REAL TIME BARCODE READER FOR LABORATORY

ATTENDANCE (SOFTWARE)

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Dedicated to:

Mak, Abah, all families and my beloved friends for giving me unconditional love and caring……

DEDICATION

Firstly, I would like to express my gratitude to Allah for the successful of this project and all the experience that I have been through is by his will.

I would like to express a sincere thanks to my supervisor, Miss. Norhashimah Bt Mohd Saad, for accepting me as her project student and for her valuable ideas, advice and help in the supervision and discussions of this Final Year Project. In fact, she gave me guidance when obstacles arise throughout this period of time. Once again, thanks to her for his tolerance and endeavors.

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ABSTRACT

To realize this project, an extensive research and study have to be done on barcode scanner, synchronization, visual basic interface, and database. It is crucial to find the right program and source code to interface all that. The purpose of this project is to create and develop database system for laboratory attendances based on Real Time Barcode Reader, which it can synchronize between hardware and software. This program called Laboratory Attendance System will be able to read and display barcode and after that save the data into a database system for a record. Microsoft Visual Basic 6 is used as main software to create the interface and database used to collect all data is being created using Microsoft Access. These are some methodologies that have been used in this project which are literature review, system development, field testing and build up software. For software interfacing, methodologies that have been used are hardware, synchronization between hardware and software, data transfer to computer, and display student information.

ABSTRAK

Untuk merealisasikan projek ini suatu kenyataaan, kajian yang mendalam harus dilakukan ke atas pengimbas kod bar, penyelarasan, sambungan ke Visual Basic dan pangkalan data. Ini adalah sangat penting untuk mencari dan mendapatkan program dan kod sumber yang betul untuk berkomunikasi antara satu sama lain. Tujuan projek ini dijalankan adalah untuk menghasilkan dan membangunkan satu sistem pangkalan data berdasarkan *Real Time Barcode Reader*, dimana ia akan menyelaraskan sambungan antara alat dengan program komputer. Sistem ini yang diberi nama Sistem kedatangan ke Makmal akan membaca dan memaparkan kod bar dan kemudiannya menyimpan data kedalam sistem pangkalan data untuk tujuan simpanan data. Microsoft Visual Basic 6 telah digunakan sebagai program komputer utama untuk menghasilkan sambungan dan pangkalan data yang digunakan untuk menyimpan semua data dihasilkan melalui program Microsoft Access. Terdapat banyak kaedah digunakan dalam projek ini termasuklah kajian latar belakang, pembangunan sistem, ujian lapangan dan penghasilan program. Untuk sambungan program komputer, kaedah yang digunakan meliputi peralatan dan komponen, penyelarasan antara alat dengan program komputer, penghantaran data ke komputer untuk paparan maklumat pelajar.

CONTENTS

CHAPTER 3 PROJECT METHODOLOGY

CHAPTER 4 RESULT AND ANALYSIS

CHAPTER 5 CONCLUSION

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

BASIC	-	Beginner's All-purpose Symbolic Instruction Code
GUI	-	General User Interface
ADO	-	ActiveX Data Object
DAO	-	Direct Access Object
SQL	-	Structured Query Language

CHAPTER 1

INTRODUCTION

Chapter 1 starts with the background of the project. It is followed by objectives, scope of the project and problem statements. Research methodologies are presented in fourth part and lastly organization of the thesis is described.

1.1   BACKGROUND OF PROJECT

Real Time Barcode Reader System for Laboratory Attendance (Software) has been developed to a comprehensive, user-friendly development environment to aid technicians or lecturers taking the advanced laboratory technology development module to evaluate their student more effectively and reducing time. This system provides a database which can store data from Barcode Reader and display all data in a simple way. Furthermore, a stand alone system also has been created which means system can be operated even though barcode reader is not functioning. It acts as a comprehensive reference providing student information and data.

The first step to get data is through Barcode Scanner as an input device. This device contains a small sensory reading element where it detects the light being reflected back from the bar code, and converts light energy into electrical energy. The result is an electrical signal that can be converted into data. For this project, barcode scanner will detect barcodes from matrix card and then send it to the barcode reader to be stored. Barcode reader acts as a portable reader and it can display and stored data temporarily then transfer the data to computer through serial port.

After finished sending data to the barcode reader, then all data will be transferred to the pc. Microsoft Access is used to recognize data from input device with a data from database. If data is true, then data will be displayed in software created with Microsoft Visual Basic 6.This software called Laboratory Attendance System consist of student information and barcode interface. For student information interface, this program can add and display student information in a simple way. All data recorded will be saved in the database. For barcode interface, this program is created if barcode reader is not functioning. Barcode Scanner will be connected directly to computer through a serial port and data will be sent every time the trigger is being pulled.

1.2   OBJECTIVES

The purpose of this project was to create and develop a database system for laboratory attendance base on Real Time Bar Code Reader. The interfacing between hardware and software system are synchronized to add store, store and display the students information into the system in real-time.

1.3 SCOPES OF WORK

This project was focused on developing an attendance software program by using Microsoft Visual Basic 6. Apart from that, it is also focused on building a database using Microsoft Access. This can be done by communicating the system between hardware and software or in the other word, doing transmitting and receiving process. Creating password for user is also some part of this project, thus making this project available for certain individuals only.

1.4 PROBLEM STATEMENTS

Reality happen now is that most system used in taking student's attendance or others informal information required student to write it down manually. These non-effective system lead students to cheat and give wrong information about themselves as there is no one will monitor every second student's enter and exit labs. Real Time Barcode Reader System for Laboratory Attendance (Software) is one of the best solutions to handle these problems and thus makes system easier and effective.

Another problem is, high demands on high voltage and complex devices lead to high cost of the devices. Therefore, a simple and portable barcode reader is suitable for storing data.

1.5   RESEARCH METHODOLOGIES

There are several approaches taken to achieve the objectives, which are:

1.   Background and literature review
2.   System development
3.   Field up testing
4.   Build up software

For software development, these are some methods used in developing the interface which are:

1.   Hardware
2.   Synchronization between hardware and software
3.   Data transfer to PC
4.   Display student information

1.6   ORGANIZATION OF THESIS

Each chapter begins with identifiable objectives and brief overview. This report is divided into several chapters which are Introduction, Background and Literature Review, Project Methodology, Result and Analysis and Conclusion.

The first chapter is an introduction to the project. It consists of objectives, scope of works, problem statements and research methodologies that clearly describe what is the project is all about.

The second chapter contains about theory and concept of the entire project. Literature review based on technologies and information has been done in order to create a specific research about this project. Several research are been highlighted such as real time operating system, barcode reader history and application, serial connection, and the used of visual basic as an interface.

Chapter three explained the methodology of implemented used in this project in detail. In this chapter, the methods and the project flow has been explained clearly.

In chapter four, it describes the results and analysis obtained on this project. This is the main chapter that shows the development of the project and thus, provides a full analysis on the project, starting from theoretical findings to a conceptual design and lastly simulation results.

For the last chapter of the thesis, some suggestions have been made to make this project much better.

CHAPTER 2

LITERATURE REVIEW

This chapter explains about theory and concept of the entire project. Literature review based on current and exist technologies and information has been done in order to create a specific research about this project. Research hypothesis is been described clearly. Several methods have been used for solving problems which will be discussed in the next chapter.

2.1 REAL TIME OPERATING SYSTEM

A real-time operating system (RTOS) is a multitasking operating system intended for real-time applications. Such applications include embedded systems (programmable thermostats, household appliance controllers, and mobile telephones), industrial robots, spacecraft, industrial control, and scientific research equipment.

An RTOS facilitates the creation of a real-time system, but does not guarantee the final result will be real-time; this requires correct development of the software. An RTOS does not necessarily have high throughput; rather, an RTOS provides facilities which, if used properly, guarantee deadlines can be met generally (soft real-time) or deterministically (hard real-time). An RTOS will typically use specialized scheduling algorithms in order to provide the real-time developer with the tools necessary to produce deterministic behavior in the final system. An RTOS is valued more for how quickly and/or predictably it can respond to a particular event than for the given amount of work it can perform over time. Key factors in an RTOS are therefore minimal interrupt latency and a minimal thread switching latency.

2.2   GRAPHICAL USER INTERFACE (GUI)

Graphical user interfaces allow end users to interact with applications in a more or less intuitive manner. An interface is a way to interact with something. For example, television remote control is an interface to a television. A user interface is the way someone interacts with a program. The simplest user interface consists of two components: a prompt displayed on the screen and the keyboard used to enter information into the program. The prompt might be some text that tells the user of the program to enter a student ID. The user then enters the student ID into the program using the keyboard. The program then processes the student ID when the ENTER key is pressed.

No doubt the term *GUI* used whenever anyone talks about a user interface for a program. GUI is an acronym for graphical user interface. Practically every program used today uses graphics as a way for a user to interact with the program because a GUI is an

intuitive and efficient way to collect information from a user and to display information for a user to read.

Researchers at Xerox's Palo Alto Research Center (PARC) are credited with developing the GUI, which was later enhanced by Apple Computer and then by Microsoft. At the heart of a GUI are the standard graphical elements that collectively form the user interface. These elements are commonly recognized as windows, menus, push buttons, labels, text boxes, radio buttons, and other similar GUI objects that being used in nearly all commercial programs today.

Besides making a program look pretty, the standard GUI dramatically reduces the time necessary for someone to learn how to use a new program. Arguably, 75 percent of every program is the same. That is, it uses the same two-dozen or so graphical elements. Each of those graphical elements operates identically across programs. For example, nearly everyone who has used a computer program knows to select the down arrow to the right of a text box in order to see a list of values that can be entered into the text box. The values are likely to change from program to program, but the process used to select those values is the same in all programs.

2.3   VISUAL BASIC

A programming language and environment developed by Microsoft. Based on the BASIC language, Visual Basic was one of the first products to provide a graphical programming environment and a paint metaphor for developing user interfaces. Instead of worrying about syntax details, the Visual Basic programmer can add a substantial

amount of code simply by dragging and dropping controls, such as buttons and dialog boxes, and then defining their appearance and behavior.

Although not a true object-oriented programming language in the strictest sense, Visual Basic nevertheless has an object-oriented philosophy. It is sometimes called an event-driven language because each object can react to different events such as a mouse click.

Since its launch in 1990, the Visual Basic approach has become the norm for programming languages. Now there are visual environments for many programming languages, including C, C++, Pascal, and Java. Visual Basic is sometimes called a Rapid Application Development (RAD) system because it enables programmers to quickly build prototype applications.

2.3.1 Differences between Visual Basic and C++

Visual Basic and C++ are programming languages. The major difference is their syntax- the instruction language use to program with. Visual Basic, as its name suggests, is more visually oriented. Instead of having to hard code a dialog box, for example, dragging one from the VB toolkit and drop it into work area, adding buttons and windows, and define their functions

In C++, on the other hand, must define each and every piece of adding that have been made. This is one of the reasons VB is often used as a RAD, or Rapid Application Development: Software engineers can create a prototype in VB and see how it runs quickly. Once all the necessary tweaks have been made, they then write the code in C++