ONLINE HEALTH SERVICE SYSTEM

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ONLINE HEALTH SERVICE SYSTEM

NWA HAMEED HAMASALIH

A thesis submitted in fulfilment of the
requirements for the award of the degree of
Bachelor of Computer Science (Software Engineering)

School of Computing
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I declare that this thesis entitled *"Online Health Service System"* is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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DEDICATION

This thesis is dedicated to my family, who taught me that the best kind of knowledge to have been that which is learned for its own sake. It is also dedicated to my university, who taught me that even the largest task can be accomplished if it is done one step at a time.

ABSTRACT

Online healthcare systems have become more popular in recent years as they aim to integrate the latest computer and telecommunications technologies into healthcare systems to drive patient needs. When you go to the doctor for a special case, including surgery, the doctor may ask if you've had any previous operations, or the doctor may request your health data, so your data is stored in such a way that obtaining critical information is difficult for management. This post is web-based, allowing doctors and staff to track patient medical records, reduce patient wait times, and increase the number of patients receiving care by minimizing paperwork and manual recording of records. It also presents research that evaluates the acceptance of implementations of online medical systems. The interview was used for evaluation to collect information from hospital staff. Developed using HTML, CSS, PHP, and some other languages commonly used in web-based applications, this system uses professional programming to implement the system, especially databases in-common online health systems. Describes how to access and store data. Practice proves that our online medical system is working well. It's fully automated, user-friendly, time-saving, efficient, and content-friendly. The chosen methodology for the system is RUP. Also, for the system architecture, the chosen system architecture is MVC. SRS, SDD, and, STD are applied in the system. The implementation of the code is also described.

ABSTRAK

Sistem penjagaan kesihatan dalam talian telah menjadi lebih popular sejak beberapa tahun kebelakangan ini kerana ia bertujuan untuk mengintegrasikan teknologi komputer dan telekomunikasi terkini ke dalam sistem penjagaan kesihatan untuk memacu keperluan pesakit. Apabila anda pergi ke doktor untuk kes khas, termasuk pembedahan, doktor mungkin bertanya sama ada anda pernah menjalani pembedahan sebelum ini, atau doktor mungkin meminta data kesihatan anda, jadi data anda disimpan sedemikian rupa sehingga mendapatkan maklumat kritikal adalah sukar untuk pengurusan. Siaran ini berasaskan web, membolehkan doktor dan kakitangan menjejaki rekod perubatan pesakit, mengurangkan masa menunggu pesakit dan meningkatkan bilangan pesakit yang menerima rawatan dengan meminimumkan kertas kerja dan rekod rekod manual. Ia juga membentangkan penyelidikan yang menilai penerimaan pelaksanaan sistem perubatan dalam talian. Temu bual digunakan untuk penilaian untuk mengumpul maklumat daripada kakitangan hospital. Dibangunkan menggunakan HTML, CSS, PHP dan beberapa bahasa lain yang biasa digunakan dalam aplikasi berasaskan web, sistem ini menggunakan pengaturcaraan profesional untuk melaksanakan sistem, terutamanya pangkalan data sistem kesihatan dalam talian yang biasa. Menerangkan cara mengakses dan menyimpan data. Amalan membuktikan bahawa sistem perubatan dalam talian kami berfungsi dengan baik. Ia automatik sepenuhnya, mesra pengguna, menjimatkan masa, cekap dan mesra kandungan. Metodologi yang dipilih untuk sistem ialah RUP. Juga, untuk seni bina sistem, seni bina sistem yang dipilih ialah MVC. SRS, SDD dan, STD digunakan dalam sistem. Pelaksanaan kod juga diterangkan.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Today, more than ever, people are becoming more health-conscious and taking the necessary steps for a healthy body and mind so every day. Over time, many people come to clinics and medical facilities to find out about their health and treatment. And as the number of patients grows, everyone knows that managing a clinic can become even more difficult, especially if everything is done manually. The solution to these problems is the introduction of an online medical system. Today, countries around the world are fully switching to digital systems that can more easily and effectively share and record information of patient data online between doctors and healthcare facilities, updating medical history, reports, and analytics. There is no place for paperwork in the world. And the rays of each patient. With the rapid advancement of information and communication technology, countries around the world are racing to implement digital health systems that promise better and more comprehensive healthcare services for individuals and communities.

The advancement of digital electronics in recent decades has aided in the development of hardware and software that can be used to improve health care services. People nowadays are more familiar with using computers, and most of companies and organizations use computer to make their works easier. Most health care interactions are still done on paper, especially in most medical clinics. We are all aware that modern health care facilities are now functioning at breakneck speed to provide the finest possible care to as many patients as possible.

However, as the number of patients has increased and new medical conditions have arisen, the manual way of maintaining patients' information, prescriptions, billing, and appointment schedules has become obsolete. The trend of how health delivery systems are lagging behind technological improvements is provided by the rapid growth of technology and the expanding digital divide. We can now frequently send imaging studies, schedule appointments, check medical records, and conduct live demonstrations and remote consultations via video conferencing (Abubakar Ado, Ahmed Aliyu, Zhongwei-he. 2014). Also, for this system it will be using Visual Studio Code, with PHP, CSS and HTML.

1.2 Problem Background

When you go to the doctor for a special case, including surgery, the doctor may ask if you've had any previous operations, or the doctor may request your health data, so your data is stored in such a way that obtaining critical information is difficult for management. Also, dealing with concerns about a patient's record can be problematic if the information is not kept in an easily accessible manner. If the patient's information isn't saved in an easily accessible format, it can be difficult to deal with concerns. Of course, there are some other issues with today's healthcare systems, such as pricing and transparency, as well as developing plans and methods to handle rising medical and pharmaceutical expenses, as well as their implications for access and quality of care. Consumer experience, comprehension, and assurance that all consumer contacts and outcomes are simple, convenient, timely, streamlined, and integrative so that health simply fits into the daily flow of each individual's, families, and society's daily activities. (Bali, A., Bali, D., Iyer, N. and Iyer. 2011).

1.3 Project Aim

Inside the domain of the health system, the major goal is to ensure that health is distributed evenly among the population. The public, on the other hand, wants the health-care system to treat people with decency. This system helps employees around the country, especially for hospital administration. The system is also to improve the efficiency of online system in hospitals. Also, will provide the best quality for healthcare management. (WHO. (n.d.). 2011).

1.4 Project Objectives

For every project must have objectives that must be met in order to solve the problem stated at the outset. As a result, the following objectives are outlined in this system:

(a) To elicit and analyze the requirements and needs of doctor, employee, admin, and lab assistant stakeholders for Online Health Service System.

(b) To design the architectural models, user interface and database for the developed Online Health Service System based on the elicited requirements and design models.

(c) To develop the Online Health Service System based on the designed models.

(d) To evaluate and validate the developed Online Health Service System by applying Black Box Testing, White Box Testing, and User Acceptance Testing.

1.5 Project Scope

This project's scope will be limited to procedures for managing patient information and performing analysis. Some suitable security architecture, which integrates various data security measures required to achieve the desired data security, will be investigated. Although the scope of this project is broad, it focuses/emphasizes the maintenance of a secure and controlled online database records system for patients in the nursing and medical departments.

1.6 Project Importance

With extremely long-life spans, a growing proportion of people living with chronic diseases, and healthcare costs, healthcare systems in the world are under increasing strain. In addition, there is a growing trend toward digital health approaches to healthcare. Patients have faster access to health services thanks to digital health platforms, which improves the quality of care provided to them. Concurrently, by initiating the concept of patient self-care, these platforms help to reduce burdens on health care facilities. (Kristen Bowers. 2017).

1.7 Report Organization

The research will be organized as follows: the first chapter will show a brief introduction to the project, that I did on this chapter which includes introduction, problem background, project aim, objectives and some other specific thing that we needed for this chapter which is shown above, and the next chapter will illustrate existing workers who are related to the project in a literature review. The second chapter which is called literature review will be done after this one. The literature review is about comparing my project to other projects which are the same as mine and discussing what I will do on my project beside their projects.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

A literature review is, in general, a selective analysis of current existing research relevant to the proposed system. In other words, it depicts the process of gathering, obtaining, and analyzing data required for the system's development. It also provides explanations and justifications that aid in the resolution of research challenges. Several subjects will be explored in this chapter. These comprise a summary of the organization's case study, current system analysis, comparison with existing systems, technology, tools, and techniques used for the proposed system, and technology, tools, and techniques utilized for the proposed system. Finally, there will be a brief conclusion to this chapter. Also, the research location, as well as a study of current knowledge relating to the subject of inquiry, are investigated and mentioned in this part. It also sells at the planned research's relationship for the goal of accurate depiction and critical examination of the current literature.

2.2 Current System Analysis

This section's goal is to identify any problems and benefits in the present system. Its purpose is to address these issues, and the establishment of an online health-care system will be more user-friendly than the current manual procedure. This system, which will be implement, is system which provides patient data and patient medical history, and provides easy using by the user, friendly and helpful. Because of this system the hospitals can do their works easier and more efficient.

According to an interview conducted with staff members of the Kurdistan Ministry of Health, they are still utilizing paper and such an antiquated method to enter patient data, and they do not have a good record to keep track of all the duties that have been completed. In all departments in Kurdistan, accessing patient files and records is done manually, which is both time-consuming and ineffective. This procedure necessitates the processing of vast amounts of data, which takes a long time. The hospitals staffs may have problem with losing their patient's data, and that's because having a lot file inside their data room or anywhere that they save files in. This was really inconvenient and stressful. This trend needed to be addressed in order to provide better hospital services to patients. They asked about something else, and that was when maybe a patient loses his/her medical card or file.

Either as side benefit, the system helps to saving patient information and medical costs, as well as assessing the position of old and new patients. Many reasons have for not using manual way to adding patient data in hospitals such as: The current clinical model has several shortcomings, such as incorrect data, and fit breakage, there is a great chance of losing past patient records and information. It wastes time, for example, while recording, evaluating, and validating patient information, scheduling, and making appointments. It faced the risk of many human errors in prescriptions induced by doctors who were tired. (Anusheh Zohair Mustafeez. 2022).

2.3 Existing System (Related System)

2.3.1 Patient Record Management System

Moving on, this PHP MySQL patient records management system project is primarily concerned with patient consultations, diagnoses, and other records. In addition, the system displays all of their employees', patients', and doctors' data. Admin, Patient, Doctor, and Staff Login are the four categories in which the project is split. In this web app's overview, the admin is in charge of the system's privileges, such as user administration. From the admin panel, a user can also add hospital records. More specifically, a patient account can examine a variety of records under different sections such as consultation, operation, and diagnosis records. The available Features for this system are: Admin login, Patient login, Doctor login, Staff login, Manage patient's record, Filter patient's record, Account settings, Patient management system, Doctor management system, Staff management system, Hospital management system, Consultation records, Surgery records and Diagnosis records. Figure 2.1 shows a sample of the system. (Shahriar Khan Fahim. 2021).

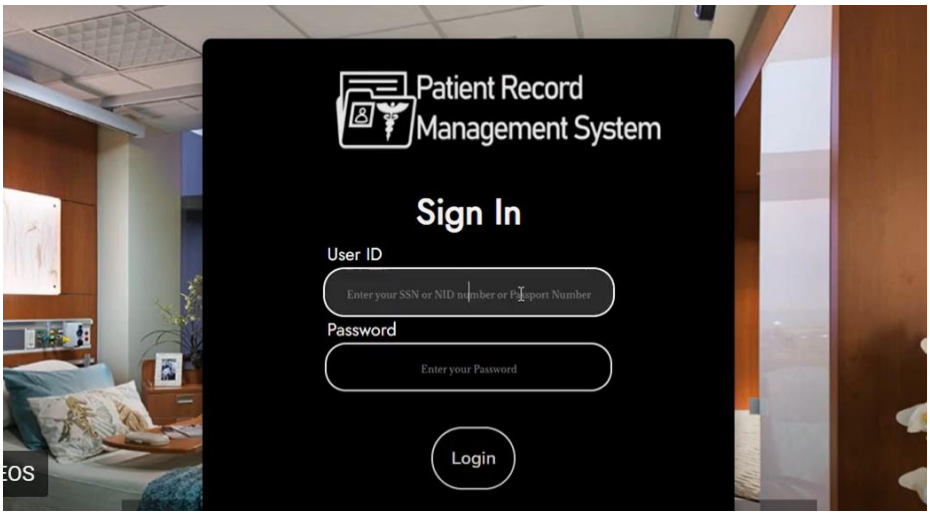

Figure 2.1 Patient Record Management System

2.3.2 Hospital Patient Record Management System

The Hospital's Patient Records Management System is a simple PHP project. It's a web-based tool that allows a hospital to store and manage patient records in an automated manner. The management can keep track of the patient's diagnostic/treatment and admission records in this section. MySQL Database is used to store the data. It uses the Bootstrap Framework and the Admin LTE Template to create a simple and pleasant user experience. The features for this system are: Secure Login and Logout, Dashboard, Manage Room Types, Manage Rooms, Manage Doctors, Manage Users list (CRUD), Manage Account Details/Credentials and Manage System Information. Figure 2.2 shows a sample of the system. (Online Source. 2021).

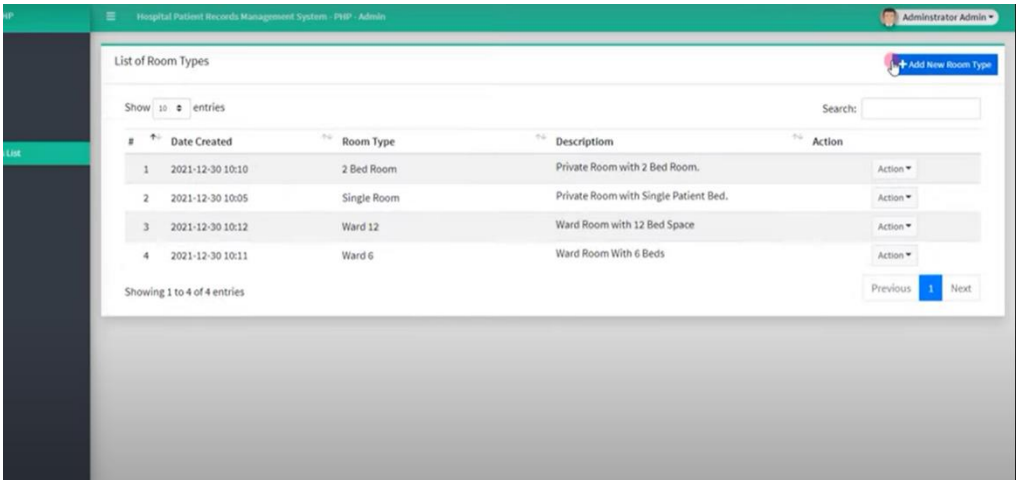

Figure 2.2 Hospital Patient Record Management System

2.3.3 Medical Record System

The Medical Record System is a part of the clinic's operation. Personal information about the patient, official health records, medical and dental history, daily transactions, medicine logs and inventories, and common and uncommon ailments are all examples. These documents must be kept secure and accessible by the clinic. This is because these records serve as a foundation for generating patient data such as medical and dental histories. The project will be available with these programming languages: Visual Basic and MySQL, C# and MySQL and PHP, MySQL and Bootstrap. Figure 2.3 shows a sample of the system. (Online Programming Lesson. 2019).

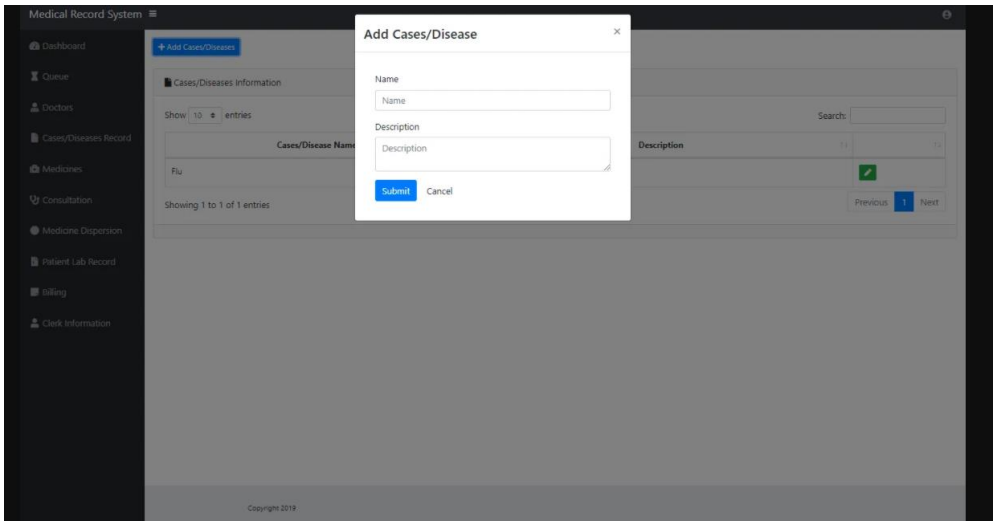

Figure 2.3 Medical Record System

2.4 Comparison Between Current and Existing Systems

A variety of technologies are used to create modern websites. When someone don't want to be a knowledgeable in these type of coordinating websites effectively, this person may want to learn the principles of the various technologies, as well as their pros and downsides, so that person can appreciate the long-term influence he/she has. When people talk about creating websites, there is no such thing as a

correct technology. Many tasks need to get a load for, experience of the seller, overall reduction of team talents, improving, license rates, the company's inner policies, web analytics, manageability, flexibility of growth for growth, and etc. (Ben Kalkman. 2017).

The compare will be between this system and the first system that have been mentioned which is Patient Record Data Management System. The existing system which is shown is for recording patient data which is works good with an easy using, but that system has many unnecessary parts like Manage room. When you are developing a system, you don’t need to go through the details, you need to focus on specific and necessary parts for your system. Another point of that system is when you enter to the website you need to log in by your password No. but here in Kurdistan don’t use password No. always. Instead of that people are using phone number which is very common in every country.

So, in this system the staff and the admin can login by their phone number or by an ID that will be create for them. The system will have a very friendly web design for the system which the user can use every part of the website very easily. Inside this system, user experience attests to the extent to which a consumer or system assists the client who is using it in achieving a task. By allowing constrained access and authorization to each employer in Health Centre's guidelines and principles, the system is meant to protect the confidentiality and reliability of information acquired.

A database can either be a set of multiple files or a set of MySQL databases. This database's layout is developed to ensure data services, and updates are simple for medical personnel as well as the host. The health center would be able to more efficiently manage their patient's data by rigs system, which prepared a simple pathway for employees to collect recommendations earlier, preventing them from trying to write invalid recommendations and letting administration to save on for the health center more easily.

Threats:

- It may be susceptible to technological dangers.

- It necessitates finances in order to maintain and develop.

Weaknesses:

- Staff may forget to add patient data
- Not knowing how to use the system very well from the staff
- The staff must have internet access to join the system

Strengths:

- Adding the data more easily and faster
- Not scaring to lose the data
- Having all information about the patient clearly
- Time safe for all the staff and hospitals

Opportunities:

- Getting government support
- Reduce using paper and cost

Make the record easier for the staff

2.5 Literature Review of Technology Used

Microsoft's Visual Studio Code (often known as VS Code) is a free open-source text editor. For Windows, Linux, and macOS, VS Code is available. VS Code includes numerous significant features that have made it one of the most popular development environment tools in recent years, despite its modest weight. VS Code is compatible with a wide range of programming languages, including Java, C++, Python, CSS, Go, and Docker file. VS Code also allows you to add additional extensions, such as code linters, debuggers, and cloud and web development tools, and even design your own. So inside VS things will be using are PHP, HTML and CSS for this project. (Microsoft. Visual Studio Code. 2016).

By starting with HTML because it's where the internet began. Back in the day, we had only the drab old HTML to work with when creating webpages. It was a dreadful ordeal; nowadays, web designers have it so simple with their fancy layouts and dynamically generated pages. What does HTML (Hyper Text Markup Language) stand for? Steps of working, Hyper textual text, this refers to a text document's ability to connect to different sections of the same document or webpage, as well as to other text documents on completely different webpages and websites. The web's interconnectedness is due to linking.

CSS Cascading Style Sheets (CSS) instruct browsers on how to render HTML tags. These style rules override the browser's default display rules for HTML tags. The style sheets are cascading in the sense that they can have many competing rules applied to a single tag, but the most specifically targeted rules will overrule the less specifically targeted rules.

PHP is simpler to construct page templates for something like a website, allowing you to change a common component of the site, such as the header or navigation, at first when rather than on each page. This reduces the likelihood of making a mistake or overlooking an instance that has to be changed. In a nutshell, that's all there is to it. HTML is now the most elementary and primary computer tool for web designers, so even though CSS and PHP are improved across money to secure constructing html files and websites easier.

For this system which it will be using PHP, HTML and CSS, it will be a web application system which will be having Two main users (Admin and Staff). Here in my system patients do not need to log in to the system and check their details. So, the web application will be created so easily and friendly for the staff which will use the website. They need to have their own username and password for entering the system and then they can add and remove data about the patients. (Kenton, W. 2020).

2.6 Chapter Summary

Lastly, chapter two was about a literature calculation of the both existing and earlier systems. It also contains an analysis and comparison of the current system. This chapter has identified and incorporated features and elements that must be included as part of the proposed system. It also talks about the technologies that will be used to create this system. The focus of the next chapter will be on the approach employed during the development process.

CHAPTER 3

SYSTEM DEVELOPMENT METHODOLOGY

3.1 Introduction

Chapter Three discusses about techniques that were implemented in the development of a health online service system. In addition to having an efficient and structured economic development, the methodology is a valuable and main component that should be worked with. It is a list of software development processes. It also serves as a guide to guarantee that the system's development is on track. The process of constructing a system will be easier to organize with a methodology, minimizing the system development cost, maximizing the development duration, and fulfilling the objectives through time management.

3.2 Methodology Choice and Justification

According to the Software Development Life Cycle, from conception until retirement, a life cycle model depicts the many actions performed on a software product. Various life cycle concepts can assign different growth activities to different periods. The figure 3.1 shows (SDLC) phases.

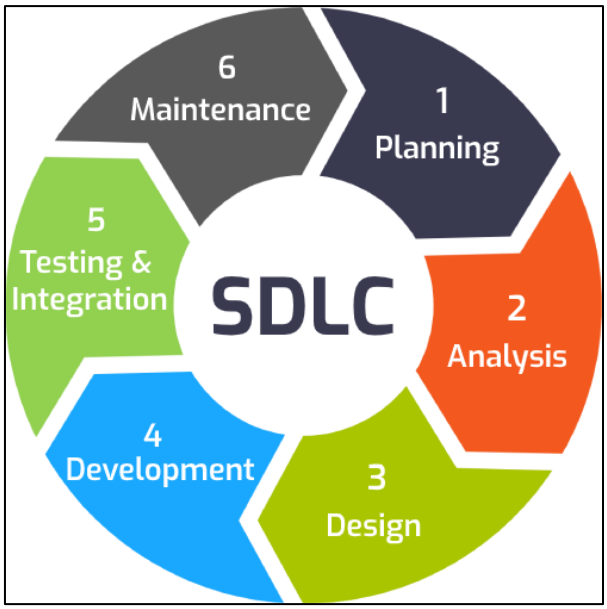

Figure 3.1 Software Development Life Cycle

The Software Development Life Cycle (SDLC) is a well-defined procedure for producing high-quality, low-cost software in the shortest amount of time possible. The SDLC's purpose is to create exceptional software that meets every user's demands. A SDLC is a step-by-step process that specifies and explains a specific plan including parts, or cycles, that each have their own methodology and deliverables. Following the SDLC improves development speed and reduces program expenses associated with other manufacturing techniques. The SRS report's objectives are used as information in the design phase, and system design is created for development process.

A doing code phase begins when the designer will get the Requirements specification. The prototype of the system is used to generate source code. Every one of the system's modules gets constructed within this stage. Testing begins once the coding is complete or the components are ready to be tested. During this phase, the resulting software is rigorously tested, and any faults detected were delegated to workers to be fixed. The technology is either placed into production or first submitted to UAT, relying upon prior expectations. Following the deployment of a product in a production server, professional engineers are responsible for

performance administration, which covers resolving the challenges that come and making any necessary enhancements.

Waterfalls its developing system types such as: agile, RAD, and RUP process are some of the common approaches for developing a system. The Online Health Service System will be developed through Rational Unified Process (RUP). Each method has its own set of benefits and drawbacks. This is dependent on whether or not the method is appropriate for developing the system. (Software Testing Help. 2019).

3.2.1 Rational Unified Process (RUP) Methodology

When someone talks about Rational Unified Process, the person should know that this methodology was made in 2003 by IBM. A Rational Unified Process (RUP) is now a rapid application development technique that divides a program's cycle, or programming, across four different phases.

Throughout those phases, a range of influences takes to occur, including modeling, evaluation, designing, construction, testing, and framework. This Rational Unified Process is iterative, which means that it is repeated, as well as agile. Since many of the process's basic tasks repeat all across the project, it's called iterative. Because different components can be altered and portions of a process could be redone until the program fits the goals and objectives, the process is agile. A landmark mark the end of each phase. A landmark is a moment in time when a document specifies should be taken. These aims were also met as an order to attempt to make such selections. The development of the use case, for instance, is a landmark by the first two stages. This use case diagram is a graphic of a model to represent that specifies who is allowed to do what with it. It is a key part of the application process. Testing begins during first stage, as shown in the RUP visualization. Usually, a project has to be finished by that time. This is due to the fact that mockups and theoretical studies are involved.

RUP helps organizations define the initiatives such that hazards may be informed by staff. It offers a suite of patterns for such essential characteristics, layout, and strategy objects that engineers should generate in order to gain a thorough understanding of software products that are yet to create. (Online Source. Techterms.com. 2020).

3.3 Phases of the Chosen Methodology

3.3.1 Inception

During this phase, the project's goal is specified. The goals accurately range this program as a foundation by confirming primary and financial plan. Also, the project's core concept and architecture are established. This group faces on a routine basis during this process to identify the program's need, including its feasibility and acceptability. The estimated expenses and resources required to accomplish the work after it's granted the free pass are also included in viability and appropriateness. Before deciding on the system's requirements, it's important to grasp the existing state of online health. In Online Health System it will guarantee that the system will provide the same functionality as the current system. It provides you with a broad vision project initiative paper with several alternatives. The project scope is determined using the basic project model. Financial analysis is included in this basic business suite. a business model and a multi-phased project plan It is necessary to comprehend. Actual expenses vs. projected expenditures. (Online Source. 2020).

3.3.2 Elaboration

This part will go over the system's requirements as well as the design that is required. And that is when the project actually gets formed. Because this is the most significant phase among the others, it includes problem domain analysis, system architecture, planning, and construction of the Online Health Service System. This phase necessitates a better knowledge and validation of requirements by determining the relevant criteria and modifying the current Online Health system to ensure that the requirement is adequately defined. In this elaboration phase for this system, there are two iterations. The first is the actors and uses cases for Online Health that have been identified. The procedure developed is reviewed in the second iteration to see if any errors were made. (Online Source. 2020).

3.3.3 Construction

The physical evolution of the system begins during the construction phase. This phase guarantees that the whole system, including its components and features, is built. The key to success in this phase is to write code that is based on the architecture design. The system's usability is validated using a variety of tests. The project is developed and completed during this period. All of the features are produced and integrated into the product here, indicating that the software has been effectively planned, written, and tested. As a result, for the system which is Online Health System, the development product will be deployable. It assesses the product's completeness. The Construction phase's conclusions for this system are as follows: The software product is integrated across multiple components. It comes with a user manual. Is the current version of the product stable? Is it up to par with the client's expectations? (Online Source. 2020).

3.3.4 Transition

When the finished system is eventually released and handed to the user, the transition phase begins. This phase entails the system's delivery, which includes the delivery and deployment plan, as well as system monitoring and quality assurance. The last tweaks or modifications are performed in response to user feedback. The project is delivered and provided to the general clients during this phase. For this Phase this system Online Health System will be updated or changed in response to feedback from end-users. It is the deployment procedure. The Transition phase's conclusions for this system are as follows: It's a type of testing phase that ensures the product satisfies the needs of the users. It tells the user if they will be pleased or not. All forms of training resources are accessible to the users. (Online Source. 2020).

3.4 The Technology or Tools Used to Develop the System

Throughout this section, it will be going through in detail research on technology and software that was used to create the Online Health Service System. They will be discussed in this section. The tools that will be utilized to create the proposed system.

3.4.1 Visual Studio Code

Microsoft Visual Studio is Microsoft's IDE and is used to develop various types of software such as computer programs, websites, web apps, web services, and mobile apps. It includes complimentary tools, compilers, and other features to facilitate the software development process, Visual studio supports multiple programming languages for coding, Visual studio is used for this project to implement all the coding in the IDE. Visual Studio Code (VS Code) is indeed an accessible scripting language that is mainly can use to examine and correct programming problems in internet and web apps. Microsoft created Visual Studio Code, which is compatible with macOS, Linux, and Windows. The features in VS Code can be used to enhance the usability of any code. Having a similar publisher element used within Azure DevOps is used in VS Code, which is predicated upon that Electron platform. (Online Source. 2019).

3.4.2 HTML

HTML (Hypertext Markup Language) is now a content method of expressing the architecture of material inside an Html document. Html code instructs a search engine including how to render text, pictures, and other material on a website. HTML is a file format with certain syntactic, folder, and name standards that indicate to the system and web host that the file is already in HTML and must be viewed as the same. Any client easily designs and develops a simple website and then submits it to the web by using basic HTML principles to a text document in nearly any word processor. HTML Forms are indeed a crucial aspect of the Internet since they enable a lot of the features you'll need to engage with sites, such as enrolling and signing in, submitting feedback, purchasing things, and so on. This module introduces you to the customer aspects of forms. (Online Source. 2021).

3.4.3 CSS

Cascading Style Sheets CSS is a feature that may be applied to HTML to give webpage designers and operators greater power about how webpages are presented. CSS allows developers and architects to construct CSS rules that control the appearance of various elements including headers and hyperlinks. Such style scripts could be added to any Web page, allowing us to enhance its placement by optimizing it. There is internal CSS and external CSS. An internal CSS process requires putting a statement of CSS variables in an HTML post's footer. The CSS guidelines immediately be anywhere in the page, bypassing every HTML article's default appearance. Putting CSS and HTML on the very same page has various benefits. The external CSS statement is saved in its own folder but then just received through into the HTML pipeline as the internet explorer parses the HTML code received from the site's server. This strategy has the benefit of minimizing clutter inside the Html file for a page's top. This strategy also system is a combination of the same Style sheets to all pages in a website or set of sites a breeze. It also makes updating the aesthetic appeal of a site simply by focusing just on CSS file rather than all of the app's web pages. (Online Source. 2018).

3.4.4 PHP

PHP is a programming language in its most basic form. This open-source server-side language can be used to develop a variety of websites, including web applications, dynamic websites, and static websites. It's a popular general-purpose programming language that can be embedded in HTML. It is a significant lure for anyone interested in web development because of its interaction with HTML. HTML code is frequently long and contains a large number of commands. PHP is advantageous since its pages contain HTML with embedded code, making project management much easier. Rather than accessing an external style sheet to handle data, PHP functions can be usually inserted into an HTML original document. It has also progressed to incorporate controlled access and the ability to run independent app inventor. Due to restrictions on the use of the word PHP, PHP is illegal only with

General Public License. PHP is downloadable on practically all web applications so as a freestanding terminal through almost each software and device. (Online Source. 2018).

3.4.5 Microsoft SQL – SQL Server

The MySQL server is a relational database concept that integrates querying, networking, and great data architecture, and also the ability to integrate with a variety of platforms. In strong industrial operations, this could safely and swiftly handle massive databases. The MySQL server has a number of features to make it suited for data retrieval, such as accessibility, reliability, and safety. (Online Source. 2019).

3.5 System Requirement Analysis

This project's system requirements include both hardware and software. Hardware includes any physical instruments, such as gadgets or computer equipment, that perform numerous roles like display the value, intake, computing, processing, and save process. Software, on the other hand, is a collection of guidelines that teaches a computer how to perform specific activities, such as writing code and building a system. These modules are necessary to build this technology.

3.5.1 Hardware Justification

Hardware stated reason is essential in program assuring that it performs well in any user environment. The specifications for the hardware used to build this framework are displayed in the table 3.1.

Table 3.1 Hardware Justification Table

Hardware	**Minimum Specification**
Processor	Intel(R) Core (TM) i7-7500U CPU @ 2.70GHz, 2.90 GHz
Random Access Memory	8.00 GB
Hard Drive Capacity	500 GB
Operating System Architecture	64-bit
Display	1366 * 768
Input Device	Mouse & Keyboard
Output Device	Printer

3.5.2 Software Justification

The Table 3.2 shows the software needs that meet the preferred requirement with the minimum specifications.

Table 3.2 Software Justification Table

Software	**Minimum Specification**
Operating System	Windows 10
Integrated Development Environment	Microsoft Visual Studio
Database Management System	XAMPP
Web Browser	Google Chrome
Visual Modeling & Design Tool	Lucid Chart

3.5.3 Project Planning

For the project plan, there is Gantt chart that people use it as a visual representation of the development period for this project. A Gantt chart aids in the explanation of each activity included in this project, as well as the time spent on each task. The figure 3.2 shows the Gantt Chart for the FYP1 and, FYP2.

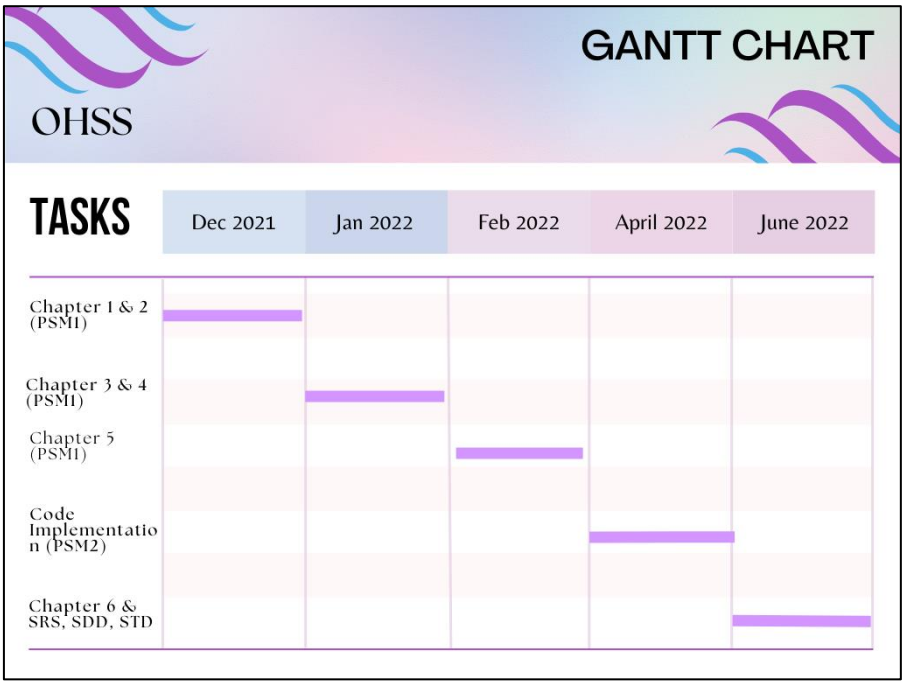

Figure 3.2 Gantt Chart for Online Health Service System

3.6 Chapter Summary

Last, this chapter discusses the application of methodology in the development of an online health service system. Justification was provided to clearly show why the methods employed are appropriate for the development of this system. Furthermore, each phase is discussed in depth to ensure that everyone participating in the project understands it. All of the phases were utilized in this project is to show the project workflow in each step. Like, RUP phases including inception is critical for determining the objective of establishing a new system inside the user context as well as comprehending the user problem. The same is true for subsequent phases that are interconnected to ensure that any given project is produced in accordance with user requirements and perspectives.

CHAPTER 4

REQUIREMENT ANALYSIS AND DESIGN

4.1 Introduction

The chapter will go through the Online Health Service System's further analysis and design. There will be certain diagrams generated, like: for the requirement analysis it will be have use case diagram and sequence diagram. And for design it will be have class diagram, UML diagram, system architecture and interface diagram. The actors' tasks will be described in-depth, and also the objectives will be split down per modules.

4.2 Requirement Analysis

Video provides a powerful way to help you prove your point. When you click Online Video, you can paste in the embed code for the video you want to add. You can also type a keyword to search online for the video that best fits your document.

Table 4.1 Requirement Analysis Information Table

Admin	An admin can manage whole system. Manage doctor, lab assistant, employee and also the patient data.
Employee	An employee can add the patient data to the system, and edit the patient data also or delete the patient.
Lab Assistant	A lab assistant can put any lab test result into the system.
Doctor	A doctor can add medical report for the

	patient into the system, and also can edit patient data.

4.2.1 Use Case Diagram

Use case diagrams style characteristics of the phenomenon and aid within catch of the platform's necessities. Use case is to explain a platform's strong features and context. Such graphs also ensure that the project and its stakeholders interact with one another. In Online Health Service System, as mentioned before the stakeholders are admin, doctor, lab assistant, and employee. Which all have their works as shown in the figure, like an admin can manage all system and users. And there is doctor which can add medical report which is main part for the doctor. Figure 4.1 shows the use case of the system.

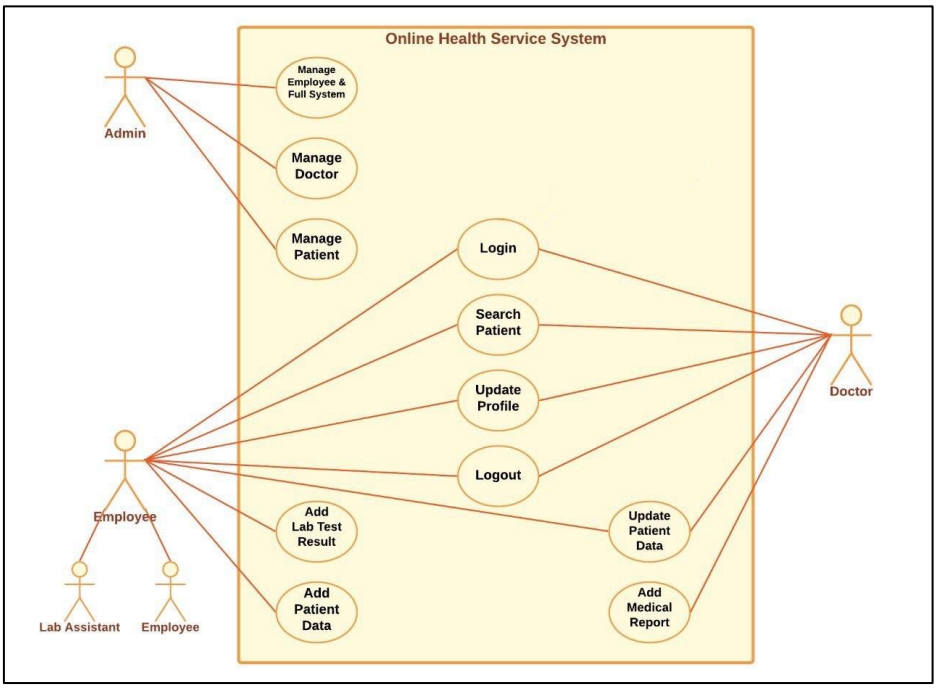

Figure 4.1 Online Health Service System Use Case

Table 4.2 Use Case Table Information for Online Health Service System

Login & Logout	For each Admin, Doctor and both Employees. They all need to login to the system to do their jobs inside it. Also, they all can logout.
Search for Patient	All of actors can search for any patient inside the system, then they can see the whole information about the patient.
Update Profile	Every user of the system can update his/her profile, which means they can edit their names or anything they need to change.
Add Patient Data	Adding patient data only an employee can add any patient name and information. Then a lab assistant and a doctor can only edit the patient.
Update Patient Data	All users can update any data of the patient that they want.
Add Lab Test Result	Only a lab assistant can add any lab test result into the patient's profile. Which is when the patient does any test immediately a lab assistant can add the lab test result into the system for the patient, then the doctor can see the result.
Add Medical Report	Only a doctor can add any medical report into the patient's profile. Which is when the patient needs any treatment or other things immediately a doctor can add medical report into the system for the patient, then another doctor can see the report.

Managing	Managing all system and users only an admin can manage it.

4.2.2 Sequence Diagram

Throughout the framework of UML, the sequence model illustrates item integration and can be used to identify recurring patterns among entities for something like a particular result. The sequence diagram seems to be a necessary element in systems such as evaluation, styling, and paperwork.

This figure 4.2 shows that when the user will login to the system, the user needs to take these steps for logging in. and also it includes the logout step for the system.

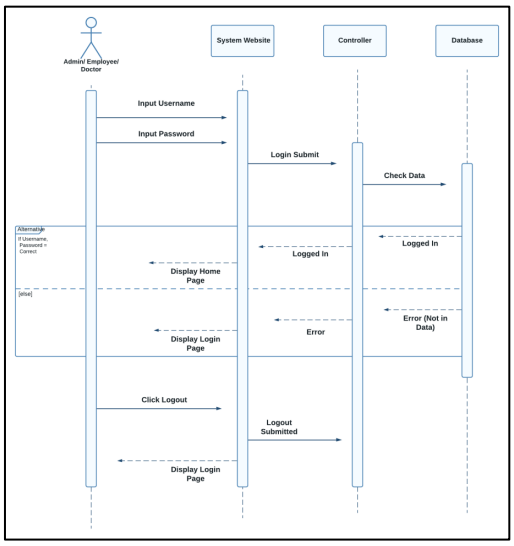

Figure 4.2 Sequence Diagram of Login & Logout (Admin, Employee and Doctor) in Online Healthcare System

The figure 4.3 shows managing the system, will be held from the admin of the system. And admin can manage all users inside the system, which means an admin can edit, add, delete, and update any data of the users.

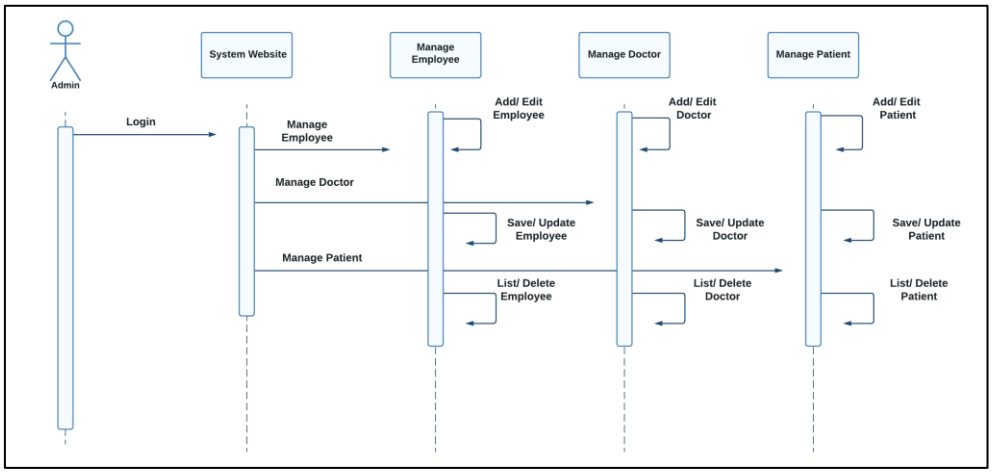

Figure 4.3 Sequence Diagram of Managing the system (Admin) in Online health System

The figure 4.4 shows that when an admin or an employee logged in to the system, they both can add any new patient data to the system. Then the data will be stored on the database.

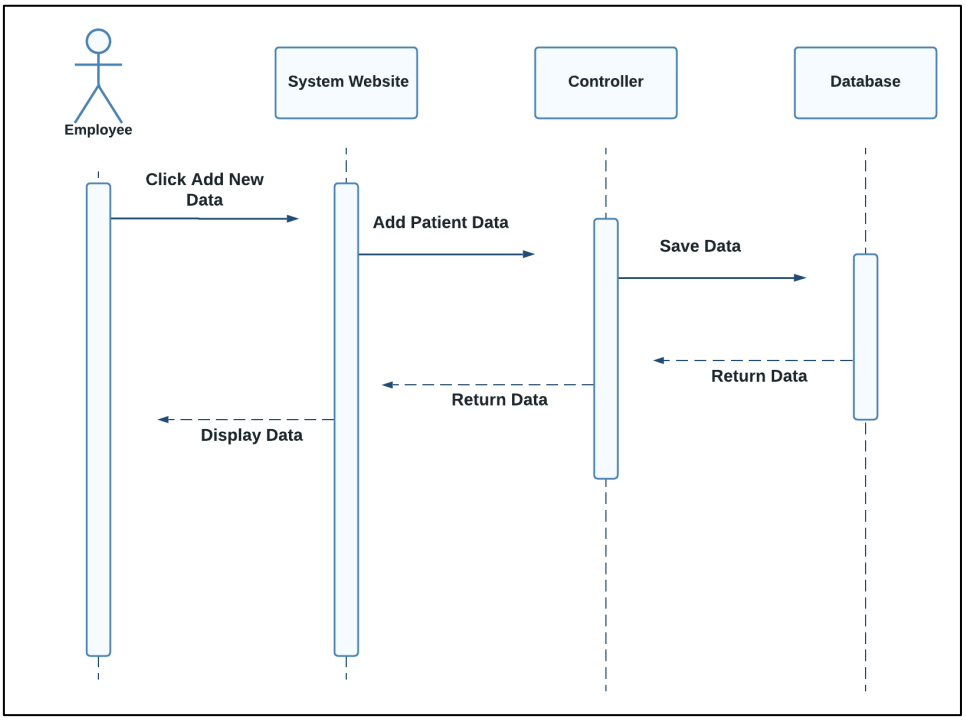

Figure 4.4 Sequence Diagram of Add patient data (Admin, Employee) in Online Health System

The figure 4.5 shows that when the users logged in to the system, they can search for any patient by writing the patient's name, id, and phone number. Then they can see the patient information.

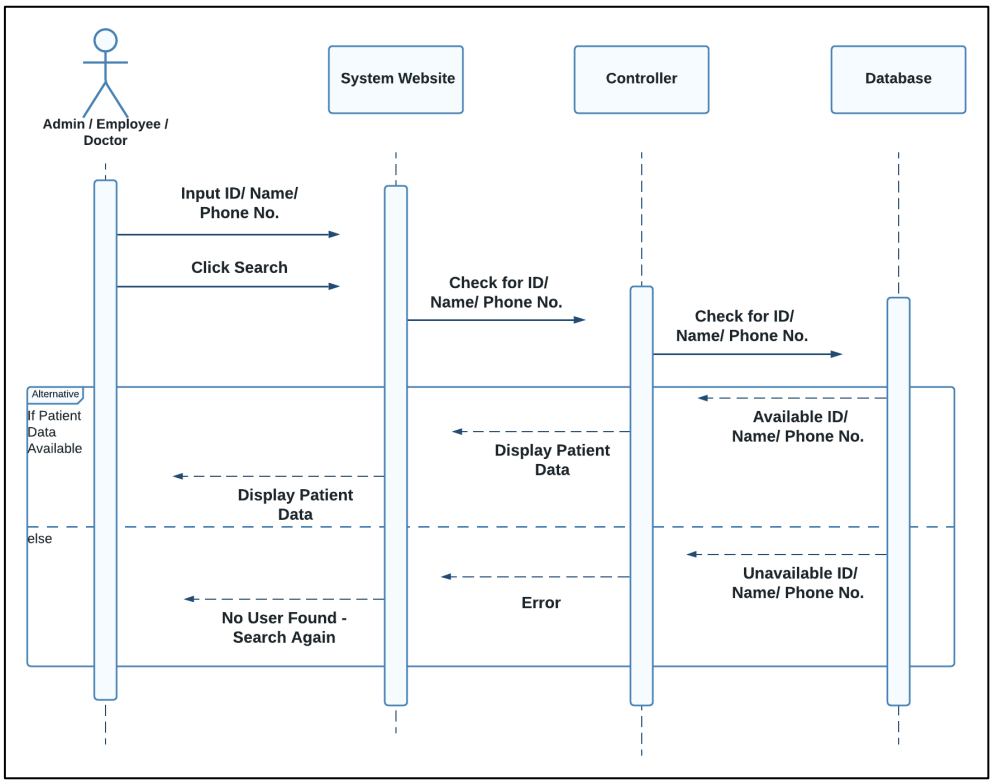

Figure 4.5 Sequence Diagram of Search for patient (Admin, Employee and Doctor) in Online Health System

This figure 4.6 shows that all users inside the system can update data for the patient, like changing name of the patient or changing phone number. Then the updated data will be saved into the database.

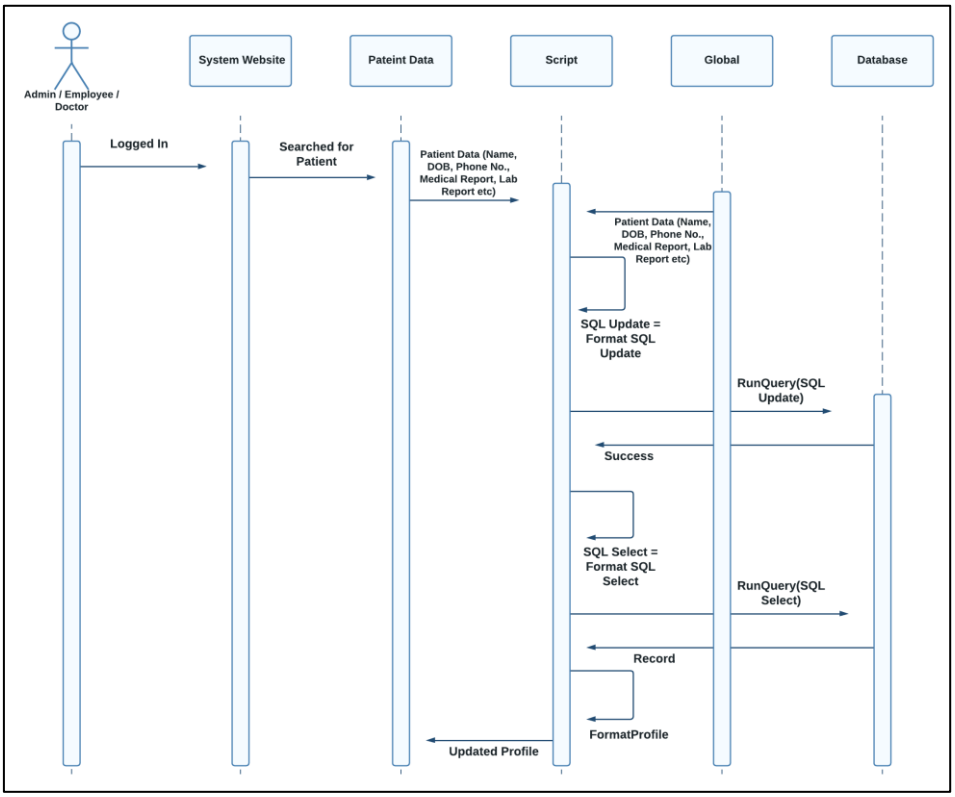

Figure 4.6 Sequence Diagram of Update Patient Data (Admin, Employee and Doctor) in Online Health System

The figure 4.7 shows that when the users use the system, they will have their own profile which includes some information about that user. If there are any changes about that user's data, then they can edit their profile and update it.

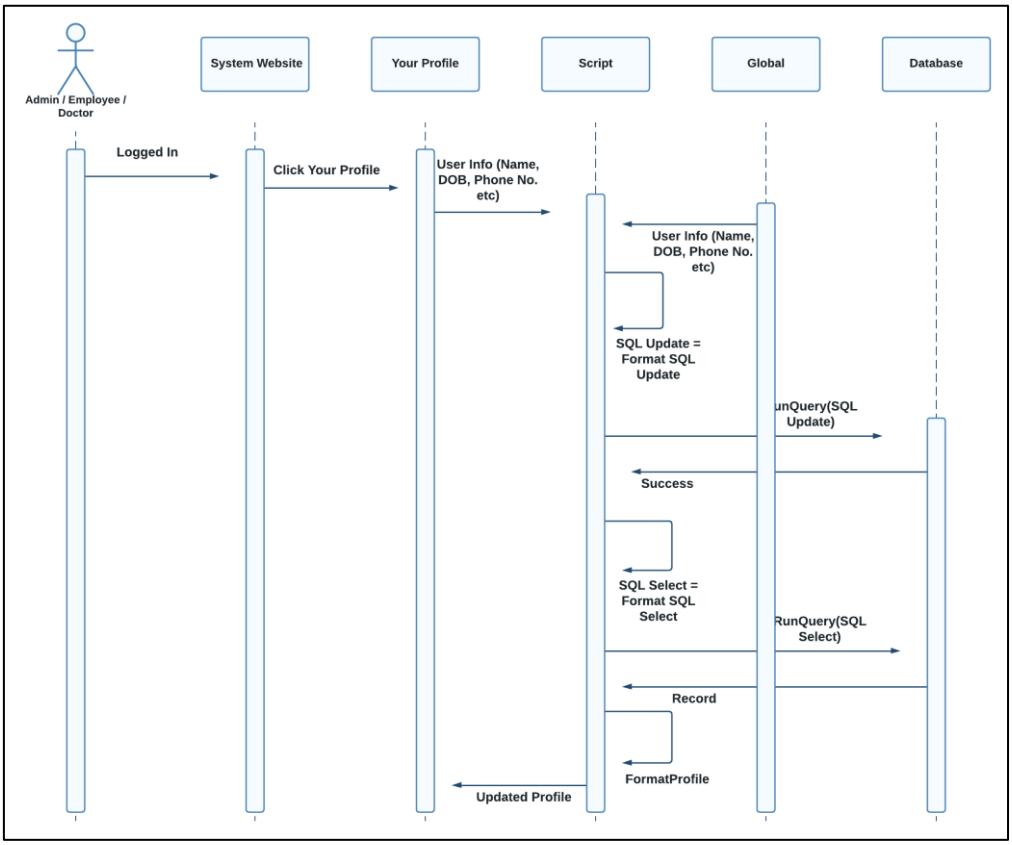

Figure 4.7 Sequence Diagram of Update Profile (Admin, Employee and Doctor) in Online Health System

This figure 4.8 show that when any patient needs to do any kind of test. After doing the test a lab assistant which is an actor of the system can add the test result info into the patient's profile and update it.

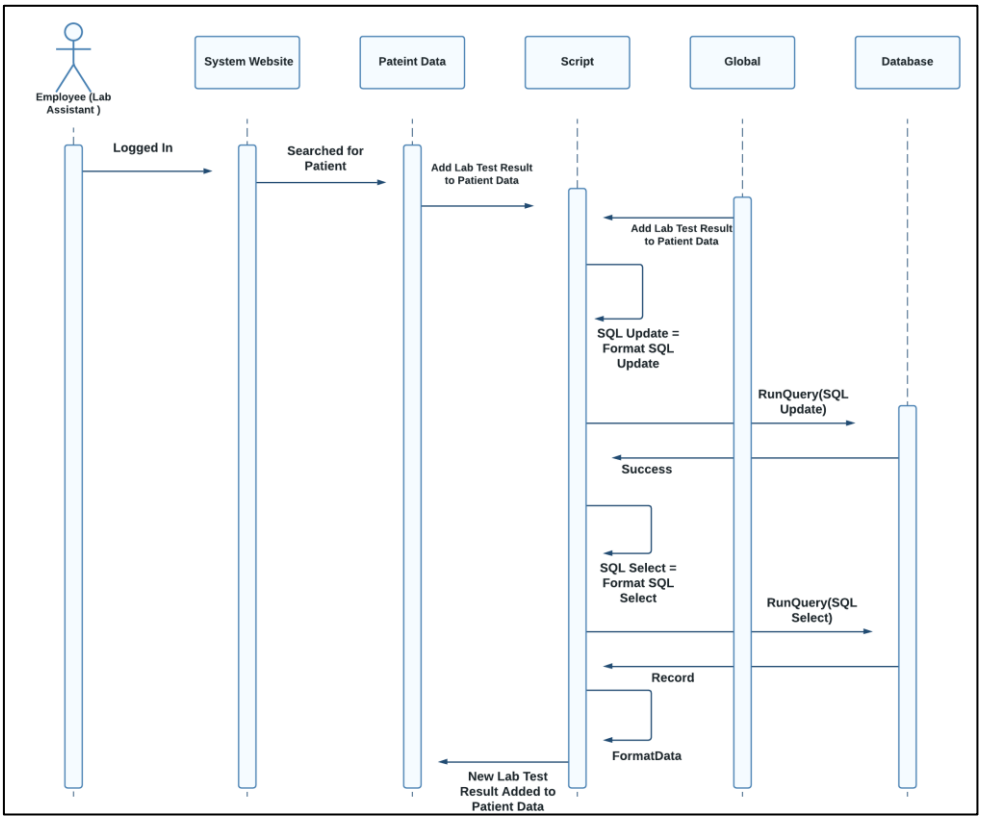

Figure 4.8 Sequence Diagram of Add Lab Test Result (Lab Assistant) in Online Health System

The figure 4.9 for sequence diagram shows that when any patient needs to visit any doctor by any reason. After the patient's meeting with the doctor the doctor which is an actor of the system can add any info into the patient's profile which is medical report and update it.

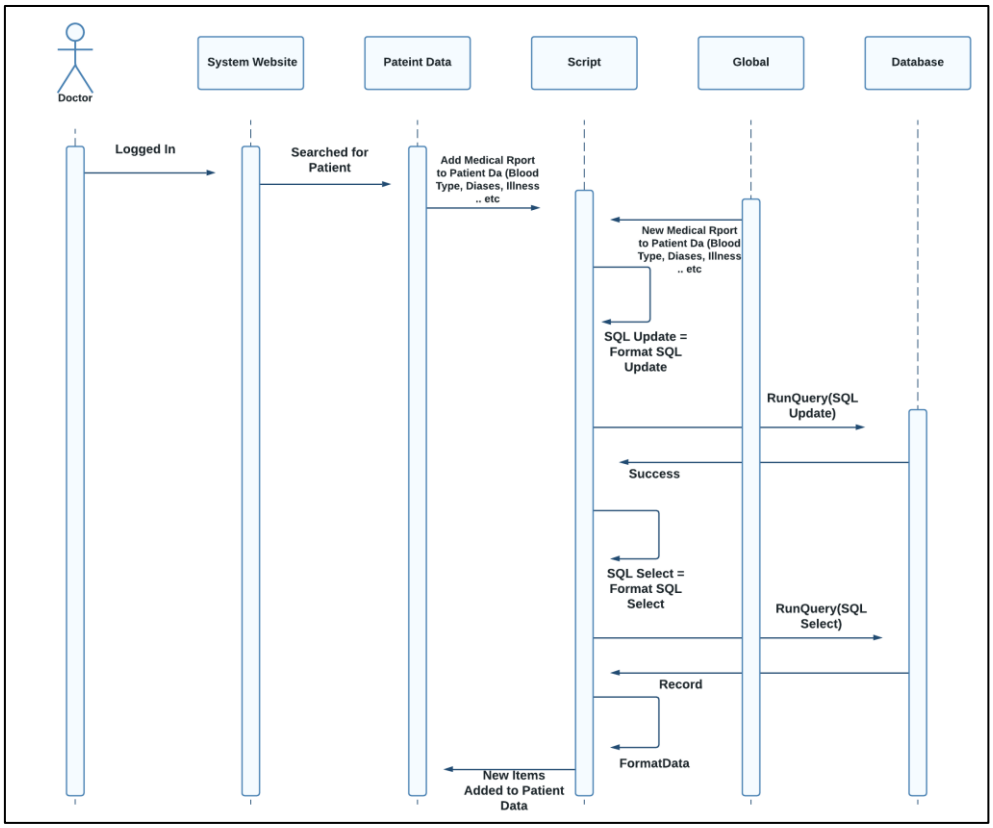

Figure 4.9 Sequence Diagram of Add Medical Report (Doctor) in Online Health System

4.2.3 Activity Diagram

The activity diagram would be a behavior of a system sketch modification that is a visualization like a completed series of logical process steps. Activity diagrams explain side-by-side and implicit tasks, utilizing cases, and functional requirements. The activity diagram is a graphical representation of the serial procedure of a massive task besides putting the emphasis on chase scenes and style to make interrupt terms. A situation of an operation is related to how each process step is completed.

This figure 4.10 shows that when an admin logged in to the system and then the admin can manage all users and the system.

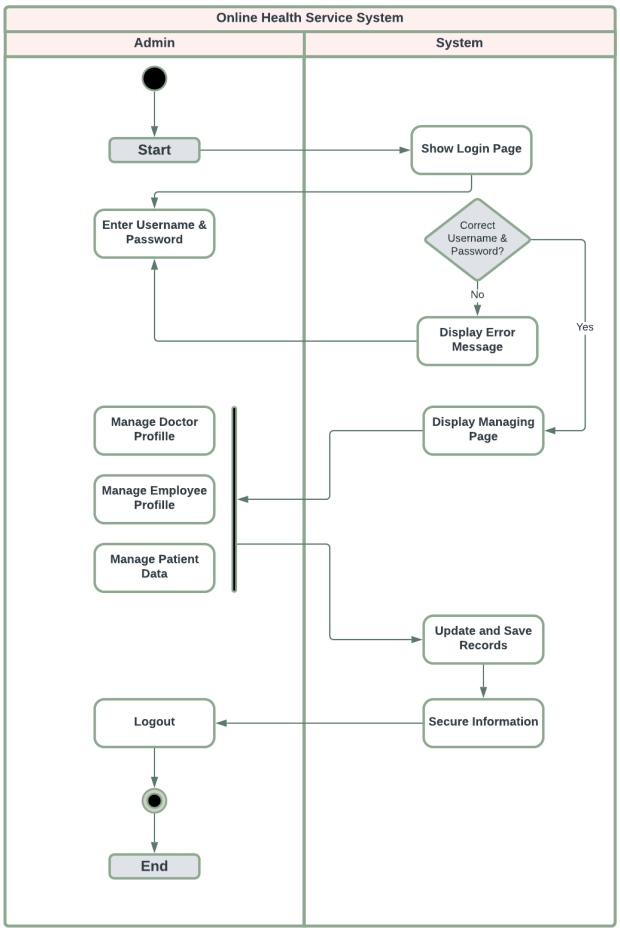

Figure 4.10 Activity diagram of Admin in Online Health System

The figure 4.11 activity diagram if when an employee of the system will add the patient data into the system after logged in.

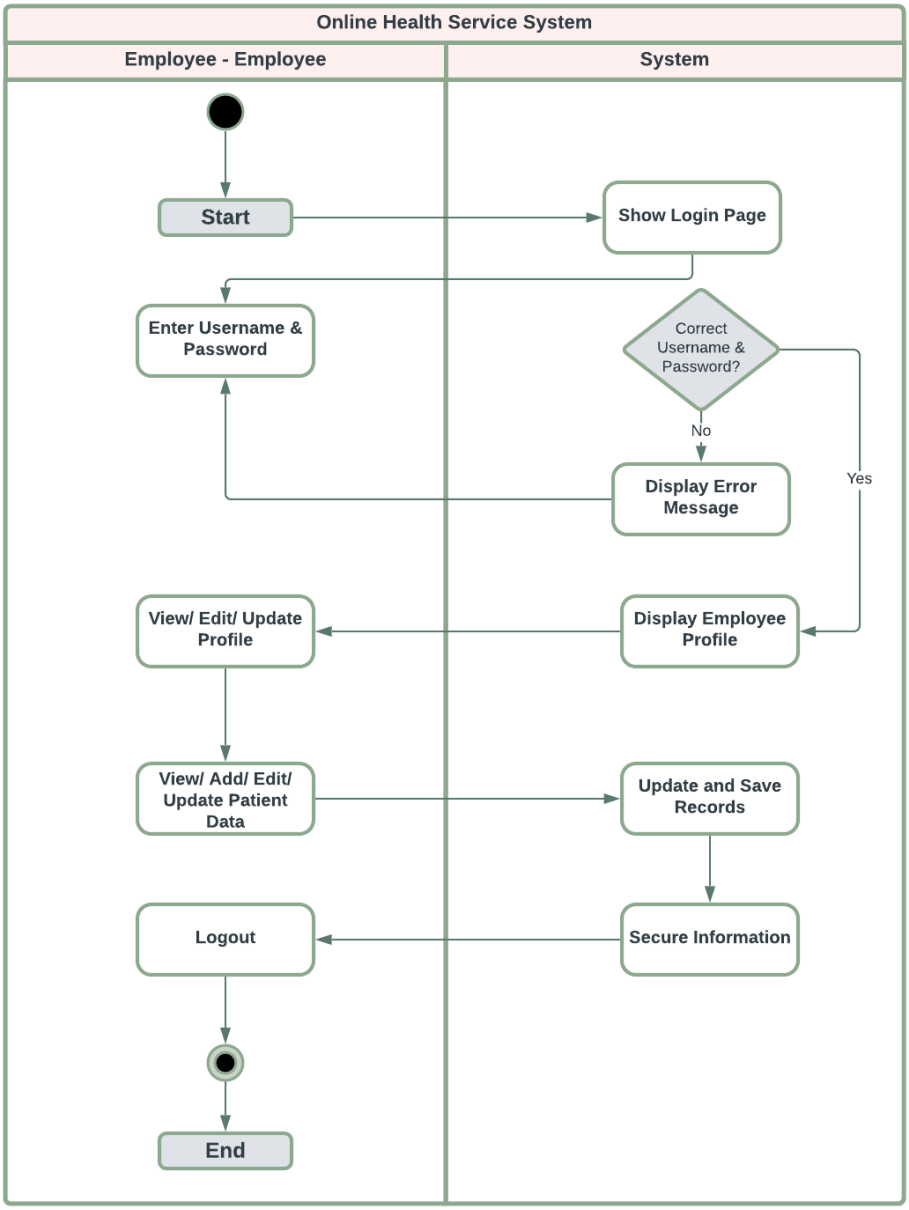

Figure 4.11 Activity diagram of Employee in Online Health System

The figure 4.12 shows the activity diagram for a lab assistant, when the lab assistant needs to log in to the system, and then he/she can add any lab test result into the patient's profile

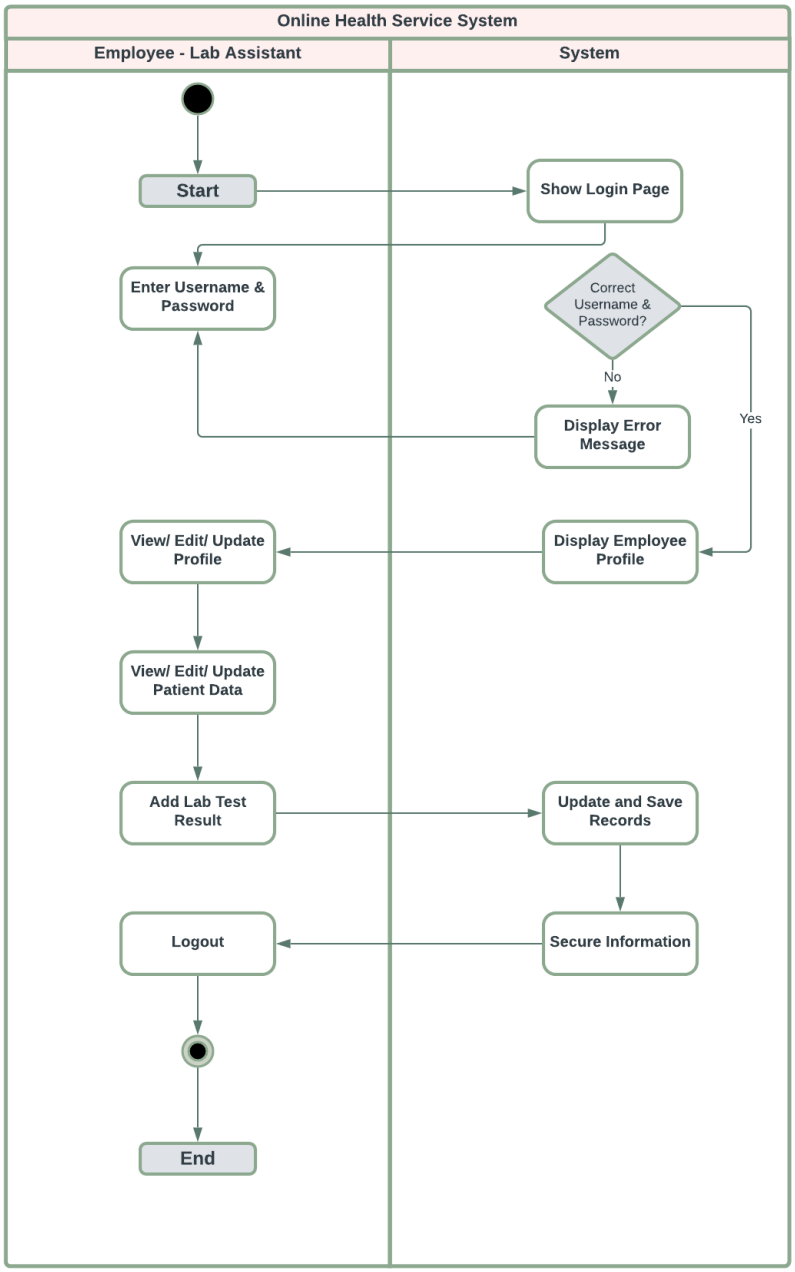

Figure 4.12 Activity diagram of Lab Assistant in Online Health System

The figure 4.13 shows the activity diagram for a doctor, when the doctor needs to log in to the system, and then he/she can add any medical report into the patient's profile.

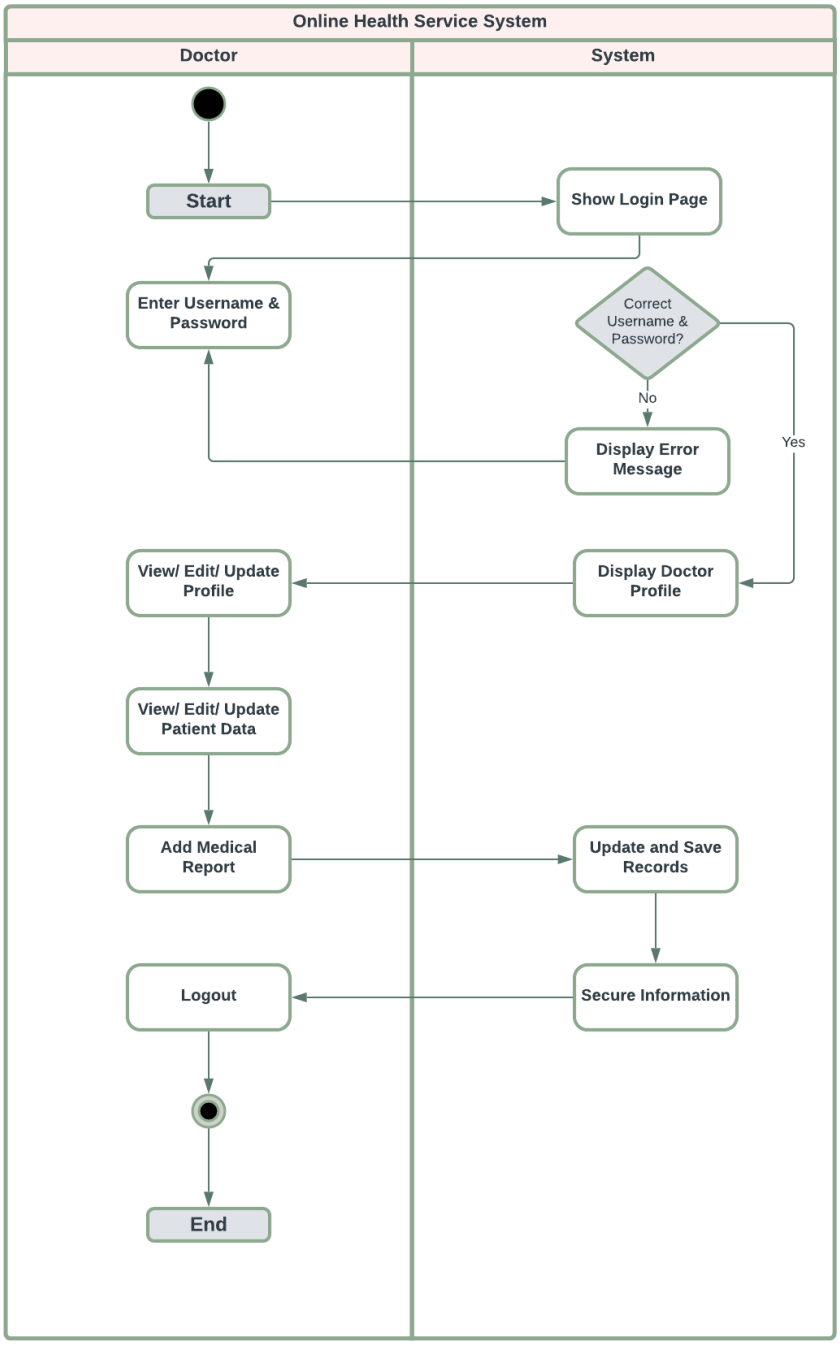

Figure 4.13 Activity diagram of Doctor in Online Health System

4.3 Designs

4.3.1 System Architecture

Application Software Architecture serves as a place that describes the main map of application components and their configuration. Including the building, the relationships and connections in between components are made clear. The specifications and attributes of such aspects provide insight into the design and its operation. The structure, which discusses the platform's richness and alignment, is used to derive efficiency and technical characteristics.

The goal of this system design is to define a comprehensive solution based on logically connected and consistent principles, concepts, and properties. The figure below shows the system architecture for Online Health Service System, which include the all users and how the system work. The figure 4.14 shows the system architecture.

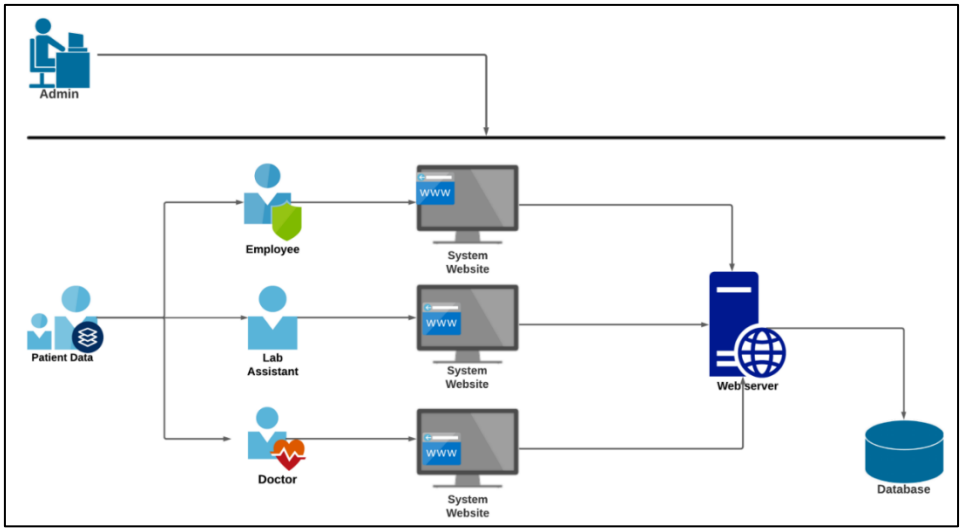

Figure 4.14 Online Health Service System Overall System Architecture

4.3.2 Class Diagram

Class diagrams have been essential in the attribute design phase because they represent the platform's internal view. Obviously, it depends upon that platform's richness, a specific class diagram can also be used to design the overall system, or many case diagrams could be used to model the platform's parts. It can be used to design the program's items, show interactions among them, and identify what these particles have and the facilities they give. As it shown the system has Doctor class, Patient class, Employee class, Lab Test Result class and Medical Report class. The patient class is which the patient does not need to do any action, so that's why only the attribute is shown. Then there is a relationship between the patient and the doctor class, again the patient with the employee class. Also, the lab assistant which is a part of an employee has a relationship with lab test result, because a lab assistant will add lab test result into the system. Also, for the doctor when a doctor adds medical report to the system. the figure 4.15 shows the class diagram.

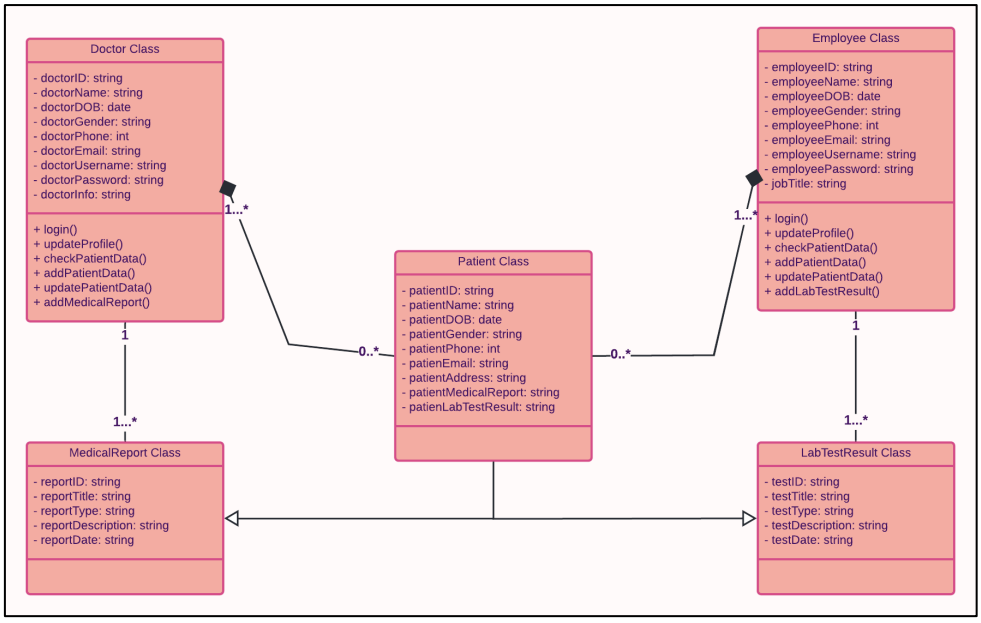

Figure 4.15 Online Health Service System Class Diagram

4.4 Database Design

Database design is the organization of actions or practices that enable with the planning, implementation, deployment, and maintenance of enterprise data management systems. The entity, that are either tables that carry specific data in the database, are represented as Graphs, rectangles, or squares. Connections, or the exchanges here between objects, are represented as diamonds. An entity's properties or data are represented by ovals. Despite their complexity, ERD diagrams let informed users grasp database systems once at a good degree while needing to know the intricacies. ER diagrams are used by database designers to depict the interconnections among information entities in a transparent manner. The figure 4.16 shows the ERD for the system.

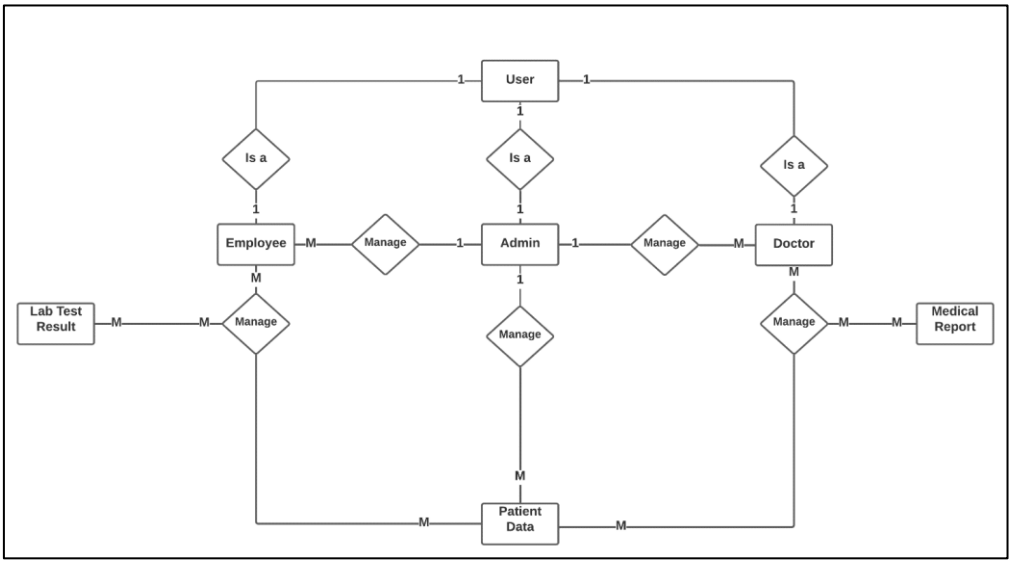

Figure 4.16 Online Health Service System ERD

Table 4.3 Data Dictionary Table

Table	Attribute	Type	Length	PK/FK	Null
admin_login	Id	varchar	20	PK	Not Null
	Pass	longtext			
doctor	SSN	Varchar	20	PK	Not Null
	F_Name	Char	15		
	L_Name	Char	15		
	Address	Varchar	30		
	Contact_No	Varchar	20		
	Email	Varchar	50		
	Department	Char	35		
	Speciality	varchar	30		
doctor_login	d_ssn	Varchar	20	PK	Not Null
	pass	longtext			
consultation	Patient_SSN	varchar	20	PK	Not Null
	Doctor_SSN	varchar	20	FK	
	Date_Time	datetime		PK	
	Complains	Longtext			
	Findings	Longtext			
	Treatments	Longtext			
	Medicines	Longtext			
	Allergies	Longtext			
operation	Patient_SSN	varchar	20	PK	Not Null
	Doctor_SSN	varchar	20	FK	
	Date_Time	datetime		PK	
	Description	longext			

	Complications	longext			
	Allergies	longext			
diagnosis	Patient_SSN	varchar	20	PK	Not Null
	Doctor_SSN	varchar	20	FK	
	Date_Time	datetime		PK	
	Diagnosis_Name	varchar	25		
	Description	longext			
	Complications	longext			
	Allergies	longext			
employee	SSN	varchar	10	PK	Not Null
	F_Name	varchar	100		
	L_Name	varchar	100		
	Address	varchar	100		
	hname	varchar	100		
	Contact_No	varchar	100		
	Email	varchar	100		
employee_login	e_ssn	varchar	10	PK	
	pass	longtext			
lab	SSN	varchar	20	PK	Not Null
	F_Name	char	15		
	L_Name	char	15		
	Gen	char	15		
	Contact_No	varchar	35		
	Email	varchar	20		
	Address	varchar	50		
lab_login	l_ssn	varchar	20	PK	
	pass	longtext			
lab_test	Patient_SSN	varchar	20	PK	Not Null
	Doctor_SSN	varchar	20	FK	

	Date_Time	datetime		PK	
	tid	varchar	10		
	ttype	varchar	100		
	Labname	longtext			
	note	longtext			
patient	SSN	varchar	20	PK	Not Null
	F_Name	char	15		
	L_Name	char	15		
	Address	varchar	30		
	Contact_No	varchar	20		
	Email	varchar	50		
	Date_Of_Birth	date			
	Gender	char	10		

4.5 Interface Design

In the field of computer science, user interface design means the creation of a touch screen for programs, websites, or programs. It's all about programming the appearance of things in order to make them more usable and enhance the customer experience. A decent User Interface is vital in the idea that it allows the intended audience to view the items more clearly. It is created in such a way that it clearly displays the services that provide in order to capture your visitors' interest and maintain visitors on the site.

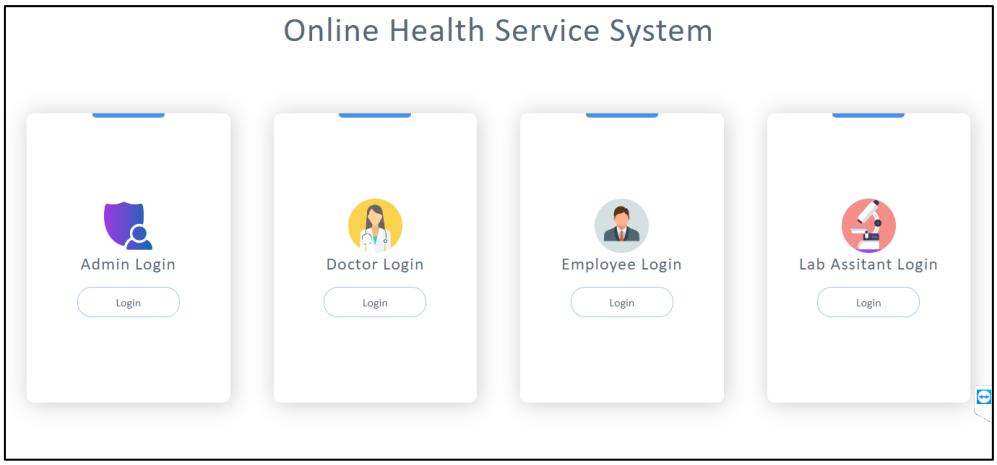

Figure 4.17 Login Page (Admin, Doctor, Lab Assistant and, Employee)

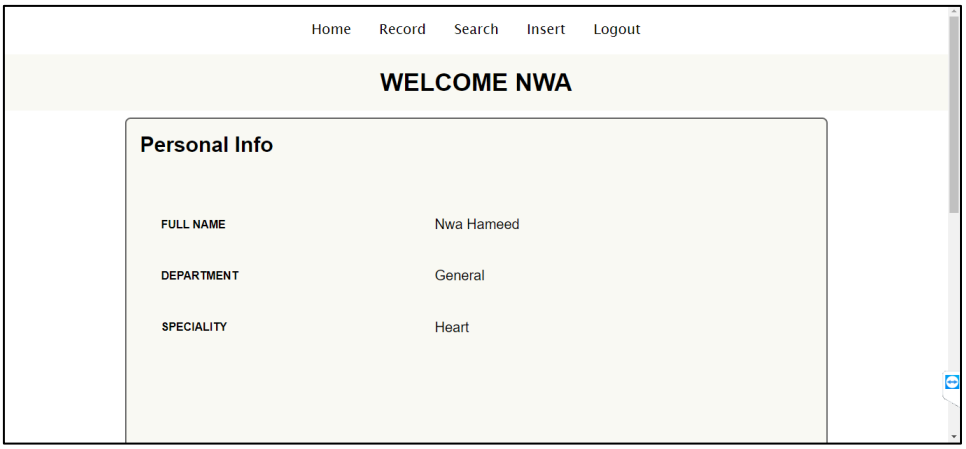

Figure 4.18 Welcome Page (Doctor & Lab Assistant, and, Employee)

Figure 4.19 Login Page (Admin, Doctor, Lab Assistant and, Employee)

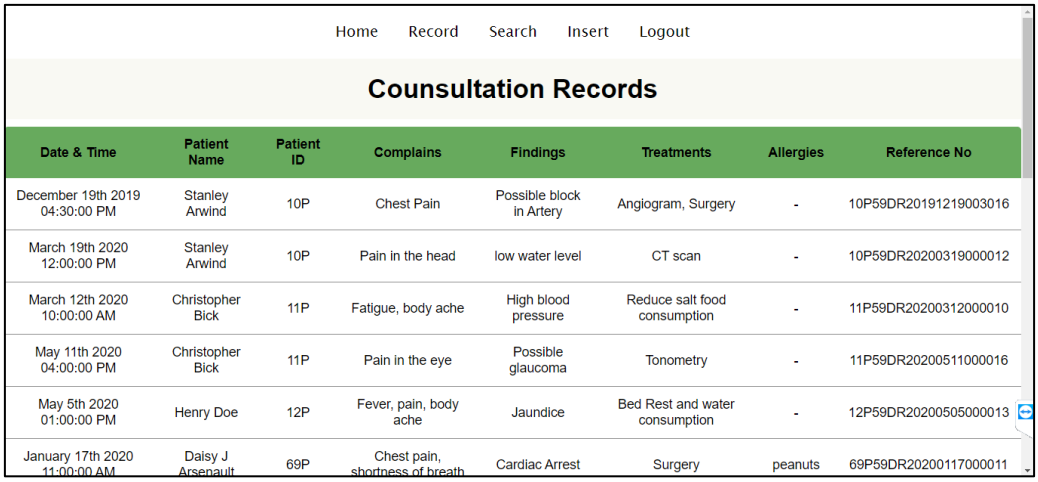

Figure 4.20 Patient Data Page (Doctor & Lab Assistant)

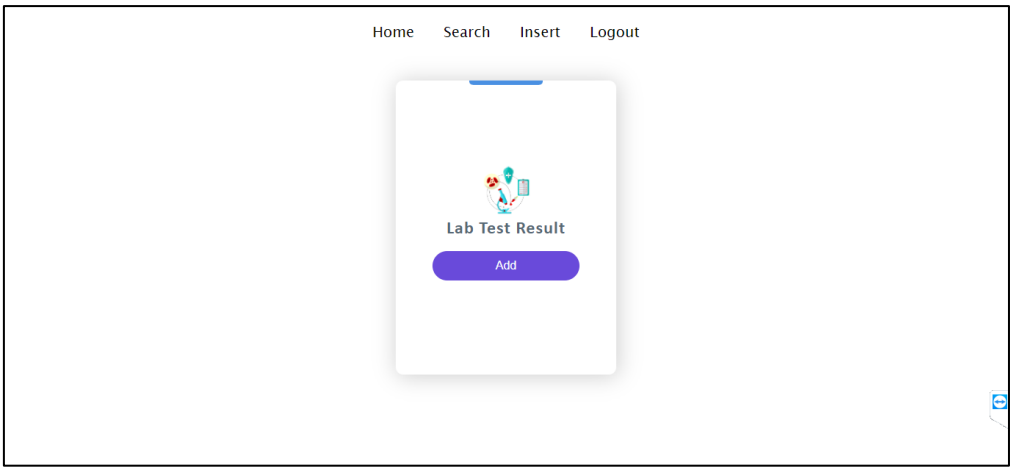

Figure 4.21 Insert Lab Test Result (Lab Assistant)

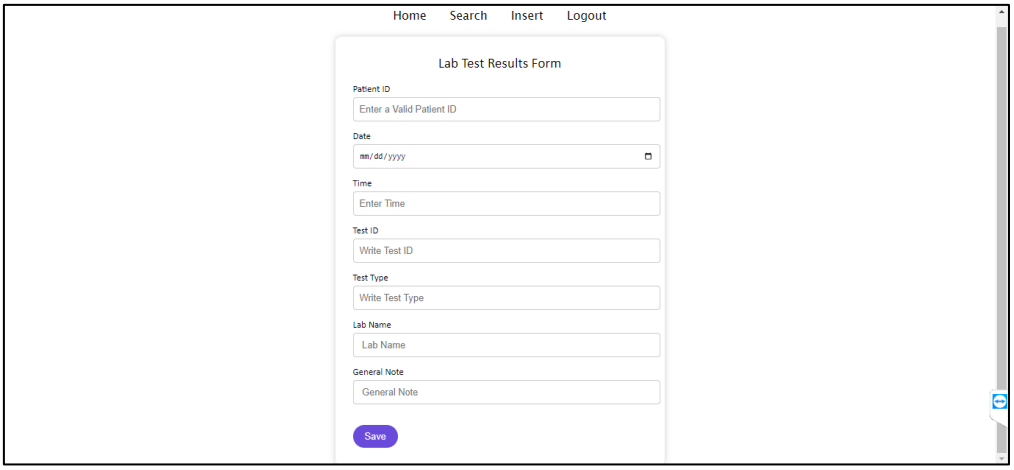

Figure 4.22 Lab Test Result Form (Lab Assistant)

4.6 Chapter Summary

Generally, this chapter addresses the fundamental requirements for the study and design of an Online Health Service System. This chapter focused on these things which have done: UML diagrams, class diagram, ERD for the database design and also the system architecture which shows the full system. Chapter 4 is important chapter of the project, because hence the reader can get all parts clearly.

CHAPTER 5

IMPLEMENTATION AND TESTING

5.1 Introduction

The section will cover the Online Health Service System's implementation and testing phases, as well as examples of primary feature code snippets. Once a comprehensive need and system objective have been acquired, both the development and testing processes should be completed. Installation of essential software, coding, black box, and white box testing are all part of this step.

5.2 Coding of System Main Functions

The front-end design of the Online Health Service System was created using CSS, HTML, and PHP. Furthermore, Visual Studio is an integrated development environment (IDE) for writing code. This section will go over the coding implementation for the system's primary features.

5.2.1 Login Page

The login page is a site entry page that requires a credential to access a specific or complete section of the website. Although the website currently supports a variety of authentication mechanisms, this system still uses a password-based scheme. The four users can log in here, and the administrator can establish an account for the others. A code snippet for the login function is shown in Figure 5.1.

```
        if ($_GET["error"]=="emptyfields") {
          echo "<p class=login_error>Fill in all the fields</p>";
        }
        else if ($_GET["error"]=="wrongpass") {
          echo "<p class=login_error>Password does not match</p>";
        }
        else if ($_GET["error"]=="nouser") {
         echo "<p class=login_error>No User Found!</p>";
        }
      }
      else if (isset($_GET["login"])) {
        if ($_GET["login"]=="success") {
        echo "<p class=login_success>Login Succesful!</p>";
          }
      }
      ?>

      <label for="userID">User ID</label>
      <input type="text" name="userID" placeholder="Enter ID">
      <label for="pass">Password</label>
      <input type="password" name="pass" placeholder="Enter your Password">
      <input type="submit" name="login-submit" value="Login">
    </form>

    </div>
  </div>
  </div>
</body>
```

Figure 5.1 Login Page

5.2.2 User Adding

The admin will create new users to use as credentials to access the Online Health Service System for this function. Username, password, full name, email address, and other information will be entered. For all users to access the system, the administrator will create a password. A code sample for user registration is shown in figure 5.2.

```
echo
<div class="formbody">
    <section class="containerr">
    <header>Patient Registration Form</header>
    <form action="register_patient(admin).php" class="form" method="post">
      <div class="input-box">
        <label for="pssn" >Patient ID</label>
        <input type="text" name="pssn" placeholder="Enter a Valid Patient ID" required />
      </div>

      <div class="input-box">
        <label for="fname" >First Name</label>
        <input type="text" name="fname" placeholder="Enter First Name" required />
      </div>

      <div class="input-box">
        <label for="lname" >Last Name</label>
        <input type="text" name="lname" placeholder="Enter Last Name" required />
      </div>

      <div class="input-box">
        <label for="cno" >Phone Number</label>
        <input type="text" name="cno" placeholder="Enter Phone Number" required />
      </div>

      <div class="column">
        <div class="input-box">
          <label for="mail" >Email</label>
          <input type="email" name="mail" placeholder="Email" />
        </div>

        <div class="input-box">
```

Figure 5.2 Add User

5.2.3 Add Information by Doctor

In this section, the doctor will add consultation, surgery, and diagnosis separately to the patient's table. After filling up all details the data will be added to the patient table and the data will be stored. Then the doctor can search for any data she/he wants to see. As shown in figure 5.3.

```
echo '
<div class="formbody">
    <section class="containerr">
    <header>Consultation Form</header>
    <form action="insert_consultation(doctor).php" class="form" method="post">
      <div class="input-box">
        <label for="pssn" >Patient ID</label>
        <input type="text" name="pssn" placeholder="Enter a Valid Patient ID" required />
      </div>

       <div class="input-box">
          <label for="date" >Date</label>
          <input type="date" name="date" id="date" placeholder="Date" required />
        </div>


      <div class="input-box">
        <label for="time" >Time</label>
        <input type="text" name="time" id="time" placeholder="Enter Time" required />
      </div>

            <div class="input-box">
        <label for="complains" >Complains</label>
        <input type="text" name="complains"  placeholder="Write Complains" required />
      </div>

      <div class="column">
        <div class="input-box">
          <label for="findings" >Findings</label>
          <input type="text" name="findings" placeholder="Write Findings" />
```

Figure 5.3 Add Info by Doctor

5.2.4 Add Lab Test Result by Lab Assistant

In this section, the Lab Assistant will add lab test results to the patient's table. After filling up all details the data will be added to the patient table and the data will be stored. Then the lab assistant can search for any data she/he wants to see. The code is shown in figure 5.4.

```
echo '
<div class="formbody">
    <section class="containerr">
    <header>Lab Test Results Form</header>
    <form action="insert_labtest(lab).php" class="form" method="post">
      <div class="input-box">
        <label for="pssn" >Patient ID</label>
        <input type="text" name="pssn" placeholder="Enter a Valid Patient ID" required />
      </div>

      <div class="input-box">
          <label for="date" >Date</label>
          <input type="date" name="date" id="date" placeholder="Date" required />
        </div>


      <div class="input-box">
        <label for="time" >Time</label>
        <input type="text" name="time" id="time" placeholder="Enter Time" required />
      </div>

            <div class="input-box">
        <label for="TestID" >Test ID</label>
        <input type="text" name="tid"  placeholder="Write Test ID" required />
      </div>

      <div class="input-box">
        <label for="TestType" >Test Type</label>
        <input type="text" name="ttype"  placeholder="Write Test Type "  required/>
      </div>
```

Figure 5.4 Add Lab Test Result

5.2.5 Reset Password

In this section, all 3 users (doctor, lab assistant, and, employee) can reset their password by writing the current password, then writing the new password 2 times. Then the password for that user will be updated inside the system and the database. As it is shown in figure 5.5.

```
        </ul>
      </nav>
    </div>
    <div class='welcome'><h2 class='welcome_mssg'> Reset Password </h2></div>

    <div class="wrapper">
      <div class="container">
        <form class="ci_edit_form" action="resetpass_lab.php" method="post">


          <input type="password" name="cp" placeholder="Current Password" required><br>


          <input type="text" name="np" placeholder="New Password" required><br>


          <input type="text" name="npr" placeholder="Re-enter Password" required>

          <input type="submit" name="info-submit" value="Save">
        </form>
      </div>
    </div>

    <?php
     require "connection.php";
     if(isset($_POST["info-submit"]))
     {
       if (!empty($_POST["cp"]) && !empty($_POST["np"]) && !empty($_POST["npr"])) {
          $uid=$_SESSION["userID"];
          $cp=$_POST["cp"]; $np=$_POST["np"]; $npr=$_POST["npr"];

          $sql="SELECT pass FROM lab_login WHERE l_ssn = '$uid'";
```

Figure 5.5 Reset Password

5.3 Testing

A fully functional system is tested as part of the system testing process to make sure it complies with all the specifications laid out by the customer in the form of the functional specification or system specification documentation. As this testing should be covering the full workflow of the end-to-end system, it is typically conducted concurrently with the integration testing.

5.3.1 Black box Testing

In the black-box testing, the tester is unaware of how the software system operates on the inside. A high degree of testing called the black box focuses on how the software behaves. It entails testing from the viewpoint of the user or the outside world. Almost all software testing levels, including unit, integration, system, and acceptance, can use black-box testing. The table 5.1 shows the black box testing for login page.

Table 5.1 Black Box Testing for Login Page

Input	**Expected Result**	**Actual Result**	**Status**
Valid (username & password), after that click on the (Login) button	Successful login and go to the dashboard page (admin, doctor, employee, and, lab assistant) dashboard.	Successful login and go to the dashboard page (admin, doctor, employee, and, lab assistant) dashboard.	Pass
Invalid (username & password), after that click on the (Login) button	Unsuccessful login then error message (password do not match! Or user not found!).	Unsuccessful login then error message (password do not match! Or user not found!)	Pass
Missing a necessary field	System message (Fill in all the fields).	System message (Fill in all the fields).	Pass

5.3.2 White box Testing

Is a testing method that examines the system's internal operation. This approach bases testing on the extent to which code statements, branches, pathways, or circumstances are covered. Low-level testing is referred to as white-box testing. It is also known as code base testing, transparent box, clear box, and glass box. The white-box testing approach presupposes that a unit's or program's logic flow is known. The tables 5.2 and 5.3 show the white box testing for login page.

Table 5.2 White Box Testing for Login Page

Use Case Name	Login
Use Case ID	UC001
Description	The use case identifies how the user can log in to the system.
Pre-Condition	1. There is an internet connection. 2. Having username and password. 3. Fill out the form correctly.
Date	15 Apr 2022
Tester	Nwa Hameed

Table 5.3 White Box Testing for Login Page

Input	Expected Output	Actual Output
Valid username & password	Go to the dashboard page	Go to the dashboard page
Invalid username & password	Error message.	Error message.

5.3.3 User Testing

Real people test a product, service, website, or app's functionality during user testing. The group conducting the tests and offering the review will be made up of the target audience for the company during the user testing procedure. The website's target audience will test it, identify any shortcomings, and suggest any potential areas for improvement before reporting their findings to the company that developed the website or app. User testing has several advantages, including the possibility to improve the site's design and the option to gather input directly from a professional point of view. For the user testing, by asking some staff of the university and students, the result came up. The tables 5.4 and 5.5 shows the User Acceptance for Online Health Service System.

Table 5.4 User Acceptance Testing for Online Health Service System

Tester: Sahand Azad		
Date: 20 June 2022		
Use Case: Add Lab Test Results		
Instruction	**Expected Result**	**Result**
1. Logged in to the system. 2. Filling up information about the lab test result. 3. Click on Save. (cc)	1. Successfully logged into the system by the lab assistant. 2. Inserted lab test result. 3. Successful message showed. 4. Updating lab test results.	pass

Table 5.5 User Acceptance Testing for Online Health Service System

Tester: Sahand Azad		
Date: 20 June 2022		
Use Case: Add User		
Instruction	**Expected Result**	**Result**
1. Logged in to the system. 2. Filling up information about adding a doctor. 3. Click on Save. (dd)	1. Successfully logged into the system by the admin. 2. Inserted doctor information. 3. Successful message showed. 4. Updating doctor list.	pass

5.4 Interface of System Main Function

The system interface is a critical component because it serves as a conduit for items to flow between the system database and end-users. A decent user interface contributes to a better user experience. The Online Health Service System, like any other system, requires a user-friendly interface.

5.5 Chapter Summary

Both implementation and testing phases are described in this chapter. From the implementation phase, all of the requirements acquired during the previous phase are expressed as a system that completely functions and meets the requirement. To interpret all of the requirements into the system, the coding operations must be done properly to ensure that all of the necessary functions can be implemented. The encoding operations carried out during the implementation process should be extensively tested during the testing phase to guarantee that the system generated is free of mistakes.

CHAPTER 6

CONCLUSION

6.1 Introduction

The basic purpose of the health-care system is to ensure that health is distributed fairly among the population. On the other hand, the public expects the healthcare system to treat people with respect. The official definition of health system sensitivity was given as the ability of the health system to meet the population's realistic expectations regarding their engagement with the health system, as opposed to expectations for advancements in health or wealth within this framework. The findings and objectives of the Online Health Service System will be discussed in this chapter, as well as suggestions for future enhancements.

6.2 Achievement

The study began with observations and conversations with a variety of persons in Kurdistan's health department. The goal is to have a better understanding of the backdrop and business processes in place around. When the system is complete, system’s problem with the present circumstance and project is discovered, leading to a proposed solution for resolving such issues

After that section it will come up with description about literature review. The projects of present system as well as three other done systems was conducted during this section. The systems chosen are similar to the proposed system in terms of features and processes. All elements and characteristics that might be useful are incorporated in the suggested system during the analysis. Technology employed is one of the aspects and features that have been considered in conjunction with the proposed system. In addition, we reviewed the technology that is now in use on

existing systems in this chapter. MYSQL Server is included as part of the technology.

The methodology of the system is detailed in Chapter 3. The Rational Unified Process (RUP) Methodology, which was chosen, has been explained and justified again for the chosen model. Set to start with the inception phase and ending with the transition phase, all phases of the chosen approach are addressed. In addition, this chapter discussed Software Requirement Analysis, which includes both software and hardware requirements.

In Chapter 4, the most important aspects of this project are explained. This chapter covers system analysis and design, which covers everything first about requirement analysis then system design, database design, and UML diagrams among other things. This chapter also includes an early interface design for the planned system.

In Chapter 5, the code implementation for the main parts is described with a sample of the code for all parts. Also, SDD, SRS, and, STD are defined in the appendixes with their requirements.

6.3 Suggestions for Future Improvement

In order to keep upgrading this system, certain additional features and function abilities can be implemented in the future. New version may add to the system with new style and design.

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Appendix A Interview

Interview with Kurdistan Ministry of Health Staff and Manager (20 Dec 2021)

Q1: How you record the patient data for your hospitals data collections?

A: As we know hospital administrative data are frequently utilized as a data source in health services research, this method has not been compared to other widely used methodologies in any studies. But here in Kurdistan we will record patient data manually in most of the hospitals. We need to make all hospitals to record the data by online and with one big system which includes all hospitals here.

Q2: Have you faced any problem while entering your data in hospitals?

A: recording data and data collection in a manual method will cause Slows Productivity, while someone records data in a manual way he/she wants more time than recording that data online. Also, another issue is budget, we buy a lot paper for writing the patient on it which is a very old way and bad way. Sometimes when someone needs to write down the data maybe the person does one wrong thing then he/she needs to left that paper and write on a new paper.

Q3: Have you ever tried one online website or application for recording data?

A: Yes, of course, we tried more than 1 website. But they were not as good as professional to record the data, sometimes we had an error which we could not fix it by ourselves, and having error with the system which made a problem for the recording.

Q4: What are the important things you want to have for recording patient data?

A: The main important thing for us, is the best website which can make the works easier for us. The website which includes best options and a lot of tasks inside, which all hospital staffs can get benefit from that website. Also, we need a website to store a lot of data and hold them for a long time.

Appendix B Software Requirement Specification (SRS)

1. Introduction

1.1 Purpose

The goal of this document is to provide a comprehensive overview of the Online Health Service System. It will describe the system's goal and features, as well as the system's interfaces, what the system will perform, the limitations that it must function under, and how the system will react to external stimuli. This paper is meant for both the system's stakeholders and developers

1.2 Scope

The software product is limited to procedures for managing patient information and performing analysis. Some suitable security architecture, which integrates various data security measures required to achieve the desired data security, will be investigated. Although the scope of this project is broad, it focuses on/emphasizes the maintenance of a secure and controlled online database records system for patients in the nursing and medical departments.

Every project must have objectives that must be met to solve the problem stated at the outset.

1.3 Definitions, Acronyms, and Abbreviation

Table B.1 Definition, Acronyms, and, Abbreviation

Acronym/Abbreviation/Terms	Definition
SRS	Software Requirement Specification
ERD	Entity Relationship Diagram
CPU	Central Processing Unit
VS	Visual Studio
UC	Use Case

1.4 References

Wheatcraft, L.S. (2010). 9.2.2 Everything you wanted to know about interfaces.

1.5 Overview

The introduction, which gives a summary of the complete Software Requirement Specification (SRS), will describe the first of the three components of this SRS. The second section provides a general overview of this system as well as a discussion of the specifications that will limit how the system is developed and used. The third component is a detailed need that provides a thorough description of the system specification.

2. Overall Description

The Online Health Service System contains 3 main modules. The modules of the Online Health Service System are shown below:

1. Manage Users (doctor, patient, employee, and, lab assistant).
2. Insert (consultation, surgery, and, diagnosis) by the doctor.
3. Insert lab test results by the lab assistant.

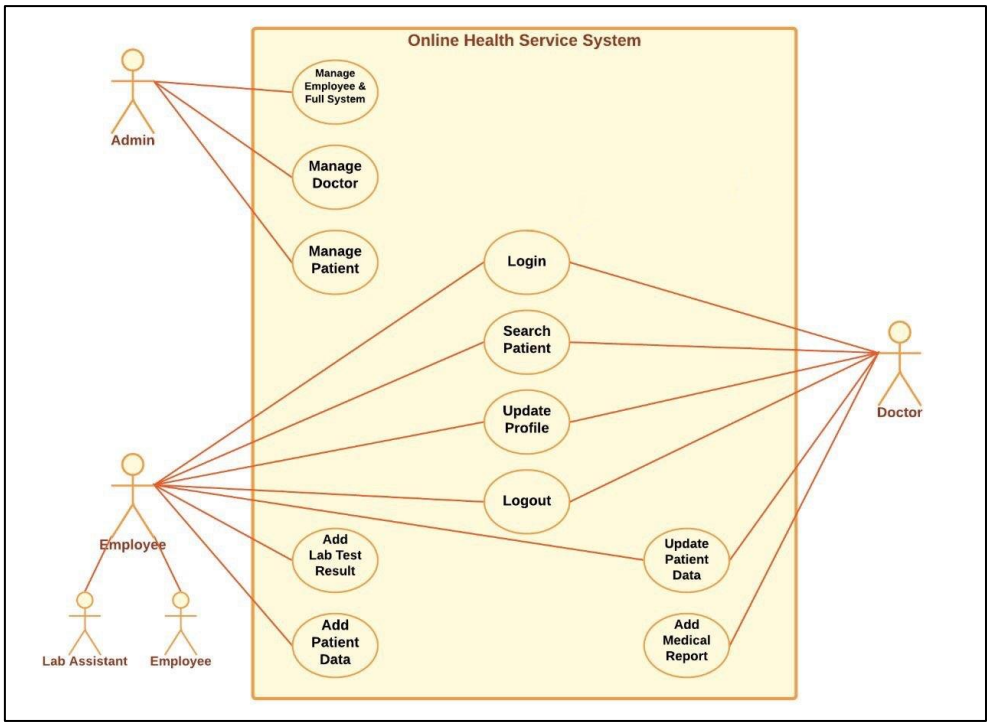

Figure B.1 Use Case Diagram of Online Health Service System

2.1 Product Perspective

The Online Health Service System will provide the best quality online health websites to make the work easier, flexible, and, easy to use. The system will help the hospital employees, doctors, and, staff to do their jobs in the best way. It helps the doctors to add any information to the patient profile without using any paper and is time-saving. The system will also help the patient to do not do anything while the patient does any tests, the lab assistant will add lab test results into the system in a proficient way. A web-based software application controls the system. As much while there is network connectivity, users can log in to this platform. To record the operation of Online Health Service, containing customer information, the system must communicate with database engine administration. This system is the best web application to store the data of the patient.

2.1.1 System Interface

The Online Health System's user interface is particularly welcoming for all of its users, who come in four different users (admin, doctor, employee, and, lab assistant). Each actor has a unique interface for their modules as well as unique functionalities. Although the UI is straightforward to look at, anyone may use it. The doctor has a lot of jobs to complete inside the system with the best quality features and design since they can search, add, edit, and reset passwords. There are several excellent duties and the best design for all users.

2.1.2 Hardware Interfaces

Processor: Intel(R) Core (TM) i7-7500U CPU @ 2.70GHz, 2.90 GHz
Random Access Memory: 8.00 GB
Hard Drive Capacity: 500 GB
Operating system architecture: 64-bit
Display: 1366 * 768
Input device: Mouse and keyboard
Output device: Printer

2.1.3 Software Interfaces

Operating System: Windows 10
Integrated Development Environment: Microsoft Visual Studio (VS)
Database Management System: XAMPP
Web Browser: Google Chrome
Visual Modelling & Design Tool: Lucid Chart

2.2 Product Functions

Table B.2 Data Description

No.	**Use Case**	**Description**
1.	Manage User	This use case allows the admin to register a new user and delete any user he/she wants.
2.	Insert Medical Report	This use case allows the doctors inside the system to add their medical reports and search for them.
3.	Insert Lab test Results	This use case allows the lab assistants inside the system to add their lab test results and search for them.

2.3 User Characteristics

Table B.3 User Description

No.	Actors	Description
1.	Admin	An admin can manage the whole system. Manage doctors, lab assistants, employees, and also patient data.
2.	Employee	An employee can add the patient data to the system, and edit the patient data also or delete the patient.
3.	Lab Assistant	A lab assistant can put any lab test result into the system.
4.	Doctor	A doctor can add a medical report for the patient into the system, and also can edit p.data.

2.4 Constraints

Here are all constraints of the Online Health Service System:

Scalability: the system will handle greater traffic, various user kinds, and an expansion.

Performance: all processes of the system need to be done in a very quick time.

Security; no one can see others' data.

Maintainability: Users who use the system often should find the interface to be simple.

Usability: Even users without technical knowledge should be able to easily comprehend and use the interface.

2.5 Assumption and Dependencies

Assumption**:**

- The Online Health Service System will start by logging in to the system the users. There the users can do their tasks which user has different tasks.
- Updating patient data by inserting information from the doctor and the lab assistant.
- The system will help the employee to add a new patient into the system.
- The system provides a database to store the whole data inside the system and keep track of the history.

Dependencies:

If the server's activities are interrupted by technical issues or if users don't have an internet connection, they won't be able to access the Online Health Service System. the admin must create a username and password for the users unless they cannot log in to the system.

3. Specific Requirements

3.1 System Features

3.1.1 UC001: Use Case <Login>

Use Case Name	Login
Use Case ID	UC001
Actors	1. Admin 2. Doctor 3. Employee 4. Lab Assistant
Description	The use case identifies how the user can log in to the system.
Pre-Condition	4. There is an internet connection. 5. Having username and password. 6. Fill out the form correctly.
opening	1. Opening the system. 2. Displaying Login Page 3. Entering username & password. 4. Clicking Login button. 5. Validating user's verifications. 6. Successfully Login & go to the dashboard page. 7. End of the use case.
Exception	Failing verification, error message for invalid username or password. Then displaying a message to retry.
Post-Condition	1. Successfully logged into the system. 2. Go to the dashboard page.

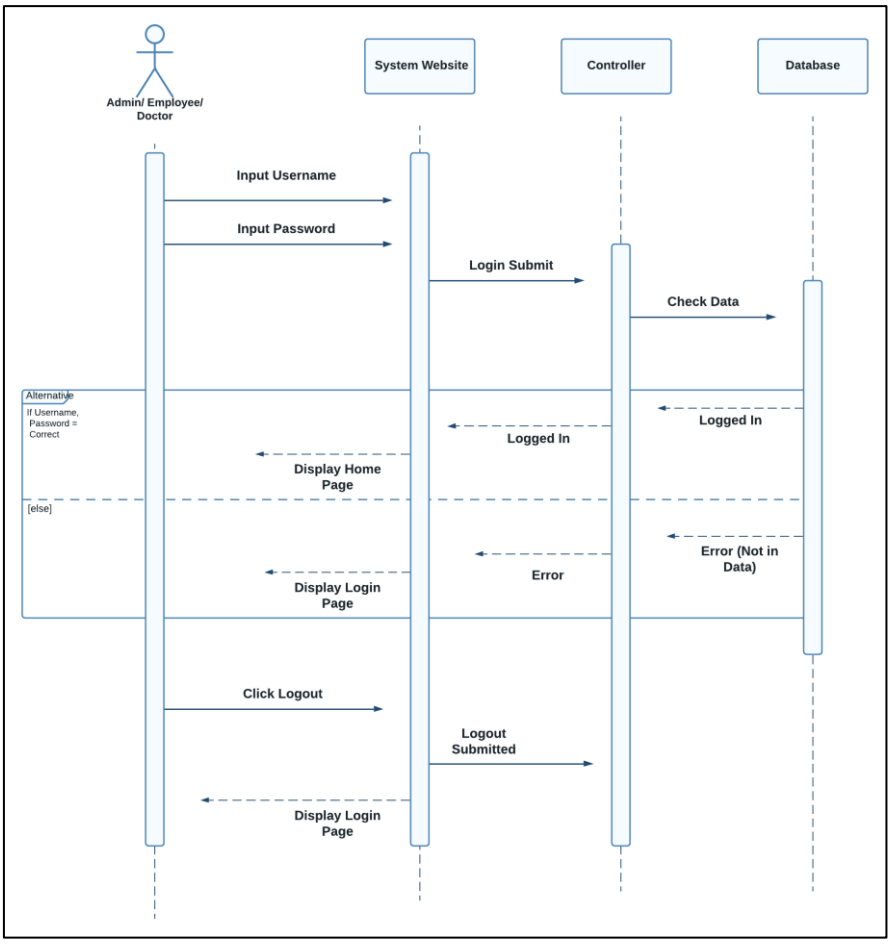

Figure B.2 System Sequence Diagram of Login Page

3.1.2 UC002: Manage Use Case Description UC002

Use Case Name	Manage User
Use Case ID	UC002
Actors	Admin
Description	The use case identifies how the admin can manage users in the system.
Pre-Condition	1. There is an internet connection. 2. Having username and password. 3. Fill out the form correctly.
Normal Flow	1. The admin will manage users by adding new users to the system and removing users inside the system. 2. When the admin wants to register a new user, he/she performs alternative flow 1. 3. When the admin wants to remove a user, he/she performs an alternative flow 2.
Alternative	1. Register New User - Displaying Users box - Choosing User - Displaying the form of register - Click on the Save button - Successfully registered 2. Remove Existing User - Displaying Users box - Choosing User - Displaying delete box - Click on the delete button - Successfully deleted
Exception	Fail, the error message for invalid username to delete. Then displaying a message to retry.
Post-Condition	Register and Delete users.

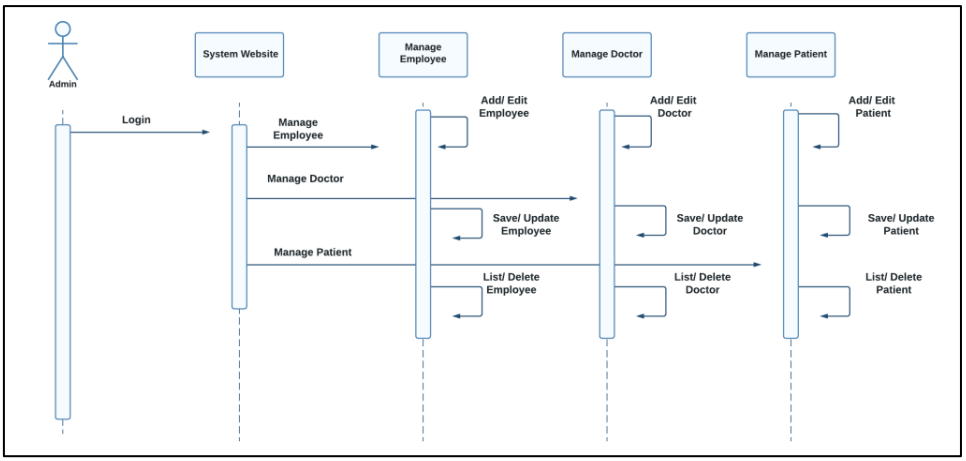

Figure B.3 Sequence Diagram of Manage Use

3.1.3 **UC003:** Insert Medical Report Use Case Description UC003

Use Case Name	Insert Medical Report
Use Case ID	UC003
Actors	Doctor
Description	The use case identifies how the doctor can add a medical report to the patient data in the system.
Pre-Condition	1. There is an internet connection. 2. Having username and password. 3. Fill out the form correctly. 4. Registered patient in the system. 1)
Normal Flow	1. The doctor will add 3 types of medical reports for the patient. 2. When the doctor wants to add any medical report, he/she performs alternative flow 1. 3. When the doctor wants to search for a patient, he/she performs an alternative flow 2.
Alternative	1. Add Medical Report - Displaying the box - Choosing the type - Displaying the form of medical items - Click on the Save button - Successfully added 2. Search for Patient - Displaying search box - Writing patient ID - Click on the search button - Show patient data
Exception	Fail, the error message for invalid patient ID to search. Then displaying a message to retry.
Post-Condition	Add and Search users.

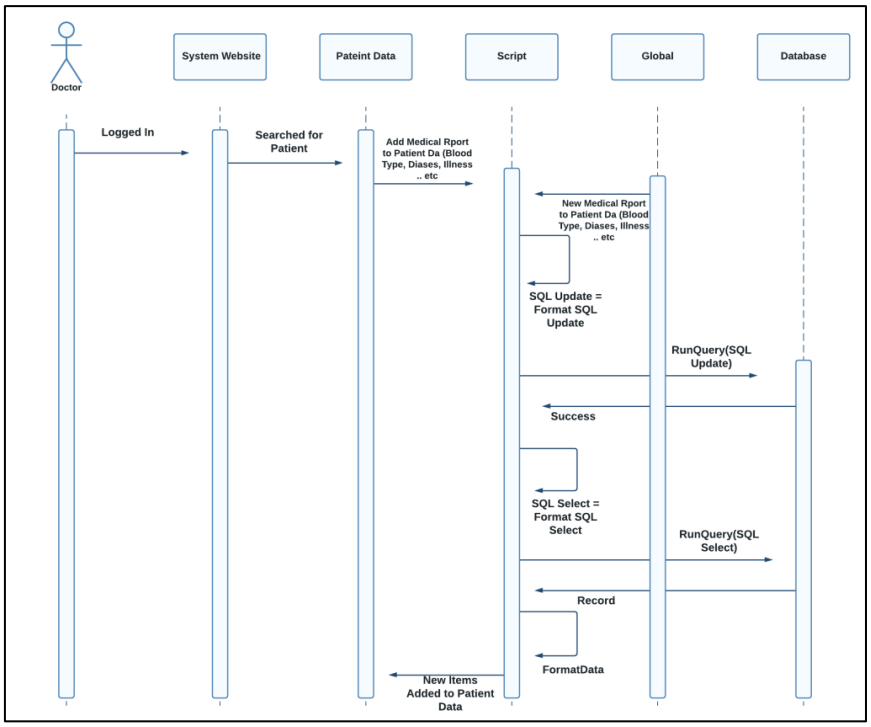

Figure B.4 Sequence Diagram of Insert Medical Report

3.1.4 **UC004:** Insert Lab Test Results Use Case Description UC004

Use Case Name	Insert Lab Test Results
Use Case ID	UC004
Actors	Lab Assistant
Description	The use case identifies how the lab assistant can add the lab test results to the patient data in the system.
Pre-Condition	5. There is an internet connection. 6. Having username and password. 7. Fill out the form correctly. 8. Registered patient in the system. y)
Normal Flow	2. The lab assistant will add the lab test results for the patient. 3. When the lab assistant wants to add any lab test results, he/she performs alternative flow 1. 4. When the lab assistant wants to search for a patient, he/she performs an alternative flow 2.
Alternative	2. Add Lab Test Result - Displaying the box - Choosing the lab test result - Displaying the form of lab test result - Click on the Save button - Successfully added 2. Search for Patient - Displaying search box - Writing patient ID - Click on the search button - Show patient data
Exception	Fail, the error message for invalid patient ID to search. Then displaying a message to retry.
Post-Condition	Add and Search users.

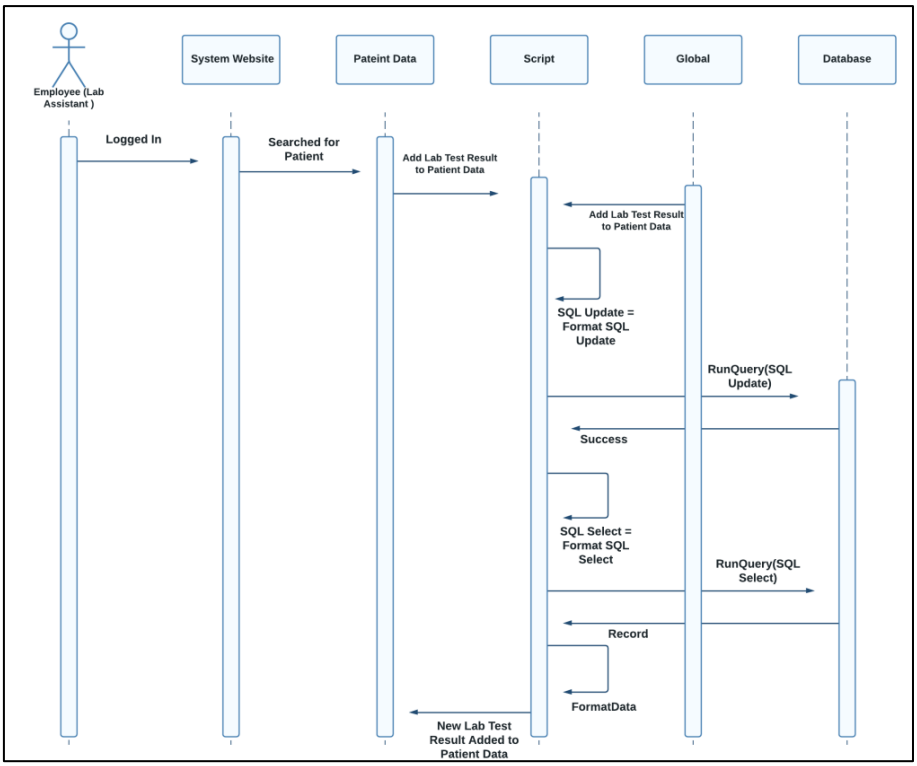

Figure B.5 Sequence Diagram of Insert Lab Test Results

3.2 Performance Requirements

Performance: all processes of the system need to be done in a very quick time. Security; no one can see others' data.

3.3 Other Requirements

Maintainability: Users who use the system often should find the interface to be simple.

Usability: Even users without technical knowledge should be able to easily comprehend and use the interface

Appendix C Software Testing Document (STD)

1. Introduction

The section will cover the Online Health Service System's implementation and testing phases, as well as examples of primary feature code snippets. Once a comprehensive need and system objective have been acquired, both the development and testing processes should be completed. Installation of essential software, coding, black box, and white box testing are all part of this step.

1.1 Purpose

This STD provides the approach that will be used to test this website, the tools that will be used, the testing environment, the testing constraints, and the timetable of testing operations. It will show the 3 tests (Black Box Testing, White Box Testing, and, Acceptance Testing). The classes will have unit testing also. There are the testers who did the test for the project and their results.

1.2 Scope

The software product is met by the university staff and students.

1.3 Definition, Acronyms, and, Abbreviation

Table C.1 Definition, Acronyms, and, Abbreviation Table

Acronym/Abbreviation/Terms		**Definition**
STD		Software Testing Documentation
UC		Use Case

1.4 System Overview

We have 3 main tests which are: Black Box Testing, White Box Testing, and, Acceptance Testing.

2. Testing

2.1 Black box Testing

In the black-box testing, the tester is unaware of how the software system operates on the inside. A high degree of testing called the black box focuses on how the software behaves. It entails testing from the viewpoint of the user or the outside world. Almost all software testing levels, including unit, integration, system, and acceptance, can use black-box testing. The table 5.1 shows the black box testing for login page.

Table C.2 Black Box Testing of Login Page Table

Input	**Expected Result**	**Actual Result**	**Status**
Valid (username & password), after that click on the (Login) button	Successful login and go to the dashboard page (admin, doctor, employee, and, lab assistant) dashboard.	Successful login and go to the dashboard page (admin, doctor, employee, and, lab assistant) dashboard.	Pass
Invalid (username & password), after that click on the (Login) button	Unsuccessful login then error message (password do not match! Or user not found!).	Unsuccessful login then error message (password do not match! Or user not found!)	Pass
Missing a necessary field	System message (Fill in all the fields).	System message (Fill in all the fields).	Pass

2.2 White box Testing

Is a testing method that examines the system's internal operation. This approach bases testing on the extent to which code statements, branches, pathways, or circumstances are covered. Low-level testing is referred to as white-box testing. It is also known as code base testing, transparent box, clear box, and glass box. The white-box testing approach presupposes that a unit's or program's logic flow is known. The tables 5.2 and 5.3 show the white box testing for login page.

Table C.3 White Box Testing of Login Page r Table

Use Case Name	Login
Use Case ID	UC001
Description	The use case identifies how the user can log in to the system.
Pre-Condition	7. There is an internet connection. 8. Having username and password. 9. Fill out the form correctly.
Date	15 Apr 2022
Tester	Nwa Hameed

Table C.4 White Box Testing of Login Page Table

Input	Expected Output	Actual Output
Valid username & password	Go to the dashboard page	Go to the dashboard page
Invalid username & password	Error message.	Error message.

2.3 User Testing

Real people test a product, service, website, or app's functionality during user testing. The group conducting the tests and offering the review will be made up of the target audience for the company during the user testing procedure. The website's target audience will test it, identify any shortcomings, and suggest any potential areas for improvement before reporting their findings to the company that developed the website or app. User testing has several advantages, including the possibility to improve the site's design and the option to gather input directly from a professional point of view. For the user testing, by asking some staff of the university and students, the result came up. The tables 5.4 and 5.5 shows the User Acceptance for Online Health Service System.

Table C.5 User Acceptance Testing of Online Health Service System Table

Tester: Sahand Azad		
Date: 20 June 2022		
Use Case: Add Lab Test Results		
Instruction	**Expected Result**	**Result**
4. Logged in to the system. 5. Filling up information about the lab test result. 6. Click on Save.	5. Successfully logged into the system by the lab assistant. 6. Inserted lab test result. 7. Successful message showed. 8. Updating lab test results.	pass

Table C.6 User Acceptance Testing of Online Health Service System Table

Tester: Sahand Azad		
Date: 20 June 2022		
Use Case: Add User		
Instruction	**Expected Result**	**Result**
4. Logged in to the system. 5. Filling up information about adding a doctor. 6. Click on Save.	5. Successfully logged into the system by the admin. 6. Inserted doctor information. 7. Successful message showed. 8. Updating doctor list.	pass