E-MANAGEMENT FOR DRUGSTORE PHARMACY

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E-MANAGEMENT FOR DRUGSTORE PHARMACY

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ABSTRAK

E-Management for Drugstore Pharmacy adalah sistem berkomputer yang direka untuk pengguna menguruskan stok inventori ubat-ubatan dan mengawasi kemudahan stok. Sistem ini berfungsi seperti sistem inventori stok yang menyediakan amaran ubat-ubatan yang sudah luput dan jumlah minimum setiap ubat.

Analisis mengenai sistem semasa dan teknik mencari dilakukan untuk mendapatkan pemahaman yang lebih baik mengenai sistem. Metodologi RAD yang digunakan dalam pembangunan projek ini melaksanakan pembangunan berulang yang sesuai untuk keperluan sistem ini yang berubah dari semasa ke semasa.

Ujian dilakukan setiap fasa kitaran hayat pembangunan untuk memastikan sistem berfungsi dengan baik. Projek ini dibangunkan menggunakan Visual Studio 2010 dan SQL server sebagai platform pangkalan data.

ABSTRACT

E-Management for Drugstore Pharmacy is a computerized system designed for user to manage the stock of the drugs inventory and monitoring the stock facility. This system is acting like stock inventory system that provides alert of expire drugs and minimum quantity of each drugs.

Analysis on the current system and searching technique was done to get better understanding of the system. The RAD methodology was used in this project development implements iterative development which is suitable for this system requirements that changes from time to time.

Testing is done every phase of the development life cycle to make sure that the system working properly. This project was developed using Visual Studio 2010 and SQL server as a database platform.

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LIST OF SYMBOLS

RAD	Rapid Application Development
SRS	Software Requirements Specification
UI	User Interface
SDD	Software Design Document
HMS	Hospital Management System

LIST OF ABBREVIATIONS

RAD	Rapid Application Development
SRS	Software Requirements Specification
UI	User Interface
SDD	Software Design Document
HMS	Hospital Management System
ERD	Entity Relationship Diagram

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The project named "E-Management for Drugstore Pharmacy", a Restorative Data system is a client/server based application. There are still in the minimum circumstance of drug store shop that utilizing the stock inventory system in over the world. Centering in Malaysia as a contextual investigation, the drug specialist itself did not understand the significance and benefits utilizing this system, however, more depends on the manual system simply. So when the new medications or new clumps of the drug arrive in the Drugstore the manual section is done in enroll.

What's more, this additionally took after when the medication is given to any patients. At the point when the month is finished the specialist in the Drugstore need to create the rundown or report physically of the medications in the Drugstore. This work is done to keep up require stock in the Drugstore. This sort of work may prompt slip-up by specialists and prompt real issues. The whole drug specialist must keep an exact tally of their drugs stock inventory. Thusly, it is basic to know the subtle elements of every medication and the stock equalization must be quickly updated because of any endorsed transaction.

1.2 PROBLEM STATEMENT

Drugstore administration has kept the paper record in filling cupboards. Dealing with an extensive drug store will be repetitive and hard to monitor inventories concerning the medications in the store, expiry date, amount of medications accessible in light of the classifications and their functions. Accordingly, stock-outs, overloads, and obsolete materials and their related expenses were a consistent problem.

Previously, if the drugstore office needed to know the lapsed date of the specific medications the drug specialist itself must go and keep an eye on the paper, so this is taking a ton of time. There is as yet least amount of system that ready to give a reminder message or update for the lapsed date for each medication in the stock. With drugstore pharmacy system, we approached continuous and exact information.

What's more, the drug specialist needs to arrange medications to restock the officially decreasing stock. Requesting of medications is been completed manually. A critical measure of time allotted for composing the requests as the drug specialist needs to experience the stock equalization and make an unpleasant gauge of the amount to order. This drug store administration system will incite about medications that are near expiry, keeping those medications from being sold and furthermore giving solution for the prior expressed issues.

1.3 OBJECTIVE

The objectives of this project are to:

i. To design drugstore pharmacy system using structured approach
ii. To develop a prototype of drugstore pharmacy
iii. To validate the prototype system of drugstore pharmacy

1.4 SCOPE

i. System Functionality
   - This system will give convenient to system user on managing related information regarding drug information

ii. System User

   Drugstore Admin
   - The system user must have certified qualification and have the authorities to use the system.

   Pharmacist
   - The system user should be registered by admin first to manage the system data

iii. System Architecture & Platform
   - The system created in a Windows environment
   - The system is using SQL server service to store data

1.5 THESIS ORGANIZATION

` This thesis is divided into 5 chapters and each chapter is divided to discuss the different issue in the project. Below are the summaries for all chapter in this thesis:

Chapter 1 is the introduction. This chapter will discuss an introduction to the system. The problem statement, objective and scope will be identified.

Chapter 2 is about literature review. Here, 4 existing system has been compared and the advantages and disadvantages of current system is identified.

Chapter 3 will discuss about methodology that will be used to develop this system. The flow of this system also will be discuss in this chapter.

Chapter 4 will discuss about the implementation, testing and result for this system. The User Acceptance Test will be run to test the system functionality.

Chapter 5 will discuss about the conclusion. It will discuss the future work to create better system and research constraints. The limit of work load while develop this project.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

The usage of computer systems in the drug store had accelerated rapidly during the last 10 years. They have modified both institutional and community exercises dramatically. A computer system has automatic among the conventional technical capabilities of drug specialist, permitting them to grow their clinical knowledge. The running conditions of the society drug specialist have additionally gone through unprecedented modifications due to computerization. As an instance, prescription refills, which may additionally account for three quarters or extra drug stores. Since the 1990s, it is miles tough to discover many drug stores do not have a few sorts of computer. Many in fact, have numerous. Computerization has even prolonged past the drugstore department into the remainder of the store. Inventory control, point-of-sale facts and certainly some other function inside a drugstore is been computerized.

Normally, E-Management for Drugstore Pharmacy is a system that includes facts entry, retrieval, and stock monitoring facility, era of reports and statistics and others. E-Management for Drugstore Pharmacy focuses on store operation and the way it manages the stock drift with suppliers (external) and departments' dispensary (internal). The system covers normal operations like receiving the drug from suppliers, processing departments' drug requests, distributing the drug to departments, returning the expired drug to providers. The system also affirms an inventory book on stock provides monthly

inventory record and insights on drug consumption. This system keeps track of doctor, drug specialist, sedate and prescription records. It will print receipts of indent, invoice, inventory information, payments, and others.

E-Management for Drugstore Pharmacy is a drug inventory system that includes of tracking inventory facility, data entry, retrieval, alert of expiring drugs and minimum amount of each tablet. String searching technique additionally applied in this system. This method is referring by drugs name, drug code and description of the drugs. Besides, the system constantly checking the date to remind the drug specialist if the drug expired and will remind the drug specialist if the drug reached the minimum quantity. This system offers an alert message in order that drug specialist is able to manage and monitor the drugs stock well.

2.2 EXISTING SYSTEM

There are many existing of drug store inventory systems in the world nowadays. Drug stores operations, as one might expect, lend themselves especially well to stock control procedures because of the need of the provider (the drug store) to take care of the patients' demand for drugs. The requirement for the demand to fulfill the requirements must adjusted against the standard stock expenses (e.g. holding cost, reorder cost, and so forth). While deciding a therapeutic stock strategy, one must think about that interest for drugs can be either deterministic or stochastic. There is a large number of articles relating to stochastic procedures (as connected to the stock hypothesis) to medicate dissemination. This discourse not proposed to incorporate the majority of the work that been done in this field.

Stock control of drugs is essentially an extraordinary case of perishable inventory management hypothesis (which itself an uncommon case of common stock control theory). There is a huge number of articles depicting stochastic stock control. Many of the author note that the majority of the writing on stock models describes demand as deterministic, in spite of the fact that stochastic request more suitable in many cases.

2.3.1 Pharmacy Information & Management System (Pharmatrax)

This system are utilized to consistently combine five clear purposes that are vital to a drug store - prescription, apportioning, billing, acquiring, and inventory management ("Pharmatrax-Company Overview," 2018). This system contains product arrival, purchase order and product maintenance for simple markup on the products. The sales modules are isolated into distinctive sorts of patients such for in-patient, outpatient and walk-in patient. Every sales transaction automatically deducted from the stock amount for automatic stock generated report.

Other module is producing report. The report contains such as sales report, stock allocation, stock development status, monthly report, delivery report, and stock card for item easy evaluation. This system moreover cautions client for any terminating drugs and drugs that needs re-order.

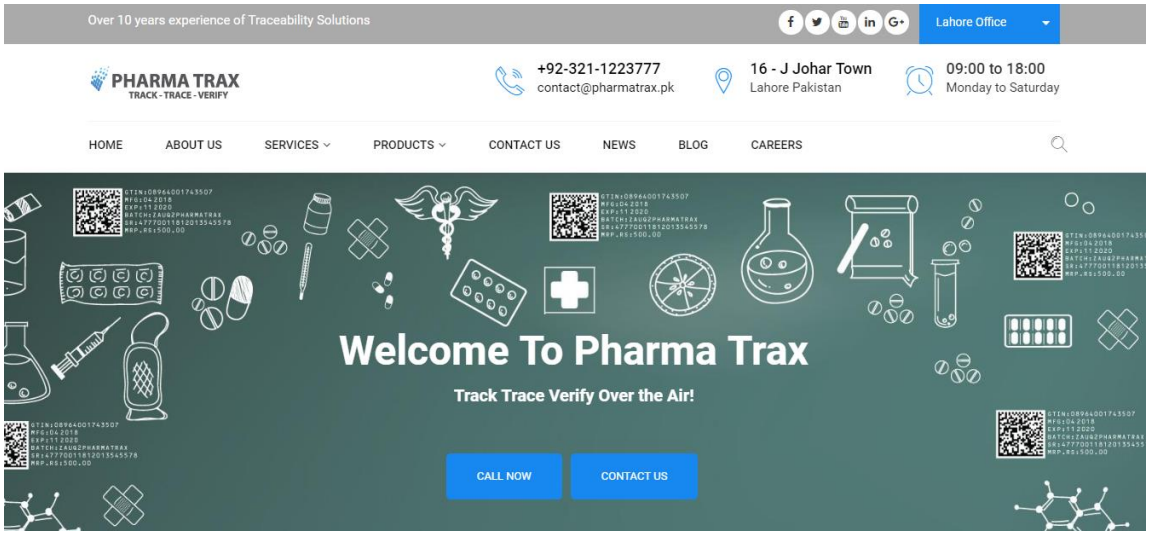


Fig. 2.1. Pharmacy Information & Management System website interface

2.3.2 Hospital Management System (HMS)

Hospital Management System's (HMS) integrated drugstore solution provides online approach to all crucial drug store purposes such as drug administration records and drug names, patient profiles, and drug charges (*Integrated Hospital Management System*, n.d.). One of the drug store modules of this integrated system is simple order section. The system allows the drug store office to submit drug requests by mnemonic code, brand, or general statement. It underpins default values, such as dosage, frequency, route of organizations and standard comments.

Next module is custom made reports. The system incorporate an adaptable implement that can make boundless reports, counting customized observing of workload statistics and medicate utilization. Helpful integration is the last of drug store module. The drug store solution joins with HMS's Laboratory solution to show key lab values that influence patient's health profile. Moreover, it coordinating with HMS's Materials Management solution to give accurate, perpetual inventory system.

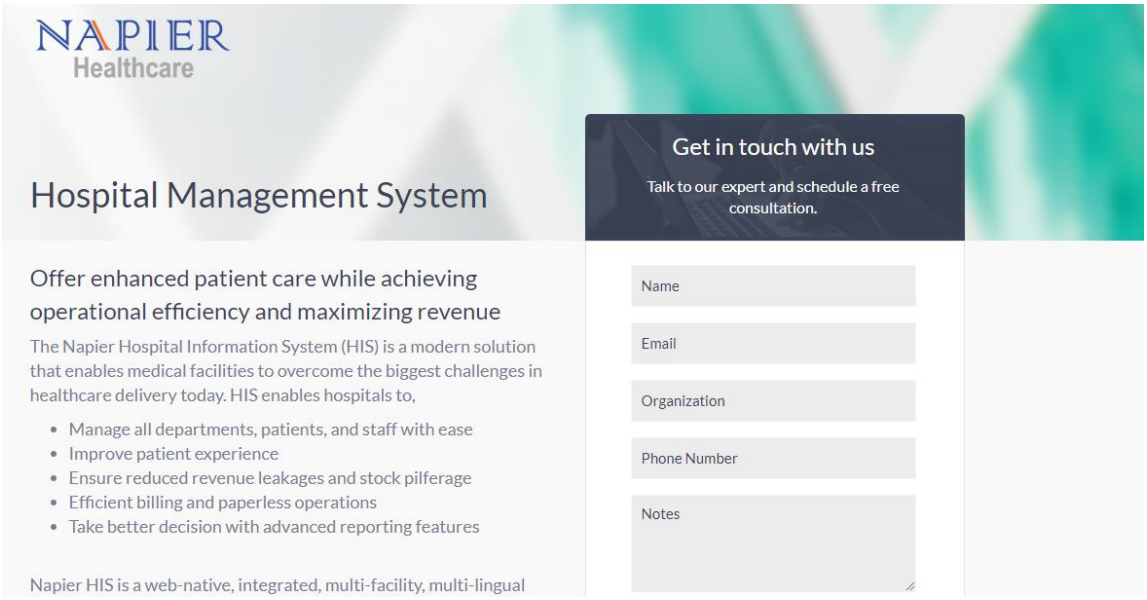


Fig. 2.2. Hospital Management System website interface

2.3.3 Pharmaceutical Management System

The current system focuses on drugstore activity and how it deals with the stock stream with providers (external) and departments' dispensary (inside). The system covers run of the mill tasks like getting drugs from providers, work up department drug demands, disseminating prescription to department, returning expired drug to providers. The system likewise keeps up a stock book on stock in/out details, and gives month to month stock report and measurements taking drugs utilization. Drugstore system patient, specialist, drug and prescriptions record. It will print receipts of invoice, bills, inventory detail and so on.

Drug store system manages every medicinal things. Tasks include enquiry, online approval, maintenances of drug stock, manage request for drug stock from different sub stores, online stock exchange, returning nearly expired drugs, physical stock check and modification, online approval and many other tasks.

First the record of the drugs will be provided by drug provider and supplies it to the store inventory, and afterward the confirmation from departments' pharmaceutical must be requested and then updates both stock and department inventory. Enquires the store inventory and automated perpetual inventory control.

The issues are requested to the providers and the entire stock quantities will be accepted and automatically the amount from store inventory will be updated. After all the procedure was accomplished, all the detail posting of stock in and stock out operation for a given time period, by drug, drug type, and drug supplier ("Pharmaceutical Management System," 2012).

Fig. 2.3. Pharmaceutical Management System website interface

2.3.4 Pharmaceutical Health Information System

The Pharmaceutical Health Information System module, combined with the Purchasing module, give a complete Materials Management Solution for hospitals. Totally incorporated with the Pharmaceutical Health Information System, which the inventory system is automatically recorded and any changes in stock levels are managed in real time throughout the hospital.

When an item is sold, it will recorded immediately and at the same time it visible to inventory users system. As item are charged to a patient's record they are automatically deducted from the store stock. Restoring between stores happens either automatically or semi-automatically, as set up per item per store. When an item have reached minimum level, a purchase request is accessible for preparing in the Purchase Module.

All stock developments presented on the General Ledger. Stock work processes are additionally improved with the option of peripheral devices, for example, hand held stock check devices and full barcode printing and reading functionality. Besides, to automating the normal work process of a drug store, the Pharmaceutical Health Information System (PHIS) gives apparatuses to the venture wide administration of drug organization, critical in the reduction of hazard in the medication administration process.

First module is Traditional and online purchase. This is bolster for either coordinated web based requesting by doctors or unified request information passage by drug specialists utilizing manually written requests transmitted to the drug store utilizing the Pharmaceutical Health Information System archive imaging highlight. Online stock level access additionally bolster in this system. Combination to the Pharmaceutical Health Information System gives precise real time drug stock levels. The measurement suggestions is available that recommends fitting measurements and frequencies upon drug choice.

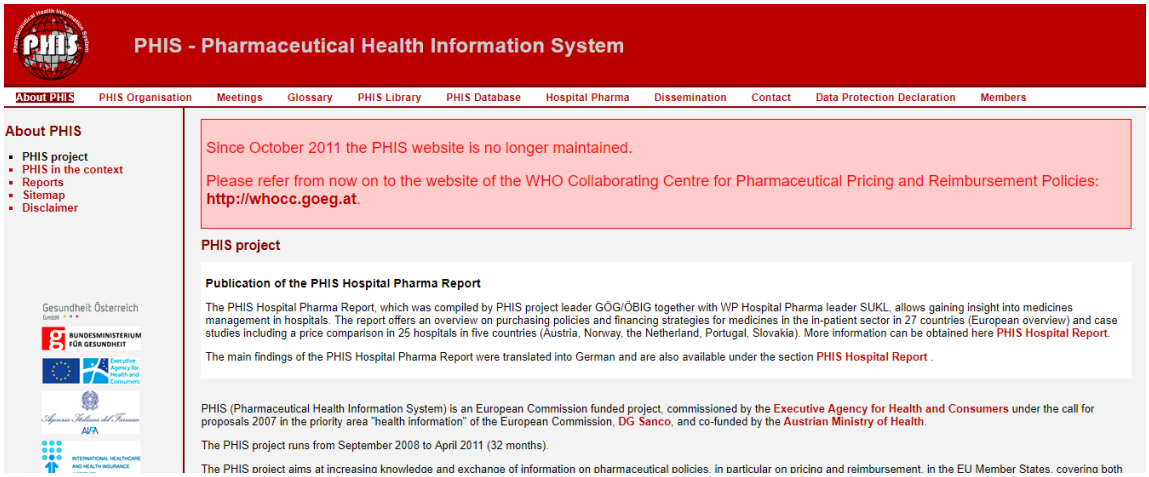


Fig. 2.4. Pharmaceutical Health Information System website interface

2.3 THE COMPARISON OF EXISTING SYSTEM

The comparisons of existing systems are shown in **Table 2.1**.

Table 2.1: The Comparison of Existing Systems

System	Package	Alert Expire Date	Ordering	Bar Coding
Pharmacy Information & Management System (Pharmatrax)	Alone	Yes	No	No
Hospital Management System (HMS)	Integrated	No	No	No
Pharmaceutical Management System	Alone	No	No	No
Pharmaceutical Health Information System (PhIS)	Integrated	No	Automatic	Yes

2.4 ADVANTAGE AND DISADVANTAGES OF CURRENT SYSTEM

The list of advantage and disadvantages of current system is shown in **Table 2.2**.

Table 2.2: Advantage and Disadvantages of Current System

Advantage	Disadvantages
Utilize coordinated checking, where the compact unit shows every item to be tallied, or with bar coding where the user simply scans the standardized tag for every item and then enters the quantity	Unable to detect and no cautioning for the terminated date and minimum quantity for every drugs in the stock
	No searching technique applied for identifying drugs that suitable for the disease

2.5 CONCLUSION

In this chapter, the method and technique along with the four existing systems and its limitation has been focus. Each system had their own advantages and disadvantages whereas it can be merge to develop proposed system based on the project that has been made.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter will cover the chosen methodology that will used to complete this project. There are variety of methodology in software development process such as Spiral, Agile Methodology, Waterfall and so on. The development process in very important to ensure all the development of system work efficiently and smoothly.

3.2 RAPID APPLICATION DEVELOPMENT APPORACH

In order to complete this project, RAD methodology will be utilized. RAD or Rapid Application Development methodology is the best and suitable software development process for E-Management for Drugstore Pharmacy system. RAD methodology is chosen because the development of system take a short period of time with good quality. This methodology encourages to develop the main part of the system before adding any features to avoid the decrease of development time.

Figure 3.1 shows process of RAD methodology. There are 4 phase in RAD, which are:

I. Analysis and quick design
II. Prototype cycle:
III. Testing
IV. Development

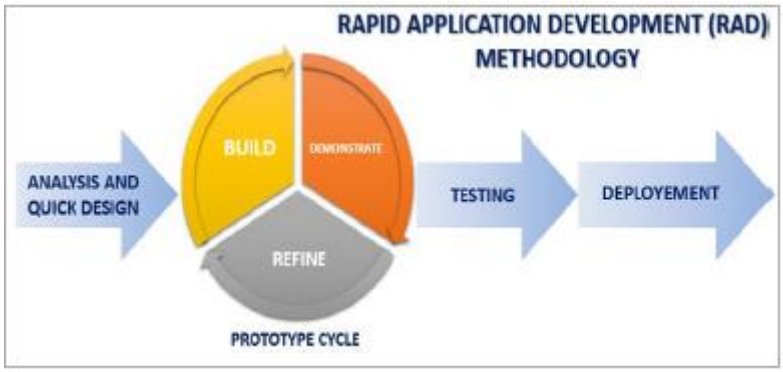


Fig. 3.1 Rapid Application Development (RAD) methodology

3.2.1 Analysis and Quick Design

The cycle for RAD start with analysis and quick design. All requirements for E-Management for Drugstore Pharmacy system are discovered in this phase. At the beginning of project period, the date to meet supervisor is set to discuss about the flow of this system. After that, meeting with client to gather information and collect the important requirements for this system.

Besides, the objective, problem statement, and requirements of the project are defined. After meet the client, a lot of observation has been made. Meeting with the client must be often to ensure all information is gathered. All information for this system is collected from observations.

Furthermore, existing system and existing project are identified to get some extra information. From existing system, some issues and problems are discovered. Besides, during this phase, the notification alert has been studied. The pharmacy will be notify by the system 14 days before the date of expired date. To check if the medicine has reached its minimum quantity, they do it manually not automatically.

3.2.2 Context Diagram

Figure 3.2 shows the context diagram. Context diagram shows the relationship between the system and other external entities. User of this system should login to view and manage data in the system. Here, there are two external entities of user which are Drugstore Owner and Pharmacist. Drugstore owner responsibilities to register account for new user/pharmacist, and then the pharmacist can login to the system. Pharmacist lead big role to manage all the transaction and medicine data while the owner can only view the data.

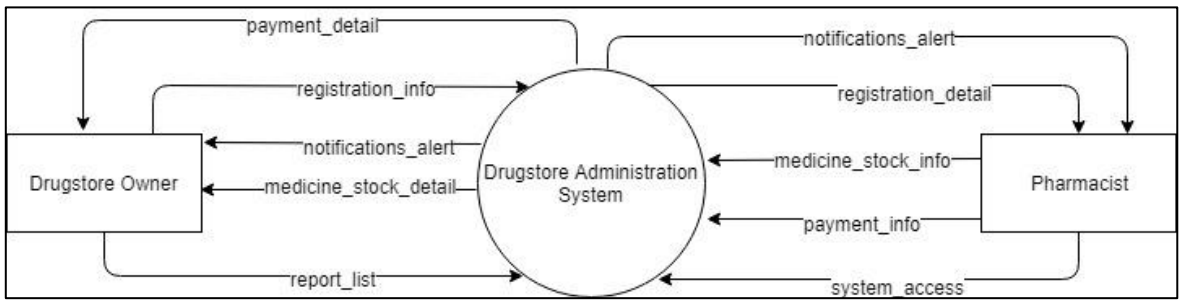


Fig. 3.2 Context Diagram

3.2.3 Use Case Diagram

Figure 3.3 shows use case diagram. It shows the relationship between user and a system.

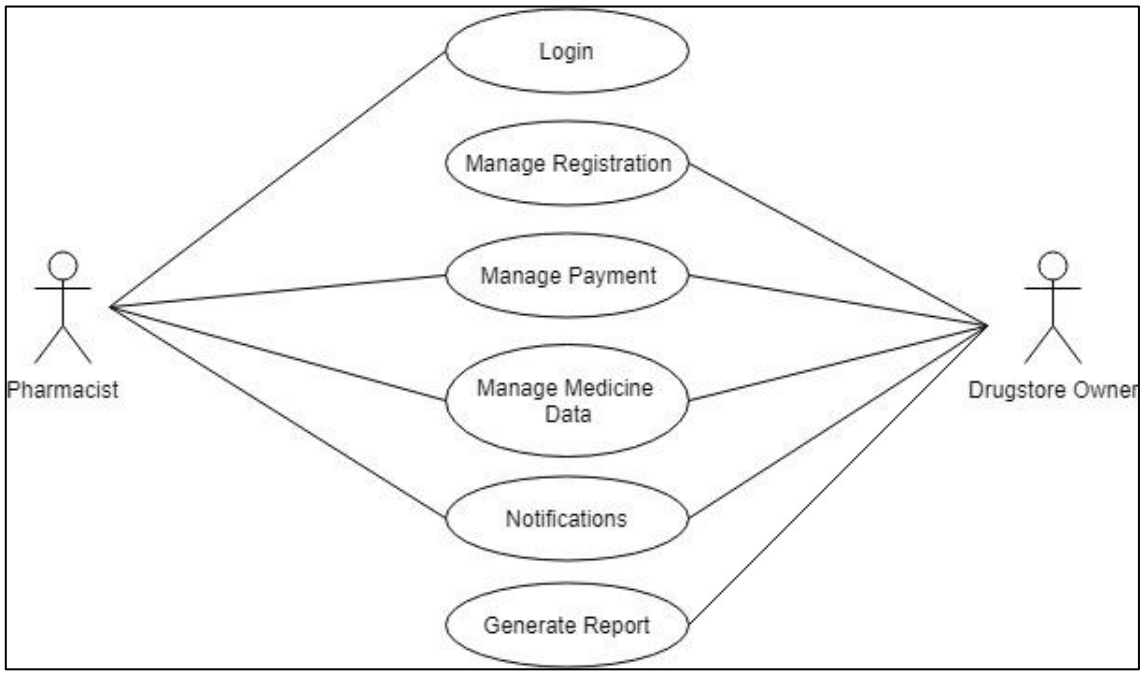


Fig. 3.3. Use case diagram

3.2.4 Data Dictionary

A data dictionary shows the number and its attributes in one database. Data dictionary provides description to allows people easily understand the input needed.

1) REGISTRATION

This table will store the information of registered user. The user details store in this table.

Table 3.1 REGISTRATION Table

Field Name	Description	Data Type	Constraint
firstname	First name of staff	VARCHAR(50)	
lastname	Last name of staff	VARCHAR(50)	
NRIC	Staff identity card number	VARCHAR(50)	
email	Staff email address	VARCHAR(50)	
phonenumber	Staff contact number	VARCHAR(50)	
username	Staff username	VARCHAR(50)	PK
password	Staff password	VARCHAR(50)	

2) SUPPLIER

This table store all the transactions data with supplier. From this table, a payment report can be generate.

Table 3.2 SUPPLIER Table

Field Name	Description	Data Type	Constraint
supplierID	Payment ID	INT	PK
supplierName	Payment date	DATETIME	
MedID	Medicine ID	INT	FK
medicineName	Payment amount	DOUBLE	
quantity	Payment balance	DOUBLE	
totalPrice	Medicine ID	INT	
paymentType	Medicine name	VARCHAR2(50)	

3) **ADDMEDICINE**

This table will record stock in and stock out of medicines. Notifications event are based on this table data.

Table 3.3 ADDMEDICINE Table

Field Name	Description	Data Type	Constraint
medID	Medicine ID	INT	PK
medicineType	Medicine type	VARCHAR(50)	
medicineName	Medicine name	VARCHAR(50)	
dayManufactured	Manufactured day	NCHAR(10)	
monthManufactured	Manufactured month	NCHAR(10)	
yearManufactured	Manufactured year	NCHAR(10)	
dayExpired	Expiry day	NCHAR(10)	
monthExpired	Expiry month	NCHAR(10)	
yearExpired	Expiry year	NCHAR(10)	
medicineQuantity	Quantity of medicine	INT	
price	Price of medicine	FLOAT	
medicineDescription	Description of medicine	VARCHAR(50)	

4) SUPPLIERDETAILS

This table will store the supplier details. In the payment page, supplier details will be selected from database.

Table 3.4 SUPPLIERDETAILS Table

Field Name	Description	Data Type	Constraint
supplierID	Notification type	INT	PK
supplierName	Medicine expired date	VARCHAR(50)	
supplierAddress	Medicine quantity	VARCHAR(MAX)	
supplierContact	Medicine ID	VARCHAR(50)	
supplierEmail	Medicine name	VARCHAR(50)	
supplierPerson	Notification date and time	VARCHAR(50)	

3.2.5 Entity Relationship Diagram (ERD)

Figure 3.4 shows the relationship of each table in E-Management for Drugstore Pharmacy system.

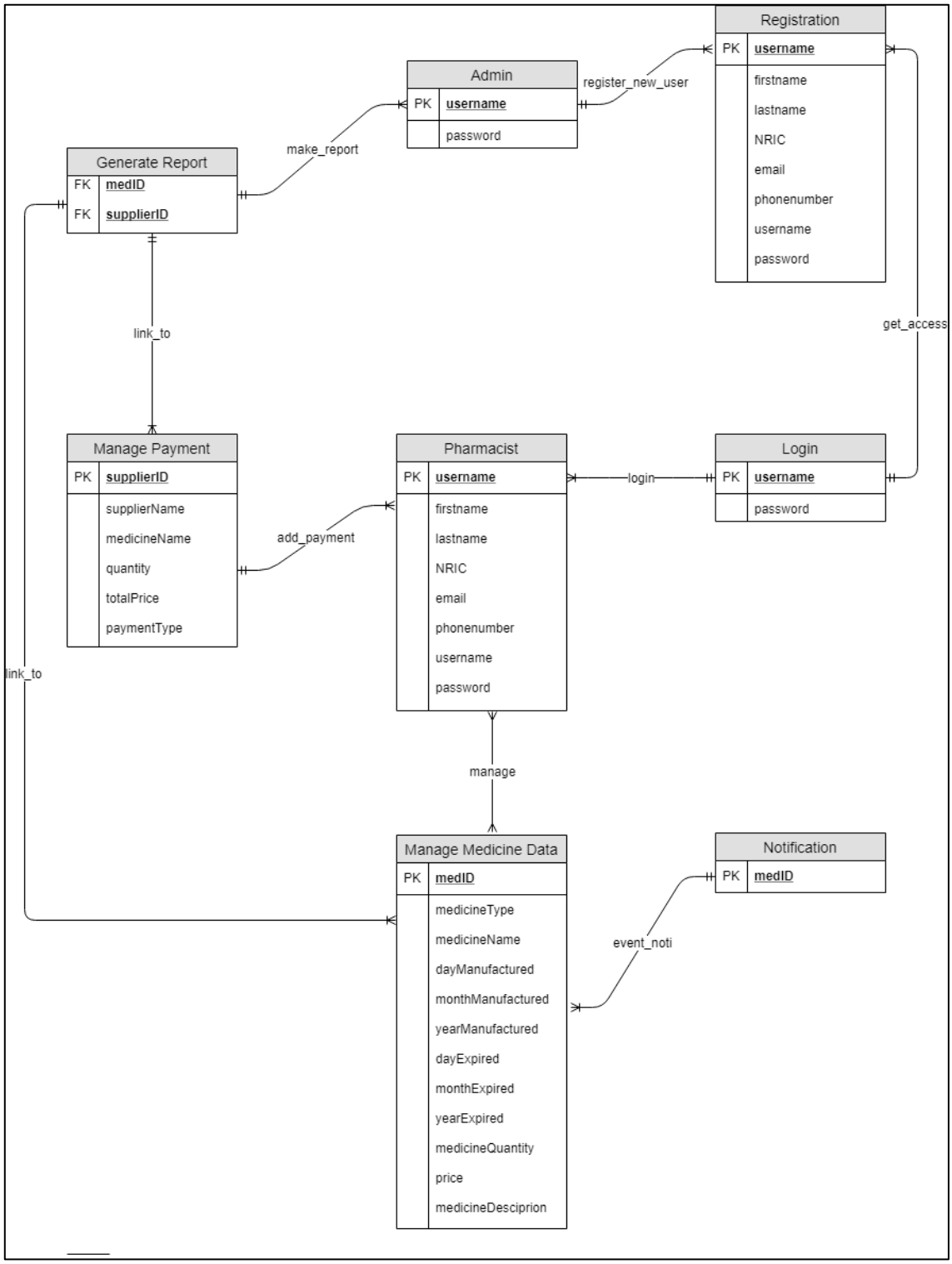


Fig. 3.4. Entity Relationship Diagram (ERD)

3.3 PROTOTYPE CYCLE

The next phase is prototype cycle. It consists of build, demonstrate and refine. After analyze the hardware and software, the system will be code at this time. Visual Studio 2013 or 2016 will be used to make this system. Meanwhile, java, c++, php, html will be used to set up the codes. The process will be focus on each phase to figure the best solution in developing the system.

The status of the system will keep demonstrate and update to the user after being build the system. All the process will be shows and explained to the users. The function of the system will be explained detail to the client. This is because to ensure all the requirements has been fulfill within the scope of users. If the requirements are not satisfied, the changes will be made.

3.4 TESTING

Next phase is testing. The system will be test to ensure it is free from error and work correctly based on planning. The database will be testing in this phase. The data need to passing correctly between the database and interfaces. Debugging will be made to eliminate existing errors. In additional, acceptance test need to be prepared to tested by the users. This is to make sure the system follow the flow and the system is done based on user requirements.

Table 3.5 shows the user acceptance test and figure 3.12 shows the example of system testing approval.

No	Acceptance Requirement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	User can register and the data successfully stored in the database					
2.	The system provide recovering features such as forgot password etc.					
3.	The system is user-friendly and easy to handle or control					

4.	User can generate tabulated report based on payment details					
5.	The system provide an alert or message that make user alert with the inventory environment					
6.	The system able to do calculation correctly based on the provided details					
7.	The system can perform searching technique and the searching method is efficient					

Table 3.5 User Acceptance Test (UAT)

	Name	Date
Verified by: Developer		
Approved by: Client		

Table 3.6 System Testing Approval

3.5 DEPLOYMENT

The last phase is deployment. At this phase, the system will be demonstrated to the user. User will check and evaluate the system. Web application and database are required in this system. Hence, to use web application, it is need to be deployed in localhost environment.

3.6 SOFTWARE AND HARDWARE

The subtopic below are the description of software that will be used in this system.

3.6.1 Software

Table 3.8 shows software that will be used in this system.

Software	Description
Windows 8.1	To develop the project and download other software
XAMPP	To store data and information to the database
Visual Studio 2010	To design interface for web application
Microsoft office	To prepare the document

Table 3.7 Software and description

3.7 GANTT CHART

Figure 3.13 shows the Gantt chart for develop this project.

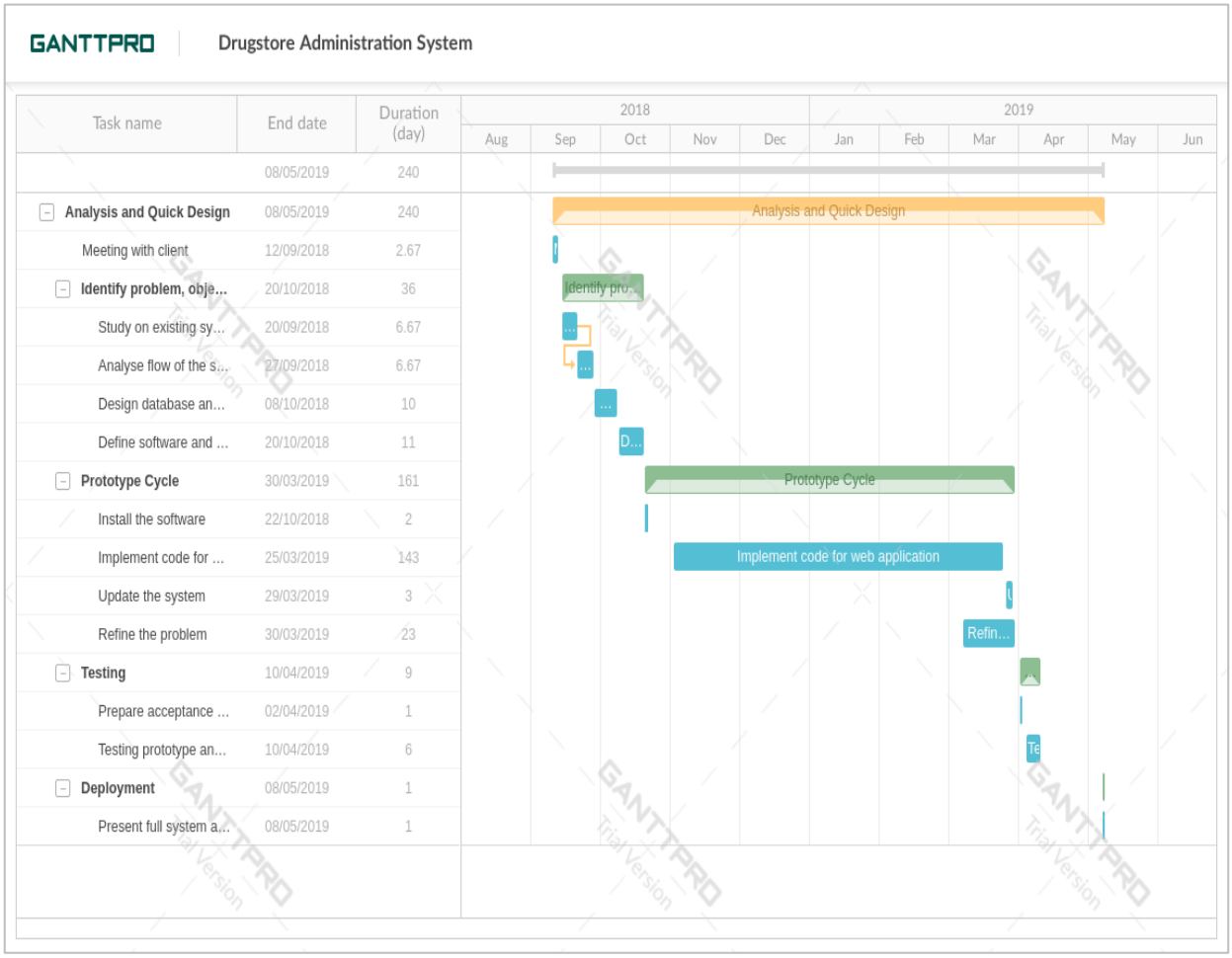


Fig. 3.13. Gantt Chart

3.8 CONCLUSION

This chapter explain about methodology that being used and shows the flow for E-Management for Drugstore Pharmacy system. RAD methodology is the most suitable method for this project. It can helps the developer to develop the system efficiently.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

Chapter 4 will explain about the implementation, testing and result for E-Management for Drugstore Pharmacy system. The testing is done to ensure the system is complements with the system analysis and design. The testing includes testing of the whole functionality of the system in order to ensure there is no errors that will affect the system functionality.

Web application will be implemented in the laptop. All the data will be send into database. Web application was implemented using C Sharp, CSS, HTML and javascript. All the interfaces will be explained in this chapter. PDF report will be generated using web application.

4.2 DEVELOPMENT

Setting up a locally-hosted environment is a critical advance in any development project. Doing this empowers to securely test the site's highlights and usefulness, on a site that is totally private. In this project development, XAMPP has been used as a localhost which is as web server development.

XAMPP stands for Cross-Platform (X), Apache (A), MariaDB (M), PHP (P) and Perl (P). XAMPP is a free and open source package developed by Apache Friends, consisting mainly of the Apache HTTP Server, MariaDB database and interpreters for scripts written in the PHP and Perl programming languages. There, so many things can be tested such as modules, explore different avenues regarding topics and coding, and do other advancement activities securely. Figure 4.1 shows XAMPP control panel.

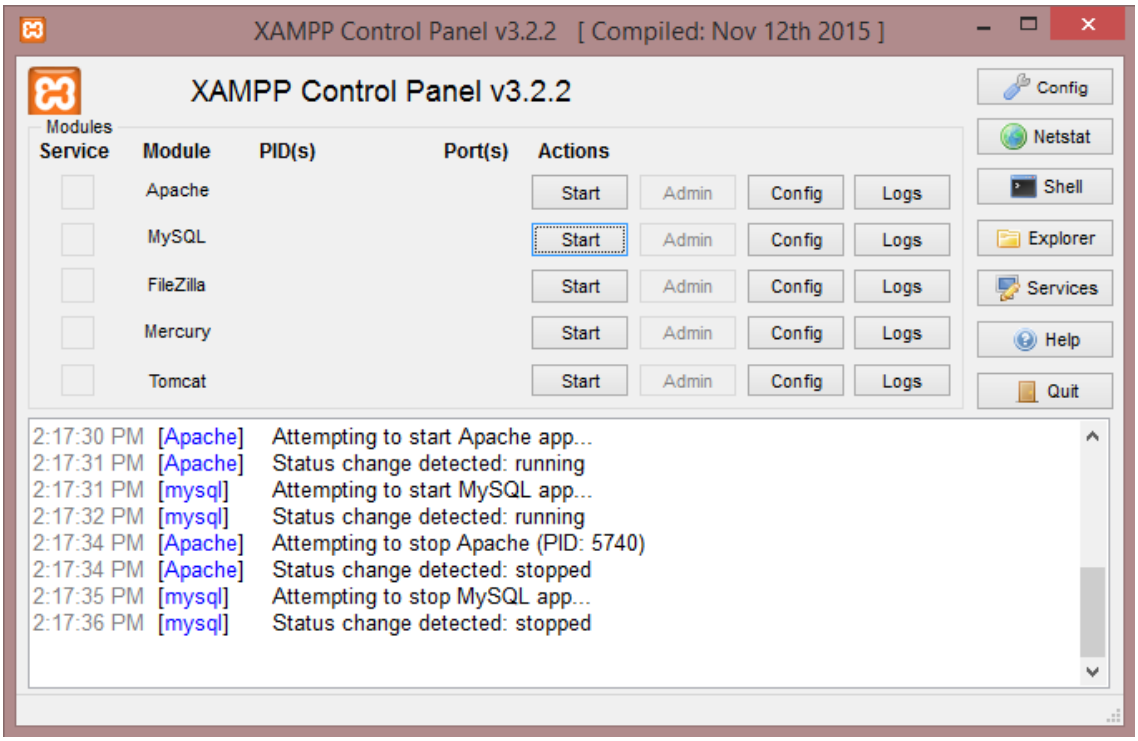


Fig. 4.1. XAMPP Control Panel

4.2.1 Development Environment

This part will explained about the set up code behind the interfaces. The languages that been used in developing this project is C#, CSS, html and javascript. C sharp or C# is a programming language intended for structure wide scope of enterprise locations that running on the .NET System. The objective of C# is to give a straightforward, safe, modern, object-oriented, high performance, powerful and durable language for .NET improvement. Additionally, it empowers designers to build solutions for the broadest scope of clients, including web applications, Microsoft Windows Structured based applications, and smart client gadgets.

1) Add New User Source Code

To use system configuration, the "*using System.Configuration*;" reference should be added. *ConfigurationManager* is the class which helps to read data from configurations and provides access to configuration files for client applications.

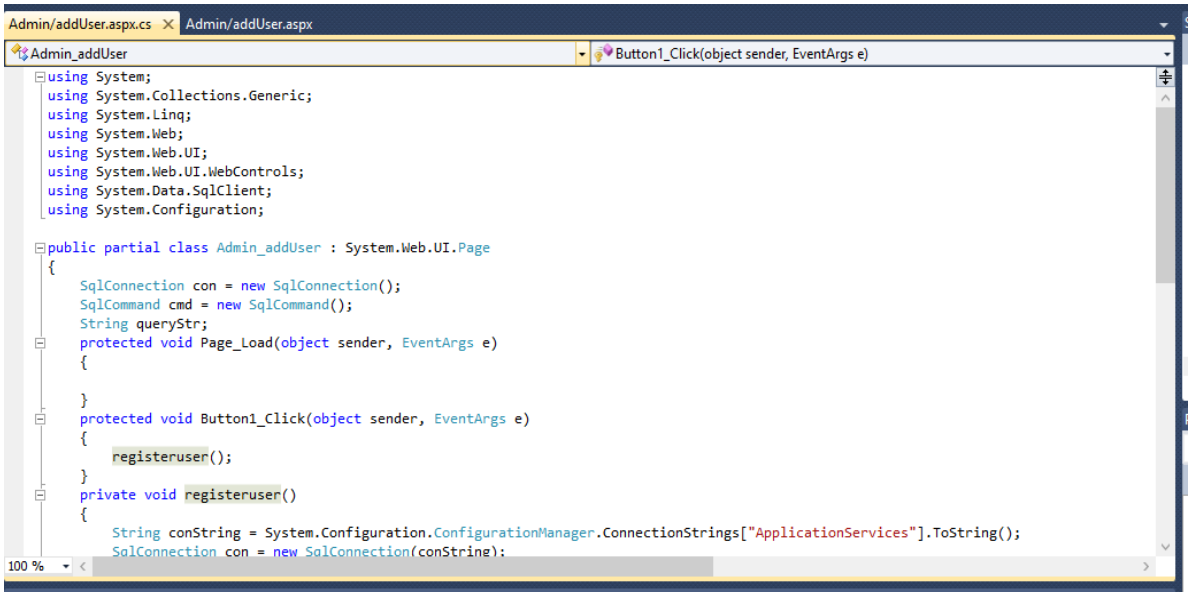


Fig. 4.2. Add New User Code (Part 1)

The ***System.Data.SqlClient*** namespace contains the provider-specific ADO.NET objects used to connect to a SQL Server 7 or SQL Server 2000 database, execute a command, and transfer information to and from a ***DataSet***. The SQL Server .NET provider is optimized for accessing the SQL Server data source protocol.

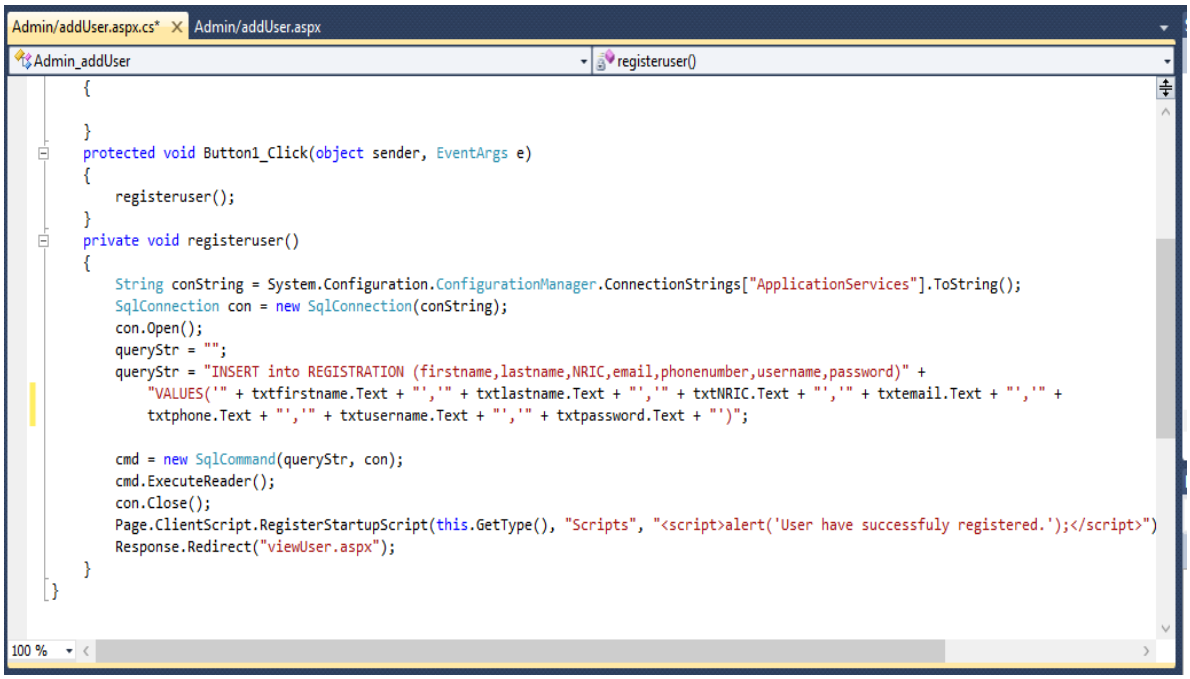


Fig. 4.3. Add New User Code (Part 2)

2) Search for Medicine Information Code

Cmd.Parameters.AddWithValue() is used to pass database parameter list to a function.

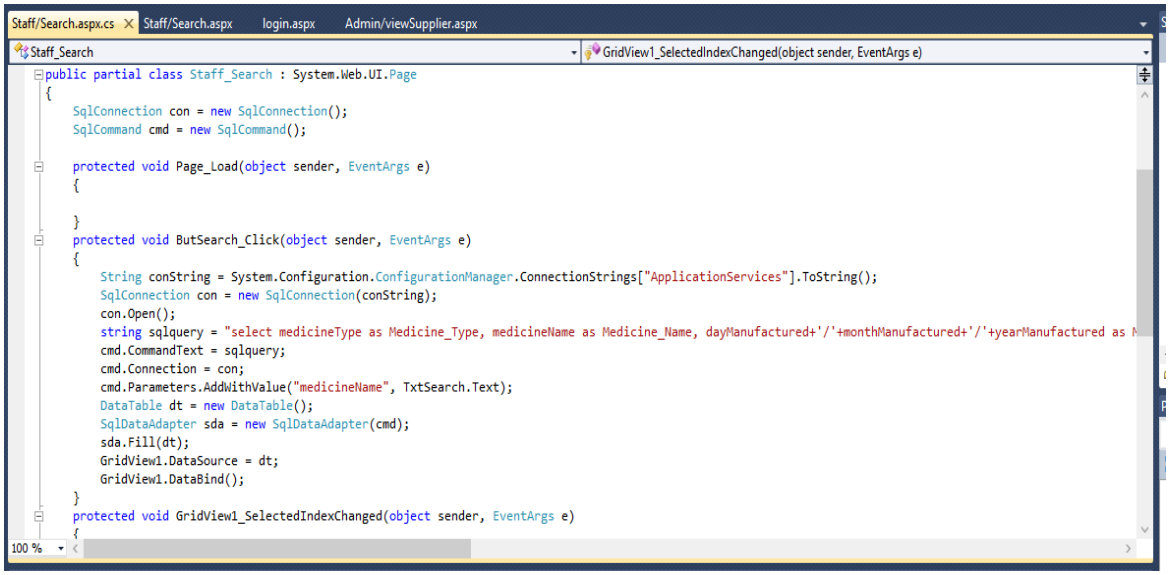


Fig. 4.4. Search for Medicine Information Code

3) Payment to Supplier Source Code

Here, there are two different type of Data Field. DataTextField refers to what would be displayed in dropdownlist. DataValueField refers to what value would it get on selection in code that we may require to implement some business logic.

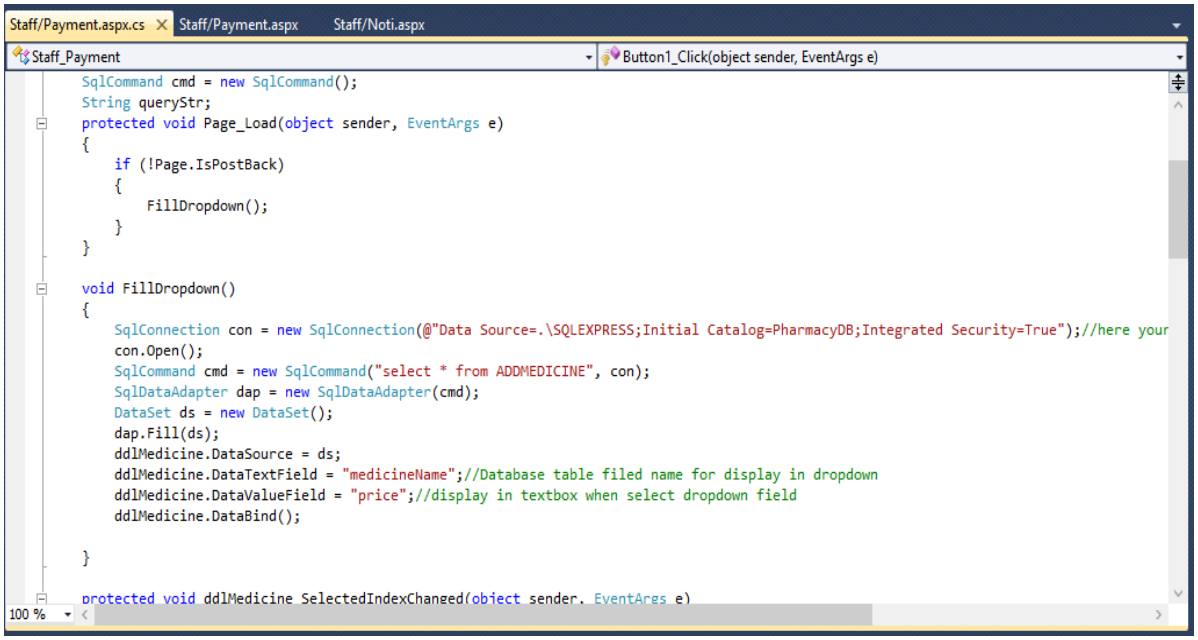


Fig. 4.5. Payment to Supplier Code (Part 1)

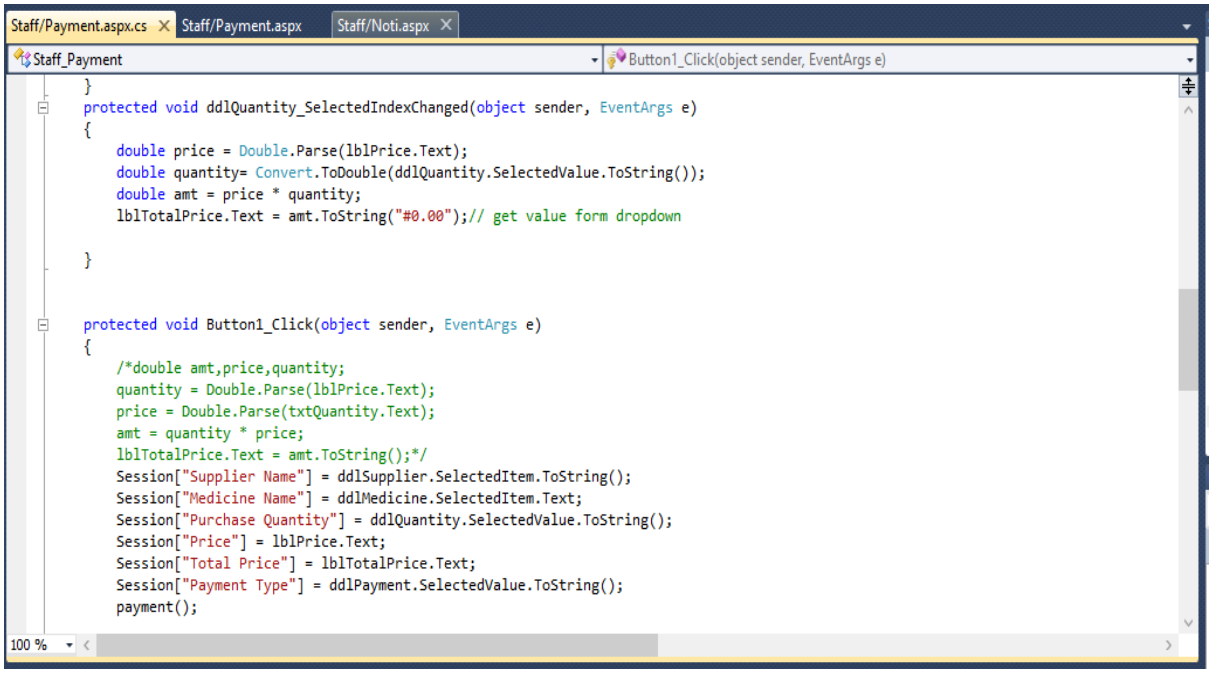


Fig. 4.6. Payment to Supplier Code (Part 2)

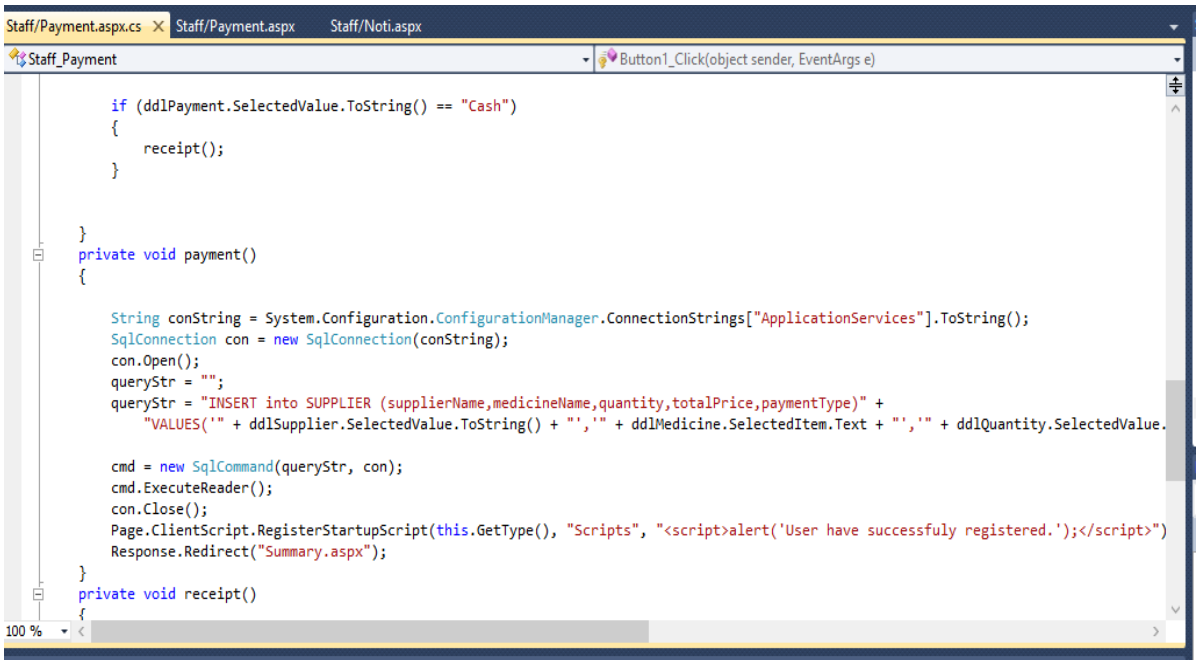


Fig. 4.7. Payment to Supplier Code (Part 3)

4) Add Supplier Source Code

Fig. 4.8. Add Supplier Code

5) Generate Report Source Code

To generate pdf report, iTextSharp file should be installed first through manage Nuget. Then, add it as reference in the project. Add two namespaces in top of .cs page.

```
1. using iTextSharp.text;
2. using iTextSharp.text.pdf;
```

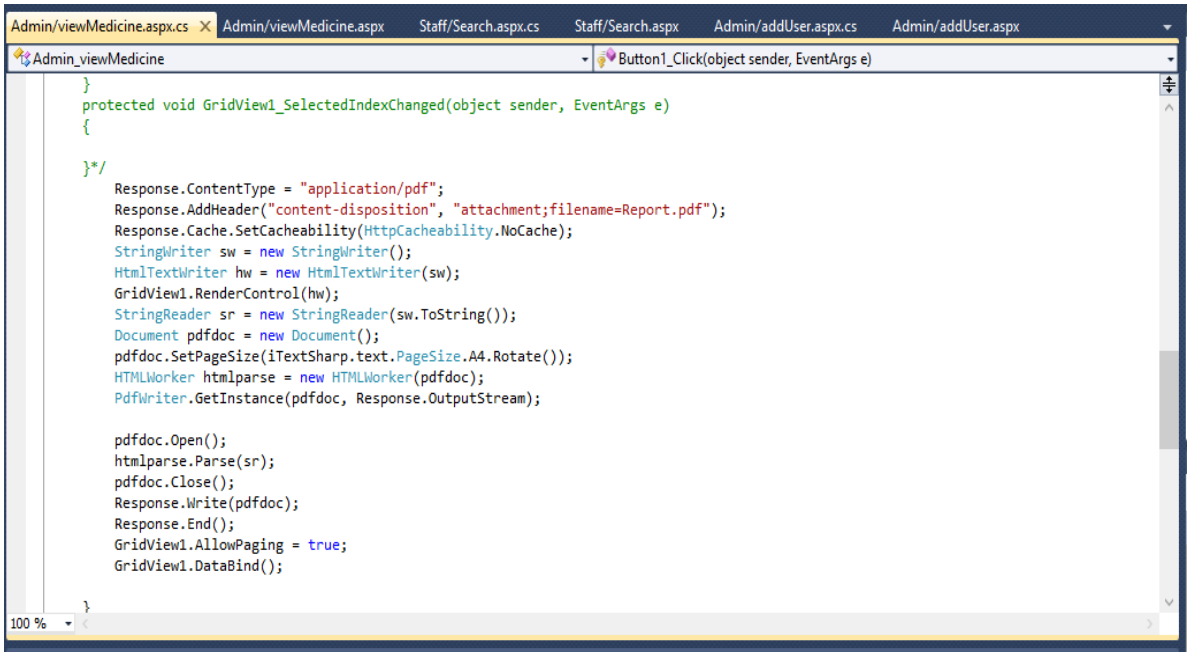


Fig. 4.9. Generate Report Code

4.3 IMPLEMENTATION

During implementation process it is important to consider hardware and software installation. To ensure this project is complete and successfully develop as needed, the software and hardware need to choose properly. This is important to avoid any problem in the future.

4.3.1 System Functionality

User Interface (UI) design is the wat toward making interfaces in software or modernized gadgets with an emphasis on looks or style. Designers aim to make designs clients will discover simple to utilize and pleasurable. UI configuration normally alludes to graphical UIs yet in addition incorporates others. UI configuration is an art that includes building a basic piece of the client experience.

1) Login Page

User need to login before access the system. There are two users which is admin and pharmacist.

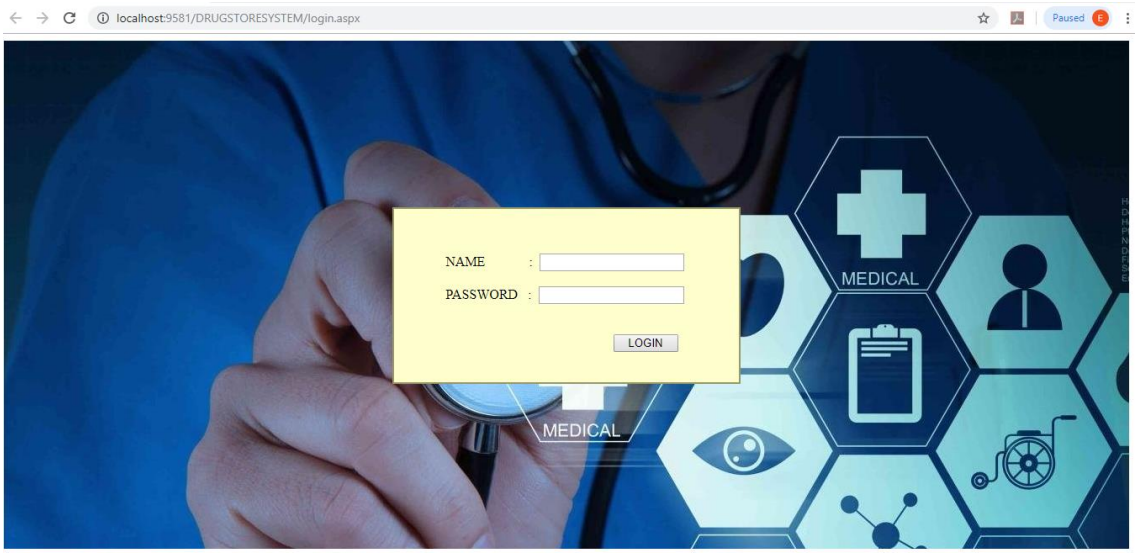


Fig. 4.10. Interface of login page

2) Register Page

Before pharmacist can access the system, admin will register an account for the pharmacist. The username of pharmacist is taken from 4 last digits in NRIC number. The password is also setup by admin.

Fig. 4.11. Interface of register page

3) Home Page

The homepage include home, manage registration, contact us and generate report menus for admin. For staff, there is manage medicine data menu such as add medicine data, delete medicine data, view medicine data and update medicine data.

Fig. 4.12. Interface of home page

4) Medicine Info Page

User can add, view, delete and edit medicine information. User also can search for the medicine information by type in medicine name. Here, only staff can manage medicine data. Admin can only view the data.

Fig. 4.13. Interface of medicine info page

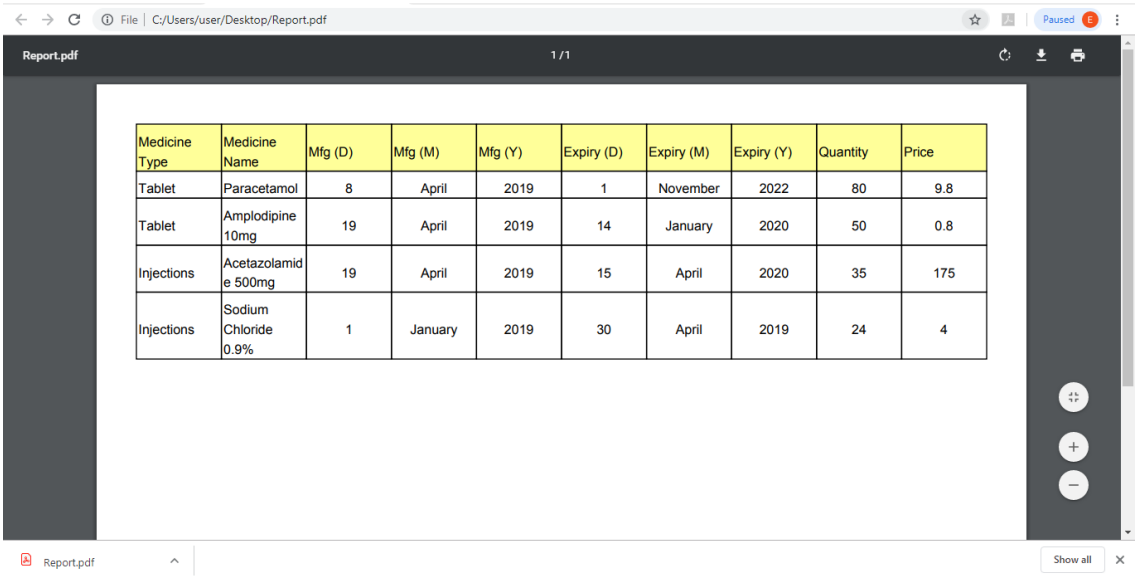
5) Payment Page

User add payment, enter items detail and the system will calculate the total price. This type of payment, when pharmacist want to purchase or restock the medicine. This kind of payment in done to supplier. This part is done by pharmacist while admin can only view the payment details.

Fig. 4.14. Interface of payment page

6) Generate Report Page

Generate report is done by admin. User can generate payment and medicine data report. The report is in a tabulated data. User can download the report.



Medicine Type	Medicine Name	Mfg (D)	Mfg (M)	Mfg (Y)	Expiry (D)	Expiry (M)	Expiry (Y)	Quantity	Price
Tablet	Paracetamol	8	April	2019	1	November	2022	80	9.8
Tablet	Amplodipine 10mg	19	April	2019	14	January	2020	50	0.8
Injections	Acetazolamide 500mg	19	April	2019	15	April	2020	35	175
Injections	Sodium Chloride 0.9%	1	January	2019	30	April	2019	24	4

Fig. 4.15. Interface of generate report page

7) Notifications Page

User will receive alert notification if medicine has reached its minimum quantity level. The minimum quantity level for medicine is 30.

Fig. 4.16. Interface of notifications page

4.4 TESTING

Next phase is system testing. Testing phase is important to ensure the system is running without an error and follow the requirements as stated in the document.

Besides, the database will be testing in this phase to ensure it can retrieve data successfully from the database such as insert, delete, update, and view data. The data need to passing correctly between the interfaces and database. The error detected has been solved so that the system run smoothly.

Moreover, the User Acceptance Test or UAT should be prepared. The system will be tested by user to ensure that the system follow the user requirements. The user will evaluate the system and do the acceptance test.

4.4.1 Testing Report

Figure 4.16 shows User Acceptance Test.

Project Title: E-Management for Drugstore Pharmacy

Testing Period: 23 April – 28 April 2019

No	Test Steps	Expected Results	Pass/Fail
1	Generate report and download in pdf	User can generate tabulated report and download the report in pdf	Pass
2	The system is user friendly and flexible	The system provide recovering features such as forgot password etc.	Fail
3	Retrieve data from database	User can register and the data successfully stored in the database	Pass
4	System reminder as an alert	The system provide an alert or message that make user alert with the inventory environment	Pass
5	Perform successful calculation based on medicine details	The system able to do calculation correctly based on the provided details	Pass
6	Apply searching technique	The system can perform searching technique	Pass
7	Log in to the system	Logged to E-Management for Drugstore Pharmacy System	Pass
8	Manage medicine data	User can edit, view, delete and add medicine information	Pass
9	Manage payment	User can add payment details	Pass

Fig. 4.16. User Acceptance Test

CHAPTER 5

CONCLUSION

5.1 INTRODUCTION

The purpose of this chapter is to make conclusion regarding the whole process in developing E-Management for Drugstore System. From this document, we can identify what technique or methodology is needed to develop the system. This chapter will discuss about the objective of the whole proposal, things that cannot be achieved, and future problem that might occur in the system.

5.2 RESEARCH CONSTRAINTS

The constraints for this system development are the system can only be used in the pharmacy itself. It cannot be used outside the pharmacy. Any user that have permission to access the system should be registered first by admin. They cannot register in their own. The password of user account cannot be changed. The time also limited to develop this project this is due to lack of experience in web application development. The most important thing to successfully develop this project is internet connection to search for information regarding to the system flow.

5.3 FUTURE WORK

There are several enhancement and improvement to be done for future work in order to create better system. The scanner to add medicine data automatically. Just scan the medicine and user just enter the medicine quantity. The system should be able to be used outside the pharmacy so that the system is flexible and easier for the user. The system can be access using smart phone whether it is iOS platform or android platform. It is like app lite that easy to be used and user friendly. The system also can be used for customer just to view medicine information so that they know what type of medicine and what the purpose of the medicine.

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2018

SOFTWARE REQUIREMENT SPECIFICATIONS (SRS)

E-MANAGEMENT FOR DRUGSTORE PHARMACY

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Universiti Malaysia Pahang
Bachelor of Computer Science (Software Engineering)

TABLE OF CONTENTS

1.0 PRODUCT DESCRIPTION

1.1 User Characteristics

There are four (4) types of users for Drugstore Administration System: Drugstore Owner, Pharmacist.

Table 1.1 User Characteristics

User	Education level	Background experience
Drugstore Owner	Experts	Be responsibility to generate monthly report and has staff ID. Must be the one who knowledged to manage the whole system.
Pharmacist	Intermediates	Pharmacist has wide view about the medicines and should be able to provide customer with medical information, causes and treatment for the symptoms and has staff ID.

1.2 Constraints

Below is the list of constraints for Drugstore Administration System:

1. Drugstore Owner will generate user name and password for the pharmacists.
2. Must have internet connection to use the system.
3. The username is taken from 4 last digits in NRIC numbers.
4. The system should provide use of icon and toolbars on user interface.

2.0 INTERFACE REQUIREMENTS

2.1 User Interface

User Interface Name	Description
Registration Interface	To register new user
Login Interface	To get access to the system with login to the system
Homepage Interface	Homepage that consist of payment, medicine info, generate report and register menu
Add Medicine Data Interface	To add medicine information
Update Medicine Data Interface	To update medicine information
Delete Medicine Data Interface	To delete medicine information
View Medicine Data Interface	To view medicine information
Notification Interface	Reminder for medicine quantity
Contact Us Interface	Contact details of system
Payment Interface	To add new payment

Generate Report Interface	To generate report based on the payment details and medicine details
Add User Interface	To add user details
Delete User Interface	To delete user details
View User Interface	To view user details
Update User Interface	To update user details

2.2 Hardware Interface

Not applicable

2.3 Software Interface

Not applicable

3.0 SOFTWARE PRODUCT FEATURES

3.1 Use Case Login

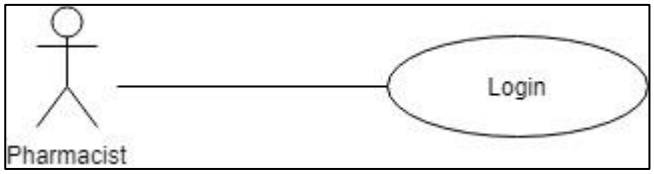


Figure 3.1 Login Use Case Diagram

Table 3.1 Use Case Login

Use Case ID	SRS_REQ-01-00
Brief Description	This use case is for user to login to the system
Actor	Pharmacist
Preconditions	• User should have existed account • Access to a terminal which has access to the system network
Basic Flow	1. User selects the login button on the screen 2. The system will prompts for username and password 3. The user enters the required information 4. The system validates the input of the user and the appropriate user interface is display (**E-1: Invalid username or password**)
Alternative Flow	N/A
Exception Flow	**E-1: Invalid username or password** 1. User can click Forgot Password! button 2. The system will prompts for email address linked to that account

	3. User enters the required information 4. The system will send reset password link to the email address 5. User check their email address to create new password for their account
Post-Conditions	• The user is successfully logged to the system
Rules	N/A
Constraints	**C-1: Password combination** - User should include uppercase and lowercase letter and number in their password (reset password).
Sequence Diagram	Refer Appendix A -2.1.1

3.2 Use Case Manage Registration

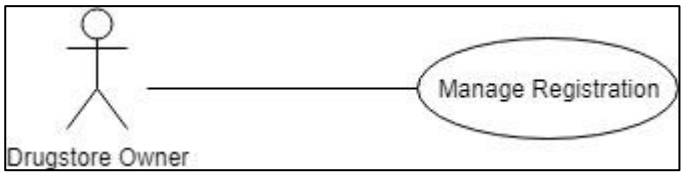


Figure 3.1 Manage Registration Use Case Diagram

Table 3.1 Use Case Manage Registration

Use Case ID	SRS_REQ-02-00
Brief Description	The Drugstore Owner view, delete and registers new user
Actor	Drugstore Owner
Preconditions	• Login page is displayed (it contains option to register for new user)
Basic Flow	1. Drugstore owner can add, delete and view user 2. If owner selects add registration: 3.1 The system prompts for user details 3.2 Owner enters the staff information 3.3 Identity card number as staff ID 3.4 Password are created by drugstore owner 3. If owner selects delete registration: 3.1 If user/pharmacist no longer available in the pharmacy surrounding, the owner can remove user from the system 3.2 Owner select which user should be deleted from the system 3.3 The system will automatically delete all user details 4. If owner selects view registration: 7.1 Owner able to view the registered user information
Alternative Flow	N/A

Post-Conditions	• User is registered and information is updated
Rules	- The deleted user no longer available to access the system
Constraints	N/A
Sequence Diagram	Refer Appendix A -2.1.2

3.3 Use Case Manage Payment

Figure 3.1 Manage Payment Use Case Diagram

Table 3.1 Use Case Manage Payment

Use Case ID	SRS_REQ-04-00
Brief Description	This use case is for user to manage the payment and other transaction details
Actor	Pharmacist
Preconditions	User is logged to the system
Basic Flow	1. This use case starts when user want to add payment for customer payment 2. The system will calculate all the item price and customer need to pay the total price of the item 3. User take cash from customer and give the chance if there is any **(A-1: Payment via credit card)** 4. System will generate receipt from every transaction 5. User give the receipt to the customer as payment proof
Alternative Flow	**A-1: Payment via credit card** 1. Customer pay via credit card method 2. User will swipe the credit card to the credit card machine 3. The system will prompt for credit card PIN number 4. The system will validate the credit card **(E-1: Invalid PIN number)** 5. The system will process the payment and amount will be deducted from credit card **(E-2: Insufficient amount)**

	6. The system will generate a receipt 7. User will ask for customer signature 8. Payment completed 9. Drugstore owner can only view the payment details not manage payment data
Exception Flow	**E-1: Invalid PIN number** 1. Customer enter the PIN number again 2. If the PIN number still invalid go to any branch of the credit card bank for further details. **E-2: Insufficient amount** 1. If credit card amount is insufficient, it cannot be used until the amount is sufficient 2. If it is caused by credit card reached its limit, customer can change the limit first before make any transaction
Post-Conditions	Payment details has been added to the system
Rules	N/A
Constraints	N/A
Sequence Diagram	Refer Appendix A -2.1.3

3.4 Use Case Manage Medicine Data

Figure 3.1 Manage Medicine Data Use Case Diagram

Table 3.1 Use Case Manage Medicine Data

Use Case ID	SRS_REQ-03-00
Brief Description	User can add, delete, update and view medicines information
Actor	Pharmacist, Drugstore Owner
Preconditions	• User is logged to the system
Basic Flow	1. The system display the medicine data 2. Pharmacist can select to update, delete, view, or add medicine 3. When pharmacist selects update medicine: 3.1 Pharmacist can edit medicine details such as medicine name, medicine quantity etc. 4. When pharmacist selects delete medicine: 4.1 Pharmacist can delete any medicine information 4.2 If pharmacist delete medicine information it will automatically delete all the details about the medicine 5. When pharmacist selects view medicine; 5.1 Pharmacist is able to view the medicine details such as medicine expired date, medicine quantity and so on. 6. When pharmacist selects add medicine: 6.1 Pharmacist can add medicine data to the system 6.2 Pharmacist enters required information such as medicine name, medicine quantity, medicine type and another information 7. When pharmacist selects view medicine:

	7.1 The medicine name, medicine quantity, medicine expired date etc. will be displayed 8. Drugstore owner can only view the medicine information not manage the medicine data 9. For view medicine, user can view medicine data by searching technique via medicine name **(A-1: Searching method)**
Alternative Flow	**A-1: Searching method** 1. Search via medicine type 2. User enters medicine type 3. The system will displayed medicine name
Post-Conditions	User has updated the medicine details
Rules	• User should update the medicine information every time supplier deliver the medicines • Deleted medicine data cannot be undone
Constraints	N/A
Sequence Diagram	Refer Appendix A -2.1.4

3.5 Use Case Notifications

Figure 3.1 Notifications Use Case Diagram

Table 3.1 Use Case Notifications

Use Case ID	SRS_REQ-04-00
Brief Description	This use case if for user view the notifications about quantity of the medicine when reach its minimum level
Actor	Pharmacist, Drugstore Owner
Preconditions	User is logged to the system
Basic Flow	1. User will receive medicine minimum level notification when medicine has reached its minimum quantity level
Alternative Flow	N/A
Exception Flow	N/A
Post-Conditions	User has received the notification
Rules	- The minimum quantity is 30
Constraints	N/A

Sequence Diagram	Refer Appendix A -2.1.5

3.6 Use Case Generate Report

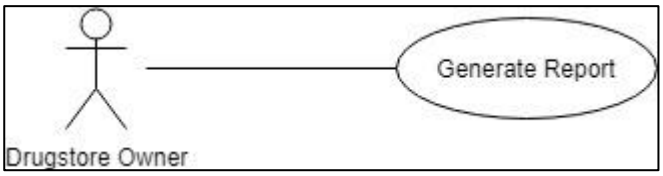


Figure 3.1 Generate Report Use Case Diagram

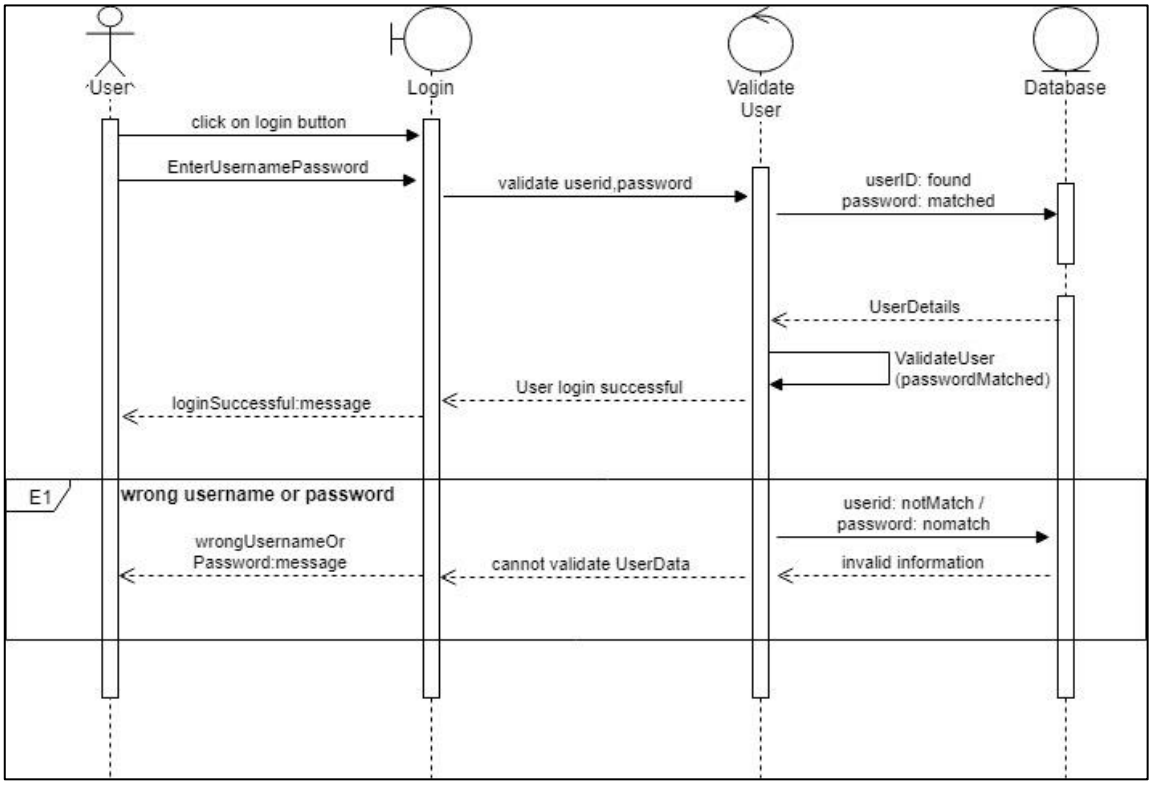
Table 3.1 Use Case Generate Report

Use Case ID	SRQ_REQ-05-00
Brief Description	This use case is for user to generate or view payment and medicine data report
Actor	Drugstore Owner
Preconditions	User is logged to the system
Basic Flow	1. User selects generate payment/medicine report 2. System display list of payment details/medicine details 3. User select payment details/ medicine details 4. System retrieves payment/medicine data from the database (**E-1: No data retrieves)** 5. System generates a tabulated report using the payment data 6. System prompts user to choose report format whether in .pdf or .csv. 7. User choose report format 8. System uploads the finished report in chosen format
Alternative Flow	N/A
Exception Flow	**E-1: No data retrieves** 1. System retrieves null data instead 2. System stops from generating report

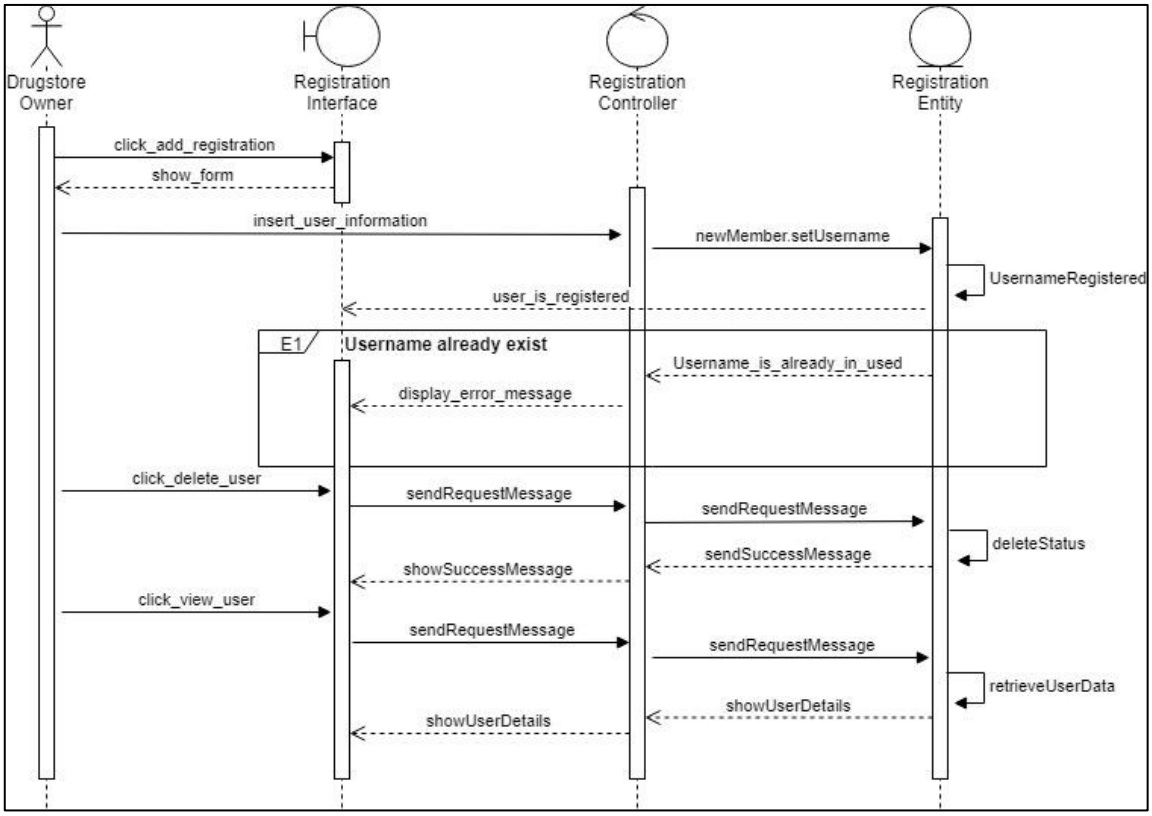
	3. System display error message dialog to the user 4. Continue to basic flow step number 2
Post-Conditions	System automatically downloads the report file in the user's computer in the assigned format
Rules	Report format shall be in tabular form Report data showed by ascending date
Constraints	N/A
Sequence Diagram	Refer Appendix A -2.1.6

APPENDIX A -2

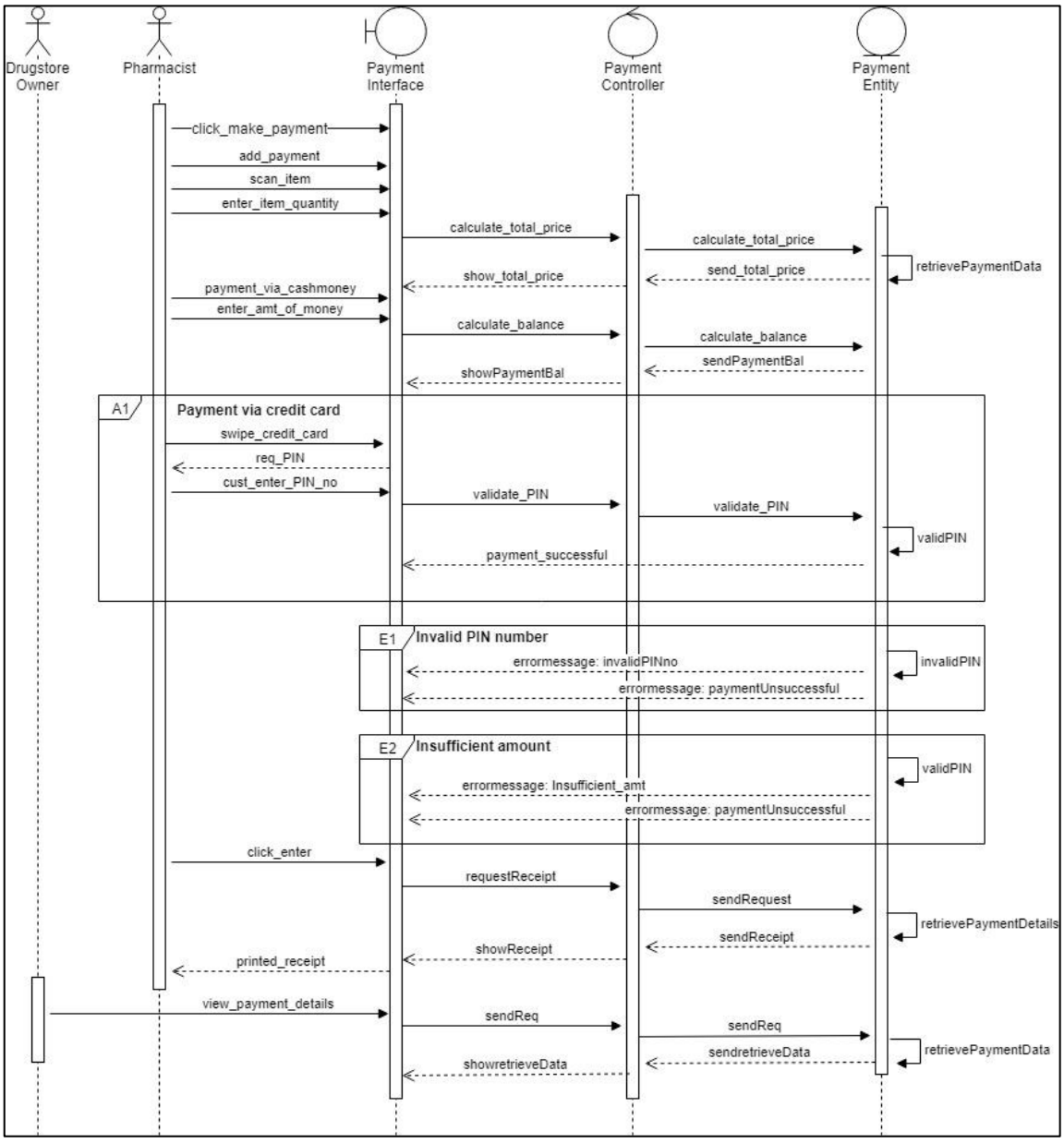
SEQUENCE DIAGRAM



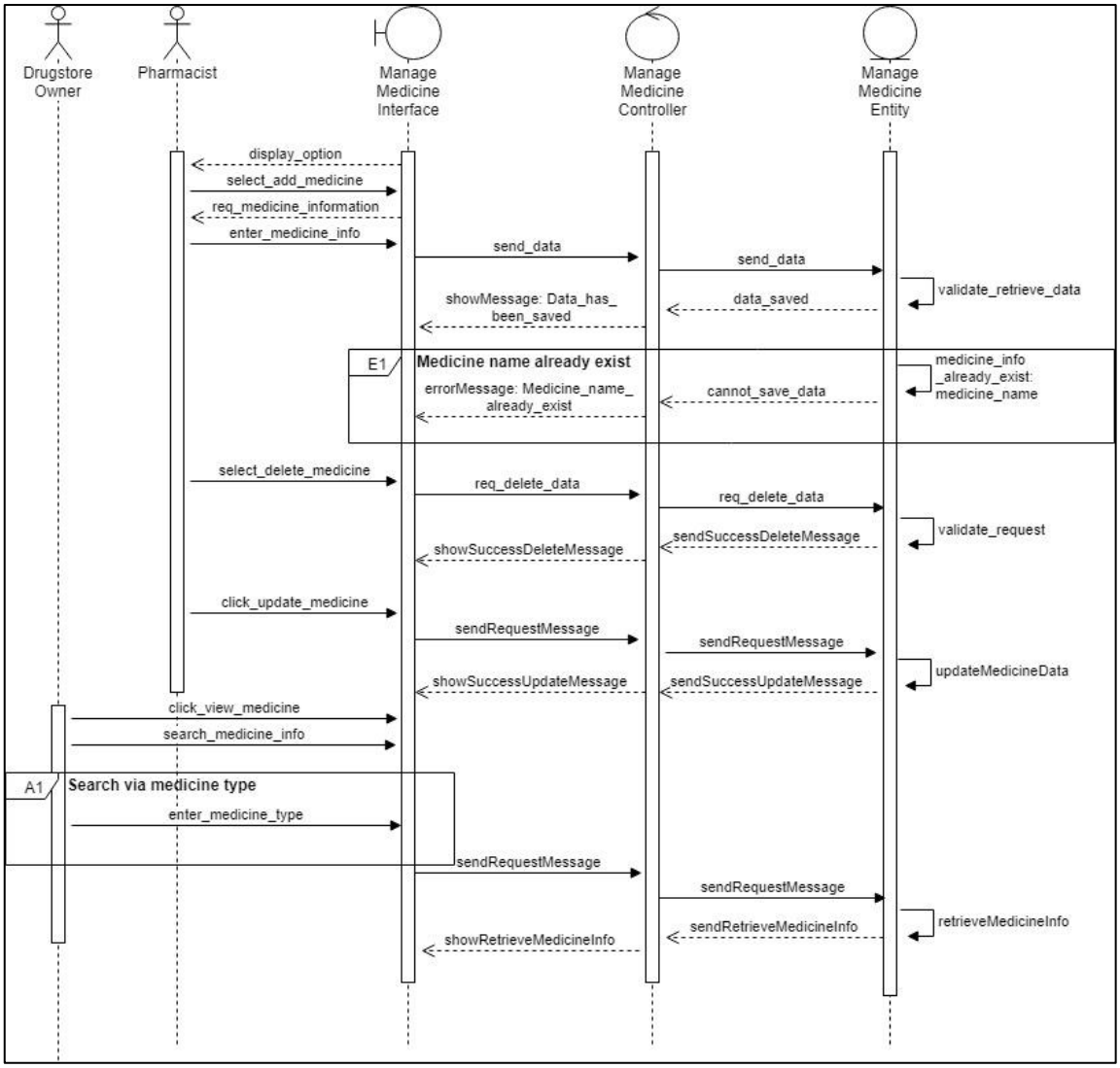
A – 2.1.1 Login Sequence Diagram



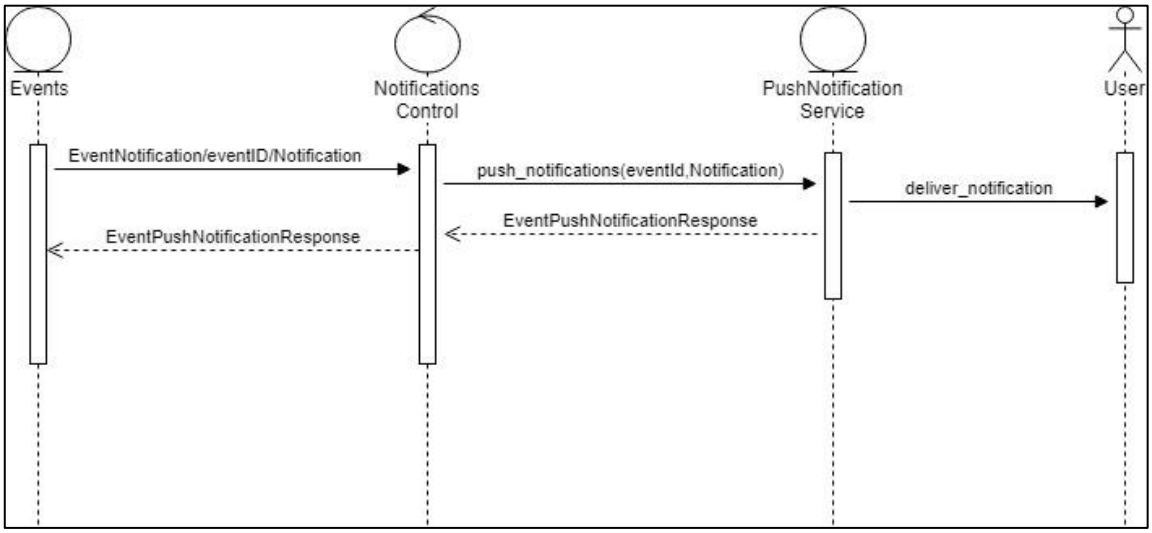
A -2.1.2 Manage Registration Sequence Diagram



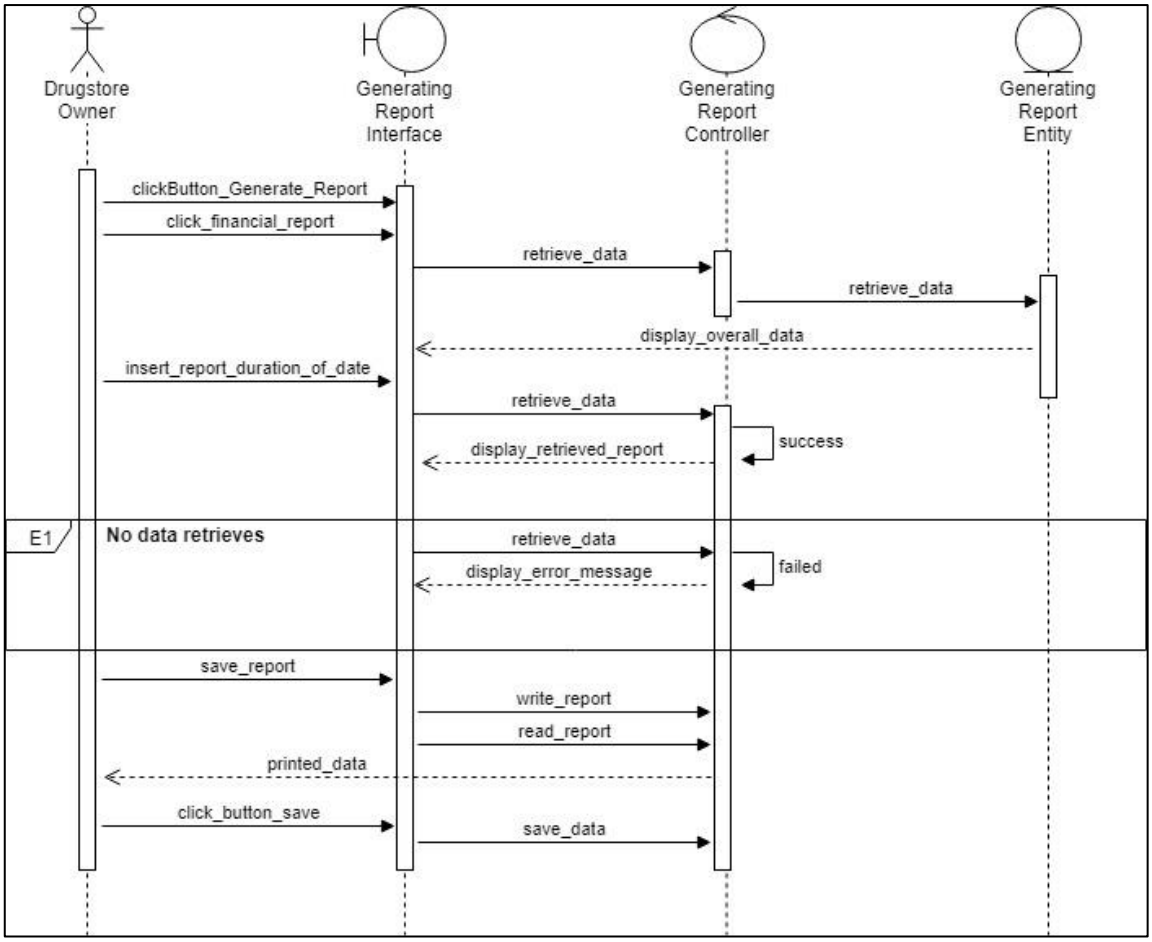
A -2.1.3 Manage Payment Sequence Diagram



A -2.1.4 Manage Medicine Data Sequence Diagram



A -2.1.5 Notifications Sequence Diagram



A -2.1.6 Generate Report Sequence Diagram

4.0 SYSTEM REQUIREMENTS APPROVAL

	Name	Date
Verified by: _____ Developer		
Approved by: _____ Client		

2018

SOFTWARE DESIGN DOCUMENT (SDD)

E-MANAGEMENT FOR DRUGSTORE PHARMACY

JASNIAH BINTI JAMIL
Universiti Malaysia Pahang
Bachelor of Computer Science (Software Engineering)

TABLE OF CONTENTS

1.0 DATA DICTIONARY

1.0 REGISTRATION

Field Name	Description	Data Type	Constraint
firstname	First name of staff	VARCHAR(50)	
lastname	Last name of staff	VARCHAR(50)	
NRIC	Staff identity card number	VARCHAR(50)	
email	Staff email address	VARCHAR(50)	
phonenumber	Staff contact number	VARCHAR(50)	
username	Staff username	VARCHAR(50)	PK
password	Staff password	VARCHAR(50)	

1.2 SUPPLIER

Field Name	Description	Data Type	Constraint
supplierID	Payment ID	INT	PK
supplierName	Payment date	DATETIME	
MedID	Medicine ID	INT	FK
medicineName	Payment amount	DOUBLE	
quantity	Payment balance	DOUBLE	
totalPrice	Medicine ID	INT	
paymentType	Medicine name	VARCHAR2(50)	

1.3 ADDMEDICINE

Field Name	Description	Data Type	Constraint
medID	Medicine ID	INT	PK
medicineType	Medicine type	VARCHAR(50)	
medicineName	Medicine name	VARCHAR(50)	
dayManufactured	Manufactured day	NCHAR(10)	
monthManufactured	Manufactured month	NCHAR(10)	
yearManufactured	Manufactured year	NCHAR(10)	
dayExpired	Expiry day	NCHAR(10)	
monthExpired	Expiry month	NCHAR(10)	
yearExpired	Expiry year	NCHAR(10)	
medicineQuantity	Quantity of medicine	INT	
price	Price of medicine	FLOAT	
medicineDescription	Description of medicine	VARCHAR(50)	

1.4 SUPPLIERDETAILS

Field Name	Description	Data Type	Constraint
supplierID	Notification type	INT	PK
supplierName	Medicine expired date	VARCHAR(50)	
supplierAddress	Medicine quantity	VARCHAR(MAX)	
supplierContact	Medicine ID	VARCHAR(50)	
supplierEmail	Medicine name	VARCHAR(50)	
supplierPerson	Notification date and time	VARCHAR(50)	

2.0 PRELIMINARY DESIGN

2.1 System Architecture

This paragraph identifies the internal organization structure of the Drugstore Administration System. The relationship among system subsystem will be described.

2.1.1 Static Organization

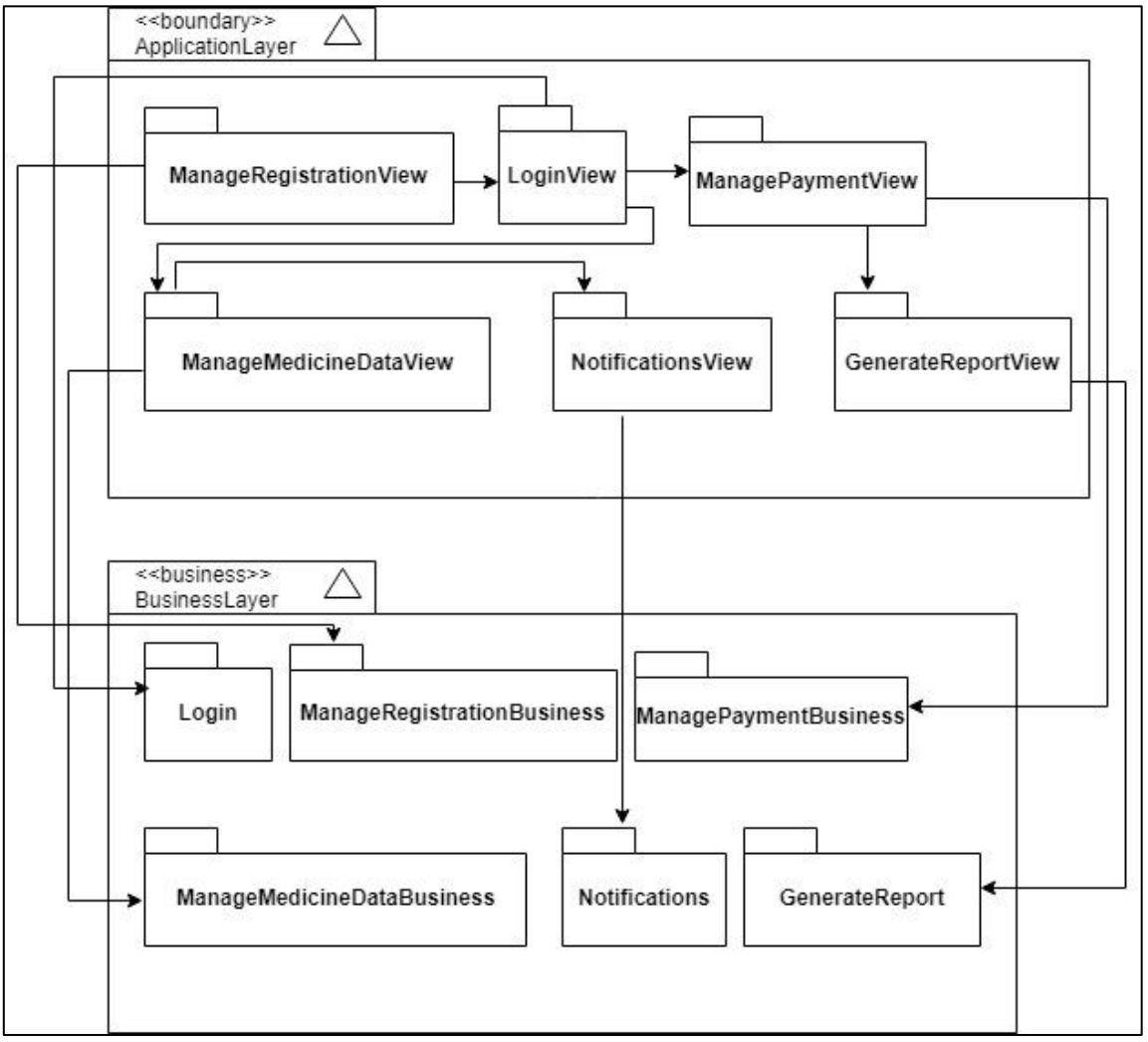


Figure 2.1 shows the static organization for Drugstore Administration System.

This section describes the detail for each subsystem/package:

1. **Login**

   This package is responsible to control the information about user when interacting with Drugstore Administration System. This package consists of the following classes or unit:

   a. LoginView Class
   b. Login Class
   c. LoginController Class

2. **Manage Registration**

   This package is responsible to control the user information before having an access to the Drugstore Administration System. This package consists of the following classes or unit:

   a. RegistrationView Class
   b. Registration Class
   c. AddRegistration Class
   d. UpdateRegistration Class
   e. DeleteRegistration Class
   f. ViewRegistration Class

3. **Manage Payment**

   This package is responsible to control all the transaction in the Drugstore Administration System. This package consists of the following classes or unit:

   a. MakePaymentView Class
   b. MakePayment Class
   c. MakePaymentController Class
   d. AddPayment Class
   e. ViewPayment Class

4. Manage Medicine Data

This package is responsible to control the medicines information in the Drugstore Administration System. This package consists of the following classes or unit:

a. MedicineDataView Class
b. MedicineDataController Class
c. AddMedicineData Class
d. DeleteMedicineData Class
e. ViewMedicineData Class
f. UpdateMedicineData Class
g. SearchMedicineData Class

5. Notifications

This package is responsible to control the reminders of medicine of the Drugstore Administration System. This package consists of the following classes or unit:

a. MedicineQuantityNotificationView Class

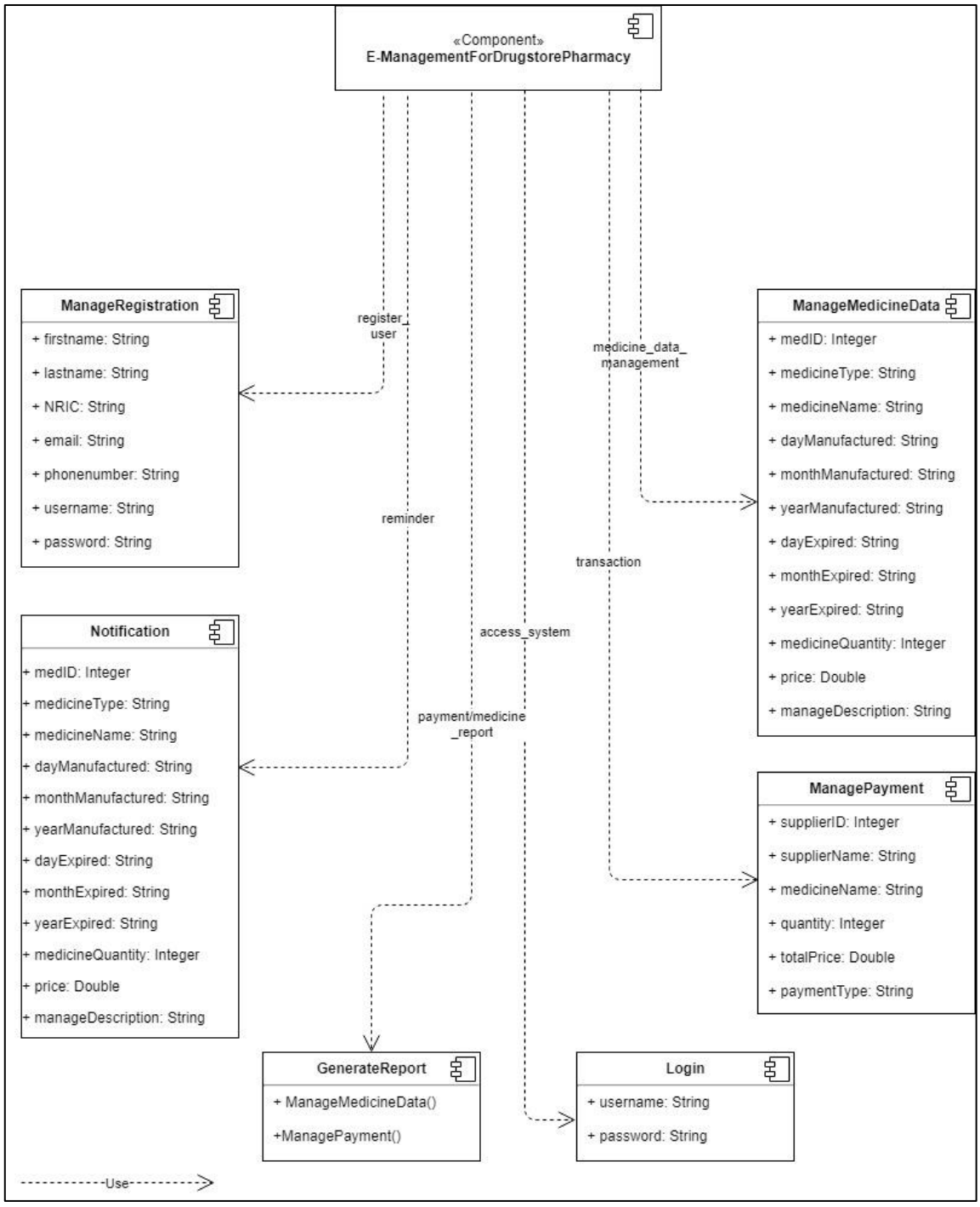
6. Generate Report

This package is responsible to control the payment monthly report of the Drugstore Administration System. This package consists of the following classes or unit:

a. Report Class
b. ReportController Class
c. ReportView Class
d. SaveReport Class

2.2.1 Dynamic Organization

Figure 2.2 shows components and their relationships between each other in the system.



3.0 DETAILED DESIGN

3.1 Login

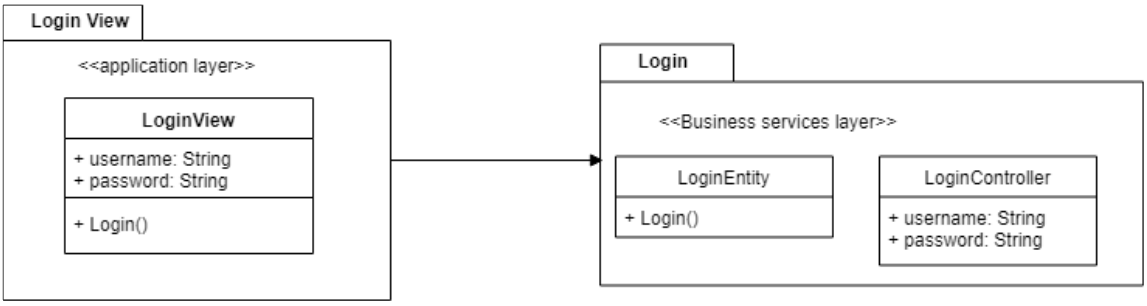


Figure 3.1 Login Package

3.1.1 LoginView.class

Class Type	Boundary Class	
Responsibility	Login to get access to the system	
Attributes	username password	String String
Method	void Login()	To verify the username and password

3.2 Manage Registration

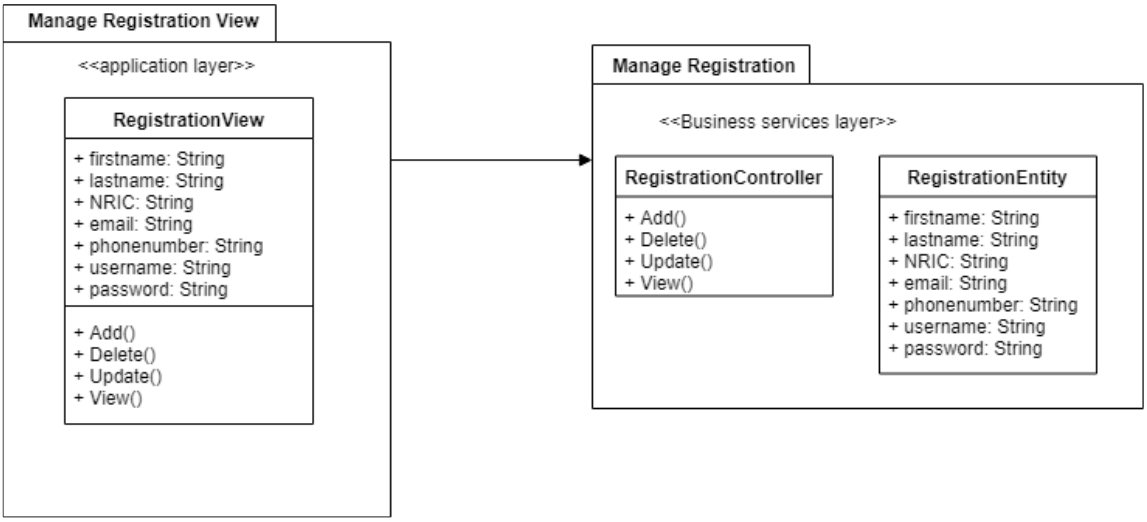


Figure 3.2 Manage Registration Package

3.2.1 RegisterView.class

Class Type	Boundary Class	
Responsibility	Register system user	
Attributes	firstname lastname NRIC email phonenumber username password	String String String String String String String
Method	void Add() void Delete() void Update() void View()	To add new user to the system To delete user information To update user information To view user information

3.3 Manage Payment

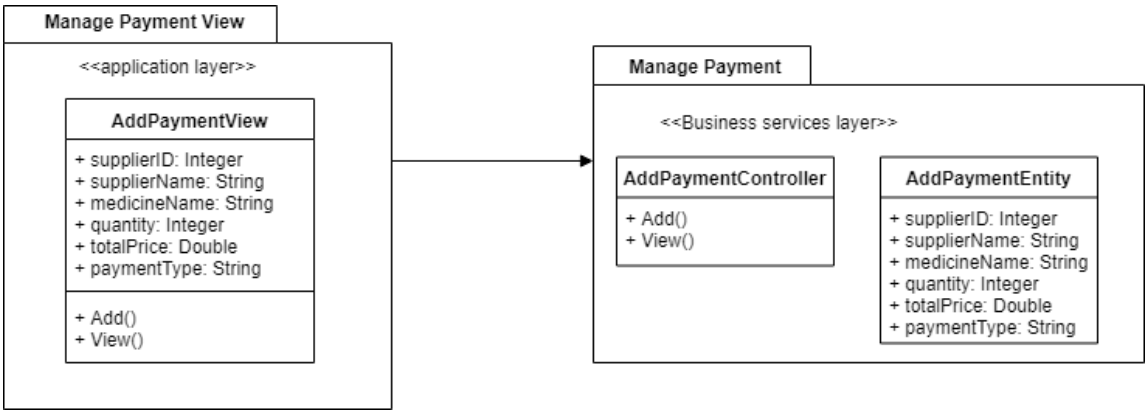


Figure 3.3 Manage Payment Package

3.3.1 MakePaymentView.class

Class Type	Boundary Class	
Responsibility	Add payment due to the customer transaction	
Attributes	supplierID supplierName medicineName quantity totalPrice paymentType	Integer String String Integer Double String
Method	void Add() void View()	To add new payment details To view payment details

3.4 Manage Medicine Data

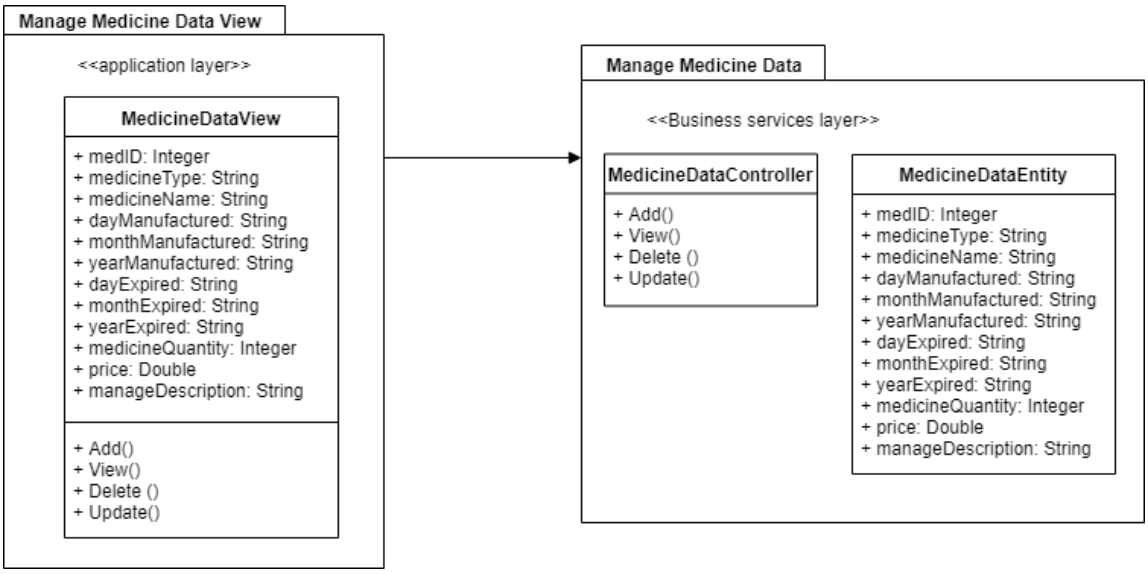


Figure 3.4 Manage Medicine Data Package

3.4.1 MedicineDataView.class

Class Type	Boundary Class	
Responsibility	To add, delete, view and update medicine information	
Attributes	medID medicineType medicineName dayManufactured monthManufactured yearManufactured dayExpired monthExpired yearExpired medicineQuantity price manageDescription	Integer String String String String String String String String Integer Double String
Method	void Add() void Delete() void View() void Update()	To add new medicine record To delete the medicine record To display the medicine information To update the information about the medicine

3.5 Notifications

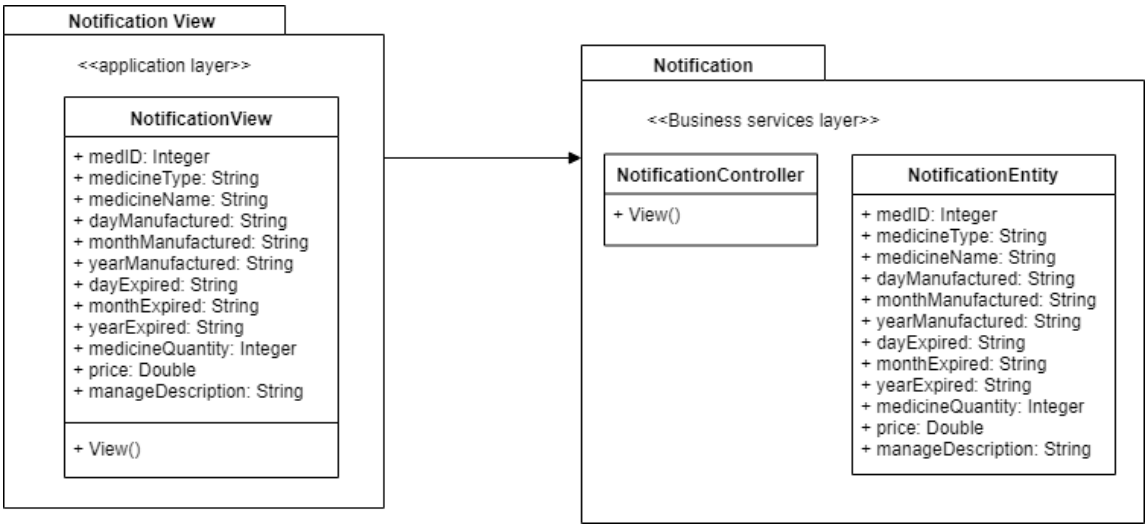


Figure 3.5 Notification Package

3.5.1 NotificationsView.class

Class Type	Boundary Class	
Responsibility	To view the medicine reminder for medicine quantity below than 30	
Attributes	medID medicineType medicineName dayManufactured monthManufactured yearManufactured dayExpired monthExpired yearExpired medicineQuantity price manageDescription	Integer String String String String String String String String Integer Double String
Method	void View()	To view the medicine reminder for medicine quantity below than 30

3.6 Generate Report

3.6.1 ReportView.class

Class Type	Boundary Class	
Responsibility	To generate payment report	
Attributes	ManageMedicineDataPackage ManagePaymentPackage	
Method	void Display() void Download()	To view the report To download the report in certain format

4.0 SYSTEM DESIGN APPROVAL

	Name	Date
Verified by: _____ Developer		
Approved by: _____ Client		