



# **An Undergraduate Internship/Project on Medical Store Management System**

By

**MD. TAREK AZIZ**

Student ID: 1730050

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Supervisor:

**Bijoy Rahman Arif**

**Lecturer**

Department of Computer Science & Engineering

Independent University, Bangladesh

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Science in Computer Science

Department of Computer Science & Engineering

**Independent University, Bangladesh**

# Attestation

This is to certify that the report is completed by me, Md. Tarek Aziz (1730050), submitted in partial fulfillment of the requirement for the Degree of Computer Science and Engineering from Independent University, Bangladesh (IUB). It has been completed under the guidance of Bijoy Rahman Arif. I also certify that all my work is genuine which I have learned during my Internship. All the sources of information used in this project and report has been duly acknowledged in it.

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Signature

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Date

Md. Tarek Aziz

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Name

# Acknowledgement

I would like to thank Almighty Allah for keeping me and my family safe during this COVID-19 situation. I would like to again thank him for giving me an opportunity to complete my graduation from a reputed University in Bangladesh and complete my internship from a well-known organization. I would like to express my gratitude to my honorable supervisor Bijoy Rahman Arif, Internship Supervisor Lecturer, Department of Computer Science Engineering, Independent University, Bangladesh, for his helpful assistance, tolerance, time, constructive criticism, and careful counsel on several elements of my internship and report preparation. Without his help, suggestion and cooperation, this report would not have been completed successfully.

I would also like to express my gratitude to Mr. Delwar Alam, Maneging Director, BugsBD for giving a chance to prove my worth and skills in his company and work on a wonderful project. The knowledge and experiences I've gained here have greatly aided me in my work as a Backend developer and System Analyst, and they will undoubtedly aid me in my future endeavors. I would also like to thank my organization's intern supervisor Mr. Mahmud Rana, others member of BugsBD, my friends and family for always helping me through the hard times while working on this project. Without them this journey would have not been easy.

Finally, I am grateful to Independent University, Bangladesh (IUB), for providing this knowledgeable and wonderful internship experience as a platform to enrich my career.

# Letter of Transmittal

10 January,2022

Bijoy Rahman Arif

Lecturer,

Department of Computer Science and Engineering,

Independent University, Bangladesh

Subject: Letter of Transmittal for Internship Report, Spring 2022

Dear sir,

It's my great pleasure to place my Internship report for your kind approval. I, Md. Tarek Aziz, from Spring 2022, Section 5, have completed my Internship Program and its report. I completed my internship at BugsBD Limited, which started on 1st February of 2022. This report contains my experience and work in the company. It is my immense pleasure to presenting you my experience in all the different technology related fields of the company, including research and development, content writing, documentation, designing, software development and also to get acquainted with software development processes and practices.

I hope, this report will reflect my learning and the work i did during the internship program. I also pray and hope that you will find it in order.

Sincerely,

Md. Tarek Aziz

1730050

# Evaluation Committee

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# Abstract

The experienced I gathered from the internship program conducted at BugsBD Limited is written in this report. BugsBD is a Bangladesh based Cyber Security company offering solutions by using technology as just a platform to mobilize the world around us. BugsBD offer's products and solutions to enhance not just businesses but also assist in improving your daily activities. Main services provided by BugsBD Limited's are:- End-point Security, File Integrity Monitor, API Security, DNS Security, DDOS Application Protection, Network monitoring System, Penetration testing, Mobile Security, Source Code Audit, Network Security, Software Solutions etc.

I was selected at BugsBD Limited as a web developer to build them a Medical Store Management System which will complete my internship program as a web developer under the company. The aim of the project was to develop a system which will be a dynamic modular based fully customizable system which can be integrated with any medical store. The system will allow a medical store to transform their services into a digital platform where salesman can search medicine and create order directly from their website. It will allow to show the sales reports, order history, employee status. It will also allow the store to monitor and manage their internal system, update and track their inventory system.

Before working on any project, I had to gather initial requirements for the system and submit an action plan for the medical store management which consists a documentation of all the functionalities the system will have after development.

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# Chapter 1

## Introduction

### 1.1 Overview/Background of the Work

Medical stores deal with a lot of medicines. A medical store contains different categories of medicine, and those are located in different parts of the store. It is very hard to recognize the locations of every medicine in a specific category of store. So, finding a medicine is tough for a salesman or management team in a store, as it takes a long time. And tracking every order history is not an easy task at all. Usually, the management team uses manual approaches to find medicines as well as track past orders. Therefore, the medical store management team suffers a lot to maintain their internal tasks such as finding medicine, tracking order history, sales statistics, etc. In this digital era of technology, creative people are creating and providing well-suited computerized solutions for many existing problems. A computerized solution makes the process much faster, easier, and more efficient. And people are also opting for more online services than ever before. The company that I'm working for is trying to create a solution for medical stores from all over the world by which they can manage their stores very easily and efficiently with the help of technology. This medical store management system was developed in favor of the medical store management team and will help them save records of the medicine, stock, order history, sales statistics, and others. This solution was developed from the troubles of the medical store management team.

### 1.2 Objectives

The main objective of this project is to allow a medical store to transform their internal tasks into a digital platform where the management team can easily maintain all internal tasks for their store. It will give the users (management team) the ability to add medicines along with all the necessary information like category, price, location, etc. A salesman will be able to find a specific medicine with all the necessary information by

searching. They will also be able to create an order. The manager will be able to view the sales statistics as well as the individual salesman's performance. It will also allow the store to update and track their inventory system.

## 1.3 Scopes

- **Admin dashboard:** A customized dashboard for admins where they can create, add, update, and delete medicine and employees.
- **Login page:** Users will be able to login to the system through this page with the proper user id, password, and user type.
- **Home page:** The first page the user will see after login the website.
- **Medicine List Page:** This page will display all medicines that are stored in inventory with their information.
- **Employee list:** This page will display all employees with information in the medical store.
- **Orders:** This page will display all the orders and information that have been placed in the store.
- **Sales:** This page will display sales information and statistics.

# Chapter 2

## Literature Review

### 2.1 Relationship with Undergraduate Studies

The fundamentals of understanding how real-world applications operate in general were taught throughout undergraduate courses. Starting from CSE 203, the data structure course helped me build the basic building blocks of programming, such as linked lists, stacks, queues, graphs, pointers, nodes, structs, etc. In CSE 211, Algorithms, I learned about different types of algorithms (Greedy, Dijkstra's shortest path, Kruskal, Prim), iterative sorting (Bubble sort, Insertion sort), recursive sorting (Merge sort, Quick sort, Heap sort), decision tree analysis, time complexity, hashing, etc. And those algorithms helped me develop my computational thinking skills. And it helped me to find patterns, rational thinking, and logical approaches towards a real-world problem for a better solution. In CSE 213, Object-Oriented Programming, I learned about representing data as objects and how to interact with other objects. I learned concepts like classes, objects, constructors, composition, abstract data types, inheritance, overloading, function chaining, polymorphism, etc. In CSE 303, database management system, I learned how to work with databases. This project used how to push or pull data from databases and represent it to the front-end users as they wanted it, which was helpful in this project. CSE 307, System Analysis and Design: This course covers the Use Case Diagram, Use Case Scenario, and SDLCs, as well as how to apply them to a project. CSE 309, Web Applications and the Internet, taught students how to create web applications. HTML, CSS, PHP, JavaScript, jQuery, Bootstrap, Django, SQLite, and MySQL were among the technologies studied, and they are all in great demand in the market. And those technologies helped me a lot in developing this project.

## 2.2 Related works

There are some software farms are providing software for medical store management system. Zaman IT, Techno360, Smart Software Ltd., MM IT Soft Ltd. etc. are providing software solutions for medical store management.

# Chapter 3

## Project Management & Financing

### 3.1 Work Breakdown Structure

A work breakdown structure (WBS) is a deconstruction of a project that is visible, hierarchical, and focused on deliverable. It is a useful diagram for project managers because it helps them to work backwards from a project's product to identify all the actions required to complete the project successfully. For this project, we've also created a WBS which reflects our workflow, visualization of scopes, responsibilities in a structured way.[1]

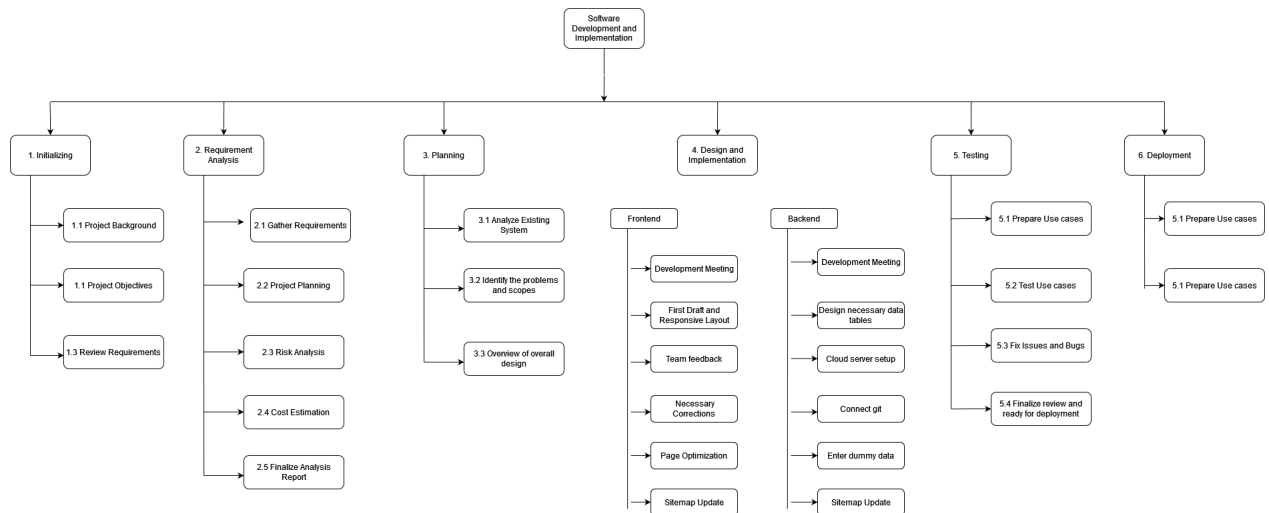


Figure 3.1: Work Breakdown Structure

## 3.2 Process/Activity wise Time Distribution

The critical path is the longest sequence of tasks that must be completed from start to finish in order to successfully complete a project. The acts on the critical path are those that, if postponed, will cause the entire project to be delayed. Using the essential path, you may assess the entire length of a project and get a comprehensive picture of the project's genuine timeframe. As the duration of the project was 3 months, the total workflow and the time duration is shown by using the critical path method.

Activity	Duration (Days)	Work Percentage
Initializing	7	5
Requirement analysis	15	15
Planning	7	10
Design and Implementation	51	50
Testing	7	15
Deployment	6	5

Table 3.1: Process/Activity wise Resource and Time Allocation

## 3.3 Gantt Chart

Gantt chart, which is widely used in project management, is one of the most popular and useful ways to depict activities (tasks or events) against time. A list of the activities may be found on the left side of the chart, and a suitable time scale can be found along the top. Each action is represented by a bar, whose location and length indicate the activity's start, duration, and end dates. This allows you to quickly see various activities, start and end time of activity, activity duration etc.[?]

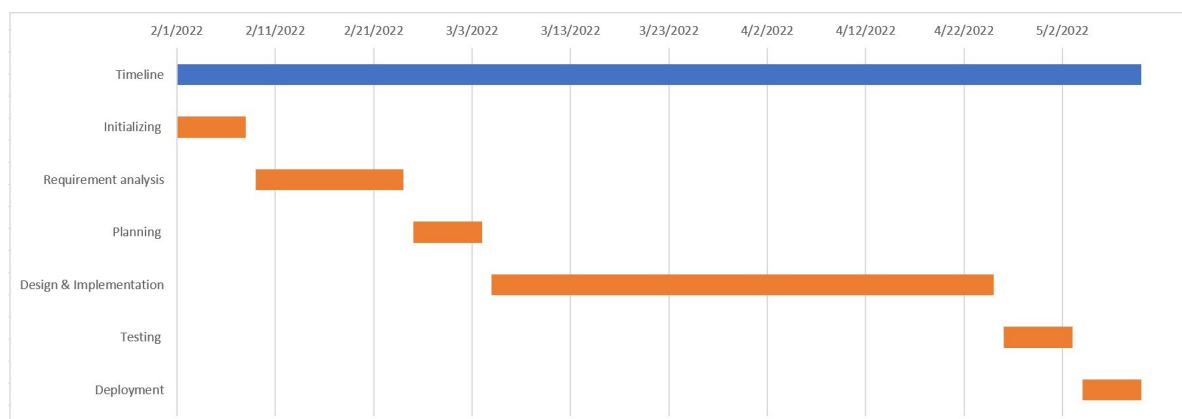


Figure 3.2: Gantt Chart



## 3.4 Process/Activity wise Resource Allocation

The management system we're creating for medical stores is for the users who are mainly facing problems during maintain their medical store's internal tasks. To make this come to life, we've been working on various resources. So, it was very crucial for us to allocate right resource at right time. The developers played a main role in developing this application. So, every development tool such as computers, internet, server, electricity etc. are considered as resources in this project.

- **Initializing:** This is the first stage of the development process. Where brainstorming about the project took place. We developed the idea of creating such solution for medical stores and began to initiate it.
- **Requirement Analysis:** In this stage we worked on getting the requirements for this project. For example: What should be the features of our system, which functionality must be implemented, how many computers will be involved and their specifications, how many developers and marketing team required. We also considered the features we're going to add.
- **Planning:** In this stage, we started planning our look and feel of the applications. We set our goals and planned on how to execute it. Also planned on implementing different features that will be very helpful for medical store management team.
- **Design and Implementation:** This is the stage where the main work started. After planning the UI, we designed the frontend. First, we set goals to develop different sections of the app. Every day we reached our goals and start developing the next goal. We faced some issues while developing, that's why in the midway the process became slow as we had to find solutions for it. After completing the whole frontend, the next goal was to develop the backend. And just like the frontend we designed the tables and the data we were going to store in the server. The backend took less time than frontend as all the required fields were already decided while developing the frontend.
- **Testing:** In this phase, our app was almost ready and ready for testing. First, we tested using the dummy data and fake user. We checked the transaction process and product uploading and purchasing process. The errors we faced were corrected immediately. And this process continued until there were no errors.
- **Deployment:** After passing the testing phase, the project is ready for deployment. And the final product is deployable which met each deadline perfectly.

## 3.5 Estimated Costing

The total cost of this project is based on total manpower, resources and maintenance used in this project. The evaluated cost was 2,05,000 Taka. This can increase in the future if changes are brought.

Work Distribution	Costing
Web application development	1,20,000
Domain and Hosting	40,000
Salary	45,000
Total	2,05,000

Table 3.2: Estimated Costing

# Chapter 4

## Methodology

A web application, unlike computer-based software programs that run locally on the device's operating system (OS), is software that runs on a web server. The user uses a web browser with an active network link to access web applications.

The Scrum technique was used in the project development process for our project. Agile is an iterative process in which each unit of work should be completed in a limited amount of time (a couple of weeks is ideal). At the end of each iteration, the aim is to provide working functionality to the customer. And, after getting customer input, items are tweaked for the next version.[2]

Each of these iterations is referred to as a sprint in Scrum. This is the most important principle in Scrum. Sprints are typically based on the backlog, which is a prioritized list of specifications provided by the product owner. Throughout the life of a project, the backlog may change.

A sprint preparation meeting is held after the backlog is formed to schedule the work to be completed during a sprint. The backlog is dissected and divided into logical units, which are distributed among development team members. To minimize the probability of changes in requirements or priorities, a sprint should last no more than one month.

The Scrum master's job is to ensure that everyone on the team is focused and understands their position. A regular Scrum, which is essentially a 15-minute standup meeting to rapidly review current progress and answer any questions, is normally held after the sprint has begun.

The sprint analysis and sprint retrospective periods occur at the conclusion of a sprint and before the start of the next sprint. The first is more concerned with the client, while the other is more concerned with the production team. The Scrum team meets with the product owner and any stakeholders during the sprint review to determine which backlog things have been completed and which are still outstanding. The backlog and goals for the next sprint are normally changed based on the team's success and exchange of ideas. The Scrum team then meets to discuss the previous sprint's strengths and challenges, and to use the knowledge to adjust and develop the work methodology for the next sprint.

# Chapter 5

## Body of the Project

### 5.1 Work Description

Medical store management system web application is a project under BugsBD Limited. The system was built with dynamic capability being the core requirement so that it can be integrated with any medical store to allow a medical store to transform their services into a digital platform where the management team can complete their internal task by using this web application. This application allows to add medicine with their proper category location in the store, employee or staff members with their proper designation. It also allows to create an order for a specific sale with proper customer information and view sales statistics by daily, monthly, yearly basis. From this system, management team will be able to keep track their inventory as well by medicine list. This system also keep track of how many orders placed by a specific salesman and total sold amount as well. I was assigned to this project by my intern supervisor. The supervisor used to assign me a daily task and took a progress report end of the day. As a part of this project, my job was to develop backend of this system. For backend, I had to use PHP, Laravel and MySQL. I also had to work frontend a little bit while working on backend and for that I used HTML, CSS and Bootstrap. To keep track of daily tasks and planning our internal system was used.

## 5.2 Requirement Analysis

### Rich Picture

Part of the soft systems methodology, rich pictures provide a mechanism for learning about complex or ill-defined problems by drawing detailed ("rich") representations of them. Rich pictures are a diagrammatic way of relating our own experiences and perceptions to a given problem situation through the identification and linking of a series of concepts. The creation of a rich picture provides a forum in which to think about a given situation[3].

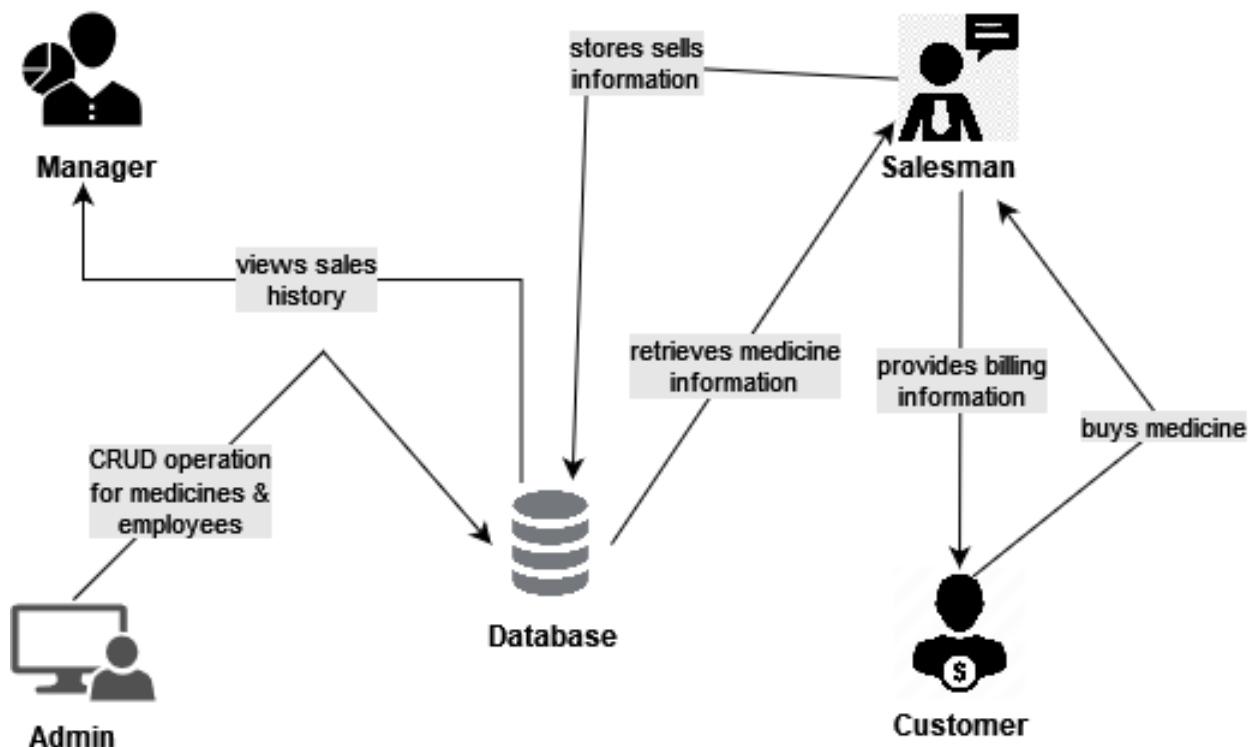


Figure 5.1: Rich Picture

### Functional and Non-Functional Requirements

End users specifically request certain conditions as the system's essential capabilities, which are known as functional requirements. All of these functions must be included into the system as part of the contract. These are represented or indicated by the system input, operation, and desired outcome. They are essentially the user's requirements, as opposed to non-functional requirements, which can be seen in the finished product right away.[4]

A non-functional requirement is another example of how a system should conform, as well as the constraints of its usefulness. All other needs that do not come under

the functional requirements are classified as non-functional requirements. Criteria that evaluate a system's functioning instead of behavior.

**Functional Requirements:**

- After entering the user id and passwords, the system will authenticate if the user is valid or not. If the user is not valid then the system will display a proper message.
- Admin will be able to add medicine with proper name, category name, location rack number, price and quantity.
- Admin will be able to add employee with their types as well as proper information.
- To find a medicine's information user need to search for medicine in search bar.
- To create an order salesman needs to select medicine, customer name, number of quantity and price.
- Salesmen are able to update their status as on-duty or on-leave. If a salesman takes leave, then he/she can update status.
- Salesmen are also able to see their sales performance like how many orders they placed and total sold money.
- Manager will be able to view sales statistic such as daily basis, monthly basis and weekly basis. And they will also be able to view individual sales performance of a salesman.

**Non-Functional Requirements:**

- All kind of data validity will be checked and if any data is invalid or not found the system will return a 404-error code.
- This system can be used for any medical store's management team around the globe.
- There will be a backup of user data for safety and in case the system fails.
- This system is very user friendly and easy to navigate.
- This system has instant response time, that's why users don't need to wait much time.
- This system does not require high end device or equipment, any web browser can be used to access this system.

## 5.3 System Analysis

### 5.3.1 Six Element Analysis

Process	Human	Non-Computing Hardware	Computing Hardware	Software	Database	Communication and Networking
Add/ Manage/ Update/ Delete Medicine	Admin	-	Keyboard, mouse, computer	Web Browser	MySQL	LAN/ WAN
Add/ Manage/ Update/ Delete Employee	Admin	-	Keyboard, mouse, computer	Web Browser	MySQL	LAN/ WAN
Add/ Manage/ Update/ Delete Location Rack	Admin	-	Keyboard, mouse, computer	Web Browser	MySQL	LAN/ WAN
Create/ Update Order	Salesman	-	Keyboard, mouse, computer	Web Browser	MySQL	LAN/ WAN
View Sales Statistics	Admin/ Manager/ Salesman	-	Keyboard, mouse, computer	Web Browser	MySQL	LAN/ WAN
Update Status	Salesman/ Manager/ Admin	-	Keyboard, mouse, computer	Web Browser	MySQL	LAN/ WAN
View Salesman Performance	Manager	-	Keyboard, mouse,r computer	Web Browser	MySQL	LAN/ WAN
View Order History	Manager	-	Keyboard, mouse, computer	Web Browser	MySQL	LAN/ WAN

Table 5.1: Six Element Analysis of Medical Store Management System

### 5.3.2 Feasibility Analysis

A feasibility study is an assessment of the practicality of a project or system. A feasibility study aims to objectively and rationally uncover the strengths and weaknesses of an existing business or proposed venture, opportunities and threats present in the natural environment, the resources required to carry through, and ultimately the prospects for success.[5]

**Technical feasibility:** BugsBD Limited is a very known and established company and they have worked with some of the biggest names in the industry as well as government projects to provide them service such as Cyber security, building web applications, cloud computing, digital marketing. This project is technically feasible since all of the necessary hardware, software, and other technical requirements are available.

**Economical feasibility:** Every project's financial component must be examined prior to the start of the project. In economic feasibility, the nature of investment options and financial rewards are investigated. This assessment is essentially a cost-benefit analysis that will aid the company in estimating the project's expenses and benefits. Our project's cost and benefits were pretty much identical to what we had calculated before to beginning it. To finish the project, no further funds or people were required.

**Feasibility:** Before moving forward with this project, all legal restraints were considered, including data protection statutes, social media rules, and zoning laws, to ensure that it would not face any legal issues in the future.

**Operational feasibility:** The operational feasibility of a solution is a measure of how well it will work in the company. It is also a reflection of how people see the system/project. In this project, after getting access to this system, management team will be able to complete all tasks are needed to maintain a medical store. They are also free to interact with them in whatever way they see fit. As a result, this project is operationally viable.

**Scheduling feasibility:** It is critical to complete a project within the timeframe given in order for it to be successful. With only two development modules in the project pipeline, the project is already operational with all components. It will be completed ahead of schedule for the project.



### 5.3.3 Problem Solution Analysis

There were many problems encountered while completing the project and they were solved accordingly. Some of problems are:

**System dynamic capability:** The core requirement of this system to be fully dynamic and customizable, the problem arose while trying to fulfill this requirement. Database were moved from NOSQL to RDBMS. And there were some problems while building relationships with entities. We had to go through trial and error many times. After fixing this issue, the was made fully dynamic so that it can adapt to any medical stores requirements with only minor changes to the system.

**Updating views:** This issue arose during the development of the system's front end. The system requires the views to update with every post request to the server because there are several views of the same model with various access rules for different staff users according to their functionality. To solve this issue RESTful API was used.

### 5.3.4 Effect and Constraints Analysis

Each project has its own set of constraints and risks that must be managed to ensure the project's ultimate success. Project managers have three major constraints: time, scope, and budget. The triangle of project management is often known as the three limits. Extending the project's scope, for example, will almost certainly require more time and money, but shortening the project's timetable can save money while also reducing the scope.

**Constraint 1 - Time:** In the development of any undertaking, time is vital. All employees in our project worked from home and gave a daily update at the end of the day. As a result, our project stayed on track, and no delays were recorded.

**Constraint 2 - Cost:** A project's budget includes both fixed and variable costs, such as materials, permits, work, and the financial impact of project team members. The budget was previously approximated because various evaluations for our project had already been completed.

**Constraint 2 - Scope:** The project's boundaries are defined by its scope. It contains components that the project and the organization must achieve. You'll find not only deliverables in scope, but also procedures for creating them. There was no backtracking in our project because the scopes were defined from the start.

## 5.4 System Design

### UML Diagrams

UML is an architecture, design, and implementation of large web application systems. It stands for Unified Modeling Language. When we write code, an application has a thousand lines and tracking the relations and hierarchies inside the web application system is tough. Divide UML diagrams into components and sub-components.[6]

### Activity Diagram for Admin

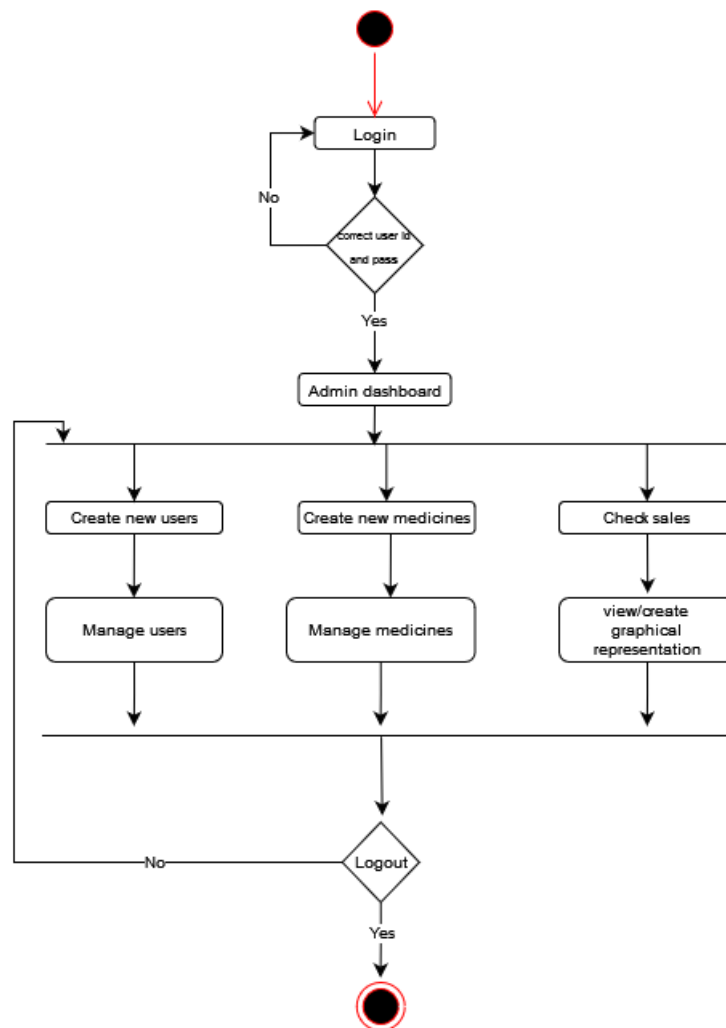


Figure 5.2: Activity Diagram for Admin

## Activity Diagram for Manager

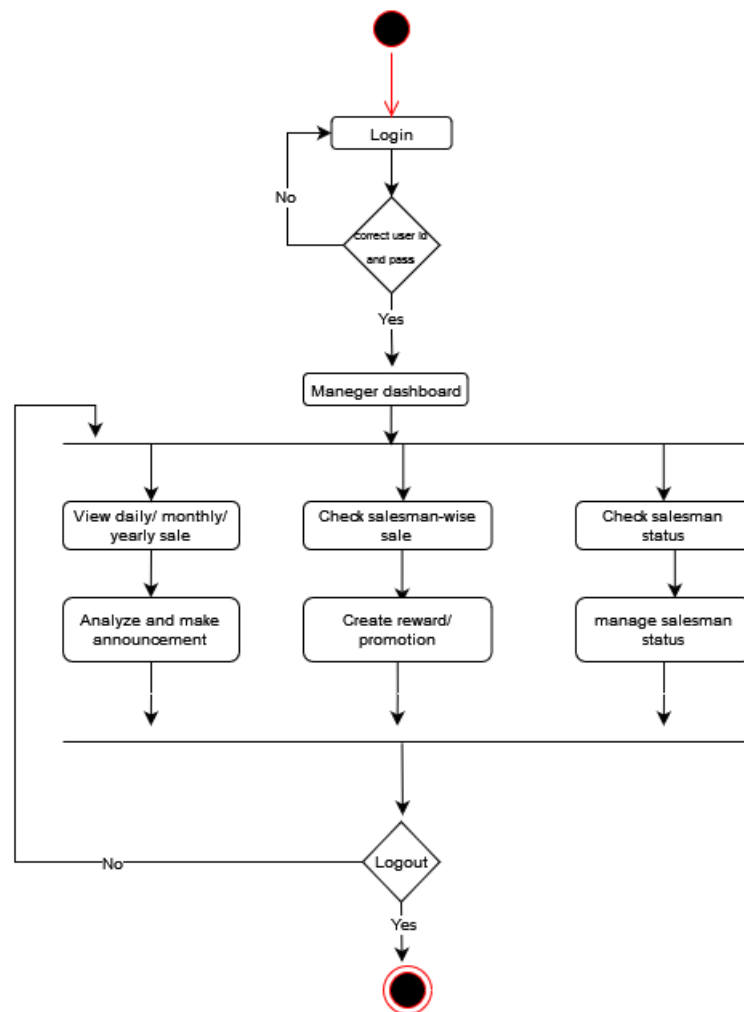


Figure 5.3: Activity Diagram for Manager

## Activity Diagram for Salesman

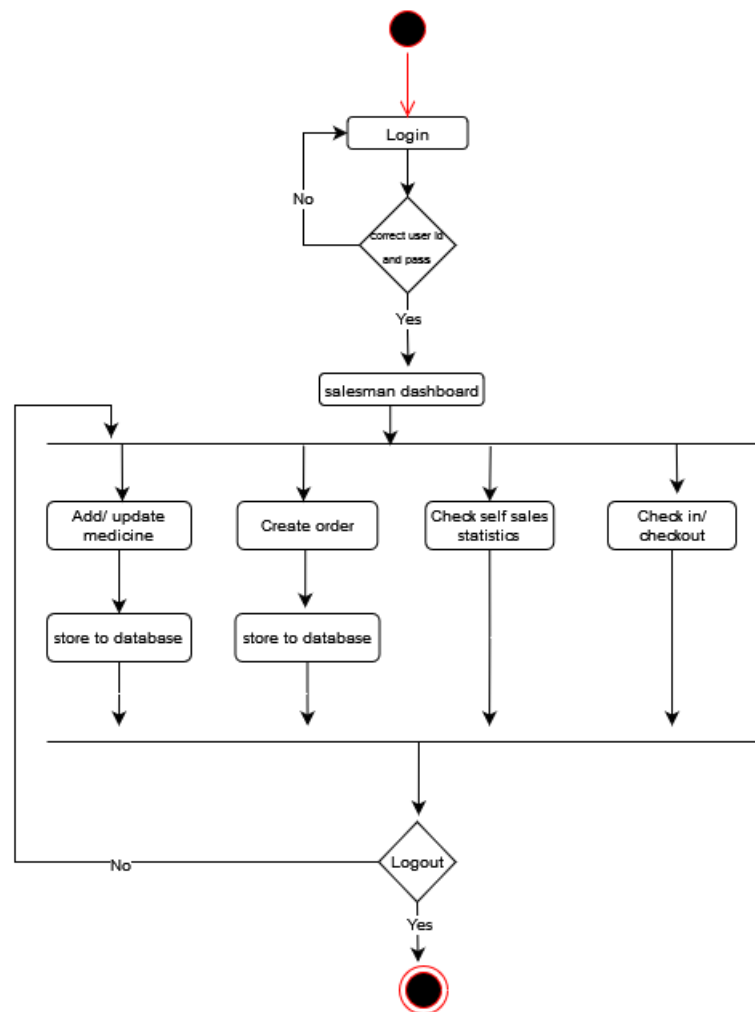


Figure 5.4: Activity Diagram for Salesman

## Use Case Diagram of System

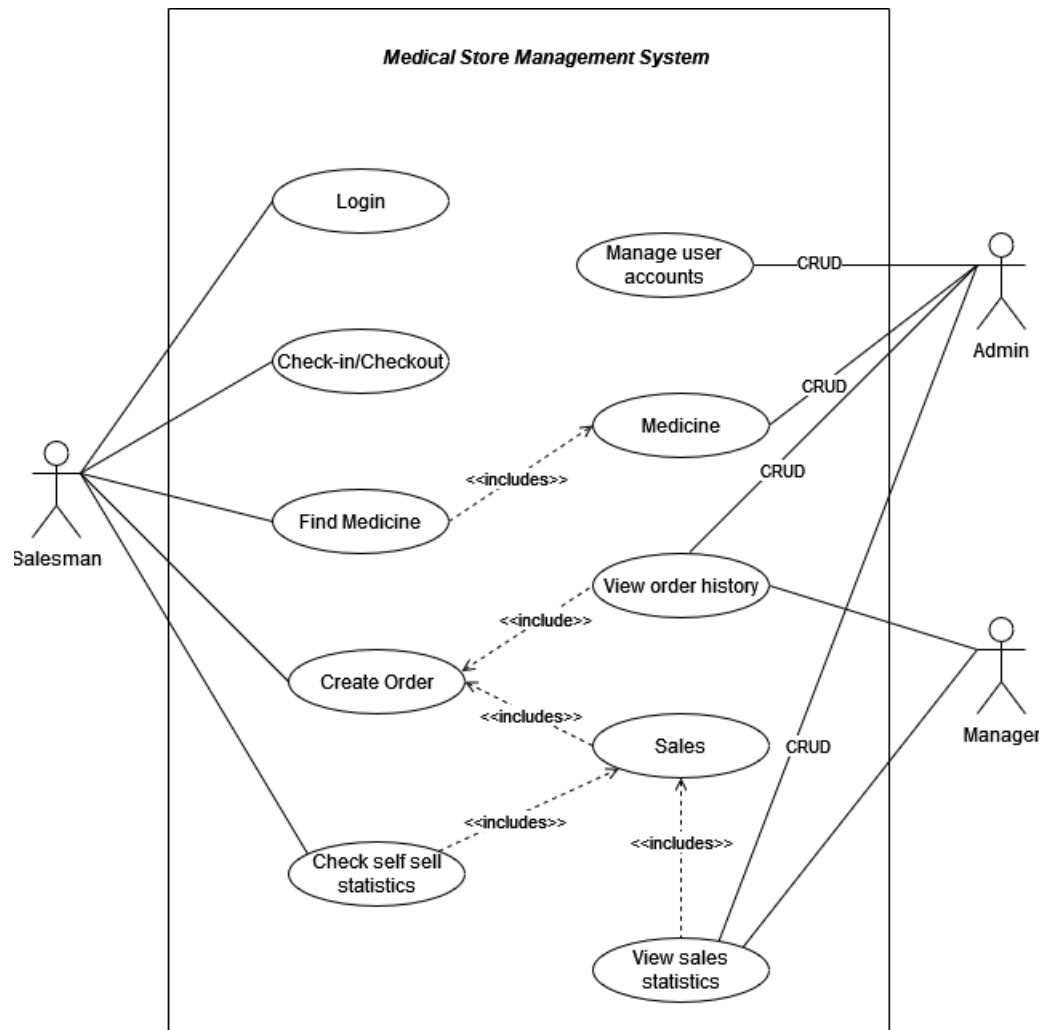


Figure 5.5: Use Case Diagram of System

## Entity Relationship Diagram of System

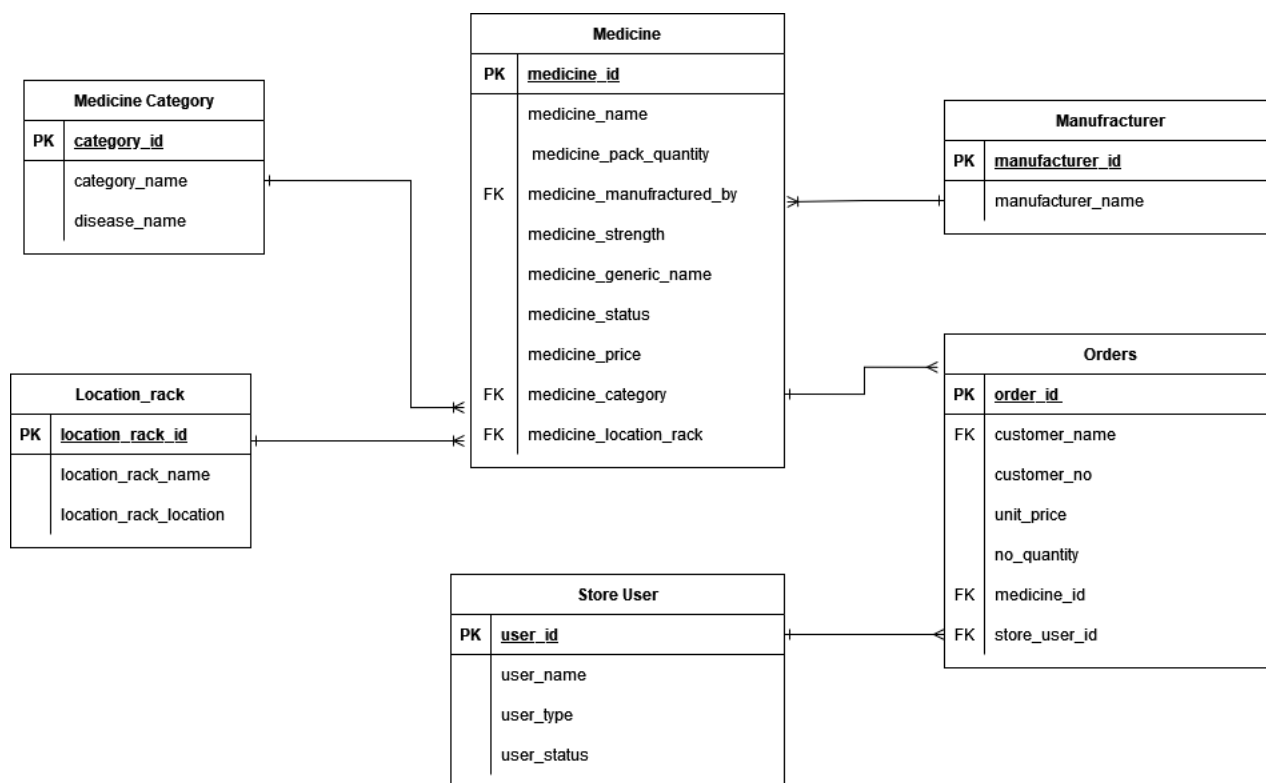


Figure 5.6: Entity Relationship Diagram of System

## Architecture

Software architecture is a set of decisions based on a variety of criteria that are employed in the software development process. Modifiability, security, performance, traceability, and availability are all systemic properties provided by this framework. It also serves as a means of communication for stakeholders. The cornerstone of a system is its software architecture. Changing a software architecture after it has been established in a software development can be extremely costly and time consuming. As a result, every decision made has a significant impact on meeting the project's requirements given the limits. The MVC software architectural pattern was employed for this project.

### MVC- Model View Controller pattern

Model view controller is a software design pattern that can be used in a variety of frameworks and programming languages, such as Python, PHP, Ruby, JavaScript, and others. It is the most widely used programming language for creating web and mobile applications.[7][8] The model view controller is an architectural pattern that divides an application into three logical components:

1. Model.
2. View..
3. Controller.

This method distinguishes between internal data representations and how data is presented to clients. This model view controller architecture is now supported by almost all common programming languages and is used in a wide variety of simple and complex web applications.

### Components of MVC

- **Model:** The model is the most significant aspect of the architectural pattern on the server side of the application. It is separate from the user interface and contains the dynamic data structure of the application. It stores the data structure and controls the system's data, logic, and rules.
- **View:** A view is a graphical depiction of data held in the model of a system. The view presents model data in a specific format to the viewer, such as a map, diagram, table, or types. All functionality that connects directly with the user, such as pushing a button, is included in this view.
- **Controller:** The application's brain is the controller. It is connected to the model and view. The controller, which lies between the view and the model, is in charge of the app's numerous functions. It acts as a link between the model and view components, processing all logic, conducting CRUD operations (create, retrieve, update, and delete data in the model) and incoming requests, altering data with the Model component, and interacting with the views to achieve the desired result.

The controller takes input from the application's view, converts it to demand for the model using logic implemented in the controller, the model then fetches data from the database and transfers it to the controller, who then passes the data received from the model back to view for the user to see in a graphical interface.

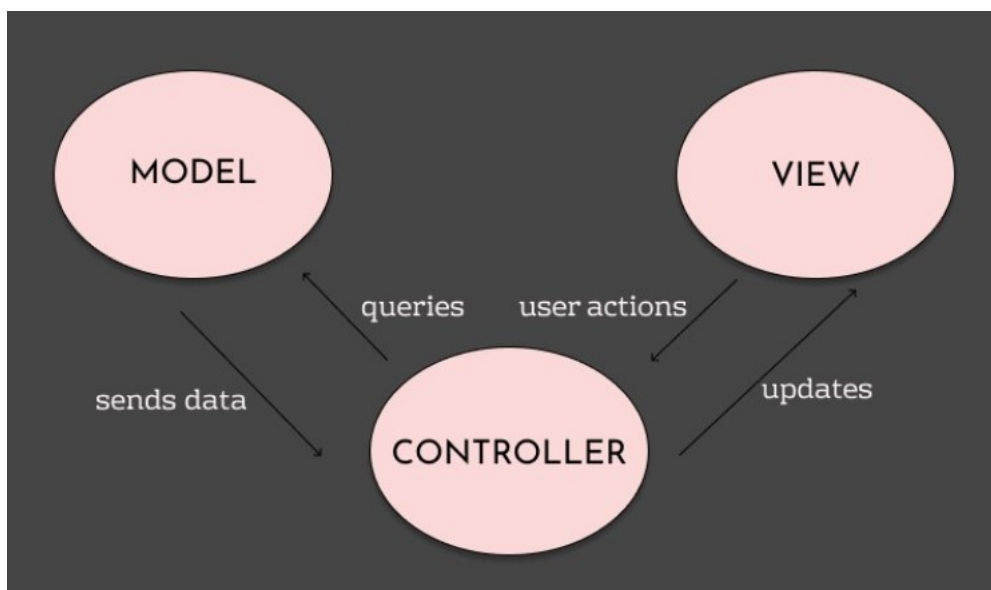


Figure 5.7: MVC Architecture

## 5.5 Implementation

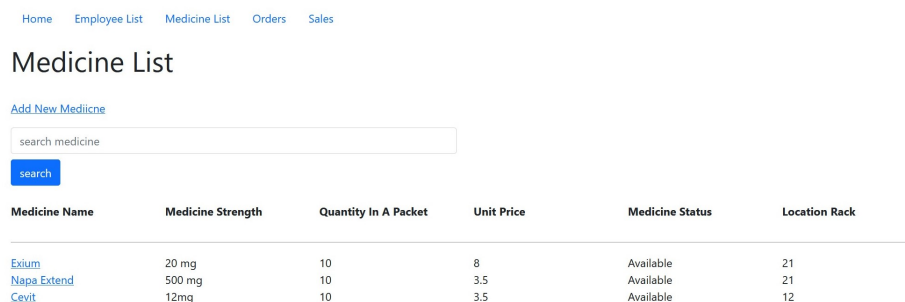
To implement this medical store management system, we have used HTML, CSS, Bootstrap in front-end. And for back-end we have used PHP, Laravel. MySQL was used as relational database. This system can be used by any medical store to manage their internal tasks such as finding a medicine, employee check-in check-out, creating an order, viewing sales statistics by search (by date, month and year). On the other hand, Admin can apply CRUD functionality for medicines, orders, employees. Sales statistics is not editable because we generate this by using order details. This system is pretty much easy to navigate and very user friendly.



## 5.6 Testing

For testing, here I am showing one features of our system which is adding a medicine into our system.

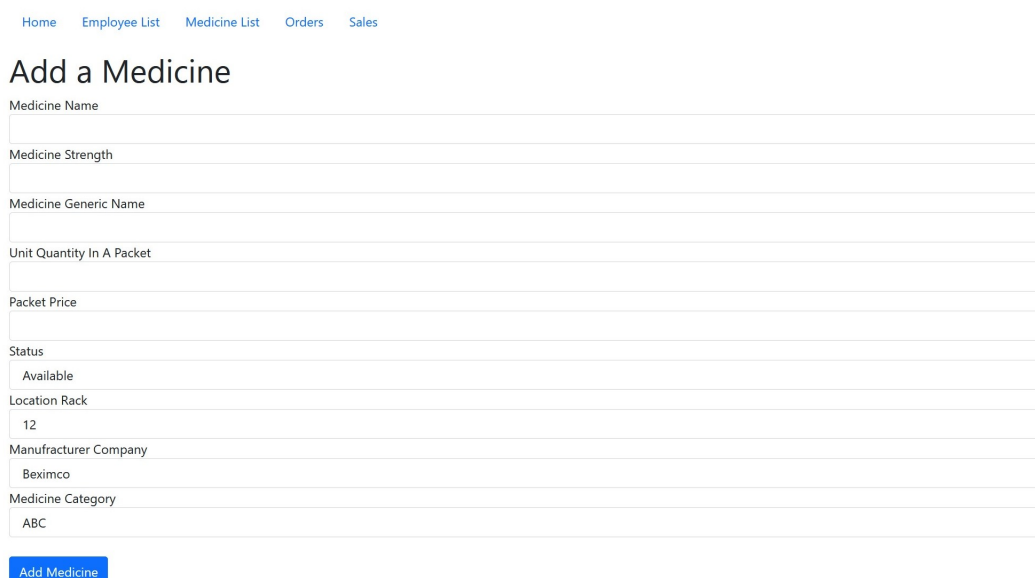
### Input



Medicine Name	Medicine Strength	Quantity In A Packet	Unit Price	Medicine Status	Location Rack
<a href="#">Exium</a>	20 mg	10	8	Available	21
<a href="#">Napa Extend</a>	500 mg	10	3.5	Available	21
<a href="#">Cevit</a>	12mg	10	3.5	Available	12

Figure 5.8: Adding a medicine

This is medicine list page from where user can view all available medicines with necessary information. Users are able to find medicines by search from here. And users (admin, salesman) are allowed to add a new medicine by clicking ‘Add New Medicine’ from this page, this will show an input form to user where he/she needs to give all necessary information to add a new medicine.



Home Employee List Medicine List Orders Sales

### Add a Medicine

Medicine Name

Medicine Strength

Medicine Generic Name

Unit Quantity In A Packet

Packet Price

Status

Available

Location Rack

12

Manufacturer Company

Beximco

Medicine Category

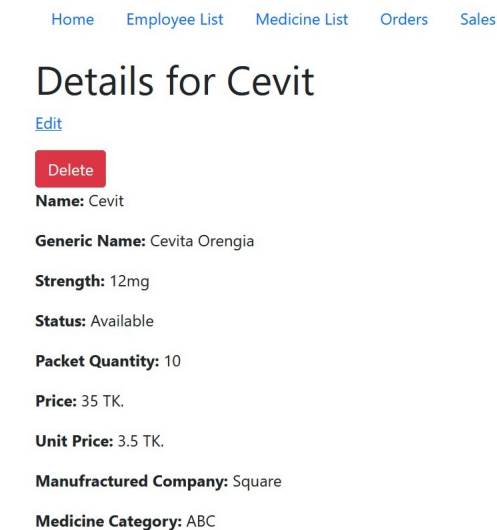
ABC

Add Medicine

Figure 5.9: Input form to add a medicine

## Output

Medicines added from the user input are shown above at figure 5.8. This system redirects users to input page with newly added medicine. Details output for a specific medicine can be found by clicking on a specific medicine and this is shown below:



Home Employee List Medicine List Orders Sales

### Details for Cevit

[Edit](#)

[Delete](#)

**Name:** Cevit

**Generic Name:** Cevita Oregia

**Strength:** 12mg

**Status:** Available

**Packet Quantity:** 10

**Price:** 35 TK.

**Unit Price:** 3.5 TK.

**Manufactured Company:** Square

**Medicine Category:** ABC

Figure 5.10: Added medicine

Above figure illustrate details information of a medicine which added by user. And users are able to edit or delete a medicine.



Home Employee List Medicine List Orders Sales

### Edit Details of Cevit

Medicine Name  
Cevit

Medicine Strength  
12mg

Medicine Generic Name  
Cevita Oregia

Unit Quantity In A Packet  
10

Packet Price  
35

Status  
Available

Location Rack  
12

Manufacturer Company  
Beximco

Medicine Category  
ABC

[Save Medicine](#)

Figure 5.11: Editable output of a medicine

# Chapter 6

## Results & Analysis

This part contains screenshots of some of main features of the application so that you can understand how the system looks like. Here I will illustrate two main functionalities and those are order and sales reports.

### Create and view an Order

#### Create Order

Home Employee List Medicine List Orders Sales

### Create a new order

Customer Name

Customer Contact No

Select Medicine

Exium

Medicine Price per unit

Exium: 8 taka

Numebr of Quantity

Select Salesman

Aswad Bilal

Make Order

Figure 6.1: Create order view

User need to fill out this form to create an order. After making an order, it will redirect to order history page.

## Order history

[Home](#) [Employee List](#) [Medicine List](#) [Orders](#) [Sales](#)

### Order List

[Add New Order](#)

Order ID	Customer Name	Medicine Name	Number of Quantity	Total Amount	Sold By
<a href="#">5</a>	Ricky Ponting	Exium	12	96	Aswad Bilal
<a href="#">6</a>	Adam Zampa	Napa Extend	5	17.5	Atul Miya
<a href="#">7</a>	Jogendra Varma	Cevit	15	52.5	Zahidul Islam
<a href="#">8</a>	Tarek Aziz	Exium	10	80	Atul Miya
<a href="#">9</a>	Liam Zeon	Exium	20	160	Aswad Bilal

Figure 6.2: Order history

This is the order history view, user can add another new order from this page which will redirect him/her to fig 6.1 page.

### Details of an order

[Home](#) [Employee List](#) [Medicine List](#) [Orders](#) [Sales](#)

[Edit](#)

Delete

Order 9

**Customer Name:** Liam Zeon

**Customer Contact Info:** 9988776655

**Purchased Medicine:** Exium

**Quantity:** 20

**Total Bill:** 160

**Sold By:** [Aswad Bilal](#)

Figure 6.3: Order details view

This is the details information of a created order.

## View Sales Reports

### Home view of sales reports

The screenshot shows the 'Sales Reports' section of a web application. At the top, there is a navigation bar with links: Home, Employee List, Medicine List, Orders, and Sales. Below the navigation bar, the title 'Sales Reports' is displayed. There are three search filters available:

- Search By Date:** Includes a text input for 'Select a Date' with a placeholder 'mm / dd / yyyy' and a blue 'Search' button.
- Search By Month:** Includes two dropdown menus for 'Select Name' (with 'January' selected) and 'Select Year' (with '2022' selected), and a blue 'Search' button.
- Search by year:** Includes a text input for 'Select Year' with '2022' entered and a blue 'Search' button.

Figure 6.4: Sales reports home view

This is home view of sales reports page. From here user can view sales history by searching with specific date, month and year.

### Search by date results

Home Employee List Medicine List Orders Sales

Total Sales In 2022-05-08

Order ID	Customer Name	Unit Price	Number of Quantity	Total Amount
5	Ricky Ponting	8	12	96
6	Adam Zampa	3.5	5	17.5
7	Jogendra Varma	8	15	120
8	Tarek Aziz	8	10	80

Total Sale: 313.5

Figure 6.5: Date wise sales

### Search by month results

Home Employee List Medicine List Orders Sales

Total Sales In May, 2022

Order ID	Customer Name	Unit Price	Number of Quantity	Total Amount
5	Ricky Ponting	8	12	96
6	Adam Zampa	3.5	5	17.5
7	Jogendra Varma	8	15	120
8	Tarek Aziz	8	10	80
9	Liam Zeon	8	20	160

Total Sale: 473.5

Figure 6.6: Month wise sales

## Search by year results

[Home](#) [Employee List](#) [Medicine List](#) [Orders](#) [Sales](#)

## Total Sales In 2022

Order ID	Customer Name	Unit Price	Number of Quantity	Total Amount
5	Ricky Ponting	8	12	96
6	Adam Zampa	3.5	5	17.5
7	Jogendra Varma	8	15	120
8	Tarek Aziz	8	10	80
9	Liam Zeon	8	20	160

Total Sale: 473.5

Figure 6.7: Year wise sales

# Chapter 7

## Project as Engineering Problem Analysis

### 7.1 Sustainability of the Project/Work

Sustainability is a business model that balances the environmental, social, and economic aspects of project-based activities to meet stakeholders' current expectations while avoiding future generations' burdens. The project's maintenance is also part of the sustainability. The main outcome from this project is to provide a solution for medical stores management team who suffers a lot to maintain their business in manual way. Finding medicine, keeping track of sales, orders etc. are pretty much tough for them. Purpose of this project is to maintain their internal tasks in more easier and efficient way. To maintain the system's integrity, it is required to go through maintenance after certain periods of time.[9]

The system is made in a user friendly way and easy to navigate through. The admin has complete control over the system so he can create, manage, update, delete any unnecessary data from the system that is no longer needed. As this system is easy to use and maintain, users will have a better experience.

### 7.2 Social and Environmental Effects and Analysis

**Social Effect:** The main goal of this project is to transform a medical into a online platform where all internal task will be maintained by this platform. This platform will incorporate all of a medical store's physical tasks into an online-based system so that physical labor is no longer required. This system will provide all the functionalities from managing the system, finding medicine, creating orders, keeping records of sales, managing the inventory and analyze the overall business. The main benefit of this system is it will save enormous amount of time, because normally people have to wait much time

to buy medicines from a store, this system will help to reduce that time and people will get a better service from medical stores. And this will have a great impact in our social life.

**Environmental Effect:** This platform will reduce physical labour and save time to provide a service. Normally people need to wait outside or inside the stores to get medicine because it takes time when you will provide medicines in manual way. Sometimes it makes crowd in a medical store and many of them are patients as well, there are some diseases which can be transferred into others' body through this crowd, as this system will allow to provide a quick service to the customers the probability of being crowd is less. And this will have a great environmental effect from this system.

## 7.3 Addressing Ethics and Ethical Issues

There is always a security problem for user data when discussing a system that deals with online activity. If user data is exposed, it can be exploited in a variety of ways. This is a significant security risk. To ensure that user data is never leaked or compromised, we used an end-to-end encryption solution. We're also beefing up the security layer because there will be a lot of transactions every minute.



# Chapter 8

## Lesson Learned

### 8.1 Problems Faced During this Period

The main problem I faced during my internship period was my lack of practical knowledge of building production level software. All I had was my theoretical knowledge I had gained from different courses while completing my degree. I had to gather software requirements directly by brain storming, analyzing the existing problem, discussed with my intern supervisor, make an action plan with the core functionalities of the software which would have to meet the clients' requirements and how I was going to approach building the software.

During my internship period, I had to build the backend system using PHP's Laravel framework, which I had no prior knowledge, all I had some basic knowledge of PHP. But for this system, I had to learn and build the system using the Laravel Framework because the system had to be built on a RESTful API so that it could communicate with the frontend. As I was building the backend by myself, I had to complete a lot of work within a short period of time.

Another challenging part was the lack of communication. As I had to work remotely from home due to Covid-19 pandemic , often lack of communication caused longer time to fix the bugs which arose while working on backend as I had no working experience in Laravel.

### 8.2 Solution of those Problems

Being new to Laravel framework, I had to read lot of documentations, go through Youtube tutorials, learning all the ins and outs of the framework while developing the system. As I was the only developer working on the backend system of the software, I had to plan out my work plan for the week ahead so that I could deliver the system within the given timeline.

I spent a lot of time for building logic to implement all the functionality of the system which helped me to understand the requirements and implement the system. My intern supervisor used to have a daily meeting with me and helped me where I stuck, and this daily meeting solved lack of communication.

# Chapter 9

## Future Work & Conclusion

### 9.1 Future Works

As this project is still in the development phase, we have plans to add more features to provide better user experience. We have plan to integrate e-commerce for medicine along with this system, medical stores will not only use this to maintain their internal task but also online selling, and we hope this will be a great asset for this system. In future, we also have plans to collaborate with big pharmacies and bring a mobile app version of this system.

### 9.2 Conclusion

Throughout the development of this system, I had a wonderful experience. I learned many things that are not only academic for example: new programming language, new libraries, and new workspace etc. but also soft skills such as managing workload, maintaining time, working as a backed developer and building a good relationship with people. The supervisor, HR, and the COO all were very supportive and helped solve any problems that I faced.

To conclude, every moment working on this system was a great lesson for me and truly a great experience. I have learned how to collect user requirements, design, develop, integrate and test an entire commercial based software while building the entire backend for this application. I really hope to use the experiences I earned in my future endeavors.

# Bibliography

- [1] “Work breakdown structure (wbs).” <https://www.projectmanager.com/guides/work-breakdown-structure>.
- [2] “What is scrum? methodology and project management.” <https://www.nutcache.com/blog/what-is-scrum-methodology-and-project-management/>.
- [3] “Rich picture.” [https://en.wikipedia.org/wiki/Rich\\_picture](https://en.wikipedia.org/wiki/Rich_picture).
- [4] “What are functional and non-functional requirements and how to document these.” <https://enkonix.com/blog/functional-requirements-vs-non-functional/>.
- [5] “Types of feasibility study in software project development.” <https://www.geeksforgeeks.org/types-of-feasibility-study-in-software-project-development/>.
- [6] “Uml - standard diagrams.” [https://www.tutorialspoint.com/uml/uml\\_standard\\_diagrams.htm](https://www.tutorialspoint.com/uml/uml_standard_diagrams.htm).
- [7] “Everything you need to know about mvc architecture.” <https://towardsdatascience.com/everything-you-need-to-know-about-mvc-architecture-3c827930>
- [8] “How laravel implements mvc and how to use it effectively.” <https://blog.pusher.com/laravel-mvc-use/>.
- [9] “Sustainability in software development.” <https://blog.scottlogic.com/2019/12/30/sustainability-in-software-development.html>.