# MEDI NEST

*Pharmacy Management System*

A web-Based System to Customer Experiences

One Website for All the People and The Pharmacies.

# HD in Computing & Software Engineering

### *CSE5015 Computing Project Proposal Approval Sheet*

*Student Use only;*

| Group Name | | Attempt No | 1 |
|---|---|---|---|
| **Title of the project** | Medi Nest | | |

| **System platform** | 🟥 Web Application      ⬛ Desktop Application<br>⬜ Mobile Application<br>………………………… |
|---|---|
| **Technology** | HTML, CSS, JavaScript, PHP, Wamp Server |
| **Programming methodology** | ⬜ Structured System Analysis and Design Methodology<br>⬜ Object Oriented Analysis and Design Methodology |
| **SDLC** | Agile Methodology |

| **Student No** | 112/62 | **Full Name** | Karshana Chamurditha |
|---|---|---|---|
| **Roles & Responsibilities;**<br>**Project Manager**<br><br>Coordination of the team.<br>Planning, and risk management. | | | |
| **Student No** | 112/68 | **Full Name** | Damitha Eranga |
| **Roles & Responsibilities;**<br><br>**System Analyst**<br>Requirement Gathering<br>Analyzing, Process Optimization | | | |
| **Student No** | 112/62 | **Full Name** | Karshana Chamurditha |
| **Roles & Responsibilities;**<br>**UI/UX Engineer**<br>User researching, Interface Designing | | | |
| **Student No** | 112/52 | **Full Name** | Mohamed Kaamil |
| **Database Engineer**<br>Database Designing, Data Management,<br>Performance Optimization | | | |
| **Student No** | 112/08 | **Full Name** | Fadhila Khan |
| **Software Engineer**<br>Software developments, Code Writing, Debugging the code | | | |

**System Functionality:**

| Function | Description |
|---|---|
| Users/Customers | |
| Login | Users can login securely. |
| Sign up | User can create their accounts |
| Email OTP | An email including an OTP will be sent to users upon account creation in order to verify their identity. |
| Logout | Allow users to securely log out of their accounts. |
| Search Function | Users can search for products and pharmacies. |
| Add to Cart | Users can add products to the cart. |
| Order Placement | Users can pick products, safely place, modify, and remove orders, as well as see order history. |
| Bill Management | Once user is done with shopping total will be displayed. |
| Delivery details | A delivery details will be provided to the user's email once they place an order. |
| Feedback | Customers can leave comments regarding the website and the services that the pharmacies have provided. |
| Direct contact | Users can choose the option to get in contact with that particular pharmacy. |

| Pharmacy Staff | |
|---|---|
| Signup | Pharmacies can create their accounts using Medi nest |
| Login | Pharmacies can login to their page. |
| Add product | Pharmacies can add their products to the website. |
| Update Product | Pharmacies can update their product details. |
| Delete Product | Pharmacies can delete their products. |
| Search Products | Pharmacies can Search their own products |
| View Orders | Pharmacies can view customer orders. |
| Confirm Orders | Pharmacies can Confirm the orders. |

| Admin | |
|---|---|
| Admin Login | Admin can login to the webpage as well as to the dashboard |
| View Customers | Admin can view users |
| Delete Customers | Admin can Delete Customers |
| View Pharmacy Users | Admin can view pharmacies |
| Delete Pharmacy Users | Admin can delete pharmacy users |
| Availability to handle the whole website | Admin can access any features in the website |

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**Task – 01**

# MEDI NEST

**Group Members**
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- (02)   Fadhila Khan
  (CL/HDCSE/CMU/08)
- (03)   Damitha Eranga
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# Task - 02

**Medi Nest**

An Online Platform for Medicine and Healthcare Services

## Abstraction

Medi Nest is an online shopping platform that makes it simple for users to look up, evaluate, and purchase medications from different pharmacies. It facilitates a seamless purchasing experience, encourages accessibility, and gives pharmacies the ability to manage product listings effectively. Medi Nest creates a fair marketplace by improving access to necessary medications, especially in communities with limited resources.

## Introduction

In the modern world access to necessary medications and medical treatment is needed, but many individuals still face major challenges, especially those who live in remote or rural locations. These obstacles include not knowing which medications are acceptable, not knowing when they will be available, and not knowing what reasonable market pricing are. People in these places usually have access to pharmacies, which forces them to rely on dangerous replacements like the black market, where they could pay high prices or buy fake goods.

This situation inspired the creation of Medi Nest, a comprehensive online platform designed to solve these pressing issues. Medi Nest seeks to make healthcare and medicine more accessible and affordable by providing a digital marketplace where customers can search for and purchase medications directly from legitimate pharmacies. Through the platform, users can easily compare prices, check the availability of medicines, and ensure they are paying fair, market-standard prices. By promoting transparency, Medi Nest aims to eliminate the need for people to resort to unsafe alternatives while ensuring that everyone, regardless of location, can obtain the medicines they need.

Medi Nest provides a dependable platform for buying medications together with tailored healthcare recommendations. Based on the users' medical needs, including cardiac medicine, it suggests hospitals and certified medical professionals. Additionally, Medi Nest offers educational resources to educate the public about proper medicine use and medical care. By including trustworthy pharmacies, open pricing, and reputable healthcare professionals, the platform seeks to enhance the quality of life for underserved populations.

# Task 03

## Background Study

This means that, due to the upheaval in technology and changing consumer expectations, the pharmaceutical industry has drastically shifted to digitalization. With rising healthcare costs and accessibility posing a more significant concern by the day, the demand for online platforms delivering convenience, choice, and value for money competitive pricing has grown exponentially. In this scenario, the idea of an online marketplace for pharmacies where several registered pharmacies could list their products for sale constitutes a strategic evolution in the industry toward meeting the needs of the modern consumer.

The purpose of this background study is be directed at the factors that contributed to the establishment and success of online pharmacy platforms. Drawing from a historical context of the pharmaceutical industry and the evolution of e-commerce, this study will project how their intersection has shaped today's market environment. thus, background study considers about several key objectives.

## Objectives

- Evaluation of historical context and industry

A brief review of how the pharmaceutical industry has evolved in concert with technological changes, customer behavior, and regulatory frameworks will be provided. In this topic, the e-commerce boom and its effects on retail industries like pharmaceuticals will be taken into consideration.

- Current Market Landscape

This section will discuss about existing online pharmacy platforms, both single pharmacy and multi pharmacy models, identifying key players, their market strategies, strengths, and weaknesses.

- Technological and Regulatory Considerations

An overview of the technological considerations necessary for building a secure, efficient, and user-friendly online pharmacy platform. This includes discussions on payment gateways, data security, user authentication, and inventory management. Also, the study will provide

regulatory considerations, including the legal framework governing the sale of pharmaceuticals online, privacy concerns, and compliance with health regulations.

- Consumer Behavior and Expectations

This will provide insight into customer behavior in the digital age and how consumers interact with an online pharmacy platform. It touches on consumer needs, preferences, and concerns at the heart of making an online marketplace of pharmacies successful, including trust, convenience, product range, and pricing.

## Existing pharmacy systems

This is one complex, multi-dimensional project that requires much research and strategic planning in the development of this web application for the pharmacy marketplace. As a first step, to prove this project a success, detailed research is necessary into already existing online platforms of pharmacies. By examining such platforms, we could be able to come up with common features, key functionalities, and some innovative elements that have made them successful.

- **Union Chemists Pharmacy**
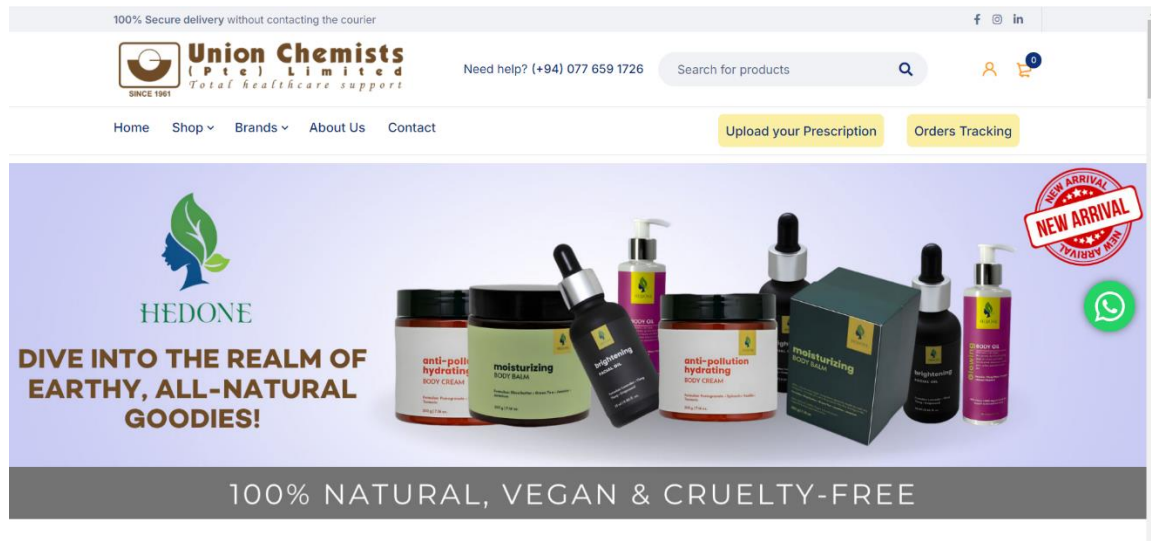


Figure 1: Union chemists webpage PC view
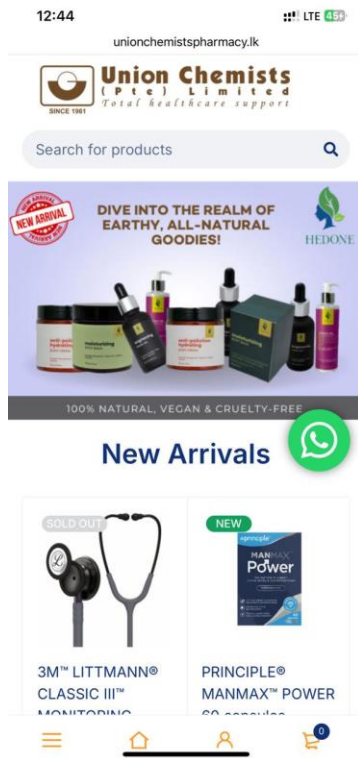
Figure 2: Union Chemists Webpage

## User Experience Design(UX)

The User Navigation bar is intuitive and put right at the top to get easy access for important sections like Home, Shop, Brands, About Us, Contact, Upload Prescription, and Orders Tracking. Everything is organized and put out of the way on the website. One uniform color enhances the aesthetic levels.

The hero section gives a very nice, effective presentation to "Hedone" line products and comes in engaging visuals, along with a clear call to action: "Dive into a realm of earthy, all-natural goodies!" Information on each product is present concisely inside the hero section cards in the form of the product name, product image, and a short description.

### Responsive Web Design

Union chemists use a responsive web application. The website seems to fit most screen dimensions very well, ensuring a good user experience on both desktop and mobile devices. The images seem to be responsive because they resize depending on the screen width. It doesn't cause distortion or give way too much loading time.

**Security**

An online web application's security is crucial, especially when managing user sensitive data like payment information, address information, and phone number. Users can create user profiles on Union Chemists and add personal information to them. The user profile can only be viewed with a username and password, ensuring that the personal information is kept private and safe.

**Front End**

1. The web application's basic structure and style are done using HTML and CSS.
2. JavaScript will improve the computational functions and the dynamism of online applications.
3. Use responsive design to make sure the web application is optimized for a wide range of devices.

**Back End**

01. Medicine information, user details, and payment details are stored in a MySQL database.
02. State management and handling across requests are handled by session management.
03. Management of product catalogues (CRUD)

- **Health Guard Pharmacy**
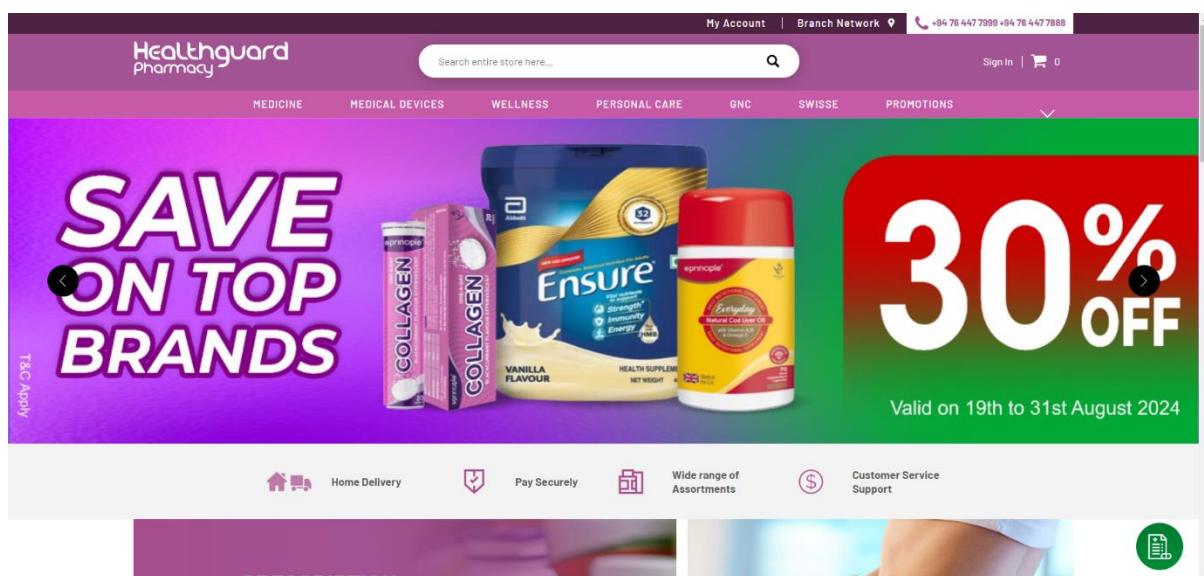


Figure 3: Health Guard PC View
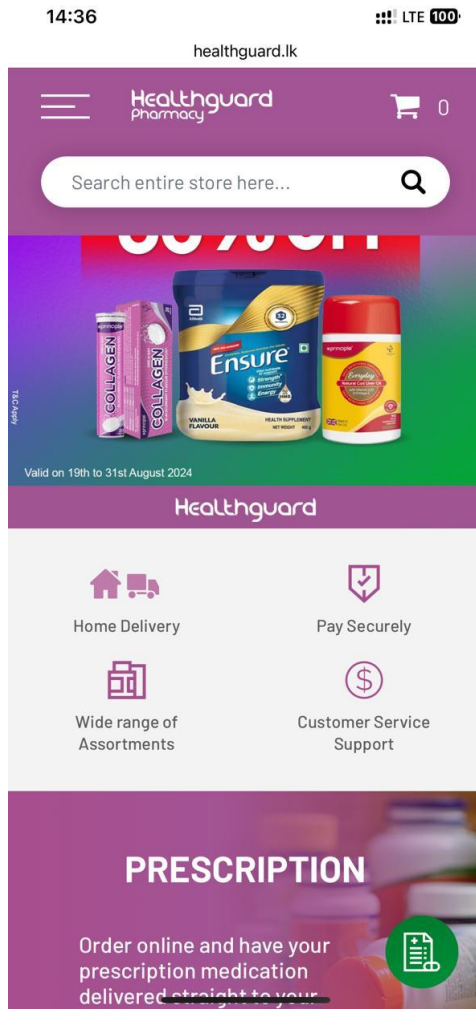
Figure 4: Health guard Mobile View

## User Experience Design (UX)

A clear horizontal navigation bar tops the page with selections available via categories such as "Medicine," "Medical Devices," "Wellness," "Personal Care," and "Promotions." There is also a search bar. From a UX perspective, it would be good to check if the search bar supports advanced filtering by category or brand. This should be clear and simple as per procedure, with understandable instructions on the possible payment methods followed by easily interpretable procedures.

The design of the screen features a clean and professional feel with a white background and the use of purple.

**Responsive Web Design (RWD)**

Health guard Pharmacy has one of the best responsive web applications consisting an online web site, mobile web site. They all complement one another and function really well together. Adaptive layouts that guarantee content stability and quality according to device/screen size are among the key advantages.

**Security**

Same as Union Chemists application a user authentication system is added to Health guard as well to keep the user sensitive information safe within the system. Secure online transactions which require an OTP code for confirming the payment and checking user ownership of the given payment method.

**Front End**

1. HTML used for structuring and CSS making sure to keep a visually appealing user interface is made with Health guard signature branding.

2. Upgrading the application interactivity using JavaScript.

**Back End**

1. User and management data are stored and retrieved using database management (MySQL).

2. Scripting will be handling the real time availability check and inventory upgrades.

3. To maintain a responsive design flexible layout will adapt on the layout size depending on the device or screen size.

- **My Care Online Pharmacy**
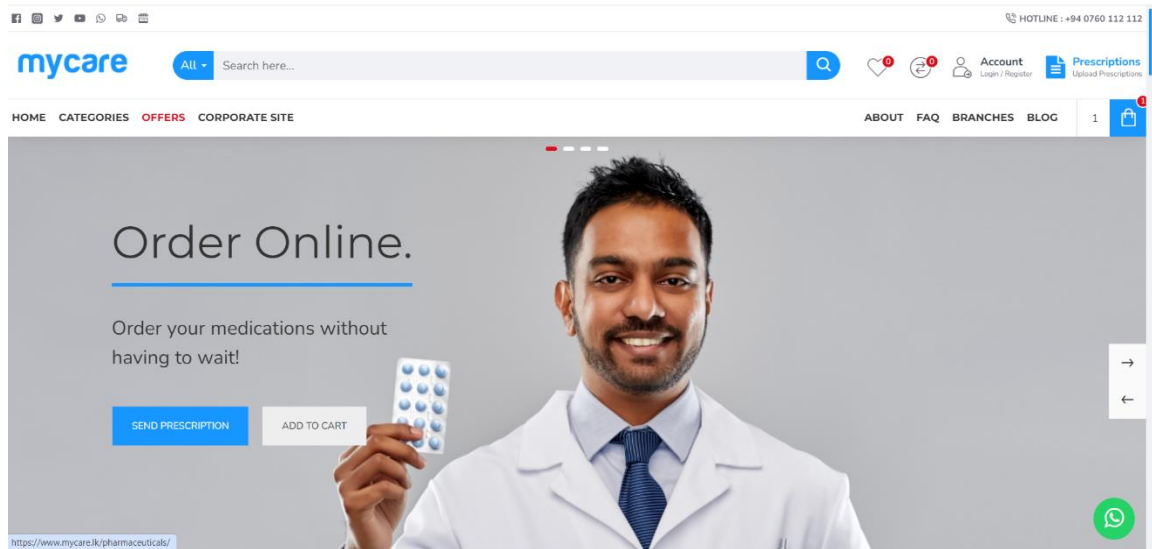


Figure 5: My Care Online PC View



Figure 6: My Care Online Mobile View

## User Experience Design (UX)

My Care is an online pharmacy that is popular in Sri Lanka a user-friendly interface with enhanced animations. They have given the user a menu for option access instead of a navigation option menu.

## Responsive Web Design (RWD)

It also looks great with the HD images on both the web application of the mobile and the computer, not forgetting the smooth transition between the images. The visuals and the font change depending on which device is used. The mobile version has a different layout rather than making the laptop version squish into the tiny screen area.

## Security

Offers a user login that consist of email and password making the user get all the notifications to the own logged email. The user can save their payment details in the system under their username and gets notified when the account is used. Here also include the OTP code for the payment verification.

## Front End

1. Website core with HTML/CSS/JavaScript using bootstrap. Programs for coding like Visual Studio will be used.
2. Google development tools help in debugging and testing of the web applications. These are inbuilt tools of the google chrome bowser.
3. File transfer protocols, such as cyberdeck, can be used to upload files to the web application.

## Back End

1. One dependable open-source database choice is MySQL. This might be used by My Care to keep track of orders, merchandise, and another store information.
2. To guarantee that their account is safe, authentication will be required if the profile contains sensitive data. Applications for authentication such as Author are one example.
   It looks like Spring Boost, a very well-liked Java framework, was used to create the web application framework.

# Task – 04

## Problem Statement

When developing a web application for a pharmacy marketplace, various challenges are to be faced by the developers and stakeholders in the success of the platforms. These challenges emanate from complex health issues and the robust technological solutions required with strong expectations from consumers.

- ▪ Here's an expanded explanation of some of the key problems

### Regulatory Compliance

The pharmaceutical sector is one of the most regulated industries where strict laws and acts have been passed with regard to the sale of medications, especially prescription drugs, making it very complex to develop a platform since regulations differ in different regions.

### Security and Privacy Problems

Robust security measures will inevitably have to be in place for dealing with sensitive customer information regarding their case history, prescription details, and payment details. Advanced security measures, thus, should be developed by the developers to protect the information of the users from infiltration, unauthorized access, or any other form of cyber-attack.

### Pharmacy Integration and Inventory Management

In order to ensure a seamless connection for product listing and availability management, the project entails merging several pharmacies into a single marketplace, managing inventory systems, synchronizing them for real-time updates, and controlling availability.

### User Experience and Interface Design

A wide range of users, including clients, pharmacists, and medical professionals, should be served by the web application. It should be simple to use, accessible, and intuitive, with rapid product finding and easy checkout processes. The difficulty is striking a balance between ease of use and extensive capability, as both customers and pharmacists need to find it easy to use.

### Delivery Management

It is a major logistical difficulty to ensure the safe and timely delivery of medications, particularly in areas with inconsistent infrastructure. It is essential to integrate with partners for effective distribution, cold chain logistics, punctual deliveries, and return/exchange handling. Establishing client trust also requires providing real-time tracking and updates for shipments.

# Task – 05

- ## Literature Review

The literature review looks closely at other systems and technologies not similar to ours. Our goal is to gain an understanding of the current state of pharmacy management systems. We seek to learn what functions effectively and what doesn't in these systems by reading pertinent literature. We also wish to identify any fresh concepts or trends in the industry. Using the knowledge, we've gained from various sources this comprehensive evaluation will assist us in creating the greatest possible marketplace.

- ## Online Pharmacy Platforms

This section examines the most widely used pharmacy item ordering websites in our nation. These websites are crucial since they simplify the process of ordering medications straight from retailers. In order to comprehend what consumers, anticipate when they place an online pharmacy purchase, we must examine them.

Online pharmacy orders can be placed on a variety of websites, each with unique characteristics. For instance, clients may easily view their order history and manage their accounts with Health guard. However, occasionally, they might not provide all you're looking for, so users might visit other websites as well. Additionally, Union Chemists allows users to view their order history and manage their accounts. However, there are occasionally technological issues, and the inventory on the online store may differ from that at the physical locations.

My Care Online pharmacy is good for both customers and sellers and has membership plans for sellers. But it can be hard to make both buyers and sellers happy, and it's important to make sure the quality of products stays consistent across different sellers.

Every website contributes to the improvement of online drug sales and purchases in some manner, but each one also has drawbacks that buyers and sellers must consider.

- ## Customer Oriented

A prosperous pharmaceutical marketplace website puts the requirements of its users first, providing a smooth buying journey, tailored promos, and one-on-one guidance. This enhances consumer satisfaction, boosts profitability, fosters loyalty, and assures market competitiveness in a field that is undergoing rapid change. As a result, giving customers' requirements top priority is essential for a successful pharmaceutical marketplace.

- **Comparative Analytics**

## Union Chemists Pharmacy

**Strengths**

- This website very User-Friendly Design. The Union Chemists website is lean and clean, hence easy to navigate for customers in search of their required products. Some features it has highlighted, considered to be core competencies, include search and product categorization.
- This site is characterized by the availability of various pharmaceutical products, definitely an added advantage for customers searching for particular medications.
- Union Chemists holds a trusted name in the entire territory of Sri Lanka. This act fuels the customers' trust in the brand's online platform.

**Weakness**

- Limited Web Features

  Although the website is very user-friendly, sometimes other advanced features like online consultation or even just prescription management are not a part of it.

- Design Aesthetics

  The design, though functional, would look and feel so much better if it came with a more visually pleasing and modern interface that was attractive to users
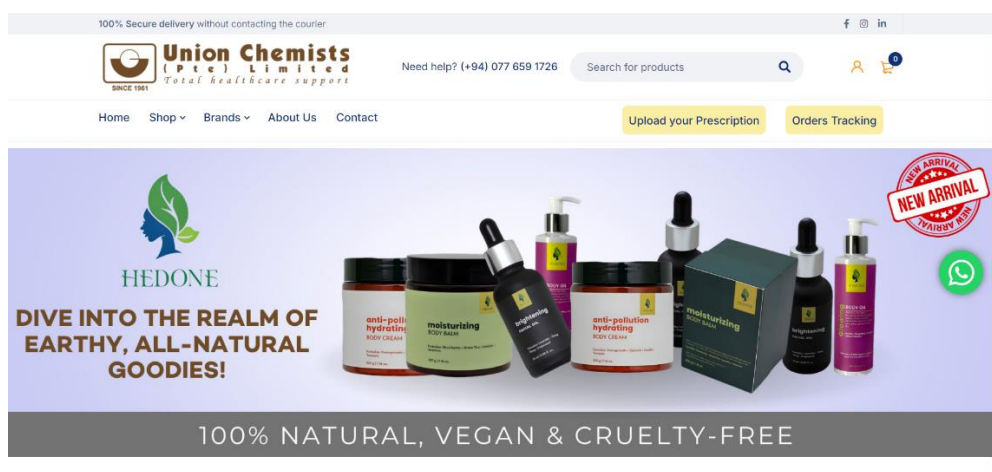


Figure 7: Union Chemists Webpage

# Health guard Pharmacy

**Strength**

- It has a very strong distribution network backed by **Sunshine Healthcare Lanka**, thereby ensuring efficient delivery of products throughout Sri Lanka. This makes it a huge logistical advantage.
- The website offers a wide range of products, running from pharmaceuticals to wellness products and beauty items in order to satisfy all types of customer needs.
- Integration of Technology

  Health guard is implementing the latest technologies, such as AI and cloud analytics, toward improving the efficiency of services, making the firm quite forward-looking.

**Weakness**

- Complexity for New Users

  The site, with all its numerous features and manifold facilities, could be very complicated to use for a new user who is not familiar with e-commerce or health portals.

- Pricing Transparency

  Pricing on the website is not very clear, which could pause some very price-sensitive customers from purchasing.
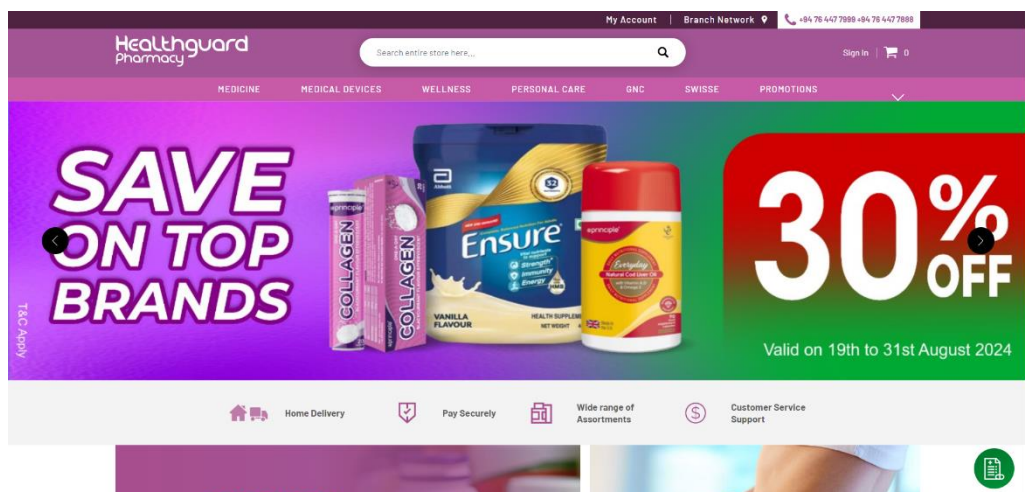


Figure 8: Health guard Webpage

## My Care Online Pharmacy

## Strengths

- Detailed Listings

  My Care provides a range of pharmaceutical products with information regarding the availability and pricing of the items in detailed listings.

- The website has added features, like wish lists and products comparisons, that really put added punch into customers' shopping experiences.

- Responsive Customer Service

  My Care has built for itself a reputation for customer responsiveness that helps iron out issues and queries effectively.

## Weakness

- Problems with Stock Management

  Customers searching for certain products may find it leading to when the website indicates that a product is out of stock.

- UI

  Although the design is functional, some users may find it difficult to navigate since it feels a little crowded.
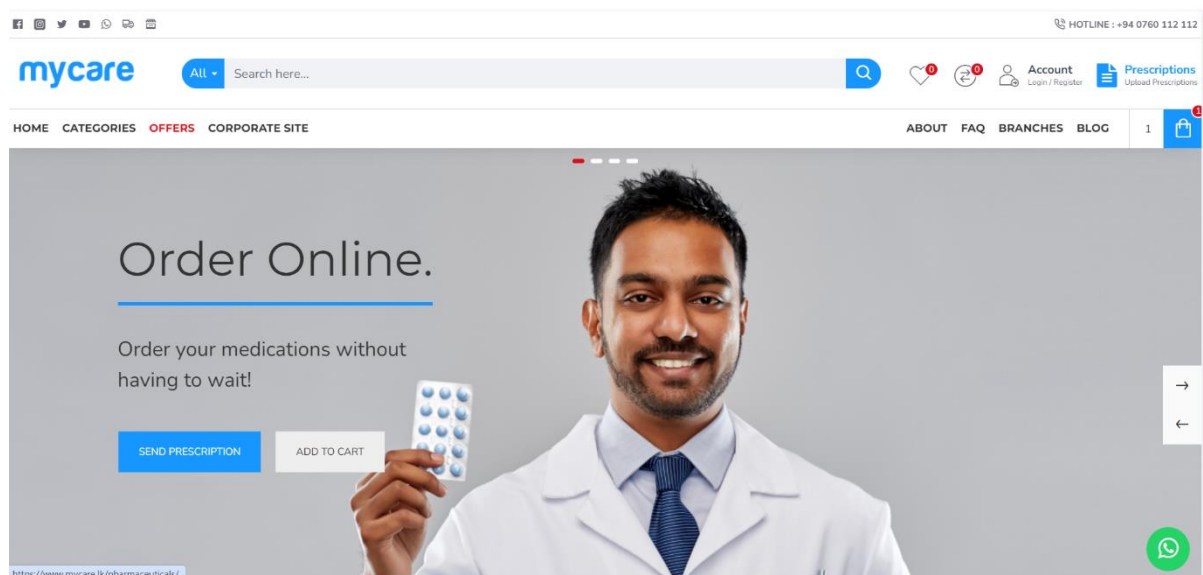


Figure 9: My Care Webpage

# Task - 06

**Proposed Solution**

The goal of the planned pharmacy website is to completely transform Sri Lankan consumers' experience when purchasing medicine. With the help of this platform, pharmacies all throughout the country may manage their product listings, set up customized pages, and make adjustments in real time that are immediately displayed to customers. Whether a pharmacy is across the nation or just down the block, customers can easily browse and search for medications, compare pricing, and place orders from any pharmacy. The website guarantees a smooth transaction with current availability, delivery choices, and improved accessibility, increasing the effectiveness and convenience of pharmaceutical purchases for all parties.

**Key features of Medi Nest for pharmacies**

- **Developing and managing profiles**
  - pharmacies may quickly establish and maintain their profiles, which include contact details, address, and business hours.

- **Management of products**
  - Add/Update/Delete products – as needed, pharmacies can add new products, make updates to their current inventor, and remove things.
  - Product search – a feature that allows users to easily locate and track products in the inventory.

- **Order administration**
  - View orders – pharmacies have real time access to view incoming consumer orders.
  - Order confirmation – the capacity to verify and handle orders, together with inventory control according to sales.

- **Updates on inventory in real time**
  - Product availability is automatically updated in response to shifts in inventory and sales.

**Key features of Medi Nest for customers**

- **Management of user accounts**
  - Sign Up/Sign In – users can set up profiles, log in, and establish accounts.
- **Product Navigation**
  - Customers have the option to peruse and look up medications by name, category, or pharmacy.
  - Price comparison – evaluate the cost at various pharmacies.
- **Shopping cart**
  - Add to cart – consumers can add prescription drugs from several pharmacies to their cart
  - View and edit cart – before checking out you can view and make changes to your cart.
- **Placing an order**
  - Secure checkout – purchases can be placed online, and customers can select whether to pick up or have their purchases delivered.
  - Order tracking – Stay up to date on the current status of their orders.
- **Integration of payments**
  - Multiple payment options – acceptance of credit/debit cards, mobile payments, cash on delivery.

Our mission is to transform the pharmacy shopping experience by facilitating better communication between pharmacies and their customer base, as well as enabling customers to obtain the medicines they require from the most accessible and nearby suppliers. This platform is establishing a new benchmark for online pharmacy services across the country by guaranteeing real-time updates, easy-to-use navigation, and a seamless purchase experience.

# Task - 07

## Justification to the solution

The proposed Medicine website is designed to address the significant challenges faced by both customers and pharmacies in Sri Lanka. The current landscape of pharmaceutical services in the country reveals several critical gaps that this platform aims to fill, thereby improving the overall efficiency, accessibility, and convenience of medicine purchases. Below is a detailed justification for the solution

a. Taking care of the Absence of Online Pharmacy Services
- Current Situation
  - There are not many pharmacies in Sri Lanka that offer online services, and there are not many pharmacy websites available. Because of this, an outstanding 95% of people still get their prescription drugs filled by going to physical pharmacies. This conventional approach is not only expensive but also uncomfortable, particularly for people with mobility impairments or in emergency situations.
- Proposed solution
  - Customers may locate and buy medications from local pharmacies with ease thanks to the Medicine website, which provides a centralized online marketplace. This solution offers customers a more accessible and streamlined approach to get the prescriptions they require without having to make in-person visits by digitizing the pharmacy experience.

b. Improving Availability in Underserved Communities
- Present difficulties
  - In Sri Lanka, there are not many pharmacies with an internet presence in many cities and towns, especially in rural outlying regions. This makes it challenging for locals to find and buy particular medications, particularly when those medications are not easily found at nearby pharmacies.

- Proposed solution
    - Customers can use the website to find and purchase medication from local pharmacies, making it accessible to even those who live in rural places. This feature improves accessibility by making prescription medication quick and easy to obtain.

c. Enhancing Convenience and Customer Experience
- Present difficulties
    - When searching for specific prescriptions, customers frequently have to deal with lengthy wait times and the effort of going to several pharmacies. It can be annoying to go through this process, especially if you have emergency medical needs.

- Proposed solution
    - The Medicine website offers features including a search bar for simple access, many delivery options, and real-time inventory updates to streamline the shopping experience. From the comfort of their own homes, customers can browse the medications that are available, evaluate costs, and place an order with the closest pharmacy. In order to improve the entire customer experience, the platform also has account management capabilities that let customers trace order history and modify their accounts.

d. Helping Pharmacies Operate More Efficiently
- Present difficulties
    - Managing large customer volumes is a common challenge for pharmacy operators, which can result in operational and customer service difficulties. Furthermore, their inability to efficiently manage stocks and reach a larger audience is hampered by the absence of digital technologies.

- Proposed solution
    - The software gives pharmacists all the tools they need to effectively manage their orders, inventory, and profiles. Pharmacies can lower operating expenses, enhance customer service, and concentrate on expanding their businesses by automating these procedures. With tools like reward programs and individualized communication, the site also strengthens ties between pharmacies and customers.

e. Time and Money Savings for All Parties
- Efficiency Increases
  - The website is cost-effectively constructed in addition to being convenient. Pharmacies can cut overhead by streamlining processes and minimizing the demand for buildings. The efficiency of the procedure is increased for clients because they spend less time looking for and waiting in line for medications when they can easily locate and order them.
- Extra Worth
  - Customers receive extra value from features like order history, account management, and different payment choices, which makes the site an essential tool for taking care of their health needs. Because these features make the user experience more tailored to them and more pleasurable, they also increase client loyalty.

f. Ensure security and compliance.
- Data Security:
  - In today's digital world, safeguarding client information is critical. The Medicine website will be constructed using cutting-edge, dependable technology that guarantees the security and privacy of user data. By complying to industry norms and legal laws, the platform will ensure that both customers and pharmacies are safe.
- Legal Compliance:
  - It is important to ensure that the platform conforms with any local rules and regulations. This involves following criteria for online drug sales, data protection regulations, and ensuring that all transactions are lawful and transparent. By maintaining strong compliance standards, the website will gain the trust and credibility of its users.

g. Mobile-friendly design for better accessibility.
- User accessibility
  - Given the extensive use of smartphones, particularly in Sri Lanka, it is critical that the website be mobile-friendly. An adaptable design ensures that users can access the platform at any time and from any location, making it easier to manage their medical needs while on the go. This accessibility is critical for attracting and retaining customers, as it addresses the growing trend of mobile internet usage.

The proposed Medicine website is a comprehensive solution that covers the major issues facing both clients and pharmacists in Sri Lanka. The system promises to alter the way drugs are purchased and managed in the country by providing a platform that increases accessibility, customer experience, pharmacy operations efficiency, and security and compliance. This platform is more than just simple. It aims to create a viable, efficient, and customer-centric ecosystem that benefits all stakeholders. With the correct technology and resources, the Medicine website has the potential to redefine online pharmacy services in Sri Lanka, making it an essential tool for modern healthcare delivery.

# Task - 08

## Scope

- Developing a Comprehensive Online Healthcare and Pharmacy Platform

Medi Nest is an online platform providing convenient, reliable access to medicines and healthcare services, aiming to help users in outstation areas avoid black market options, find necessary medicines, and connect with appropriate professionals.

## Recognizing the Objective

Our main goal with Medi Nest is to create an online platform where customers can find and buy medicines, access healthcare services, and get informed about the correct market prices for medicines. Pharmacies will be able to manage their products, and customers will have access to various features, including recommendations for doctors and hospitals based on their medical needs. By offering all these services in one platform, we hope to make healthcare more accessible and transparent for people, especially those in rural areas.

The platform is meant for an extensive group of users, including both urban and rural residents. Medi Nest is intended for those seeking easy access to prescription drugs, reliable medical treatment, and up-to-date cost information. Customers can use the platform to effectively manage their common medications or chronic diseases, depending on their needs. We can better serve our audience by customizing the platform's features based on our understanding of their demands and usage patterns.

## Functional Requirements

Functional requirements describe what the system must be able to do to satisfy user needs. The goal of Your Health is to develop features that facilitate simple, dependable, and trusted access to medical services and medications.

- **User Interface (UI) Design**
  Develop an intuitive and user-friendly interface that allows customers to navigate through different categories, easily find the medicines they need, and access healthcare information.

- **Login and Registration (Admin/Pharmacy/Customer)**
  Implement secure login and registration processes, allowing different roles like admin, pharmacy, and customer to have specific privileges and functionalities.

- **Medicine Catalog**

  Create a detailed product catalog where pharmacies can upload medicines, complete with descriptions, prices, availability, and images. Customers can browse through categories such as prescription medicines, over-the-counter drugs, and wellness products.

- **Search Functionality**

  Implement a powerful search feature that helps customers find medicines and healthcare providers by entering keywords or filtering through categories.

- **Online Ordering**

  Design a seamless online ordering system where customers can add items to their cart, review their selections, and proceed to checkout.

- **Payment Options**

  Integrate multiple payment gateways, including credit/debit cards, online banking, and cash on delivery, ensuring convenience for all types of users.

- **Promotions and Discounts**

  Allow pharmacies to offer promotions, discounts, and special deals to attract customers and incentivize purchases.

- **Doctor and Hospital Recommendations**

  Provide customers with suggestions for doctors and hospitals based on their search for specific health issues, helping them find the best care for their condition.

- **Customer Support**

  Offer multiple support channels, such as live chat and email, to assist customers with any questions, issues, or feedback they may have.

- **Feedback and Reviews**

  Enable customers to leave feedback and rate medicines or healthcare services, helping others make informed decisions.

## Non-Functional Requirements

Non-functional requirements focus on the system's performance, security, and reliability.

1. **Performance**

   The platform should load quickly and respond promptly to ensure a smooth user experience, even during peak traffic times.

2. **Scalability**

   The platform should be able to scale easily as more pharmacies join, more products are added, and the number of customers increases, without affecting performance.

3. **Security**

   Implement strong security measures, such as data encryption and secure authentication, to protect customer data, including sensitive medical and payment information.

4. **Reliability and Availability**

   The platform should be available 24/7 with minimal downtime. It should have backup systems in place to ensure continuous service, even during technical issues.

5. **Usability and Accessibility**

   Ensure the platform is accessible to all users, including those with disabilities, and compatible with various devices and browsers to reach a wider audience.

6. **Backup and Disaster Recovery**

   Regularly back up data and have a disaster recovery plan to restore the platform quickly in the event of a failure or cyber-attack.

Medi Nest is a platform aiming to improve access to essential medicines and healthcare services, addressing challenges like availability, price transparency, and access to qualified professionals. It aims to create a safer, more reliable healthcare environment, benefiting communities areawide.

# Task - 09

## Methodology and Technology

### Methodology

We chose the **Agile Software Development Model** to construct the pharmacy website. This choice is motivated by the project's dynamic and broad character, which intends to transform the medicine buying experience in Sri Lanka. The Agile framework provides various benefits that are ideally aligned with the goals and difficulties of our platform.
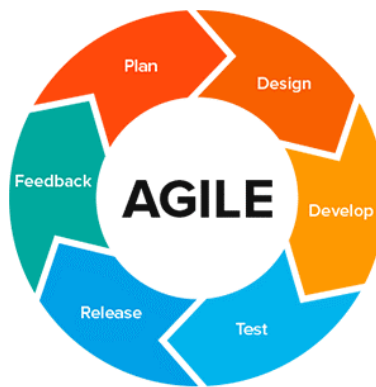


➤ Why is Agile the Correct Choice?

Iterative Development and Flexibility

Agile's iterative approach allows for manageable project development and delivery increments, as well as continual improvement based on real-time feedback. This adaptability is especially important for real-time inventory changes, numerous payment choices, and mobile accessibility, which keeps the platform relevant and user-friendly.

The Agile model's flexibility allows us to tailor and development process to new issues or market developments, ensuring that the website remains current and serves the demands of both pharmacies and customers.

Customer Collaboration and Feedback

Agile development stresses strong engagement with customers and stakeholders, resulting in a user-centric platform that is intuitive, user-friendly, and directly answers user requirements. Regular contact between pharmacies and end users is required for services such as account management, product navigation, and secure checkout.

Agile's iterative cycles allow for rapid intake of customer feedback, ensuring that the platform improves in accordance with user expectations, refining the user experience and increasing its efficacy in accomplishing its goals.

Risk Management

Agile's incremental development methodology enables early problem discovery, which is especially important for projects needing data protection, legal compliance, and operational efficiency. Addressing difficulties when they arise reduces the likelihood of larger ones developing later in the project.

Agile technique promotes continuous testing throughout the development process, ensuring consistent validation of website functionality, security, and performance, lowering post-launch issues and encouraging a stable and secure platform.

Enhanced communication and collaboration

Agile encourages cross-functional collaboration among developers, designers, testers, and business stakeholders to achieve the seamless integration of multiple components of a project, such as pharmacy management, user experience, security, and legal compliance.

Agile encourages transparency by giving regular updates to all stakeholders, keeping them informed of the project's progress. This integrates the project's aims with the needs of pharmacies and customers, resulting in a shared goal.

Quickly deliver a Minimum Viable Product (MVP).

Agile technology facilitates the rapid development and release of a Minimum Viable Product (MVP), allowing Sri Lankan pharmacies and customers to enter the market early, collect significant market insights, and iteratively improve the platform with new features.

Following the MVP launch, we intend to gradually offer advanced features such as improved payment integrations, loyalty programs, and tailored communication tools, assuring the platform's stability and ongoing enhancement based on real-world usage and feedback.

The decision to employ the Agile Software Development Model is in line with the objectives of our pharmacy website project. Agile offers the flexibility, customer focus, and iterative approach required to create a platform that can effectively solve the difficulties confronting both pharmacies and customers in Sri Lanka. By implementing Agile, we ensure that our platform is not only adaptable to changing needs, but also capable of providing a seamless,

efficient, and secure pharmaceutical purchasing experience. This strategy will assist us in achieving our aim of transforming the way medicines are purchased and managed throughout the country, establishing a new standard for online pharmacy services in Sri Lanka.

**Technology**

A current technological stack is being used to design a user-friendly medicine website. The front-end uses HTML, CSS, and JavaScript to create a responsive interface, while the back-end employs PHP and JavaScript to handle server-side logic and client requests. MySQL was chosen because of its dependability and security for sensitive data. The website is hosted on WAMP Server, which provides a convenient environment for creating and deploying PHP and MySQL-based web applications. This combination of technology provides a secure, scalable, and efficient online pharmacy solution for both clients and pharmacies. The website's flexibility enables a smooth transition to a live server environment when it becomes public.

Table 1: Technology Used

| Front – End Technologies | Back – End Technologies | Database | Hosting Platform |
|---|---|---|---|
| <ul><li>HTML</li><li>CSS</li><li>JavaScript</li></ul> | <ul><li>PHP</li><li>JavaScript</li></ul> | <ul><li>MySQL</li></ul> | <ul><li>WAMP Server</li></ul> |

Front – End Technologies

- HTML
    - HTML, or Hypertext Markup Language, is the standard markup language for constructing web pages, combining hypertext with markup language. It defines textual content within tags and annotates it for machine comprehension and modification. HTML is human-readable, whereas tags denote text manipulation. (him0000 Follow et al., *HTML introduction* 2024)
- CSS
    - CSS stands for Cascading Style Sheets, and it is a simple design language used to make web pages more appealing by applying CSS attributes. CSS specifies how an HTML element should be provided on a webpage. (*CSS tutorial*)

- JavaScript
  - JavaScript is a simple, accessible programming language. It is frequently used to generate dynamic and interactive features in online applications. JavaScript is simple to implement because it is built into HTML. It's open and cross-platform.

Back – End Technologies

- PHP
  - PHP is a versatile and strong scripting language that is appropriate for both new and seasoned developers. Its ease of use, broad support, and interaction with many technologies make it a fantastic choice for developing dynamic, feature-rich websites and apps.

Database

- MySQL
  - MySQL has been chosen as the database management system (DBMS) for data management. My SQL assists in saving, retrieving, and managing structure data, which is critical for the operation of the pharmaceutical website.

Hosting Platform

- WAMP Server
  - The project operates on a local server that is powered by the WAMP (Windows, Apache MySQL, PHP) stack. WAMP provides a comprehensive framework for local web development, allowing developers to imitate the production environment using their own workstations.

**Resource Requirement**

Resource requirements and allocation involve identifying, estimating, and allocating the necessary human, financial, physical, and technological resources to complete the system. This procedure aids in managing the system's scope, time, quality, and money. A well-rounded team is required for the Medicine website, which includes a project manager, developers, a designer, a database administrator, and customer service representatives. Salaries, gear such as servers and workstations, and development and security software tools are all included in the costs. The chosen resources ensure that the website is efficient, secure, and user-friendly, meeting the needs of both clients and pharmacists.

**Team Structure**

The success of the Medi Nest project is dependent on a well-organized and professional team with clear roles and responsibilities. A focused strategy guarantees that all project phases, from development to maintenance, are completed quickly. The suggested team structure includes critical responsibilities such as Project Manager, System Analyst, web developer, designer, IT support specialist, and quality assurance, all of which are aligned with industry best practices and will deliver a high-quality solution to pharmacies and customers.

The roles are performed by,

- Project Manager – Karshana Chamurditha
- System Analyst – Damitha Eranga
- UI/UX Engineer – Karshana Chamurditha
- Database Engineer – Mohamed Kaamil
- Software Engineer – Fadhila Khan

**Roles and responsibilities of the team.**

| Name | Job Role | Description | Responsibilities |
|------|----------|-------------|------------------|
| Karshana Chamurditha | Project Manager | The Project Manager oversees the Medicine website development process, which includes assuring timely completion, budget management, quality assurance, stakeholder participation, risk management, and effective resource distribution. | Coordinating the team<br><br>Project planning<br><br>Risk and budget management |
| Damitha Eranga | System Analyst | In addition to fixing technical problems, a system analyst designs and optimizes information systems to satisfy organizational requirements, maximize performance, and guarantee compatibility with current technology. | System Analyst<br><br>Requirement Gathering<br><br>Stakeholder collaboration<br><br>Process Optimization |

| Karshana Chamurditha | UI/UX Engineer | A UI/UX Engineer prioritizes usability, accessibility, and responsiveness when designing and improving user interfaces. They work with development teams, do user research, and produce prototypes. In order to maximize the entire user experience, they regularly test and improve designs in response to user input and analytics data. | User Research<br><br>Interface design<br><br>Wireframe creation<br><br>Prototype development<br><br>Usability testing |
|---|---|---|---|
| Mohamed Kaamil | Database Engineer | Database engineers design, oversee, and enhance databases to ensure safe, dependable, and effective data retrieval and storage. They work with developers to design database structures that enable applications, manage data migrations, and ensure data integrity. | Database Design<br><br>Data Management<br><br>Performance optimization<br><br>Data Migration<br><br>Backup Solutions |
| Fadhila Khan | Software Engineer | To satisfy user and corporate needs, software engineers design, implement, and maintain software programs. They design, test, troubleshoot, make fixes, and guarantee the efficiency, security, and scalability of systems. They work in cross-functional teams, adhere to best practices, and keep up with the latest developments in the field. | Software developments<br><br>Code Writing<br><br>Debugging Code<br><br>System Maintenance<br><br>Solution Implementation |

**Cost**

| Expenses For | Cost | Total |
|---|---|---|
| **Research and planning cost** | | Rs. 100,000 |
| Market research and strategic planning cost | Rs.100,000 | |
| **Software and tools (per month)** | | Rs. 145,000 |
| Accounting Software (Quick books) | Rs. 60,000 | |
| Accounting Software (Xero) | Rs. 30,000 | |
| Financial analysis tools (Microsoft Excel) | Rs. 15,000 | |
| Financial analysis tools (Google Sheets) | Rs. 15,000 | |
| Data visualization tools | Rs. 25,000 | |
| **Training and transport cost** | | Rs.160,000 |
| Employee trainee cost | Rs. 85,000 | |
| Employee support cost | Rs. 75,000 | |
| **Documentation cost** | | Rs.50,000 |
| User & technical documentation | Rs. 50,000 | |
| **Operation cost (One time)** | | Rs. 1,000,000 |
| Computer & equipment | Rs. 1,000,000 | |
| **Continuity cost** | | Rs, 500,000 |
| Continuity fund | Rs, 500,000 | |
| Total cost | | Rs. 1,955,000 |

**Hardware and Software Requirement**

Hardware and software requirements for the Medicine website project include workstations, servers, storage devices, networking hardware, high-performance CPUs, RAM, and monitors; additionally, development environments, web servers, database management systems, version control systems, and design software are needed, in addition to testing tools and security software.

# ➢ Hardware Requirements

## Development Environment

A desktop or laptop computer with sufficient RAM, computing speed, and storage to support the demands of software development makes up the development environment. For,

- Developer's PC
- Designer's PC
- Tester's PC
- Project Manager's PC

**Operating system -** Linux, Windows, or macOS, set up with developer tools.

**High-performance CPU** - A state-of-the-art multi-core processor (like the AMD Ryzen 7 or Intel Core i7) that can multitask and do complex computations with ease.

**Generous RAM** - To guarantee lag-free operation of various development tools, virtual machines, and massive datasets, a minimum of 16 GB of RAM is required.

**Fast Storage** - To ensure quick startup times, quick file access, and effective data processing, a Solid-State Drive (SSD) with a minimum size of 512 GB is recommended.

**Internet Connectivity -** A seamless development process depends on internet connectivity, which makes it easier to collaborate, access online resources, and communicate in real time, as well as ensures effective workflows and reduces downtime.

**Server Hosting** - Before transferring to a live server, it is best to use a locally hosted WAMP server for effective development, testing, and debugging. This will guarantee a smooth integration with the project's requirements.

## ➢ **Software Requirements**

The key programs, platforms, and instruments required to effectively create, test, and implement the project are referred to as software requirements.

Integrated Development Environment (IDE)

Software such as Visual Studio Code, which offers a complete environment for developing, testing, and debugging code, is an example of an integrated development environment (IDE).

Database Management System (DBMS)

MySQL, which is necessary for handling the project's backend data and for administering and querying databases.

Project Management Tool

Recommended – Microsoft Project

Purpose - to efficiently schedule, arrange, and monitor the completion of activities and project milestones. Strong scheduling, resource allocation, and timeline management features are provided by Microsoft Project, ensuring that the project stays on course, meets deadlines, and effectively accomplishes its goals.

Web Browser

Recommended – Google Chrome, Microsoft Edge

Purpose - Through the usage of the internet, the project tests, views, and troubleshoots websites across a variety of browsers, guaranteeing debugging, performance analysis, and a consistent user experience.

- While inventory management software helps handle product orders, track stock levels, and prevent stockouts, ensuring products are available when needed, point-of-sale (POS) software optimizes sales operations with real-time monitoring and discounts.
- CRM software analyzes interactions to improve customer happiness and retention, while employee scheduling software effectively creates and maintains staff schedules depending on availability and peak hours.

- SCM software optimizes supply chain processes for effective inventory control and cost control, while accounting software is essential for cost tracking, financial management, and reporting.

- While online ordering and delivery systems are essential for pharmacies to conduct online purchasing smoothly, data analytics and business intelligence (BI) technologies assist businesses in analyzing client behaviors, market trends, and operational effectiveness.

# Task – 10

## Grant Chart Plan

| Pharmacy Management System | **Phase 01:** Initiation Phase (5 days). | Specify the project's goals, parameters, and deliverables. |
|---|---|---|
| | | Determining the Core Group and Positions. |
| | | obtaining the first needs from the relevant parties. |
| | | Budget Planning. |
| | | **Milestone**: Project Proposal Acceptance. |
| | | |
| | **Phase 02:** Requirement Gathering. (6 days) | Interview and survey healthcare professionals and pharmacy employees |
| | | Identify functional and non-functional requirements. |
| | | Making Project Schedule. |
| | | **Milestone**: Project Charter approval |
| | | |
| | **Phase 03:** System Design (7 days). | Make Data Models and System Architectures. |
| | | Create the user's experience and interface. |
| | | Make mockup diagrams and wireframes. |
| | | **Milestone:** Acceptance of produced System Architecture. |
| | | |
| | | |
| | **Phase 04:** Development (14 days). | Create a development environment. |
| | | Creating Database. |

| | | |
|---|---|---|
| | | Create user friendly interface (Front End Development). |
| | | Database Setup, Server-side scripting (Back-end Development). |
| | | Testing Front end and back-end interactions. |
| | | |
| | **Phase 05:** Testing and Quality Assurance (7 days). | Develop test cases based on requirements. |
| | | Conduct unit testing, integration and system testing. |
| | | Conduct user acceptance testing with pharmacy staff |
| | | **Milestone:** Identify and solve bugs or issues. |
| | | |
| | **Phase 06:** Pre-Launch deployment (7 days). | Adding more content to the website (e.g.: - images, product description, etc.) |
| | | Checking the accuracy of the inserted content. |
| | | Setting up necessary infrastructure, systems and processes to ensure smooth launch. |
| | | Server Configurating, testing functionalities. |
| | | Staff Training |
| | | |
| | **Phase 07:** Deployment (4 days). | Test Entire System. |
| | | Develop User Manuals. |
| | | **Milestone**: Deploy the supermarket websites. |
| | | |
| | **Phase 08:** Post launch Support and Maintenance (5 days). | Provide ongoing technical support. |
| | | Monitor website and address any issues or bugs if arisen. |
| | | Update frequently in response to user comments and developments in pharmacies. |
| | | |
| | **Phase 09:** Project Closure (2 days). | Finalize all project documents. |
| | | Conduct a project review with stakeholders. |
| | | |

# Grant chart

| ID | Task Mode | Task Name | Duration | Start | Finish | Predecessors |
|---|---|---|---|---|---|---|
| 1 | | **Phase 01: Initiation phase** | **5 days** | **Wed 8/28/24** | **Tue 9/3/24** | |
| 2 | | Define Project Objectives, Scope, & Delivarables | 1 day | Wed 8/28/24 | Wed 8/28/24 | |
| 3 | | Identifying key teams and Roles | 1 day | Thu 8/29/24 | Thu 8/29/24 | 2 |
| 4 | | Gathering initial requirments from stakeholders | 1 day | Fri 8/30/24 | Fri 8/30/24 | 3 |
| 5 | | Budget Planning | 1 day | Mon 9/2/24 | Mon 9/2/24 | 2,4 |
| 6 | | Milestone : Project proposal acceptance | 1 day | Tue 9/3/24 | Tue 9/3/24 | 2,5 |
| 7 | | **Phase 02: Requirment Gathering** | **6 days** | **Wed 9/4/24** | **Wed 9/11/24** | **6** |
| 8 | | Conduct interviews and surveys with pharmacy's staff | 2 days | Wed 9/4/24 | Thu 9/5/24 | 6 |
| 9 | | Identify functional and non-functional | 2 days | Fri 9/6/24 | Mon 9/9/24 | 8 |
| 10 | | Marking Project Schedule | 1 day | Tue 9/10/24 | Tue 9/10/24 | 9 |
| 11 | | Milestone: Project charter approval | 1 day | Wed 9/11/24 | Wed 9/11/24 | 10 |
| 12 | | **Phase 03: System Design** | **7 days** | **Thu 9/12/24** | **Fri 9/20/24** | **11** |
| 13 | | Create system architecture and Data | 2 days | Thu 9/12/24 | Fri 9/13/24 | 10,11 |
| 14 | | Design the user interface and user experience | 2 days | Mon 9/16/24 | Tue 9/17/24 | 10,13 |
| 15 | | Create wireframes and mockup diagrams | 2 days | Wed 9/18/24 | Thu 9/19/24 | 13,14 |
| 16 | | Milestone: Acceptance of produced system architecture | 1 day | Fri 9/20/24 | Fri 9/20/24 | 14,15 |
| 17 | | **Phase 04: Development** | **14 days** | **Sat 9/21/24** | **Wed 10/9/24** | **16** |
| 18 | | Setup Development Environment | 1 day | Sat 9/21/24 | Sat 9/21/24 | 16 |
| 19 | | Creating Database | 2 days | Fri 9/20/24 | Mon 9/23/24 | 13,14,15 |
| 20 | | Create User-friendly interface(Front End Development) | 4 days | Tue 9/24/24 | Fri 9/27/24 | 15,19 |
| 21 | | Database Setup, Server-Side Scripting(Back End | 4 days | Tue 9/24/24 | Fri 9/27/24 | 13,15,19 |
| 22 | | Testing Front end and Back-end interactions | 3 days | Mon 9/30/24 | Wed 10/2/24 | 20,21 |
| 23 | | **Phase 05: Testing and Quality Assuarance** | **9 days** | **Tue 10/1/24** | **Fri 10/11/24** | **20,21** |
| 24 | | Develop Test Cases Based on Requirments | 2 days | Thu 10/3/24 | Fri 10/4/24 | 22 |
| 25 | | Conduct unit testing, intergration and system testing. | 2 days | Mon 10/7/24 | Tue 10/8/24 | 24 |
| 26 | | Conduct user acceptance testing with supermarket | 2 days | Wed 10/9/24 | Thu 10/10/24 | 25 |
| 27 | | Milestone: Identify and solve bugs or issues | 1 day | Fri 10/11/24 | Fri 10/11/24 | 25,26 |
| 28 | | **Phase 06: Pre-Launch deployment** | **7 days** | **Sat 10/12/24** | **Mon 10/21/24** | **27** |
| 29 | | Adding more content into the website | 1 day | Fri 10/11/24 | Fri 10/11/24 | 26 |
| 30 | | Checking the accuracy of the inserted content. | 1 day | Mon 10/14/24 | Mon 10/14/24 | 29 |
| 31 | | Setting up necessary infrastructure, systems and processes to ensure smooth launch. | 1 day | Tue 10/15/24 | Tue 10/15/24 | 26,30 |
| 32 | | Server Configurating, testing functionalities. | 2 days | Wed 10/16/24 | Thu 10/17/24 | 31 |
| 33 | | Staff Training | 2 days | Fri 10/18/24 | Mon 10/21/24 | 31,32 |
| 34 | | **Phase 07: Deployment** | **4 days** | **Tue 10/22/24** | **Fri 10/25/24** | **32,33** |
| 35 | | Test Entire System | 2 days | Fri 10/18/24 | Mon 10/21/24 | 31,32 |
| 36 | | Develop User Manuals | 1 day | Tue 10/22/24 | Tue 10/22/24 | 35 |
| 37 | | Milestone: Deploy the pharmacy websites. | 1 day | Tue 10/22/24 | Tue 10/22/24 | 35 |
| 38 | | **Phase 08: Post launch support and maintenance** | **5 days** | **Wed 10/23/24** | **Tue 10/29/24** | **37** |
| 39 | | Provide ongoing technical support | 1 day | Wed 10/23/24 | Wed 10/23/24 | 37 |
| 40 | | Monitor website and address any issues or bugs if arisen | 2 days | Thu 10/24/24 | Fri 10/25/24 | 39 |
| 41 | | Implement regular updates based on user feedback and market | 2 days | Thu 10/24/24 | Fri 10/25/24 | 39 |
| 42 | | **Phase 09: Project Closure** | **3 days** | **Sat 10/26/24** | **Tue 10/29/24** | **37** |
| 43 | | Finalize all project documents. | 1 day | Mon 10/28/24 | Mon 10/28/24 | 41 |
| 44 | | Conduct a project review with stakeholders | 1 day | Tue 10/29/24 | Tue 10/29/24 | 43 |

An essential tool for effective project management is a Gantt chart, which shows tasks, deadlines, and links between them in a clear and understandable visual manner. It facilitates resource management, progress tracking, team and stakeholder alignment, and project planning simplification. Its straightforward design guarantees project completion on schedule, enhances communication, and lessens uncertainty. Complex project timelines are made easier to follow by using Gantt charts.

Phase 01 - **Initiation Phase,** this five-day phase lays the groundwork for the project by establishing goals, assigning teams, obtaining needs from stakeholders, creating a budget, and preparing for project proposal approval.

In the second phase of the project, information is gathered, interviews are held, functional and non-functional requirements are identified, the project timetable is marked, and the transition to the system design phase is marked.

Phase 03 - **System Design entails producing wireframes and mockups**, designing technical architecture and data, and making sure user interfaces satisfy project specifications. Acceptance of the interfaces signals that they are ready for production.

Phase 04 – **Development**, this 14-day period includes coding, system configuration, database construction, backend and user interface development, and integration testing.

Testing and quality assurance phase five (phase 05) entails nine days of work that include creating test cases, carrying out system, integration, and unit tests, and finding and fixing issues.

Phase Six - **Launching The final steps leading up to the system's debut**, such as content addition, infrastructure setup, and server configuration, are completed during the seven-day deployment period.

The project's seventh phase, which signifies the change from development to operation, consists of user manual development, staff training, system testing, and live deployment.

Phase 08 - Post-Launch Monitoring and Maintenance is a five-day procedure designed to guarantee system operationality by addressing any issues that arise after launch and provide continuous technical support.

Phase 09 - Project Closure is a three-day event that includes completing project documentation and reviewing it with stakeholders. It also serves as a formal project closure, highlighting accomplishments and lessons learned.

**Risks**

1. To ensure the project's success, it is imperative to identify and handle numerous risks during the pharmacy website's development. Such as,

    a. **Technical Risks**

    b. **Operational Risks**

    c. **Security Risks**

    d. **Customer Risks**

    e. **Market Risks**

a. <u>Technical Risks</u>

- **Software errors and complications**

    Unexpected flaws or problems in the website's coding might cause features to stop working, functionality to break, or even cause crashes. Thorough testing and quality control procedures are necessary to find and fix these problems prior to deployment.

- **Integration Issues**

    When integrating different services or systems, such payment gateways, inventory management systems, or customer databases, issues may occur. Such risks can be reduced by making sure integrations are compatible and thoroughly tested.

- **Performance issues**

    Dangers related to the responsiveness and performance of the website, which may have an impact on user happiness and experience. These problems can be resolved by optimizing website performance using effective coding techniques, content delivery networks (CDNs), and routine performance monitoring.

b. <u>Operational Risks</u>

- **Training Requirements**

    Because of changes in workflow or the new system's technical sophistication, frontline staff may face opposition or need intensive training. To solve this, offer thorough training courses, write user-friendly manuals, and provide continuing assistance to guarantee a seamless transition and successful system adoption.

- **Dependency on Internet Connectivity**

  For online transactions and real-time data updates, the website depends on dependable internet connectivity. The user experience and operational continuity may be impacted by any interruptions or outages in connectivity. Reducing these risks can be achieved by putting backup internet options in place and keeping an eye on connectivity.

- **Data Integrity and Accuracy**

  Inaccuracies in inventory management algorithms or data analytics might result in erroneous stock projections, which can cause overstock or stockout scenarios. To maintain correct inventory and data management, make sure that data processes are rigorously tested and validated, conduct routine audits, and employ trustworthy algorithms.

c. Security Risks

- **Data breaches**

  If sensitive consumer or financial information is accessed without authorization because of inadequate security measures, the website's reputation may be damaged and legal action may follow. Use strong encryption, access limits, and frequent security audits to protect data to lessen this.

- **Cybersecurity Threats**

  The confidentiality of data and the availability of systems may be compromised by harmful actions including phishing attempts, ransomware, and hacking efforts. To defend against these threats, bolster cybersecurity defenses with firewalls, anti-malware software, and ongoing surveillance.

- **Compliance Violations**

  There may be fines or legal repercussions for breaking regulatory standards, such as the GDPR for data protection or the PCI DSS for payment security. Maintain compliance with pertinent requirements by updating security procedures and conducting routine compliance audits.

d. <u>Customer Risks</u>

- **Customer Dissatisfaction with the User Experience**

  Ineffective user interface design or usability problems can irritate users, which lowers engagement and adoption. To improve user experience on the website, pay close attention to user-centered design, carry out usability testing, and obtain feedback.

7. **Privacy Concerns**

   If customers feel their privacy is not sufficiently safeguarded, they may be unwilling to join loyalty programs or submit personal information. To foster trust, put in place strict privacy policies, open data processing procedures, and reliable security measures.

- **Service disruptions**

  In times of high customer traffic, technical issues or system breakdowns can have a detrimental effect on the clientele and possibly result in lost revenue. Make sure you have dependable hosting options, consistent system upkeep, and prompt reaction procedures to deal with any interruptions.

e. <u>Market Risks</u>

- **Competitive Pressures**

  The website's market share and competitive advantage may be eroded by new rivals providing comparable services or by the quick development of technology. Maintain a competitive edge in the market by consistently innovating and differentiating your products.

- **Changing Customer Preferences**

  For a website to be current and competitive, it may be necessary to make changes to its features or adapt to changes in consumer behavior, such as an increasing inclination for online shopping. To make well-informed changes and enhancements, keep an eye on consumer feedback and market developments.

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