**SMS Timetable Retrieval**

By

Nur Diyana Amalina Binti Zahari

Dissertation submitted in partial fulfillment of

the requirements for the

Bachelor of Information Technology (Hons)

(Business Information System)

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**CERTIFICATION OF APPROVAL**

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A project dissertation submitted to the
Information System Programme
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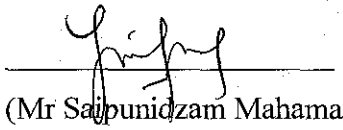
Approved by,



(Mr Saipunidzam Mahamad)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
January 2007

## CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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NUR DIYANA AMALINA ZAHARI

## ABSTRACT

SMS (short message system) is becoming a common media of communication in Malaysia not only because it is economical but also fast and accurate. Now days, with SMS you can do banking, bidding, shopping and also voting. As for this project, the main objective is to develop a SMS timetable retrieval system where students in UTP are able to SMS for their timetable. To retrieve their timetable, students will send the requested subject name to a service provider number and after a short while they will receive their timetable based on the requested subject. This new method is developed to propose a new method for UTP students to view their module timetable. In order to develop this project, a research was conducted on several areas to assist in finding more knowledge and understanding about the new method of retrieving student's timetable. This project had used the Project development Life Cycle (PLDC). The result of this project will be a mobile timetable where students can retrieve and view it anywhere and anytime.

## ACKNOWLEDGEMENT

First and foremost, I would like to thank God for giving me the strength and granting me the effort and knowledge throughout the progress of this research.

I would like to convey my highest gratitude to my FYP supervisor; Mr Saipunidzam Mahamad for giving extensive information and useful feedbacks which had contributed to the success of this project.

Special thanks to all of my family and friends for their endless support and encouragement financially, mentally and spiritually. Highest appreciation dedicated to my father, Mr Zahari Mahmood for his financial aid in purchasing the device for this project.

Finally, special thanks to my close friends for unwavering support and understanding during the many hours I dedicated to achieving this milestone in my life and career.

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## ABBREVIATIONS

| | |
|---|---|
| UTP | Universiti Teknologi Petronas |
| SMS | Short message service |
| PDLC | Project development life cycle |
| HTML | Hyper Text Markup Language |
| GSM | Global system for mobile |
| AT –commands | Attention commands |

# CHAPTER 1
# INTRODUCTION

## 1.1 Background of Study

In UTP, at the end of every semester, each student will have to pre-register their courses for the following semester by accessing the UTP's website. This procedure will help the academic central services (ACS) to arrange all of the registered courses before a new semester opens. It also helps students to plan ahead with their courses and studies. Students will log in to www.utp.edu.my , and choose to go the online registration course link. In here, they will choose courses offered for the next semester and submit it. They can only register their wanted courses once and any changes of it can be done in the following semester during the Add/Drop Week. After registering, the ACS will then arrange individual timetable to each students according to their registered courses. This timetable can be viewed trough the UTP website. However, there are times when students can't access the website due lack of time visiting the website.. These problems will then lead to absenteeism of students to class at the beginning of the semester.

For this project, a new method will be developed as a new approach to ease students in viewing their timetable at the beginning of every semester. This new method is using a short message service (SMS) system. This method will require end user (student) to send a SMS to a specific number by typing their requested subject. After a short while they will receive their timetable. This however is still using the Internet connections. Students can start their classes of the semester in a much easier way with no hassle. With this method also, student can plan early for their timetable at home before coming to UTP. This will be easy for those having class scheduling problems.

## 1.2 Problem Statement

Currently, UTP's system in retrieving student's timetable is through accessing the website. However, there are still few problems that led to the idea of developing a new method which is the SMS system. The current method is not time savvy because of the network and server conditions that are sometimes congested where too many students are on the network at the same time. Problem uploading the timetable page is also one the reasons why the current method is inefficient. The page that contains the timetable is usually congested with icons and unnecessary information that will affect the downloading rate.

## 1.3 Objective and Scope of Study

### 1.3.1 Objectives

The objectives of the project are:

- To develop a new method for viewing the timetable.
- To embed the algorithm of extracting data from HTML
- To ease timetable planning.

### 1.3.2 Scope of Study

The scope of study for this project is about developing a new method for students to view their timetable at the beginning of every semester. As mentioned earlier, the method is using the SMS system. This method can be use by all students in UTP. It basically serves two major functions, which are; students can view their individual timetable, can select to view subject timetables. The focus of this project is concentrated only on establishing system

for viewing subject timetables. When students send in their student id to the wireless modem, they will receive the timetable in a format where the day, time and venue of the presubjects they have pre-registered. The scope of research uses a wireless modem.

### 1.3.3 Relevancy of the project

The SMS system will add benefits to the current method in retrieving student's timetable among students in UTP. By implementing the new technique, it will be easier to view and retrieve student's timetable without tany time and location constraints. The party that will benefit the most is the students that are having problems in accessing the UTP website to retrieve their timetable. The solution proposed by this project shall help students in viewing their timetable without hassle.

### 1.3.4 Feasibility of the project

This project will be developed within a specific time frame given. There are possible limitations and constraints throughout the development of this project. However, the main goal to be achieved at the end of this project is to create a complete SMS system that can retrieve student's timetable. The main objective shall be achieved during the planning phase as well the development phase.

# CHAPTER 2
# LITERATURE REVIEW AND THEORY

## 2.1 Short message service (SMS) system

SMS (Short messaging service) is a favorite to everyone in this world. SMS is the acronym for Short Message Service. SMS allows up to 160 characters of text to be sent or received by a digital mobile phone. GSM (Global System for Mobile communication) researched about SMS to sent 190billions messages in 2002. It's so easy to use. Just type your message onto the keypad of your cellular phone. If you're mobile is turn off, it's saved till your mobile can use and then you can get a message. [1]

The above matter, prove that SMS is a common mean of communicating among people now days. Not only it's easy to use but also flexible, where even if your hand phones are off, you can still receive a SMS after u have on it. For this matter, it shows that by using the SMS system to retrieve timetables, it would be an easy way for students. Every one seems to owned hand phones these days, so it is not odd to implement this method in UTP.

At the beginning, SMS is used by teenagers because it's cheaper than speech calling. But little by little, it's expanded for marketing and customer management. Specially, people of all ages and both sexes are using SMS service because anybody can use easily. [1]

The extracted scenario was extracted from a case study from Korea stating that teenagers usually used the SMS system, but towards the end, many people are using it because not only cheap but easy to handle. The same thing happens in Malaysia, where SMS were usually used by teenagers but now, even parents and older ones are using it for daily operations.

According to GSM Association, 15 billion SMS massages were sent over GSM wireless networks during December 2000 (Pastore, 2002). In Singapore alone, an average of 8.5 million text massages are sent out daily by the island's 3 million mobile subscribers (Tham, 2001). Given the current exponential growth in SMS usage and its importance, it is worth finding out the extent to which service quality and the value perceived by the current SMS users would impact their SMS usage in the post adoption phase. [2] This method is definitely worth trying out and to be implemented in UTP.

## 2.2 Extracting data from HTML

When students request their timetable online through the UTP website, a new page will appear that contains their required timetable. For the first part of this project, extracting the page that contains that particular timetable into an application developed will be studied. In order to retrieve that particular page, there are some codes to program.

With the development of the Internet, the Web has become invaluable information source. In order to use this information for more than human browsing, web pages in HTML must be converted into a format meaningful to software programs. [4]

The system needs to download the source code of the website into their hard disk and use some solution to extract the data from html. Then, the data could be saved in the system database for system future use. [5]

A common routine to extract data from HTML is by extracting the text from an article given a URL, strip out the HTML, and then convert all of the white space and carriage returns into single space. In order to strip out the entire HTML tags from the document, regular expressions are used. A regular expression is a pattern that can match various text strings, used for validations. [5]

Later, the SMS service will be used for students to retrieve their timetable; the whole page can't seem to display everything on the hand phone screen. This is due to the limited space where only display 160 characters as mentioned earlier in 2.1. To solve this issue, when the timetable is been requested only certain data will be extracted on to the application. Important data displays are as such; the day, time, lecturer and also venue of the subject requested. Basically no database is required for this project because the data are available online and when a particular subject is requested, it will retrieve it from that page.

Web pages often contain clutter (such as unnecessary images and extraneous links) around the body of an article that distracts a user from actual content. Extraction of "useful and relevant" content from web pages has many applications, including cell phone and PDA browsing, speech rendering for the visually impaired, and text summarization. Most approaches to making content more readable involve changing font size or removing HTML and data components such as images, which takes away from a webpage's inherent look and feel. Unlike "Content Reformatting," which aims to reproduce the entire webpage in a more convenient form, our solution directly addresses "Content Extraction." We have developed a framework that employs an easily extensible set of techniques. It incorporates advantages of previous work on content extraction. [6]

## 2.3 GSM Modem and Wireless modem

What is a GSM modem? A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. [12] What is a wireless modem? A modem connecting to the serial port but does not connect to telephone lines. It receives through the air. [7]

Based on these definitions about wireless modem and GSM modem, these devices enables a computer to transmit data over, for example, hand phones or cable lines. Computer information is stored digitally, whereas information transmitted over telephone lines is transmitted in the form of analog waves. A modem converts between these two forms.

A GSM modem can be an external modem device, such as the WaveCOM FASTRACK Modem. Insert a GSM SIM card into this modem, and connect the modem to an available serial port on your computer. A GSM modem can be a PC Card installed in a notebook computer, such as the Nokia Card Phone. [9]

When inserting a GSM SIM CARD into the modem, AT commands will be used to send and receive SMS. After successfully sending and receiving SMS using AT commands via the HyperTerminal, developers can 'port' the ASCII instructions over to their programming environment, for example Visual Basic, C/C++ or Java and also programmically parse ASCII messages from modem. [7] These AT commands can be used for both wireless modem and GSM modems.

There are few models of modems that are suitable for SMS service. Below are the modems taken from a Singaporean website that list several modems that are available in markets.

GSM Modems for SMS and GPRS/EDGE are as such; Teltonika USB, COM and PCI GSM modems supports EDGE Class 6 or GPRS Class 10 to allow fast GPRS access to the internet and for SMS applications. [14]

# CHAPTER 3
# METHODOLOGY

## 3.0 Procedure Identification

To collect information regarding this project, several actions were taken. For a start, a survey was conducted among students. This method is where questionnaires were distributed to users (student). The results of the questionnaires are as in appendix A. Besides that, previous project was also used as a guide. It was recommended by supervisor, and was used as a guide to understand more on the scope of the project. Research was conducted to assist in understanding the project.

## 3.1 Development Methodology

The project had followed the common project development life cycle. The following discussions will be on the planning, analysis, design and also the implementation phase of this project.

### 3.1.1 Planning phase

This stage was the starter of the project. Every plan for this project was clarified and studied in this phase. Below are the steps in developing the planning phase:

- A proposal was sent and a week later the topic was approved.
- The scope of the topic was narrow down and requirements for the project are identified.

- The project timeline was developed in order to schedule appropriately. Refer appendix A for project Gantt chart.
- The project's problem statements, objective were defined to get a clear picture of the project.
- The project's methodology was discussed and plan in this stage.

### 3.1.2 Analysis Phase

In this phase, a survey has been conducted. The survey was conducted to retrieve students' preferences about the SMS service in retrieving student's timetable. This is to create a solution that can be proposed to curb the problems in accessing the timetable using the current method.

In this phase also a research was done about the cases being studied which are the SMS system and how to extract data from html. The research done is very crucial in determining the user of the system and the expected system functionality, where in this project the target user are the UTP students who wants to view their timetable using the SMS system. During this stage, problem statements of the current method of viewing student's timetable are collected to ensure the to-be developed system shall be able to strengthen the currently available system. All possible findings concerning the project are carefully reviewed to ensure the best solution is proposed to end user.

### 3.1.3 Design Phase

Design phase is also considered as one of the most challenging part in Project Development Life Cycle phase. In this phase, the logical design of the project was planned. The function for the application was developed in this phase which is to retrieve the timetable page from UTP website to this application. Interface for this system was also designed during this phase. All of the functions and design are being discussed more in chapter 4. In this phase also, a suitable device was chosen based on findings and research done in analysis phase.

### 3.1.4 Implementation phase

During this phase, hardware and software installation was done to proceed with the developing process of this project. Once the timetable page from UTP Website has been retrieved, it will be then displayed on the hand phone screen. This phase is all about how to display the timetable on the hand phone screen after student has sent an SMS to request it.

## 3.2 Tool Required

The development of this new method is going to require a few tools and equipment during the development and implementation and they are:

- **Device** – Wireless modem
  Model: Samba 75
  Brand: Falcom
  Main Functions: provides EDGE, GPRS and GSM connectivity for portable, handheld computers and others.
- **Programming Language** – Visual Studio 2003
- **Operating system** – Microsoft Windows XP

# CHAPTER 4
# RESULTS AND DISCUSSION

## 4.0 Background

In this chapter, all the results derived from the research and assessment done will be displayed and discussed. The results are showed in this chapter covers the design part of the system that includes device specification, system architecture, workflow and also the extracting method. Next is about the functionality of the system and lastly is about the analysis where results from the questionnaire are been summarized.

## 4.1 Design

### 4.1.1 Device

The device used for this project is a Wireless Modem, a product from Falcom. This device is a Plug-and-Play, compact, light-weight, wireless modem that provides EDGE, GPRS and GSM connectivity for portable, handheld computers and others. This device can be inserted a hand phone SIM card that allows and support sending and receiving message when end user request their timetable. This device can be controlled by AT Commands. Most functions in this system are the AT commands which is included in its CD installation driver. Refer to Appendix C for the device picture. Below are its important features;

- It can be easily controlled by using AT-commands for all kind operations.
- It is a plug-and-play
- Integrated Quad Band GSM/GPRS/EDGE Engine

- SAMBA 75: 850/900/1800/1900 MHz
- Data, SMS, Fax, MMS, Downloads
- TCP/IP stack implemented
- Audio/Video streaming
- GPRS class 12, class B
- EDGE class 10, class B
- Integrated USB-Hub
- GSM antenna included
- USB serial link
- World-wide applicable

### 4.1.2 System architecture

The system architecture for the development system is included to provide further understanding of how the system works.

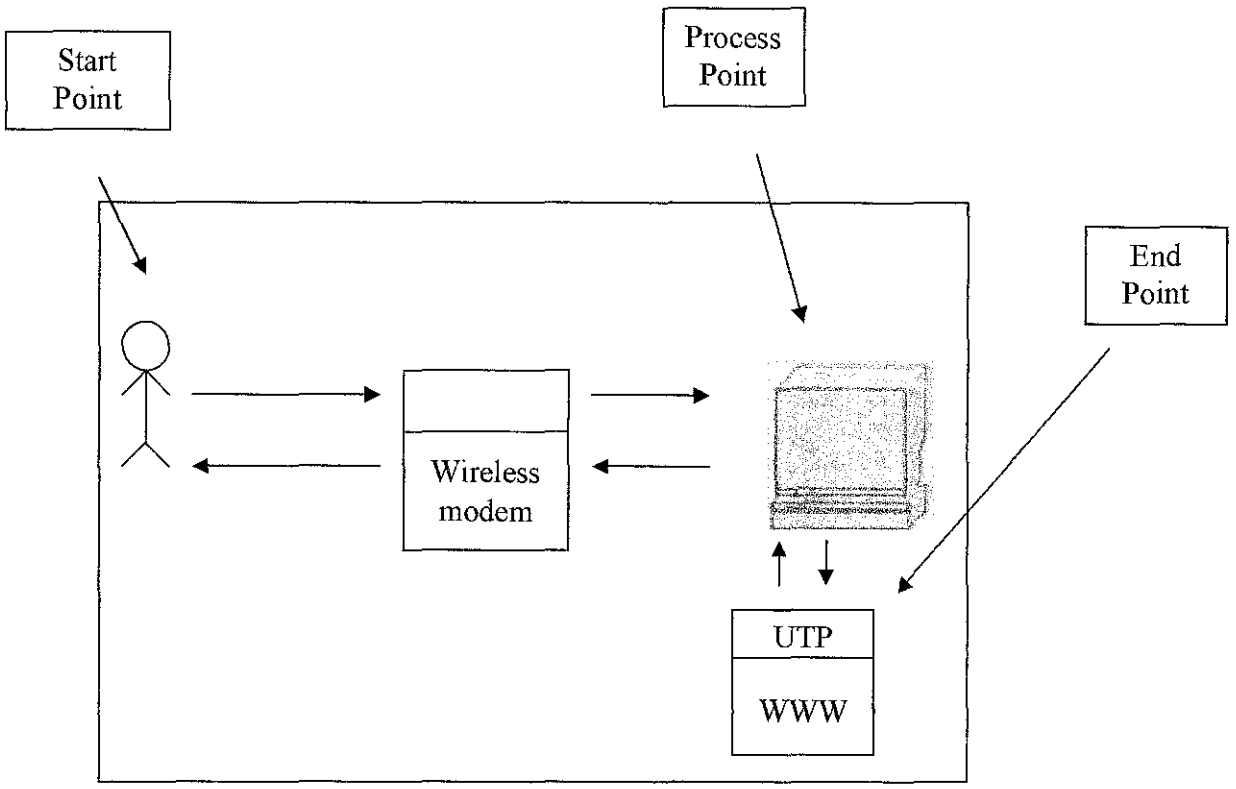


Figure 1: System Architecture for the SMS timetable retrieval

Based on figure 1, the system consists of three major components which are the start point, process point and end point. In the start point, the user will send a SMS to the wireless modem requesting their subject timetable. The request will then be processed by the SMS server at the process point. At this point, the SMS server will then send a request to the end point to extract the timetable that user has requested. The SMS server will process the requested timetable where only selected information will be choose such as the day, time, venue, and the lecturer for that particular subject. User will get their requested timetable within seconds depending on the stability of the UTP's server.

### 4.1.3 Extracting method

This is the two functions in this system. This is because the system doesn't have a database so all the data needed are being extracted from HTML. First of all, the system will capture the URL of the website before extracting the website. The figure below shows the codes when the system captures the UTP website's URL.

```
Public Function GenerateURL(ByVal subjectToExtract As
String) As String

        If
subjectToExtract.ToUpper().StartsWith("ACCOUNTING") Then
            Return
"http://utptt.petronas.com.my/reporting/individual?identi
fier=Accounting+%284Yr%29&B1=View+Timetable&objectclass=M
odules&idtype=name&width=100&weeks=27-46&periods=1-30"
        ElseIf
subjectToExtract.ToUpper().StartsWith("BADMINTON") Then
            Return
"http://utptt.petronas.com.my/reporting/individual?identi
fier=Badminton&B1=View+Timetable&objectclass=Modules&idty
pe=name&width=100&weeks=27-46&periods=1-30"
        Else
            Return ""
        End If
    End Function
```

Figure 2: Coding of capturing URL

After it has captured the URL, it will then extract the timetable. Figure 4 shows the coding of how it extracts data from html. Then the extracted HTML from the website will be parsed using XML tools into their corresponding data. Refer to appendix D for the codes.

## 4.2 Functionality

### 4.2.1 System Functionality

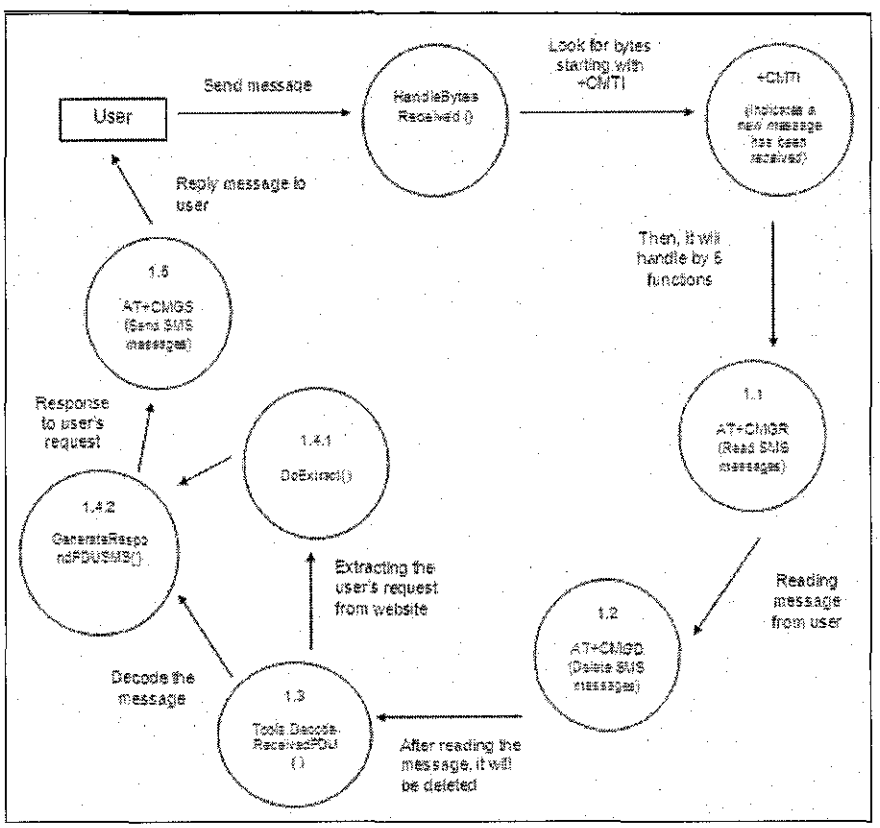


Figure 3: Data flow diagram

The system functionalities are group into five main functions which is actually AT Commands that is able to control the device mentioned earlier. When a user sends a message, the modem will receive the message where the function HandleBytesReceived () will look for bytes that start with +CNMI. This is because, +CNMI is an AT Commands that indicates that a new message is received. After that, it will be handle by 5 functions which are 1.1 to 1.5 accordingly.

- AT Command 1.1 does the reading of messages that user has sent. It will read the subject name.
- AT Command 1.2 will then delete the message. This is to avoid the inbox message to be full and doesn't require any manual deleting. It will be automatic deleted by this function.
- Function 1.3 will decode that message to response to user's request and to start the extracting function which is the DoExtract( ) function. After it has extracted the requested timetable.
- AT Commands 1.5 will send a message to user, replying their request.

### 4.2.2 System interface

This is the screen shot of the main interface. Figure 4 shows that the SMS server has been started. Before starting it, sim card pin number must be entered. After clicking the button 'Start sms Server', the modem communication logs will output the result whether the server is success connecting to the modem. 'Received data AT+CNMI =OK' means that it's successfully connected.

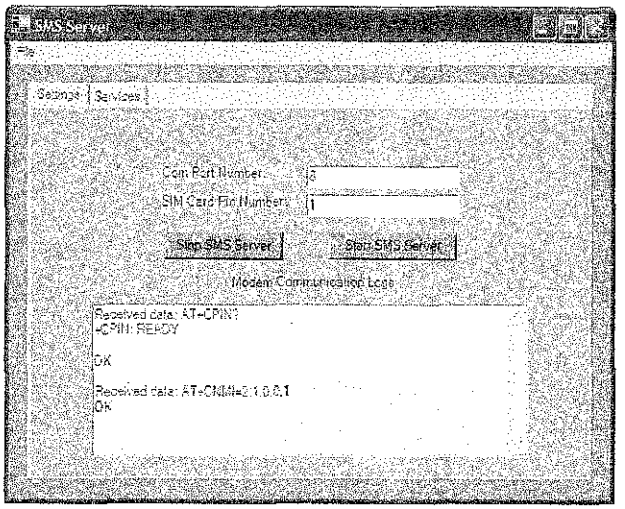


Figure 4: Snapshots of the SMS Server Interface before user sends a message

Figure 5 shows that when a user has sent a message requesting the accounting timetable. The status will show as processing done while the output will be the list of results from user's request. In figure 5 is an example when user request for subject 'Accounting'.


Figure 5: Snapshots of the SMS Server Interface after user sends a message

## 4.3 Analysis

### 4.3.1 Pre-evaluation

A survey was conducted online using www.freeonlinesurvey.com . A URL was created where respondent did their survey through the address sent trough their e-mails. The purpose of this survey is to get the public's level awareness about the issue as well as the opinion towards the current system as well as the to-be developed system.

There were 30 respondents for the survey conducted. The results of the survey were being depicted in the diagrams below. See the diagrams below for further understanding:

- Question 1

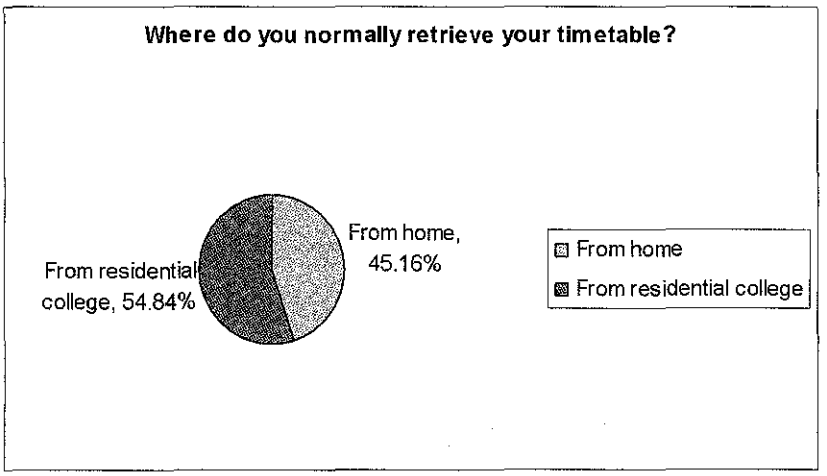


Figure 6

Based on the diagram above, 45.16% respondents retrieved their timetable by accessing the UTP website from home before coming to UTP. The 54.84% is where respondents retrieved their timetable from their residential college using the UTP server.

- Question 2

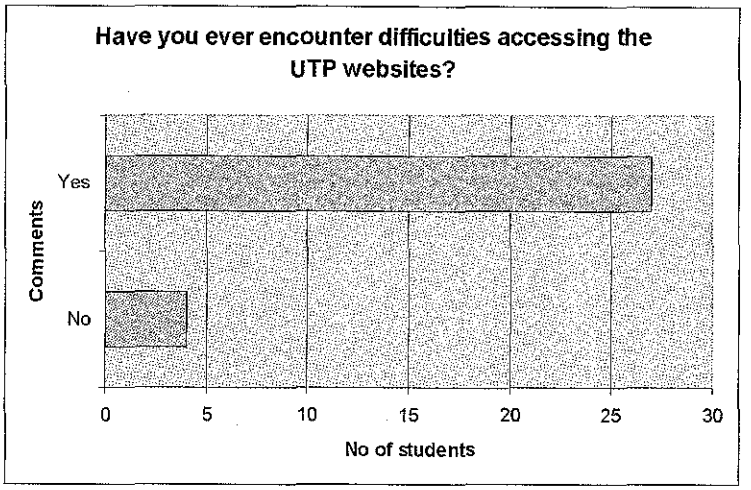


Figure 7

Based on the diagram, 27 out of 31 respondents had encounter difficulties when using the UTP website. Only 4 respondents never faced problems.

- Question 3

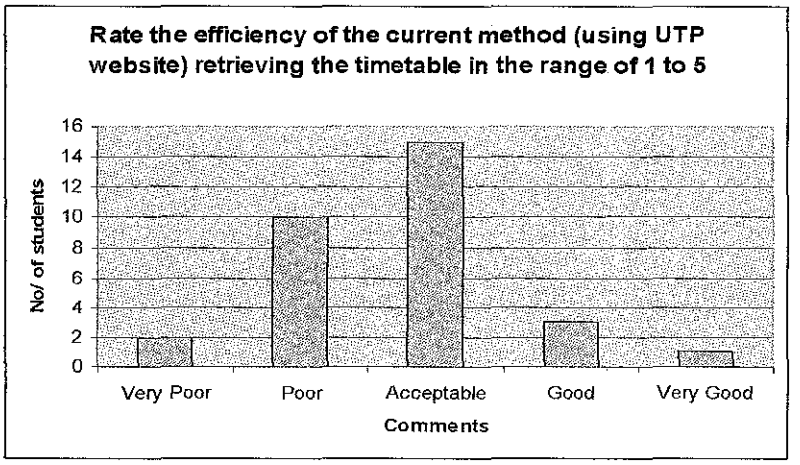


Figure 8

Based on the diagram, 15 respondents voted that current method of retrieving the timetable is acceptable adequate. 10 claimed that the current method is poor, 3 of them

think it's good while 2 of them thinks that it's very poor. Lastly, only 1 respondent that claimed the current method is very good.

- Question 4

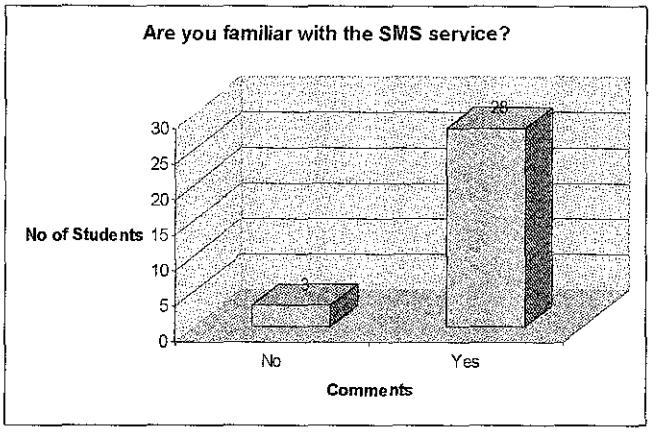


Figure 9

Based on this diagram, almost all respondents, 28 out of 31 are familiar with SMS. This shows that it's a suitable method to propose developing for UTP students.

- Question 5

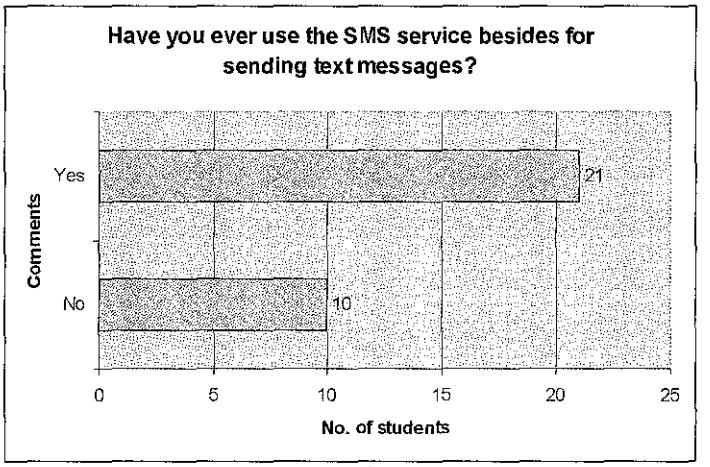


Figure 10

Based on this diagram, 21 respondents have used the SMS service besides for sending text messages. While 10 respondents, only use the SMS service for sending text messages.

- Question 6

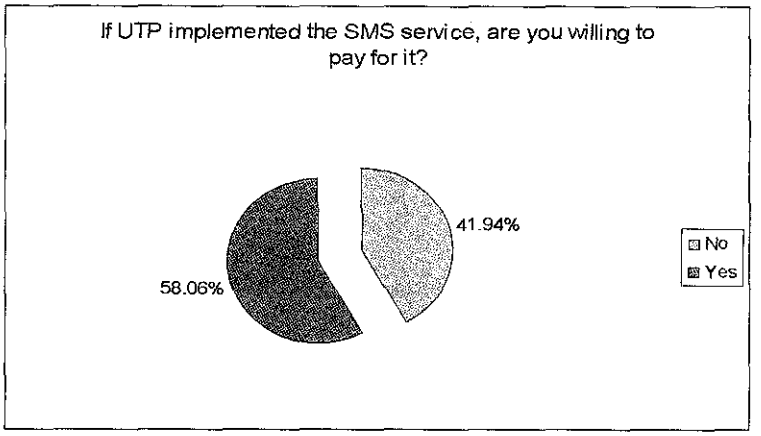


Figure 11

Based on this diagram, 58.06% of respondents are willing to pay for the SMS service if it is implemented while 41.94% respondents aren't willing to pay. Since the amount of not willing to pay is close to the percent of those who are willing to pay for this service, UTP might consider paying for this service. Maybe, each student will have the privilege to send; let say six messages for each semester to view their timetable course.

- Question 7

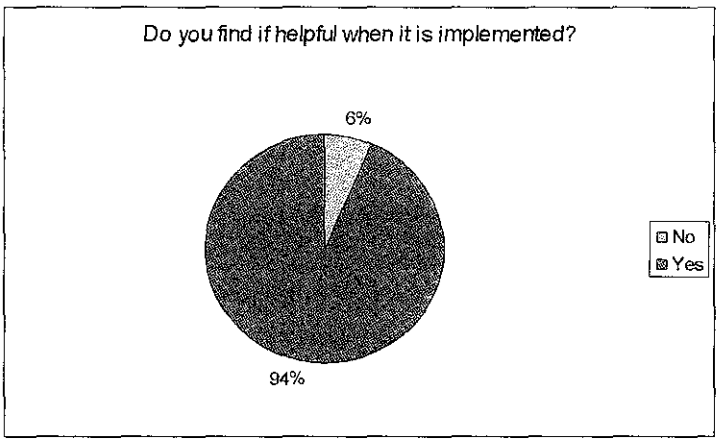


Figure 12

The above diagram proved 93.55% of the respondent found it very helpful if this system is implemented in UTP.

- Question 8

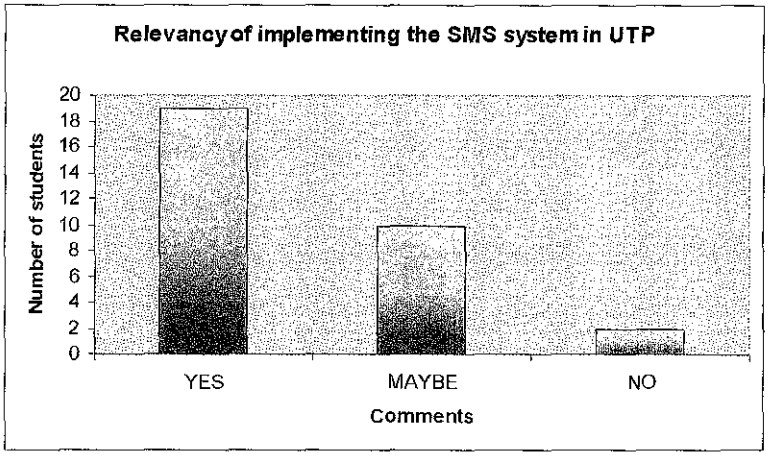


Figure 13

The above diagram shows that for A (YES), respondents agree that the SMS service is relevant to be implemented in UTP, while B (MAYBE), perhaps it is relevant to be implemented in UTP. The last bar C (NO), it not relevant at all to implement the new system in UTP.

### 4.3.2 Post - evaluation

Usability testing was conducted with the purpose to ensure that the system developed meets the objectives set during the analysis phase. The main objective of the test conducted was to ensure that the system gives correct output according to the input or status of the current process state. This testing was carried out throughout the project's development phase. Results from the testing are as in Figure 15 below:

- Step 1: user had to type in their requested subject. This project only implemented one subject which is accounting.
- Step 2: Then, user then sent the message to UTP SMS server which is a normal maxis prepaid number. When the modem received the messages from user, it will be handled by five main functions as discussed in Figure 3 earlier.
- Results: Upon sending the message, user will then receive their timetable in the format of; day, time, lecturer's name and also venue. The result is as in figure 15.

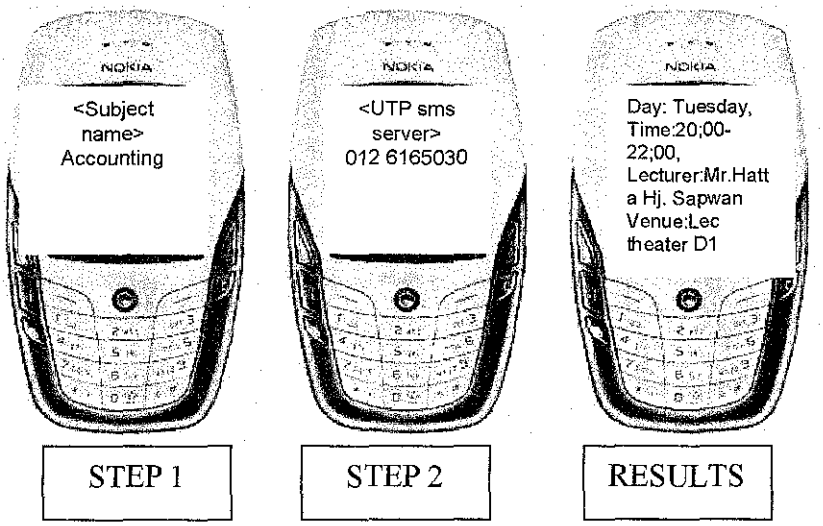


Figure 14: Steps to Request subject Timetable

# CHAPTER 5
# CONCLUSION AND RECOMMENDATION

## 5.1 Conclusion

This project is mainly designed to propose a supporting alternative that could help students in UTP to view their timetable. The main objective is to develop a SMS timetable retrieval system where students in UTP are able to SMS for their timetable. To retrieve their timetable, students will send the requested subject name to a service provider number and after a short while they will receive their timetable based on the requested subject. The developed system has meet the objectives mentioned earlier and also has all the functionalities needed according to the requirements that have been gathered previously. By implementing this new method, it has east the retrieving student's timetable without any time and location constraints. Even though it requires internet connection, students can still go mobile to view their timetable.

## 5.2 Recommendations

My recommendation in the future for this project would be to extract the timetable directly from the ACS Database and to provide not only SMS service for timetable but other relevant services such as the checking exam results. With the increased number of mobile subscribers over the world, Short Message Service, or SMS in short, has also gained its popularity. So by moving towards the future, by implementing this project, UTP can lead to a high technology university.

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# APPENDIX A
# GANTT CHART

**Gantt Chart**

| Project Timeline and Milestone (FYP Part A) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Detail\Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 | **Selection of project title** | | | | | | | | | | | | | | |
| | i) Research on interested topic | | | | | | | | | | | | | | |
| | ii) Submission of Project Proposal | | | | | | | | | | | | | | |
| | iii) Topic approval and supervisor assigned | | | | | | | | | | | | | | |
| 2 | **Requirement analysis and definition** | | | | | | | | | | | | | | |
| | i) Project background identification | | | | | | | | | | | | | | |
| | ii) Literature Review | | | | | | | | | | | | | | |
| | iii) Project relevancy analysis (survey) | | | | | | | | | | | | | | |
| 3 | **Submission of Preliminary Report** | | | | | | | | | | | | | | |
| 4 | **System Design** | | | | | | | | | | | | | | |
| | i) System architecture | | | | | | | | | | | | | | |
| | ii) Database Design | | | | | | | | | | | | | | |
| | iii) Storyboard design | | | | | | | | | | | | | | |
| 5 | **Submission of Interim Report** | | | | | | | | | | | | | | |
| 6 | **System and Website Development** | | | | | | | | | | | | | | |
| | i) Web server installation | | | | | | | | | | | | | | |
| | ii) Database server installation | | | | | | | | | | | | | | |
| | iii) Interface design | | | | | | | | | | | | | | |
| 7 | **Oral presentation** | | | | | | | | | | | | | | |

**PROCESS** **MILESTONE**

| Project Timeline and Milestone (FYP Part B) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| # | Detail\Week | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 1 | **System and Website Development** | | | | | | | | | | | | | | |
| | i) Programming and coding | | | | | | | | | | | | | | |
| | ii) Database Management | | | | | | | | | | | | | | |
| 2 | **Submission of Progress Report** | | | | | | | | | | | | | | |
| 3 | **Implementation and testing** | | | | | | | | | | | | | | |
| | i) Set-up system | | | | | | | | | | | | | | |
| 4 | **Maintenance** | | | | | | | | | | | | | | |
| | i) Correcting error | | | | | | | | | | | | | | |
| 5 | **Submission of Final Draft** | | | | | | | | | | | | | | |
| 6 | **Seminar** | | | | | | | | | | | | | | |
| 7 | **Pre-EDX (Exhibition)** | | | | | | | | | | | | | | |
| 8 | **Submission of Final Report** | | | | | | | | | | | | | | |
| 9 | **Oral Presentation** | | | | | | | | | | | | | | |
| 10 | **Submission of Dissertation** | | | | | | | | | | | | | | |

**PROCESS** **MILESTONE**

# APPENDIX B
# QUESTIONAIRE RESULTS

Printer friendly page

Invitations Sent: **0**
Invitations Accepted: **0**
Invitations (e-mails) Bounced: **0**

Untracked Responses: **31**
Total Responses Received: **31**

# Results for: SMS Student Timetable Retrieval

Download the results as a spreadsheet
(This file contains all of the data we have collected on your behalf)

View individual responses
(This will allow you to view each participants set of answers)

Add a Filter to these results.
(For example: *"Show only the results for people who chose 'YES' to Question 4.")*

**Want to track who has or hasn't taken your survey? - click here for information**

) Where do you normally retrieve your timetable at thebeginning of every semester? If you choose option 1 or 2, Please proceed with question 2.If you choose option 3, skip to uestion 4) Chart Wizard

| | Percentage | Responses |
|---|---|---|
| By accessing the UTP website before coming to UTP | 45.2 | 14 |
| By accessing the UTP website from your residential college(UTP network) | 54.8 | 17 |
| By getting it from freinds | 0.0 | 0 |
| **Total responses:** | | **31** |

) Have you ever encounter difficulties accessing the UTP website from your residential college? Chart Wizard

| | Percentage | Responses |
|---|---|---|
| Yes | 87.1% | 27 |
| No | 12.9% | 4 |
| **Total responses:** | | **31** |

) Rate the efficiency of the current method (using UTP website) retrieving the timetable in the ange of 1 to 5. Chart Wizard

| 1 very poor | 2 poor | 3 acceptable | 4 good | 5 very good | Responses | Average Score |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| 2 (6.45%) | 10 (32.26%) | **15 (48.39%)** | 3 (9.68%) | 1 (3.23%) | 31 | 2.71 / 5 (54.20%) Chart |
| | | | | | | **2.71 / 5 (54.20%)** |

) Are you familiar with SMS service? Chart Wizard

| | Percentage | Responses |
|---|---|---|
| Yes | 90.3% | 28 |
| No | 9.7% | 3 |
| | **Total responses:** | **31** |

) Have you ever use the SMS service besides for sending text messages? Chart Wizard

| | Percentage | Responses |
|---|---|---|
| Yes | 67.7% | 21 |
| No | 32.3% | 10 |
| | **Total responses:** | **31** |

) If UTP implemented the SMS service to retrieve students timetable, are you willing to pay for ? Chart Wizard

| | Percentage | Responses |
|---|---|---|
| Yes | 58.1% | 18 |
| No | 41.9% | 13 |
| | **Total responses:** | **31** |

) Do you find it helpful when it is implemented? Chart Wizard

| | Percentage | Responses |
|---|---|---|
| Yes | 93.5% | 29 |
| No | 6.5% | 2 |
| | **Total responses:** | **31** |

) Is it relevant for UTP to implement the SMS service to retrieve students timetable? Chart Wizard

| | Percentage | Responses |
|---|---|---|
| Yes | 61.3 | 19 |

| | | | |
|---|---|---|---|
| Maybe |  | 32.3 | 10 |
| No |  | 6.5 | 2 |
| | | **Total responses:** | **31** |

Download as a spreadsheet | Printer Friendly version

# APPENDIX C
# DEVICE SPECIFICATIONS

FALCOM
WIRELESS COMMUNICATIONS GMBH

# SAMBA 75

## Quad Band GSM/GPRS/EDGE Modem

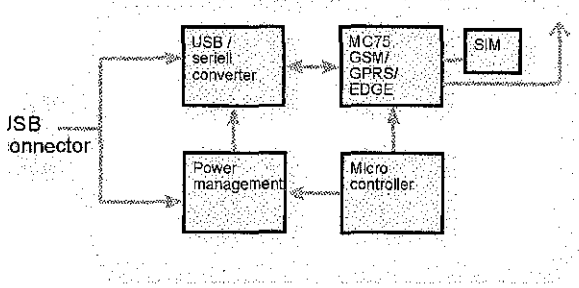
Integrated Quad Band GSM/GPRS/EDGE engine
GSM 850/900/1800/1900 MHz
Data, Fax, SMS, MMS
Audio/Video streaming
Integrated SIM interface
GSM antenna included
Plug-n-Play
Integrated USB-Hub
Very lightweight
World-wide applicable

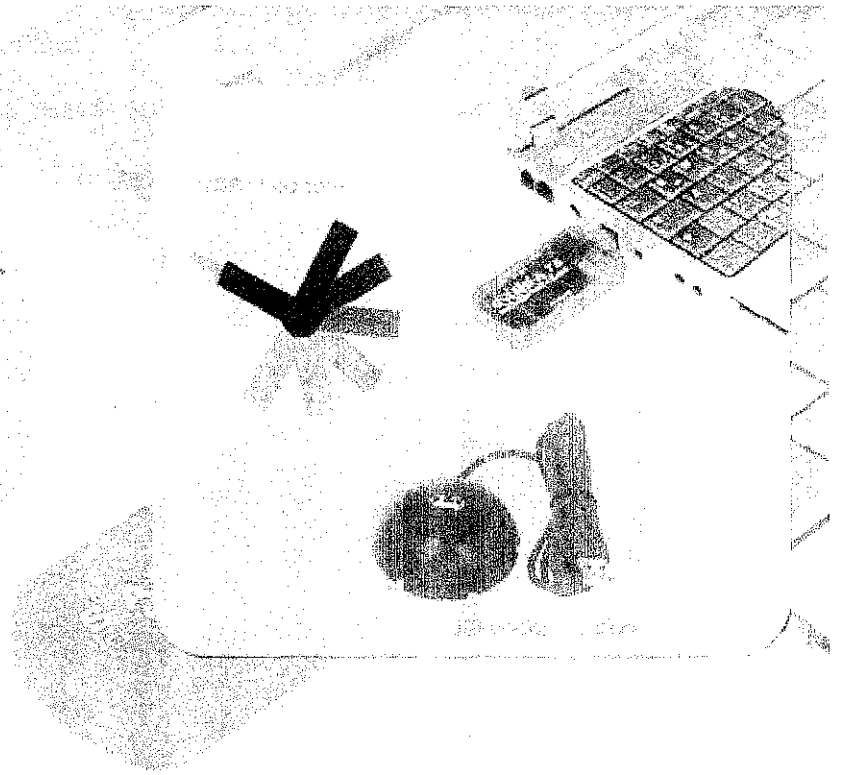

### The FALCOM SAMBA 75

s a Plug-and-Play, compact, lightweight, wireless modem that provides EDGE, GPRS and GSM connectivity for portable, handheld computers and others. The major benefit over earlier SAMBA GSM/GPRS modem is that SAMBA75 supports EDGE and additionally offers a TCP/IP stack.
SAMBA75 allows subscribers to send and receive data, including digital images, web pages and photographs, with a transfer rate three times higher than possible with GSM/GPRS sevices. It supports MMS, SMS & fax.

It can be easily controlled by using AT command for all kinds of operations.
The SAMBA75 is designed for use on any GSM network in the world.

## Block diagram



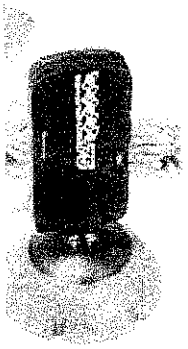



## oftware driver

odem driver,
L/NDIS driver - for
icrosoft® Windows
)00/XP

## lardware equirements

entium® 90 or higher
'ith
CD-ROM drive
A valid SIM card
Free compatible USB
oort
Appr. 6 Mb of free
1ard disk space



## Technical specification

**General**

Quad-Band GSM/GPRS/EDGE modem
850 / 900 / 1800 / 1900 MHz
Class 4 (2W) for EGSM900
Class 1 (1W) for DCS1800 / PCS1900
Small size and low power consumption
Fax / data transmission without extra hardware
Internal 3 V SIM interface
Easy remote control by AT commands for dedicated applications
Fully type approved according to GSM phase 2+ specification
Fully shielded and ready-to-use

**Basic features**

SMS (GSM and GPRS mode): text and PDU, SMS, MMS
point to point MT and MO, SMS broadcast
GSM circuit data features: transparent and non transparent up to 9600 bps, group 3: class 1, class 2, alternate fax, MNP 2

**GPRS packet data features:**

data uplink transfer: max. 42.8 kbps;
data downlink transfer: max. 85.6 kbps;
coding schemes CS-1 to CS-4
WAP compliant and compliant with SMG 31

**Electrical characteristics**

Power supply: +5 V DC (trough USB port)

**Physical characteristics**

Dimensions: (L x W x H)
88.7 mm x 37.6 mm x 12.6 mm
Weight: 79 g
Normal range temperature: -20°C to +55°C
restricted operation:
-30°C to -20°C and +55°C to +65°C

**EDGE features:**

data transfer max. 384 kbps
provides audio/video streaming

**Interfaces**

Single antenna interface
Internal SIM interface: 3 V only
USB serial link

**Other features**

SIM, network and service provider locks
Real time clock
UCS 2 character set management

FALCOM
WIRELESS COMMUNICATIONS GMBH

# APPENDIX D

## Code of how to extract data from html

```
Public Function DoExtract(ByVal subjectToExtract As String) As String
        Try
            ClearTextBoxes()
            'StatusTextBox.Text = "Starting timetable extract"
            SetStatusTextBox("Starting timetable extract")
            Dim doc As System.Xml.XmlDocument
            ' base URL is http://utptt.petronas.com.my/Module.htm
            'http://utptt.petronas.com.my/reporting/individual
            '?identifier=Accounting+%284Yr%29
            '&B1=View+Timetable
            '&objectclass=Modules
            '&idtype=name
            '&width=100
            '&weeks=27-46
            '&periods=1-30

            'Dim url As String =
"http://utptt.petronas.com.my/reporting/individual?identifier=Strategic
+Management&B1=View+Timetable&objectclass=Modules&idtype=name&width=100
&weeks=1-17&periods=1-30"

            Dim url As String = GenerateURL(subjectToExtract)
            If url = "" Then
                Return "Invalid Subject"
            Else
                'Dim url As String =
"D:\Projects\diyana\TimetableExtractor\bin\original.html"
                'Dim url As String =
"D:\Projects\temp\anand\collegeassignmentmortgagecalculator\Copy of
Terms of Reference\word\document.xml"

                Try
                    'StatusTextBox.Text = "Retrieve data from URL"
                    SetStatusTextBox("Retrieve data from URL")
                    doc = LoadURLUsingWebClient(url)
                Catch ex As Exception
                    MsgBox("Error occured " & ex.Message)
                    'StatusTextBox.Text = "Retrieve data from URL
error"
                    SetStatusTextBox("Retrieve data from URL error")
                End Try
                'NavigateXML(doc, url)

                If Not doc Is Nothing Then

                    'Dim nodelist As Xml.XmlNodeList = doc.ChildNodes
                    'Dim nodelist As Xml.XmlNodeList =
doc.SelectNodes("table")
                    'If nodelist.Count > 0 Then
                    'Dim items As System.Collections.IEnumerator
                    'items = nodelist.GetEnumerator
                    'End If

                    '<!-- START REPORT HEADER -->
```

```
                    Dim nodecount As Integer = 0
                    Dim xmlnode As System.Xml.XmlNode =
doc.DocumentElement.FirstChild
                    nodecount = nodecount + 1

                    'StatusTextBox.Text = "Processing started"
                    SetStatusTextBox("Processing started")
                    While Not IsNothing(xmlnode)
                        If nodecount = 2 Then
                            'MsgBox("Content found " &
xmlnode.OuterXml)
                            Dim contentnode As System.Xml.XmlNode
                            contentnode = xmlnode.FirstChild
                            Dim currentnodetype As String = ""
                            While Not IsNothing(contentnode)
                                If (contentnode.OuterXml.Trim = "<!--
START REPORT HEADER -->") Then
                                    currentnodetype = "header"
                                    modulename =
ProcessHeader(contentnode)
                                    'MsgBox("module name: " &
modulename)
                                End If

                                If (contentnode.OuterXml.Trim = "<!--
END REPORT HEADER -->") Then
                                    currentnodetype = "timerow"
                                    timetable =
ProcessContent(contentnode)
                                    'ModuleTextBox.Text = modulename
                                    SetModuleTextBox(modulename)
                                    Dim i As Integer
                                    Dim j As Integer
                                    Dim timeTableResult As String = ""
                                    Dim days As ArrayList =
timetable.Item(0)
                                    For i = 0 To days.Count - 1
                                        Dim a_day As ArrayList =
days.Item(i)
                                        For j = 0 To a_day.Count - 1
                                            Dim a_session As Hashtable
= a_day.Item(j)
                                            timeTableResult =
timeTableResult & "Day:" & a_session.Item("day") & "," & vbCrLf
                                            'SetResultTextBox("Day:" &
a_session.Item("day") & ",")
                                            timeTableResult =
timeTableResult & "Time:" & a_session.Item("time") & "," & vbCrLf
                                            'SetResultTextBox("Time:" &
a_session.Item("time") & ",")
                                            timeTableResult =
timeTableResult & "Lecturer:" & a_session.Item("lecturer") & "," &
vbCrLf

'SetResultTextBox("Lecturer:" & a_session.Item("lecturer") & ",")
```

```
                                                timeTableResult =
timeTableResult & "Venue:" & a_session.Item("venue")

SetResultTextBox(timeTableResult)
                                            Next
                                            'ResultTextBox.Text =
ResultTextBox.Text & vbCrLf & vbCrLf
                                            'SetResultTextBox(vbCrLf &
vbCrLf)

                                        Next
                                        'StatusTextBox.Text = "Processing
done"
                                        SetStatusTextBox("Processing done")
                                        '
                                        'Exit Function
                                        Return timeTableResult
                                    End If

                                    If (contentnode.OuterXml.Trim = "<!--
START ROW OUTPUT -->") Then
                                        currentnodetype = "datarow"
                                    End If
                                    If (contentnode.OuterXml.Trim = "<!--
START OBJECT-CELL -->") Then
                                        currentnodetype = "datastart"
                                    End If
                                    If (contentnode.OuterXml.Trim = "<!--
END OBJECT-CELL -->") Then
                                        currentnodetype = "dataend"
                                    End If

                                    'MsgBox(currentnodetype & " " &
contentnode.OuterXml)
                                    contentnode = contentnode.NextSibling
                                End While
                            Else
                                ' first node is title, ignored
                                'MsgBox(xmlnode.OuterXml)
                            End If
                            xmlnode = xmlnode.NextSibling
                            nodecount = nodecount + 1
                        End While
                        'NavigateXML(doc)
                    End If
                End If
                Return "Invalid Subject"
            Catch ex As Exception
                MsgBox("Error occured " & ex.Message)
            End Try
        End Function
```

# APPENDIX E

## Code starts the SMS server and connects to the wireless modem.

```
Private Sub StartSMSServer()
        ' check for com port and sim card pin text box
        Try
            portnumber = System.Int16.Parse(ComPortBox.Text)
        Catch ex As Exception
            MsgBox("Port number invalid, please enter an positive
integer")
        End Try

        If (SIMPINBox.Text.Length = 0) Then
            MsgBox("Must enter a PIN number")
        Else
            pinnumber = SIMPINBox.Text

            Try
                Dim needDetail As Boolean = True
                If smsServer Is Nothing Then
                    smsServer = New Rs232
                    'Dim keywords() As String = {"OK", "ERROR",
"+CMTI:", "+CMGR:", "+CMGS:", ">"}
                    Dim keywords() As String = {"OK", "ERROR",
"+CMTI:", ">"}
                    smsServer.Keywords = keywords
                    smsServer.Timeout = 8000
                    needDetail = True
                Else
                    needDetail = False
                End If

                If Not smsServer.IsOpen Then
                    'StartSMSButton.Enabled = False
                    SetStartServerButtonEnable(False)
                    'smsServer.Close()
                    If needDetail Then
                        smsServer.Open(portnumber, 9600, 8,
Rs232.DataParity.Parity_None, Rs232.DataStopBit.StopBit_1, 1200)
                    Else
                        smsServer.Open()
                    End If
                    smsServer.Dtr = True
                    smsServer.Rts = True
                    Dim timeoutcount As Integer = 8000
                    Dim modemOk As Boolean = True
                    While Not smsServer.IsOpen()
                        System.Threading.Thread.Sleep(1)
                        timeoutcount = timeoutcount - 1
                        If timeoutcount = 0 Then
                            MsgBox("Error connecting to modem, please
make sure modem is on and connected")
                            modemOk = False
                            Exit While
                        End If
                    End While

                    If modemOk Then
```

```
                        'If Not pinIsOk Then
                        'AT+CPIN?
                        '+CPIN: READY
                        'serverState = "CPIN_INIT"
                        serverState = "CPIN_CHECK"
                        Dim tempi As Integer
                        'Dim result As String = SendString("AT+CPIN="
& pinnumber, tempi)
                        Dim result As String = SendString("AT+CPIN?",
tempi)
                        smsServer.RxBufferThreshold = 1200
                        smsServer.EnableEvents()
                        'Else
                        'End If
                    End If
                End If

            Catch ex As Exception
                'StartSMSButton.Enabled = True
                SetStartServerButtonEnable(True)

                MsgBox("exception " & ex.StackTrace)
            End Try
        End If
    End Sub
```

# APPENDIX F

## Code that reads the SMS sent by user

```
Private Function RetrieveSmsPDUString(ByVal astring As String) As
String
        ' example string
        ' at+cmgr=4
        ' +CMGR: 1,,35
        '
07910621000010F5040B910621597399F3000070305040534223l2E834889E76E741F4
F29C0E028068B31A
        '
        ' OK
        Dim seperatorString As String = ControlChars.Cr
        Dim results() As String = astring.Split(seperatorString)
        Dim i As Integer
        For i = 0 To results.Length - 1
            If (results(i).Trim().Length > 5) And _
                (results(i).Trim().IndexOf("+CMGR:") < 0) And _
                (results(i).Trim().IndexOf("AT+CMGR") < 0) Then
                Return results(i).Trim()
            End If
        Next
        Return Nothing
    End Function
```

# APPENDIX G

## Code that will respond from users SMS sent to SMS server.

```
Private Function GenerateRespondPDUSMS(ByVal receivedPDU As String) As
String
        Dim result As Hashtable = Tools.DecodeReceivedPDU(receivedPDU)
        If Not result Is Nothing Then
            Dim        respondMessage        As        String        =
DoExtract(result.Item("Message"))
            Dim         respondPDU         As         String         =
Tools.EncodeSendPDU(result.Item("SenderNo"), respondMessage)
            Return respondPDU
        Else
            Return Nothing
        End If
    End Function
```

# APPENDIX H

## Code that processes user's request.

```
Private Sub HandleBytesReceive(ByVal source As Rs232, ByVal Mask As
Rs232.EventMasks) Handles smsServer.CommEvent
        Debug.Assert(Me.InvokeRequired = False)

        'Dim iPnt As Int32, sBuf As String, Buffer() As Byte
        Debug.Assert(Me.InvokeRequired = False)
        'lbAsync.Items.Add("Mask: " & Mask.ToString)
        If (Mask And Rs232.EventMasks.RxChar) > 0 Then
            'lbHex.Items.Add("Received data: " &
source.InputStreamString)
            'Buffer = source.InputStream
            'For iPnt = 0 To Buffer.Length - 1
            'lbHex.Items.Add(iPnt.ToString & ControlChars.Tab &
String.Format("0x{0}", Buffer(iPnt).ToString("X")))
            'Next
            'lbHex.SelectedIndex = lbHex.Items.Count - 1
            TextBox4.Text = TextBox4.Text & "Received data: " &
source.InputStreamString & vbCrLf
            Dim tempi As Integer
            If serverState = "CPIN_CHECK" Then
                ' getting result after cpin check
                If source.InputStreamString.Trim.IndexOf("READY") >= 0
Then
                    pinIsOk = True
                    'StopSMSButton.Enabled = True
                    SetStopServerButtonEnable(True)
                    serverState = "CNMI_INIT"
                    Dim cnmiresult As String =
SendString("AT+CNMI=2,1,0,0,1", tempi)
                Else
                    serverState = "CPIN_INIT"
                    Dim result As String = SendString("AT+CPIN=" &
pinnumber, tempi)
                End If
            ElseIf serverState = "CPIN_INIT" Then
                ' getting result after cpin initialization
                'MsgBox("result for AT+CPIN is " & result)
                If source.InputStreamString.Trim.IndexOf("OK") >= 0
Then
                    pinIsOk = True
                    'StopSMSButton.Enabled = True
                    SetStopServerButtonEnable(True)
                    serverState = "CNMI_INIT"
                    Dim cnmiresult As String =
SendString("AT+CNMI=2,1,0,0,1", tempi)
                    'MsgBox("result for AT+CNMI is " & cnmiresult)
                Else
                    pinIsOk = False
                    'StartSMSButton.Enabled = True
                    SetStartServerButtonEnable(True)

                    'MsgBox("SMS Server not started, incorrect PIN
number")
```

```
                End If
            ElseIf serverState = "CNMI_INIT" Then
                ' getting result after cnmi sms event notification
initialization
                If source.InputStreamString.Trim.IndexOf("OK") >= 0
Then
                    ' we are ready to received incoming SMS
                    serverState = "SERVER_READY"
                Else
                    'MsgBox("Modem not support new SMS notification")
                End If
            ElseIf serverState = "SERVER_READY" Then
                If source.InputStreamString.Trim.IndexOf("+CMTI:") >=
0 Then
                    storeLocation =
GetSmsLocation(source.InputStreamString)
                    If Not storeLocation Is Nothing Then
                        serverState = "READ_SMS_INIT"
                        'Read SMS by
                        '1) AT+CPMS="MT"
                        '2) AT+CMGR=2
                        Dim aresult = SendString("AT+CPMS=" &
storeLocation(0), tempi)
                    Else
                        ' invalid sms, ignore it
                        TextBox4.Text = TextBox4.Text & "Server state:
" & serverState & " invalid source.InputStreamString: " &
source.InputStreamString & vbCrLf
                    End If
                End If
            ElseIf serverState = "READ_SMS_INIT" Then
                If source.InputStreamString.Trim.IndexOf("OK") >= 0
Then
                    serverState = "READING_SMS"
                    Dim aresult = SendString("AT+CMGR=" &
storeLocation(1), tempi)
                End If
            ElseIf serverState = "READING_SMS" Then
                'If source.InputStreamString.Trim.IndexOf("+CMGR:") >=
0 Then
                If source.InputStreamString.Trim.IndexOf("OK") >= 0
Then
                    serverState = "DELETING_SMS"
                    receivedPDU =
RetrieveSmsPDUString(source.InputStreamString)
                    If Not receivedPDU Is Nothing Then
                        Dim aresult = SendString("AT+CMGD=" &
storeLocation(1), tempi)
                    Else
                        ' invalid pdu string, ignore
                        TextBox4.Text = TextBox4.Text & "Server state:
" & serverState & " invalid receivedPDU: " & receivedPDU & vbCrLf
                        serverState = "SERVER_READY"
                    End If
                End If
            ElseIf serverState = "DELETING_SMS" Then
```

```
                If source.InputStreamString.Trim.IndexOf("OK") >= 0
Then
                    ' delete sms ok
                    smsToSend = GenerateRespondPDUSMS(receivedPDU)
                    If Not smsToSend Is Nothing Then
                        serverState = "SENDING_SMS_INIT1"
                        Dim aresult = SendString("AT+CMGF=0", tempi)
                    Else
                        ' invalid pdu string, ignore
                        serverState = "SERVER_READY"
                    End If
                End If
            ElseIf serverState = "SENDING_SMS_INIT1" Then
                If source.InputStreamString.Trim.IndexOf("OK") >= 0
Then
                    serverState = "SENDING_SMS_INIT2"
                    Dim aresult = SendString("AT+CSMS=1", tempi)
                End If
            ElseIf serverState = "SENDING_SMS_INIT2" Then
                If source.InputStreamString.Trim.IndexOf("OK") >= 0
Then
                    serverState = "SENDING_SMS_INIT3"
                    Dim aresult = SendString("AT+CMGS=" &
((smsToSend.Length / 2) - 1), tempi)
                End If
            ElseIf serverState = "SENDING_SMS_INIT3" Then
                If source.InputStreamString.Trim.IndexOf(">") >= 0
Then
                    serverState = "SENDING_SMS"
                    Dim aresult = SendString(smsToSend & Chr(26),
tempi)
                    smsServer.Timeout = 12000
                End If
            ElseIf serverState = "SENDING_SMS" Then
                serverState = "SERVER_READY"
                smsServer.Timeout = 8000
                If source.InputStreamString.Trim.IndexOf("OK") >= 0
Then
                Else
                End If
            End If
        End If
        'lbAsync.SelectedIndex = lbAsync.Items.Count - 1
                                End Sub
```

# APPENDIX I

## Code that will send users requested timetable

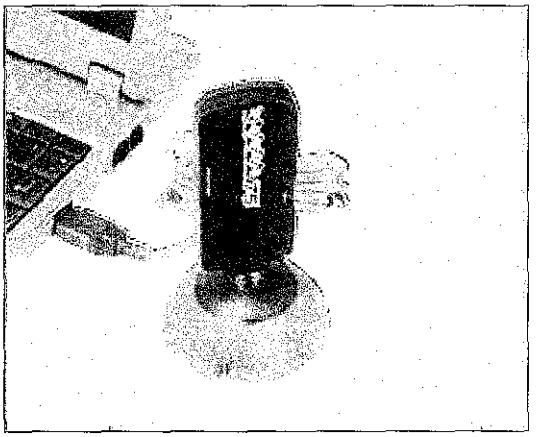
```
Private Function SendString(ByVal stringToSend As String, ByRef
totalByteRead As Integer) As String
        Try
            smsServer.PurgeBuffer(Rs232.PurgeBuffers.TxClear Or
Rs232.PurgeBuffers.RXClear)
            Dim originalString As String = stringToSend &
ControlChars.Cr

            smsServer.Write(originalString)
            ' don't read the respond, let the even handler read the
result
            ' based on the keywords
            'Dim totalread As Integer = smsServer.Read(800)
            'Dim bytes() As Byte = smsServer.InputStream
            'TextBox4.Text = TextBox4.Text & "totalread " & totalread
& vbCrLf
            'TextBox4.Text = TextBox4.Text &
System.Text.ASCIIEncoding.ASCII.GetString(bytes) & vbCrLf
            'totalByteRead = totalread
            'Dim result As String =
System.Text.ASCIIEncoding.ASCII.GetString(bytes)
            'Return RemoveEcho(originalString, result)
            'TextBox4.Text = TextBox4.Text & " buffer len " &
smsServer.InBufferCount.ToString()
        Catch ex As Exception
            'MsgBox("exception " & ex.StackTrace)
            'TextBox4.Text = TextBox4.Text & "in EXP " &
System.Text.ASCIIEncoding.ASCII.GetString(smsServer.InputStream)
            'totalByteRead = smsServer.InBufferCount
            'Return smsServer.InputStreamString
        End Try
        Return ""
                            End Function
```

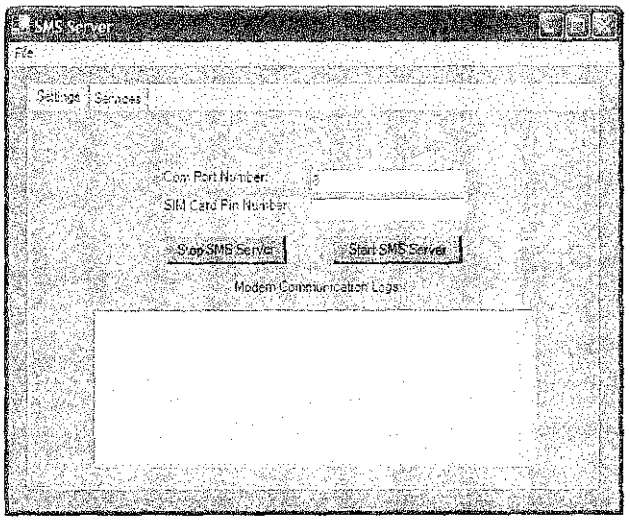
# APPENDIX J
# Instructor Manual

**How to use the SMS Server**

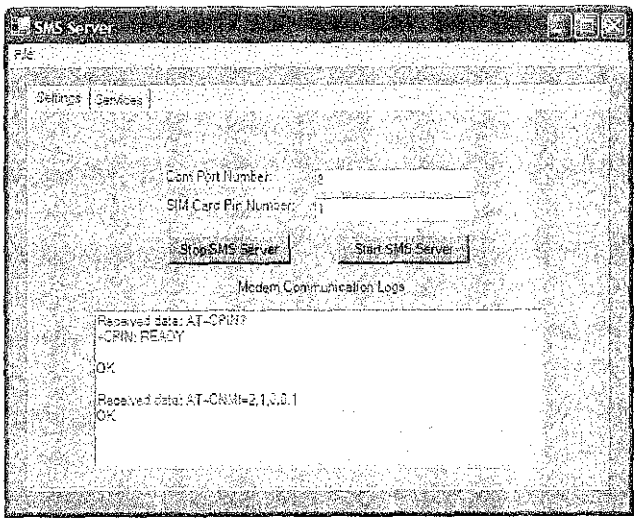
| Steps | Actions |
|---|---|
| 1 | Insert the wireless modem into the USB port. |



| Steps | Actions |
|---|---|
| 2 | After the modem has already been plug-in, you can enter the SIM Card Pin Number in the text field. |




| Steps | Actions |
|---|---|
| 3 | Click "**Start SMS Server**" button to start the server. After clicking the "**OK**" statement will appear in the 'Modem Communication Logs". To stop the server, just click the '**Stop SMS server**" button. |



| Steps | Actions |
|---|---|
| 4 | To view the subject that has been extracted by the system, click Tab "**Services**". Below are the example of the Accounting subject that been extracted. |