Examination Automation System

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Abstract— **This paper presents an examination automation system that uses barcode system to automate the examination attendance taking procedure. It aims to eliminate the use of examination slips and examination attendance slip in order to improve the efficiency of the attendance taking process while at the same time ensuring the genuineness of the verification process. The system captures the barcode on the students' matric card and registers it into the database to capture the attendance of that particular student for that particular examination. The software system is based on inserting, updating and querying of a database management system. Emphasis is mainly on a real time application, namely tracking and counting of students in the examination halls within a short time. This system aims to reduce the amount of workload borne by the university examination unit and saves time used up to collect and count the examination attendance slip. A barcode system will also significantly reduces human error in the whole process as it is all capture into the computer directly via a barcode scanner.**

The methodology used in the development of this system is prototyping due to the fact that this method allows developer to continuously improve and modify the system based on user preference.

The development software used in the development of the prototype is Microsoft Visual Studio 2010.

I. INTRODUCTION

Universiti Teknologi PETRONAS is an Engineering and Technology higher learning institution. Despite the availability of many advanced technology in campus, the examination attendance system in the university is still conducted the manual way. Every semester, students need to queue up in a hall to collect their examination slip that states the number of course registered.

The purpose of the examination identification number is to protect the confidentiality of the students when the examination scripts are being marked. While the purpose of the examination slip is necessary but the entire process is too much of a hassle. Staff from the examination unit needs to put off two days of work to distribute the examination slip to the students while students need to queue up in to obtain their examination slip. Besides that, every student needs to fill up an attendance sheet upon sitting for an examination as an evidence of his or her attendance to that particular examination. During the examination, students also need to present the matric card as a proof of the students' identity while the examination slip confirms the examination that the student is sitting for. The attendance sheet is then collected and checked with the master record to confirm students' attendance. When the examination is over the examination attendance slip needs to be stored for later references. The whole procedure is performed by the examination invigilators.

The procedure is practical but it may be very time consuming and difficult to handle when there is a large number of students. Therefore a more efficient way of managing the whole examination procedure needs to be implemented. To automate the examination attendance management system with a barcode system would saves time and eliminate human errors as well

II. Methodology

A. Research Methodology

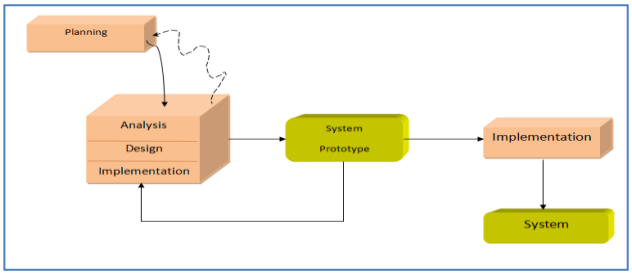
In order to collect data and information needed for the project, three method of research had been used. It started of with literature review on articles and journals related to automated attendance taking system and followed by interview on related parties on whether or not the system should be implemented in the university. Lastly the students' opinion on the system is collected and analysed.

B. Development Methodology

RAD methodology, or Rapid Application Development methodology, is a new system development methodology that emerged in the 1990s. This methodology helps adjust the SDLC phase so that it could get some parts of the system quickly to be delivered to customers. By this, customers can understand the application and suggest revisions to help improve system's functionality.

The type of methodologies following the RAD concept used in this project is prototyping. A prototyping-based methodology will perform the analysis, design and implementation phase concurrently. All these three phases are performed concurrently until the system is completed. Users will be provided with the system very quickly to interact with and will involve in the development of the system development process. The usage of prototyping methodology also allows the user to sample the framework of the final product and allows the developer to alter the product accordingly shall there be any dissatisfaction.

The core elements in the prototyping-based methodology are displayed in the following diagram:



Planning: This phase serves the purpose of understanding the reason for this application should be built. In this phase, problem statement for the project should be clearly understood. The purpose for building this system needs mentioning, too. Also, the feasibility analysis needs conducting to examine the key aspects of the project.

Analysis: In this stage, the developer will carry on research about current systems (literature review) and gather requirement through interviews or questionnaires.

Design: Design phase will decide how the system will operate in the future. Thus, it requires the availability the application framework and application interface as the deliverables for this phase.

Implementation: This is the final stage in SDLC, in which the system is actually built.

Since prototyping-based methodology is used in this project, the prototype will be given to users to ask for their feedbacks.

C. Tools and Equipment used

Software:

1. Microsoft Visual Basic 2010

Microsoft Visual Basic (VB) 2010 will be used as the main Integrated Development Environment (IDE) in this project. It will be used to develop the system and connect the database to the whole system that works with the barcode scanner.

2. Microsoft Access 2010

Microsoft Access 2010 will be used to store databases of students information and examination courses used in the system. This system prototype is developed using Microsoft Access to create a mock database for the system. When the system is implemented, MySQL will be used to store the database as it can host a larger amount of data. MySQL is one of the world's most popular open source databases because of its high performance, high reliability and ease of use. It is being used by many of the world's largest organization to develop and maintain their systems. Also, MySQL can run on multiple platforms like Linux, Windows, Mac OS, Solaris, thus we can flexibly use it in our system.

Hardware:

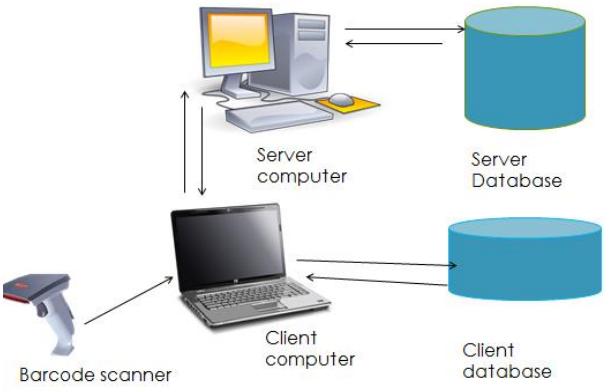
A laptop computer

The computer needs to have a minimum of 3.5Ghz processor that supports both MySQL and Microsoft Visual Basic 2010.

A simple barcode scanner

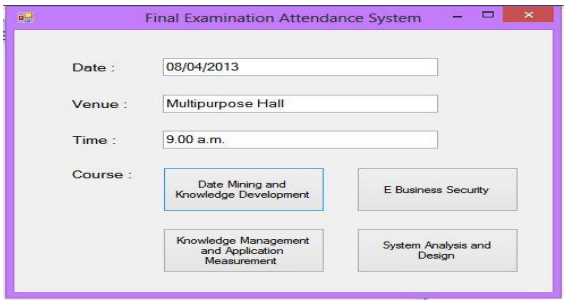
This project needs a simple barcode scanner that is able to capture and store one dimensional barcode.

D. System Architecture



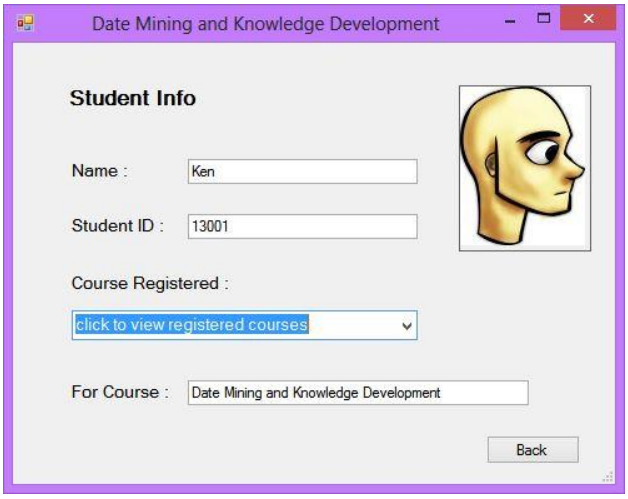
In the system architecture above, it is shown that the barcode scanner is connected to the client computer. These two items will be placed in the examination hall to collect students attendance during the examination session. The scanner used here is a handheld portable scanner, therefore the invigilator will need to walk around the examination hall to scan the students matric id. The client computer will download students information for the particular examination commencing during that session and store the data in the client database. Once the students attendance is captured, it will be matched with the information from the client database for the verification process. After all the verification is done, the information in the client database will be sent to the server computer and stored in the server database for long term storage purposes and all the data in the client database will be wiped out for security purposes. A web based portal will be created for students to check that their attendance had been collected and captured.

D. Interface Design

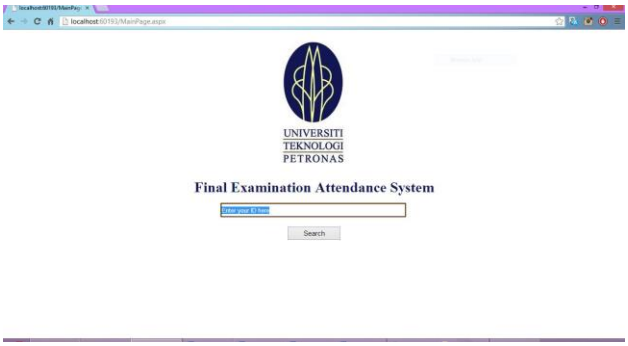


The above figure shows the main window of the system. From this window user can see that the date and venue of that particular day of examination is displayed along with the courses held on the examination on that particular day. Once that particular course is selected, the following window shows.

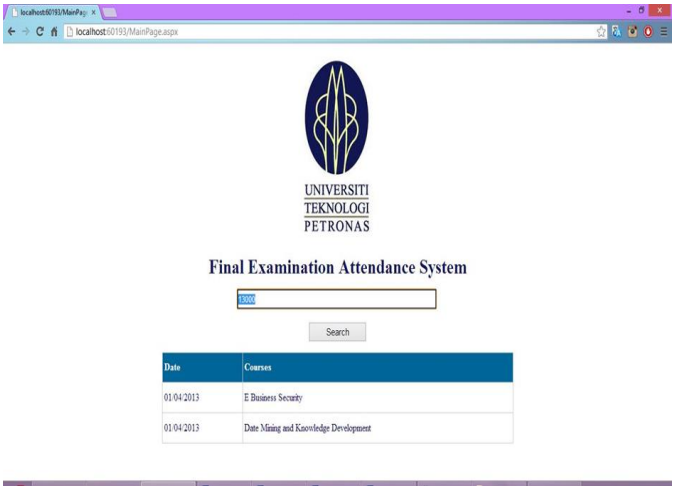
The above image shows that the system is ready for input, thus a barcode scanner is used to scan the barcode of the students' matric ID for input.



The above image shows information of the particular student for verfication by lecturer to prevent fraud.



The above web portal is designed for the student to keep track of the examination attendance instead of the previous examination attendance slip.



The above image shows the attendance recorded for the particular student.

III. Conclusion

According to the results from data gathering, we can conclude that the project is strongly supported by target users – students. Hence, it should be implemented as soon as possible. Moreover, analysis and designing should be continuously revised as the project goes on in order to save more time for the development.

I sincerely hope that those concerned will find this project useful for the Attendance Recording (with Hardware Interaction) during the final examination, and will provide ease at the all end namely students, invigilator and also the staff at the Examination Unit.

Success of this project has motivated us to learn and apply more of the computer knowledge to develop new computer applications, even better and useful; Suggestions are always welcome to make this effort more useful.

IV. Future Work Continuation

The development of the prototype should be started latest by January 2013. At the same time, data gathering will also be conducted and reviewed from time to time to ensure that all requirements are met.

Certainly, the examination automation system should be able to serve its main objective is to assist simplifying the examination attendance taking process and while ensuring the genuineness of the students information

Besides, there was a suggestion from Dr. Dominic and Dr. Baharum that alternative method of automatic identification should also be considered instead of focusing on barcode system.

Besides that, there is also suggestion that an Android based system should be created to replace the need for barcode scanner and the client computer. The Android system will use the barcode scanner on a smartphone to act as both the scanner and the client computer.

Last but not least, having student web based portal on mobile platform is obviously more attractive to user. Thus, porting to mobile is also included in our ‘wish list’ to be considered in the future after the development of the main system is completed.

This project can be improvised in many ways to ease up the process of the examination attendance taking system especially in this particular university where many information system and technology elites reside.

V. References

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