"I/We hereby verify that I have read this report and I/we find it sufficient in terms of quality and scope to be awarded with the Bachelor's Degree in Electronic (Computer Electronic) Engineering."

Signature : .....

Supervisor's Name: EN. AZMI BIN AWANG ISA

Date : 5/5/06

AZMI BIN AWANG MD ISA
Pensyarah
Fakulti Kejuruteraan Elektronik dan Kejuruteraan Komputer
Kolej Universiti Teknikal Kebangsaan Malaysia
Karung Berkunci 1200
Ayer Keroh, 75450 Melaka

PERSONAL COMMUNICATOR: PERSONAL MEDICAL ASSISTANT/CARE

NAZREEN NADIA BINTI MOHAMED SHAMAUN

This Report Is Submitted In Partial Fulfillment Of Requirements For The Bachelor's Degree In Electronic Engineering (Computer Engineering)

Fakulti Kejuruteraan Elektrik
Kolej Universiti Teknikal Kebangsaan Malaysia

May 2006

"I admit this report is written by me except the summary and extraction for each I have been clearly presented."

Signature: .....

Name NAZREEN NADIA BINTI MOHAMED SHAMAUN

Date : 05/05/06

Specially dedicated to family, friends and lecturers....

ACKNOWLEDGEMENT

A million thank you to my friends who always lend a helping hand in completing this report. These thanks are also dedicated especially to my supervisor En. Azmi Bin Awang Md Isa who is constantly ready to share his abundant knowledge with me and not to forget in helping and giving ideas to solve the problems faced in finshing this project. I would also like to wish many thanks to my panel, Pn. Mardiana and Miss Norhashimah who's urged has made me steadfast in finshing this project.

ABSTRACT

Personal Digital Assistants (PDAs) offer clinicians the ability to enter and manage critical information at the point of care. Although PDAs have always been designed to be intuitive and easy to use, recent advances in technology have made them even more accessible. The ability to link data on a PDA (client) to a central database (server) allows for near-unlimited potential in developing point of care applications and systems for patient data management. Although many stand-alone systems exist for PDAs, none are designed to work in an integrated client/server environment and purposely built for common users. This Project will develop software for personal medical assistance which is rare in medical software history. The software will content user database and medical information, and can be linked to the PDA and use as software just like any other PDA software. As most medical assistant software emphasize on professionals such as doctors and pharmacists, common users have been neglected in terms of medical assistant usage. This client/server environment software development is to be completed based on helping public user enhance their healthy life management as well as their detailed medical records. This is done by promoting simple medical tasks in the software to be executed toward proving its importance and usability to common users.

ABSTRAK

Personal Digital Assistants (PDAs) atau Pembantu Digital Persendirian ini menawarkan kebolehan klinikal untuk mengendalikan maklumat kritikal bagi bahagian penjagaan. Walaupun PDA adalah direkabentuk bagi kegunaan mudah dan praktikal bagi pengguna, dengan kemajuan teknologi terkini ia telah menjadi lebih menyeluruh. Kebolehan data berhubung dari PDA pelanggan ke pusat maklumat mengalukan potensi yang hampir tiada terhadnya bagi memajukan aplikasi penjagaan dan sistem bagi menguruskan data-data pesakit. Walau bagaimanapun dengan pelbagai sistem yang berdiri sendiri wujud bagi PDA, tiada satu pun yang dibangunkan dalam integrasi lingkungan client/server dan membantu pengguna biasa. Projek ini dibangunkan dalam bentuk perisian bagi 'bantuan perubatan persendirian' yang jarang sekali berlaku di dalam sejarah perisian perubatan. Perisian ini akan mengandungi maklumat persendirian dan perubatan pengguna dan berupaya berhubung ke PDA seperti perisian PDA yang lain. Oleh kerana kebanyakkan perisian bantuan perubatan menekankan ke arah perubatan profesionalisme sahaja seperti doktor dan ahli farmasi, pengguna biasa telah diabaikan dari segi penggunaan bantuan perubatan. Perisian pelanggan/pusat maklumat ini dibangunkan agar dapat menolong orang awam meningkatkan mutu hidup serta pengendalian kesihatan mereka sambil menguruskan sendiri data rekod perubatan sendiri dengan lebih terperinci. Ini dilaksanakan dengan mempromosikan tugas mudah di dalam perisian ini bagi membuktikan kepentingan dan kepenggunaannya kepada pengguna biasa.

CONTENTS

CHAPTER	TITLE	PAGE
	PROJECT TITLE	**i**
	DECLARE	**ii**
	DEDICATION	**iii**
	ACKNOWLEDGEMENT	**iv**
	ABSTRACT	**v**
	ABSTRAK	**vi**
	CONTENT	**vii**
	LIST OF FIGURES	**x**
	APPENDICES	**xiii**
I	**INTRODUCTION**	
	1.1 PROJECT INTRODUCTION	1
	1.2 BRIEF OVERVIEW OF THE PROJECT	2
	1.3 PROBLEM STATEMENT	2
	1.4 OBJECTIVE	3
	1.5 SCOPE OF WORK	4
	1.6 METHODOLOGY	5
II	**LITERATURE REVIEW**	
	2.1 BRIEF HISTORY OF PDA	8
	2.1.1 Introduction	9
	2.1.2 PDA Interconnecting with network	11
	2.1.3 Applications of PDA Technology	14
	2.1.4 Project PDA	15
	2.1.5 Project Relations with PDA Functionality	17

CONTENTS

CHAPTER	TITLE	PAGE
	2.2 MEDICAL SOFTWARE/PROGRAM EXAMPLE	18
	2.2.1 Medical Program Example on Desktop	18
	2.2.2 Medical Program Example on PDA	33
	2.3 HYPOTHESIS	38
III	**METHODOLOGY**	
	3.1 INTRODUCTION	39
	3.1.1 Literature Review and research	40
	3.1.1.1 Study PDAs	41
	3.1.2 Study Visual Basic Software Development	41
	3.1.2.1 Develop System Software About Medical Care Information By Using Visual basic	42
	3.1.3 Study Programming of PDA	47
	3.1.4 Implement Visual Basic Software Into PDA	48
	3.1.5 Study Client/Server Base	49
	3.1.5.1 Integrate Client/Server With Developed Software In PDA	49
	3.1.6 Performance Evaluation And testing Completed Project For Final Result	50
	3.2 SOFTWARE DEVELOPMENT	50
IV	**RESULT**	
	4.1 INTRODUCTION	61
	4.2 EVALUATION OF PROGRAM	61
	4.3 PROGRESS REFER TO HYPOTHESIS	68

CONTENTS

CHAPTER	TITLE	PAGE
V	**DISCUSSION AND CONCLUSION**	
	5.1 DISCUSSION	69
	5.2 IMPROVEMENT AND FURTHER ENHANCEMENT	71
	5.3 CONCLUSION	72
	REFERENCE	73
	APPENDIX	75

LIST OF FIGURES

FIGURE	TITLE	PAGE
2.0	Apple Newton Message Pad the Original PDA	9
2.1	Logical Layout of PDA Functions	10
2.2	Bluetooth frequency Hopping	12
2.3	Blackberry 7100t	13
2.4	Apple iPod	14
2.5	O2 XDA 2i lli model	16
2.6	Introduction to the Program	19
2.7	Main Window	20
2.8	General Information Window	21
2.9	Drug Allergy window in General Information	22
2.10	General Information on Medicine in General Information Window	23
2.11	Medical Conditions Window	24
2.12	Medical Conditions Window	25
2.13	Non Prescription Window	26
2.14	Early Detection Window	27
2.15	First Aid Main Window	28
2.16	First Aid Window for Male User	29
2.17	First Aid Window for Female User	30
2.18	Index on First Aid Window	31
2.19	Dictionary Window	32
2.20	About Mayo Clinic Program	33
2.21	Example of PDA Introduction	34

LIST OF FIGURES

FIGURE	TITLE	PAGE
2.22	PDA Example (1)	35
2.23	PDA Example (2)	35
2.24	PDA Example (3)	36
2.25	PDA Example (4)	36
2.26	PDA Example (5)	37
2.27	PDA Example (6)	37
3.0	Steps In Visual Basic Programming	43
3.1	Steps In Building Program	51
3.2	Main Window	52
3.3	Main Window Flow Chart	53
3.4	Medical Library	54
3.5	Medical Library Flow Chart	54
3.6	Calendar	55
3.7	Calendar Flow Chart	55
3.8	Reminder	56
3.9	Reminder Flow Chart	56
3.10	Edit Task	57
3.11	Edit Task Flow Chart	57
3.12	Create Task	58
3.13	Create Task Flow Chart	58
3.14	Bell Setup	59
3.15	Bell Setup Flow Chart	59

LIST OF FIGURES

FIGURE	TITLE	PAGE
3.16	Alarm Display	60
3.17	Alarm Display Flow Chart	60
4.0	Main Window	62
4.1	Medical Library	63
4.2	Calendar, Current Date	64
4.3	Calendar, Chosen Date	64
4.4	Reminder	65
4.5	Edit Task	66
4.6	New Task	66
4.7	Bell Setup	67
4.8	Alarm (1)	67
4.9	Alarm (2)	68

APPENDICES LIST

APPENDIX	TITLE	PAGE
A	Module 1	75
B	Module 2	78
C	Main Window	79
D	Calendar	79
E	Medical Library	83
F	Reminder	84
G	New Task	91
H	Atm 1	94
I	Bell	98
J	Bell Setup	98

BAB I

INTRODUCTION

This chapter discusses briefly about the project developed with the overview of project included as well.

1.1 PROJECT INTRODUCTION

Personal Communicator: Personal Medical Assistance/Care project is meant to serve and assist common users like us in terms of medical aids and medical data management. It is built as software and linked to the Personal Digital Assistant (PDA) to handle medical tasks related to user's needs. Its practicality and usability is appropriate for users nowadays who fast becoming acquainted with PDA or Pocket PC and acknowledge the importance to enhance and upgrade one's health and care.

1.2 BRIEF OVERVIEW OF THE PROJECT

The importance of this project is first to build medical aid software linked to the PDA that is able to assist common users. And second, to create database as a server that can co-interact with the PDA. Its software is Windows based operating system and its hardware is O2 XDA 2i lli model PDA. This project is different from other typical medical based software because it purposely serves the common users well known as the public. There may be such software exists, but none are widely developed as a marketable software product to be use by the public. Hence this project suggests the initiative to do the different and build such software for the public knowledge and usage.

1.3 PROBLEM STATEMENT

Obstacles occur mainly on understanding the programs in order to build the project's software. A norm in building any software is that there are bound to have string of errors with additional try-and-error method in building process up till its completing date. That is why most software building is usually delayed in completion time. This shows that time constraint in building software is also a factor as well.

Understanding the needs of a user is also a task to pay detail attention to. Generally, users or public can be distinct in their choice of needs and wants. Therefore, to build any software this information from the users is crucial to meet at a cross point where the public is treated as individual. We may not want the software to end up useless or not according to the client's requirement.

1.4 OBJECTIVE

The objectives or aims of this project is to build medical based software using Visual Basic programming to serve as an application to the users which are the public through a PDA device. A database that acts as a server is also linked to the software.

As a whole, the project aims to expose the students to the processes of software programming and design and practice through the appropriate use of skills and knowledge learned throughout the project. This project will include details such as a time plan; work undertaken for developing the project, risk assessment as well as resources checklist. This project has the objectives in the view of the whole course as follows:

1. To study Visual Basic programming for software developing. The Medical Assistant program is developed solely and independently before integrating with the PDA. It is tested to run smoothly before and after it is integrated in the PDA.

2. To study and understand PDA's functions and PDA's programming. The initial process of completing this final year project. Very important to understand because this part needs to accept the developed program of Visual Basic later on.

3. To collect as much information on medical and medicine for client/server base data storage. This is for inputs in Medical Assistant section of First Aid/Emergency. It also acts as a medical library based on the simple understanding for common users.

4. To develop Medical Assistant/Care software based on client/server environment for common user. The server acts as storage area for the section of First Aid/Emergency information. Other function of the software is also surveyed through user's requirement in medical aid software.

5. Lastly, to integrate developed software into the PDA and link to client/server base. This is the final stage when both program of Visual Basic and the PDA is working and functioning well. The PDA will then link to a server.

1.5 SCOPE OF WORK

The scope of this project is to develop medical aid software system that enables users to be able to perform the following sample tasks:

1. To handle own medical data and information. All clinical report can be accessed and monitor.

2. Reminder to set medical appointments or medicine intake. This is convenient as it set aside medical reminder from the typical reminder in the PDA.

3. Additional first aid or medical library on common sickness and remedies for user's knowledge.

Multiple tools and work scope as below are needed to complete the software programming and design:

1. Software: PDA programming, Visual Basic(VB)

To build system software (VB) and develop path in PDA for software to function understanding of the device and programming. software is compulsory. VB function can automatically design user interface, and all is left is the knowledge of linking it to the PDA as a stand alone system that works both in PDA and in the computer.

2. Hardware: Personal Digital Assistance (PDA)

Without the actual PDA, parallel port implementation and interfacing cannot be tested. PDA device model O2 XDA 2i lli is use to implement project software through linking and the software can be tested on the PDA as well.

3. Hardcopy: Basic medical care and medicine knowledge

Reference such as books, journals, magazines, cds on medical and health care and information is vital to understand the user's needs and potential medical requirement of the software. Information to store as sample in the database is also important.

1.6 METHODOLOGY

Methodology applied and used to build up this project consists of several methods and ways to get the work done. Below are all the methods in completing this project explained in brief:

1. Literature review and research on PDAs, medical and medicine information and programming of PDAs are carried out simultaneously. This is the initial action in every project so as to be more familiar with the project's title. To carry out any project, firstly, we have to understand the title, what we must do and steps to be taken to accomplish the project.

2. Study PDAs (its functions, specifications, operating system). This is the platform of the project as it links to the software that will be developed and to the server as well. To understand PDA well its characteristic is studied and understand.

3. Study Visual Basic software development. If PDA is the body of this project, this is the heart of the project as it is the content of the title's project. This program is experimented and tested solely in the first stage to be acquainted with its functions and tools.

4. Develop system software for Medical Care information by using Visual Basic. This software is to be applied in PDA and predicted to function well just like an extension program inside the PDA. For beginners, a basic program of the medical assistant will be developed to test out the PDA acceptance to a new program.

5. Study programming of PDA. Besides Visual Basic programming, PDA programming is considered equally important in this project. This is because PDA programming is what determines whether an external programming can coincide in the PDA or not.

6. Implement Visual Basic software into PDA. Then, the heart and the body of this project in attached together. The program will be implemented inside the PDA and is made sure it functions according to the users' specifications as programmed previously.

7. Study client/server base. The following phase of this project is to link the whole package of software programming that is developed to a server in a

client/server base. Information will be stored in a server and the PDA will be able to access the required information using the developed Visual Basic program. Hence, this phase has to be studied as well.

8. Integrate client/server with developed software in PDA. The client/server which is developed will be linked together with the new medical assistant program in the PDA.

9. Performance evaluation and testing completed project for final result. Next, the phase is completed by implementing and applying all the stages of the software in one functional system.

BAB II

LITERATURE REVIEW

This chapter discusses about the background research and concept of the project and will explain further of the project's perspective and methods used in research.

2.1 BRIEF HISTORY OF PDA

In 1993, Apple Computer Inc. introduced the world to the first PDA, the Newton Message Pad. The term "personal digital assistant" was coined on January 7, 1993 by John Sculley at the Consumer Electronics Show in Las Vegas, Nevada, referring to the Apple Newton. [Farlex 2004] Sculley predicted PDAs would become ubiquitous tools that would hold telephone numbers, keep your calendar, store notes, plus send and receive data wirelessly. Unfortunately, the Apple Newton was not able to deliver all of those features at the time it was released.

Its handwriting recognition software failed to live up to the marketing hype; PDA sales dwindled and almost fell off the charts.

Figure 2.0: Apple Newton Message Pad the Original PDA

In March 1996, Palm, Inc. delivered the industry's first truly compelling handheld computer, the PalmPilot. Sculley's predictions finally came true starting with the Palm VII, which had the first wireless data transfer for a PDA. New PDAs continue to arrive from Palm, IBM, Apple, HP, Motorola, Sony, and others. In the near future, the world can expect the next step in PDA performance in the smart phone, a device combining a wireless phone will all of the functions of a PDA.

2.1.1 INTRODUCTION

A personal digital assistant (PDA) is a handheld computing device used to process, store and access data while away from one's desktop computer. PDAs are usually used to store personal information, a calendar and contact information. Over time, their functionality has expanded due to increasing on-board memory, more powerful central processing units (CPU), and most importantly wireless network access. The main purpose of a personal digital assistant (PDA) is to act as an electronic organizer or day planner that is portable, easy to use and capable of sharing information with your PC. It is supposed to be an extension of the PC and not

a replacement because PC still proceeds in data storage and functionality rather than the limited specialties of a PDA.

All PDAs use the same basic hardware and software concepts: screen, RAM, CPU, OS and applications. They each have a small liquid crystal display (LCD) screen; most rely on stylus/touch-screen technology and handwriting recognition programs for data entry. Some small amount of on-board RAM is used to store the operating system (OS), applications and data. Data processing is done by a small microprocessor that has been modified to utilize as little power as possible. Newer PDAs possess the ability to read and write to additional add-on socketed memory cards. Modern models offer wireless access to local area networks (LANs) and the Internet.

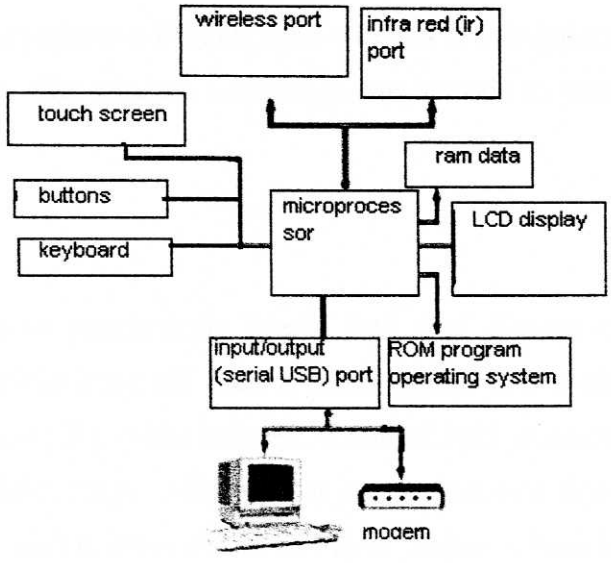

Figure 2.1: Logical Layout of PDA Functions

Software, both application software and operating system, is used to differentiate between competing models. *Currently, there are two primary software manufacturers creating the core operating systems for PDA devices: Palm OS and Windows Pocket PC.* [Farlex 2004] Both operating systems offer similar basic functions: calendaring, wireless web browsing, email (both sending and receiving)