DESIGN OF MULTILAYER ACCESS CONTROL FOR STUDENT ATTENDANCE SYSTEM

BY

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DEPARTMENT OF ELECTRICAL/ELECTRONICS ENGINEERING FACULTY OF ENGINEERING,

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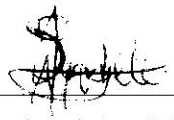
CERTIFICATION

This is to certify that the project titled ''Design of Multilayer Access Control for Student Attendance System'' has been performed in the Department of Electrical/Electrical Engineering under the supervision of Engr. Ofusori Temidayo. The information derived from the literature has been duly acknowledged in the list of references provided. No part of thesis was previously presented for another degree or diploma at any university.



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ABSTRACT

This project is absolutely on the computer based multilayer attendance management system. Computer based attendance system provide efficient means of determining eligibility criteria for students to meet examination requirements. Now, with the advent of the computerized attendance management system, problems associated with the manual processing of student attendance will be alleviated to minimum level. Hence, computerization of attendance management system aimed at its incorporating a computer based system in processing attendance of student at promoting speed of operations and accuracy of results. This project looks at the existing system of student attendance and attempt to convert the process from manual to a computerized one in order to reduce the time spent on manual operations to eradicate errors and time consumptions.

This project was developed like a software application which allows the user (lecturer) to log in as an administrator who controls the whole section in this software application. Only the administrator has access to enrol student with their matriculation number and provide each student a secret password for authentication which is recorded in the data base automatically. The administrator can also change a forgotten password for the students and can easily change details of a student if there is any error during enrolment. This project is able to provide all attendance details of each student, it takes records of the time each student enters the class and also take record of the student punctuality (i.e. came early or came late). All the records can also be reviewed in the MS Access which is a personal use for the administrator.

The programming language used for this project work was Microsoft Visual Studio, it was used because it is easy to manage, and it is object oriented and its availability of debugging tools and also includes , visual basic 6.0, visual c++, the new language c# (c sharp) and the net framework. Visual basic .net used as front-end and MS Access used as the back-end.

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ACKNOWLEDGEMENT

All glory is to God for making this project possible. My sincere appreciation goes to my supervisor Engr. Ofusori Temidayo who found time to go through the work despite his schedules. His constructive criticism contributed immensely to the success of this research. My profound gratitude goes to the entire staff of Electrical/Electronic Engineering Department, my family and friends for their encouragement.

CHAPTER ONE

1.0 Introduction

In the existing system attendance is maintained using the attendance register for students. Lecturers take attendance of students manually, due to which it increases paperwork, maintaining records and calculating attendance of each student become tedious. The intention of developing Design of Multilayer Access Control for Student Attendance System is to computerize the traditional way of taking attendance. Attendance Management System is a platform for daily student attendance in institutes. It facilitates to access the attendance information of a particular student in a particular class. It also avoids proxy attendance. Data accuracy is maintained, within a short span of time (Bevitt, 2010)

As the attendance is maintained in registers it is very cumbersome to manage, track and update the data. Having backup is also very difficult in this method. This system will also help in evaluating attendance eligibility criteria of a student. The proposed system requires very less paper work. All the data is feted into the computer immediately and reports can be generated through computers. Moreover work becomes very easy because there is no need to keep data on papers (Wagh, 2015).

This project is very useful project to maintain and manage the attendance of students. This project can also be software to monitor attendance details. The main purpose of this project is to provide details of student and managing attendance of students generate attendance reports; manage and record student details. The project multilayer access control of student attendance system is a easy way to keep track of attendance for school activities. The system calculates the number of working days and the number of absent days.

This project involves the design of computer software which is capable of taking attendance record of students for a particular course with the aim or purpose of determining their eligibility to sit for the exams, which can easily be printed out to the head the department for future purpose in the MS Access. Design of Multilayer Access Control for Student Attendance System basically has two main modules for proper functioning which are

- First module is the admin, which has the right of creating space or registering new student. (Access to report or data sheet, changing of password and names etc.)

- ❖ Second module is control by the user (sub-admin) which can be an operator. User has a right of making daily attendance and generating report.

1.1 Background of the Project

The world itself has become a global village of technology today, especially with technology. With the advent of new technology, the world is now witnessing an easy way to keep information or data. Hence the introduction of computer is one of the greatest challenges facing man today. Student attendance system is software developed for daily student attendance in schools, colleges and institutes. It facilitates to access the attendance information of a particular student in a particular class. The information is sorted by the operators, which will be provided by the lecturer for a particular class. This system will also help in evaluating attendance eligibility criteria of a student. Since ages, attendance system has remained one of the most important systems for evaluating the working time of students in any college or school. In short, this project is used to mark the number of days present or absent in any academic year of students in college or institution. The system software also helps in evaluating the examination eligibility criteria for a student in the sense that only those students with minimum of 5 attendances will be able to participate in the semester exams. And this system will also help in evaluating attendance eligibility criteria of a student. In schools, attendance is important and mandatory. Nowadays, due to the large number of students, it is efficient to use attendance management system to manage attendance in schools (Choi, 2002).

Multilayer access control for student attendance systems are used for identification of human mainly for verification and identification all kinds of office and schools in today's environment (Jain, Hong and Pankanti, 2000).

Examination is defined as a formal test of one's knowledge or ability in a particular subject especially by means of answering questions or practical exercises (Benard, 1998). Therefore, it is through examination that students are evaluated or tested to find out the quality and quantity of knowledge they have acquired within a specific period. Thus, examination could be either internal, external, oral, written or both. Continuous assessment scores, terminal, semester, annual or promotion examinations are examples of internal examinations (Benard, 1998).

Although student's performance in examination may not be the true reflection of their ability, up till now, examination still remains the best tool for an objective assessment and evaluation of

what a learner has achieved after a period of schooling/training. In fact, it is one of the most reliable indicators used to determine the extent of students' performance in a given training.

Examination malpractice is not a new phenomenon in Nigeria. The first examination malpractice in Nigeria occurred in 1914 during the Senior Cambridge Local Examination papers which were leaked before the scheduled date of examination (Maduemezia, 1998). Thus, examination malpractice which started at a low trend became more pronounced in 1970, involving persons other than the candidates. Since then examination malpractice became more advanced and sophisticated. Examination malpractice is an illegal act committed by a single student or in collaboration with others like fellow students, parents, teachers, supervisors, invigilators, computer operators or secretarial staff and anybody or group of people before, during, or after examination in order to obtain undeserved marks or grades (Awanbor, 2004). In recent times, examination malpractice has gone from simple girrafing" where students occasionally stretch their necks to catch glimpse of what they want to copy from other students" scripts to a variety of sophisticated ones. These include:

i. Use of „Micro-chip": writing very tiny summaries on pieces of paper, parts of the body, or on material is found within the venue.

ii. Sorting: in which students negotiate with corrupt examiners for scores by rewarding the examiners in cash or kind.

iii. ECOMOG/ECOWAS/OAU: This is an alliance among classmates, to communicate via coded language during the examinations.

iv. Hand-held smart devices such as modern cell phones.

It has developed to the level where friends can impersonate their friends and sit for any exam for them. These irregularities have in no doubt posed a vital question on the credibility of the examination system and standard (Awanbor, 2004).

The examination bodies like the schools have not turned a blind eye to all these practices and have introduced various policies like strict invigilation of the students during the examination exercise to cut down student's communication during the examinations. Also, the spacing pattern during the examination is aimed at reducing any form of communication amongst students, even

"girrafing". Institutions have gone as far as motivating the examiners and encourage them to cut down the excesses of the students during the examination (Awanbor, 2004).

However, in a very large class in Federal University Oye-Ekiti having a number of examination candidates averaging about 400 to 450 students, it has been discovered that some of these policies against examination malpractices introduced by the institutions may not be so effective due to the large number of students. Implementing multilayer access control student attendance system will eradicate the issue of examination malpractices.

1.2 Statement of the Problem

At the moment, most of the attendance systems that are being used in universities still are written a piece of paper. For classes, tutorial and laboratory session the student still have to sign the signature on the attendance sheet. This method is not flexible because the risk of losing the attendance data is very high. If the attendance sheet is missing, the attendance data will be lost. Other than that, unethical problem may be occurring such as cheating in signature. For example, a student does not attend his class but his attendance form has been signed by other student. This system is proposed to overcome these problems. Besides that, since the proposed system also record the time, the lecturer can easily monitor the punctuality of the students too.

1.3 Motivation

Every organization whether it be an educational institution or business organization, has to maintain a proper record of attendance of students or employees for effective functioning of organization (R Mishra - 2011). Designing a better multilayer attendance system for students so that records are maintained with ease and accuracy was an important key behind motivating this project (R Mishra - 2011). This would improve accuracy of attendance records because it will remove all the hassles of roll calling and will save valuable time of the students as well as teachers. Mishra also reported that Image processing and fingerprint recognition are very advanced today in terms of technology.

1.4 Project Aim and Objective

- This report describes the capabilities that will be provided by Design of Multilayer Access Control for Student Attendance System. The purpose of developing this multilayer attendance management system is to computerize the traditional way of taking attendance in classes and also manage student information along with their classes and subjects.
- Another purpose for developing the project is to generate the reports automatically whenever required in between the semester or after the semester.
- This project is to motivate and improve students' punctuality to the class
- To provide quick access to any information regarding the student's attendance
- Multilayer access control student attendance system is significant to all organizations such as educational institutions. Is to manage and control the success of any organization by keeping track of people within the organization such as students to maximize their performance.

CHAPTER TWO

2.0 Review of Literature

Computer is a machine that follows instructions in order to process data, solve specific problem or accomplished task is referred to as program. Attendance Management System facilitates the attendance information of a particular student in a particular class. The information is sorted by the operators, which will be provided by the lecturer for a particular class. This system will also help in evaluating eligibility criteria of a student to sit for an examination (Fapohide, 2005).

(Shoewu.O, 2011) Proposed an electronic card-based solution to the lecture attendance problem in higher institution in the developing countries, this system uses a single chip computer based on subsystem interfaced serially to the serial port of the digital computer. The limitation of this system is that not all computer systems possess serial port.

(Adewale.J. 2014) Proposed the development of fingerprint biometrics attendance systems for non- academic staff in tertiary institution. The system was developed to manage attendance record in an organization using the available computer development tools. The proposed application captures attendance electronically with the help of fingerprint recognition system. In Adawale's work the emphasis was to reduce labour intensiveness associated with manual attendance record system.

(Mahyid.J. 2008) Proposed student attendance management system makes use of student card in order to grant or deny the student from taking attendance. This technique also did not identify individual based of who he/she is which therefore can lead to impersonation.

(Turk.J, 2007) Proposed SMS software technology to send SMS easily to student parent. The system can store in details all data about the students and those cares absent. The advantage of it using efficient techniques to store and update the student attendance and report in the Web Site rather than wasting the paper as well as decreasing the faculty's time also.

(Michael.B, 2011) Proposed the multitude developed Web-Based Student Attendance System using Radio Frequency Identification technology will significantly improve the current manual process of student attendance recording and tracking system, especially in a university or school environment because it is easy to connect data of internet. The system promotes a semi-

automated approach in capturing the student attendance, i.e. by having the students to flash their student cards to the RFID reader

Multilayer attendance system software application for an institute has been designed to achieve maximum efficiency and reduce the time taken to handle the storing activity. It is designed to replace an existing manual record system thereby reducing time taken for storing data. The system is strong enough to withstand regressive daily operations under conditions where the database is maintained and cleared over a certain time of span. The implementation of the system in the institution will considerably to reduce data entry, time and also provide readily reports (Kharel, 2003).

2.1 Working of Present System

In the present system all work is done on paper. The whole session attendance is stored in register and at the end of the session the reports are generated. We are not interested in generating report in the middle of the session or as per the requirement because it takes more time in calculation. At the end of session the students who don't have 75% attendance get a notice from the administrator (lecturer) by showing them their attendance records on the MS Access.

2.1.1 Disadvantages of Present Working System

- **Not User Friendly:** The existing system is not user friendly because their retrieval of data is very slow and data is not maintained efficiently.
- **Difficulty in report generating:** We require more calculations to generate the report so it is generated at the end of the session and the student does not get a single chance to improve their attendance.
- **Manual control:** All calculations to generate report, is done manually so there is greater chance of errors.
- **Lots of paperwork:** Existing system requires lot of paper work. Loss of even a single register/record led to difficult situation because all the papers are needed to generate the reports.

- **Time consuming:** Every work is done manually so we cannot generate report in the middle of the session or as per the requirement because it is very time consuming.
- **Less security:** Security of data is less in manual systems. This is because majority of the records are stored as statements or in registers. Moreover, these data can be accessed by anyone and even they can modify any important data.

2.2 Proposed System

This project is developed for automating the processing of attendance. It also enhances the speed of performing attendance task easily. It also generates periodic reports to keep a check on the students who are regular and who are not, it also requires the use of matric number for registration which will create a new password for the student to have access to the class (B Walmsley, 2016).

The Admin has to login to the system and then in the attendance option to enroll each student to the database. So this will display the list of the students who are eligible to appear in this session. Now the admin has to just select the students name from the manual attendance sheet according to their roll number and then submit the sheet. This will add the selected students as present student in that particular session.

This system is very useful to the office, organization and institution, because they can generate various types of reports and submit them to respective department and can be submitted to the head of department. Office staff can also generate black list of students who have Attendance less than 50% to 75%. There are various kinds of reports can be generated and printed out in the MS Access (Walmsley, 2016).

2.2.1 Characteristics of the proposed system

- **User Friendly:-**The proposed system is user friendly because the retrieval and storing of data is fast and data is maintained.
- **Efficiently:-** Moreover the graphical user interface is provided in the proposed system, which provides user to deal with the system very easily.
- **Reports are easily generated:-** Reports can be easily generated in the proposed system so user can generate the report as per the requirement (monthly) or in the middle of the session. User can give the notice to the students so he/she become regular.

- **Very less paper work:-** The proposed system requires very less paper work. All the data is feted into the computer immediately and reports can be generated through computers. Moreover work becomes very easy because there is no need to keep data on papers.
- **Computer operator control:-** Computer operator control will be there so no chance of errors. Moreover storing and retrieving of information is easy. So work can be done speedily and in time.
- It will also give opportunity for provision of job employment.

This project will be able to solve the problems of the literatures listed above because it can be installed in any laptop in the sense that it has been compiled as a software application, and this project will be able to identify each student based on their registered matric number and the secret password generated for each students. Unlike the literature of (Shoewu,O, 2011) which requires serial port for activation but not available in most laptops nowadays. And also the literature of (Mahyid, 2008) which does not identify student based on who he/she is which can cause impersonation.

CHAPTER THREE

3.0 Methodology

Design of Multilayer Access Control for Student Attendance System has been developed in Federal University Oye-Ekiti for computerized attendance submission and its monitoring by Lecturers, Head of Departments, Dean Academic Affairs and Director. Students/Guardians also have access to view their attendance. In this, the Lecturers engaging different classes are required to submit the attendance of the students present in their class regularly. Detailed guidelines for its use are under. Teachers will submit their attendance through this Multilayer Student Attendance System.

The system will maintain information about various students enrolled in the course in different years. The following information will be maintained for each student: Student name, Matriculation number, Admission year, Level. The system will also allow creation, modification, deletion of new and existing student's info by the admin, and also the ability to list all the students enrolled in a particular year (Walmsley, 2016).

3.1 Requirement specification

The model employed to materialize the Student Attendance Management System is the iterative waterfall model. A common mistake is to consider "iterative" and "incremental" as synonyms, which they are not in software (systems development). The basic idea is to develop a system through repeated cycles (iterative) and in smaller portions at a time (incremental), allowing software developers to take advantage of what was learned during development of earlier parts or versions of the system. Learning comes from both the development and use of the system, where possible key steps in the process start with a simple implementation of a subset of the software requirements, iteratively enhance the evolving versions until the full system is implemented. At each iteration, design modifications are made and new functional capabilities are added.

The procedure itself consists of the initialization step, the iteration step, and the Project Control List. The initialization step creates a base version of the system. The goal for this initial implementation is to create a product to which the user can react. It should offer a sampling of the key aspects of the problem and provide a solution that is simple enough to understand and implement easily

3.1.1 NON-FUNCTIONAL REQUIREMENT

Hardware requirements

Hardware Interface 1: The system should be embedded in the PC/Laptop.

Hardware Interface 2: 40 GB hard disk and 256 MB RAM.

System Requirement:

Minimum RAM:- 256 MB

Hard Disk: - 40 GB

Processor:- Intel Pentium 4

Operating System:-Windows XPService Pack2, Windows 7, Windows 8, Windows 10

3.1.2 FUNCTIONAL REQUIREMENT

Software requirements:

Microsoft Visual Basic 6.0

MS Access

C sharp programming

Technology Used:-

Language:- VB.NET

Backend:- MS-Access

3.1.3 Introduction to Microsoft Visual Basic 6.0

Visual Basic is a programming language and development that allows you to create programs that run under the windows operating system. It enables you to develop many different type of applications, it is a programming language used to create window-based application. It makes it very easy to get the user interface of the application and running it. It is very easy and it provides a very user-friendly environment while programming in Visual Basic. It provides a vital link to graphical environment and allows you to develop applications based on standard windows, features: dialog boxes, command buttons, pull-down menus, scroll bars and selection lists etc. it also allows creating robust applications that fully makes use of the graphical user interface.

The version of Microsoft visual studio used called visual studio .net includes, visual basic 6.0, visual c++, the new language c# (c sharp) and the .net framework.

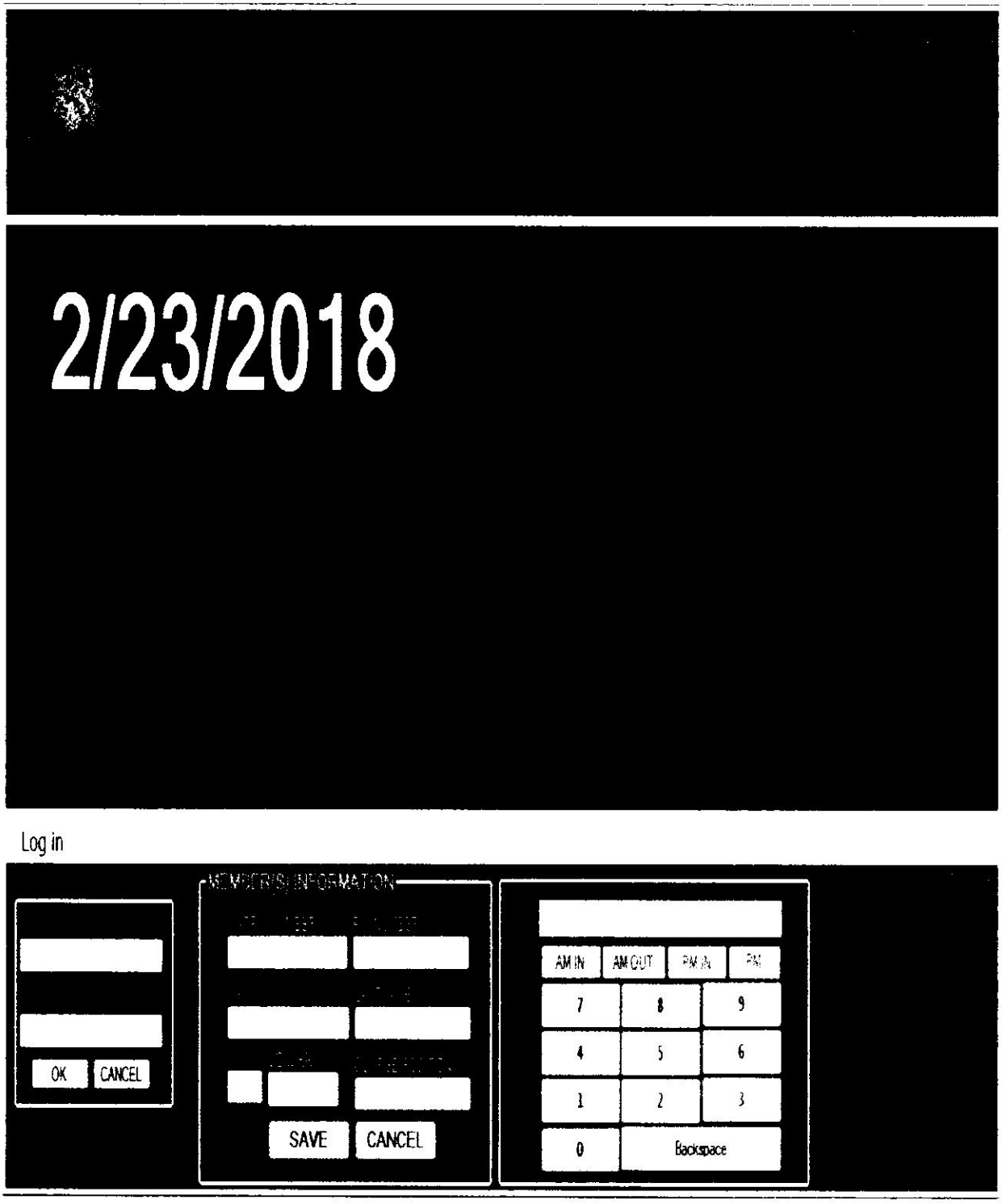

Fig3.1: Visual Studio .NET Design

3.1.3 Introduction to MS Access

Microsoft Access is s one of the world's most popular and powerful relational database systems. and it is part of the Microsoft Office Professional Edition. Using Access, you can create a sophisticated and powerful database that includes data entry forms, reports and queries to store and analyze information on any number of topics.

Using the Access Database Wizard, you can quickly create detailed database that handle a number of business and personal functions such as order entry, contact management, or event management. If none of the database templates in the database wizard suits your needs or if you just want to create a database from scratch, you can easily do as do well. The access table wizard offers an easy way to create your own tables. Access includes numerous table templates that you can use to create both business and personal database tables. Access also provides step by step guidance as you create your own database.

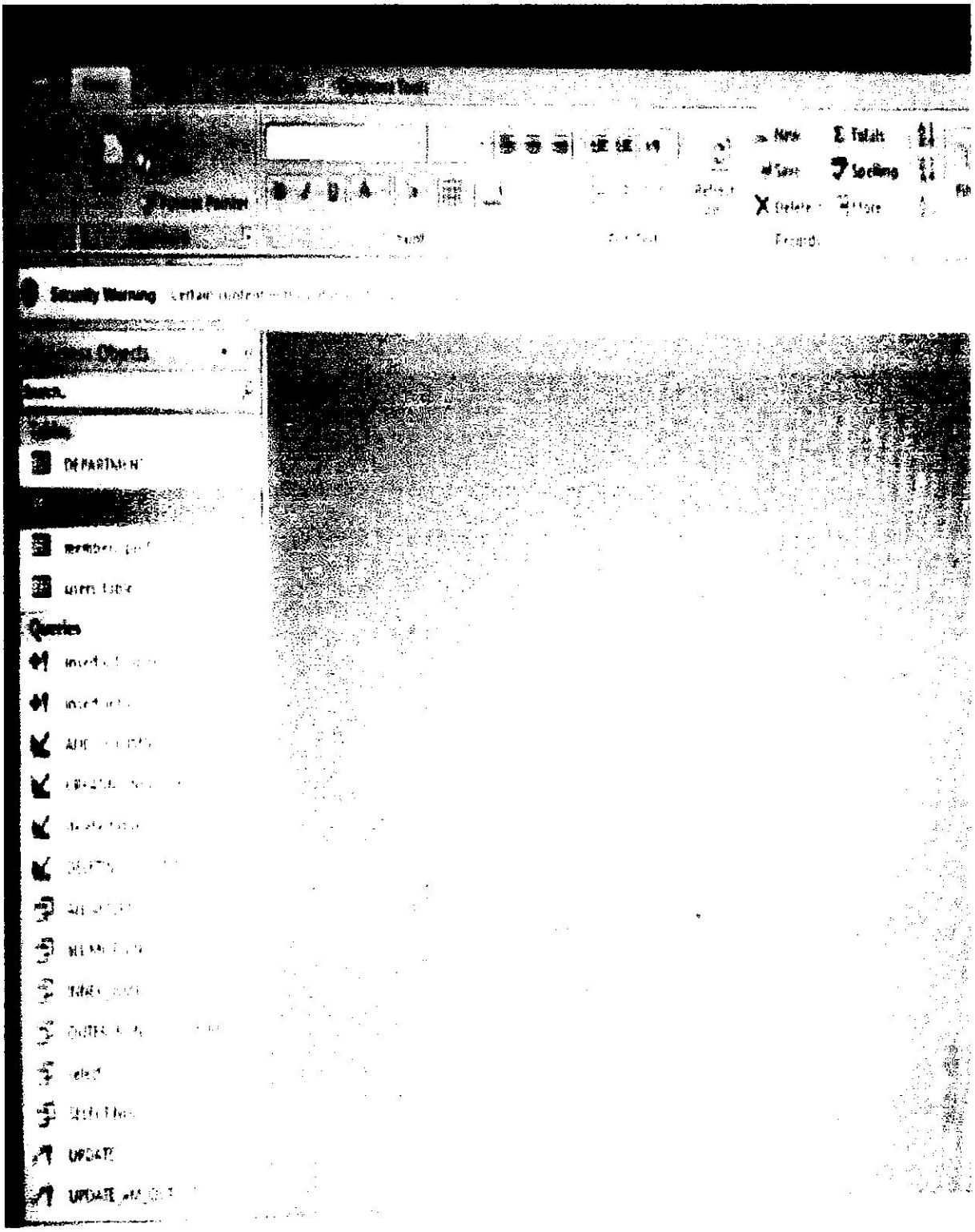

Fig3.1.2: MS Access Window

3.2 Analysis of the project

3.2.1 Maintainability

The application will be designed in a maintainable manner. It will be easy to incorporate new requirements in the individual modules (i.e. student info, student attendance info, and user accounts info and reports generation).

3.2.2 Portability

The application will be easily portable on any windows-based system that has MS Access installed.

3.2.3 Use Case Diagram

A use case diagram in the Unified Modeling Language (UML) is a type of behavioral diagram defined by and created from a Use-case analysis. Its purpose is to show what system functions are performed and the roles can be depicted or represented by the diagram below.

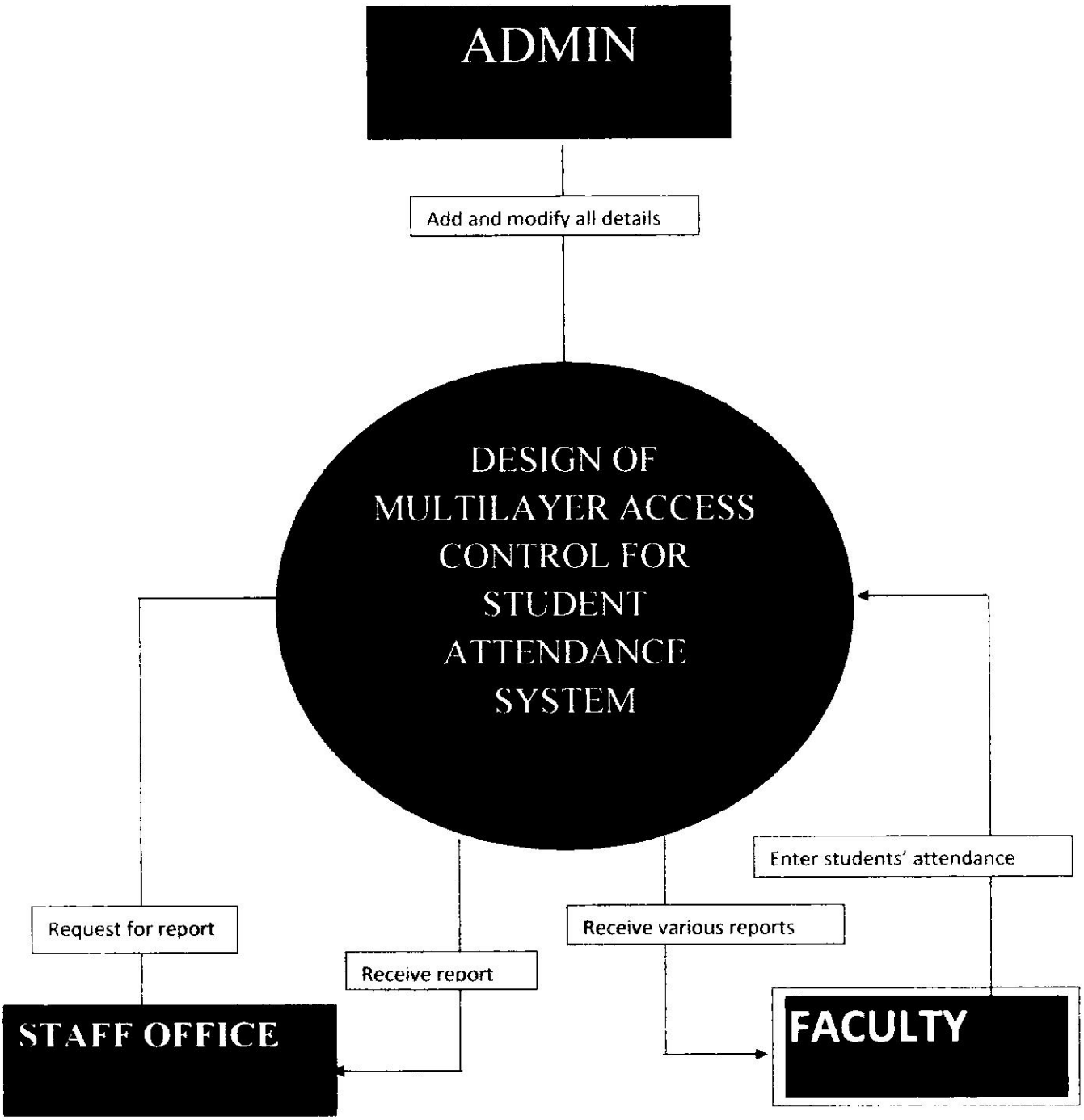

Fig3.2: Use case diagram for student attendance system

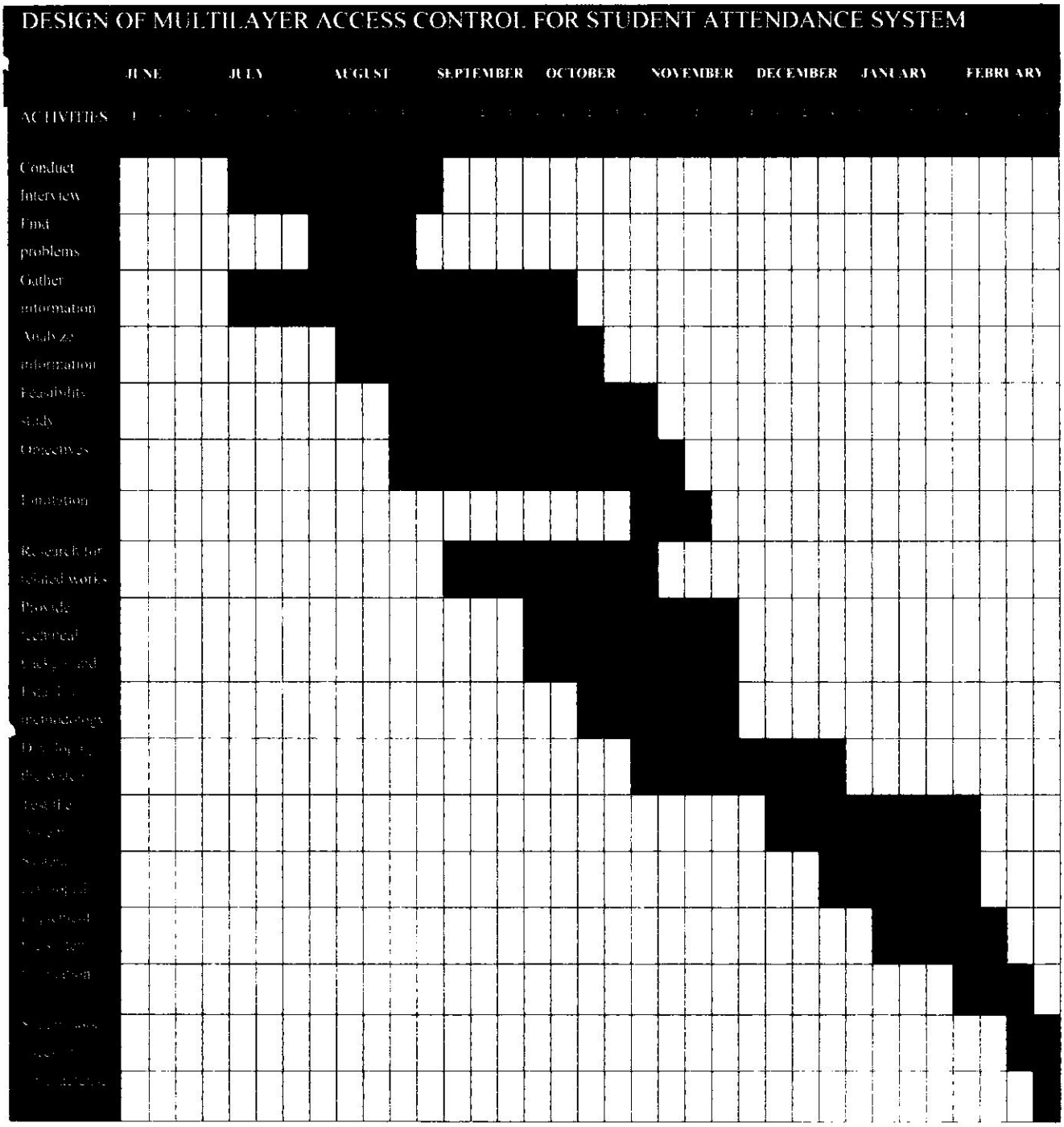

Fig3.2.1: Gant chart of the project

3.2.4 Entity Relationship Diagram

It shows the relationships of the tables in the database. The significance of having an ERD is that we can trace the connections of tables and how normalize the table is.

Fig3.2.2: ERD of the Project

3.3 Design and Development

This section shows a certain view of what to be expected in the system and it is useful to develop the system.

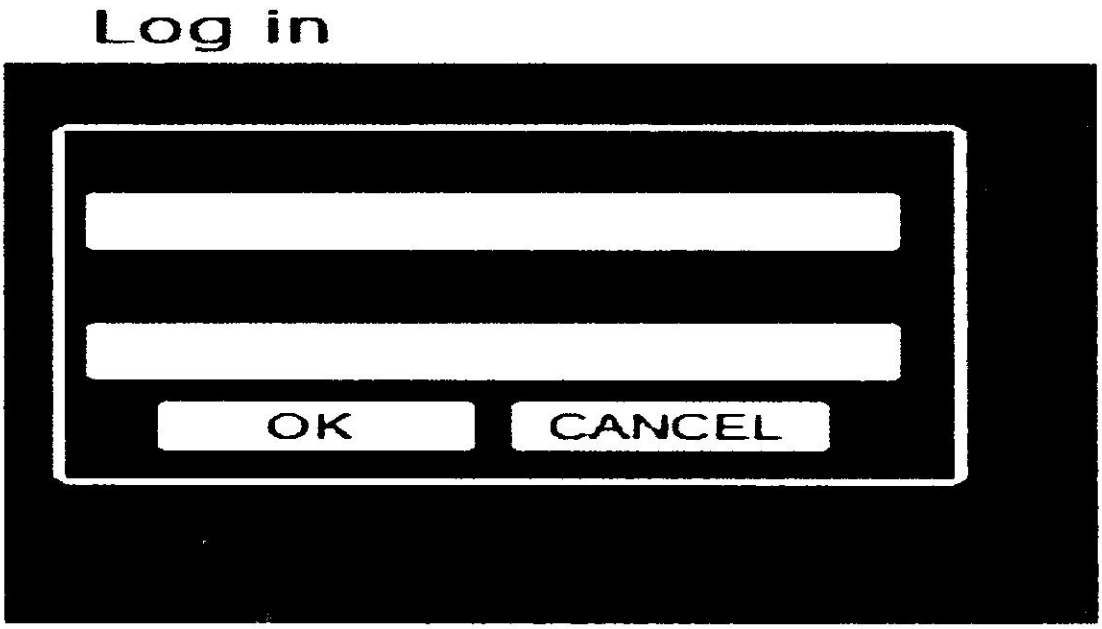

Fig3.3: Admin Login

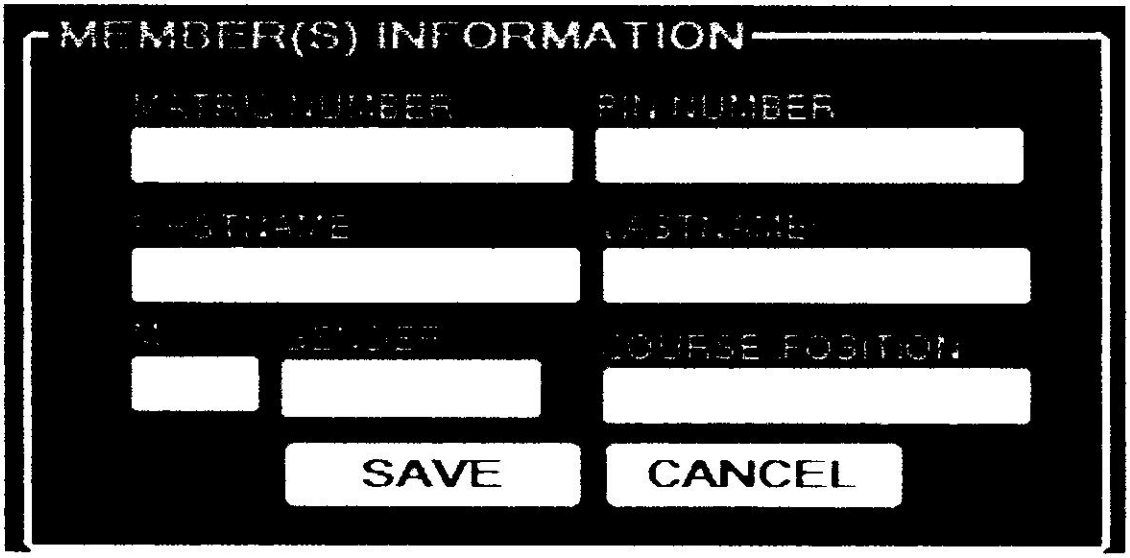

Fig3.3.1: Enrolment of Student

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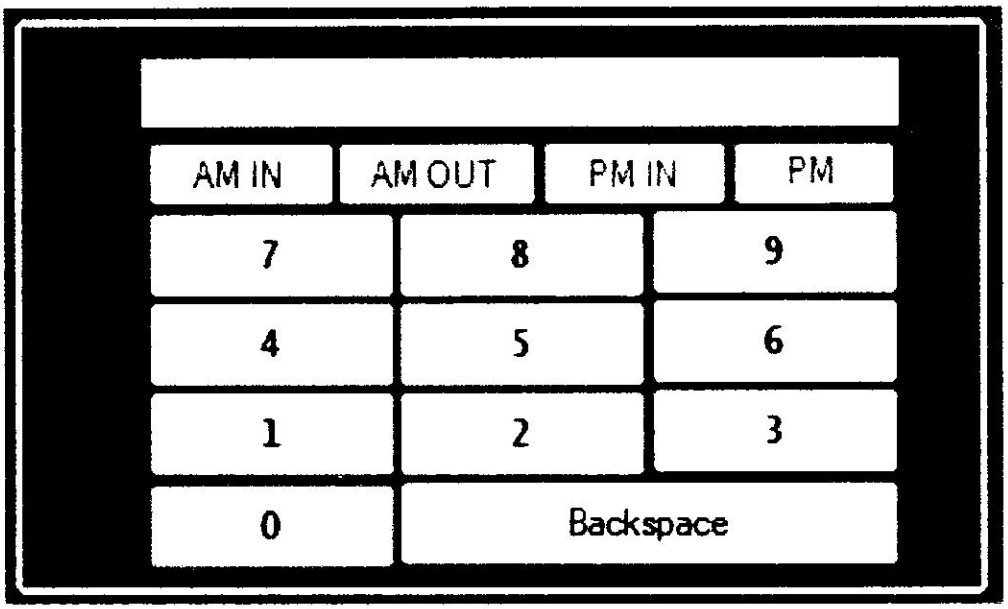

Fig3.3.2: Student Accessing Secret code

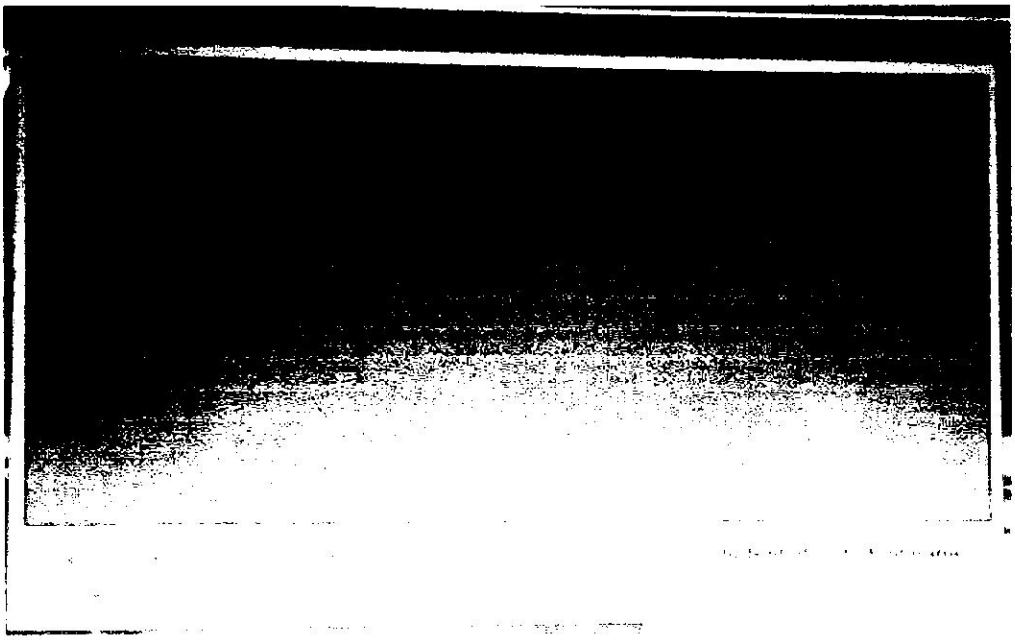

Fig3.3.3: Student data and Information

3.3.1 Data

To understand more about the data being saved in the database, this data will help to show the fields of the table.

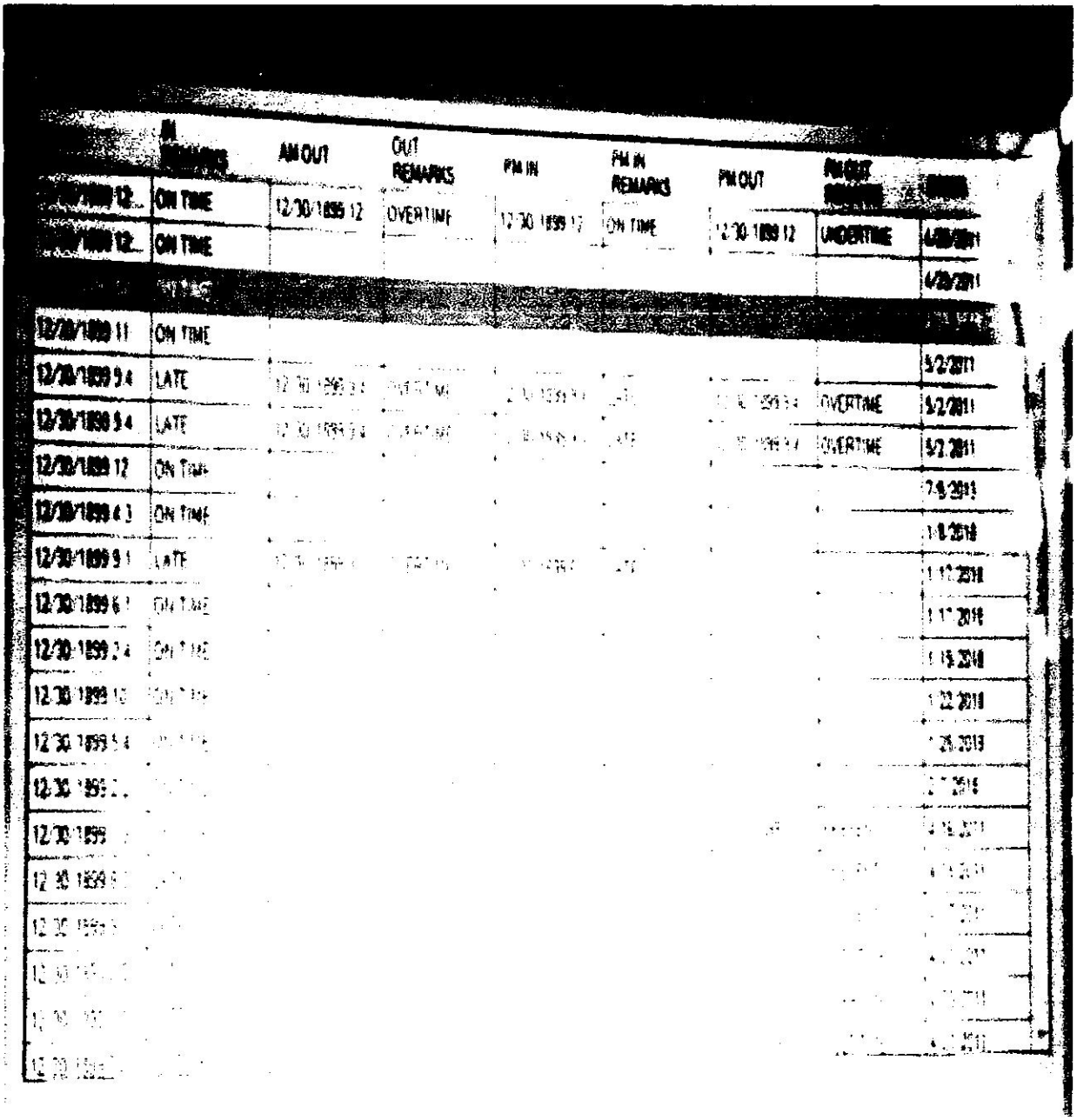

Fig3.3.4: Student Records

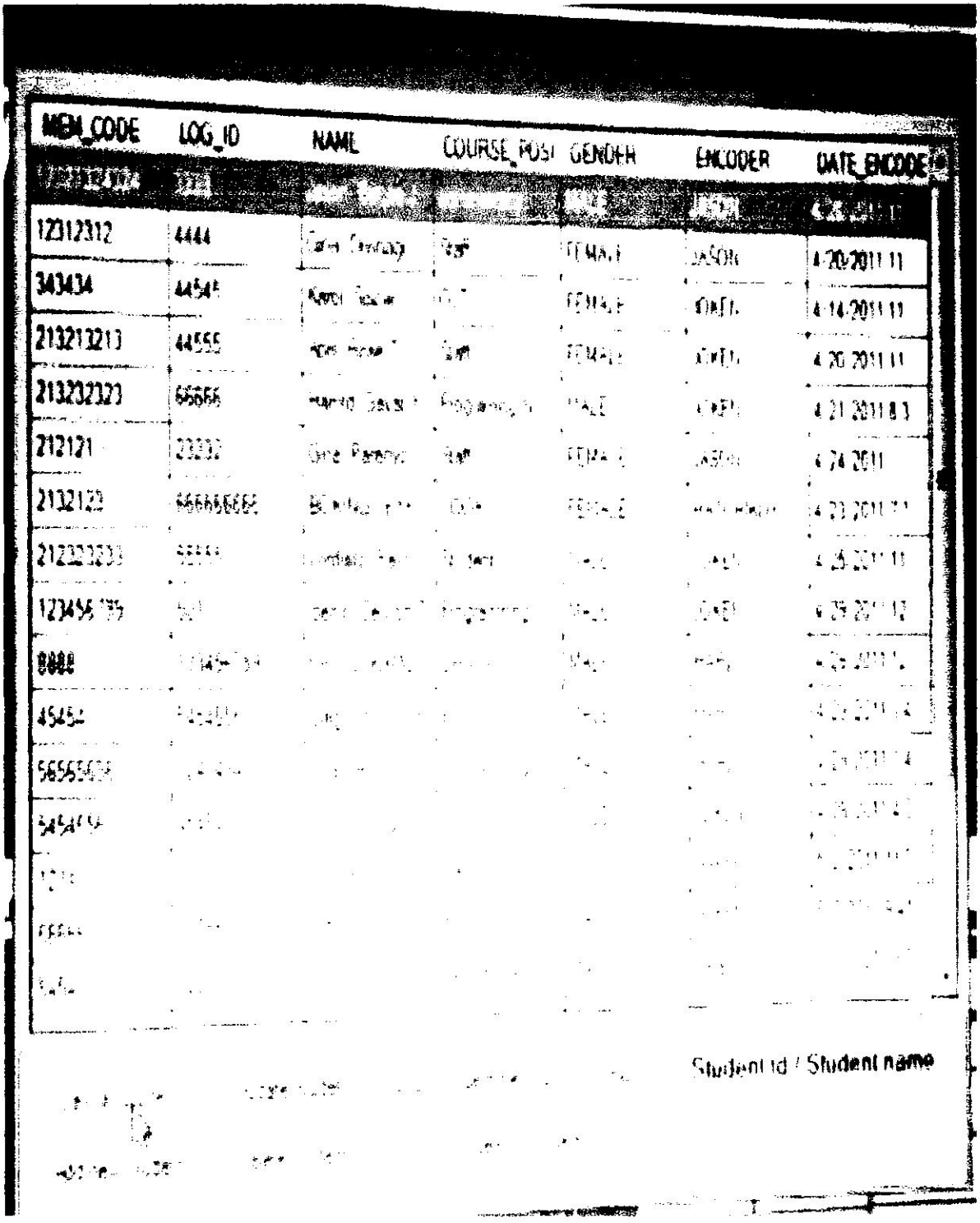

Fig3.3.5: Student Information

3.4 Project Schedule

3.4.1 Bill of Engineering Measurements and Evaluation

The aim of any engineering project is to produce a reliable and cost effective product in market. Hence, it is of prime importance that the cost analysis of any project to carried out in order to ascertain its market position with respect to price. The cost analysis of the project as carried out is presented in the table below.

S/N	Software/Hardware Component	Type	Quantity	Price
1	Computer	Hp.32bit.2Gig RAM.250ROM. Intel Pentium 4. Windows 7	1	40,000.00
2	MS Access	2000	1	5,250.00
3	VB.NET	2006	1	5,500.00
4	C# programming	2007	1	5,250.00
5	Total			16,000.00

CHAPTER FOUR

4.0 Results, Analysis and Discussion

4.1 Results

This chapter shows the screenshot of the system. In this chapter, I will discuss what the screenshot is and how the particular screenshot works.

For identification purposes, verification systems require two stages of operations enrolment and identification of students which will all be recorded in the database. During the enrolment stage, the student data is obtained and a secret code is created which are stored in the database. Verification occurs when someone claims some particular identity. The application software system compares the secret code entered by the student with the information that has been previously stored in the database.

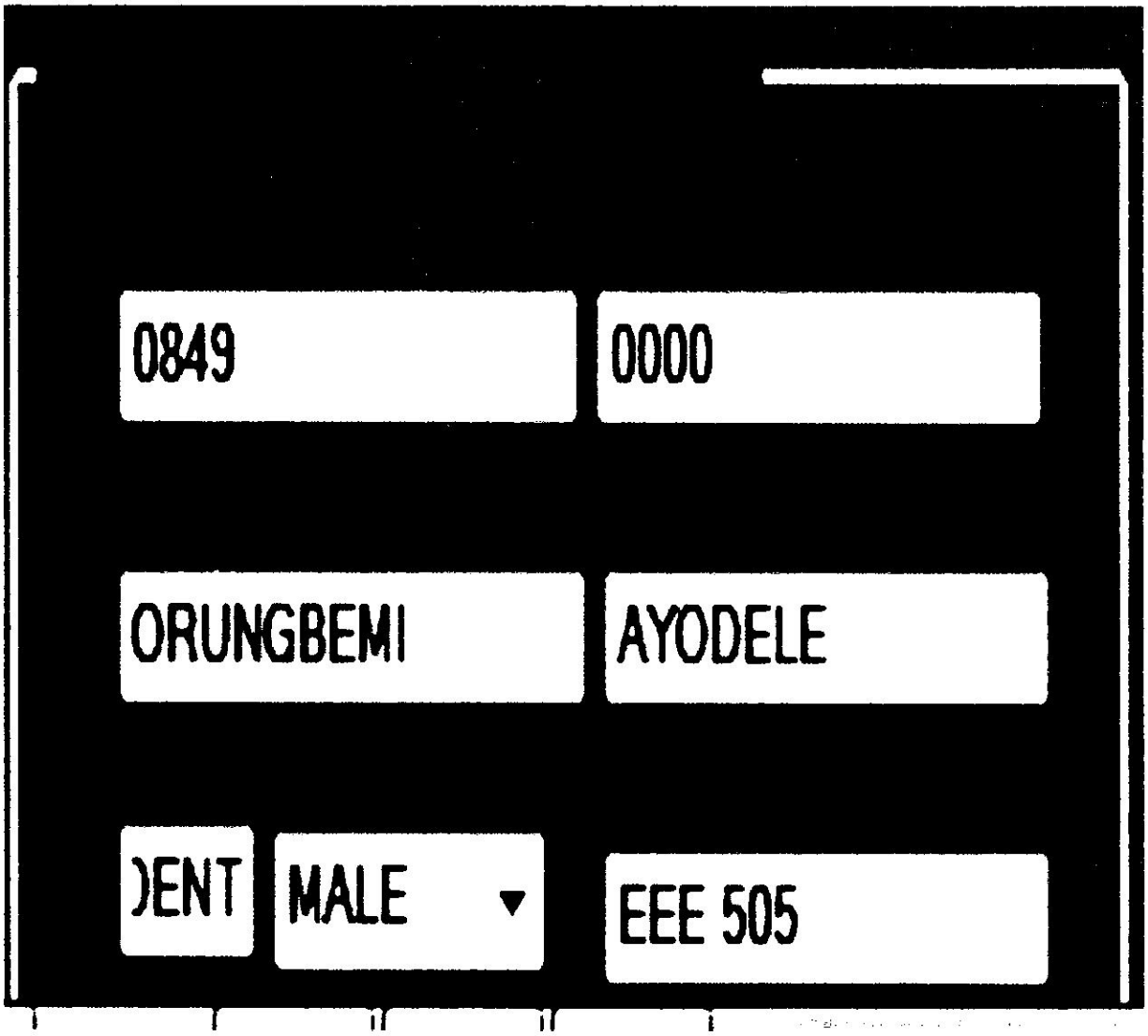

Fig4.1: Student Enrolment

The figure above is the enrolment stage. in this stage students will be enrolled with the use of their provided information such as matric number. name, gender etc. This process of enrollment will be able to create a secret code for each student which will be used for accessing their punctuality to the class. Enrolling with matric number makes the identification unique because no student shares the same number.

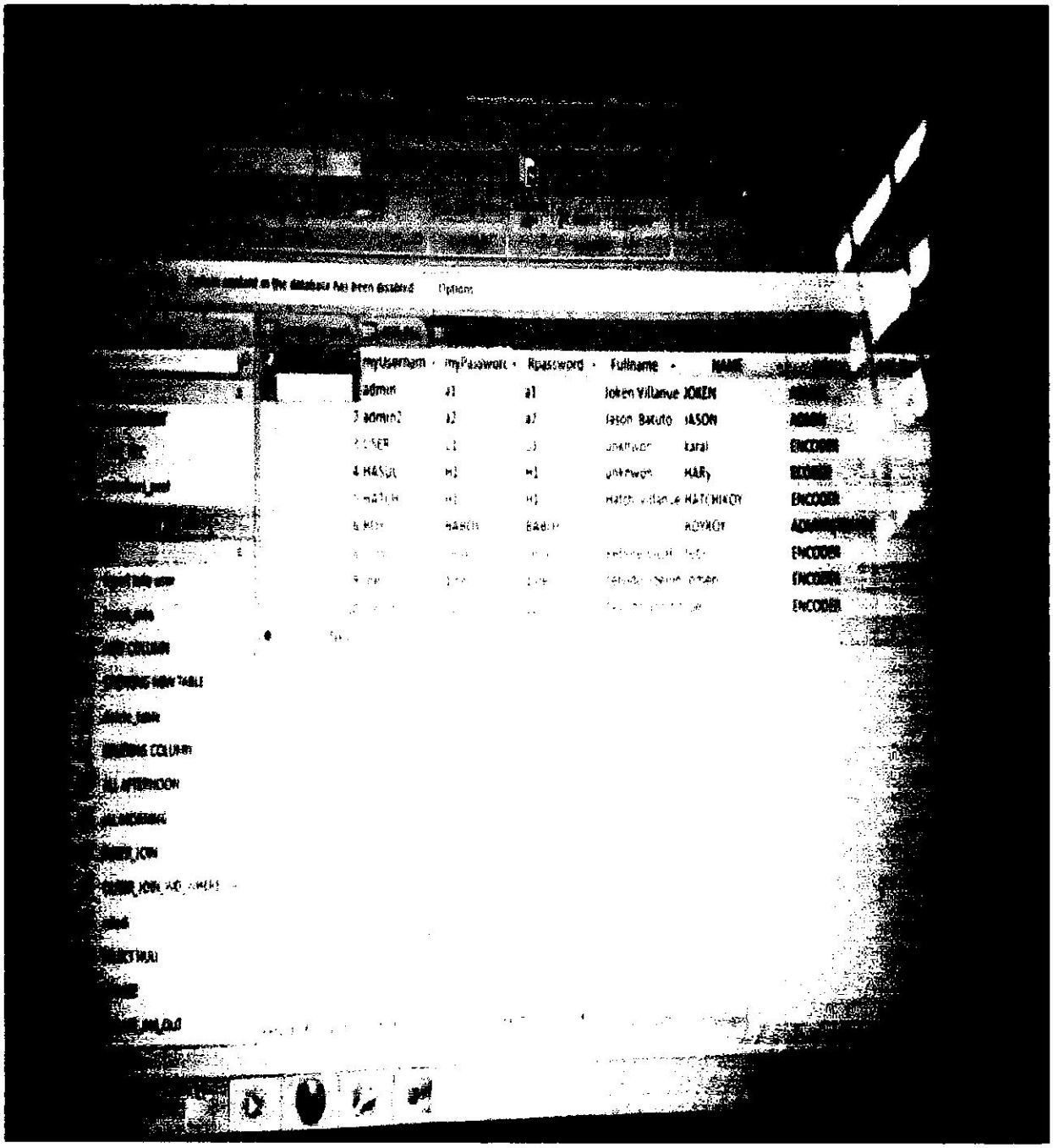

Fig4.1.1: Admin and Student Update

The figure above shows the update section where the admin can change student information if there is any wrong input while enrolling the students such as passwords, name, role etc.

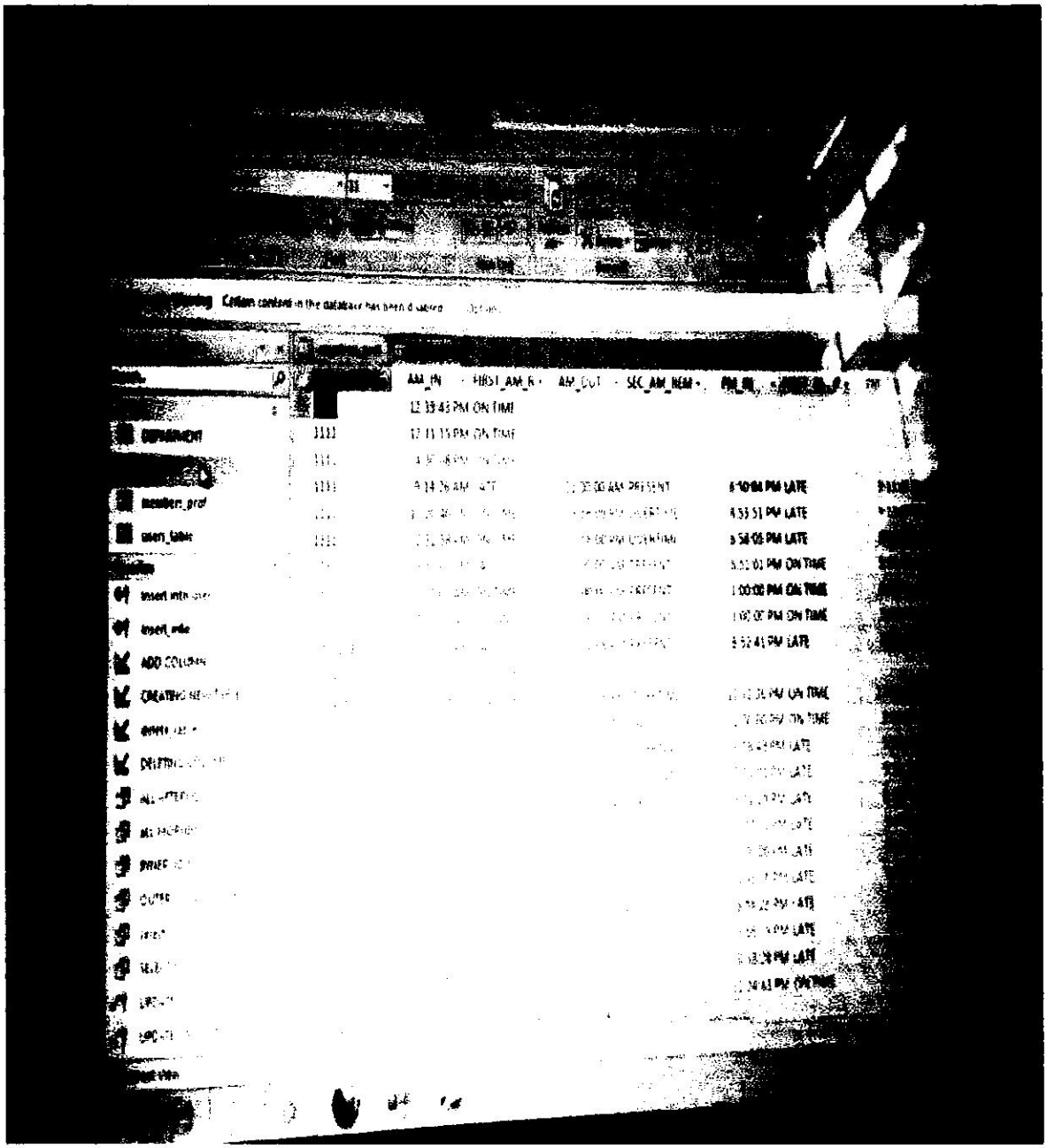

Fig4.1.2: Student Records

The figure above shows the student records. This section shows the records of student punctuality if he/she came early or very late to class.

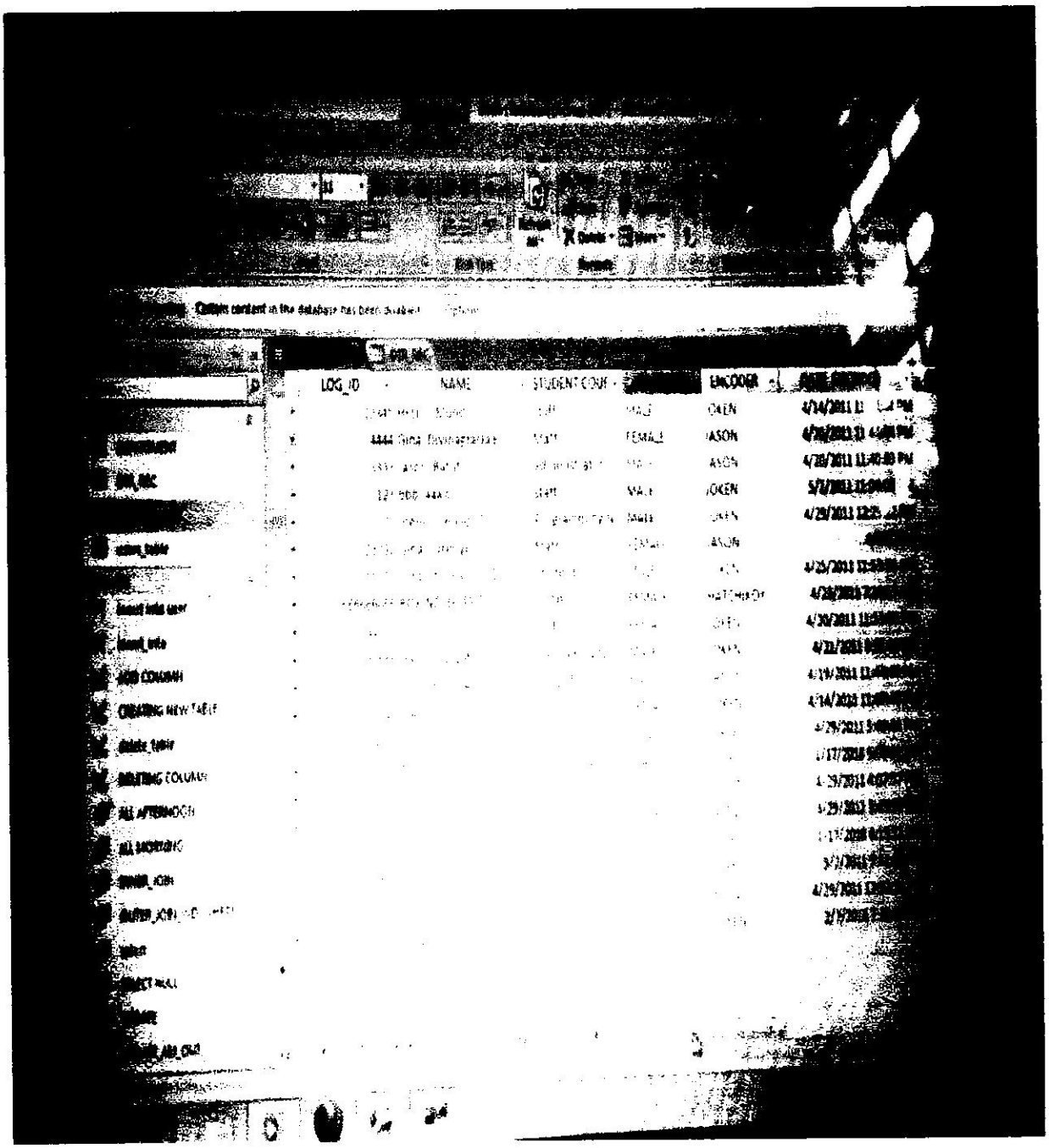

Fig4.1.3: Student Information

The figure above shows the entire information of the students. this entails the student's login ID. name. course. gender and date encoded.

4.2 Discussion

This project is absolutely on the computer based multilayer attendance management system. This system provides efficient means of determining eligibility criteria for students to meet examination requirements. Now, with the advent of this system, problems associated with the manual processing of student attendance will be alleviated to minimum level. Hence, computerization of attendance management system aimed at its incorporating a computer based system in processing attendance of student at promoting speed of operations and accuracy of results. This project looks at the existing system of student attendance and attempt to convert the process from manual to a computerized one in order to reduce the time spent on manual operations to eradicate errors and time consumptions.

This project is a device that uses a matric number and secret code for access. in this case, the multilayer access control student attendance system was used to automatically verify the identity of a student while entering the class for attendance based on the information of the student (i.e. the matric number and the password) because no student shares matric number of other students. After the whole design had been completed, the software application was used to test verification on different persons.

This project was developed like a software application which allows users to login as an administrator. Only the administrator has access to enrol student with their matriculation number and provide each student a secret password for authentication which is recorded in the data base automatically. The administrator can also change a forgotten password for the students and can easily change details of a student if there is any error during enrolment. This project is able to provide all attendance details of each student, it takes records of the time each student enters the class and also take record of the student punctuality (i.e. came early or came late). All the records can also be reviewed in the MS Access which is a personal use for the administrator.

The programming language used for this project work was Microsoft Visual Studio, it was used because it is easy to manage, and it is object oriented and its availability of debugging tools and also includes, visual basic 6.0, visual c++, the new language c# (c sharp) and the net framework. Visual basic .net used as front-end and MS Access used as the back-end.

4.3 Testing

The project has been tested and the system was evaluated to produce reliable information that makes the project more efficient and effective system. The implementation of system is very important in order to see the effects and importance of the proposed system from the present system.

Different testing has been done to examine the system functionality which is Link and system testing.

- **Link testing-** Link testing was the initial testing that started at the design stage where we create the test cases. The goal is to test each and every link that forms parts of the design once the initial code is developed.

- **System testing-** The system testing is to evaluate the systems compliance with its specified requirements. to test if the system was not logging it response it accurately and to also motivate student learning and enhance them with additional knowledge.

CHAPTER 5

5.0 Conclusion

The Design of Multilayer Access Control for Student Attendance System is developed using Microsoft Visual Basic. It fully meets the objectives of the system for which it has been developed. The system has reached a steady state where all bugs have been eliminated. The system is operated at a high level of efficiency and all the lecturers and users associated with the system understand its advantage. From the tests performed on the new system\design it will improve on the overall performance on the management of students attendance, thus the system solves the problem that it was intended to solve. Furthermore, computerization of attendance system is not just a matter of technological innovation and development; It is a process which involves individual, organization and society in general. The computerization of the attendance system has brought about faster access and easier method of viewing, editing, printing (documentation) of student attendance record.

5.1 Contribution to knowledge

This project has developed me in using Microsoft visual studio in creating multilayer access control for student attendance and I can also use this software to create or design any student attendance management.

5.2 Limitations

1. The multilayer access (password or matric-number) can easily be used on behalf of another student because it is not a unique identification unlike biometric.
2. It is an offline software

5.3 Future Works

1. To make the system takes attendance by other methods such as face recognition and using Biometrics (fingerprint) techniques, NFC mobile devices, or RFID Systems. Furthermore, we to make the system to manage and record the attendance for the staff of the university.

2. The computer should be connected via LAN (Local Area Network) for the purpose of server for storing reports which may be MS Access, MS Excel or SQL/Oracle database and storing the enrolled database with the use of automatic attendance management software.

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3. A website could be hosted on the server for online access to attendance reports. For this purpose, html, JSP (Java Server Pages) or ASP (Active Server Pages) dot net would be used.

4. The implementation of biometric fingerprint for unique identification.

5. The implementation of seven segment display for showing the list of student matric number which has been stored in the data base in process of enrolment.

6. Microcontroller (Atmega32) should be connected to the base of the transistor of the respective displays, keeps the port 'ON' for 3seconds, and then turns it off again for 5milisecondusing (_delay_) commands. This procedure is put in an endless loop, so that there is continuously display of the registered matric number.

5.4 Critical Appraisal

A lot of knowledge and skills have been gained in this project making me to have confidence in working with software like Visual Basic Studio.NET on this kind of embedded system.

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Appendix

Project Source Code

```
Public ClassForm1
PubliccmdAsOleDbCommand. cnAsOleDbConnection. sqlAs String,cnstringAs String
Private SubButton1_Click(ByValsenderAsSystem.Object.ByValeAs System.EventArgs)Handl
esButton1.Click
   If ComboBox1.Text ="" Then
MessageBox.Show("Select Username Please","Student Login")
ElseIf TextBox1.Text =String.Empty Then
MessageBox.Show("Invalid password","Student Login")
TextBox1.Focus()
Else
cnstring="Provider=Microsoft.Jet.Oledb.4.0:Data
Source=C:\Users\Undisputed\Documents\Visual
Studio2008\Projects\Attendance\Attendance.mdb"
cn =NewOleDbConnection(cnstring)
cn.Open()
sql ="Select* from student where TYPE='"& ComboBox1.Text &"' and
MatricNo='"& TextBox1.Text &"'"
cmd=NewOleDbCommand(sql, cn)
cmd.ExecuteNonQuery()
MessageBox.Show("Login Suxe4","Student Login")
student.Show()
Me.Hide()
          ComboBox1.Text=""
TextBox1.Clear()
      End If
 End Sub

Private SubLinkLabel1_LinkClicked(ByValsenderAsSystem.Object.ByValeAsSystem.Windows
.Forms.LinkLabelLinkClickedEventArgs)Handles LinkLabel1.LinkClicked
```

```
admin.Show()
Me.Hide()
    End Sub
Private SubButton2_Click(ByValsenderAsSystem.Object,ByValeAs System.EventArgs)Handle
sButton2.Click
Me.Dispose()
End Sub
End Class
```

AdminLogin

```
ImportsSystem.Data
ImportsSystem.Data.OleDb
  Public ClassadminPubliccmdAsOleDbCommand, cnAsOleDbConnection,
sqlAs String,cnstringAs String
Private SubButton1_Click(ByValsenderAsSystem.Object,ByValeAs System.EventArgs)Handl
esButton1.Click
      If ComboBox1.Text ="" Then
MessageBox.Show("Select Username Please","Student Login")
ElseIf TextBox1.Text =String.EmptyThen
MessageBox.Show("Invalid password","StudentLgin")
TextBox1.Focus()
ElseIf ComboBox1.Text ="HOD (Admin)" AndTextBox1.Text ="Computer" Then
MessageBox.Show("Welcome "& ComboBox1.Text,"Admin Login")adminpage.Show()
Me.Hide()
    Else
cnstring="Provider=Microsoft.Jet.Oledb.4.0;Data
Source=C:\Users\Undisputed\Documents\Visual
Studio2008\Projects\Attendance\Attendance.mdb"
cn =NewOleDbConnection(cnstring)
cn.Open()
sql ="Select* from login where Uname='"& ComboBox1.Text &"' and
```

```
password='"& TextBox1.Text &"'"
cmd=NewOleDbCommand(sql, cn)
cmd.ExecuteNonQuery()
MessageBox.Show("Login Suxe4"."Administrator Login")
subadminpage.Show()
Me.Hide()

ComboBox1.Text =""
TextBox1.Clear()
    End If
  End Sub
End Class
```

Admin Page

```
Public Class adminpage
Private Subadminpage_Load(ByValsenderAsSystem.Object,ByValeAs System.EventArgs)Han
dles MyBase.Load
'TODO: This line of code loads data into the'AttendanceDataSet1.student'table. You can move,
or remove it. Me.StudentTableAdapter.Fill(Me.AttendanceDataSet1.student)
End Sub
Private Sub
Create Sub
AdminToolStripMenuItem_Click(ByValsenderAs System.Object,ByValeAsSystem.EventArgs
)Handles CreateSubAdminToolStripMenuItem.
Click creatadmin.showdialog()
End Sub
Private Sub
Delete Sub
AdminToolStripMenuItem_Click(ByValsenderAs System.Object,ByValeAsSystem.EventArgs
)Handles. DeleteSubAdminToolStripMenuItem.
Click deleteadmin.showdialog()
```

```
  End Sub
  Private Sub
LogoutToolStripMenuItem_Click(ByValsenderAsSystem.Object.ByValeAsSyste.
EventArgs)HandlesLogoutToolStripMenuItem.Click
    Form1.Show()
Me.Hide()
 End Sub
Private Sub
CreateStudentToolStripMenuItem_Click(ByValsenderAs System.Object.ByValeAsSystem.Eve
ntArgs) Handles CreateStudentToolStripMenuItem.Click addstud.showdialog()
End Sub
Private Sub
Edit Student ListTool Strip MenuItem_Click(ByValsenderAs System.Object.ByValeAsSystm.
EventArgs) Handles EditStudentListToolStripMenuItem.Click Updatestud.showdialog()
    End SubPrivate
 SubDeleteStudentToolStripMenuItem_Click(ByValsenderAs System.Object.ByValeAsSystem.
EventArgs)Handles DeleteStudentToolStripMenuItem.
     Click deletestud.showdialog()
  End Sub
End Class
```

Student Page

```
Public ClassstudentPrivate Substudent_Load(ByValsenderAsSystem.Object.ByValeAs Syste
m.EventArgs)Handles MyBase.Load'TODO:
This line of code loads data into the 'AttendanceDataSet.student'table. You can move, or remove
it. Me.StudentTableAdapter.Fill(Me.AttendanceDataSet.student)
    End Sub
 Private Sub
Button1_Click(ByValsenderAsSystem.Object.ByValeAs System.EventArgs)HandlesButton1.
Click Form1.Show()
Me.Hide()
```

```
End Sub
End Class
```

Add Student Page

```
ImportsSystem.Data
ImportsSystem.Data.
OleDbPublic Classaddstud PubliccmdAsOleDbCommand,
cnAsOleDbConnection,sqlAs String.cnstringAs StringPrivate SubButton1_Click(ByValsende
rAsSystem.Object,ByValeAs System.EventArgs)HandlesButton1.Click
If TextBox2.Text =String.EmptyThenMessageBox.Show("Invalid password","Create Student")
TextBox2.Focus()
ElseIf TextBox1.
Text =String.EmptyThenMessageBox.Show("Enter FullnamePlease","Create
Student")TextBox1.
Focus()Elsecnstring="Provider=Microsoft.Jet.Oledb.4.0;DataSource=C:\Users\Undisputed\Docu
ments\Visual Studio2008\Projects\Attendance\Attendance.mdb"
cn =NewOleDbConnection(cnstring)cn.Open()sql ="Insert into student(FullName,MatricNo)
values('"& TextBox1.Text&"','"& TextBox2.Text &"')"
cmd=NewOleDbCommand(sql, cn)cmd.ExecuteNonQuery()MessageBox.Show("Student Suxe4
Created","Create Student")
TextBox2.Clear()
TextBox1.Clear()
    End If
 End Sub
End Class
```

Create Admin

```
ImportsSystem.Data
ImportsSystem.Data.OleDb
Public ClasscreatadminPubliccmdAsOleDbCommand, cnAsOleDbConnection,
sqlAs String.cnstringAs StringPrivate SubButton1_Click(ByValsenderAsSystem.Object,ByV
aleAs System.EventArgs)HandlesButton1.Click If TextBox2.
```

```
Text =String.EmptyThenMessageBox.Show("Select Username
Please","CreateSubadmin")TextBox2.Focus()
ElseIf TextBox1.Text =String.EmptyThen
MessageBox.Show("Invalid password","Create Sub-
admin")TextBox1.Focus()ElseIf TextBox2.Text <> TextBox3.TextThen
MessageBox.Show("Password Do not match","Create Sub-admin",MessageBoxButtons.OK,
MessageBoxIcon.Error)
TextBox2.Clear()
TextBox3.Clear()
TextBox2.Focus()
  Else
cnstring="Provider=Microsoft.Jet.Oledb.4.0;DataSource=C:\Users\Undisputed\Documents\Visu
al Studio2008\Projects\Attendance\Attendance.mdb"
cn =NewOleDbConnection(cnstring)cn.Open()sql ="Insert into login(Uname,password)
values('"& TextBox1.Text &"','" & TextBox2.Text &"')"
cmd=NewOleDbCommand(sql, cn)cmd.ExecuteNonQuery()MessageBox.Show("User Suxe4
Created","Create Sub-admin")
TextBox3.Clear()
TextBox2.Clear()
TextBox1.Clear()
      End If
   End Sub
End Class
```

Delete Admin

```
Imports System.Data
ImportsSystem.Data.OleDb
Public Class
Delete adminPubliccmdAsOleDbCommand, cnAsOleDbConnection,
sqlAs String,cnstringAs StringPrivate SubButton1_Click(ByValsenderAsSystem.Object,ByV
aleAs System.EventArgs)HandlesButton1.Click
```

```
IfTextBox2.
Text =String.EmptyThenMessageBox.Show("Select Username Please","Delete Page")
TextBox2.Focus()

ElseIf TextBox1.Text =String.EmptyThen
MessageBox.Show("Invalid password","Delete Page")TextBox1.Focus()Elsecnstring
="Provider=Microsoft.Jet.Oledb.4.0;DataSource=C:\Users\Undisputed\Documents\Visual
Studio2008\Projects\Attendance\Attendance.mdb"
cn =NewOleDbConnection(cnstring)cn.Open()sql ="Delete* from login where Password='"&
TextBox2.Text &"' andUname='"& TextBox1.Text &"'"

cmd=NewOleDbCommand(sql, cn)cmd.ExecuteNonQuery()MessageBox.Show("User Suxe4
Deleted","DeletePage")student.
Show()Me.
Hide()
TextBox2.Clear()
TextBox1.Clear()
  End If
 End Sub
Private SubButton2_Click(ByValsenderAsSystem.Object,ByValeAs System.EventArgs)Handl
esButton2.Click admin.Show()
Me.Hide()
 End Sub
End Class
```

Delete Student

```
ImportsSystem.Data
ImportsSystem.Data.OleDb
Public ClassdeletestudPubliccmdAsOleDbCommand,cnAsOleDbConnection.
sqlAs String,cnstringAs StringPrivate SubButton1_Click(ByValsenderAsSystem.Object.ByV
aleAs System.EventArgs)HandlesButton1.
Click If txtMat.
Text =String.EmptyThenMessageBox.Show("Select Username Please","Delete Page")
```

```
txtMat.Focus()ElseIf txtuname.Text =String.EmptyThenMessageBox.Show("Invalid
password","Delete Page")txtuname.Focus()
Else
cnstring="Provider=Microsoft.Jet.Oledb.4.0;DataSource=C:\Users\Undisputed\Documents\Visu
al Studio2008\Projects\Attendance\Attendance.mdb"
cn =NewOleDbConnection(cnstring)cn.Open()sql ="Delete* from student where
MatricNo='"&txtMat.Text&"' andFullname='"&txtuname.Text&"'"
cmd=NewOleDbCommand(sql, cn)cmd.ExecuteNonQuery()MessageBox.Show("Student Suxe4
Deleted","Delete Page")
txtMat.Clear()
txtMat.Clear()
  End If
 End Sub
Private SubButton2_Click(ByValsenderAsSystem.Object,ByValeAs System.EventArgs)Handl
esButton2.Click
admin.Show()
Me.Hide()
  End Sub
End Class
```

Sub-Admin

```
PagePublic Classsubadminpage Private Subsubadminpage_Load(ByValsenderAsSystem.Object,
ByValeAs System.EventArgs)Handles MyBase.Load'TODO: This line of code loads data into
the 'AttendanceDataSet.student'table.
You can move, or remove it, as needed.Me.StudentTableAdapter.
Fill(Me.AttendanceDataSet.student)
End Sub
Private Sub
CreateStudentToolStripMenuItem_Click(ByValsenderAs System.Object,ByValeAsSystem.Eve
ntArgs)
Handles CreateStudentToolStripMenuItem.
```

```
Click addstud.ShowDialog()End SubPrivate SubEditStudentListToolStripMenuItem_Click(ByV
alsenderAs System.Object,ByValeAsSystem.EventArgs)Handles EditStudentListToolStripMen
uItem.
Click Updatestud.ShowDialog()End SubPrivate SubLogoutToolStripMenuItem_Click(ByValse
nderAsSystem.
Object,ByValeAsSystem.EventArgs)HandlesLogoutToolStripMenuItem.Click
    Form1.Show()
Me.Hide()
  End Sub
End Class
```

Attendance Page

```
Imports System.Data
ImportsSystem.Data.OleDb
Public Class1UpdatestudPubliccmdAsOleDbCommand,cnAsOleDbConnection,sqlAs String,cns
tringAs StringPrivate SubButton1_Click(ByValsenderAsSystem.Object,ByValeAs System.Ev
entArgs)
cnstring="Provider=Microsoft.Jet.Oledb.4.0;DataSource=C:\Users\Undisputed\Documents\Visu
al Studio2008\Projects\Attendance\Attendance.mdb"
cn =NewOleDbConnection(cnstring)cn.Open()sql ="Select* from student where MatricNo='"&
TextBox1.Text &"'"cmd=NewOleDbCommand(sql, cn)cmd.ExecuteNonQuery()
   End Sub
Private Sub
Button2_Click(ByValsenderAsSystem.Object,ByValeAs System.EventArgs)
TextBox1.Clear()
  End Sub
Private Sub
Button3_Click(ByValsenderAsSystem.Object,ByValeAs System.EventArgs)HandlesButton3.
Click
cnstring="Provider=Microsoft.Jet.Oledb.4.0;DataSource=C:\Users\Undisputed\Documents\Visu
al
```


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```
   Studio2008\Projects\Attendance\Attendance.mdb"
cn=NewOleDbConnection(cnstring) cn.
Open()
sql ="Update student set week1='"& CheckBox1.Checked &"',week2='"&
CheckBox2.Checked &"',week3='"& CheckBox3.Checked &"',week4='"&
CheckBox4.Checked &"',week5='"& CheckBox5.Checked &"',week6='"&
CheckBox6.Checked &"',week7='"& CheckBox7.Checked &"',week8='"&
CheckBox8.Checked &"',week9='"& CheckBox9.Checked
&"',week10='"&CheckBox10.Checked &"',week11='"& CheckBox11.Checked
&"',week12='"&CheckBox12.Checked &"' where MatricNo='"& TextBox1.Text &""cmd
=NewOleDbCommand(sql, cn)
cmd.ExecuteNonQuery()MessageBox.Show("Upadete     Suxe4","Update Student
Info")End SubPrivate SubButton4_Click(ByValsenderAsSystem.Object,ByValeAs System.Ev
entArgs)HandlesButton4.Click
      Me.Hide()
   End Sub
End Class
```