

**Telecomm Subscriber Management System
(TSMS)**

By

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12265

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the requirements for the
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CERTIFICATION OF APPROVAL

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Approved by,

.....

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TRONOH, PERAK

May 2013

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.

.....

(CHIMA ISMAEL HASSAN)

Abstract

In the current fast growing rate of mobile phone users, Telecomm Subscriber Management System (TSMS) leads to a good management of subscribers' number by indicating the most current status of a subscriber number in telecommunication world. It helps to improve the management of subscriber numbers efficiently and also it helps to increase the revenue generated event (RGE) by the subscriber where lies the goals and objectives of any mobile telecommunication operators. This work is an automation of manual processes whereby we validate data first to ensure that there is no redundant data then we proceed to the subscriber classification. In Parallel there are several concerns that this project will provide an efficient improvement of subscriber number management that helps the telecommunication company to make significant profit in order to ensure its success in the market. There are problems are : inefficient subscriber's number management which is leading to difficulties in identifying subscriber number's status as well difficulties to clarify the usage of the block that have owned the company. There are several research papers that have been discussed about this. This work is a significant enhancement of resealed methods procedures of the researches and studies done previously. The implementation of this system will help the company in keeping the database updated, will reduce missing data and data redundancy as well as data inconsistency and unreliable data in the database as well as it has great advantages in their profit margin improvement.

Index Terms ---- Subscriber Status – Subscriber – Management – Classification & Validation

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Chapter 1

Introduction

1 Background of study

1.1 The project

Managing subscriber number's status is a rigorous issue that is needed to be considered because mobile subscriber rate is increasing from day to day. This management System is a web based application that is designed and developed for telecommunication companies. The application will help user to locate every mobile phone number's status by classifying them by their statuses and validating them to avoid redundant numbers. A good management of subscriber numbers will lead the company to gain competitive advantage and also will develop a significant cost saving as in [4], this application helps users to manage well numbers, and also it categorizes numbers based on their current status. In addition subscriber number is the second core product of telecommunication companies, because also their related products are sold only through subscriber number for example : Value added services, broadband, ringtone product ect , thus is the vital key of any telecommunication company.

Since telecommunication companies are not free when they are willing to open a new range of number, this system will help them to get a clear break down details of the usage of mobile numbers where it facilitates to the convince the third party at a real time. Also managing all subscriber numbers in a single and centralized system is more efficiently than managing them in different since the current strategy the subscriber numbers are being managed into different systems (post-paid & pre-paid system).

In any mobile telecommunication industry the number of subscribers is increasing every day; therefore managing numbers (subscribers) efficiently is a vital key of any mobile operator company. Since the mobile telephony market is one of the fastest growing service segment in telecommunication, and more than 75 % of all potential calls worldwide can be made through mobile and as with the any other competitive markets, the mode of competition has shifted from acquisition to retention subscriber [3]. Regarding this work we have two stages that are

validation and classification stage. In the validation part we have to retrieve data from the prepaid server and the post paid server; store data into the database then retrieve data from the Home located register server in order to validate the status of the subscriber and subscriber is registered only once. Then we start with the subscriber classification where we have to locate subscribers in their most current status.

The main issue of this work is increasing company income (revenue) and the clarification of usage of subscriber number to the regulatory. Any company must be able to explain how every subscriber number is managed in order to get a new range of numbers. With this application tasks are done automatically and result is given at real time. The usage of subscriber number is based on the life cycle of subscriber number; this life cycle is containing all the possible status that a subscriber number might be in.

With time constraint and employees have many tasks to handle at the same time; this system would be a relief. This system will help the company to manage its subscriber numbers efficiently and at a real time. User will also need to give input about the subscriber number's status then the system will display the required output requested. The system will also display the amount of the subscriber number with the current and exact status and an informative or warning message can tell the user if there is no information based on the request. The goal of this management system is to provide the exact status of all the possible subscriber numbers that been created and to manage them effectively. In this project the most important areas to be studied are: **Data model and Web application**

1. a Data model

A data model is defined as: "A data model in software engineering is an abstract model that describes how data are represented and accessed; also it is used as a strategic plan for applications development on how data is stored and how it is accessed." [12]

A centralized data model is proposed here because mobile telecommunication operators store their data in different systems and they are accessible only to a certain number of workers. Since not all employees have access to those systems thus makes real time result very difficult.

1.b Web application

Nowadays web application is more preferable to organization due to its availability and scalability. The introduction of web based application given more options for companies to choose the tools to develop the system in their organization. Also organizations do not need to spend much and waste time in moving from one place to another.

“A web application is a client-server application that (generally) uses the Web browser as its client”[12]. When an interactive and user friendly web base application, users will use the system more and intend to optimize their time and thus will maximize the efficiency of their productivity.

1.2 Problem statement

As in any organizations, a mobile telecomm operator deals with a large data size into the database. Data is stored into different system and thus might cause data redundancy of status and inefficient management of subscriber management. Some subscriber numbers do not have a unique status where is no consistency of the data. Since the status of subscriber numbers are not consistent that causes an invalid and weak data. The problems that have been identified in this project are:

- Difficulties in identifying the exact status of subscribers at real time.
- Inefficient Subscriber number management.
- Difficulties to clarify the break down details which is required by the regulatory office.

1.2.1 Difficulties in identifying the exact status of subscribers at real time

In mobile operator company identifying the most recent status of subscriber number is the most important task to be done according to procedures. Subscriber numbers' status must be identified at any time needed and result must be obtained at a real time. Since data is stored differently is difficult to determine the status of the numbers an operator owns at any point in time.

1.2.2 Inefficient Subscriber number management

Data is stored in different systems, same subscriber number might be public or a case of fraud can occur when disloyal employee sells reserved subscriber numbers to Very important customers at a high price without official authorization.

1.2.3 Difficulties to clarify the break down details which is required by the regulatory office.

Solution: A centralized database should be implemented; all data will be retrieved from the different databases and give authorization to employees that need this information in order to perform their task efficiently.

1.3 Significance of the project

This project is aimed to provide a centralized database management to the mobile operator company. By sitting up a management application and providing result at a real time and managing efficiently subscribers' numbers that would a relief for the company and helps the company to plan better for sales activities and optimize its productivity. By the end of this project users can download the specific status that is most needed for related tasks.

1.4 Objectives

In order to reduce errors, risk, and deployment time, automate number management process, and monitor subscriber number's blocks using a centralized database to save time and minimize potential errors.

- To propose a system that classifies and Validates telecomm subscriber numbers by considering the most current status.
- To propose a system architecture to optimize subscribers numbers management and to lead to a good management and a positive usage clarification

1.5 Scope of study

Focus on master subscriber numbers management flow and specification for a system.

- To master subscriber number management flow & specification for a system.
- To study the effectiveness of Subscriber number management.
- To study a suitable software to develop the system.
- Using Xampp for interface development
- Using MySQL for the Database

1.6 Relevancy of the project

The project is relevant because:

A- Provide a centralize database

A centralized database will help the organization to focus on the system where data is stored and identifying the inconsistency of data on time. There will be no need for sending a job request in order to know the status of subscriber's number as well as no need to wait for days in order to get the requested data. Besides users can download the data that is need for related work.

B- Reduce inconsistency of data

By sitting procedures and subscriber's number as primary, this will reduce inconsistency rate, and will help the company to an effective success as well the employees in their daily working life.

C- Encourage a better working environment

The system will employees' work, reduce time wasted and thus will motivate employees in performing their tasks and responsibilities. While dealing with such system, employees will have a greater inspiration of their career.

1.7 Product Solution

To solve this problem, we have come out with an innovation of Telecomm Subscriber Management System (TSMS). Users who wish to know the total number and exact status of any of their subscriber number that they are managing, the system should be able to locate the current status of subscriber number at real time. In this case where information is not found based the request the system will generate a warning message which does inform the user to review its input.

1.8 Benefit of the system

The system is bundled of benefits for Telecommunication Company; users can optimize their subscriber number management and it will lead to a good management and a positive clarification. Not to forget in gaining the market as well competitive advantages since subscriber number the vital key of the telecommunication business. Therefore below are some benefits of the system.

- To help the company to become more predictable in procurement & sales activities.
- To help the company to convince the regulatory office by a very clear clarifications of the usage of numbers (subscribers).

1.9 Project feasibility

1.9.1 Final year project one

In final year project one, the process was more focused on choosing and proposing a project topic, data gathering, identifying requirements for the system. Then design methodology and analyzing problems and finding solutions. After that system design is produced to ensure the model design is the expected one. The mentioned process is done in eleven weeks of May 20012 semesters. Please refer to Appendix A.

Chapter 2

Literature Review

2.1 Introduction

The current chapter consists of three individual sections, the first section is introducing Customer Churn prediction model and its basic compete and related work about data mining, the section tow is an introductory of Classification modeling and database activation and ultimately the third section is concerning this existing research regarding Telecomm Subscriber Management System in Telecommunication Company. Although the aim of this studies is on managing telecomm subscriber number but this part has had a look into several different angles and their literature review.

2.2 Related work

❖ Customer Churn prediction

Customer Churn prediction model has been accepted in 12 September 2011, it is focusing on identifying customer most likely to churn because of its crucial importance and it is establishing the higher revenue with a margin that attracting new customer. Mostly it is focusing on existing customer by maintaining them then attracting new customer, consequently, investments for retention strategies have a higher net return than for acquisitions. So, this work support that companies first spend their marketing resources to keep existing customers rather than to attract new ones. This is very for all mobile telephone business since the management of customer number is their prime concern. Therefore this work is particularly acute in the strongly competitive and now broadly liberalized mobile telecommunications industry [6]. However according to [1] Customer Churn prediction system has some disadvantages. The usage of customer demographics in churn prediction renders the resulting churn analysis at the customer. First, use of customer demographics in churn prediction renders the resulting churn analysis at the customer. In this concern, customer-level-based churn prediction is considered inappropriate. Second, information on some of the input variables employed by existing churn-prediction systems frequently is not readily available. Considering the case of Telecommunication Company the information of customer demographic is very limited and does show the inefficiency of the existing customer prediction system.

Data mining refers to a process of extracting or retrieving information from large database, mainly focusing on classification model and it has widely adopted classification techniques include decision tree induction, decision rule induction, and neural network. Clustering analysis is a process whereby a set of instances refer to the figure.

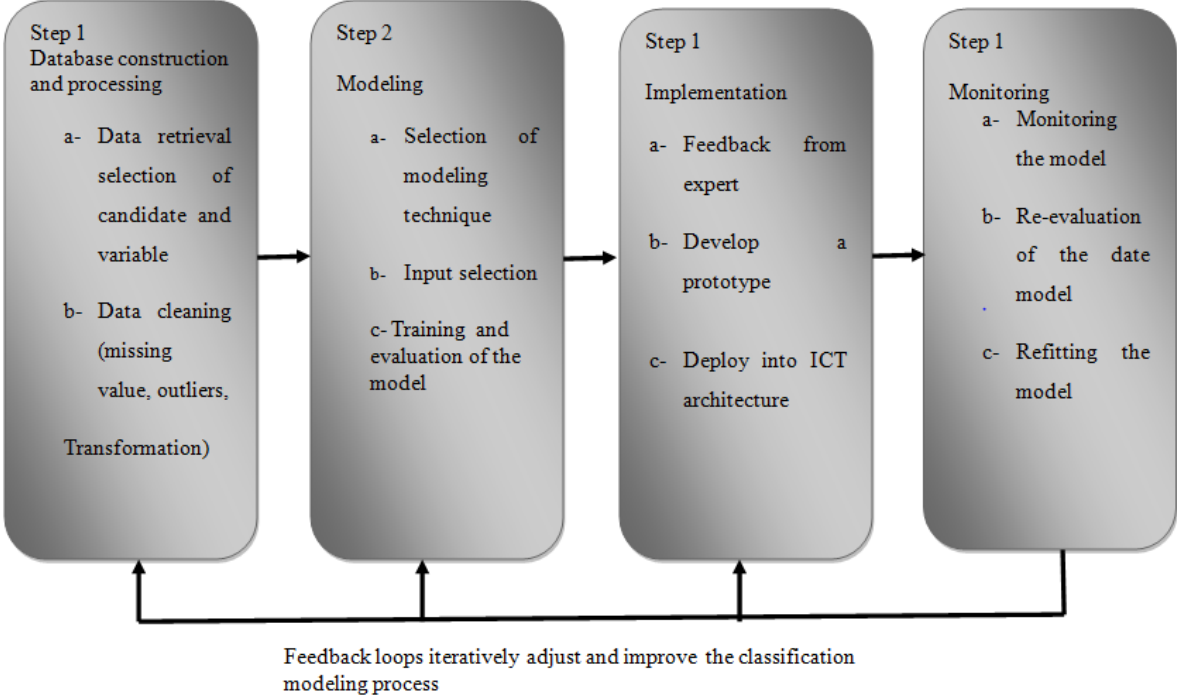


Figure 1 : Average profit per customer using maximum profit (dotted line), lift (dashed line), and AUC [12]

Therefore one can conclude the role of data mining in Customer Churn prediction model is very fundamental and critical, since it enables the company to transform the subscriber data which is the company asset into very useful information and use this information to identify valuable subscriber to increase the company’s profits. Therefore Data mining can be considered as business driven process that aims to discover and consistent use of valuable information from the organization data [11].

➤ Classification modeling & database activation

- Dynamic customer classification with imbalanced class distribution system is widely used in Customer relationship management where it is a very important for issue in any marketing business. By classifying database record into different well defined classes. In order to classify customers there are several traditional methods for example decision tree, logistic regression, and support vector machine respectively in [5],[6],[7] ect . In this work the distribution is assumed balance classification where the number of customer in classes is assumed more or less the same. Nevertheless in such classification balance classification is not an efficient strategy and always the class distribution is imbalanced classification.
- Based on classification modeling and customer prediction model there are several Static classifiers ensemble strategies. Here they have briefly introduced some commonly used ones in that system. Let us refer to their description of each classifier strategy.
- Majority voting (MAJ) is the most common method to combine more than one decision. It can be divided into absolute majority voting and relative majority voting. The former means that only the class label which is the output of more than half basic classifiers can become the final output label. The latter means that the class label which gets more votes than any others will become the final class label. While it has a disadvantage that all based classifiers are treated equally regardless of the characteristic of each classifier. Thus, weighted majority voting (WMAJ) is an improved version of each base classifier is assigned a weight according to its classification performance. They have applied WMAJ to listed companies' financial distress prediction and achieved satisfactory results.
- In Genetic algorithm based ensemble (GAE), a genetic algorithm maps a problem onto a set of strings. Each string represents a potential solution, which must encode $K \times M$ real-valued parameters (where N is the number of the base classifier, and M is the number of sample class). Through genetic algorithm, we need to find the optima combinational coefficients in [7].
- In neural network based ensemble (NNE) a feed-forward neural network takes the outputs of the ensemble of classifiers along with the input feature vector to try and learn

how to weight the different classifiers. These weights reflect the degree of confidence in each classifier. That is, it tries to understand and collect information that might be helpful in determining how to combine the different classification outputs to achieve a better performance.

- Random forests (RF) ([Breiman, 2001](#)) are a combination of tree classifiers such that each tree depends on the values of a random vector sampled independently and with the same distribution for all trees in the forest. The generalization error of a forest of tree classifiers depends on the strength of the individual trees in the forest and the correlation between them. RF adopts a random selection of features to split each node, and it has been demonstrated that RF can achieve very good classification performance and is robust against over-fitting. However, the standard random forests do not work well on datasets where data is extreme imbalance.
- Thus, [9] have proposed two ways to handle the imbalanced data classification problem of random forests: weighted random forests (WRF) and balanced random forests (BRF). The former method is based on cost-sensitive learning, and the latter one is based on a sampling technique. Further, in [10] have proposed improved balanced random forests (IBRF) by combining WRF and BRF. Their experimental results have shown that IBRF produces better prediction results than BRF and WRF.
- All the above are related studies and researches that have in we are relating them to our work, and then we will proposed our own model. Please refer to figure 2.

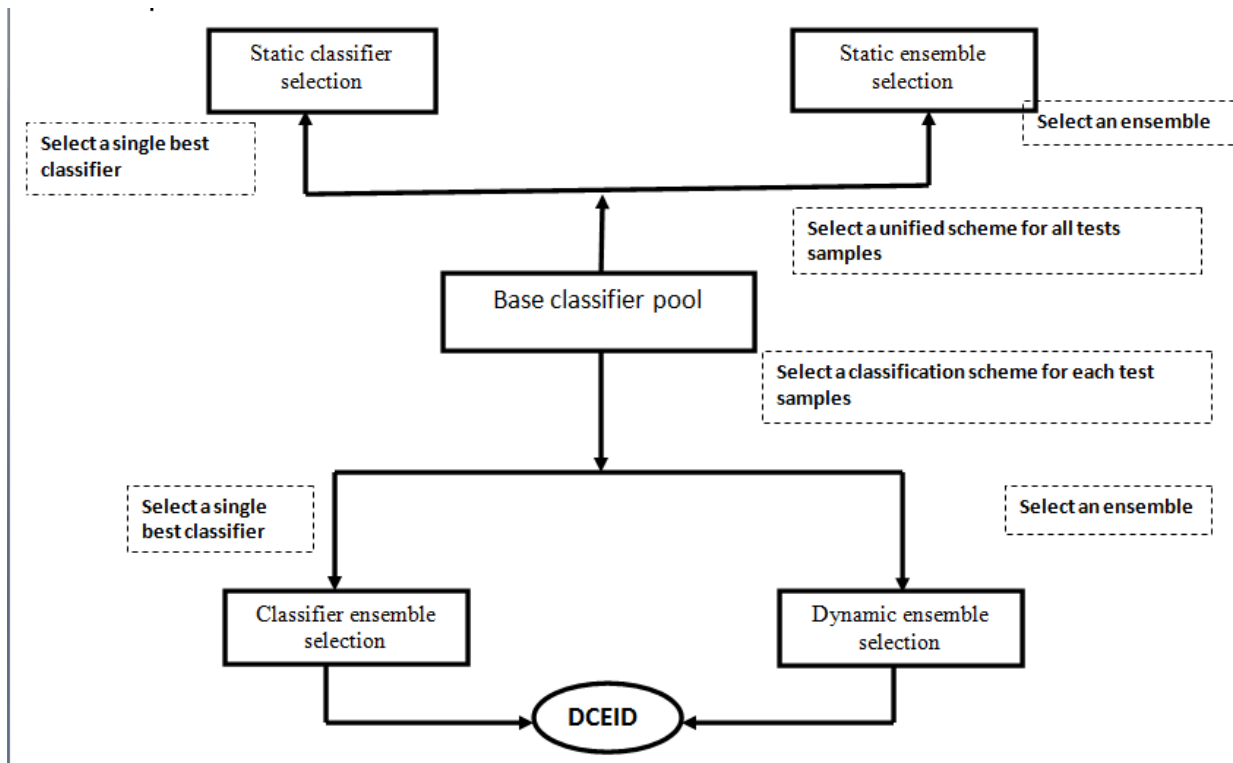


Figure 2: The composition of multiple classifier ensemble system [16]

2.3 Current Work

❖ Telecomm Subscriber Management System (TSMS)

In any mobile telecommunication industry the number of subscribers is increasing is increasing every day; therefore managing numbers (subscribers) efficiently is a vital key of any mobile operator company. In number management we have two stages that are validation and classification stage. In the validation part we have to retrieved data from the prepaid server and the post paid server; store data into the database then retrieve data from the Home located register server in order validate the status of the subscriber and subscriber is registered only once. Then we start with the subscriber classification where we have to locate subscribers in their most current status.

❖ Validation of subscriber numbers

In our work subscribers' validation is very important because in order to avoid redundant data and improve data integrity data must be validated, and this will improve the quality of the product or the application. In addition of that it helps to save space in the database where spaces are costing much in the database. Besides that, this work is improving customer value in term of service and builds a good customer relationship where we are referring to customer satisfaction as well as any company looks for.

❖ Classification of subscriber numbers

This application classifies all mobile number based on the status that they are in, by searching the subscriber number coupled with its IMSI (International Mobile Subscriber Identity) then display the results. User will obtain the result based on the task requested. Generally in the mobile communication field subscriber classification is very important and we prove this by referring to the related paper and application that in [1]. To the topic of subscriber classification there some researchers have been done on but most of them are not following the validation phase and they are referring to model building and data mining method [2]. On the top of this, this work will also avoid the case of fraud where a subscriber might register in the register server and created in the billing system in a wrong OICK id where the subscriber can call and receive calls, surfing the net without being built. So in such cases this system will strictly detect the subscriber number, also there are research papers that have been discussed concerning this in [3].

For this system imbalanced classification technique is more appropriate since we have to deal with a huge database. Since the imbalanced class distribution is characterized as having much more instances of some classes but in some cases imbalanced classifier might have some problem later on because of the huge dataset we will support this classifier technique by vector machines.

Chapter 3

Methodology

3.1 Method chosen

The methodology has been chosen in order to develop this system is waterfall model approach. I have chosen this method because all phases involved will help me to evaluate the level of my progress therefore I found it the most suitable method for this project. The important reason of choosing this model approach is it allows developer to review and correct error of previous tasks after their completion. After phases are accomplished and they are unsatisfied then developer can go back to the previous phase if there any necessary modification needs to be done.

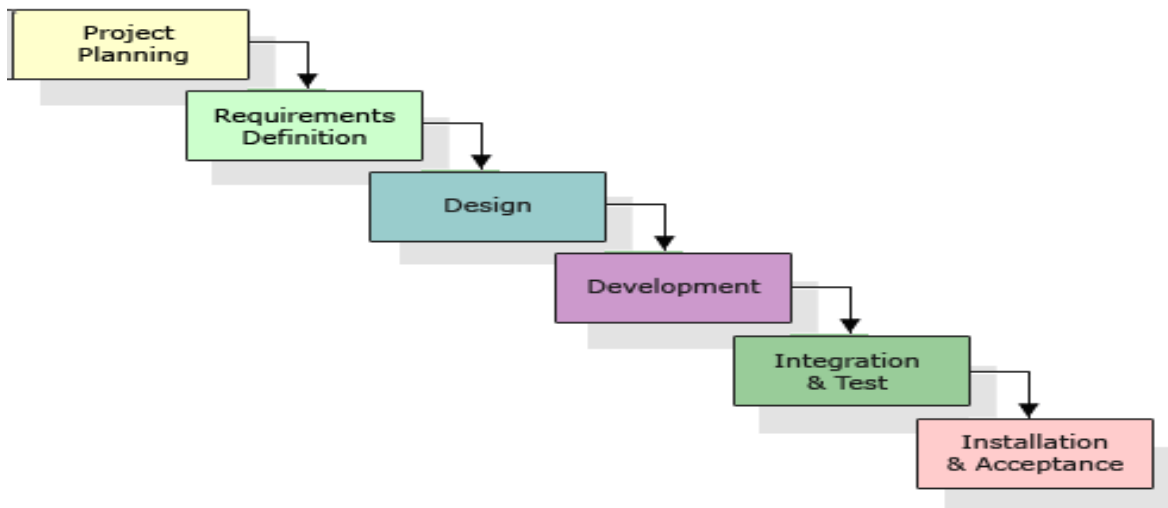


Figure 3: waterfall model approach [17]

3.1.1 Project Planning

For the first phase, the developer is required to make a project plan. This type of project plan involves activities that would be done so that the developer could cover all the job scopes of project besides achieving the objectives that have been set. In our work we choose the process model based on the nature of the application, the method, tools required to be used and the time required for delivering the product. Besides, the developer needs to collect information that is related to the project as much as possible. The purpose of gathering sufficient information is to avoid from giving wrong ones to end users. Furthermore, it is

very important for the developer to identify what kind of tools and software that would be used while developing the project as well as the methodology is clearly identified to assure a successful delivery of the project.

3.1.2 Requirements Definition

The requirement in current phase, in order to provide solution to any industry, we specification and requirement writers, software designers and software developers should understand the process strategy and improve them. Developer has to strictly satisfy the requirement phase because we must fulfill the end user expectation. In this phase is very important to gather data and understand end user needs.

3.1.3. Design

In the design phase developer can draft several designs which is consisting of functional modeling so that developer will a clear overview of the project. Then the database design and followed by the interface design and lastly the architecture design.

In addition developer will produce draft of the system architecture and the prototype of the application that will satisfy all requirement analysis. At this phase the user interface and all necessary input and process will be identified. This phase also determine the application architecture, which is going to show how to transform the logical design into basic system coding to generate the first prototype of the system. The result for this phase application interface and system design specification.

3.1.4 Integration and testing

This phase is starting right after the development phase; developer will integrate all project equipment and do some testing to verify whether the product meets the requirement specified as well as proving the efficiency and effectiveness of the project. This phase will evaluate or verify the system that was developed. This phase will have a data simulation which will simulate the true database for the system. This is to test the functionality of the system in comparing a captured data with the database. Beside, all the functionality that may cause errors or problems to the system must be specified inside this phase because, the final result

of the system is a very high priority and important. However, the testing phase will only cover to overcome the problem statement and the system objectives.

3.1.5 Installing & Acceptance

In this phase the system will be constructed, all codes are generated inside this phase. Since this application system is a real-time system in the sense that it is used to make and execute operational decisions within strictly made conditions. At the end of this phase, system should be running and most of the function for the system should be available to be used. Based on the previous phase and the prototype, the system will become the first version inside this phase, then developer will get the product acceptance if the product is up to the user's expectation and needs then and it installing and project will be in real life.

❖ Tools and techniques required

The tools required to develop the system are: PHP, Xampp server, Microsoft Access 2007, MySQL , Microsoft Words 2007 and Microsoft Project.

❖ PHP

PHP stand for PHP Hypertext Preprocessor. This language helps to make the website more flexible and more functional. PHP is the hybrid approaches to build a web application. Thus, PHP is important to run this web application.

❖ MySQL

MySQL is used as the database to store the data and perform data mining if requested by the function. It is up to developers to design the request forms; MySQL will store the data and display the data from the database to be displayed on the screen.

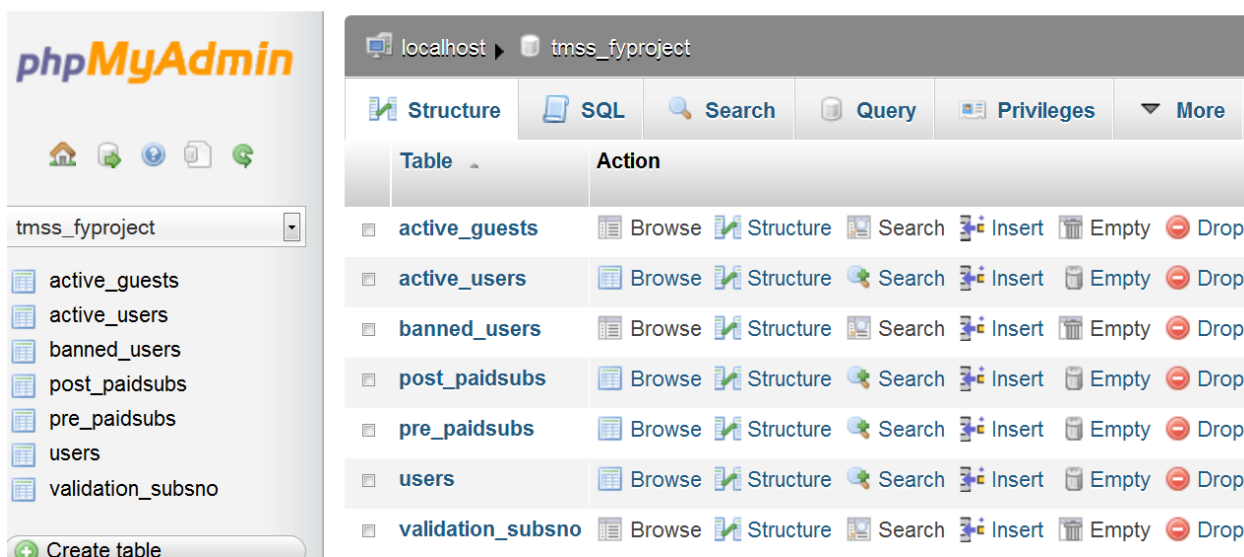


Figure 4: EasyPHP 1.7.7

This server will imitate the server used if this project is going to be implemented. This server stored the pages, the database, and enables the web pages with PHP codes to functioning. Simply building a page is will not make the function to work unless it is in a server.



Figure 5: XAMPP server Application

3.2 Data gathering

While involving on this project, there were several task done to study the need of the system in the real life. The question interviews were to ask the employee of the company to see how the system is needed and to measure it efficiency. The question interview was done by sending questionnaire to the employees, and then by analyzing the responds received this will be the results of their opinion and especially the result of this project.

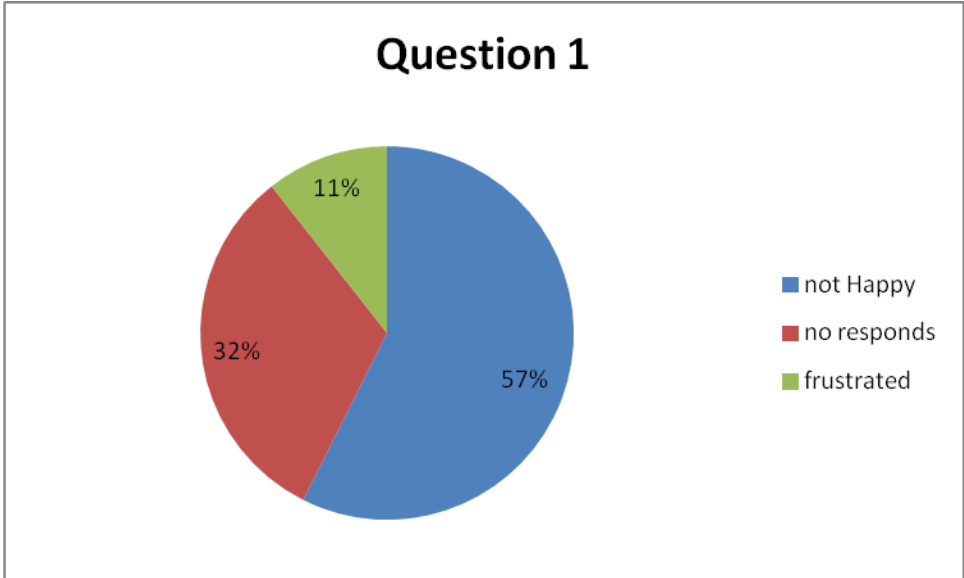
3.2.1 Data analysis

Based on the survey done to the employees of the company

The result of the finding is below:

Question 1: General opinion about the current manual situation in managing subscribers numbers.

The question requested the participants to give their opinions in the current situation in locating or looking for subscriber number status. Based on the results, 54 % are not happy with the current situation, 30 % not responded and 10 % they are frustrated by the manual process and wasted time.

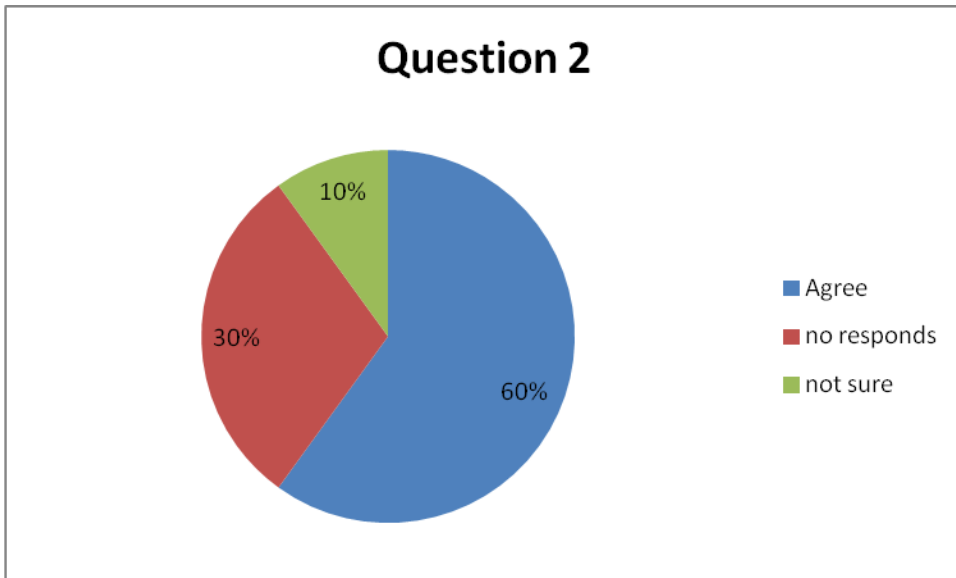


Question 2: Does telecomm number management system help the company to be sustainable?

-Yes

-NO

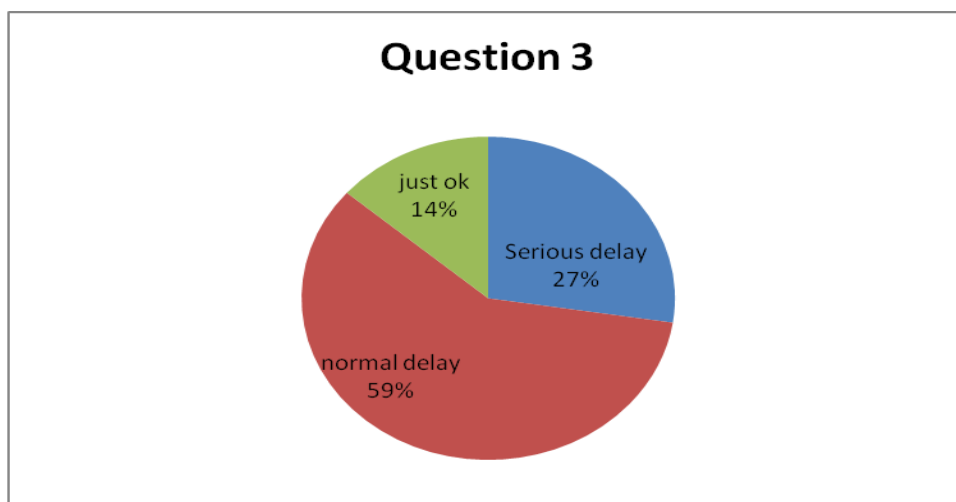
Based on the results about 60% did agree with the statement that telecomm number management system helps the company to be sustainable in managing its subscribers.



Question 3: how many percent of difficulties faced in order to know the most updated status of a subscriber number delays you from your duties?

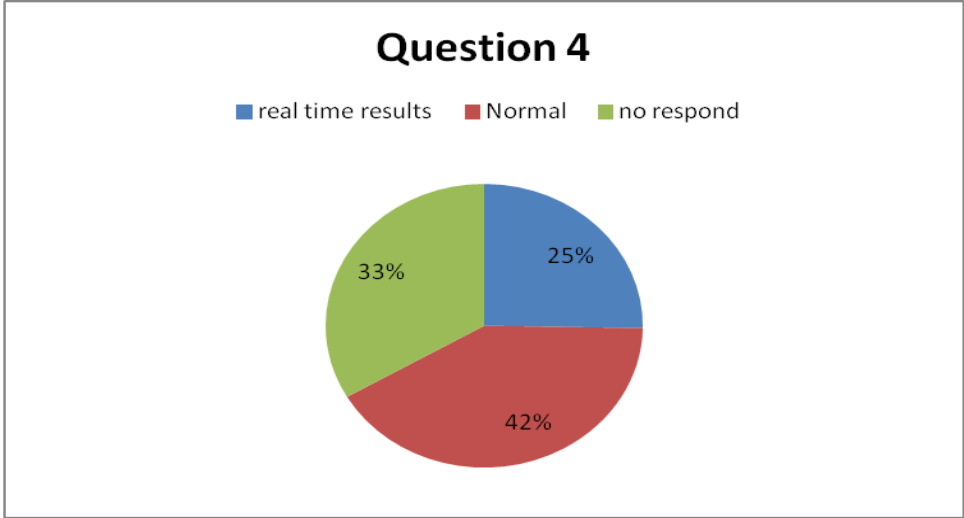
10%, 20 %, >50%,

According to the feedback received from the participants, about 30% said that delay is at 20 % affects their performance. 43 % said the delay is at 10% is affecting their daily output and rest did not respond.



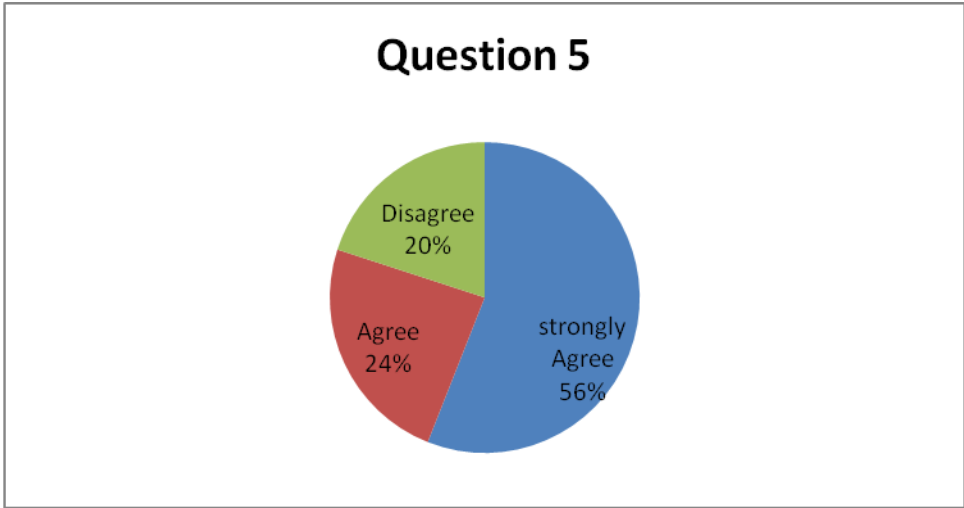
Question 4: How long does it take in order to justifying the usage of every number that has been created and the status of every Subscriber number?

According to the responds of the participants, 25 % said that no result at real time, 42% respond that is normal and rest no responds.



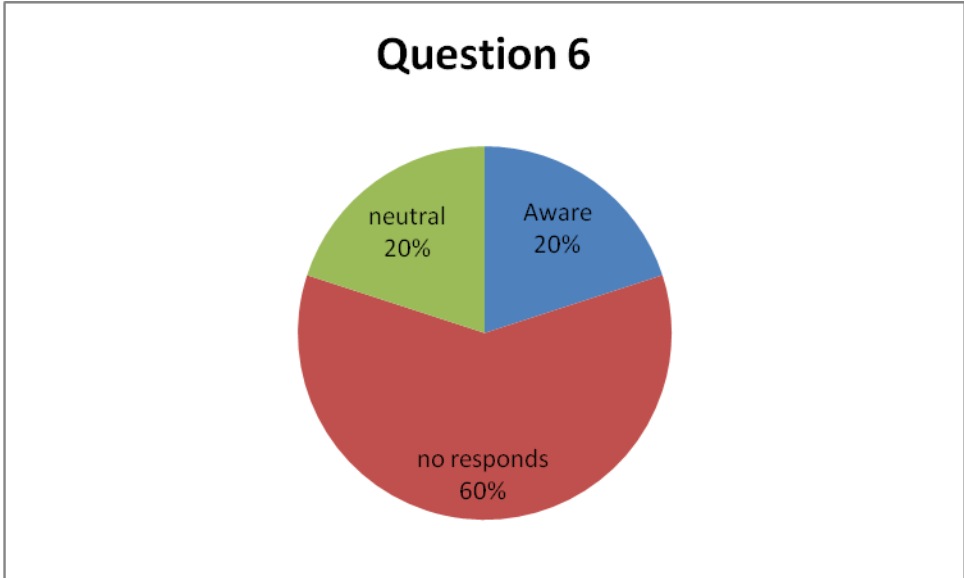
Question 5: How efficient will be if all process is automated?

Based on the question, 56% of the participants strongly agreed that an automated subscriber management system will help them in location subscriber numbers' status and also it will facilitate the clarification of the break down detail to the regulatory office. 24% agreed and 20 % disagreed.



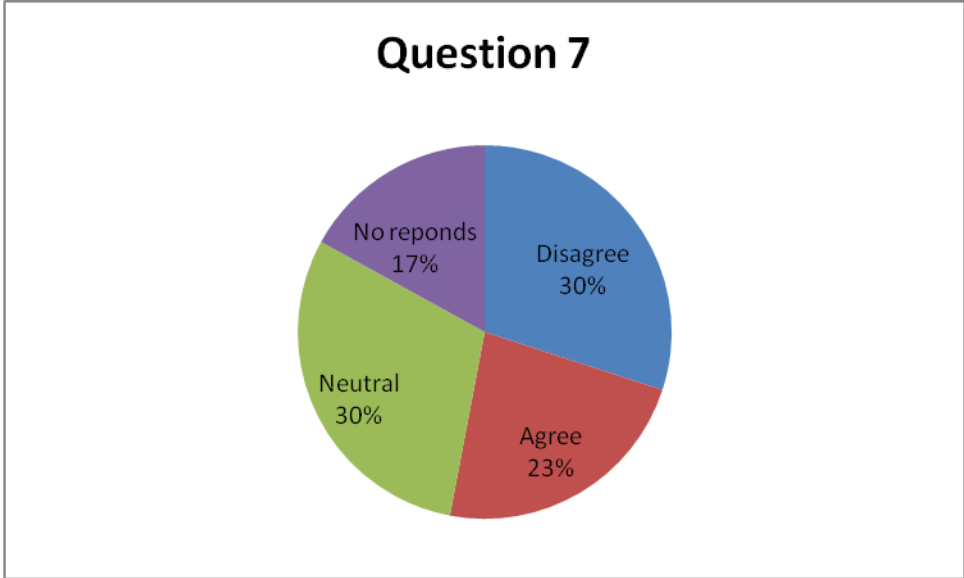
Question 6: How many percent telecomm number management systems will contribute in income of the company?

According to question N06, 20% of respondents are aware of the efficiency of the application while 60% do not respond and 20% have a neutral belief on the application's efficiency.



Question 7: Integrated and centralized database

The question asks the user about the presence of an integrated and centralized database. Some of them agree with the statement as all data are in the shared network while some do agree but at the same time they need a proper integrated and centralized database.



Almost half of the respondents agreed that telecomm Subscriber number management system would be a relief for the company, results will be gotten at real time, and the clarification of the break down details will be done without any stress. Any authorized user can check the status; download data needed with no redundant data and all up to date status.

3.3 proposed model

Based on the main rule of any telecommunication company, and by respecting the Revenue Generated Event within the allowed period (it might differ from one to another). In order to have a good management subscriber status I have proposed the diagram where is clarifying the every subscriber number's life cycle with all the possible status refer to figure4.

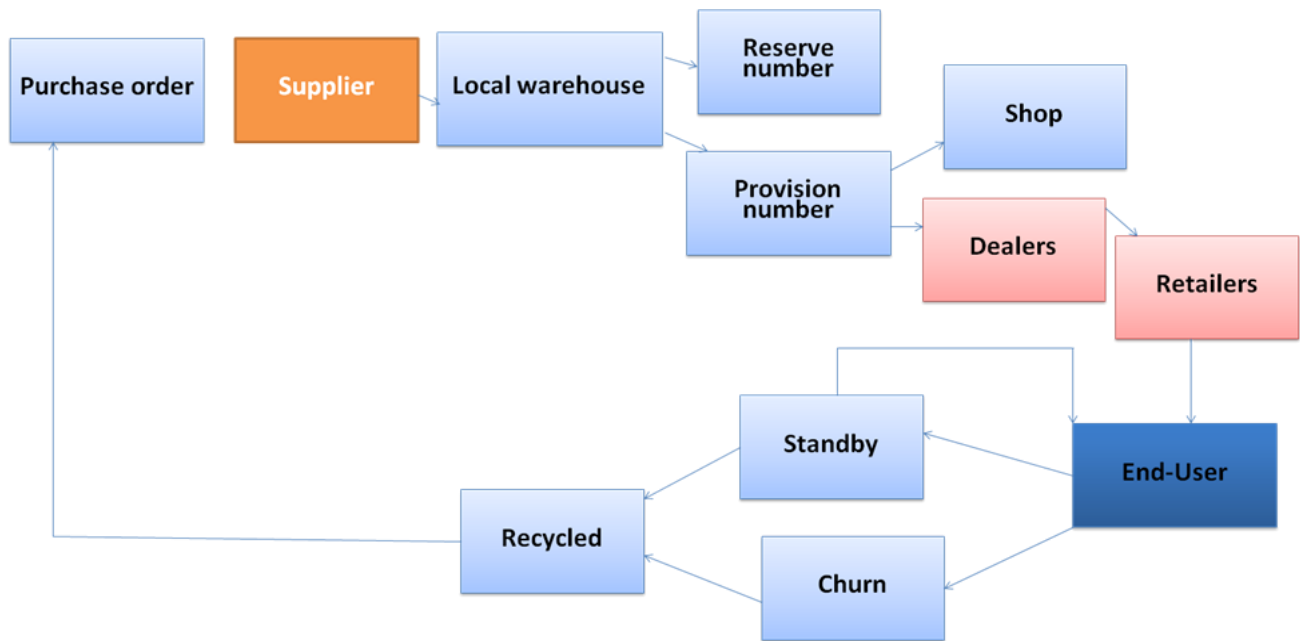


Figure 6: proposed diagram

By focusing on the above diagram we will easily define what the status of subscriber number is and where the subscriber number is exactly, therefore we need validate them and then classify each and every subscriber number. The process represented on the proposed diagram is defined as follow: All statuses are described in the coming paragh: **Install, Active, churn, Recycled, Ordered, System Reserved, staff Reserved and ordered subscriber numbers.**

1. **Install Subscriber Numbers:** All numbers that have been created (provisioned) in the system and they are ready to be sold.
2. **Active Subscriber Numbers:** All numbers generating at least one revenue event within the last 90 days.
3. **Churn Subscriber Numbers:** All numbers who did not generate any revenue within the last 90 days.
4. **Recycled Subscriber Numbers:** After X period of time, the status of churn subscribers number will change to recycled.
5. **System Reserved Subscriber Numbers:** All numbers that are kept for internal use.
6. **Staff Reserved Subs N0:** All numbers that are under purchase order sent to the supplier.
7. **Ordered Subs N0:** All numbers that are not yet provisioned.

In addition of that let us ask how data is retrieved. How it store and how loaded into the database then processed and display result to end user? Well in order to explain clearly all those question and provide efficient and possible solution let us refer to below diagram figure5.

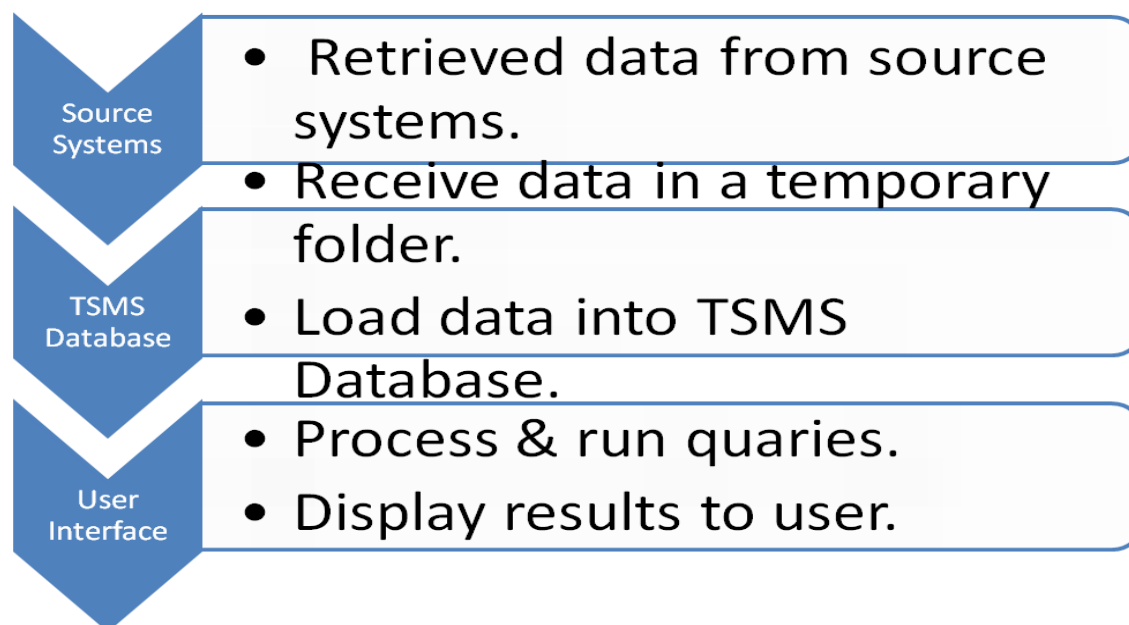


Figure 7: Data retrieval and processing

This system has to retrieve data from three different servers, where two of them are managing the prepaid and the post paid subscriber and then the third one is for validation purpose. Since subscribers are created in tow different system the probability is very high to get redundant subscriber therefore we have validate data by the third system. Regarding dependencies and data retrieval refer to figure 8.

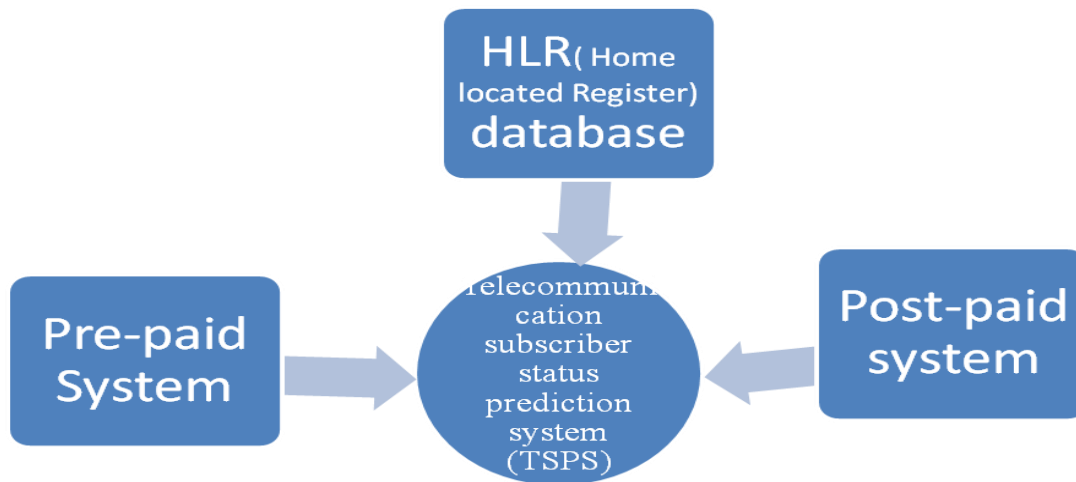


Figure 8: System dependencies and centralized database

HLR: Home Located Register, it is the main server managing all subscribers post-paid and pre-paid.

Pre-paid system: Is managing only pre-paid subscriber number

Port-paid system: Is managing only post-paid subscriber number.

3.4 System Design and development

In order to design a system, Structure must be followed to ensure the development of the application will run smoothly. There are several phases that are recommended to be followed.

- Requirement definition
- Design of the system and database
- Development or coding and implementation of the system
- Testing and evaluation
- Release the system

3.5 Database design

The database is used for the purpose of handling information as an integrated whole. It is defined as a collection of interrelated data stored with less or no redundancy to serve many users quickly and effectively. We should design a database to see how data should be organized around user requirements. The objective of the database is to make information access, easy quick, inexpensive and flexible for users. In The database design the following objectives are concerned:

- Controlled redundancy & Recovery from failure
- Accuracy and integrity
- Privacy and security
- Performance

3.5.1 UML

Use case diagram

The unified modeling language used is use case diagram. A use case is a set of scenarios that describes an interaction between a user and a system. A use case diagram displays the relationship among actors and use cases. The two main components of a use case diagram are used cases and actors. The actors in our system are System administrator and employees. The use case diagram is designed in the following figure.

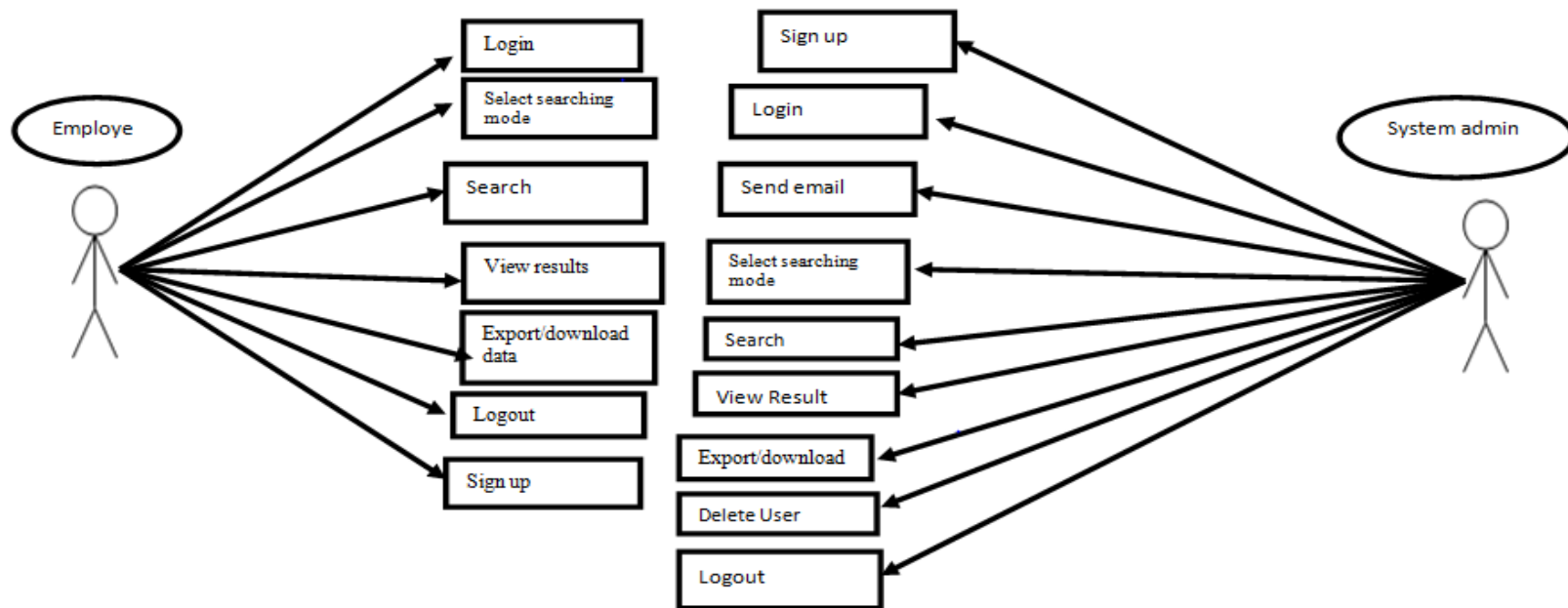


Figure 9: UML Diagram

3.5.2 Database architecture

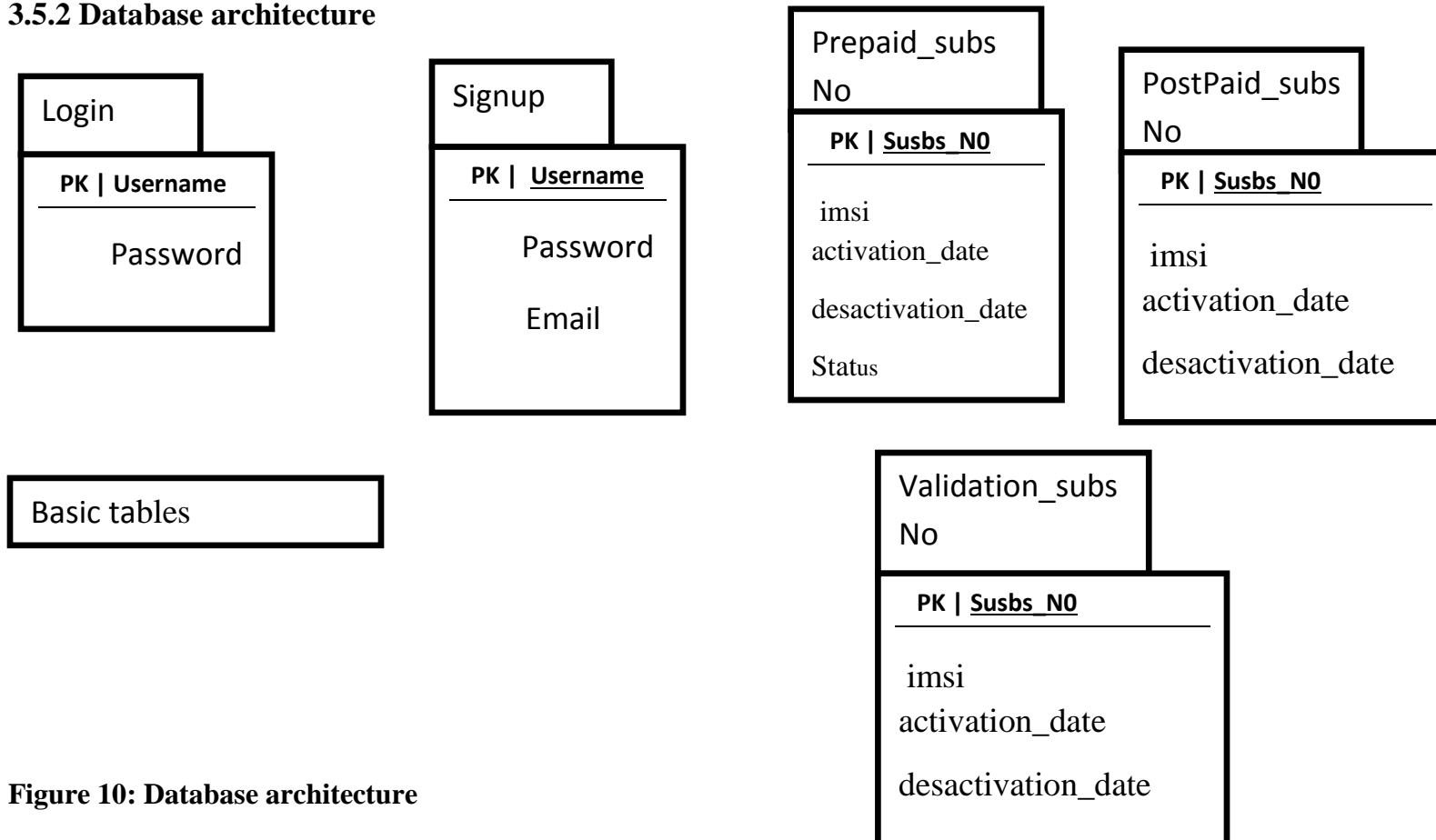


Figure 10: Database architecture

Similar to the system, the data base of the system is the map of the system. The database architecture is divided into two sections, the base table which is the login and the signup and the extension tables are tables where queries and procedures are running and communication between the database and interface.

3.5.3 System Architecture

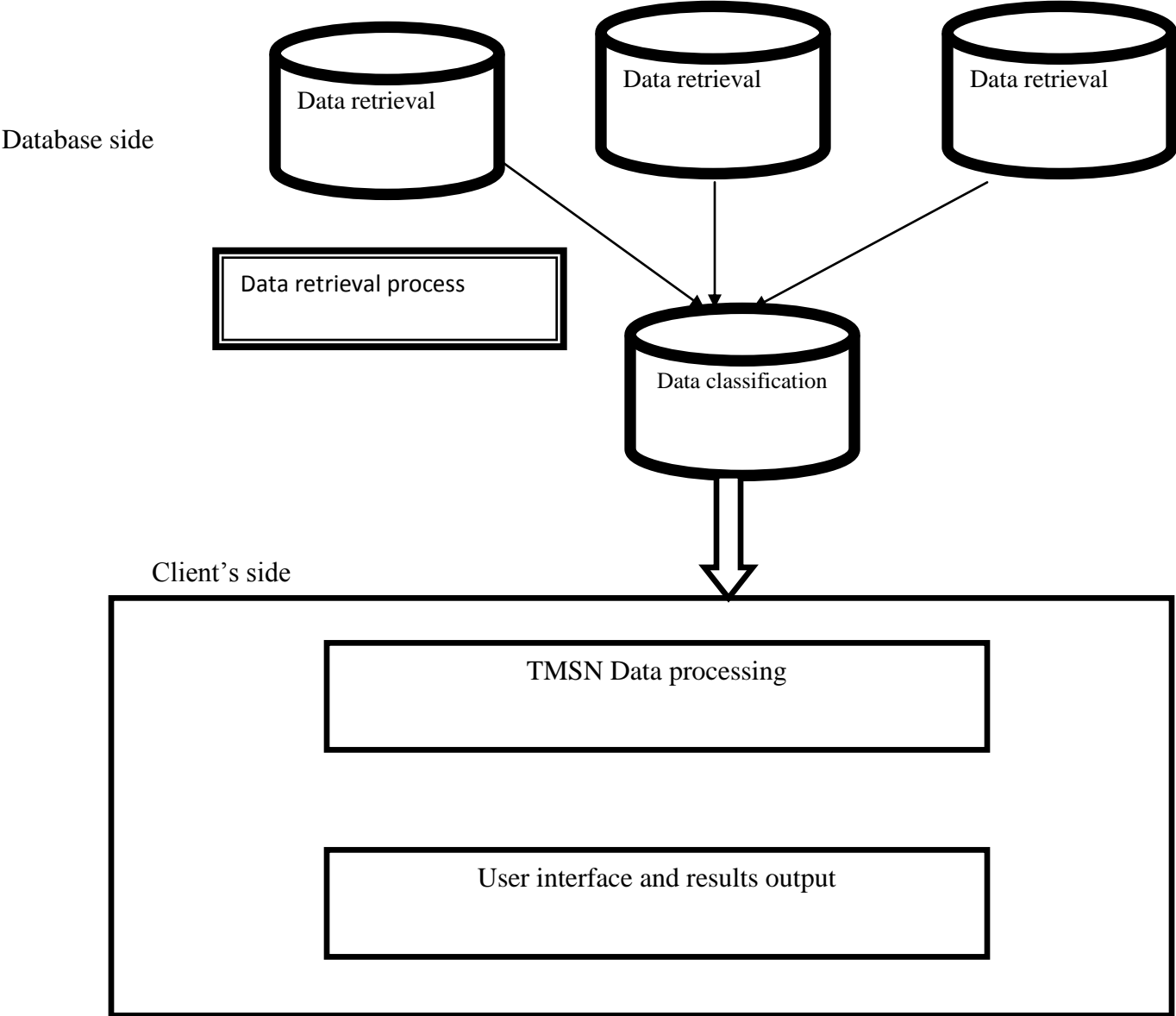


Figure 11: System Architecture

3.5.4 Implementation

HTML

side

```
<?php
$link=mysql_connect('localhost','root','') or die (mysql_error());
mysql_select_db("tmss_fyproject") or die (mysql_error());
if($_POST['value'] == 'active') {
$query = "SELECT * FROM pre_paidsubs where status='Active'";}

else if($_POST['value'] == 'churn') {
$query = "SELECT * FROM pre_paidsubs where status='Churn'";}
else
{$query = "SELECT * FROM pre_paidsubs";}

$result = mysql_query($query,$link)
or die(mysql_error());
$num_supp_name = mysql_num_rows($result);?>

<?php

while ($row = mysql_fetch_array($result)) {

$subs_NO = $row['subs_NO'];
$imsi = $row['imsi'];
$activation_date = $row['activation_date'];
$desactivation_date=$row['desactivation_date'];
$status = $row['status'];
$mode = $row['mode'];
$oick = $row['oick'];
```

Server Side

language

```
1  <?
2  include("include/session.php");
3  ?>
4  <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
5  <html xmlns="http://www.w3.org/1999/xhtml">
6  <head>
7  <meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
8  <title>Login Page</title>
9  <link rel="stylesheet" media="screen" type="text/css" title="Design" href="register.css" />
10 <script type="text/javascript">
11
12 </script>
13 </head>
14
15 <body>
16
17
18 <div id="headerB">
19   <p align="center">  <p>
20
21   </div>
22
23   <br>
24
25 <?
26
27 if($session->logged_in){
28   header ("Location: home.php");
29
30 }
```

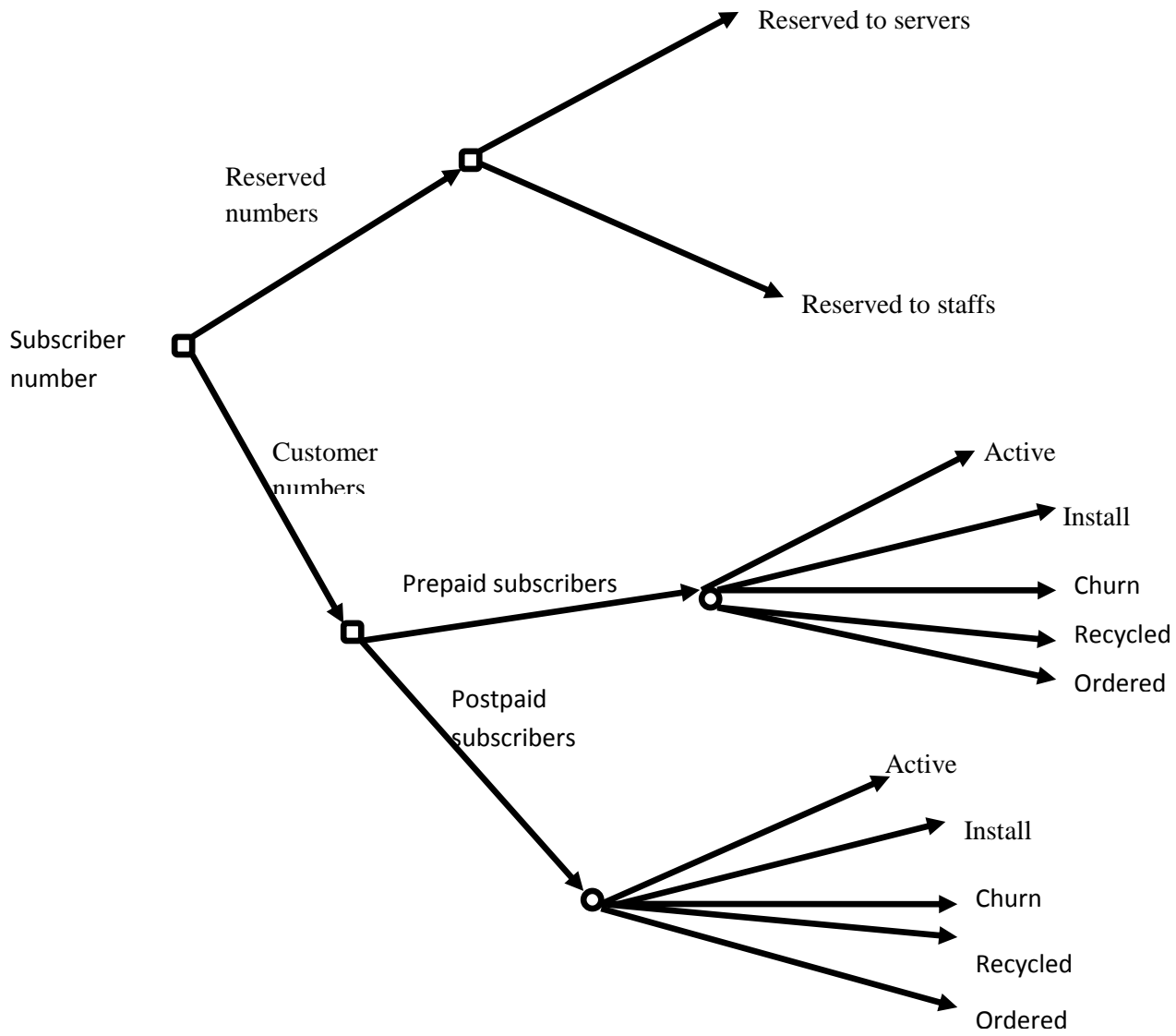
3.6 Classification method

The classification method that been used is decision tree , whereby a decision tree is a decision support tool that uses a tree-like graph or model of decisions and their possible consequences, including chance event outcomes, resource costs, and utility. It is one way to display an algorithm [19]. So base on this method subscribers numbers are classified according to their status. Therefore this method have been implemented in this work and used as a visual and analytical decision support tool, where the expected status.

The classification is done based on the stated decision. Firstly numbers are subdivided into two groups those who are reserved to intnal use of the company and the other group will be sold to customers. Also this group will be subdivided into tow groups which are prepaid and postpaid. Then numbers will be allocated to their respectives status.

The classification is based on the condition sate by this method, with this method the classification is much easier and more efficient by reducing time and accurating results.

Figure 12: Classification method, Decision tree



Chapter 4

RESULTS AND DISCUSSION

In this chapter, results and discussion will be presented. Since the development of the system is based on Prototyping Methodology, the analysis and design phase will be revised from time to time until the prototype is finalized as finding which finalizes the system. In the end the proposed system should be fully developed and it will be working to ease the management of subscriber number in the telecommunication world.

4.1. DATA GATHERING & ANALYSIS

In this project, method questionnaire had been used, whereby pre survey questionnaires had been sent to the targeted users in order to analyze their responds received this will be the results of the needs of the system their opinion and especially the feasibility of this project [refer to 3.2.1] in chapter 3.

4.1.1 External factors and system evaluation

The data used is mockup data where we have generated randomly due to unavailability of access to the real data, because telecom operators are not allowed to disclose subscribers' numbers to outsiders since data is private and confidential. Plus we have got difficulties in testing the functionality of the system therefore the system evaluation have done manually by focusing the experiments and control data.

Considerably the system evaluation is based the administration process whereby an employee have to a request in order to get the task done. Since different databases are not administrated by a single employee thus makes some difficulties and time delay in order to get.

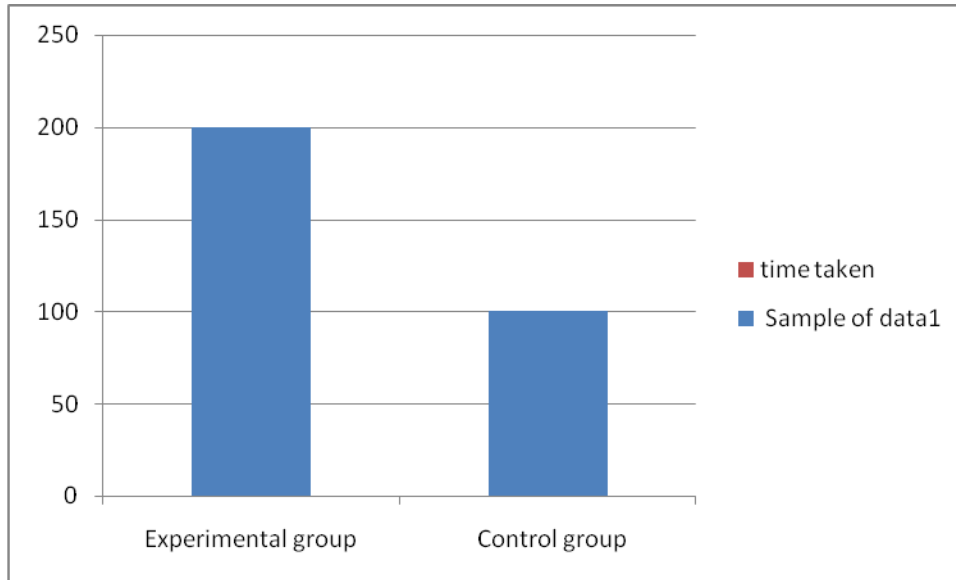


Figure 13: system evaluation1

	Experimental group	Control group
Sample of data1	200	100
time taken	0.005 seconds	25,920 seconds

Based on the for evaluation a sample of 200 subscribers' numbers are classified by Telecomm subscriber management system and results is gotten at 0.005 seconds meanwhile just half of the data sample is taken longer in the tradition process results are not gotten at real time and it takes about 25,920 seconds.

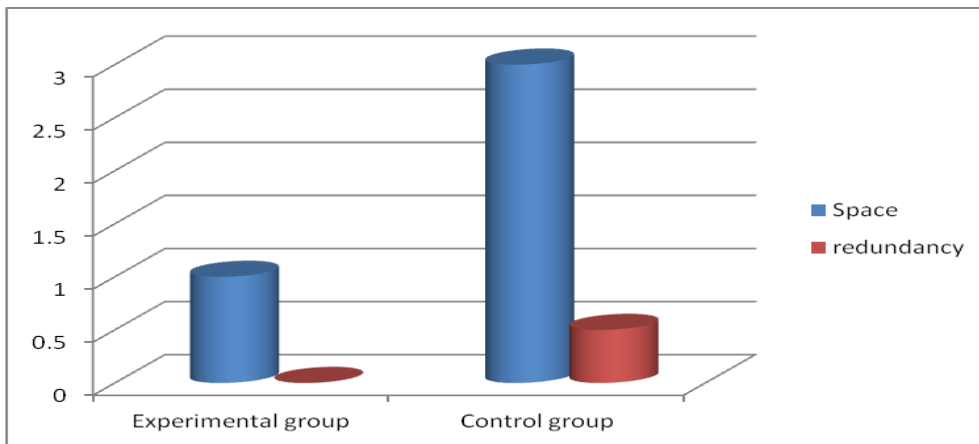


Figure 14: system evaluation2

	Experimental group	Control group
Space	1	3
redundancy	<30%	50%

The second experiment is about the data redundancy in the database and space occupied in the database. The experimental group shows that all subscribers' number will be stored in a single database where the control group side data is stored in three different databases thus may cause data redundancy which leading to an inefficient subscribers' number management.

4.2 Results

❖ System Prototype

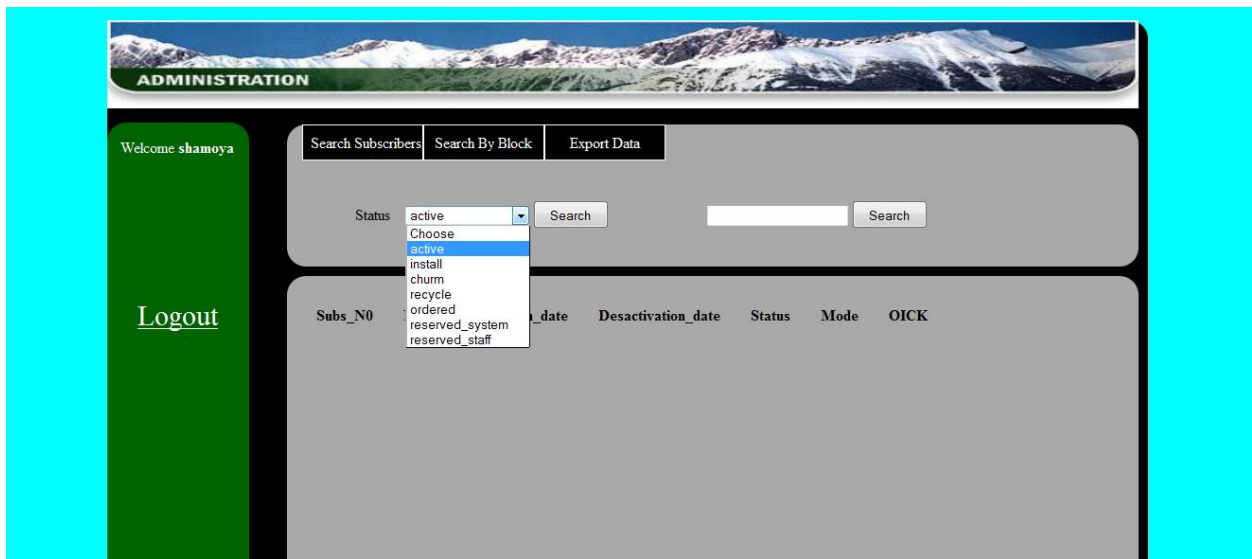


Figure 15 : data search page

Choosing the status that user is willing to know the specific status of subscriber numbers.

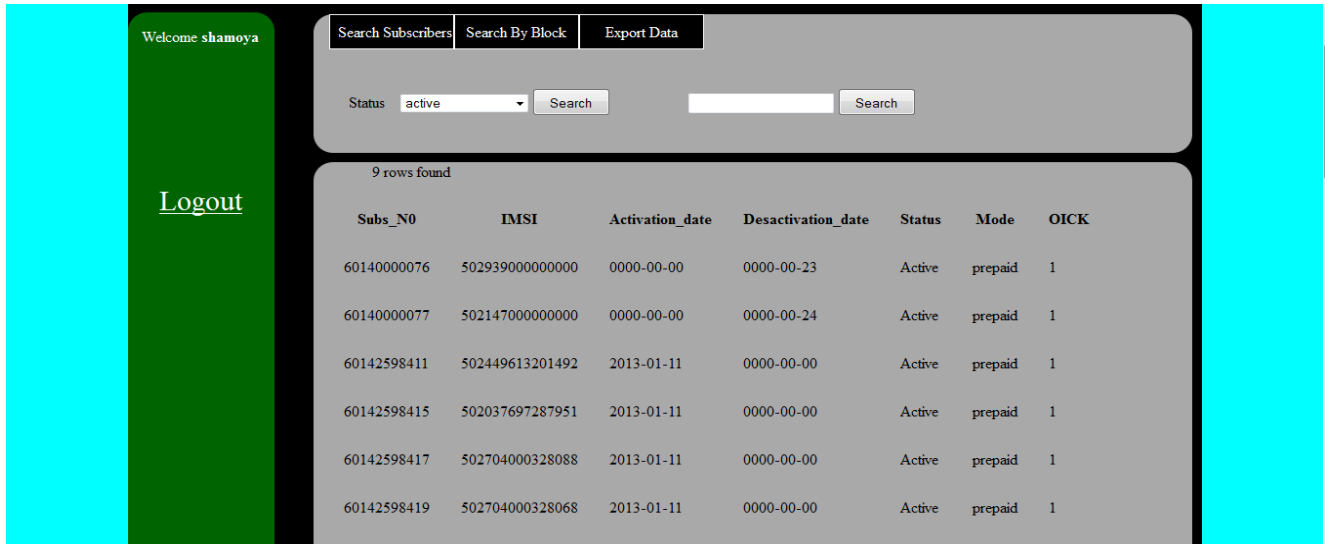


Figure 16: selected active status

The figure shows that user had selected on active status whereby the system displays only the active subscriber's number.

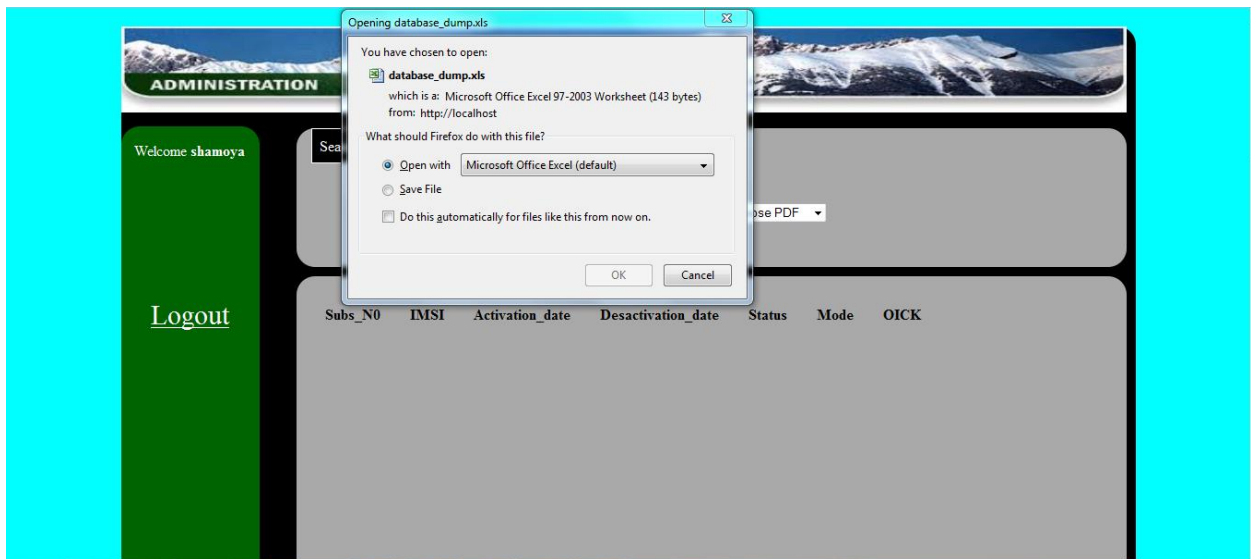


Figure 17: downloading excel page

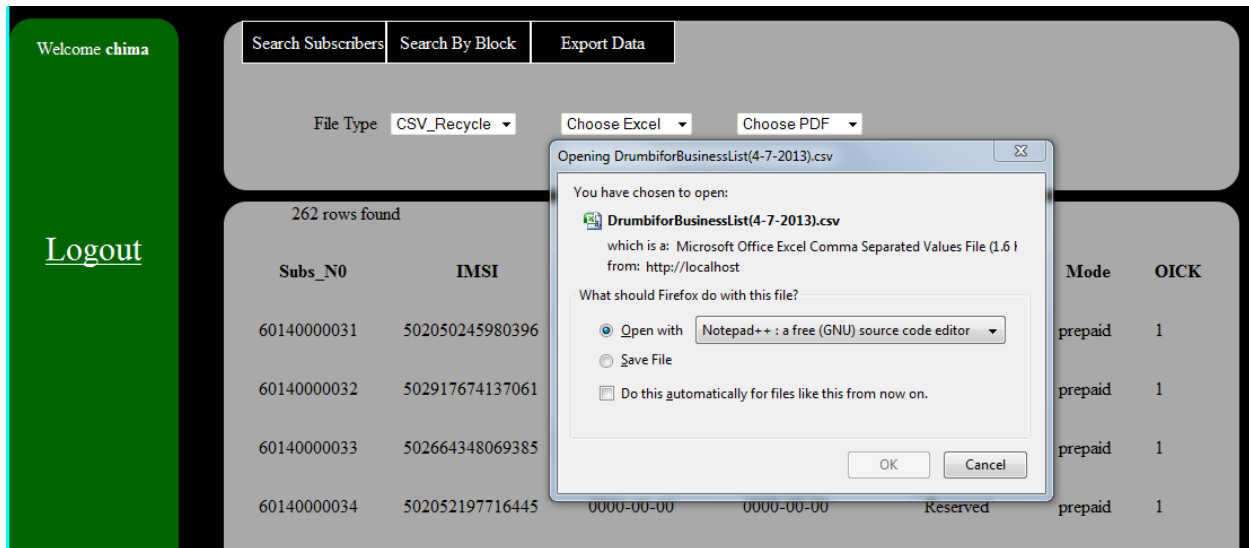


Figure 18: downloading csv file page

Both of the above figures show how user can download excel file from the system and also user is given options to shows which type of file that wants to expert, it can be excel file type, CSV (comma-separated values) file type and PDF file type. The downloaded file type is base on the user option or preference.

Chapter 5

Conclusion and recommendation

5.1 Conclusion

Telecomm Subscriber Management System is the working prototype that cover its scope that had been set at the initiation of the project and also the objectives of the project have been achieved by implementing this system. Subscribers' numbers management will be efficient and effective and accurate results will be gotten at a real time.

This project is relevant for telecommunication mobile operation, since it helps the company to become more predictable in its subscribers number management, also by using an integrated and centralized database the management will be more efficient, by reducing errors, risk, and deployment time. By resolving those problems it will create success sustainability and efficiency toward the company's competitors. It keeps the database updated, reduces missing data and data redundancy as well as data inconsistency and unreliable data in the database as well as in their profit margin improvement.

5.2 Recommendation

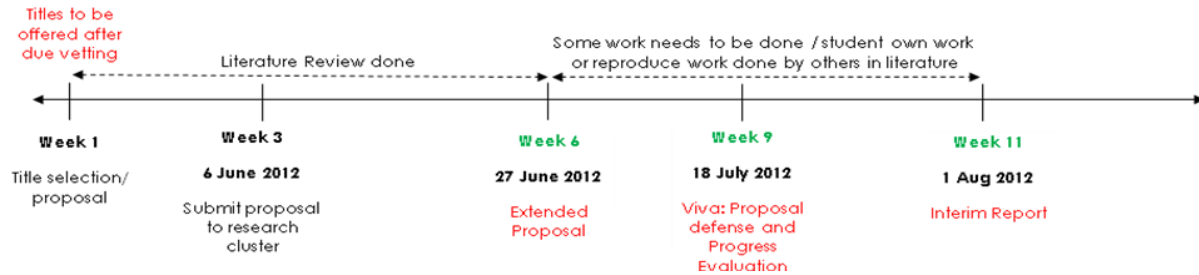
Future works related would be to further develop the system as mobile application, and addition more functions to the graphical user interface thus will help the end user to access the system at time regardless they are in their office and they can do their job in their ease. Also it will increase the productivity rate of the company since application will be accessible from anywhere and at any time.

References:

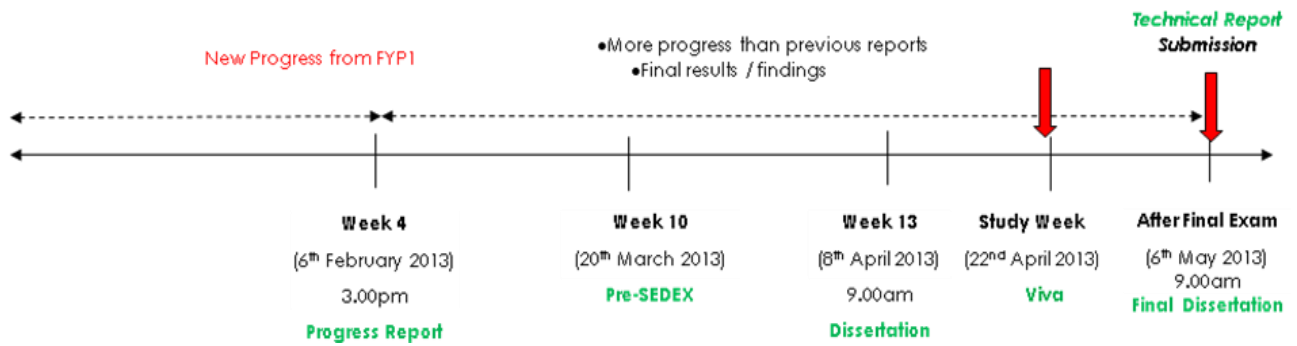
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- [17] <http://www.sciencedirect.com/science/article/pii>
- [18] <http://www.c3ns.com/images/sdlifecycle.jpg>
- [19] http://en.wikipedia.org/wiki/Decision_tree

APPENDICIES

Appendix A: FYP1 Time line and FYP2 Time line

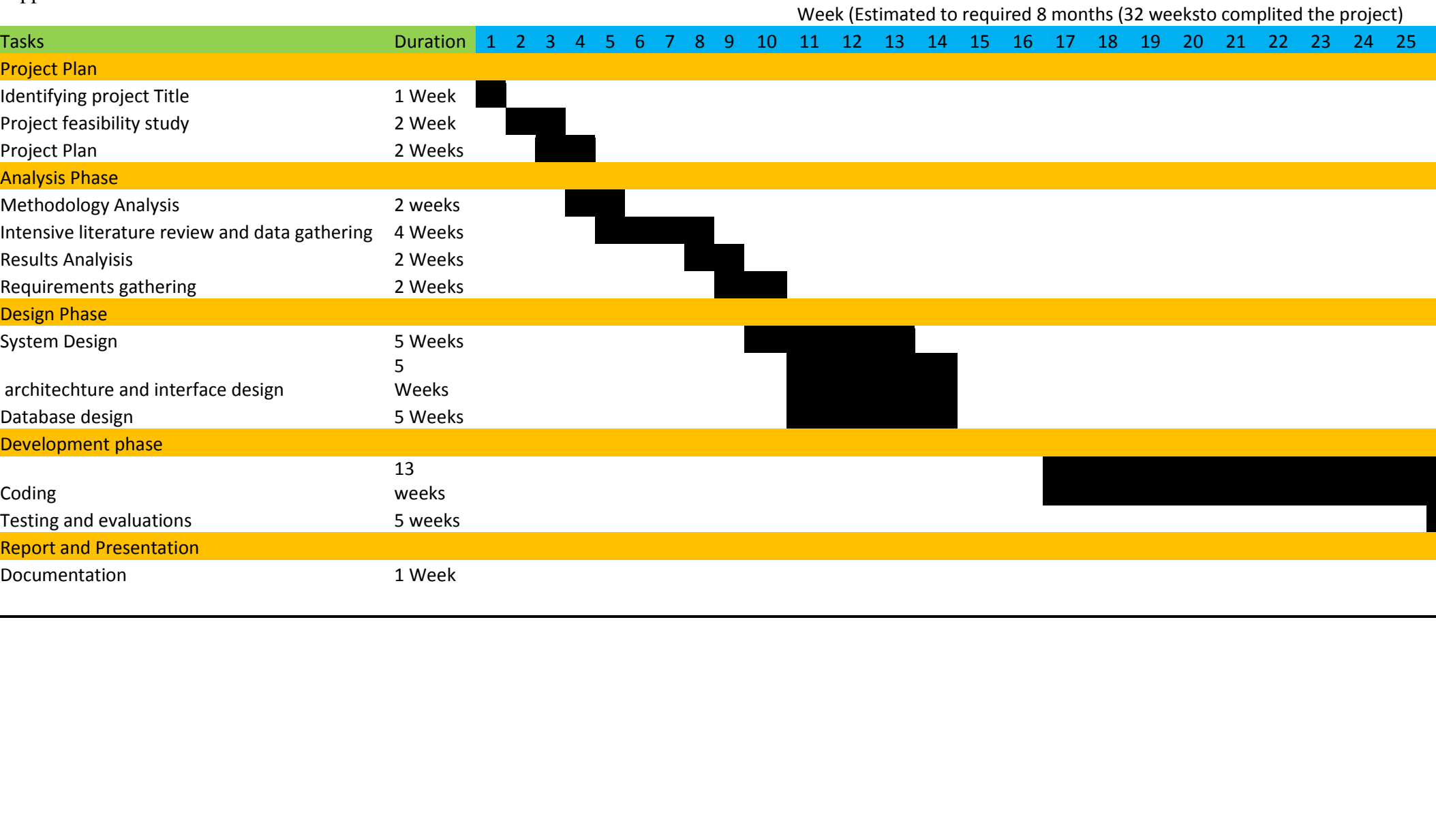


FYP1 Time line



FYP2 Time line

Appendix B: Gantt chart



Appendix C: List of numbers.

60140000031	60140000072
60140000032	60140000073
60140000033	60140000074
60140000034	60140000075
60140000035	60140000076
60140000036	60140000077
60140000037	60142593241
60140000038	60142593243
60140000039	60142593245
60140000040	60142593247
60140000041	60142593249
60140000042	60142593251
60140000043	60142593253
60140000044	60142593255
60140000045	60142593257
60140000046	60142593259
60140000047	60142593261
60140000048	60142593263
60140000049	60142593265
60140000050	60142593267
60140000051	60142593269
60140000052	60142593271
60140000053	60142593273
60140000054	60142593275
60140000055	60142593277
60140000056	60142593279
60140000057	6014259328
60140000058	60142593281
60140000059	60142593283
60140000060	60142593285
60140000061	60142593289
60140000062	60142598411
60140000063	60142598413
60140000064	60142598415
60140000065	60142598417
60140000066	60142598419
60140000067	60142598421
60140000068	60142598423
60140000069	60142598425
60140000070	60142598427
60140000071	60142598429

60142598431	60142599173
60142598433	60142599175
60142598435	60142599177
60142598437	60142599179
60142598439	60142599181
60142598441	60142599183
60142598443	60142599185
60142598445	60142599187
60142598447	60142599189
60142598449	60142599191
60142598451	60142599193
60142598710	60142599195
60142598757	60142599197
60142598759	60142599199
60142598761	60142599201
60142598763	60142599203
60142598765	60142599205
60142598767	60142599207
60142598769	60142599209
60142598771	60142599211
60142598773	60142599213
60142598775	60142599215
60142598777	60142599217
60142598779	60142599219
60142598787	60142599221
60142599139	60142599223
60142599141	60142599225
60142599143	60142599227
60142599145	60142599229
60142599147	60142599231
60142599149	60142599233
60142599151	60142599235
60142599153	60142599237
60142599155	60142599239
60142599157	60142599241
60142599159	60170021461
60142599161	60170021552
60142599163	60170021549
60142599165	60170021550
60142599167	60170021551
60142599169	
60142599171	

Appendix D: Login.PHP

```
<?
include("include/session.php");
?>

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml">

<head>

<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />

<title>Login Page</title>

  <link rel="stylesheet" media="screen" type="text/css" title="Design"
href="register.css" />

<script type="text/javascript">

</script>

</head>

<body>

<div id="headerB">

  <p align="center">  <p>

  </div>

  <br>

<?
if($session->logged_in){
header ("Location: home.php");
}
else{
```

```

?>
    <p align="center">
    <h2 align="center" style="color:white">Login
    </p>
    </h3>
<?
if($form->num_errors > 0){
    echo "<font size='2\" color='\"#ff0000\">".$form->num_errors." error(s)
found</font>";
}
?>

<form action="process.php" method="POST">
    <div align="center">
        <table border="0" cellpadding="10">
            <tr>
                <td style="color:black;font-size:20px">Username:</td>
                <td><input type="text" name="user" maxlength="60" style="height: 20px;
width: 200px; font-size:15px" value="<? echo $form->value("user"); ?>"></td><td><?
echo $form->error("user"); ?></td>
            </tr>
            <tr>
                <td style="color:black;font-size:20px">Password:</td>
                <td><input type="password" name="pass" maxlength="20" style="height: 20px;
width: 200px; font-size:15px" value="<? echo $form->value("pass"); ?>"></td><td><?
echo $form->error("pass"); ?></td>
            </tr> <tr>
                <input type="hidden" name="sublogin" value="1">

```

```

        <th colspan=2><div align="center">
            <input type="submit" name="submit" value="Login" style="height: 30px; width:
110px; font-size:20px">
        </div></th> </tr>

</table>

</form>

        <p align="center" style= "color:black; font-size:15px">

<br> <br>Not registered? <a href="register.php" style= "color:black; font-
size:15px">Sign-Up! </p>  <?>

</center>

    </div></div></div>

<br> <br> <br> <br> <br> <br> <br>

<div id="footerA">

</div></body></html>

```

Appendix E: Updatedatasearch.php

```

<?
error_reporting(0);
include("include/session.php");
?>

<?php
$link=mysql_connect('localhost','root','') or die (mysql_error());
mysql_select_db("tmss_fyproject") or die (mysql_error());
?>

<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

```

```

<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="fr" >

  <head>

    <title>Home Page!</title>

    <meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />

    <link rel="stylesheet" media="screen" type="text/css" title="Design"
href="home.css" />

  <script language="javascript">

    function showOrHide()

    {

      var div = document.getElementById("showOrHideDiv");

      if (div.style.display == "block")

      {

        div.style.display = "none";}

      else {

        div.style.display = "block";

      }

    }

  </script>

  <script type="text/javascript">

  function showonlyonev2(thechosenone) {

    var newboxes = document.getElementsByTagName("div");

    for(var x=0; x<newboxes.length; x++) {

      name = newboxes[x].getAttribute("class");

      if (name == 'newboxes-2') {

        if (newboxes[x].id == thechosenone) {

```

```

        if (newboxes[x].style.display == 'block') {
            newboxes[x].style.display = 'none';}
        else {
            newboxes[x].style.display = 'block';} }
    }else {
        newboxes[x].style.display = 'none';
    }
}    }}
</script>

</head>

<body>
<div id="bodyA">
<div id="header">
    
    
</div>
<div id="logpart">
<p align="center" style="color:white"><?
if($session->logged_in){
    echo "Welcome <b>$session->username</b><br>";
    if($session->isAdmin()){
        echo "[<a href=\"admin/admin.php\">Admin Center</a>] &nbsp;&nbsp;&nbsp;";
    }
    echo"<br></br><br></br><br></br>";

```



```

<th>IMSI</th>
<th >Activation_date</th>
<th >Desactivation_date</th>
<th >Status</th>
<th >Mode</th>
<th >OICK</th></tr>
<?php
if($_POST['value'] == 'active') {
$query = "SELECT * FROM pre_paidsubs WHERE
(subs_N0 LIKE '%$_POST[keyword]%'||
imsi LIKE '%$_POST[keyword]%' ||
activation_date LIKE '%$_POST[keyword]%'||
desactivation_date LIKE '%$_POST[keyword]%'||
status LIKE '%$_POST[keyword]%'||
mode LIKE '%$_POST[keyword]%'||
oick LIKE '%$_POST[keyword]%' ) AND
status='Active'";

$res = mysql_query($query);
if (!$res) {
    print("SQL statement failed with error:\n");
    print(mysql_error($con));
} else {
    $number_of_rows = mysql_num_rows($res);

```



```
</div><div id="footer">  
</div></div>  
</body></html>
```

Appendix E: PDFordered.PHP

```
<?php  
require('fpdf.php');  
class PDF extends FPDF  
{  
//Load data  
function LoadData($file)  
{  
//Read file lines  
    $lines=file($file);  
    $data=array();  
    foreach($lines as $line)  
        $data[]=explode(';','chop($line));  
    return $data;  
}  
//Simple table  
function BasicTable($header,$data)  
{  
$this->SetFillColor(255,0,0);  
    $this->SetTextColor(255);  
    $this->SetDrawColor(128,0,0);
```

```

    $this->SetLineWidth(.3);
    $this->SetFont('', 'B');
$this->SetFillColor(224,235,255);
    $this->SetTextColor(0);
    $this->SetFont('');

//Header
    $w=array(30,35,35,35,20,20,20);
//Header
    for($i=0;$i<count($header);$i++)
        $this->Cell($w[$i],7,$header[$i],1,0,'C',true);
    $this->Ln();
//Data
    foreach ($data as $eachResult)
    {
        $this->Cell(30,6,$eachResult["subs_N0"],1);
        $this->Cell(35,6,$eachResult["imsi"],1);
        $this->Cell(35,6,$eachResult["activation_date"],1);
        $this->Cell(35,6,$eachResult["desactivation_date"],1);
        $this->Cell(20,6,$eachResult["status"],1,0,'C');
        $this->Cell(20,6,$eachResult["mode"],1);
        $this->Cell(20,6,$eachResult["oick"],1);
        $this->Ln();
    }
    $this->Cell(array_sum($w),0,"','T');} }

```

```

$pdf=new PDF();

//Column titles

$header=array('subs_N0','imsi','activation_date','desactivation_date','status','mode','oick')
;

//Data loading  **** Load MySQL Data ****//

$objConnect = mysql_connect("localhost","root","") or die(mysql_error());

$objDB = mysql_select_db("tmss_fyproject");

$strSQL = "SELECT * FROM pre_paidsubs where status='Ordered'";

$objQuery = mysql_query($strSQL);

$resultData = array();

for ($i=0;$i<mysql_num_rows($objQuery);$i++) {

    $result = mysql_fetch_array($objQuery);

    array_push($resultData,$result);

}

//*****//

$pdf->SetFont('Arial','',10);

**** Table 1 ****//

$pdf->AddPage();

$pdf->Image('images/anumbers.jpg',80,8,33);

$pdf->Ln(35);

$pdf->BasicTable($header,$resultData);

$pdf->Output("pdfmsn/Order_data.pdf","F");

?>

```