

MAIL MANAGEMENT SYSTEM

SITI NUR FATHIAH BINTI ADNAN

A thesis submitted in fulfilment of the
requirements for the award of the degree of
Degree of Computer Science

Faculty of Computer System & Software Engineering
University Malaysia Pahang

DECEMBER, 2015

ABSTRACT

Management of records and details information is a crucial part in any organization. The purpose of such management is to ensure the traceability towards details that had been kept should there is needs to use it any time in the future. Mails record are usually recorded manually in a record book. The common problem faced with the manual records is it is outdated and finding of records are difficult and time consuming. Apart from that, the possibility that the record kept are loss or damage is high because physical records requires more attention in terms of ensuring the spaces provided for them is not preoccupied with other documents to prevent any mixed up of records. Besides that, it is difficult to hand over mails item to intended staff due to the needs to call each staff to acknowledge them regarding received mails. This problem consumed time and delayed the process of handling items to the receiver. The purpose of this thesis is to study and analyse mail system at IBS Technology Kuala Lumpur and to develop a computerized mail system according to user requirement. The methodology used for this study is Scrum in Agile Methodology which generally allows the system to be developed flexibly and able to respond to changes made even during development of system. The system developed is tested by using User Acceptance Test (UAT) which is carried out to ensure the system is developed based on user requirement and to track any error or improper way of a system behaviour so that correction can be made before implementation. The final result of the study is the implementation of the Mail Management System (MMS). The system is developed fully and record is kept in the system and searching of record can be made by different criteria.

ABSTRAK

Pengurusan rekod and butiran maklumat adalah bahagian yang penting di dalam sebuah organisasi. Tujuan pengurusan tersebut adalah untuk memastikan butiran rekod yang telah disimpan dapat dijejaki sekiranya perlu digunakan pada masa akan datang. Rekod barang pos pada kebiasaannya dicatatkan di dalam buku catatan. Masalah yang biasanya dialami dengan penyimpanan maklumat melalui cara manual adalah kesulitan untuk mencari catatan yang disimpan yang turut memakan masa untuk mendapatkan catatan yang dikehendaki. Selain daripada itu, kebarangkalian bahawa catatan yang disimpan akan hilang atau rosak adalah tinggi kerana catatan yang disimpan secara fizikal memerlukan penjagaan yang lebih dari segi memastikan ruang yang disediakan tidak bercampur dengan dokumen lain yang tidak berkaitan. Selain daripada itu, setiap penerima barang pos perlu diberitahu tentang barang pos yang diterima atas nama mereka dengan cara menelefon pekerja tersebut. Perkara ini menimbulkan masalah kerana ia memakan masa dan melewatkan proses pemberian barang pos kepada penerima. Tujuan kajian ini dilakukan adalah untuk menganalisis system surat menyurat di IBS Technology Kuala Lumpur dan untuk membangunkan system berkomputer mengikut keperluan pengguna. Metodologi yang digunakan adalah Scrum di dalam Agile Metodologi yang pada dasarnya membolehkan system dibangunkan secara fleksible dan mampu bertindak balas terhadap perubahan yang dilakukan. Sistem yang dibangunkan telah diuji menggunakan pendekatan User Acceptance Test (UAT) yang dilakukan untuk memastikan system yang dibangunkan berdasarkan keperluan pengguna dan untuk mengenalpasti kesalahan atau cara sistem beroperasi yang tidak tepat sebelum system tersebut digunakan. Hasil daripada kajian ini adalah penghasilan sistem pengurusan surat menyurat. Sistem tersebut telah siap sepenuhnya dan catatan surat dan barang post boleh disimpan di dalam sistem dan pencarian maklumat boleh dilakukan melalui kriteria yang berbeza.

TABLE OF CONTENTS

	PAGE
DECLARATION	ii
SUPERVISOR DECLARATION	iv
ACKNOWLEDGEMENTS	v
ABSTRACT	vi
ABSTRAK	vii
TABLE OF CONTENTS	viii
LIST OF TABLE	x
LIST OF FIGURES	xi
CHAPTER 1 INTRODUCTION	1
1.1 INTRODUCTION	1
1.2 PROBLEM STATEMENT	2
1.3 OBJECTIVES	3
1.4 SCOPE	3
1.5 THESIS ORGANIZATION	4
CHAPTER 2 LITERATURE REVIEW	5
2.1 INTRODUCTION	5
2.2 Adare Letters Management System	6
2.3 AA Intelligent Management System	7
2.4 ERP Letter System	8
2.5 Comparison between Three Existing Systems	9

CHAPTER 3 METHODOLOGY	11
3.1 INTRODUCTION	11
3.2 METHODOLOGY	12
3.2.1 Context and Use Case Diagram	14
3.2.2 Modules and Dialogue Diagram	16
3.3 HARDWARE & SOFTWARE REQUIREMENT	20
3.4 GANTT CHART	22
CHAPTER 4 IMPLEMENTATION, TESTING AND RESULT	23
4.1 INTRODUCTION	23
4.2 IMPLEMENTATION	24
4.2.1 Initialization of MMS Development	24
4.2.2 MMS Architecture	24
4.2.3 Database Architecture	25
4.2.4 MMS Database	25
4.2.5 Tables	26
4.2.6 Coding	30
4.2.7 Database Connection	34
4.3 TESTING AND RESULT DISCUSSION	35
4.4 STRENGTH AND WEAKNESSES	36
4.4.1 Challenges Faced	37
CHAPTER 5 CONCLUSION	38
5.1 INTRODUCTION	38
5.2 RESEARCH CONSTRAINT	39
5.3 FUTURE WORK	40
REFERENCES	41
APPENDICES	42

LIST OF TABLES

TABLE NO.	TITLE	PAGE
2.1	Differences between Three System	9
3.1	Hardware Requirement	21
3.2	Software Requirement	21
3.3	StaffData Entity	41
3.4	Department Entity	41
3.5	Notification Entity	42
3.6	MailItemRecord Entity	42
3.7	RecordStatus Entity	43
3.8	RecordType	43
3.9	Hardware Requirement	44
3.10	Software Requirement	44
4.1	MMS Testing	35

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE
2.1	Manual Logbook	5
2.2	Adare Letters Management System	6
2.3	AA Intelligent Management System	7
2.4	ERP Letter System	8
3.1	Scrum Development Model	12
3.2	Context Diagram for MMS	14
3.3	Use Case Diagram for MMS	15
3.4	Dialogue Diagram	19
4.1	Database Structure	25
4.2	Department Table	26
4.3	MailItemRecord Table	27
4.4	MS_Data Table	27
4.5	Notification Table	28
4.6	RecordStatus Table	28
4.7	RecordType Table	29
4.8	StaffData Table	29
4.9	Open SQL connection	34

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Delivering and receiving of mails is a routine activity happened in any organizational and institutional body. The movement of mail is always recorded manually to ensure the record is available for reference in the future. With the existence of such records, it can prove that certain or a particular mail had been received. The record of receivable mails is made by jotting down its date, title of the mail, and the name of the receiver or recipient.

This Mail Management System is a Web Based System which is accessible through online. There are two types of users which is the administrator role hold by the mailing staff of the mailing Department and other staffs. The user of this system are able to records mails information in a single database. For each different roles of user, there are several difference task that can be accomplished.

For staff, they are restricted to viewing and searching of information such as their own mails record and notification messages for them. This system also allows the modification of staff account information. While for the administrator role, they are able to edit, search, delete records, and notify staff about the mails received. Apart from that, they are also able to view report of mail types received by the company. For security purposes, the system will require login username and password authentication before entering the system.

1.2 PROBLEM STATEMENT

Records of mail movement are made manually simply by noting it in the records book. However, this method is not suitable and outdated as it creates problems later such as the difficulties to find older records and understanding variety unique of hand writing. The possibility of losing track of records and the inability to receive mail from the correct person is very high. Besides that, it is slower to hand over mail to receiver as it consumes quite amount of time to call each staff individually to pick up their mail and post items. Apart from that, it is difficult to sort and find mail placed in a small HR office, which also made the room crowded. With the development of this system, finding of records and confirmation of mail receive can be made easily. Besides that, with the notification function available, user can be alerted once they login into the system.

1.3 OBJECTIVE

The objective of this thesis report is as follows:

- i. To study and analyse mail system at IBS Technology.
- ii. To develop a systematic mail system
- iii. To test the system according to user requirement

1.4 SCOPE

The scope of Mail Management System is as follows:-

- i. Develop to be used within an organization.
- ii. This system will be used by two user which are Mailing Department and Staff.
- iii. The system records movements of letter and post items into the organization.
- iv. Notify staff regarding mails received.
- v. Produce report about mail types and mails status.

1.5 REPORT ORGANIZATION

This thesis consist a total of 5 chapters. The first chapter is the introduction which contain the introductory of the project. Second and third chapter contains the literature review and system methodology respectively, the fourth chapter will discuss the system design and system architecture, fifth chapter will discussed about system implementation, sixth chapter consist of system result, limitation and suggestion, while the seventh chapter consists of thesis conclusion and summarization of developed project.

Chapter 1 (INTRODUCTION) – This chapter will discuss about the introduction to the whole idea of the project which includes the project problem statement, objectives and scope of the project.

Chapter 2 (LITERATURE REVIEW) – The purpose of chapter 2 is to explain the literature review about this mail system. This chapter covers the importance of a systematic online system and discuss the different user role and the responsibility they hold for their particular role.

Chapter 3 (METHODOLOGY) – This chapter will explain the methodology used by the system and the implementation process of the method.

Chapter 4 (IMPLEMENTATION, TESTING AND RESULT DISCUSSION) – This chapter discuss system design interfaces and architecture of the MMS. Databases and coding implemented is explain further in this chapter.

Chapter 5 (CONCLUSION) – This chapter contain the conclusion of overall thesis report which conclude the system methodology implemented in the report together with system constraint and future work for that can be implemented later.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The traditional method of mail and postage record is a manual record system which does not involve any systematic used of system or application. In this manual way, staff will record the in and out movements of mail in a log book. There are two different situation which is the in and out movements of mail. Both of the mail for this particular situation will be placed temporarily either in the Human Resource (HR) department or in any specialised place if available. For all mail received addresses to staff, HR will be responsible to call the receiver of mail to inform them about the mail.

Technically, this manual method have two many weaknesses. It is difficult to keep the physical record always available when in needs. Despite the unsystematic way, this manual system consume a lot storage space. Apart from that, the risks that these record damage or lost is highly unavoidable.

The image shows a manual logbook with two pages. The left page is a table with columns: YEAR (1940), AIRCRAFT (Type, No.), PILOT, OR 1ST PILOT, 2ND PILOT, PUTH, OR PASSENGER, and DUTY (INCLUDING RESULTS AND REMARKS). The right page is a table with columns: SINGLE ENGINE AIRCRAFT (Type, No., Date, Time, etc.) and MULTI ENGINE AIRCRAFT (Type, No., Date, Time, etc.). There are handwritten entries in both tables and several paragraphs of notes on the right page. At the bottom of the left page, there is a 'GRAND TOTAL' section with the number 930. At the bottom of the right page, there is a 'TOTALS CARRIED FORWARD' section with the number 93335.

Figure 2.1: Manual Logbook

2.2 Adare Letters Management System

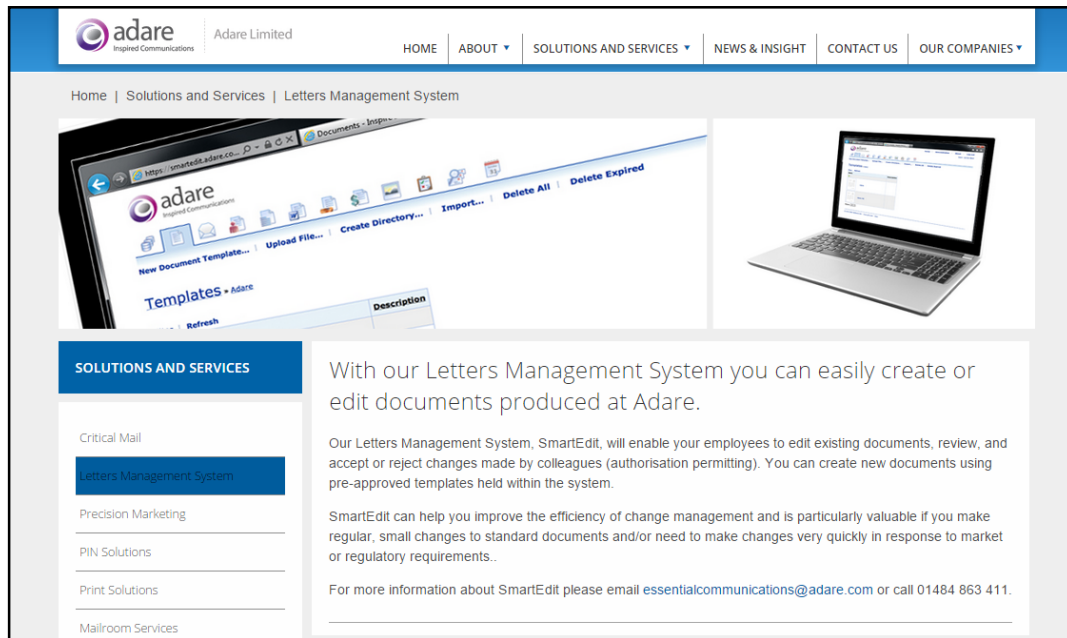


Figure 2.2: Adare Letters Management System

Adare Inspired Communication is a leading suppliers of both paper and electronic transactional communications. They own a software system which manage the aspect of communication in terms of security and reliability. This system consist of 14 main module which are critical mail, Letters Management System, Precision Marketing, PIN Solutions, Print Solutions, Mailroom Services, Democratic Services, Cross Media, ePresentment, Hybrid Mail Solution, Postal Services, Inbound Document Scanning, Business Process Outsourcing and Localised Marketing (W2P). The Letters Management System includes SmartEdit features which enable their staff to edit and review existing documents. However, this system features are more towards the change management in which audit is made available and the changes of documents can be traced.

2.3 AA Intelligent Letter Management System

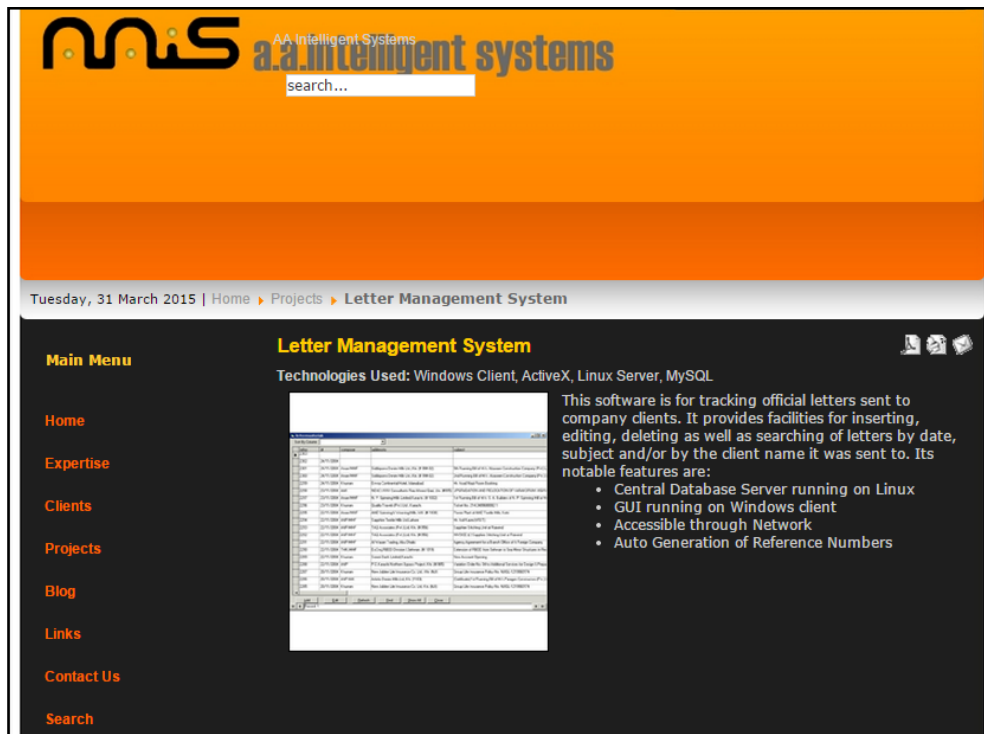


Figure 2.3: AA Intelligent Letter Management System

This software provides the function of tracking any official letter sent to their company clients. The system facilitates user to insert, edit, and delete. Apart from that, searching is also made available whereby user can search for particular letters by date, subject or client name which the letter was sent to.

Its notable features are Central Database Server which runs on Linux operating system. Besides that, Windows client tools are used in the development of the interface. This system is made as a web-based application which makes it accessible through the network. This AA Intelligent System also provides an auto-generated reference number for all letters created.

2.4 ERP Letter Movement System

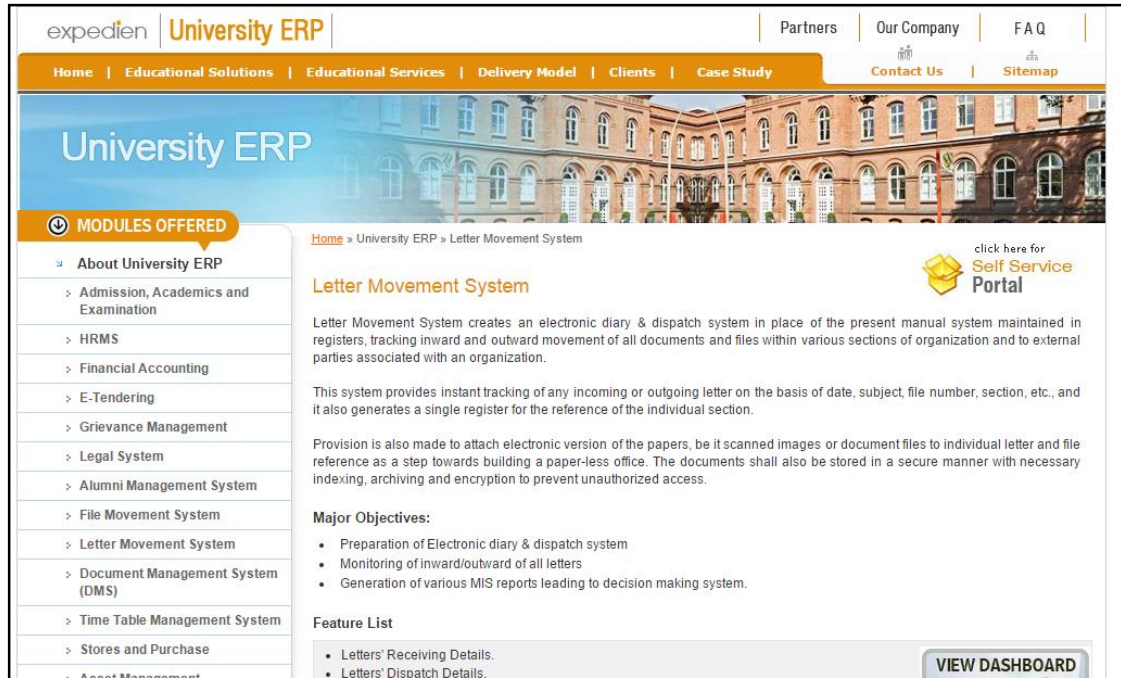


Figure 2.4: ERP Letter Movement System

This system creates an electronic and dispatch system replacing the present manual system. This system is maintained by tracking the inward and outward movements of all documents and files within various section of the organization. This system provides instant tracking of letters according to the letter's date, subject, file number, and section.

Provision is also attach to the electronic version of the papers, be it scanned images, document files, individual letter or file reference as a step towards building a paper-less office. The documents shall also be stored in a secure manner with necessary indexing, archiving and encryption to prevent unauthorized access.

2.5 DIFFERENCES BETWEEN EXISTING SYSTEM

The three existing system had different functionality and interfaces. Although they are not particularly the same in terms of overall process in storing and managing the mails, but all the three system had the same purposes which is to record and manage the movements of letters.

Table 2.1: differences between three systems

Characteristics	Adare Letters Management System	AA Intelligent Letter Management System	ERP Letter Movement System
Interesting User Interface	√	—	√
Fast Speed	√	—	√
Responsiveness	√	—	√
Web approach	√	√	√
Tracking Functionality	—	√	√
Auto generated reference number	—	√	√
Centralized database	—	√	—
Edit existing document	√	—	—
Linux platform	—	√	—
Windows platform	√	—	√

Table 2.1 above shows the advantages and disadvantages of the three existing system. Based on the table above, it can be concluded that ERP Letter Movement System possess the most necessary attribute that Mail Management System shall have. Therefore, MMS shall be developed and fulfilling the required functionality plus with the additional function which are sending of notification into the system and generate report of post item movements.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The methodology to be implemented for this project is the Agile Methodology. Agile model is the combination of iterative and incremental process models which focuses on process adaptability and in respond to unpredictability. Agile model implement an iterative development of software project. The synonym of iterative is repeated; which means that the development process is done repeatedly after each small incremental builds ends. Due to the nature of agile model, this mail system can be developed flexibly and are able to adapt to any changes occur later during development.

Besides enabling development to adapt and be flexible to changes, the quality of the mail system can be in its most optimum state due to the key principle of development in which testing is done throughout the lifecycle. Regular inspection of work product can be done and allows adjustment to be made whenever seems necessary. Agile development encourage involvement of active user throughout product development in a cooperative collaborative approach. This enable the key person and stakeholder to have an excellent visibility towards the product thus helps to ensure the product expectation are effectively managed.

Agile is a good model for software environments that regularly change. Adaptability allows changes happened to be implemented without affecting the current development process. This in return enables concurrent development and delivery within an overall planned context. Compared to the traditional waterfall model, agile model benefits more to this project.

3.2 METHODOLOGY

Scrum

Scrum is under the Agile Methodology which support development flexibility and changes during system development. Figure 3.1 shows the phases of scrum methodology.

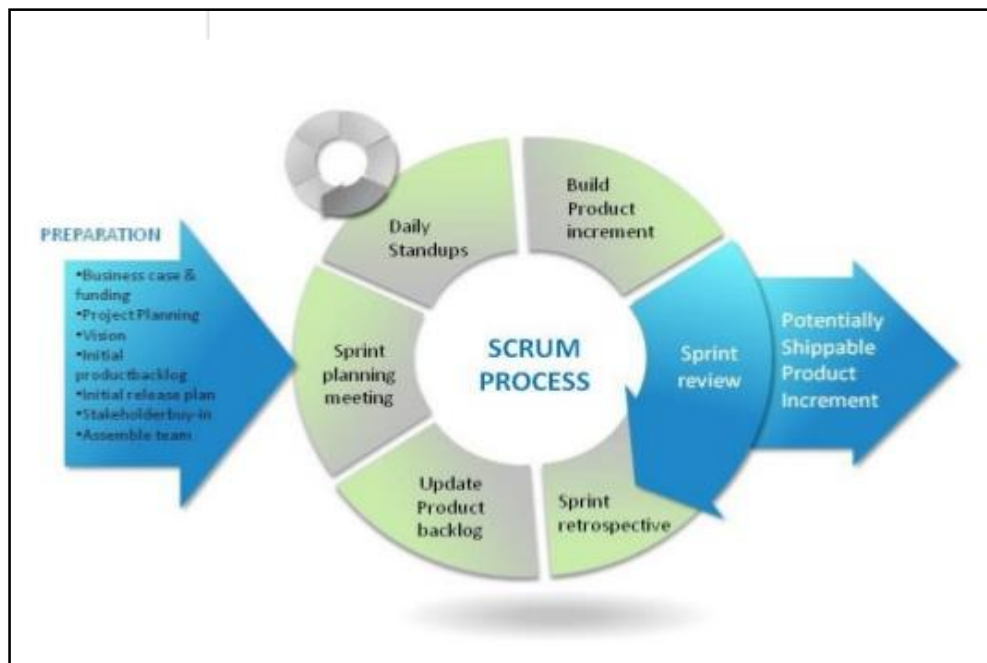


Figure 3.1: Scrum Development Model

Planning Meeting

During this phase, meeting will be held with clients to gather the requirement that will be analyse to understand their needs and the problem that the system to be created should be able to perform. Since the scope of this system is small, the meeting conducted do not last for longer hours because the system requirement is not extensive and are based on the scope that had been identified for this system.

Daily Standups

This phase is a meeting process in which the participant will attend this meeting while standing. The purpose of daily standup is to keep the meetings short within five to fifteen minutes.

Build Product Increment

Agile methodology uses the term sprint which is considered as a goal that need to be fulfilled. The potentially shippable increment of product shall be available at the end of each sprint. The sprint goal for this system would be the development of different module for two different user and the function that can be performed by both user during the development stage. The sprint for each module is complete once it has been coded, tested and are usable or in other words it can be run.

Sprint Review

This phase is informal and is done to ensure that during the end of a sprint, a shippable product had been produced and tested to fulfil user requirements. At the end of each sprint, a sprint review or meeting will be conducted to show what had been accomplished.

Sprint Retrospective

Once the Sprint Review had been done, this phase will find space for any improvement that can be done to the sprint that had been coded and tested. In general, this phase purposes is to identify specifically what should be start, stop or continue to be done. Voting will be done to elect the part that should be stop, start or continue to be done.

Update Product Backlog

Product backlog is the list of work that should be prioritized. The most important item will be stated at the top of the list and the list continue with the less important items.

3.2.1 Context and Use Case Diagram

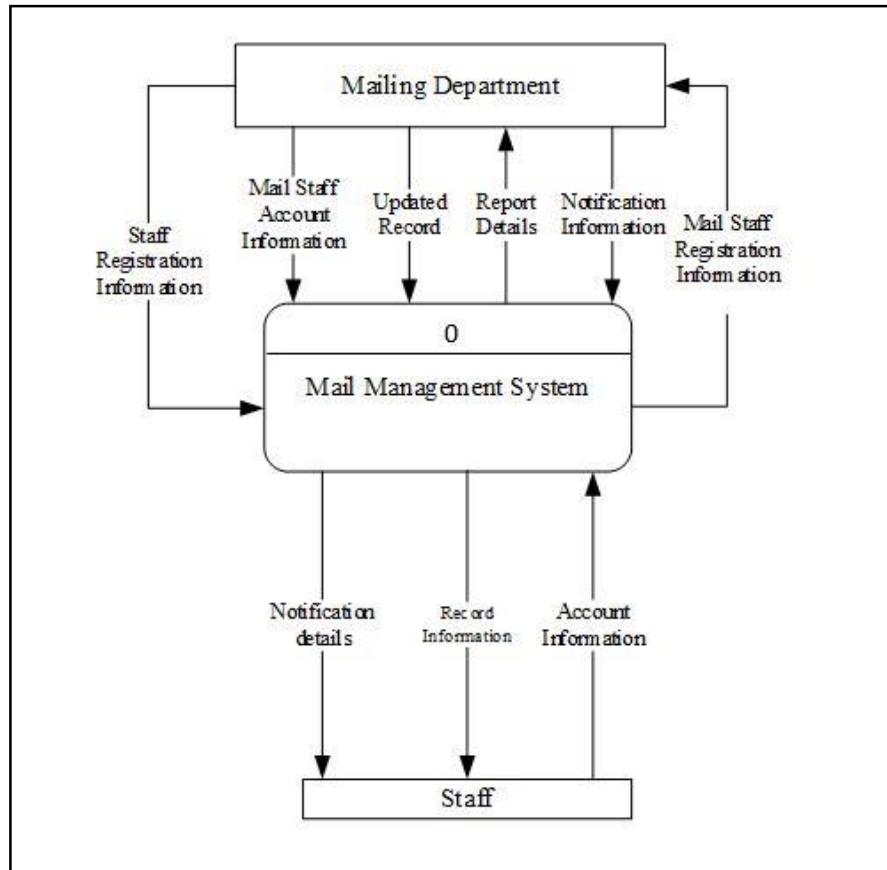


Figure 3.2: Context Diagram

The context diagram in figure 3.2 illustrates the user and the relationship that this system has with all the users of this system. MMS consists of staff and mail department staff. Both users have different views and functions that can be performed. Mail staff are responsible to create and manage mail records and notify staff of mails received. While staff can receive notification once they login to the system and view records of mails received under their name.

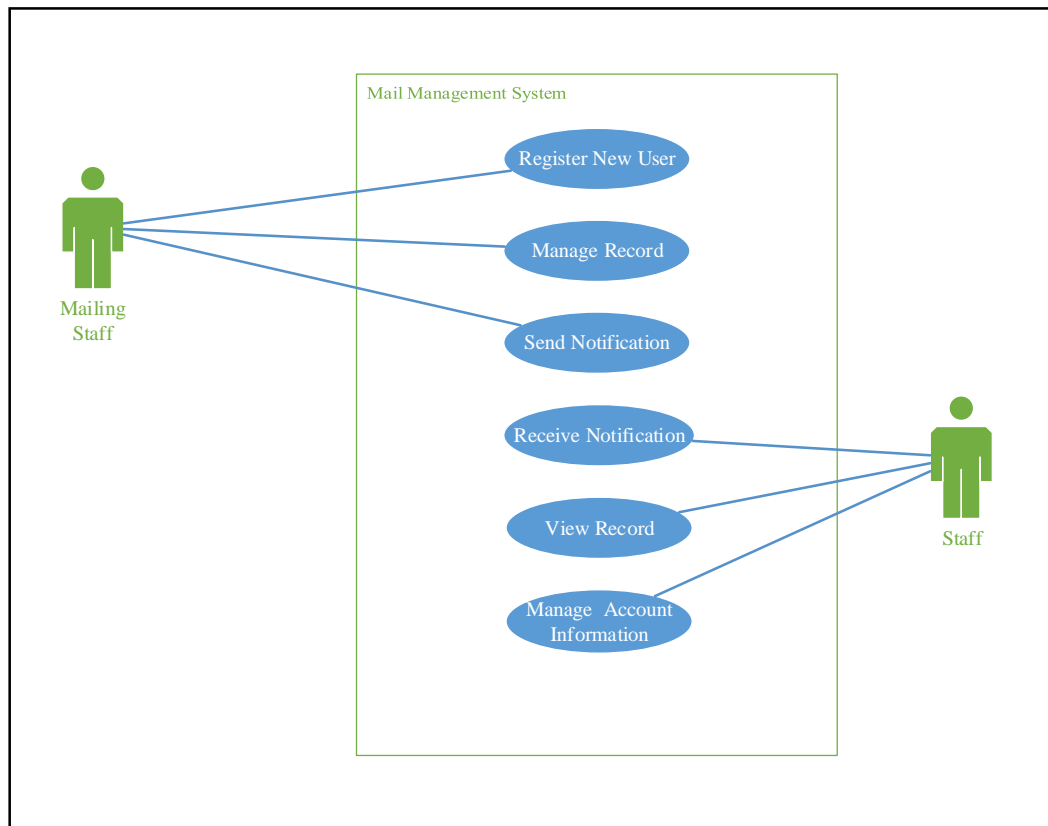


Figure 3.3: Use Case Diagram

Figure 3.3 illustrates the interaction of actor with the elements of this system. Each user can accomplish certain tasks and functionality depend on their user type. There are six use cases altogether which are Register New User, Manage Record, Send Notification, Receive Notification, View Record and Manage Account Information. All the use cases is different with one another and only mailing staff able to send notification into the system. Staff can view the notification once they login into the system.

3.2.2 Modules and Dialogue Diagram

This system have two different user which are Mailing Staff from Mailing Department and Staff from other department within the same organization. Mailing Staff contains five modules while Staff contains only one module. Different availability of module is made to distinguish the user type of the system. Mailing Staff which hold the superior role, have more modules than staff as they will manage record and notification in the system. Staff on the other hand will be able to see the notification message send to them and view mail record received for them.

Mailing Department

Module 1: Manage Record

This module display the mails record each time the details is save into the system. The information is display in a table and it is the computerized version of a mails items record book. Tracking number of items received can be search in this page. The searching function is made to allow tracking of post items. This module consist of another two sub modules which are Add New Mail Record and Send Notification. Add New Mail Record is a form which mail staff need to fill when they want new items received to be recorded into the system. Send Notification is actually a sub module of Manage Notification which is embedded into Manage Record module for the ease of sending notification to staff once mail staff had recorded the intended staff mails item into the system.

Module 2: Manage Notification

This module display the list of all notification ever send into the system. This notification messages is recorded in a table and can be deleted or altered depending on the situation. The sub module for this module is Send Notification. Once a mail staff enter this sub module, he shall be prompt with a form which contains the list of staff id in a drop down list and several fields of date, title and message that needs to be filled in to send messages to staff.

Module 3: Register New User

New user is registered in this module. Registration of user involve both type of user which are Mail Staff and Staff. This module contains another two sub module of Mail Department and Staff Registration. Mail Department is a registration form for mail staff while Staff Registration is the registration form for staff.

Module 4: Mails Report

This module display a pie chart of Mails Type and Mails Status roughly based on data in the MailItemRecord table. This chart is generated in order to observe the type of mails regularly received at a certain time in the organization. On the other hand, Mails Status chart is generated to obtain the estimated illustration of pie chart either staff regularly claim their mails or not. If not, then more spaces might need to be allocated or new rules need to be regulated. The action is depend on the Mail Department consideration based on the report received.