STUDENT ATTENDANCE FOR FINAL EXAMINATION SYSTEM

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ABSTRACT

This project is developed by using the barcode scanner and student card to get the attendance of students during final exams at the end of each semester. Previously lecturers need to use paper to obtain the attendance of students. There are many problems when using paper as the paper include student attendance will be damaged and lost. This project can help lecturers to reduce such problems by designing automatically using barcode scanner attendance and student card. The system has been running with student card and get a code barcode scanner will detect the barcode number on the student card. Graphic User Interface (GUI) has been developed using Visual Basic 6.0 to create a database that is easier to access.

In this system there is an admin who will control the overall in the system in which he will update all the data contained in this system. While users namely the invigilator only assigned to take student attendance and may view the data. Both actors in the system need to use the password and username that has been set by the admin. This shows the level of system security that cannot be accessed by others if they do not know the password and username.

As an institution of higher education which is surrounded by various types of technology, they have moving together that does not seem far behind compared to other institutions in order to create a visionary state and quality from time to time.

ABSTRAK

Projek ini dibangunkan dengan menggunakan *barcode scanner* dan kad pelajar untuk mendapatkan kehadiran pelajar semasa peperiksaan akhir di setiap hujung semester. Sebelum ini pensyarah perlu menggunakan kertas untuk mendapatkan kehadiran pelajar. Terdapat banyak masalah apabila menggunakan kertas sebagai kehadiran pelajar antaranya kertas kehadiran akan rosak dan hilang. Projek ini boleh membantu pensyarah untuk mengurangkan masalah seperti itu dengan mereka bentuk kehadiran automatik menggunakan barcode scanner dan kad pelajar. Sistem telah berjalan dengan mendapatkan kod kad pelajar dan *barcode scanner* akan mengesan nombor kod bar pada kad pelajar. Antara Muka Pengguna Grafik (GUI) telah dibangunkan dengan menggunakan Visual Basic 6.0 untuk membuat pangkalan data yang lebih mudah untuk mengakses.

Di dalam sistem ini terdapat seorang admin yang akan mengawal secara keseluruhan di dalam sistem ini di mana dia akan mengemaskini segala data yang terdapat di dalam sistem ini. Manakala pengguna iaitu pengawas peperiksaan hanya di tugaskan untuk mengambil kehadiran pelajar dan boleh melihat data tersebut. Kedua-dua aktor di dalam sistem ini perlu menggunakan kata laluan dan *username* yang telah di tetapkan oleh admin. Ini menunjukkan tahap keselamatan sistem yang tidak boleh di akses oleh orang lain jika mereka tidak mengetahui kata laluan dan *username* tersebut.

Sebagai sebuah institusi pengajian tinggi yang di kelilingi pelbagai jenis teknologi, mereka harus bergerak seiringan supaya tidak nampak jauh ketinggalan berbanding institusi yang lain bagi mewujudkan negara yang berwawasan dan berkualiti dari masa ke semasa.

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CHAPTER 1

INTRODUCTION

This chapter will focus on background of this project, problem of the manual system, the objectives, scope and significance of the project.

1.1 BACKGROUND

A barcode reader, also called a price scanner or point-of-sale (POS) scanner, is a hand-held or stationary input device used to capture and read information contained in a bar code . A barcode reader consists of a scanner , a decoder (either built-in or external), and a cable used to connect the reader with a computer. Because a barcode reader merely captures and translates the barcode into numbers and/or letters, the data must be sent to a computer so that a software application can make sense of the data. Barcode scanners can be connected to a computer through a serial port , keyboard port , or an interface device called a wedge . A barcode reader works by directing a beam of light across the bar code and measuring the amount of light that is reflected back. (The dark bars on a barcode reflect less light than the white spaces between them.) The scanner converts the light energy into electrical energy, which is then converted into data by the decoder and forwarded to a computer.

Student Attendance for Final Examination System is developed to calculate the number of student who attends the exam in certain subjects. This system using bar code which scan the student card before they enter exam hall. Student attendance for final examination system consists of many functions that determine the purpose of the system. Since the system directly not involved student, the actor/user of the system is examiners. Different user serves different purpose into the system. Some of the activities in the system require the involvement of both user and the data updated by the user will be recorded sequentially into system.

1.2   PROBLEM STATEMENT

Traditionally, student attendance is taken manually by using a list of names provided by the university the attendance. With a manual system, there are some problems faced by the invigilator because they have to find their names and sign the attendance of students in the list of names that have been given by them. This can cause, they will be overlooked due to the size of the paper that is printed quite small. Invigilators will also face the problem of error checking student attendance if no name or id is almost the same student. So as an invigilator, they should be careful when signing the attendance of students.

Because of this problem, a system may be needed in order to records the attendance of the students more accurately without have to trace manually by lecturers. A bar code will be provided at each exam hall. This system will record the attendance of students or absence in exam hall with checking their name in name list that given by faculty. This is to ensure that the students have attended their examination and give facilitate for staff or lectures that in charge during final exam.

1.3   OBJECTIVE

The objective is important to achieve the goal. The main objectives of this project are:

1.3.1   To develop the Student's Attendance for Final Examination System

The first objective is to develop Student's Attendance for Final Examination System. This system will record the attendance of the students and show list of name of students in examination hall.

1.3.2   To develop the Student's Attendance for Final Examination System using   bar code

The second objective is to develop Student's Attendance for Final Examination   System using bar code. Examiner will scan the student card.

1.3.3   To keep records of students into database

Since an existing system using paper to take attendance from students, possibility to lose data of attendance very high because papers of list name of students will be missing suddenly.

1.4   SYSTEM SCOPE

The scope of this project are :

1.4.1 System

- Record student attendance
    - Examiners will scan student card before their start examination. From this, all the records will keep in this system. This system use only for final examination.
- View record.
    - After all the records save in this system, staff or lectures can view student name list by each subject and faculty and will sort by section.

1.4.2 Usage

The implementation as a stand-alone application for final examination only at the end of semester.

1.4.3 Respondents

The respondents will be the students of Civil Engineering departments.

1.4.4 Technology

The hardware that will be used for this project is bar code.

1.5 SYSTEM SIGNIFICANCE

The significance must be considered in every proposed system to ensure that the proposed system will provide more benefit to all parties especially the faculty. For this project, the significance has been identified. The significance can be categories into 3 groups. There are:

1.5.1 Departments

This significance of this system is mainly focusing for examination department. This is because this project will enhance the efficiency of the manual system. It also can reduce in term of paper usage and avoid human error. All activities are done by computer and technology.

1.5.2 Examiners

With this system, examiners can record the attendance of their students in class easily. They also do not have to count the total student in the examination hall.

1.5.3 Students

As a user, students can motivate themselves to be more discipline and punctual.

1.6 THESIS OVERVIEW

This "Student Attendance for Final Examination System" final thesis is a combination of 7 chapters that contains and elaborates specific topics such as the Introduction, Literature Review, Hardware Design, Software Development, Result, Discussion, Conclusion and Further Development that can be applied in this project.

Chapter 1 basically is an introduction of the project. In this chapter, the discussion is all about the background and objectives of the project. The overall overview of the entire project also will be discussed in this chapter.

Chapter 2 will be discussed about the literature review for the development of the Student Attendance for Final Examination System using bar code scanner. Everything related to the project will be described generally in this chapter.

Chapter 3 discusses about methodology to develop Student Attendance for Final Examination System.

Chapter 4 will be focused on hardware design of the Student Attendance for Final Examination System using bar code scanner. This chapter included seven subtopics. The entire hardware used in this project will be discussed briefly.

Chapter 5 will be discussed about the software development of the Graphical User Interface (GUI). In this section, all basic programming will be explained with a sample programming.

Chapter 6 discusses all the results obtained and discussion of the project. The main flow chart for this project will be explained briefly under this topic.

Chapter 7 is about conclusion based on the development of the system.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Student Attendance for Final Examination System using bar code scanner is automatic record of student attendance develops especially for high institution organizations. This system will integrate with bar code scanner and Visual Basic. Both modules will be combined together in order for this system fully functioning. Each module carries own function and special features which will be discussed in detail in this chapter. **Figure 2.1** show overall block diagram of the system.
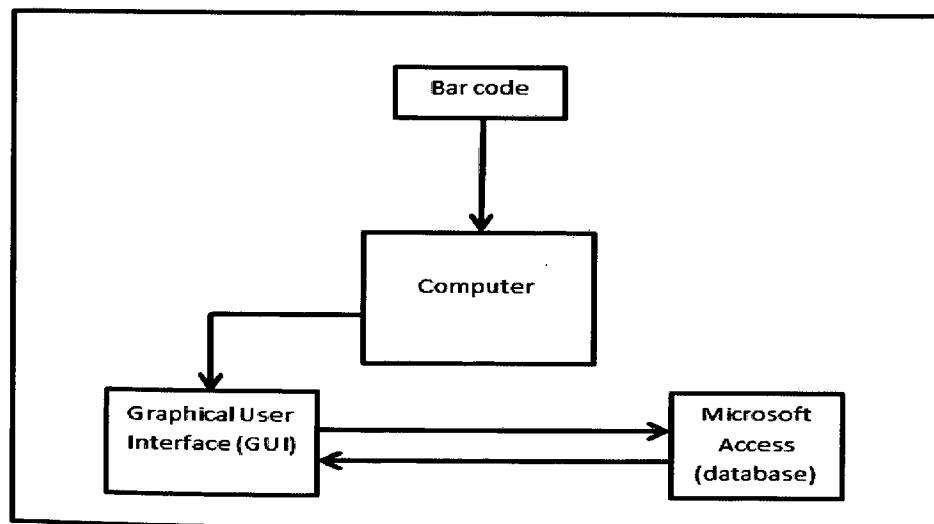
Figure 2.1 Overall Student Attendances for Final Examination System and Student Card

2.2 BAR CODE TECHNOLOGY

Barcode technology works of off a principle called symbology. Symbology at its basic form is what defines the barcode; it determines the mapping and interpretation of the encoded information or data. This encoding allows the scanning device to know when a digit or character starts and when it stops, similar to a binary representation. We recognize barcodes as an array of parallel lines alternating between white and black lines. Barcode technology provides a simple and inexpensive method of recording data or information in a number of applications [1].

The symbologies of the barcode technology can be arranged or mapped in a variety of ways. A continuous symbology is marked by the characters beginning with a black line and ending with a white line or space, while discreet symbologies have characters encoded as a black line a space and then another black line. This takes care of the characters and how each individual number or letter is read. The lines of a barcode also have variances in encoding the widths of the lines. Some barcode technology systems use two separate widths to determine the character while others use multiple width lines. The use of any of these encoding styles depends, of course, on the application for which the barcode technology is being used [1].

In order to read the data of barcode technology it needs to be scanned by a laser and then interpreted. The scanners, or lasers, used to read the barcodes measures the light reflected form the linear barcode technology and can distinguish between the white and black lines [1].

Figure 2.2 : Barcode Number

This is the barcode number which is unique and refers to an object. Barcode number also stores some data and that is why it is unique and not similar to each other. So, the barcode scanner will detect the barcode number and the data will be read and process from the barcode number.

2.3 QR CODE TECHNOLOGY

Quick Response (QR) is not a graphical design or any creative work but it is a graphical image with many coded information built in it. Quick Response (QR) code is bunch of information like URL of product, website, and details of anything like brochure of product. This information can only be retrieved when code is rightly scanned with appropriate scanner [2].

QR code is a 2D representation of the bar code which is 1D coded information. 1D barcode store the information in thickened lines with appropriately spaced bar. Whereas Quick Response (QR) code is a two dimensional storage image which stores the data in horizontal as well as vertically pattern. Quick Response (QR) code stores the information in many different patterns like square, rectangle, polygons, dots and other geometrical patterns. This means that Quick Response (QR) code stores more information than 1 D bar code[2].

Quick Response (QR) code even stores more digits as well as characters but barcode store only 20 digits. Quick Response (QR) code stores up to 7089 digits as well as 4296 characters. The concept of the Quick Response (QR) code was come up in 1994 in Japan to a car manufacturer company to identify and distinguish different parts of car during assembly of car [2].

Figure 2.3 : Transformation of barcode to QR Code

2.3.1 WHAT QR CODE MADE UP OF?

Quick Response (QR) code is made up of finder pattern, timing pattern, alignment pattern, format information, coded data and quite zone, which are key components/elements of a Quick Response code [2].

Each component has its own role. The function of each element is as under : **Finder pattern** is a block with central black square, with white and black alternate Square outside of it (concentric squares of alternate colors). There are such three blocks available in each corner except bottom right. This finder pattern tells the scanner/reader that image which is being decoded/scanned is QR code. Finder pattern does not contain any data [2].
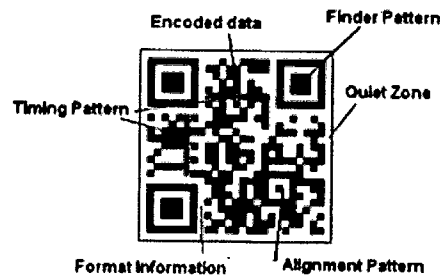
Figure 2.4 : QR Code Technology

Orientation pattern which also does not contain any data but it tells the scanner the address for correcting distortion of the QR code. The central coordinate of the alignment pattern is identified of the symbol and to detect it easily, black isolated cell is placed in it [2].

Timing pattern or time lines which does not contain any useful data. The function of timing pattern is to identify the central coordinate of each cell in QR code and timing pattern is placed between two finder patterns [2].

Format information is positioning symbol and which enables scanner to decode/scan the code at any orientation with high speed [2]. **Encoded data** is the main data which are required to be decoded by the scanner to retrieve

the information contained in it. The QR code is encoded into binary language. The white border area outside the code is called quite zone which separates the QR code from other label on the product or any stuff nearer to it [2].

2.3.2 COMPARISON QR CODE AND BARCODE

Barcode and QR code are differences in various aspects of the storage, usage and so on. **Table 2.1** show some comparisons between barcode and QR Code technology.

Table 2.1 : Comparison between barcode and QR Code

TECHNOLOGY	BAR CODE	QR CODE
Digit Stores	capable of storing around 20 digits	hold over 7,000- that's about 350 times the data
Creation of Shape	created horizontally (reason of barcode can store around of 20 digits)	QR codes can have information spread vertically and horizontally thus increasing the data storage space.
Customization	No customization, barcodes must remain in black and white and keep the same, identical design.	able to be customized with bright colors and logos
Efficiency	Can be scanned at a time	Even more limited than linear bar codes, as the scan takes longer, depending on the data

2.4 EXISTING SYSTEM

Data management for an organization is a very important thing. In management education should also be a data management system which introduced to enhance the effectiveness of management. Good data management enables users to store data in a systematic way. Users should be able to change, delete and record the new data. Users can also perform or ask the system to perform operations such as entering data into an existing file, correct the data, and add a new file to the database, delete, and change data existing database is not required.

If we look at the management of information in a classical or traditional, some weaknesses and deficiencies contained in the management system. Therefore, a little more disturbs the smooth administration of an organization. Among them is the safety factor. Information or data in a file or paper used in this system allows the possibility to be damaged or lost. If an incidents occurs, such as floods and fire burning, surely the information is difficult to be saved. Situations like this are not directly lead to the loss of the organization.

In addition, other factors that must be considered is the limited access to store information. If someone is using a file, it is difficult for other users to use the file, and have wait until the user finished their tasks. Difficult situation where the files to be updated also contributed to the weakness of the method traditional ways. The update process will be slower if the information is difficult to achieve. This led to problems for individuals completed its task.

2.4.1 STUDENT ATTENDANCE MANAGEMENT VIA INTERACTIVE INPUT AND GRAPHICAL REPORTS DISPLAY

The general description of the capabilities and functionality of the system are standalone application to take students attendance in an easy, fast and effective way. Students just scan the barcode on their matric card using barcode scanner and done. The student attendance is updated in real-time, as each attendance registration take place. The system is able to generate the attendance reports in pie chart and statistic. There are three types of reports :

- overall course report
- student attendance report
- not enough attendance report.

Lecturers and administrators are able to view the percentage of student attendance and detect

those who always absence and may disqualify to take their final exam. System is able to send e-mail to course lecturers a list of students that have not enough percentage of attendance, which is less that 80% through the e-mail trigger application [4].

The system is divided into three parts. The first part of the module is the students' attendance process, where students need to scan the barcode on their matric card to take attendance. Students can access the system to view or edit their profile, register course and view course schedule. The second part is lecturer activities, used by lecturers to view or print attendance reports, view or edit own profile and view other profiles. The third part is administration activities, used by academic staff in faculty to view or print attendance reports, view or edit profiles, add or delete user, add or delete course and add or delete program. **Figure 2.5** shows the system module of the system. [4].

The student attendance reports in the system are generated in graphical form using the web chart. Web Chart is a .NET 2.0 charting control for web applications [5]. The web chart used in this system was downloaded from the .netCHARTING website, http://www.dotnetcharting.com/, using the free developer edition. .netCHARTING makes use of the most advanced technologies available on the market today including the .NET framework [6]. In order to enable the usage of the web chart in the Microsoft Visual Studio .NET 2003, copy the dotnetCHARTING.dll and dotnetCHARTING.xml to the bin folder within the web application and add a reference to dotnetCHARTING.dll under the References node in Solution Explorer
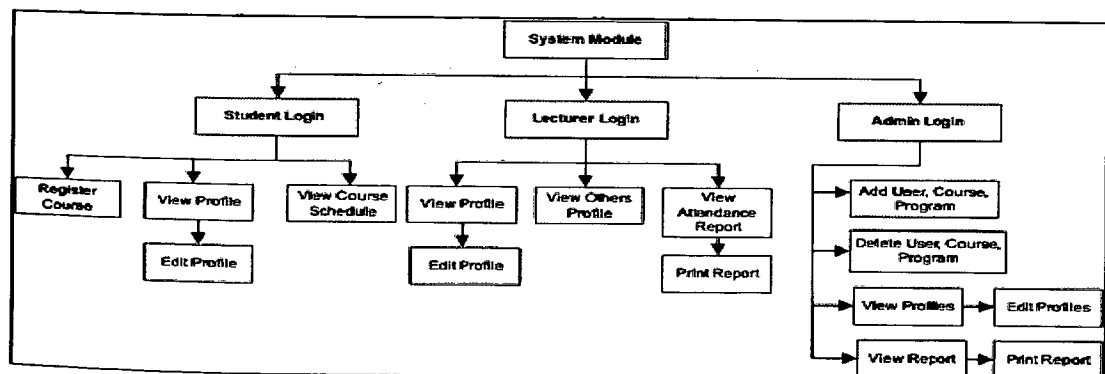
Figure 2.5 : Module of Student Attendance System by Barcode [4].

2.4.2 STUDENTS ATTENDANCE SYSTEM USING QR CODE

The system lies between online learning and traditional learning as a facilitation for the attendance record-keeping process, in a way that enriches the lecture time so that it can better be utilized in giving useful materials rather than wasting the time taking attendance [7].

The system requires a simple login process by the class instructor through its Server Module to generate an encrypted QR code with specific information. This can be done at any time before the class. During the class, or at its beginning, the instructor displays an encrypted QR code to the students. The students can then scan the displayed QR code using the system Mobile Module, provided to them through the smartphone market by the university. Along with the student's facial image captured by the mobile application at the time of the scan, the Mobile Module will then communicate the information collected to the Server Module to confirm attendance. The whole process should take less than a minute for any student as well as for the whole class to complete their attendance confirmation. Smartphones may communicate with the server via either the local Wi-Fi coverage offered by the institution or through the internet [7].

The system is composed of two modules: the Server and the Mobile Modules. The Server Module can be integrated with the eLearning platform used by the institution or it can be a separate application depending on the choice of the developer. The following subsection will describe the tasks for each module [7].

The Server Module performs the following tasks:

- Mediates students' attendance requests with the eLearning system.
- Generates a QR code for the instructor
- Runs Identity check
- Runs Location check

The Mobile Module is the part that students usually install on their smart phones. This could also be integrated with the Mobile part of the eLearning platform, or a standalone application that communicates with the Server Module. The communication will be through the local Wi-Fi network, or it could be through the internet [7].
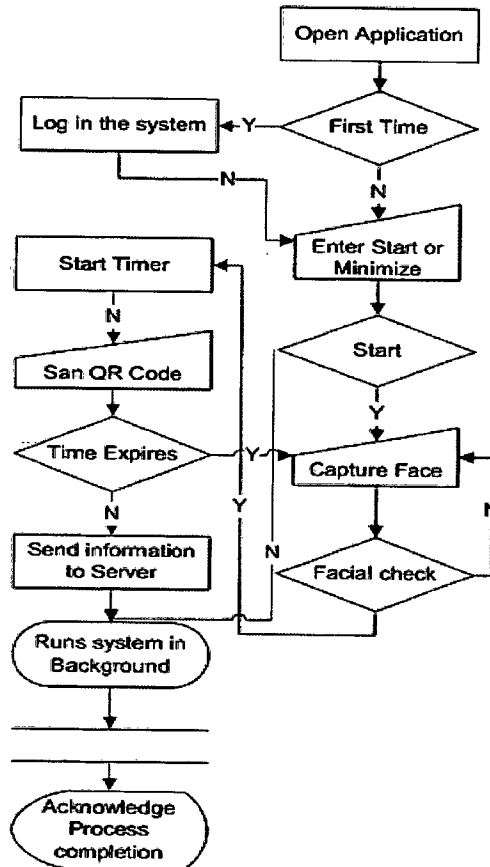

Figure 2.6 : Flow chart of Student Attendance System using QR Code [7].