant interactions. and Analyse the nature of the interactions.

3.12. Entity Relationship Diagram Notations

Peter Chen developed ERDs in 1976. Since then, Charles Bachman and James Martin have added some slight refinements to the basic ERD principles.
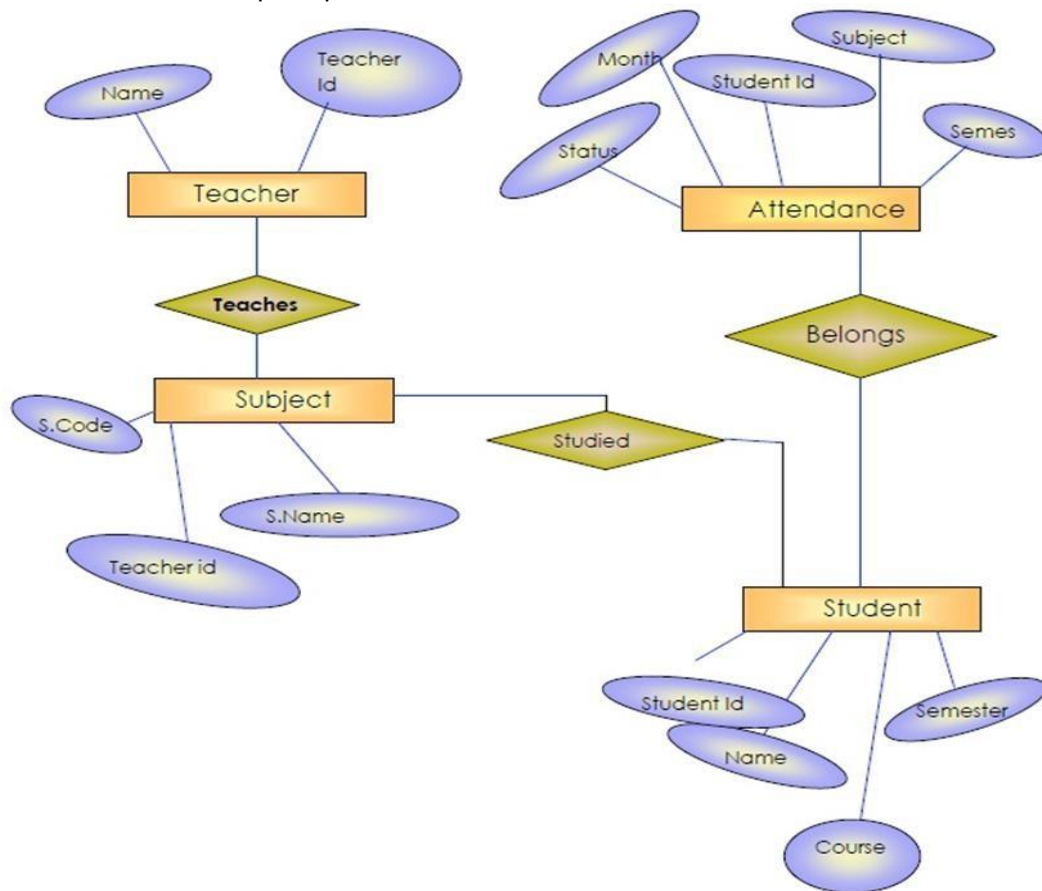

Figure 6: Showing Entity Relationship Diagram

3.13. System Testing

3.13.1. Overview of System Testing

Once source code has been generated, software must be tested to uncover (and correct) as many errors as possible before delivery to customer. Our goal is to design a series of test cases that have a high likelihood of finding

errors. To uncover the errors, software techniques are used. These techniques provide systematic guidance for designing test that:

1 Exercise the internal logic of software components, and

2 Exercise the input and output domains of the program to uncover errors in program function, behaviour and performance.

3.13.2. Steps

Software is tested from two different perspectives:

(1) Internal program logic is exercised using —White box‖ test case design

  Techniques.

(2) Software requirements are exercised using —block box‖ test case

 Design techniques. In both cases, the intent is to find the maximum number of errors with the

Minimum amount of effort and time.

3.14. Testing Methodologies

A strategy for software testing must accommodate low-level tests that are necessary to verify that a small source code segment has been correctly implemented as well as high-level tests that validate major system functions against customer requirements [12]. A strategy must provide guidance for the practitioner and a set of milestones for the manager. Because the steps of the test strategy occur at a time when deadline pressure begins to rise, progress must be measurable, and problems must surface early as possible. Following testing techniques are well known and the same strategy is adopted during this project testing.

3.14.1. Unit testing

Unit testing focuses verification effort on the smallest unit of software design-the software component or module. The unit test is white-box oriented. The unit testing is implemented in every module of student attendance management System. By giving correct manual input to the system, the data is stored in database and retrieved. If a required module is needed to access input or get the output from the End user, any error accrued over time will require the handler to show what type of error has been accrued.

3.14.2. Performance Testing

Performance testing is designed to test the run-time performance of software within the context of an integrated system. Performance testing occurs throughout all steps in the testing process. Even at the unit level, the performance of an individual module may be assessed as white-box tests are conducted. This project reduces attendance table codes and generates reports faster. It does not use extra time waiting for results. Correct data entered will show results within few milliseconds. It uses low memory space. Users do not automatically get access to software but first need to attain user permission and access to other applications.

3.15. Test cases

Test case, which is an object for execution for other modules in the architecture does not represent any interaction by itself [13]. A test case is a set of sequential steps to execute a test operating on a set of predefined inputs to produce certain expected outputs [14]. There are two types of test cases: -

Manual land automated.

A manual test case is executed manually while an automated test case is executed using automation. In system testing, test data should cover the possible values of each parameter based on the requirements. Since testing every value is impractical, a few values should be chosen from each equivalence class. An equivalence class is a set of values that should all be treated the same. Ideally, test cases that check error conditions are written separately from the functional test cases and should have steps to verify the error messages and logs. Realistically, if functional test cases are not yet written, it is ok for testers to check for error conditions when performing normal functional test cases. It should be clear which test data if any, is expected to trigger errors.

Table 1: Agent and admin login form

no	Test case id	Test case name	Test case Desk	Step	Expected result	Actual Result	Test case status pass/fail
1	Login admin	Validate login	To verify that login name on login page	Enter the Login name and password and click Submit Button	Login successful or an error message "In valid login or password" must be displayed	Login successful	Pass
2	Login Staff	Validate login	To verify that login name on login page	Enter the Login name and password and click Submit Button	Login successful or an error message "In valid login or password" must be displayed	Login successful	Pass
3	Password	Validate password	To verify that password on login page	Enter password and login Name Click Submit Button	An error message "Password invalid" must be displayed	An error message "Password invalid" must be displayed	fail

3.16. System Implementation

System implementation is the important stage of project when the theoretical design is turned into a practical system. The main stages in the implementation are as follows:

➢ Planning

➢ Training

➢ System testing and

➢ Changeover Planning

Planning is the first task in the system implementation. At the time of implementation of any system, people from different departments and system analysis are involved. They are to confirm practical problems of controlling various activities of people outside their own data processing departments.

The line managers control through an implementation coordinating committee. The committee considers ideas, problems, and complaints of user department, it must also consider:

The implication of system environment

➣ Self-selection and allocation for implementation tasks

➣ Consultation with unions and resources available

➣ Standby facilities and channels of communication

Student Attendance management system will collect student details, staff handle, subjects' details, separate login details, timetable details. It will be used to enter subject-wise attendance. This application elaborates attendance table, generate weekly consolidated report, for the End user. Mostly this application will calculate date-wise attendance, select a starting date to end date, and generate reports at the time of activities.

3.17. System Maintenance

Software maintenance is far more than finding mistakes. Provision must be made for environmental changes, which may affect either the computer, or other parts of the computer-based systems. Such activity is normally called maintenance. It includes both the improvement of the system functions and the corrections of faults, which arise during the operation of a new system. It may involve the continuing involvement of a large proportion of computer department recourses. The main task may be to adapt existing systems in a changing environment.

Back up for the entire database files are taken and stored in storage devices like flash drives, pen drives and disks so that it is possible to restore the system at the earliest. If there is a breakdown or collapse, then the system gives provision to restore database files. Storing data in a separate secondary device leads to an effective and efficient maintains of the system. The nominated person has sufficient knowledge of the organization's computer passed based system to be able to judge the relevance of each proposed change.

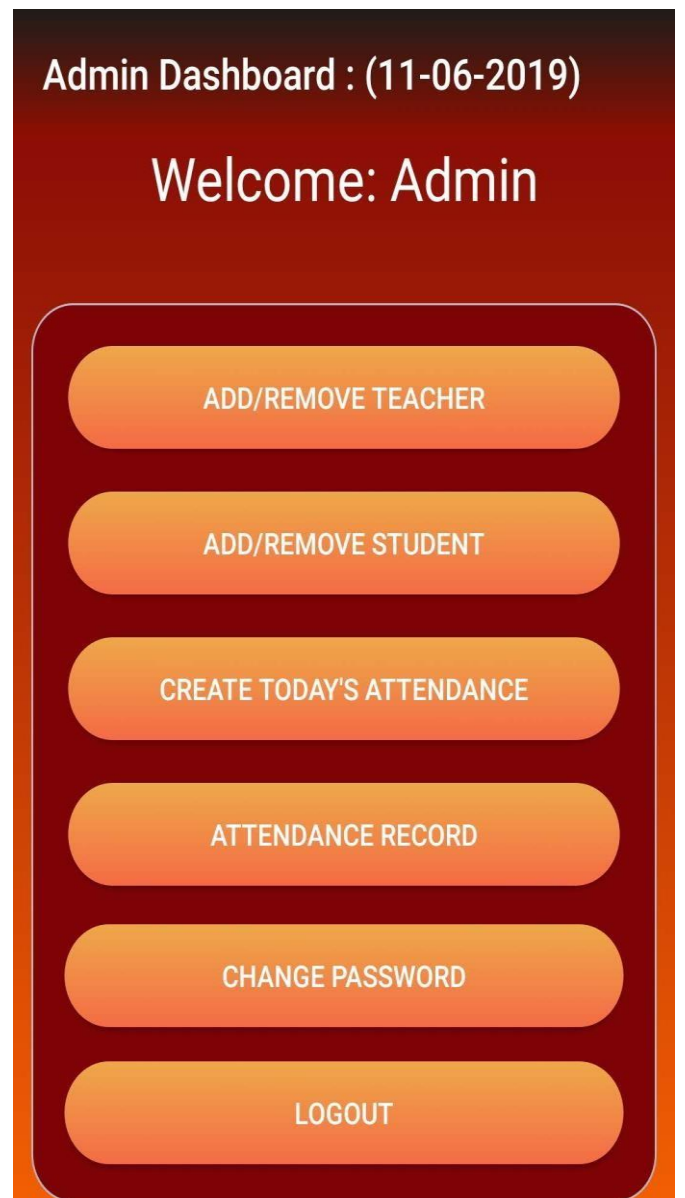### 3.18. Screenshots of the Application

Figure 7: interface

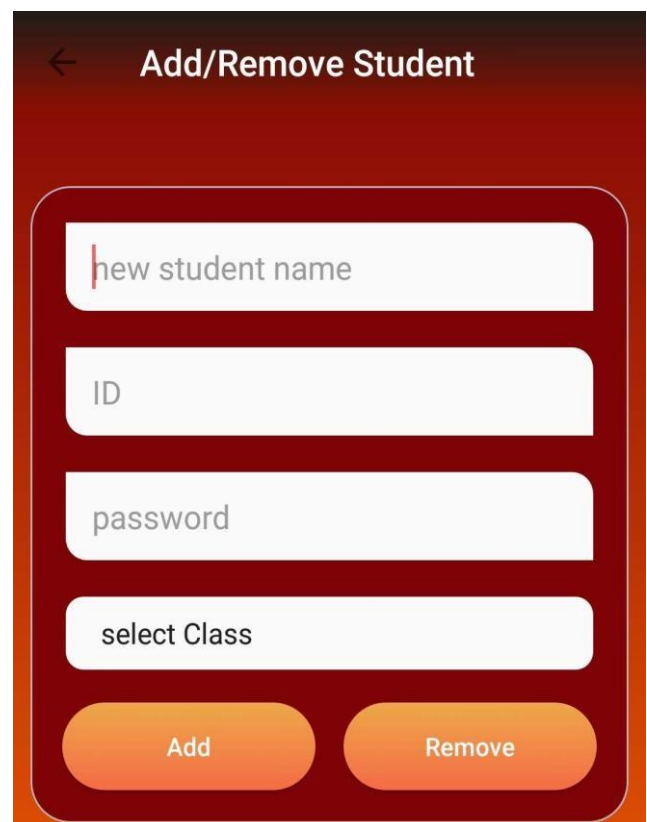
Figure 8: admin dashboard

Figure 9: How to add Remove Teacher
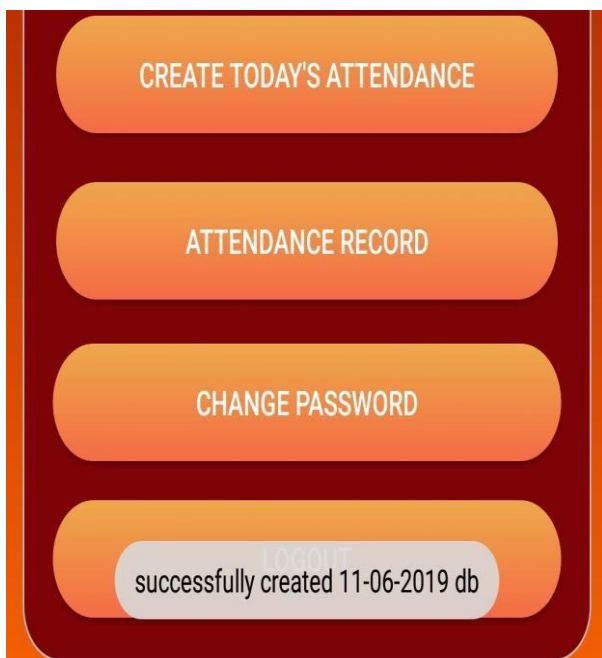

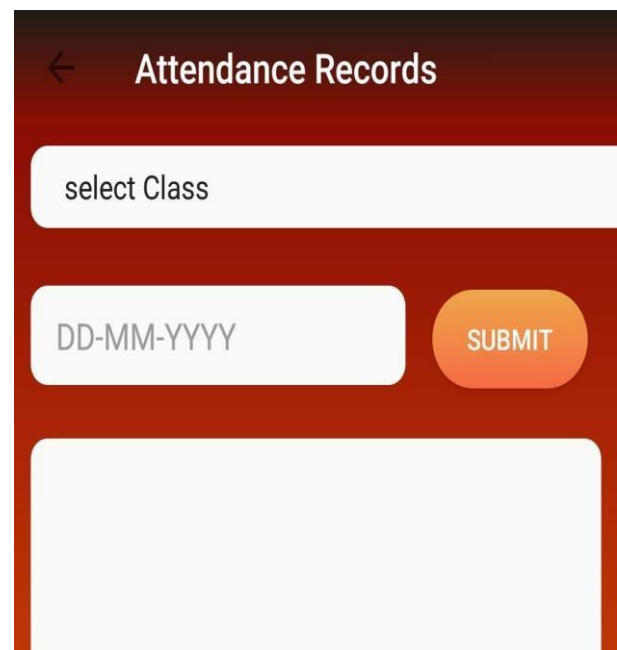**Figure 10: Add Remove Student**

Figure 11: Create Today's Attendance

Figure12: Attendance Record

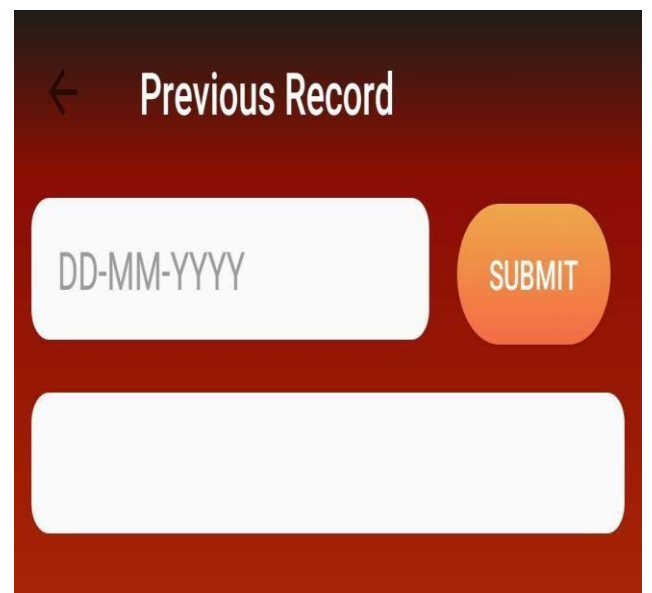**Figure 13: Change Password**
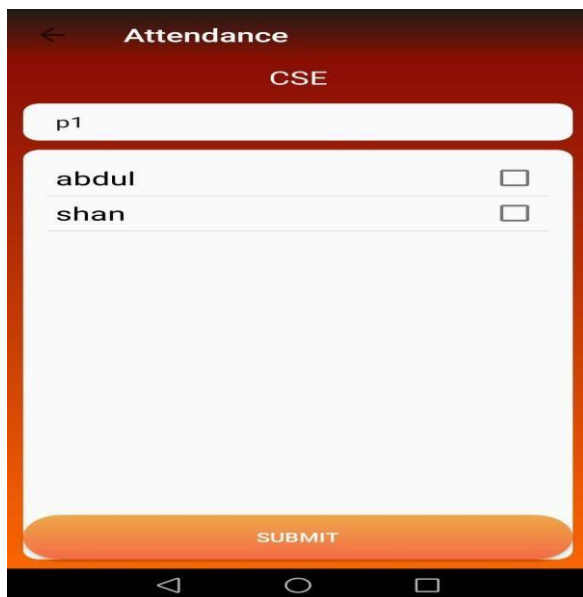

Figure 14: Logout

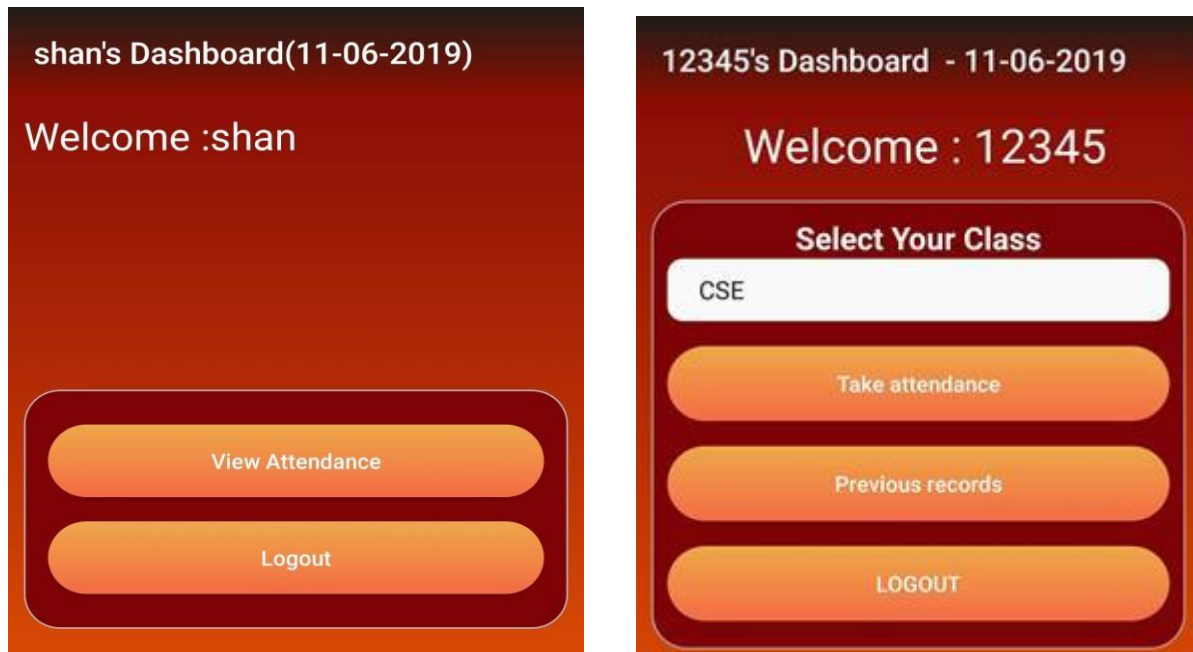**Figure 15: taking attendance**

Figure 16: Student dashboard

Figure 17: attendance records

4.   Discussion

For the past few years, the Internet has been used by many companies in conducting all sorts of studies all over the world. Whether it is market or scientific research, the online survey has been a faster way of collecting data from the respondents as compared to other survey methods such as paper-and-pencil method and personal interviews [15]. Online software or internet software is one of the most popular data-collection sources, where a set a target sample input their data over the World Wide Web. The responses are aggregated to draw a conclusion. Put another way, it is the process of collecting and analysing the data.

Organizations use management applications in order to gain insights and feedback about students. With the progress made by the internet, more and more organizations depend on the data received and analysed from online software to make integral changes in their functioning [3,6,12]. For efficient data collection, organizations must choose an advanced and efficient online survey platform. The primary reason for the growth seen in the implementation of online software such as the management software proposed in this study is that they are extremely low cost and their use is convenient due to the sheer magnitude of reach.

5.   Conclusion

The study has a very vast scope in future. The study can be implemented on intranet in future. Project can be updated in near future as and when requirement for the same arises, as it is very flexible in terms of expansion. With the proposed software of database Space Manager ready and fully functional the client is now able to manage and hence run the entire work in a much better, accurate and error free manner. The following are the future scope for this study:

• Discontinue of particular student eliminate potential attendance.

• Bar code Reader based attendance system.

• Individual Attendance System with photo using Student login.

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