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Signature :

Name : En Azmi bin Awang Md 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

PRAYER TIME CALCULATOR

MASNAH BINTI MAHMUD

This Report Is Submitted In Partial Fulfillment of Requirement for the Bachelor Degree of Electronic Engineering (Computer Electronic)

Faculty of Electronic and Computer Engineering
Kolej Universiti Teknikal Kebangsaan Malaysia

APRIL 2006

DECLARATION

"I, hereby declare that this thesis entitle, Prayer Time Calculator is a result of my own research idea except for works that have been sited clearly in the references"

Signature :

Name : Masnah Binti Mahmud

Date : 5/5/06

Special dedication to my loving parents, Mr Mahmud Bin Yusuf and Pn Sainah Amit, all my siblings, my kind hearted supervisor Mr Azmi Awang Md Isa and special thank to my dearest friends.

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ABSTRACT

Muslims need to obey their obligation to perform their prayer regardless where they are, whether they are on the ground or in space. In the future time, the opportunities to go into space is great, it becomes necessary to develop a prayer calculator that can determine the prayer times and the direction of Qib'lat or Ka'abah to aid the Muslims in performing their duty. Basically, celestial sphere or falaq is a mature subject. However, the condition in space is different. The calculation of prayer times and the direction of Qib'lat are extremely difficult due to the high velocity of the space vehicle, its orientation and the direction of travel. This project will develop software to determine the prayer times and the direction of Qib'lat for a spacecraft orbiting the Earth. The prayer times for any given location for a spacecraft orbiting the Earth may be determined mathematically if the latitude and longitude of the location are known. However, the theoretical determination of prayer times is a lengthy process. Using software development may alleviate much of this tedium.

ABSTRAK

Seseorang yang beragama Islam mempunyai kewajipan untuk menunaikan tanggungjawab bersolat tidak kira di mana jua kedudukan mereka samada di atas bumi mahupun di angkasa lepas. Di masa hadapan, peluang ke angkasa lepas adalah besar menjadikan ia sesuatu keperluan dan tuntutan Muslimin membangunkan kalkulator solat yang berupaya menentukan waktu-waktu solat dan juga arah Qiblat atau juga di kenali sebagai Ka'bah bagi membantu Muslimin menunaikan kewajipan mereka. Pada asasnya, sfera "calestrial" atau ilmu falaq adalah subjek sejak zaman dahulu kala. Walau bagaimanapun, keadaan di angkasaraya adalah berbeza. Pengiraan waktu solat dan arah kiblat adalah amat sukar memandangkan kelajuan yang amat tinggi mobil angkasa, orientasi dan arah tuju yang ditetapkan olehnya. Projek ini membangunkan perisian bagi menentukan waktu solat dan arah Qiblat untuk kapal angkasa yang mengorbit bumi. Waktu solat bagi mana-mana lokasi kapal angkasa tersebut mengorbit dapat di kira secara kalkulasi jika latitud dan longitud lokasi tersebut diketahui. Walaubagaimanapun, penentuan sacara teori waktu solat adalah proses yang panjang. Tetapi dengan menggunakan pembangunan perisian kini dapat mengurangkan beban tersebut

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LIST OF ABREVIATION

PDA	-	Personal Digital Assistant
PC	-	Portable Computer
ISS	-	International Space Station
CPU	-	Central Processing Units
LCD	-	Liquid Crystal Display
OS	-	Operating System
RAM	-	Random Access Memory
ROM	-	Read Only Memory
LAN	-	Local Area Network
TLE	-	Two-Line Element
SGP	-	Satellite Geostationary Perturbation
LEO	-	Low Earth Orbit
UT	-	Universal Time
HD	-	Half Diameter
VB	-	Visual Basic
Net	-	Networking
GUI	-	Graphic User Interface
AD	-	Atmospheric Diversion
LWH	-	Local West Horizon
LEH	-	Local East Horizon
GPS	-	Global Processing System
IM	-	Instant Message
SMS	-	Short Long Message

MMS - Multimedia Message Service

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CHAPTER 1

INTRODUCTION

This chapter will discuss about project background, objective and scope project, problem statement and system operation and report structure.

1.0 PROJECT BACKGROUND

Nowadays, electronic terms is widely used in our life because its can help people to handle their life such as to obey their obligation to perform their prayer. Lately, a lot of electronic devices and peripherals have been invented such as digital electronic, mobile phone, notebook and others. This project idea came out since Tun Dr Mahathir announces about astronaut's program in Malaysia. This system was developed to enable users to know the prayer time even though they are on space. Now, with this system of Prayer Time Calculator, the student, parent even household and especially astronauts can easily to remain the time of solat and direction of Qiblat.

This project is divided into two major part; hardware and software. For hardware part, Personal Digital Assistant (PDA) and portable computer (PC) are used which it is a main of this project and control this part. The output of programming and interface will be appeared at PC monitor while PDA just showed the interface of this system. Both of these devices will let us know the each of prayer time. From the information and data of latitude and longitude, users will know when the prayer begins and ends. For software part, Visual Basic Networking (VB.NET) and Matlab 6.5 is used for interfacing between hardware and software and combined together to make this project was complete. VB.Net software is used which it is to provide the graphical user interface. This project was preferred for astronauts at the space station to know when their will perform their prayer because there are not just in one location but always go round the earth orbit.

1.1 OBJECTIVES AND SCOPE OF PROJECT

This project will discuss about the objectives of project, scope of work, problem statements and briefly explained about the methodology that has been done in this project.

1.1.1 Objective Project:

This project is carried out on the following objectives:

1) To study and understand PDA's functions and PDA's programming which is we must be familiarized with the basic knowledge of PDA before applying any program in PDA.

2) To learn about PDA programming that handheld computing device used to process, store and access data while away from one's desktop computer

3) Determine prayer time which is we can know when the prayer time begins.

4) To establish Qiblat's direction in space efficiently.

5) To develop software for PDA that can determine the prayer time.

1.1.2 Scope of Work

Scope of work for this project can be dividing into four parts:

i) Developing Software for PDA programming that can determine the prayer time.

ii) Simulations by using Matlab for simulate the calculation of prayer time.

iii) Hardware - Personal Digital Assistant (PDA) in implementing developed software.

iv) Falaq knowledge are very important to understand so that we can know the end, begin and opportunity of prayer time.

1.2 PROBLEM STATEMENTS

1) Prayer time is fixed on earth but it is questionable in according in space.

2) The system to determine Qiblat's path and prayer time is still under development as the present system only provides Qiblat's and prayer time information when the spacecraft is orbiting the earth. Questions arise when a spacecraft is hovering in space (away from the earth's orbit). Therefore prayer time is hard to resolve.

3) Problem when spacecraft is orbiting the earth is when the spacecraft circle the earth about 16 times in each prayer time every 24 hours. Consequently, astronauts have to pray 16times of 5 prayer times a day which sums up to 80 prayer times daily. This is a problem in terms of Falaq knowledge whether it should be decreased or followed thoroughly.

4) Muslims pray facing Qiblat's path. In terms of Falaq again, this is a problem for astronauts to pray as the spacecraft moves in high speed which makes the Qiblat's path changes every 3.9° per minute.

5) To ease the prayer time problems, the under development software must be integrated into the PDA for astronauts usage in space.

6) Simulation and program for this system has to be developed compatible with PDA usage. This is because the simulation and program must be integrated into the PDA.

1.3 SYSTEM OPERATION

From the block diagram, we can see that by using Matlab 6.5 we studied all the formula to calculate prayer time and direction of Qiblat. Then, after simulate or compile all the programming in Matlab, we know that the coding cannot convert directly to PDA. So, after studied the part of PDA, we examine that we require Visual Basic.Net to directly connect to PDA. Both methods go through the same process flow where program design is needed to develop both methods. For the system needed for PDA, its software package will be directly directed into it or through the PC. Meanwhile for PC, it will analyze the developed program through Visual Basic.Net where the interface design can be seen and understood better. This is because the given PDA can only store limited size file and cannot receive large data or information. Continuing to do so will cause error to the program.

Hence, both Matlab and VB.Net program is needed to develop this program successfully.

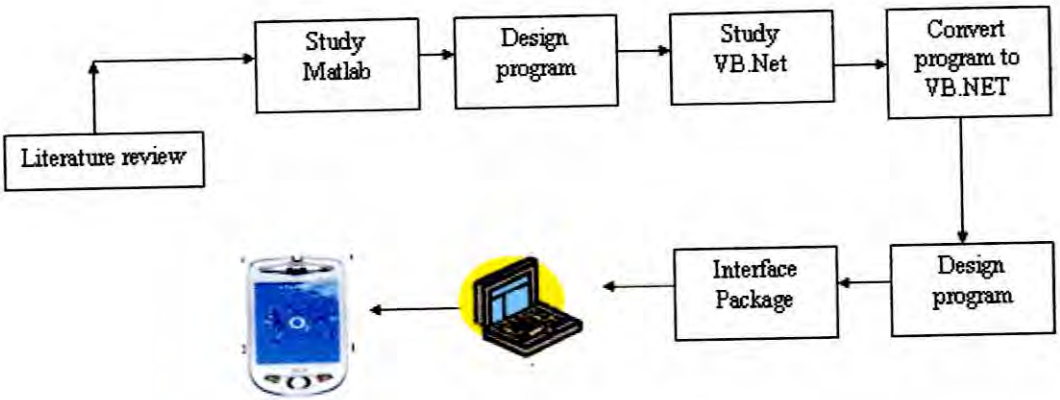

Figure 1.1: Overall Block Diagram of the PC and PDA Interface

1.4 REPORT STUCTURE

At first chapter is all about the introduction of the project. It narrates the overview of the project including objective, problem statement and scope project. At second chapter, it discuss about literature review regarding to the project. At third chapter it talks about methodology and approach taken and a closer look on how the project is actualized. In chapter four it focuses on software development that applied in this project and at chapter five, it focuses on the result and analysis of the project. For the last chapter, chapter six it contained discussion of the project and also conclusion.

CHAPTER II

LITERATURE REVIEW

2.1 PERSONAL DIGITAL ASSISTANT (PDA)

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's supposed to be an extension of the PC, not a replacement.

PDAs, also called handhelds or palmtops, have definitely evolved over the years. Not only can they manage your personal information, such as contacts, appointments, and to-do lists, today's devices can also connect to the Internet, act as global positioning system (GPS) devices, and run multimedia software. What's more, manufacturers have combined PDAs with cell phones, multimedia players and other electronic gadgetry.

2.1.1 PDA Parts

a) Microprocessors and Memory

Like standard desktop and laptop computers, PDAs are powered by microprocessors. The microprocessor is the brain of the PDA, and it coordinates all of the PDA's functions according to programmed instructions. Unlike desktop and laptop PCs, PDAs use smaller, cheaper microprocessors. Although these microprocessors tend to be slower than their PC counterparts, they are adequate for the tasks that PDAs perform. The benefits of small size and price outweigh the cost of slow speeds.

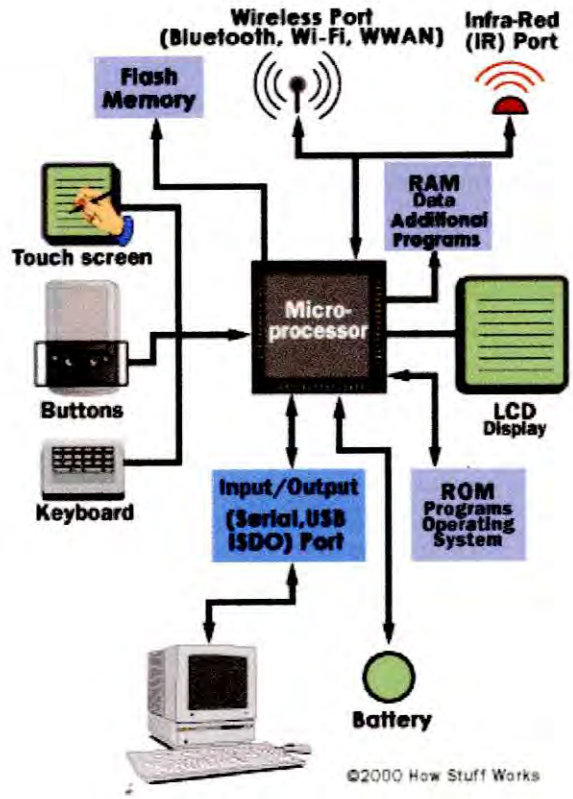

Figure 2.1: The parts that can make up a PDA

A PDA does not have a hard drive. It stores basic programs (address book, calendar, memo pad and operating system) in a read-only memory (ROM) chip, which remains intact even when the machine shuts down. Our data and any programs we add later are stored in the device's random-access memory (RAM). Information in RAM is only available when the device is on. Due to their design, PDAs keep data in RAM safe because they continue to draw a small amount of power from the batteries even when we turn the device off.

Less powerful PDAs have lower amounts of RAM. However, many application programs take up significant memory space, so most models have more memory. Also, Pocket PC devices generally require more resources and have even more RAM. To provide additional memory, many PDAs accept removable flash media add-on cards. These are handy for storing large files or multimedia content, such as digital photos.

b) Operating Systems

The operating system (OS) contains the pre-programmed instructions that tell the microprocessor what to do. The operating systems used by PDAs are not as complex as those used by PCs. They have fewer instructions, which require less memory.