MPPUTP Election via SMS

By

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information and Communication Technology Programme
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in partial fulfilment of the requirement for the
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(INFORMATION AND COMMUNICATION TECHNOLOGY)

Approved by,

_____

(Mr Justin Dinesh Devaraj)

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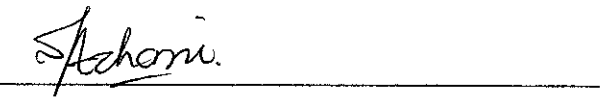
TRONOH, PERAK
January 2008

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.



AZHANI BT ABDUL RAHIM

ABSTRACT

MPPUTP Election via Short Messaging Service (SMS) is a system that allows students to vote for the candidates of the election using SMS. The system is to improve the current conventional way of voting that has been applied in the campus. The objective of the system is to overcome the problems that UTP students faced in order to proceed with the voting process. From this system, the students will not face the problems which it consumes a lot of time to go to the voting polls as the schedule of a student is often packed. The students can also vote from anywhere as long as they are registered and they can request for candidates' profiles before they vote. After the system has been fully implemented, it can reduce the time and cost to handle a voting session, besides decrease the manpower. The system will generate report of the voting and send the results to the voters. The security of the voting session will also guarantee as the application is designed so it can secure all the data.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND STUDY

Election for Students' Representatives in Universiti Teknologi PETRONAS which is called MPPUTP is held annually, which requires all students to vote in order to pick the representatives for 2 semesters. Usually the election is held on the second semester of the year. The candidates are usually from the second year of study and come from different courses and will compete for general constituency and program constituency. As for program constituency, the candidates must come from the respective programs and only students from that program can vote. The candidate that receives the most votes will be declared as winners and will act as the representatives for 2 semesters.

1.2 PROBLEM STATEMENT

The idea of creating the project arose when looking at the nature of the manual voting system. Using the manual voting system, students usually found it is hard to commit to the responsibility of voting. It is due to a few reasons that the students feel it is hard to do the voting which are:

1. Very time consuming – since the voting is done on a weekday, the students usually are packed with classes to attend. It is hard for them to find a slot to do the voting.
2. Location not suitable – the location where the voting take place usually are far from the hostel.

With the SMS voting system, the problems above could be settled with a few awareness of how important it is to vote to the students. Plus the SMS voting system can also reduce the usage of manpower and materials for the voting purposes.

The primary goal of the project was to use technology as the main approach in order to ease the process of voting on the Election Day. It is believed that most of the students must have at least one working mobile phone as mobile phones are crucial for communication nowadays. Students which age ranges from 18-25 averagely are well educated of the technology, thus it will be easier for them to accept and use the system.

1.3 OBJECTIVES

1.3.1 To develop a system that uses mobile phone to vote.

Using SMS, the students will find it is much easier to vote since it can be done at any place without consuming too much energy to walk to the voting place. Plus they can vote at any time during the voting period.

1.3.2 To provide statistics of the results for the voting.

As all data will be kept in a database and will be managed throughout the voting process, the reporting process will be whole lot easier. Once the voting period has end, the statistics for the election can be produced.

CHAPTER 2

LITERATURE REVIEW

2.1 HOW SMS IS BUILDING BUSINESS

From a study case done by Plus One organisation in Australia, it is said that the sale for Dunkin Donuts has resulted in 9% of increase in their sales after 2 months of mobile interactive and campaign. By using their mobiles, the customers can get coupons or discount by responding to the advertisement on the billboards and on the radio. By sending a short message to the published numbers, users receive an immediate reply featuring a free gift coupon or special offer exchangeable at local outlets. [1]

Another case study done by the same organisation said that a local Irish radio, Radio 98FM, wanted to interact with its audience with an opinion poll. At every new bulletin 98FM broadcast a GSM number to which listeners could send, via text message, their opinion about a nominated news topic. Participants merely sent a "yes/no" response and then received a response inviting people to send further comments. Radio station staff then had access to live statistics via a special web page.

From the case studies, it is shown that SMS could assist in marketing hence increasing the sales of the business. It is also possible that SMS could ease the Election process because SMS is cause effective, instantaneous, and interactive.

2.2 SMS IS COST EFFECTIVE

The major benefit is that SMS messaging allows communication to be timely, event-driven, personalised, and cost-effective. SMS is cheaper than making a phone call. Message to a pocket means interactive communication at any time and any place. Using internet might be cheaper but SMS is more mobile. Below is the rate charge by all service providers in Malaysia, considering that most students use prepaid.

Service provider	Rate between service provider	Rate to others
Maxis [2]	RM0.07	RM0.15
Celcom [3]	RM0.10	RM0.20
Digi [4]	RM0.07	RM0.15

Table 2.0: SMS Rate for All Service Providers

Service provider	Rate between service provider	Rate to others
Maxis	RM0.25	RM0.50
Celcom	RM0.35	RM0.50
Digi	RM0.25	RM0.50

Table 2.1: MMS Rate for All Service Providers

From the survey that has been done throughout the campus, it is shown that most students prefer to use Maxis as their service provider. Besides offering cheaper price compared to Celcom, Maxis also has wider coverage here in Tronoh.

2.3 SMS USAGE

SMS is very popular nowadays. Everyone knows how to use SMS even if they don't even know how to use Internet. As much as people think they want the cutting edge technology, but when you want information right now, you're going to go straight to the quick and easy feature that you know how to use, which is text. Unlike the new and more expensive technologies, text messaging works for almost everybody. People don't change when they have a tool that already works. 88% of US Internet users said they used text messaging. WAP and clients didn't even make this list. [5]

SMS is also all about simplicity. By using SMS, you can send the text message, leave your hand phone, and wait for reply. You don't need to keep your phone idle in some state to wait for a page to download. Information from SMS can also be stored permanently in your inbox.

The fact that SMS is the easiest mechanism in order to get an immediate result or news makes it quite powerful. People depend on SMS to get latest news in sports and even to book movie tickets. People even are using SMS to promote their business. Looking at how dependable human are to the SMS system, it is almost possible that students can adapt to the SMS Voting System.

2.4 ADVANTAGES OF USING SMS

Text messages do have some unique properties and instances where they are particularly useful. These include the following [6]:-

1. SMS is immediate

Unlike e-mail, SMS is much more likely to read by a person at any one time, since the majority of people have their mobile phones between reach 24 hours a day. This also applies to phone calls.

2. Messages are instantly recorded

Once SMS is sent, it is instantly recorded inside the receiver's phone and permanently stays there until the receiver deletes it. This proves particularly useful in the case of fairly detailed information that might otherwise be forgotten.

3. SMS is discreet

Unlike a phone call you do not have to run out of the restaurant where you are eating to field the call, yet you still know when an SMS has arrived. The discreet nature of text messaging ensures you stay in touch with minimal disturbance.

4. SMS leads to cheaper phone bills

SMS is cheaper than making a call, yet the information conveying is same.

2.5 WHAT IS VOTING SYSTEM?

A voting system is a means of choosing between a numbers of options, based on the input of a number of voters. Voting is perhaps best known for its use in elections, where political candidates are selected for public office. Voting can also be used to award prizes, to select between different plans of action, or by a computer program to determine a solution to a complex problem. Voting can be contrasted with consensus decision making. [7]

A voting system consists of the rules for how voters express their desires, and how these desires are aggregated to yield a final result. The study of formally defined voting systems is called voting theory, a subfield of political science, economics or mathematics. Voting theory began in the 18th century and has led to several proposals for voting systems.

Most voting systems are based on the concept of majority rule, or the principle that more than half of the voters should get the outcome they want. Given the simplicity of majority rule, those who are unfamiliar with voting theory are often surprised that such a variety of voting systems exists, or that popular voting systems can produce results not supported by more than half the voters. If every election had only two choices, the winner would be determined using majority rule alone. However, when there are three or more options, there may not be a single option that is preferred by a majority. Different voting systems may give very different results, particularly in cases where there is no clear majority preference.

2.6 MOBILE VOTING

Mobile voting service is simply a mobile polling location that the voters have to enter in order to cast the vote. For those who are bedridden or who cannot leave their post would still not be capable of voting. It is because of this, the idea of mobile voting is evolving into a portable device that can be taken to the voter. The ability to bring an electronic device to a voter has become possible with the advancement in laptop, tablet PCs and PDA devices. [7]

Mobile voting would be used to cater people who cannot leave a specified area, such as prisoners, and the elderly who is not capable of moving. Mobile voting can solve this problem. As for the UTP election, students find it hard to go voting using the manual voting process. Hence, the mobile voting system can help to ease the whole process.

One of the most convenient aspects of mobile voting is that it is adaptable. In stationary polling places, there are often several machines present that can be used by disabled people. This can result to long lines which are inconvenience and discourage students from voting. With mobile voting, they can easily vote from anywhere at anytime they want without having to queue.

There are 2 types of Mobile voting that usually been used:-

1. Text Messaging (SMS)

   This type of mobile voting needs voters to cast their vote through sending the text using SMS. Example: Type in the corresponding name of candidate and send it to any particular number

2. WAP Mobile phone browser

WAP Mobile Phone Browser is the type where the voters need to direct their browser in the mobile phone to address provided.

2.7 ETHICS FOR MOBILE VOTING

Online voting has been implemented in many places such as in United States. It is assumed that all online voting would be implemented via a Web browser. Since SMS is now conquering the new technology, it is said that SMS would likely to replace the current voting using web browser. The ethics issues will be the same as the concept is similar, it is just the implementation is different.

It is true that there are many benefits for mobile voting, which include everyone can vote and the votes will be counted quickly. But there are a few risks that have to be taken into consideration. Not everyone can afford to buy a handphone. Though handphone is essential nowadays, there is still possibility that not everyone owns a handphone.

Mobile voting will also increases the opportunities for vote solicitation and vote selling [8]. The conventional way of voting prohibited others from seeing when you are voting. But using mobile phones, you can show to others who you vote for and your vote is not confidential anymore. This will lead to unethical voting if the candidate decides to sell the votes by giving voters money if they prove that they vote for the candidate, which is by showing to the candidate who they vote for.

As the system is also fully computerized, it is also a risk that the system might be infected with virus and worm. Backup plan need to be prepare should there is something unplanned happen.

2.8 ELECTRONIC VOTING SYSTEM USING MOBILE TERMINAL

According to the International Journal of Computer Science and Engineering [9], it is said that the normal voting process which includes going to the polling station and normal registering and cost a lot of time and manpower. While in e-voting by going to the voting place and using the touch screen function will cost less manpower, but still the same amount of time of going to the polling station. As for the online voting system, it can only be done when the internet server is up, hence it is risky by any chance the internet server will be down on the election day.

By using SMS voting system, the voters can register using mobile terminal such as hand phones or PDA. The voter can easily cast their vote at anytime during the voting period anywhere even when the voter is not able to access to the internet.

2.9 SECURITY ISSUES IN ELECTRONIC VOTING SYSTEM

In developing the system, the security issues must also be taken into consideration, as it is serious to remain the voting process and results secretly, especially on who vote for whom because votes should remain secret. In July 2003, computer scientists from John Hopkins and Rice Universities released a security analysis of software purportedly from a direct recording electronic touch screen voting machine of a major voting-system vendor [10]. The study drew public attention to a long simmering controversy about whether current DREs are vulnerable.

Whereas according to the International Journal of Computer Science and Engineering [9], the following should be considered for secure and trustworthy e-voting.

- The relation between voter and vote should not be revealed.
- The result of a poll should be retained as a secret before counting the ballot.
- A voter can cast vote only once.

CHAPTER 3

PROJECT WORK

3.1 PROJECT DESCRIPTION

The project flow is described as the diagram below:-

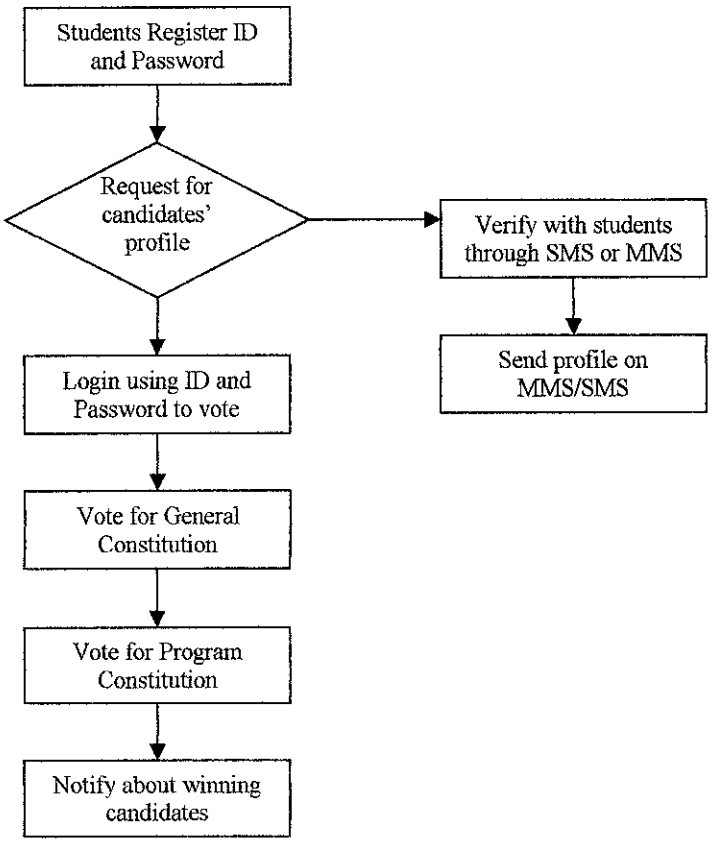


Figure 3.0: Flow of the System

3.1.1 Students Register ID and Password

The students need to register their ID and password so that no one can use their ID without them knowing it. They need to provide their Students ID as the login ID and IC number as the password. The database will match if the information is correct, then the registration is successful. Student will receive report of registration.

3.1.2 Students Request for Candidates Profile

Students need to be verified if they can accept MMS or not. If they can accept MMS, a profile including picture of the candidate will be sent to the students' phone. Profile will include name of the candidate, year of study, field of study, previous experiences, and unique voting number. If the students cannot receive MMS, the profile will be sent in SMS format. Requests for profiles can be done along the election campaign, not only on the voting day.

3.1.3 Students Login Using ID and Password

Students need to login to identify the voter in order to avoid redundancy of voting since the student can only vote for once. Once the student has vote, their ID will be blocked from voting again.

3.1.4 Students Start Voting

After login, students can start voting for both General and Program Constitution based on the unique voting number of the candidate. The examples of the voting are:-

- For General Constitution – VoteGen 01

- For Program Constitution – VoteProg 10

3.1.5 Students Will Receive Notification of the Winner

After the voting period has ended, the students will receive a notification of the results for the election. After the process is successfully done, the student can log out to leave the system.

3.2 SYSTEM ARCHITECTURE

The architecture that has been chosen in order to construct the system is three-tier client-server architecture which involves 3 layers of Client, Business, and Database server.

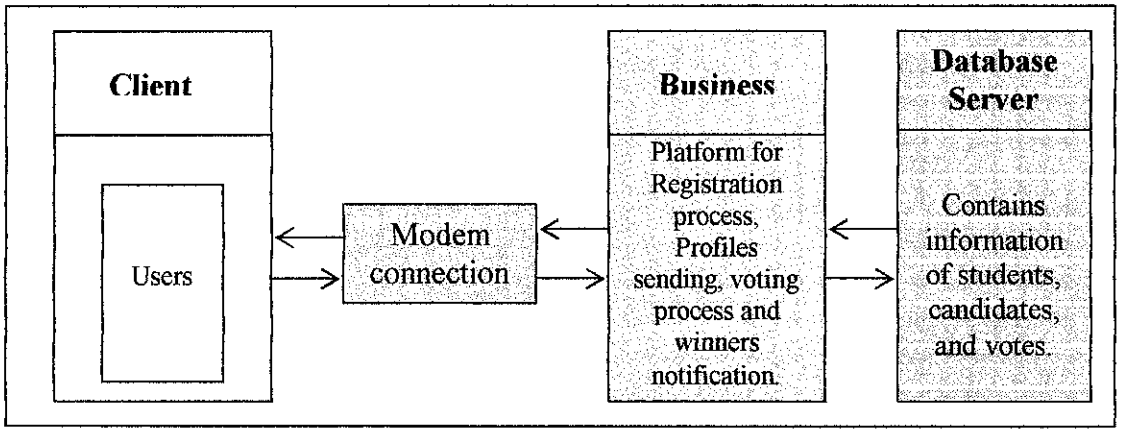


Figure 3.1: Architecture of SMS voting system

The use of the three-tier architecture in this case allows the information transfer between the Business (which is the application) and the database server to be optimized [11]. The database provides data management service. It this case, it includes the students' information, the candidates' profiles, and the vote counts on the voting day.

The business layer provides the application services such as the registration process, the profiles sending upon request by the students, the voting platform, and sends the notification of winners to the students. The client layer is where the users are, and the user is connected to the application using a modem.

3.3 METHODOLOGY

As to complete the project, the Iterative and Incremental development method has been chosen as method used in development of the system. Incremental development is a scheduling and staging strategy in which the various parts of the system are developed at different times or rates, and integrated as they are completed. Iterative development is a rework scheduling strategy in which time is set aside to revise and improve parts of the system. It does not presuppose incremental development, but works very well with it. A typical difference is that the output from an increment is released to users, whereas the output from iteration is examined for modification. [12]

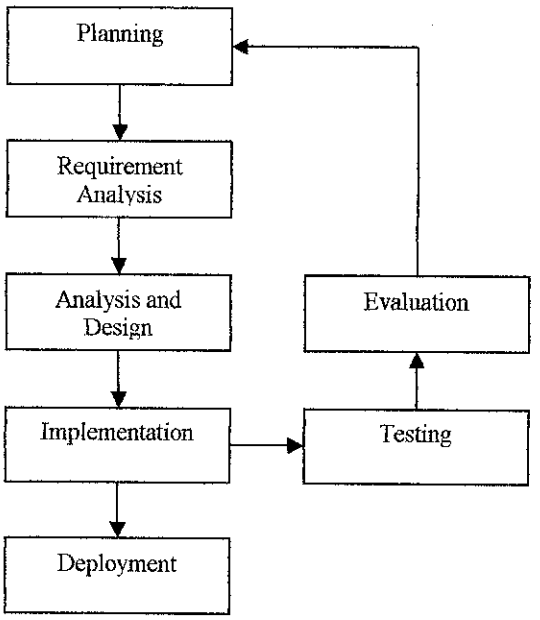


Figure 3.2: Iterative and Incremental Development Model

3.3.1 Planning

Planning for the project is conducted using Gantt chart as represented in APPENDIX A and identifies the task for the system development.

3.3.2 Requirement Analysis

The most important phase of this application development process is Requirements Analysis. It is because if the requirements are not gathered properly and analyzed clearly, it can affect the rest of the project. In order to get better understanding of the project, research on the current voting system had been done.

The approaches that had been used to gather the information are using Questionnaires and Interviews. The target respondents for the questionnaires and interviews are students from all year. Their feedbacks and comments are essential to ensure the system meet the requirements.

3.3.2.1 Questionnaires

100 printed questionnaires were distributed to a number of random students from different ages in UTP. The questions were set using simple English language as not to confuse the respondents. Questionnaires were distributed to both local and international students.

3.3.2.2 Interviews

A few informal interviews had been done with the current MPPUTP in order to ask them the method of current voting system. They explained the advantages

and disadvantages as well as the response for the current voting system from the students.

3.3.3 Analysis and Design

This phase is done in order to analyse the description of the whole system. This is to identify the flow of the system as well as actors that involves in the application. The implementation details have been comprehensive enough to avoid any problem while constructing the coding later.

3.3.3.1 Use Case Diagrams

Use cases diagram were used as it is a simple descriptions of a system's functions from the eye of the users. Use case diagrams are functional diagrams in that they portray the basic functions of the system. It includes what the users can do and how the system should respond to the user's action.[13]

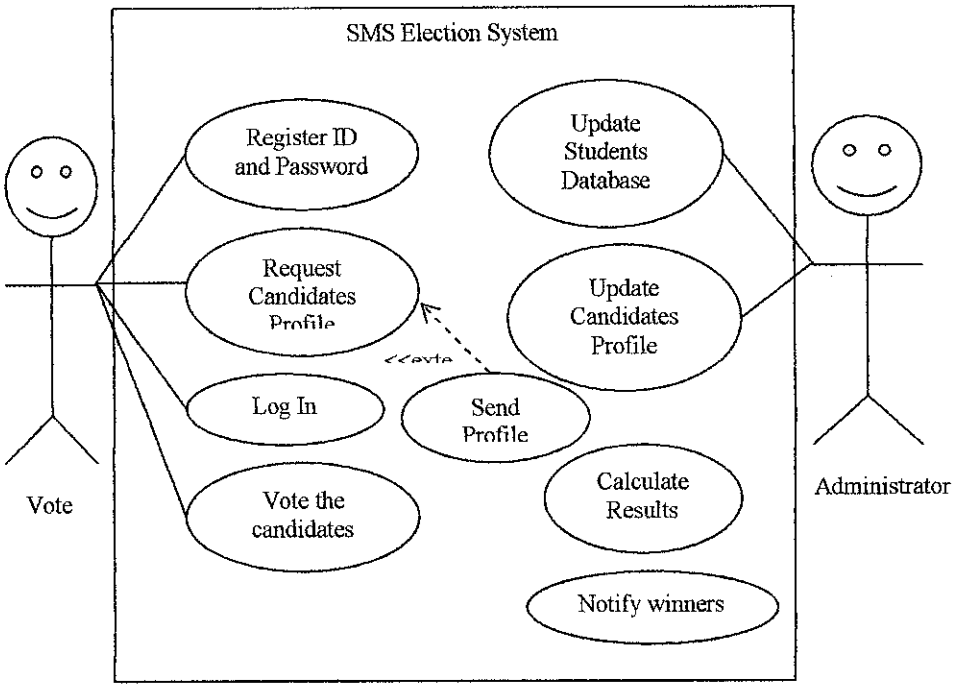


Figure 3.3: Use Case Diagram for MPPUTP Election via SMS System

i. Actors – Voter

- Register ID and Password
  - To avoid redundancy of voting.
- Request Candidates Profile
  - Students can request to view Candidates' profiles.
- Log In
  - Students need to be identified in order to vote.
- Vote the candidates
  - Students will vote for General Constitution and Program Constitution.
  - Students can only vote once.

ii. Actor – Administrator

- Update students' database
  - When the students register and log in, their information will be included in the existing database.
- Update candidates' profile
  - To ensure the students receive the correct information.

iii. System

- Send Profile
  - Profiles will be sent to students upon any request.
- Calculate results
  - After the election is completed, administrator calculates the results.
- Notify the winners
  - Students will receive notifications of the winning candidates.

3.3.3.2 Flow Chart Analysis

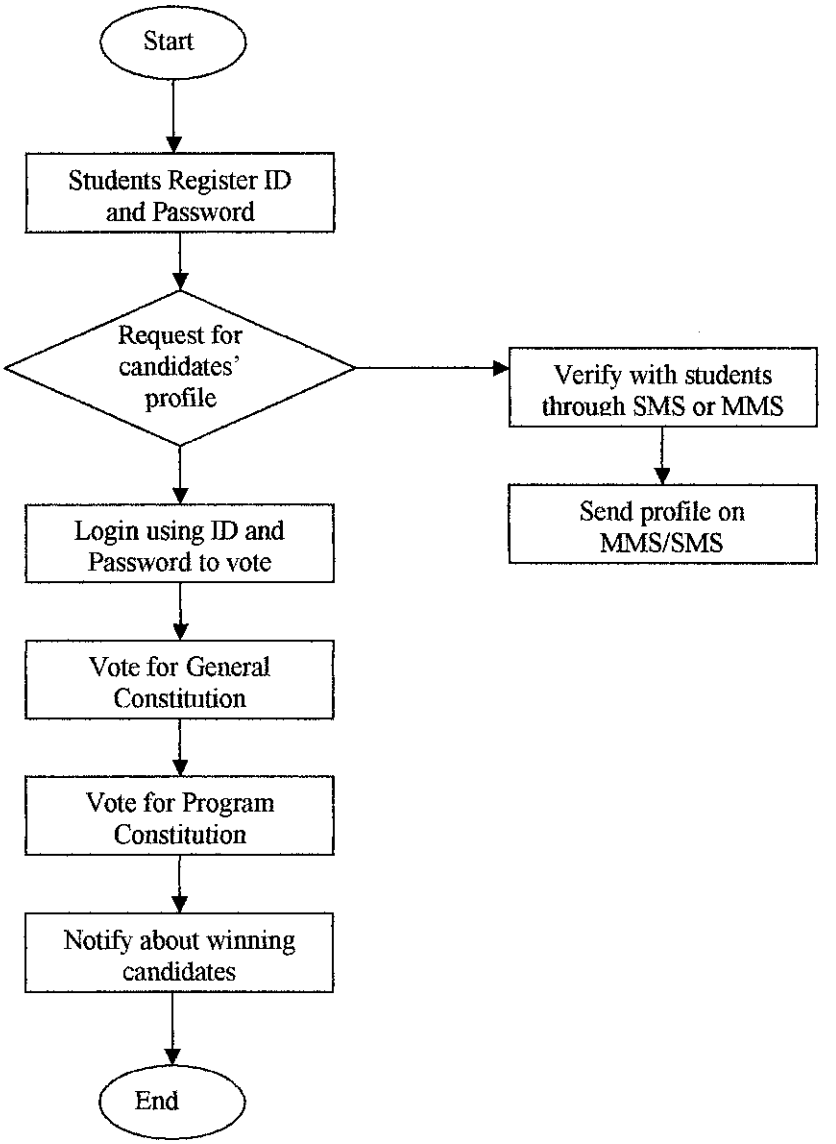


Figure 3.4: Flow Chart Diagram for MPPUTP Election via SMS System

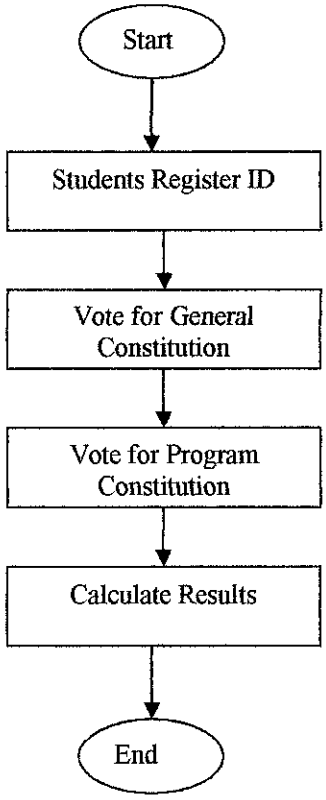


Figure 3.5: Flow Diagram for Manual Election System

Flow Chart Diagrams in Figure 3.4 and Figure 3.5 meant to compare both major system application for MPPUTP which are the manual way of voting and the proposed SMS election system. From Figure 3.5, the process of manual voting has been listed where the voter need to register at the voting counter before they can vote. After all voters have voted and the time limit has reached, the management and administrator will calculate the votes manually.

However from Figure 3.4 it is totally different for the voters who use the SMS system to vote. By using the system, the voters will begin by registering their IDs and Passwords. The students can request for profiles of candidates. After they have logged in to the system, they can vote for both General and Program constituency for once. After the voting session is done, the students will be notified of the winning candidates.

3.3.4 Implementation

Implementation phase involves with programming codes. Any design issue will affect coding phase if it is not ensured that the coding phase started prematurely, hence the codes has to be rewritten. Selection of type of programming language is also very important as to avoid wasting time.

This phase requires the most time to spend to construct the working prototype. It starts with creating the database for the SMS Election system that will contain the information of all students. Microsoft Access will be used to store the database while C++ programming language will be used to construct the system. C++ is used because it is simple and easy to code.

3.3.5 Deployment

The deployment phase of the system is where the system is released to the user. User can provide feedback that will help refining the next release until it matches exactly or close to meet their expectation.

3.3.6 Testing

Testing is crucial to any successful project. The purpose of this approach is to ensure that each release is as bug-free as possible. In this scenario, UTP students that had experience on the voting process and the students that will undergo the voting process will be the suitable tester to the system.

There are 4 basic testing:

i. Unit Testing

- Done regularly to ensure the portion of coding running correctly and to ensure that the function meets the objective.

ii. Integration testing

- To ensure that the application runs smoothly

iii. System Testing

- This testing encompasses the entire system

iv. Acceptance Testing

- The users (UTP students) perform this testing to ensure that the end-product meets their requirements and expectation.

3.3.7 Evaluation

Evaluation is the process to decide if the system has already operated based on its purposes and function. If the system does not meet the expectation, the whole process will start again.

3.4 TOOLS

HARDWARE	SOFTWARE
Ppersonal Computer	Microsoft Studio (for C++)
Handphone that can be connect to PC	Microsoft Access (for Database)
	Ozeki SMS Server (Gateway)

Table 3.6: List of Hardware and Software

CHAPTER 4

RESULTS AND DISCUSSION

4.1 USER REQUIREMENT ANALYSIS

To collect information in order to assist the implementation of the system, 100 questionnaires were distributed all over the campus to all kinds of students from all ages and both local and international students. From the survey, the result gained is shown in discussion below.

4.1.1 What service provider are you using?

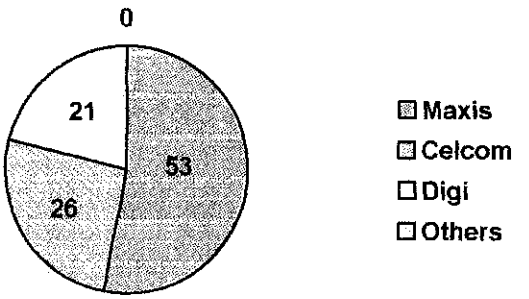


Figure 4.0: Results for Service Provider

From the results, it is shown that Maxis is the most popular service provider among the students. This indicate that if we use Maxis as the service provider for the server, more

students will consider to vote since it will cost them less comparing to send SMS to other service provider.

4.1.2 How often do you use SMS?

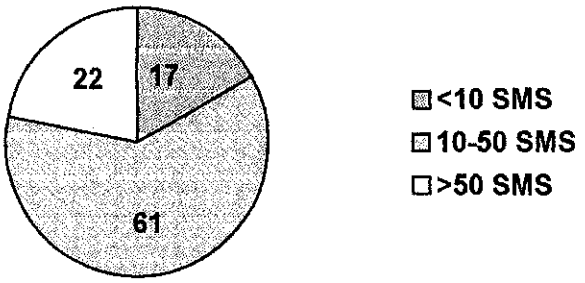


Figure 4.1: Results for Frequency of SMS Usage

From the results, it is shown that majority are using the SMS averagely per day. This specifies that the students are well educated to use SMS and most of them use it as main communication medium.

4.1.3 Did you vote for MPPUTP last year?

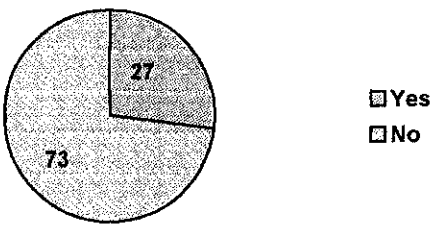


Figure 4.2: Results for Previous MPPUTP Voting

From the reasoning column that we provide, most of the students said that the election process is complicated and tiring. Apart from that, some students said that they did not know that there was Election going on. Very small amount of students said they are new to the campus.

4.1.4 What is your opinion on the current voting system?

Most of the students said that the current voting system needs improvement. This is because how the voting process will be held will affect the number of voters turn out. A few students suggested that online voting system should be held together with SMS voting system. A few students have no problems with the current voting system as it is very safe and confidential.

4.1.5 If MPPUTP election via SMS is implemented, will you vote?

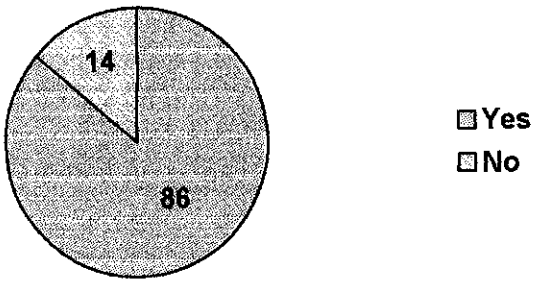


Figure 4.3: Results for Voting via SMS

Students that pick to not vote using SMS said that they refuse to vote since it is costly. They prefer the traditional way because it is free.

4.2 SYSTEM PROTOTYPE

Due to time constraint and limitation of skills and knowledge, the writer have only managed to develop the prototype of the system. Figure 4.4 describes the first step which is log in. Students will send their Student ID as log in ID and 8 last digits of their IC number as the password.

Figure 4.4: Login Page

If they enter the correct password and log in ID, an SMS will be sent to confirm their login and will ask for their choice as shown in Figure 4.5.

Figure 4.5: Students Logged in

If they have sent the wrong password or login ID, an SMS will be sent to notify the failure to log in (Figure 4.6).

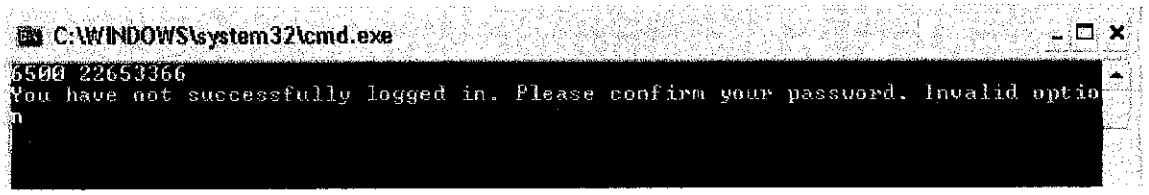


Figure 4.6: Log in failure notice

After the student has successfully logged in, they can choose from the option given whether to view profile of candidates, to vote, or to retrieve results after the election. Please refer Figure 4.5.

If the student chose to view the profile of candidates, they have to send 1 and an SMS will be sent to ask if they would like to view the profile of General Constituency Candidates or Program Constituency Candidates as shown in Figure 4.7.

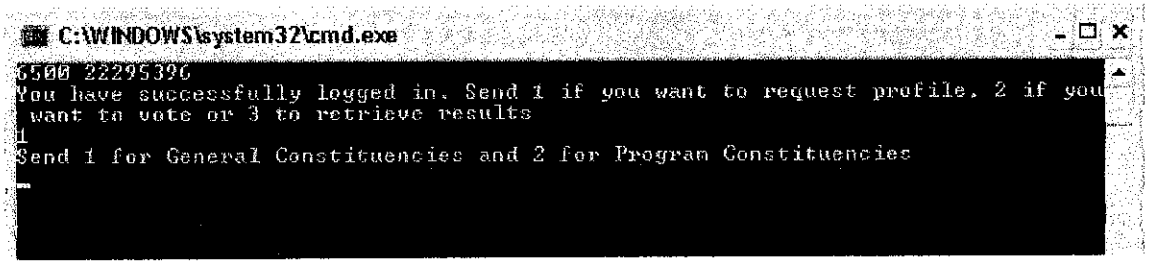


Figure 4.7: SMS sent to verify option of viewing profile

If the student chose 1 the profile for General Constituency Candidates will be sent (Figure 4.8) while profile for Program Constituency Candidates will be sent if the chose option 2 (Figure 4.9).

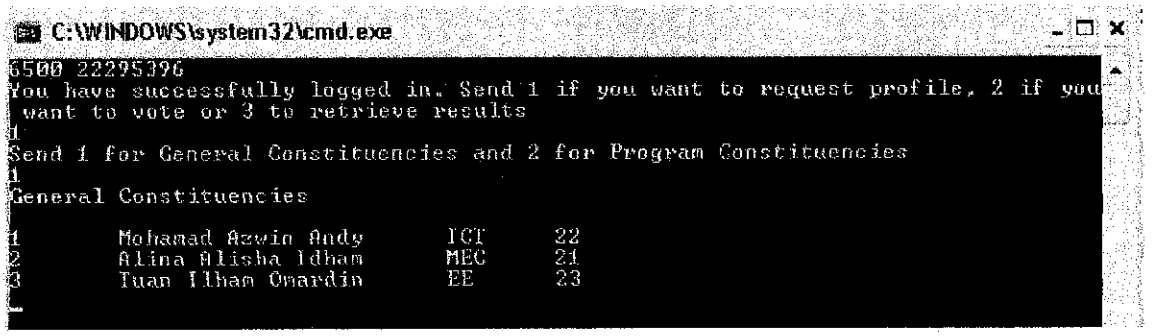


Figure 4.8: SMS containing profile for General Constituency Candidates

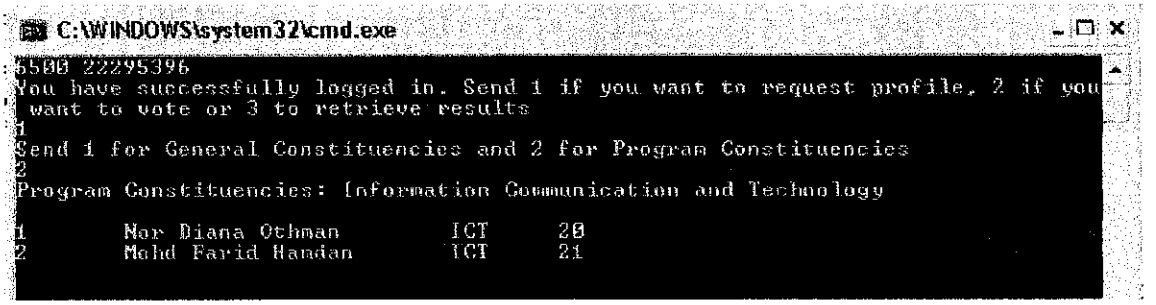


Figure 4.9: SMS containing profile for Program Constituency Candidates

Whereas if they choose to vote (during voting session only), they have to send 2 and an SMS will be sent to ask if they would like to vote for General Constituency or Program Constituency (Figure 4.10).

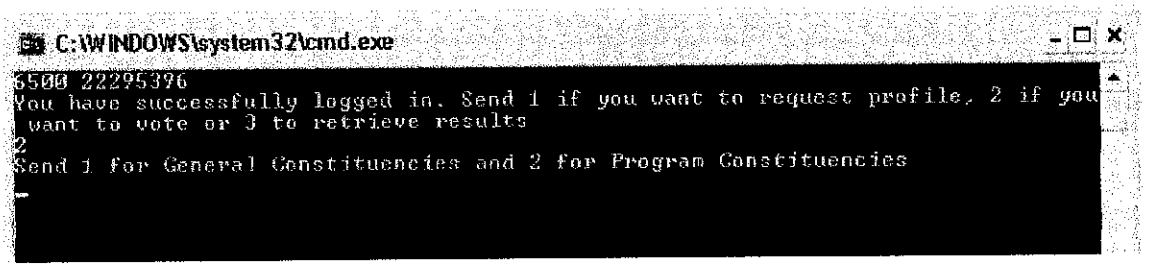


Figure 4.10: SMS sent to verify option of voting

If the student chose 1 they will be asked to vote for General Constituency Candidates (Figure 4.11) while if the student chose 2 they will be asked to vote for Program Constituency Candidates (Figure 4.12). Students will have to send the number for each candidate they would want to vote.

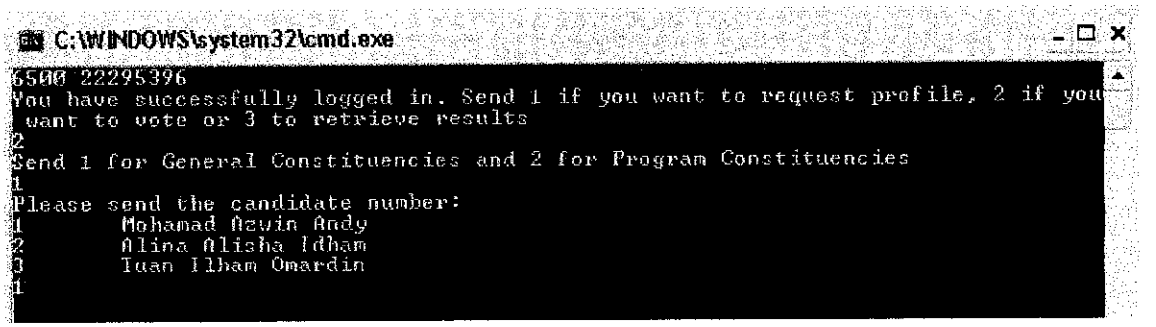


Figure 4.11: SMS to vote for General Constituency Candidates

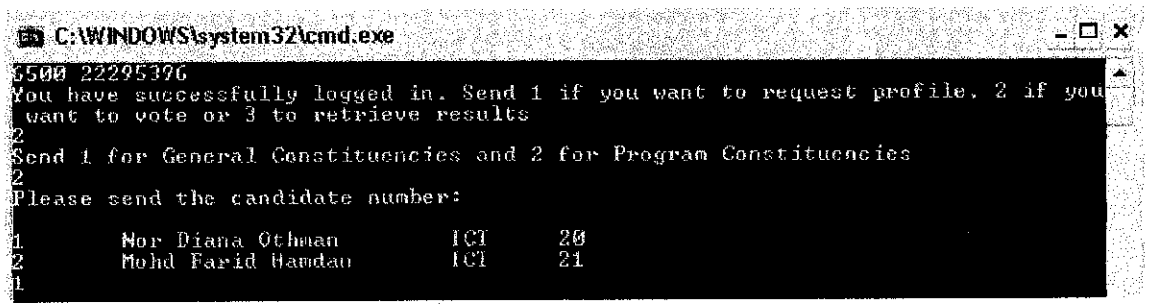


Figure 4.12: SMS to vote for Program Constituency Candidates

If the student wants to retrieve the results of the election (after the voting session), they have to send 3 and the results will be sent as shown in Figure 4.13.

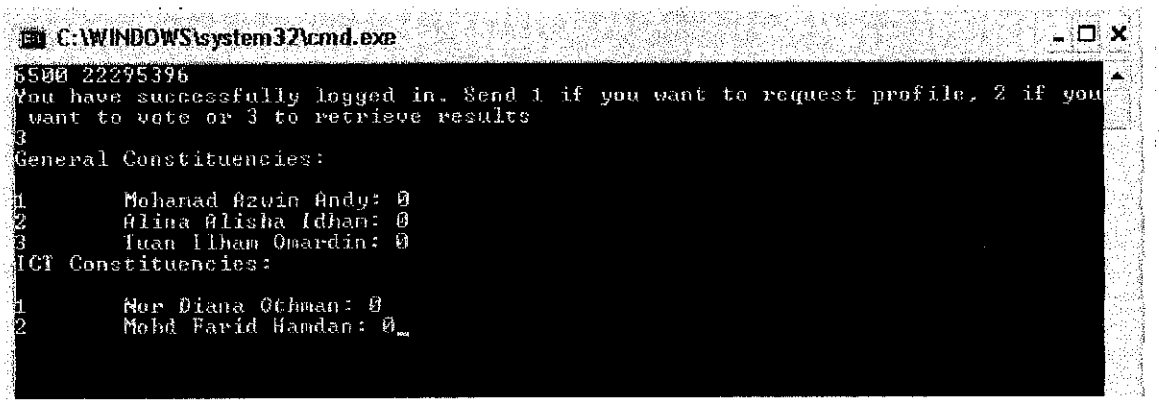


Figure 4.13: SMS of results for both constituencies.

In any case the student entered invalid number of options at any steps, an SMS will be sent to notify them of failure to proceed to the next level (Figure 4.14).

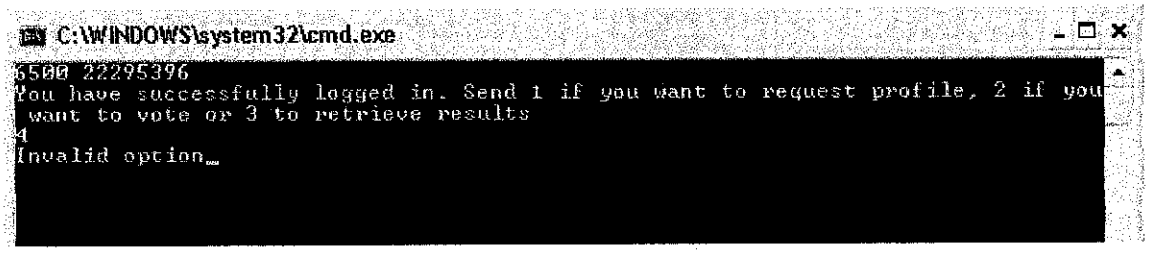


Figure 4.14: SMS for invalid option

4.3 FURTHER ENHANCEMENT

There are a few things that could be added to ensure the system will be fully working. Things that will be considered are:

- To connect the system to a database to store the data for future retrieval.
- To develop the real server for SMS using SMS Server
- To enable the function of log out to ensure data integrity.
- To enable the function for the admin to retrieve the results as election statistics.
- To enable the student to vote for only once for each constituency.

CHAPTER 5
CONCLUSION

This report has described the process and potential advantages and disadvantages of implementing the mobile voting system. Based on the research and requirements gathering for the project, it is possible that the system can be fully implemented. The system is believed to be the improvement of the current voting system.

Nevertheless, there are still a few drawbacks that have to be considered which can limit the full application of the system.

5.1 Congested Mobile Line

Since the voting will take place on a single day, it is afraid that some amount of voting at the same time will result in the line will be congested. Once the line is congested, there is possibility that the votes that students sent will not be counted.

5.2 Unavailability of Service Provider

Main problem in UTP is the difficulty to get full service from the service provider. At some places in UTP, there is no network coverage for certain service provider. This is a

big problem since the students might prefer to vote from their rooms, where the locations have no network coverage.

Another problem with the service provider is it tends to be busy on any special occasion such as National Day and Festivals. It is afraid that the Election Day will fall on a date that the service provider will be busy.

5.3 Cost for Students

In order to vote, students need to spend their own money to send SMS. One SMS can cost from RM0.10 to RM0.50. Plus if the students have no sufficient credits on their mobile phone, they cannot send SMS. It is afraid that students will use this excuse not to vote.

The development of the SMS voting for MPPUTP can be a very useful, as the system will not only ease the process of election, it will also secure the data of election and ensure data integrity. However due to a few constraints and limitations, the real system cannot be produced by writer at the meantime. There are a few concerns that must be taken into consideration in developing the real system including cost and time.

However the writer will proceed with researches to assist the process of developing the real system. In further research, possible ways of solutions will be found in order to outcome the drawbacks that might limit the full implementation of system. Somehow from the current feedback and response, the implementation of the system is possible.

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APPENDICES

APPENDIX A: QUESTIONNAIRES

Questionnaires – MPPUTP Election via SMS

This survey meant to assist in a project of implementing new voting system for the MPPUTP via SMS.

1. What service provider are you using?
   - ☐ Maxis
   - ☐ Celcom
   - ☐ Digi
   - ☐ Other – Please state (_____)

2. How often do you use SMS?
   - ☐ <10 SMS per day
   - ☐ 10-50 SMS per day
   - ☐ >50 SMS per day

3. Did you vote for MPPUTP last year?
   - ☐ Yes
   - ☐ No – Please state why

   _____

4. What is your opinion on the current voting system?

   _____

   _____

5. If MPPUTP election via SMS is implemented, will you vote?
   - ☐ Yes
   - ☐ No – Please state why

   _____

Thanks for your time and cooperation.

APPENDIX B: GANTT CHART.