

CERTIFICATION OF APPROVAL

Retrieving Transaction Receipt in Mobile Banking

By

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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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ABSTRACT

Retrieving Transaction Receipt in Mobile Banking is a system that provides Multimedia Message Service (MMS) receipt to mobile banking user. It is an enhancement of mobile banking with Short Message Service (SMS) receipt. By upgrading the system to MMS, the limitation can be improved. MMS is an extension of the SMS standard. MMS provide thousands of characters of text within a single message. User will send SMS via their mobile to make fund transfer. This system will be using the NowSMS server as its getaway application to send or receive MMS/SMS messages to and from mobile devices. The NowSMS server will communicate with the applications such as PHP and the database that contain the data that is needed by the user. The user will then receive the receipt in a form of MMS. The user will be able transfer and print out the MMS for future references. User can view their transaction in the form of MMS with a more user friendly environment where it included the real image. The users are also able to save the transaction to other devices such as thumb drive and other removable media devices. MMS is not a stand-alone technology but actually a complementary to SMS.

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CHAPTER 1

INTRODUCTION

1.1 Background of Study

Multimedia Messaging Service (MMS) is an extension of Short Message Service (SMS) system. The current system of mobile banking provides SMS receipt with limitation which they contained limited characters. The system only contain text message and does not capture a whole transaction details. The data can be easily deleted and this will create a higher risk of lost data. Not all mobile phone can save or transfer the SMS receipt to other devices such as computer or any other portable devices. Other than that, the information that sends over SMS cannot be printed out and it is not valid for future references or evidence. For this system, user sends SMS via their mobile to make fund transfer. This SMS will communicate with the applications such as PHP or SQL that contain the data which is monitored and delivered by NowSMS Server. The NowSMS server also acts as the getaway application to send or receive MMS/SMS messages to and from mobile devices with computer. Then, the receipt that contains the transaction details will be sent back to mobile phone in MMS form.

1.2 Problem Statement

1.2.1 Limited character

SMS service allowed user to only receive messages in form of text with limited character. SMS message can only carry a very limited amount of data. Each SMS (in English language) is limited to 160 characters. This limitation is due to the limitation in MAP protocol in GSM (Puneet, 2000). This limitation is easily countered by splitting of long messages in to multiple messages and does not look very appealing in mobile devices (Logix, 2005).

1.2.2 Effectiveness of information

The information that sends over SMS cannot be printed out and it is not valid for future references or evidence.

1.3 Significant of the Project

By having MMS as the transaction receipt, the limitation can be improved. It allows the user to transfer or save the MMS receipt to other devices such as computer or thumb drive. Not all mobile phone have the function to transfer SMS to other devices. Other than that, there is no maximum size for an MMS message. MMS's have robust capabilities where it supports message formats beyond text.

1.4 Objective

To develop mobile banking application that provides Multimedia Message Service (MMS) delivery receipts.

1.5 Scope of Study

The major scopes are as follows:

- This system is focusing on:
 - Funds transfer :
- The image retrieved is a read-only file that can not be modified by users.
- This image can only be viewed by mobile phone that have
 - data viewer
 - Adobe Reader application
- For the security components, the Mobile Banking Pin is tied to user bank account number.

- The Mobile pin is keyed by user during the first time registration process in order to allow user to use the system. The registration process is not included in the system.

1.4 Feasibility of the Project

1.4.1 Technical Feasibility

Technical feasibility of the project involves familiarity of the application, project size and compatibility. The risk and assumption of each factor is listed in Table 1.1.

Factors	Risk	Assumption
Familiarity of the application	Low risk	This system is using SMS and MMS technology. This is not a new technology. Users are familiar with the mobile technology and this kind of application.
Project size	Moderate risk	The system resulted in the end of this project will be a prototype that simulates the actual system. The scope of the prototype is limited to some extent.
Compatibility	Moderate risk	The system is dealing much with hardware (Mobile Phone, GSM Modem, and Server).

Table 1.1: Technical Feasibility Risk

1.4.2 Economic Feasibility

For this system, the development of the prototype does not require any costs since the software used is open source and freeware. The hardware used is developer's personal belongings. This project benefits in customer satisfaction who is mobile users in this context.

However, actual development and operating costs of the actual product cannot be determined at this stage because it involves research on the actual information.

1.4.3 Organizational Feasibility

From an organizational point of view, this project has moderate risk. The objective of the system is to provide MMS delivery receipt to the banking users. The actual project champion is expected to be the Bank Company. The users of the system are the bank users and are expected to appreciate the benefits of this system presence.

CHAPTER 2

LITERATURE REVIEW

2.1 Multimedia Message Service (MMS)

Multimedia Messaging Service (MMS) is a messaging service using in mobile environment that standardizes by WAP forum and 3rd Generation Partnership (3GPP). MMS is similar to Short Message Service (SMS) where it provides automatic and immediate delivery of user-created content to and from mobile devices. MMS not only provide message service but also provides support for email addressing. For this, message can also be sent by email. MMS can contain still image, voice, sound and audio clips. Later, MMS will also contain video clips and presentation information. MMS is not a text file with attachments and not a browsing application. It is a multimedia presentation in a single entry. MMS requires its own user interface.

There is a possibility when phone is not reachable due to being switched off, having an empty battery or being within poor network coverage. For this, a new network element called the Multimedia Messaging Service Center (MMSC) is needed for storing MMS messages until the receiving phone is reached. Other than that, MMSC hosts a number of interfaces that connects networks with Application Programming Interface (API) to enable delivery of value-added services and network interconnection to email. (Anne. B., 2002)

2.1.1 Formats that are supported by MMS

MMS does not have any specific content formats. MMS message are encapsulated in a standard way, so that the receiving party can identify those content formats that is not supported and handle them in a controlled way. The standard format that is recommended in MMS is:

- JPEG
- GIF

- Text
- AMR voice
- Some other less-important formats.

To achieve compatibility between mobile devices, Nokia and some other manufacturers have agreed upon a MMS Conformance Document that lists the minimum set of content types to be supported by a MMS phone.

2.1.2 The maximum size of MMS

There is no maximum size for an MMS message. This is to avoid the SMS limitation where it only limit to 160-character. This limit has been problematic. For MMS, it is depending for operator preferences. Some operator may want to have standardizes message size for billing purposes and for some mobile manufacturer such as Nokia, they foresees that the MMS messages in the first phase will be between 30 kB and 100 kB in size. Thus this will effect the transmission time.

2.1.3 Sending MMS messages to phone that do not have the MMS feature

The Multimedia Terminal Gateway (TGW) provides support for mobile phone that does not have the MMS feature. The receiving terminal is identified as a non-MMS phone. Instead of sending the MMS message to the phone, the message is stored on a Web page. ASMS with the address to the Web page is sent to the non-MMS mobile phone over SMS.

2.1.4 Cost for a phone user to send an MMS message

The changing of MMS traffic is controlled by the operator. For Celcom, they proposed that the MMS should be charged on a transaction basis just like SMS. SMS is being charged per message, not per size. But it is up to the operator to charge for per MMS.

MMS is the best solution to use as a receipt in Mobile banking system. MMS support format that can not be edit or change by the user. It is easy to design the receipt because there is no limit size for MMS. Other than that, if the mobile phone does not have MMS features, it will automatically be stored on a web page.

2.2 PHP: HyperText Preprocessor

PHP is officially known as "PHP: HyperText Preprocessor". It is a server-side scripting language that is usually written in an HTML context. PHP is not like the ordinary HTML page. It does not sent script directly to a client by the server, instead it is parsed by the PHP binary or module, which is server-side installed.

PHP code can query database, read and write files, create images and communicate with remote servers. Apache and MySQL are supported by PHP. Apache is now the most-used web-server in the world, while MySQL is a powerful free SQL database. PHP provides a complete set of functions for working with it. PHP also supports an extensive list of databases and web-servers. (Bas, B., 2007)

This system will be using PHP as the tools that act as a platform to develop the system interface and to insert programming code in order to make the system function. PHP is an open source product. It is well supported by a talented production team and a committed user community. Furthermore, PHP can be run on all the major operating systems with most servers.

PHP allows user to separate the HTML code from scripted elements. Therefore, it will speed up the development process. In addition, it is easy to use and can remove obstacles that stand in the way of effective and flexible design. Well-maintained open source projects offer users additional benefits. Chances are that any problem you encounter in your coding can be answered quickly and easily with a little research. If that fails, a question sent to a mailing list or forum can have an intelligent, authoritative response.

2.3 Mobile banking with similar concept using different application (SMS)

2.3.1 M2U Mobile

M2U Mobile Services are offered by Maybank Group to their customers to perform Banking transactions via their mobile phones using SMS. Maybank2U provide mobile banking services that only available to certain mobile operators. This mobile banking services is available only to subscriber with GPRS/3G mobile phone. The benefits of using this service are:

- Convenience of carrying out a wide range of banking transactions anytime, from anywhere using mobile devices.
- Easy to follow menus and instructions

These Mobile Banking-Terms is using the same definitions that apply in Internet Banking-Terms. The Mobile Banking-Service will only be available for mobile phones and data connections which meet the required specifications and configurations as may be specified by the Bank from time to time. The user agrees with the procedure and maintains a mobile phone and data connection which meet these requirements at their own expense. This Mobile Banking Services are intended to be available 7 days a week, 24 hours a day but there is no warranty that the same services will be available at all times. The service that is available in this M2U Mobile Banking services are:

- **Account enquiry**
 - Credit card balance and transactions, fixed deposit, loan enquiry, savings/current accounts (individual and joint accounts)
- **Mobile transaction history**
 - View last 20 transactions on M2U Mobile
- **Funds transfer:**

- To own accounts, registered (favourite) 3rd party Maybank accounts, registered (favourite) interbank accounts, future transfer, future transfer enquiry
- **Bill payment**
 - Future payment, future payment enquiry, Maybank loans and hire purchase, registered payment
- **Credit cards** (Maybankard American Express, MasterCard, Visa)
 - Check balance and make payment
- **Utilities**
 - Download registered bill payment list, download registered favourite 3rd party Maybank and interbank accounts list, change password

2.3.2 AmMobile Services

AmMobile Services are offered by AmBank Group to their customers to perform Banking transactions via their mobile phones using SMS. Currently, they are offering this service to Celcom and Maxis provider. The services are:

- Top-up services
- Savings or Current account balance enquiry via your mobile phones through SMS.

These services are available for individual and joint (either to sign) savings or current account holders with AmBank.

Table 2.1 below is the example of SMS format that is used in AmMobile services:

Scenario	Format	Example	Send To
Top Up	TUP A or N <Top-up Amount><Phone	TUP A 100 0199999999	88100

	No to Top-up<<Mobile PIN>	JOE123	
Cross Top Up (Celcom to Maxis)	TUP<Top-up Amount><<Phone No to Top-up><<Mobile PIN>	TUP 100 0129999999 JOE123	88100
Bank Account Balance Inquiry	BAL<Type of Account><<Mobile PIN>	BAL SA JOE123	88100

Table 2.1: Celcom SMS Format

Figure 2.2 below is the example of SMS format that is used in AmMobile services:



Figure 2.2: Maxis and Celcom SMS Format

2.4 System with different concept using similar application (MMS)

2.4.1 IMS Voice-to-Animation Technology in Multimedia Messaging Service (MMS) Application for Wireless Devices

The IMS voice-animation solutions require only a voice file in order to generate animations. The voice file can be recorded from a human voice or from text-to-speech-engine. The voice file can be in any language. It also can be analyze in real-time video audio streaming. The IMS voice-to-animation can easily be used in a Multimedia Messaging Service (MMS) application designed for delivery to wireless devices or over the web. There are three basic technology components that are needed to create a MMS voice-to-animation application which are

- a voice-to-animation engine
- character creation engine
- rendering and display engine for the client device.

According to Donovan (2003)

The following steps outline the basic user scenario for the application:

1. The user creates a character of themselves, or chooses a character from a listing provided by the service provider
2. The user's character is created using the character creation application loaded on their PC, or using a simple application loaded onto their wireless device.
3. Once the character is created it is uploaded to the MMS application server, and tagged with a special identifier that links it to the user.
4. The user records the voice message they would like to have animated. In the case of a text message, the text message is entered in the client device just as an SMS message is entered. This text will be converted to a voice file using a TTS engine and SMS decoder. The user can also specify what they want the character to do after the message is read using a list of standard emotions such smile, anger and giving wink.
5. Once the user has recorded the message, the user specifies whom the message

should be delivered to from a list of their contacts on their wireless device.

Messages can be delivered to one or more persons.

6. The user now has the choice of sending the message as is or choosing to preview the message prior to sending it. If the user chooses to preview the message the animation engine will create message then alert the user to view it on the server once it is completed.
7. If the user likes the message after viewing the preview, then all they need to do is hit the send button then it will be delivered to the recipient(s) they have specified.
8. The MMS application server will alert each user that they have a MMS message waiting for them, and will store the message in the recipient's mailbox on the server until they retrieve the message, similar to how voicemails are currently retrieved.
9. When the recipient makes the decision to retrieve the message, they will retrieve the message as they normally would a voice mail message, and view the animations on their wireless device.
10. Should the recipient not have a MMS capable phone, the message will be delivered as a voice mail message instead of an animation message. The server will need to detect the type of wireless device the recipient is using, and make a decision as to what format the message should be delivered. The recipient will also be able to retrieve their animated message using their PC, should they decide to receive their MMS messages on their personal computer. The recipient will be given the opportunity to respond to the message, or forward it onto other recipients.

This IMS voice-to-animation engine is flexible, and includes features that allow the mobile operator to address opportunities in every segment of its subscriber base regardless of the language they speak, or characters they have developed an affinity for. IMS believes that voice-to-animation technology will play a key role in new MMS applications. From this system, it has a similar application where it will store the message in the recipient's mailbox on the server until they retrieve the message. If the

recipient does not have a MMS capable phone, the message will be delivered as a voice mail message instead of an animation message. While in the mobile banking system, user will receive the MMS on a Web page. A SMS with the address to the Web page is sent to the non-MMS mobile phone over SMS.

2.5 Mobile Banking Adoption in Malaysia.

Around the globe, various initiatives use the mobile phone to provide financial services to those without access to traditional banks. Yet relatively little scholarly research explores the use of these mobile banking (m-banking) systems. The spread of mobile phones across the developing world is one of the most remarkable technology stories of the past decade. Holds up by prepay cards and inexpensive handsets, hundreds of millions of first-time telephone owners have made voice calls and text messages part of their daily lives.

However, many of these same new mobile users live in informal and/or cash economies, without access to financial services that others take for granted. Indeed, across the developing world, there are probably more people with mobile handsets than with bank accounts. The term m-banking refer collectively to a set of applications that enable people to use their mobile telephones to manipulate their bank accounts, store value in an account linked to their handsets, transfer funds, or even access credit or insurance products (Jonathan, .D, 2008). It is a fact that m-banking is still in its early life and relatively alien to Malaysians. Hence, there is a possibility that m-banking remains unknown to and underutilized by bank customers. However, there are certain institution in Malaysia has taken noble initiatives to promote this modern banking practice (Hanudin, .A, 2006).

The institutions are enhancing and adding more functions to the m-banking infrastructure. Over the past several years, the m-banking market has grown significantly where many banking institution now offer some form of m-banking to their user. The most common mobile services available nowadays are (MMA, 2009):

- Account alert, Security alert and reminder.
- Account balances, update and history.
- Customer service via mobile.
- Online payment (i.e. paying bills).
- Funds transfer.
- Transaction verification.

The strategic reasons for additive m-banking are extremely compelling. With the increasing requirement for convenience from consumers in developed economies and the essential need to provide access to financial services to consumers with limited access to other electronic channels m-banking provides the solution.

By offering m-banking as an additional electronic channel, banks in Malaysia have a significant opportunity to reduce cost by maximizing existing infrastructure and reducing further investment in expensive infrastructures such as branches and ATM networks, whilst also opening up other potential revenue streams. M-banking provides excellent opportunities to existing programs, such as branchless banking and self service banking, in the financial services industry.

In addition to this, banks and other financial organizations can use this powerful mechanism for improving the customer's banking experience whilst forging a closer relationship. As consumers begin to rely on the mobile more for a variety of services, it becomes essential that they have access to financial services at any time in any place. Increasingly the mobile phone is becoming a lifestyle driver in developed economies and this is likely to prove true for mobile financial services.

As an additional electronic channel to an already existing bank account, m-banking enables the consumer to make payments such as bill payments and transactions including money transfers, banking enquiries, balances, detailed and mini statements as well as the ability to both fund and withdraw funds from the account.

In addition to the core m-banking functionality, the m-banking solution enables banks the opportunity to offer functionality to customers that is integrated into a broader financial ecosystem (Infosys, 2006)

2.6 Advantages of Mobile Banking

Service providers are increasingly using the complexity of their supported mobile banking services to attract new customers and retain the old ones. The effective way to improve customer service is to have good communication with customer by having better way to transfer information. For example, Credit card fraud. A bank can use the mobile technology to inform owners each time purchases above a certain value have been made on their card. This way the owner is always informed when their card is used, and how much money was taken for each transaction. Also, the bank could remind customers of outstanding loan repayment dates, dates for the payment of monthly installments or simply tell them that a bill has been presented and is up for payment. The customers can then check their balance on the phone and authorize the required amounts for payment. Other than that, the customers can also request for additional information such as they can automatically view deposits and withdrawals as they occur.

There are number of reasons that should influence banks in support of mobile phones. They have the potential to bring down costs for the bank itself. Through mobile messaging and other such interfaces, banks provide value added services to the customer at marginal costs.

Other benefit is the mobility characteristics of mobile services. A mobile is almost always with the customer. As such it can be used over a vast geographical area. The customer does not have to visit the bank ATM or a branch to avail of the bank's services. (Infogile, 2007)

2.7 Future of MMS

Currently, SMS is the most popular mobile messaging services used today. But there is also other widely used application such as Enhanced Messaging Service (EMS), Multimedia Messaging Service (MMS), Mobile Instant Messaging (IM), and Email. According to the Forrester report on "Mobile Messaging Next Generation", Multimedia Messaging Service (MMS) will grow to 37% of messaging traffic by 2007. MMS will be introduced globally because it enriches the SMS experience while retaining its simplicity. The mobile operators interviewed for the Forrester report indicated that 75% of them plan to roll out MMS in 2002 and 2003. Additionally, 75% of these operators believe that MMS will have a positive effect on their messaging revenues. Mobile operators (over 75%) see MMS as a big winner from a revenue perspective, and are now gearing up to offer this service to millions of subscribers. This system has a bright future ahead as MMS is getting popular and more useful in the future.

CHAPTER 3

METHODOLOGY

This project is developed by using prototyping methodology. This is the most suitable method because the analysis, testing and implementation phase move concurrently and repeatedly in a cycle until the system is completed. With these methodologies, the basics of analysis and design are performed and work immediately begins on a system prototype. This first prototype provides a minimal amount of features. This is the first part of the system that will be used by the user. The prototype then evolves into the final system. The stages of the model are illustrated in Figure below:

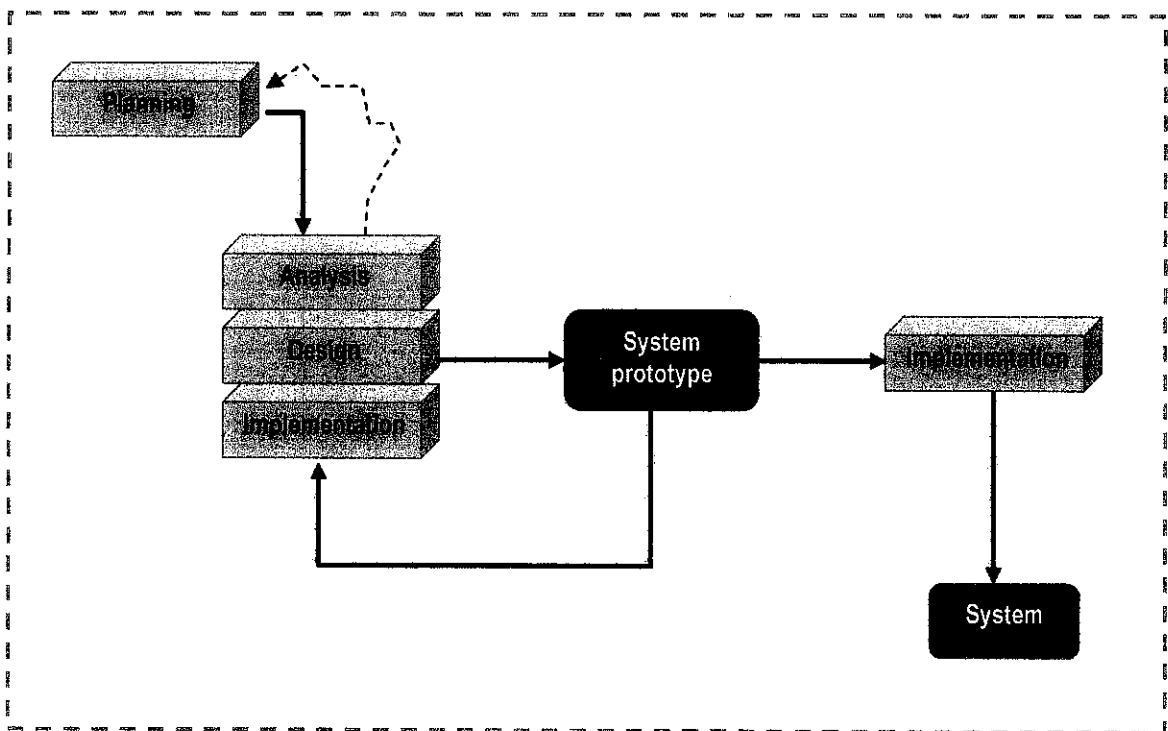


Figure 3.1: Prototyping Methodology

3.1 Planning Phase

All activities are planned according to the time line. This phase ensured that all activities are done within the specified time. Resources and constraint is taken into consideration so that ample time can be allocated to any unexpected incident along the development process. The outcome for this phase is the milestone of activities (Please refer Milestone in Appendix A). The important thing in this planning phase is to meet the due date with all or most of the requirement is in the system.

Project Milestones	Date
Proposal	30/01/2009
Proposal Approval by Research Cluster	06/02/2009
Preliminary Report	18/02/2009
Seminar 1 – Preliminary Reporting	27/02/2009
Progress Report	11/03/2009
Seminar 2 – Progress Reporting	20/03/2009
Interim Report	22/04/2009
Oral Presentation – Final Reporting	30/04/2009
Submission of Progress Report 1	04/08/2009
Submission of Progress Report 2 (Final Draft)	09/09/2009
Seminar – Progress Reporting	29/09/2009
Poster Exhibition (Pre-Edx)	07/10/2009
Submission of Dissertation (soft bound)	12/10/2009
Oral Presentation	28/10/2009
Submission of Project Dissertation (Hard Bound)	16/11/2009

Table 3.1: Project Milestone Schedule

3.2 Analysis Phase

In this analysis phase, the requirements are collected first. The project starts with research to understand the overall process of the system. It started with a brief research on the project to get a rough idea of the system. Then more detail research is conducted on the current system. The analysis start by defining the scope of the system, boundary of system, input and output process, and type of hardware and tools that is used in developing the system. After identifying all the elements, the design process starts.

3.3 Design Phase

In this phase, it starts with design of the architecture. The architecture design process is process of designing the platform or tool that will be use for the development of the system. The important part of this process is to set up the working architecture so that it can be functioning well and as expected. At this phase, the basics of design are performed and work immediately begins on a system prototype, it is called a “quick-and-dirty” program that provides a minimal amount of features.

3.3.1 Tools/equipment required

The tools required are divided into software and hardware used in the system. These tools are appropriate to be used in the prototype and are all open sources (except for SMS Gateway which is shareware). The actual implementation of the system might need more sophisticated tools.

Hardware	GSM mobile phone that has a built in modem supporting the GSM 7.05 SMS with SIM Card attached
	A phone-to-pc data cable
	Personal Computer / Laptop
Software	NowSMS Server
	Adobe Dreamweaver
	MySQL Server 5.0, requires MySQL Connector, XAMPP

Table 3.2: Tools Required

3.4 Implementation Phase

The implementation is the phase where the system that already finished. The implementation is done through pilot implementation whereby the installation will be done on one site or selected computer and the users will use the newly installed systems. This is the part of the system that will be used by the user.

CHAPTER 4

RESULT AND DISCUSSION

4.1 System Architecture

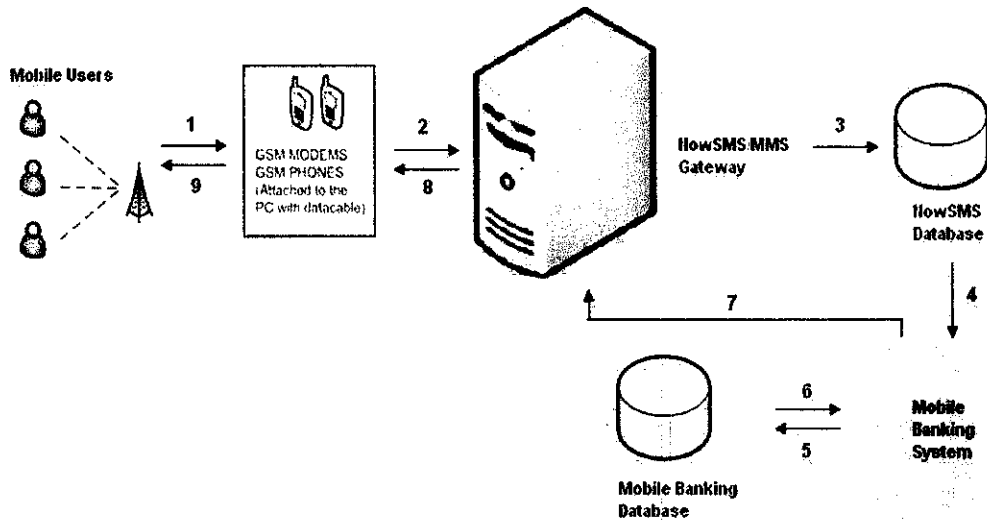


Figure 4.1: SMS/MMS gateway system architecture

For this system, user will send SMS via their mobile to make fund transfer. A mobile phone will be act as GSM Modems that is attached to pc to communicate with NowSMS Server. The NowSMS Server act as the getaway application to send or receive MMS/SMS messages to and from mobile devices with computer. The server will send user input to the NowSMS database. Next, the system will check the input from the database and make the transaction by updating mobile banking database. There will be two database involved. First is the database to capture the input from user and another database is the mobile banking database that store all data for mobile banking user. Then, the system will convert the information (receipt) into PDF form. This receipt is send to the user via the server that is connected to the GSM modem. Lastly, the user will receive MMS receipt that contains the transaction details in PDF form. Brief description of the architecture entities is explained at Table 4.1 below

<i>User Interface</i>	This system does not require building a user interface. By using this system, users will interact with the system by sending text messages in SMS form from their standard mobile devices to the specified number. Text messages will be transmitted through overlaid GSM Networks.
<i>GSM Modem</i>	GSM Modem with SIM card attached receives the text messages that is sent by the user and passes the messages to the server. GSM modem is also used to send MMS to user. GSM Modem and server are connected through Phone-to-PC data cable.
<i>SMS/MMS Gateway</i>	SMS Gateway acts as an interface between GSM Modem and the server itself. This gateway will convert the messages from PDU into text mode and stores the messages into the database. This database only captures the message that contains the first keywords that is sends by the user. For this system, it will capture the message that start with 'TRAN'. Every SMS Gateway available in the market has its own attributes and design. For this system, developer is using NowSMS Gateway which is available as freeware. SMS Gateway fetches messages from GSM Modem and stores it into database called nowsms.
<i>Database</i>	The database stores all required information that can be manipulated from any programs using SQL statements. This system is using MySQL 5.0.
<i>PHP Programs</i>	PHP programs do all processes to complete the whole cycle of the system from message retrieval to sending the MMS to the user.

Table 4.1: Architecture Entities Description

4.2 System Prototype

4.2.1 SMS/MMS Design and Format

1. User sends SMS to transfer fund via mobile phone

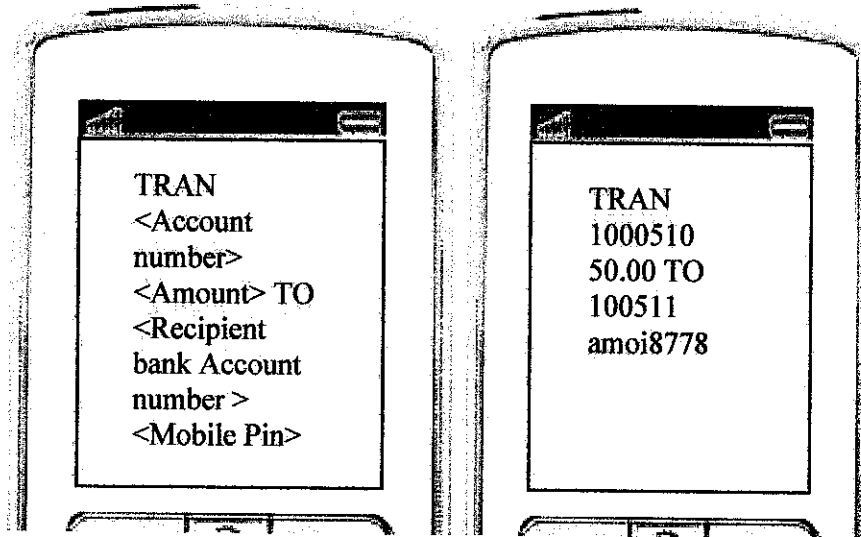


Figure 4.2: Format to transfer fund

2. User will receive a MMS receipt for the successful transaction.

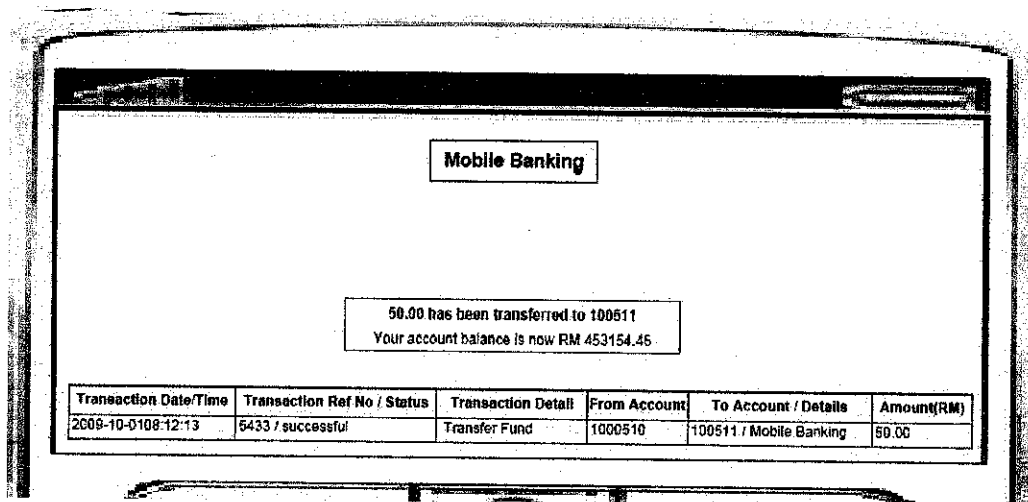


Figure 4.3: Successful Transaction

Error Message: Wrong Input

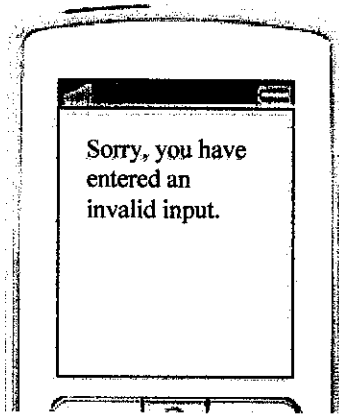


Figure 4.4: Error Message

4.2.2 NowSMS Database Design

This database is created in order to capture and record the message that is sent by the user. This database has one table, inbox for incoming messages. The NowSMS server will capture the message that start with keyword 'TRAN' that is receive from the SMS that is send by the user. It will then be inserted into the inbox table. The text message sent is inserted into 'sms' field while sender mobile number is inserted in 'hp' field. These records are passed to the system for further process. The NowSMS database tables are shown in Figure 4.5 below.

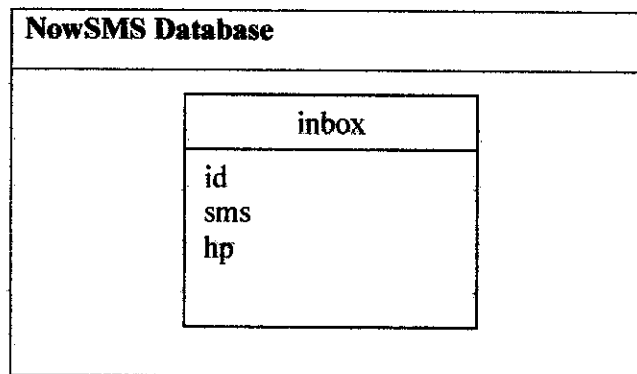


Figure 4.5: NowSMS Database

4.3 Functional Modeling

4.3.1 System Flow Chart

System Flow Chart is a traditional method of representing in schematic form the flow of data in a system. The flowchart shows the points of input and output, the logic or sequence of the various processing steps in the system, and the relationship of one element of the system to the other parts of the system. (Please refer System Flow Chart in Appendix B).

4.3.2 Use – case diagram

Use – case diagram will show what the system will provide to the end- user. In basic this diagram helps developer to identify functions that are system should have. Use – case diagram help not only developer but also end- user understanding the behavior of the system. (Please refer Use Case Diagram in Appendix C).

4.3.3 Context Diagram

A System Context Diagram (SCD) is diagrams that represent all external entities that may interact with a system. This diagram is the highest level view of a system, similar to Block Diagram, showing a, possibly software-based, system as a whole and its inputs and outputs from/to external factors. (Please refer Context Diagram in Appendix D).

4.3.4 Data Flow Diagram

A data-flow diagram (DFD) is a graphical representation of the "flow" of data through an information system. DFDs can also be used for the visualization of data processing (structured design).

On a DFD, data items flow from an external data source or an internal data store to an internal data store or an external data sink, via an internal process.

A DFD provides no information about the timing or ordering of processes, or about whether processes will operate in sequence or in parallel. It is therefore quite different from a flowchart, which shows the flow of control through an algorithm, allowing a reader to determine what operations will be performed, in what order, and under what circumstances, but not what kinds of data will be input to and output from the system, nor where the data will come from and go to, nor where the data will be stored (Please refer Data Flow Diagram in Appendix E).

4.4 NowSMS Setup

4.4.1 Install a GSM modem for use by NowSMS to receive SMS

1. Install GSM modem, or connect mobile phone to the computer, be sure to install the appropriate Windows® modem driver from the device manufacturer.
2. Select the “SMSC” tab from the gateway configuration dialog box as shown in figure 4.6 below. If no modems are yet to be defined, only the “Add” button will be available on the screen - select “Add”.

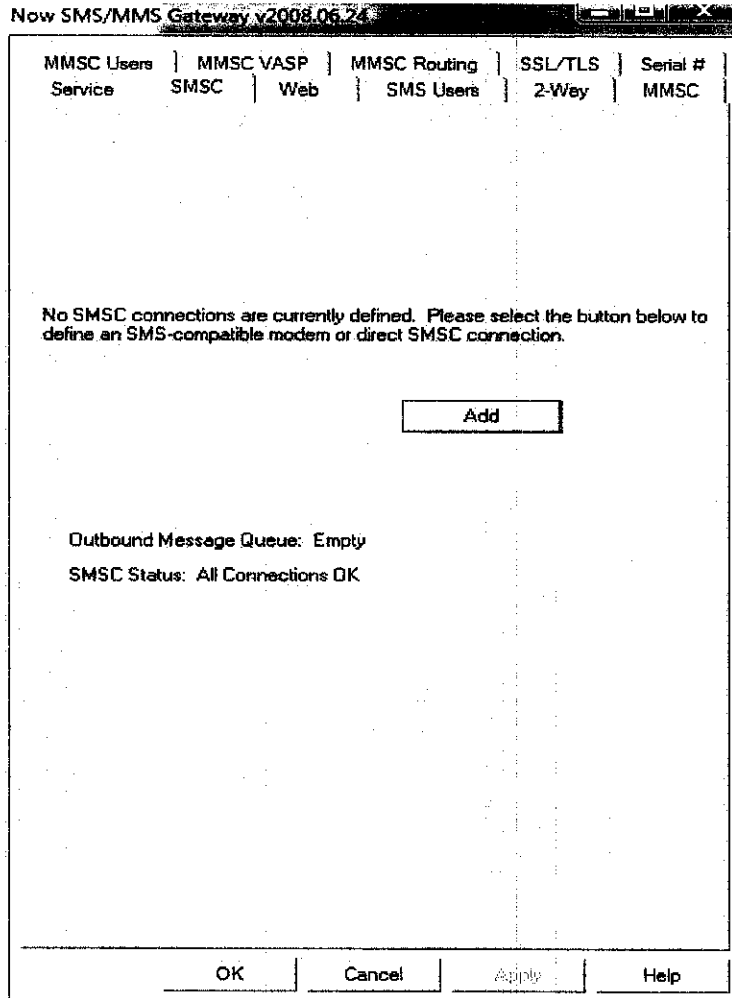


Figure 4.6: SMSC Tab

3. In the next window as shown in figure 4.7 below, select “GSM Phone or Modem” from the list and click OK.

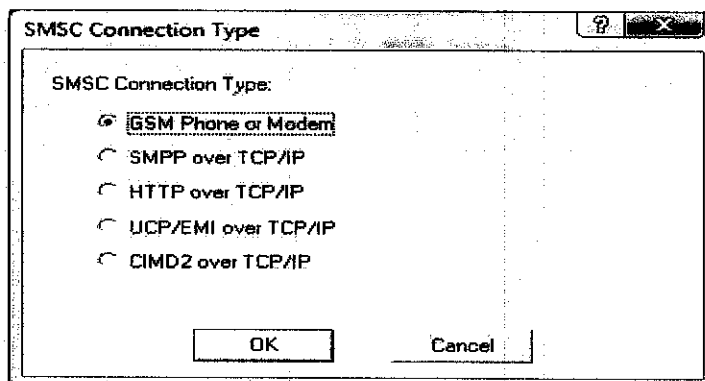


Figure 4.7: SMSC Connection Type

4. Next select an available modem and press the “Test and Add Modem” button, as show in figure 4.8 below. The gateway will then attempt to initialize the modem, and confirm that the modem supports the necessary interfaces to send and receive SMS and MMS messages. The modem will only be added to the configuration if the gateway confirms that it can communicate fully with the modem. If the SIM card for the modem requires a 4-digit PIN, please supply it in the field provided.

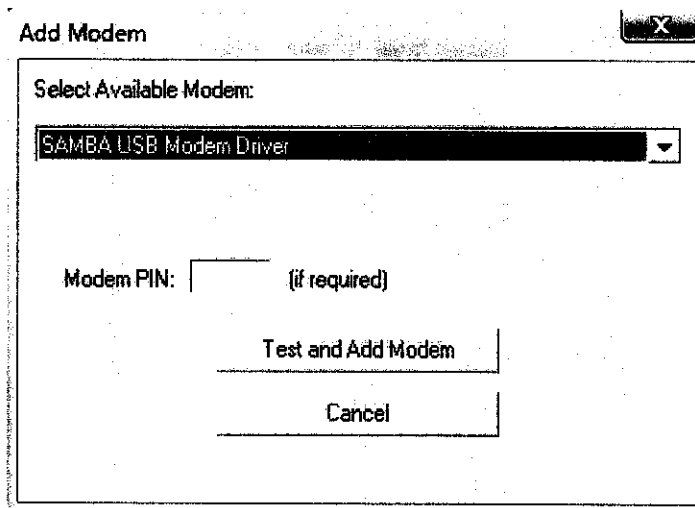


Figure 4.8: Add Modem

5. The screen showing the modem selected as show in figure 4.9 below. NowSMS is now ready to use the modem for sending SMS messages. (NowSMS Quick Start Guide 1, 2009)

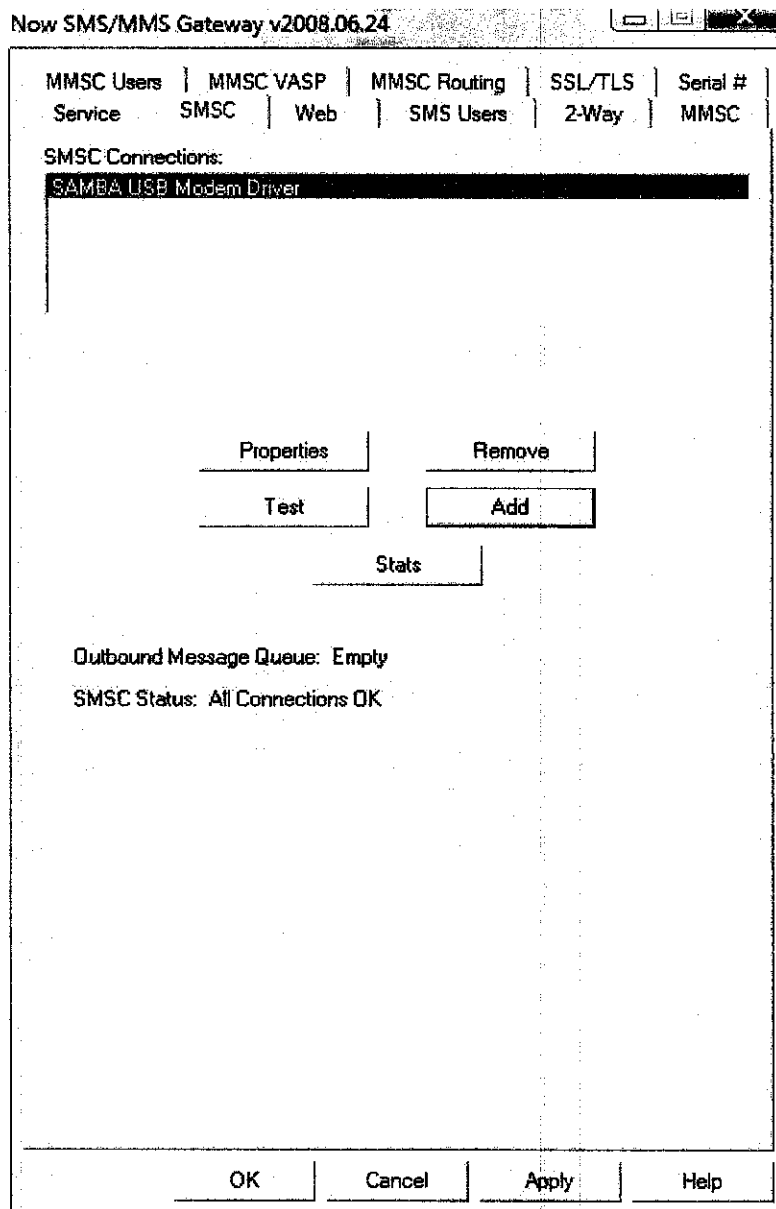


Figure 4.9: SMSC Tab showing the modem selected.

4.5 Security

Mobile Banking Pin will be tied to user account number. So, a third party will not be able to access user account from another mobile phone.

"Mobile Pin" is the personal password that user select to access Mobile Banking system and subsequently for each time user makes transaction, in order to allow Mobile Banking system to associate it with user account number for verification and authentication purposes prior to granting user access to Mobile Banking. This Mobile

pin is keyed by user during the first time registration process in order to allow system to identify user as part of the registration procedure. However, the registration process is not included in the system.

User agrees and acknowledge that they shall at all times keep their Mobile Pin confidential and shall not share or disclose to any person. In addition, user is responsible for their own personal mobile phone anti-virus and security measures to prevent unauthorized access to their transactions and accounts via the service.

4.6 System Evaluation

In acceptance testing, users are the one who conduct the test. The user tested on the system by sending the message according to the format. Then, the user received the receipt that contains the right information and the transaction is successful which the current balance is deducted with the amount that is transfer to the other bank account. The purpose of this testing is to check for the accuracy of the information in the receipt and user are able to receive the receipt in MMS form. Other than that, user also tested on the error message where here they send wrong input to the system. Then user will receive the error message in SMS form.

Over 30 tests in the acceptance testing, the system faced several errors. Even though the percentage of error is minor, author expects to eliminate the error to its minimum level. The result of the acceptance testing is depicted in the figure 4.13 below

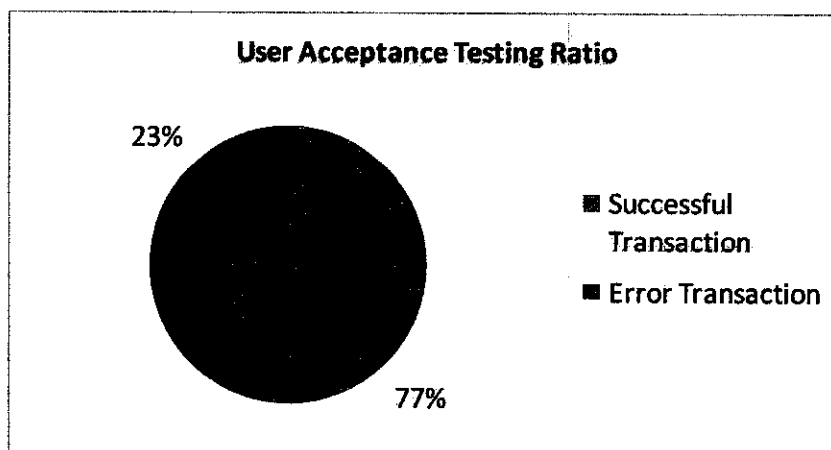


Figure 4.10: Acceptance Testing Transaction Ratio

The defects of the system are mostly in the PHP programs which do all the processing. Possible limitations of the system are:

1. The system cannot convert the information into PDF format. The database is updated but the receipt cannot be generated. This happens few times when there is pending MMS's in the server.
2. The error message also cannot be deliver to the user when there is pending SMS's in the server.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Conclusion

As a conclusion, Retrieving Transaction Receipt in Mobile Banking system is an acceptable solution to replace the traditional practice in mobile banking today. The main goal of it existed is to simplify the current exercise in the industry that using SMS approach. Furthermore due to the complexity and limitation in the traditional ways nowadays, it is believe that this is the best solution for the problem. Besides all the main purpose, this system will help the bank customers or the users to keep track on the account transaction. As the world can see now, most of the bank customers in this modern century are very busy with their daily life. So sometimes they will not have ample time to go to the bank to perform all the banking matters. By having this application, the user can do bank transaction at their finger tips.

5.2 Recommendation

The author would like to take this opportunity to make the following recommendations for the improvement of the system in the future. The recommendation needs are as follows:

- Enhance the service by adding more banking services such as bill payment
- Increased the security level for all aspect of the system including the system itself and database.
- Create a programming that can backup the data from database weekly or monthly.

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12. NowSMS Quick Start Guide

< <http://nowsms.com/documentation/quickstartguide/> >

APPENDICES

Appendix A: Milestone

Appendix B: System Flow Chart

Appendix C: Use Case Diagram

Appendix D: Context Diagram

Appendix E: Data Flow Diagram

Appendix F: Source Code

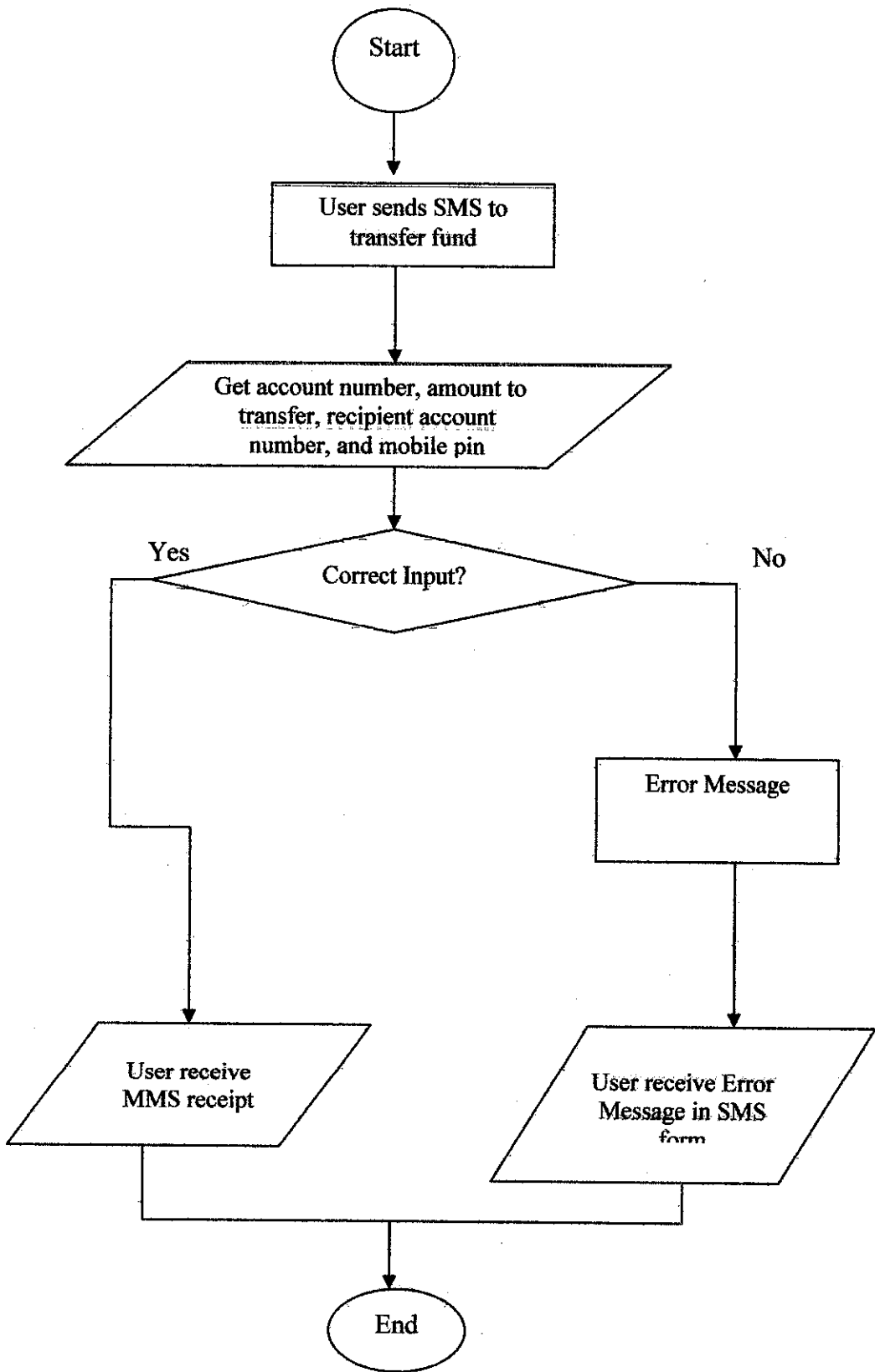
APPENDIX A

Milestone

Key Milestone

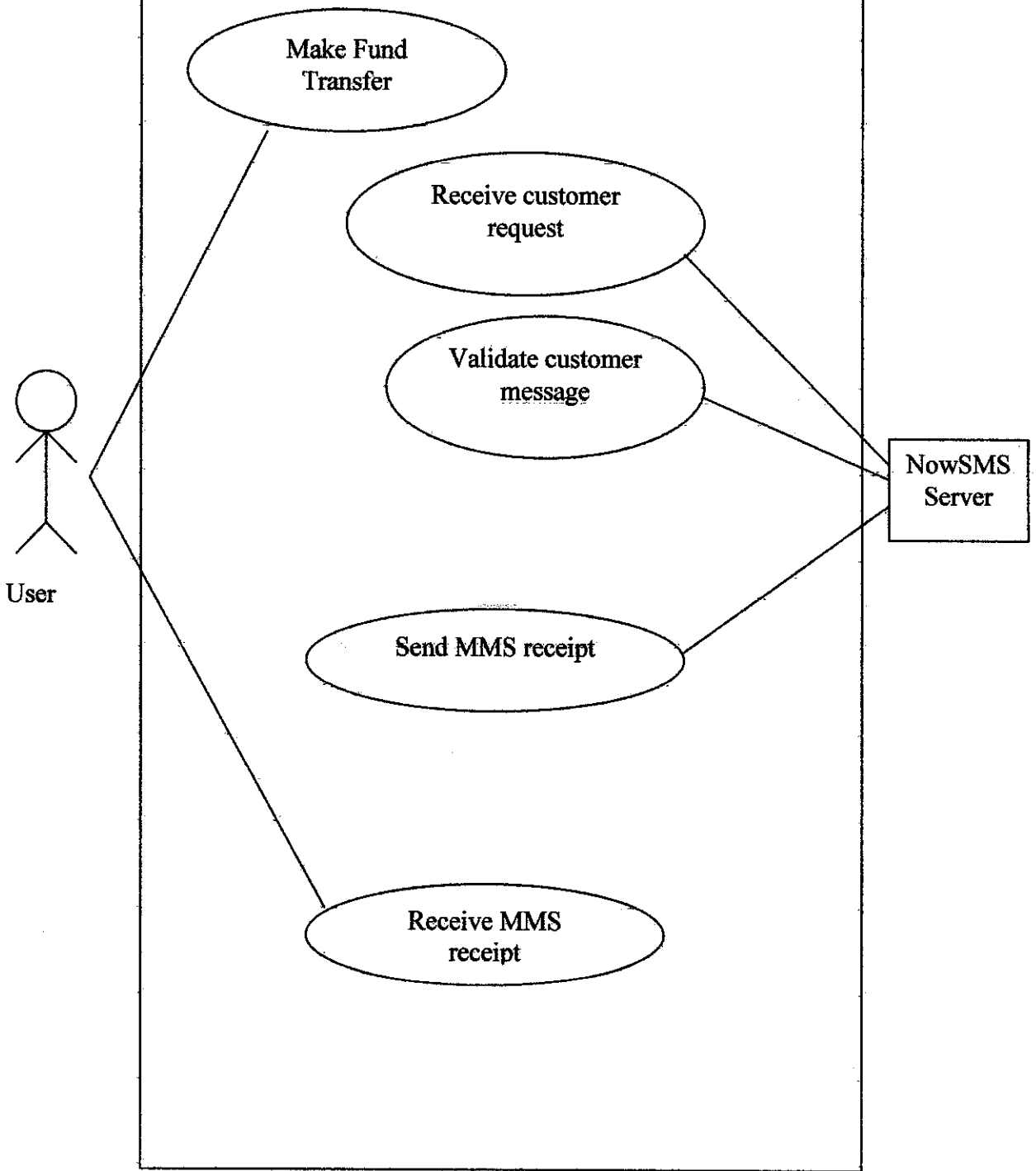
Task	January	February	Mac	April	May	June	July	August	September	October
Brief Research										
Writing Proposal										
Proposal Submission										
Objective Refinement										
Problem Refinement										
Identify Scope of Study										
Literature Review										
Identify Equipments										
Preliminary Report Submission										
FYP1 1 st Seminar Presentation										
System Architecture Design										
System Setup										
Process Flow										
Progress Report Submission										
FYP1 2 nd Seminar Presentation										
Entity Relationship Diagram Specification										
GUI Layout Design										
System Prototype										
Interim Report Submission										

APPENDIX B
System Flow Chart

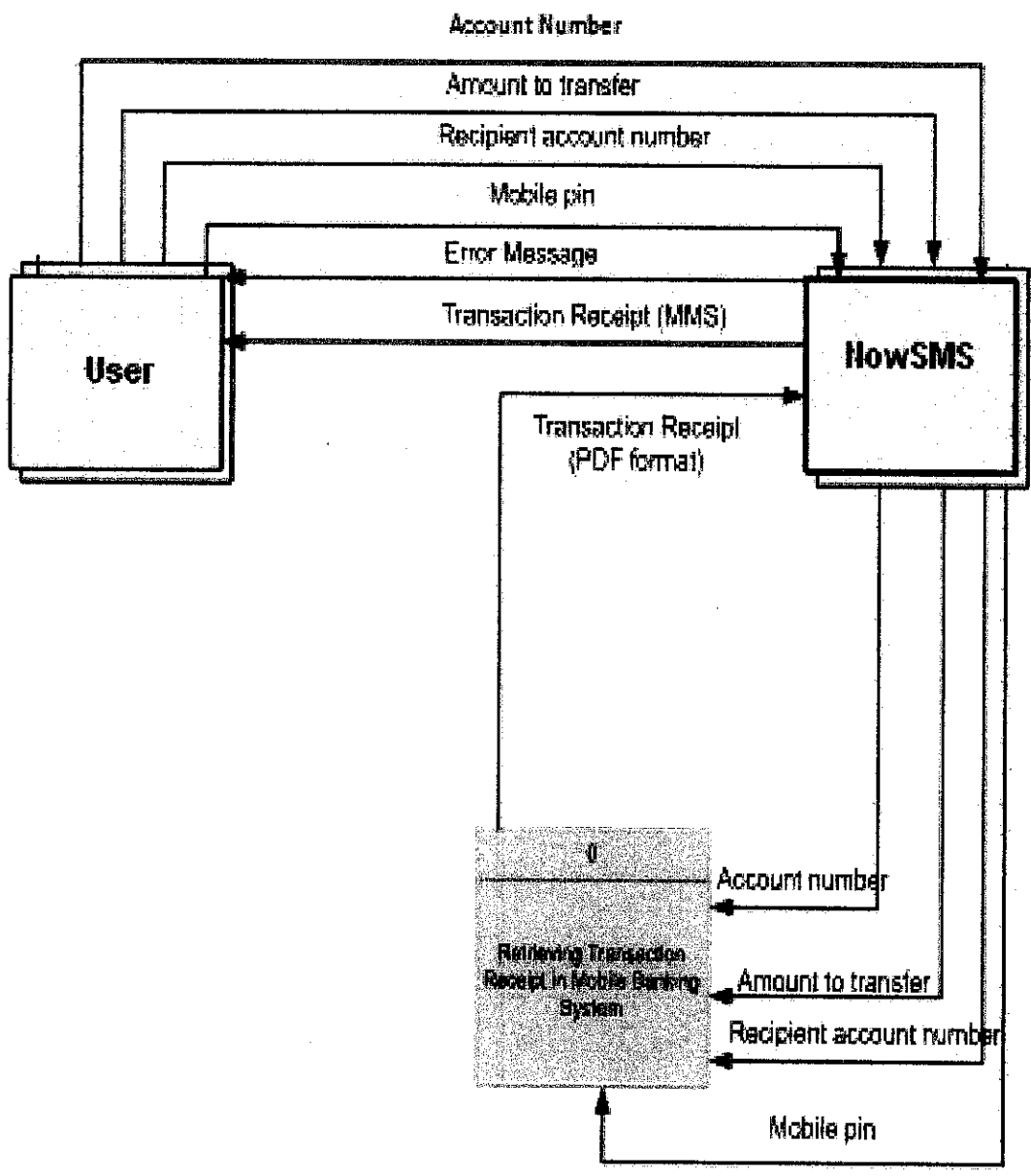


APPENDIX C
Use Case Diagram

Retrieving Transaction Receipt in Mobile Banking System

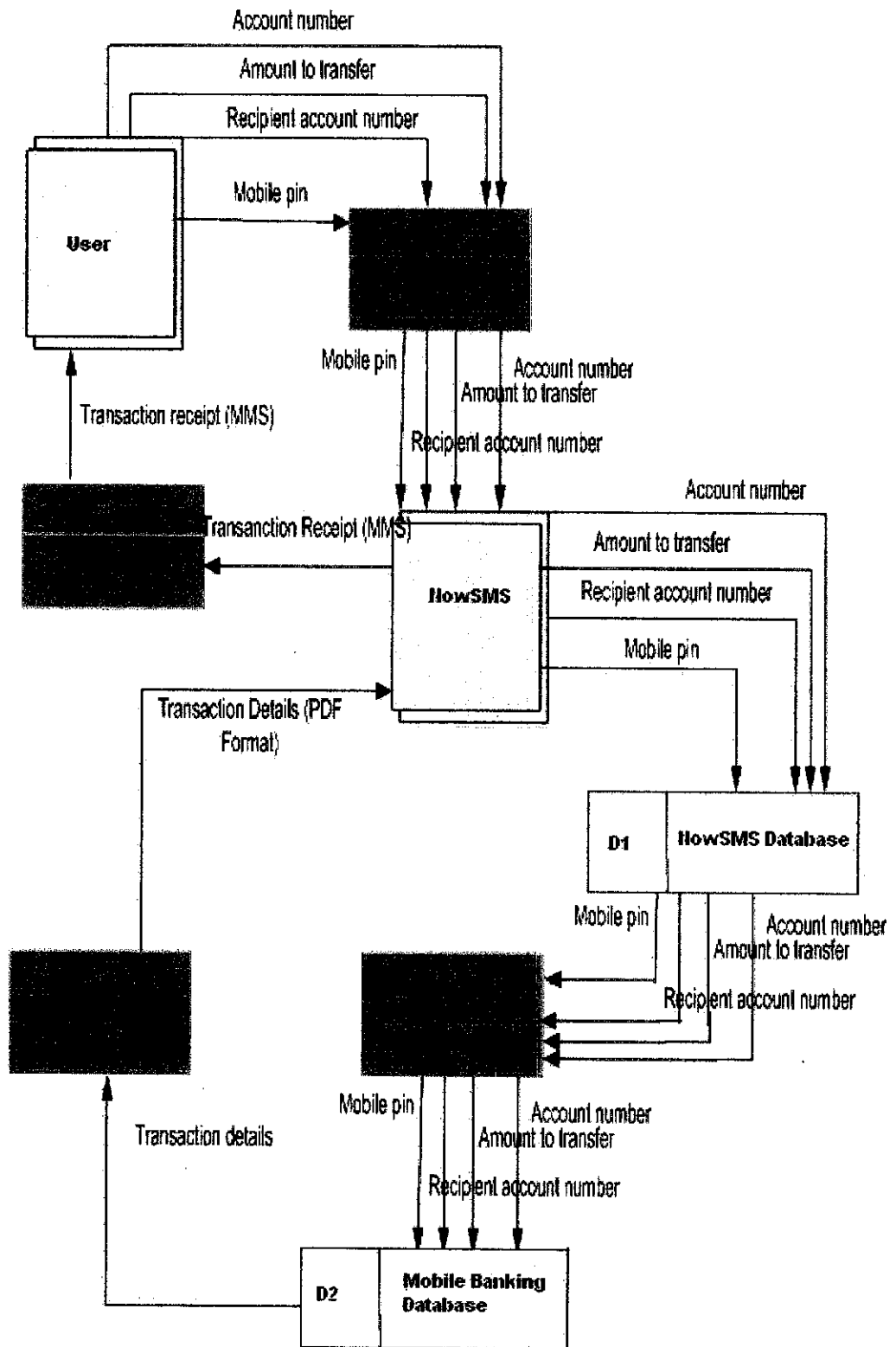


APPENDIX D
Context Diagram



APPENDIX E

Data Flow Diagram



APPENDIX F
Source Code

- Index.php

```
<?php

$sms= $_GET['sms'];
$hp= $_GET['hp'];

// setting database
$db_host="localhost";
$db_user="root";
$db_pass="";
$db_name="nowsms";

// connect to database database
$link = mysql_pconnect($db_host, $db_user, $db_pass) or die ("Unable to connect to database");
mysql_select_db ($db_name) or die ("Unable to select database");

//insert sms to table inbox
$sql = "INSERT INTO inbox SET id=", sms='$sms', hp='$hp'";
$query = mysql_query($sql) ;

?>
<?php require_once('Connections/conn.php');

//retrieve message in nowsms database
mysql_select_db($database_conn, $conn);
$query_ViewMessage = "SELECT * FROM inbox ORDER BY id DESC LIMIT 1";
$viewMessage = mysql_query($query_ViewMessage, $conn) or die(mysql_error());
$row_ViewMessage = mysql_fetch_assoc($viewMessage);
$totalRows_ViewMessage = mysql_num_rows($viewMessage);

$query = $row_ViewMessage['sms'];
$pieces = explode(" ", $query);

$accNo = $pieces[1];
$trans_amount = $pieces[2];
$recpAccNo= $pieces[4];
$pinNo= $pieces[5];

$hp = $row_ViewMessage['hp'];

$hpNo = trim($hp, "+6");

doubleval($trans_amount);
?>

<?php require_once('Connections/conn1.php');

//compare account number with the pin number
mysql_select_db($database_conn1, $conn1);
$query_viewAccountHolder = "select * from accountholder where accNo = '$accNo' and pinNo = '$pinNo' ";
$viewAccountHolder = mysql_query($query_viewAccountHolder, $conn1) or die(mysql_error());
$row_viewAccountHolder = mysql_fetch_assoc($viewAccountHolder);
$totalRows_viewAccountHolder = mysql_num_rows($viewAccountHolder);

if ($accNo != $row_viewAccountHolder['accNo'] and $pinNo != $row_viewAccountHolder['pinNo']){

//send error message for the wrong input
include('sendsms.php');

}else{

//update new current amount after successful transaction
$newamount = $row_viewAccountHolder['current_amount'] - $trans_amount;
if ($row_viewAccountHolder['current_amount'] > $trans_amount){
```

```

$query_updateAccount = "update accountholder set current_amount=$newammount where accNo = $accNo;";
$updateAccount = mysql_query($query_updateAccount, $conn1) or die(mysql_error());

$query_updateAccount = "INSERT INTO transaction VALUES ($accNo, &date, 'successful', $recpAccNo, $trans_amount, '');";
$updateAccount = mysql_query($query_updateAccount, $conn1) or die(mysql_error());

}else{

//send error message for the wrong input
include('sendsms.php');
}
}

$query_viewAccount = "select * from accountholder a, transaction t where a.accNo = '$accNo' AND a.pinNo = '$pinNo' AND
a.accNo = t.accNo;";
$viewAccount = mysql_query($query_viewAccount, $conn1) or die(mysql_error());
$row_viewAccount = mysql_fetch_assoc($viewAccount);
$totalRows_viewAccount = mysql_num_rows($viewAccount);
?>
<?
//convert message to PDF form
include('receiptpdf.php');
?>

```

● RECEIPTPDF.PHP

```

<?php
require('fpdf.php');

class PDF extends FPDF
{
    function Header()
    {
        //Arial bold 15
        $this->SetFont('Arial','B',16);
        //Move to the right
        $this->Cell(120);
        //Title
        $this->Cell(50,10,'Mobile Banking',1,0,'C');
        //Line break
        $this->Ln(20);
    }

    //Load information data
    function InfoData($info5)
    {
        //Read file lines
        $lines[0] = 'Your account balance is now RM ' . ' ' . $info5;
        $data=array();
        foreach($lines as $line)
        $data[]=explode(';',$line);
        return $data;
    }

    //Load result data
    function ResultData($date,$time,$refNo,$status,$accNo,$recpAcc,$tranAm)
    {
        //Read file lines
        $lines2[0] = $date . ' ' . $time . ' ' . $refNo . ' ' . $status . ' ' . $accNo . ' ' . $recpAcc . ' ' . $tranAm;

        $data2=array();
        foreach($lines2 as $line2)

```



```

        $data2[]=explode(';',$chop($line2));
        return $data2;
    }

    //Information Table
    function InfoTable($header,$data)
    {
//Colors, line width and bold font

// $this->SetTextColor(255);
$this->SetDrawColor(128,0,0);
$this->SetLineWidth(.3);
$this->SetFillColor(255,255,255);
$this->SetFont("B");
$this->Ln(20);
//Header
$w=array(100);
$fill=true;
for($i=0;$i<1;$i++)
{
    $this->Cell(95);
    $this->Cell($w[$i],7,$header[$i] . " has been transferred to " . $header[1],'LTR',0,'C',$fill);
    $this->SetFont("");
    $fill=!$fill;
}
$this->Ln();
//Color and font restoration
$this->SetFillColor(224,235,255);
$this->SetTextColor(0);
foreach($data as $row)
{
    $this->Cell(95);
    $this->Cell($w[0],6,$row[0] . $row[1],'LRB',0,'C',$fill);
}
}

//Result Table
function ResultTable($header2,$data2)
{

//Colors, line width and bold font
$this->SetDrawColor(128,0,0);
$this->SetLineWidth(.3);
$this->SetFillColor(224,235,255);
$this->SetFont("B");
$this->Ln(20);

//Header
$w=array(50,60,45,30,55,30);
for($i=0;$i<count($header2);$i++)
    $this->Cell($w[$i],7,$header2[$i],1,0,'C',true);
$this->Ln();
//Color and font restoration
$this->SetFillColor(255,255,255);
$this->SetTextColor(0);
$this->SetFont("");
//Data
$fill=false;
foreach($data2 as $row)
{
    $this->Cell($w[0],6,$row[0] . " . $row[1],'LR',0,'L',$fill);
    $this->Cell($w[1],6,$row[2] . '/' . $row[3],'LR',0,'L',$fill);
}
}

```

```

$this->Cell($w[2],6, 'Transfer Fund ',LR,0,L,$fill);
$this->Cell($w[3],6,$row[4],LR,0,L,$fill);
$this->Cell($w[4],6,$row[5], '/ Mobile Banking',LR,0,L,$fill);
$this->Cell($w[5],6,$row[6],LR,0,L,$fill);

$this->Ln();
$fill=!$fill;
}
$this->Cell(array_sum($w),0,"T");
$this->Ln(20);
}

function Footer()
{
}
}

$pdf=new PDF('L', 'mm', 'A4');
//Column titles
$header=array($row_viewAccount['trans_amount'],$row_viewAccount['recpAccNo']);
$header2=array("Transaction Date/Time","Transaction Ref No / Status","Transaction Detail","From Account","To
Account / Details","Amount(RM)");
//Data loading
$data=$pdf->InfoData($row_viewAccount['current_amount']);
$data2=$pdf-
>ResultData($row_viewAccount['date'],$row_viewAccount['time'],$row_viewAccount['refNo'],$row_viewAccount['s
tatus'],$row_viewAccount['accNo'],$row_viewAccount['recpAccNo'],$row_viewAccount['trans_amount']);
$pdf->SetFont('Arial',12);
$pdf->AddPage();
$pdf->InfoTable($header,$data);
$pdf->ResultTable($header2,$data2);
$pdf->Output('temp/mms.pdf','F');
?>

<?
include('sendmms.php');
?>

```

- SENDSMS.PHP

```

<?
function SendSMS ($host, $port, $username, $password, $phoneNoRecip, $msgText) {

    $fp = fsockopen($host, $port, $errno, $errstr);
    if (!$fp) {
        echo "errno: $errno \n";
        echo "errstr: $errstr\n";
        return $result;
    }

    fwrite($fp, "GET /?Phone=" . rawurlencode($phoneNoRecip) . "&Text=" . rawurlencode($msgText) . " HTTP/1.0\n");
    if ($username != "") {
        $auth = $username . ":" . $password;
        echo "auth: $auth\n";
        $auth = base64_encode($auth);
        echo "auth: $auth\n";
        fwrite($fp, "Authorization: Basic " . $auth . "\n");
    }
    fwrite($fp, "\n");

    $res = "";

    while(!feof($fp)) {
        $res .= fread($fp,1);
    }
}

```

```

    }
    fclose($fp);

    return $res;
}

$х = SendSMS("169.254.25.216", 8800, "", "", $hpNo, "Sorry wrong input.Please try again.");
echo $x;

?>

```

- SENDMMS.PHP

```

<?php

/* Function to perform HTTP POST of multi-part data */

function MmsSend ($host, $port, $username, $password, $data_to_send)
{
    $dc = 0;
    $bo = "-----mime-boundary-marker";

    $fp = fsockopen($host, $port, $errno, $errstr);
    if (!$fp) {
        echo "errno: $errno \n";
        echo "errstr: $errstr\n";
        return $result;
    }

    fputs($fp, "POST / HTTP/1.1\n");
    if ($username != "") {
        $auth = $username . ":" . $password;
        $auth = base64_encode($auth);
        fwrite($fp, "Authorization: Basic " . $auth . "\n");
    }
    fputs($fp, "User-Agent: NowSMS PHP Script\n");
    fputs($fp, "Accept: */*\n");
    fputs($fp, "Content-type: multipart/form-data; boundary=$bo\n");

    foreach($data_to_send as $key=>$val) {
        $ds = sprintf("%s\nContent-Disposition: form-data; name=\"%s\"\n%s\n", $bo, $key, $val);
        $dc += strlen($ds);
    }
    $dc += strlen($bo)+3;
    fputs($fp, "Content-length: $dc\n");
    fputs($fp, "\n");
    fputs($fp, "This is a MIME message\n\n");

    foreach($data_to_send as $key=>$val) {
        $ds = sprintf("%s\nContent-Disposition: form-data; name=\"%s\"\n%s\n", $bo, $key, $val);
        fputs($fp, $ds );
    }
    $ds = $bo . "\n";
    fputs($fp, $ds);

    $res = "";

    while(!feof($fp)) {
        $res .= fread($fp, 1);
    }
    fclose($fp);

    return $res;
}

/* Add a file part to the multipart data */

```

```

function MmsAddFile ($data, $file, $contenttype)
{

$fa = @file($file);
$xf="Content-Type: ".$contenttype."rnrnrn".implode("", $fa);
$data["MMSFile"; filename="$file"] = $xf;

return $data;
}

/* Add a field to the multipart data */
function MmsAddField ($data, $fieldname, $fieldvalue) {

$data[$fieldname] = "rnrn" . $fieldvalue;

return $data;

}

/* Initialise the MMS message */
function MmsInit () {

$data = "";
return $data;
}

/* Set parameters for connecting to the NowSMS server */
$nowsmsHostName = "169.254.25.216"; /* IP Address or host name of NowSMS Server */
$nowsmsHostPort = "8800"; /* NowSMS Port number for the web interface */
$nowsmsUsername = ""; /* "SMS Users" account name */
$nowsmsPassword = ""; /* "SMS Users" account password

/* Initialise the MMS Message structure */
$mmsMessage = MmsInit();

/* Set MMS message fields */
/* "PhoneNumber" is the recipient, and can be a comma delimited list of recipients or the name of a NowSMS distribution list */
/* "MMSFrom" is the sender */
/* "MMSSubject" is the subject */
/* "MMSText" is an optional text part of the message. Text parts can also be added as file references */
/* For additional parameters, please see http://blog.nowsms.com/search/label/sendmms.php */
$mmsMessage = MmsAddField ($mmsMessage, "PhoneNumber", $hpNo);
$mmsMessage = MmsAddField ($mmsMessage, "MMSFrom", "sender@domain.com");
$mmsMessage = MmsAddField ($mmsMessage, "MMSSubject", "Mobile Banking");
/* The MMSText field is optional */
$mmsMessage = MmsAddField ($mmsMessage, "MMSText", "Mobile Banking receipt");

/* Add the file parts here, referencing local files.
Specify a path to the file, remembering to escape backslashes in the path (c:\temp\file becomes c:\\temp\\file).
The last parameter is the MIME content type, e.g., "image/gif", "image/jpeg", "image/png", "text/plain" or "application/smil" ...
however, note that current versions of NowSMS ignore the MIME content type when messages are submitted via the interface
used by this PHP script. Instead, NowSMS uses the file extension to determine the content type (e.g., ".gif", ".jpg", ".png", ".txt",
".smil"
*/

$mmsMessage = MmsAddFile ($mmsMessage, "C:\\xampp\\htdocs\\MobileBanking\\temp\\mms.pdf");

/* Now send the message.
The HTTP response from the server is returned by this function, and this example echoes it to the console. */

$x = MmsSend ($nowsmsHostName, $nowsmsHostPort, $nowsmsUsername, $nowsmsPassword, $mmsMessage);
echo $x;
?>

```