

School of Computing and Mathematics PRCO303SL

Final Stage Computing Project

BSc (Hons) Software Engineering

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The Hospital Management System 2020/2021

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Introduction

I am proposing to develop a Hospital Management System to manage patient appointments, lab tests, prescriptions, lab reports and medical reports history, during this pandemic situation. This system includes a web application and a mobile application. The mobile application is mainly for the patients only whereas the web application will be used by patients, doctors, staff members as well as the nurses. In a world where a deadly pandemic is going on having the ability to access everything online would be very helpful. And health sector is one of those areas which is very important considering the situation. Therefore, this system is aimed at eliminating the lack of an online channeling system in Sri Lankan hospitals, especially in the government sector. Here, this hospital management system clients are doctors, nurses, staff, patients, and admin. Using this system, they hope to make their operations more convenient and reduce unnecessary paperwork. Due to the current situation (COVID-19) of the country, it is a challenging task to channel doctors manually. As a solution, a web application (website) and a mobile application are developed to manage the day-to-day medical center activities. This system wishes to replace most of the current manual processes. It will support all the types of its users (doctor, nurse, staff, patient or customer, admin), making their operations more convenient and to reduce the paper works. The Hospital Management System project involves patient identification, storing their information in the system, and even computerized pharmacy and laboratory billing. The app has the ability to assign each patient a unique ID and automatically store the information of each patient and the staff. It includes a search facility to recognize each room's current status. Users will check for a doctor's availability and a patient's information using the id. A username and password can be used to access the Hospital Management System. Either an administrator or a receptionist can access it. They can only add data to the database. The data can easily be retrieved. The GUI(Graphical User Interface) is really easy-to-use. The data is well secured for personal use and makes the processing of data very rapid. The aim of the HOSPITAL MANAGEMENT SYSTEM project is to computerize Hospital Front Office Management to develop user-friendly, quick, fast, and cost-effective software. A form is a major part of the Visual Basic application, allowing the user to enter and display the outcome of the data. A control is an object we use to allow or improve user interaction with an application using a form (web or mobile). Therefore, a Visual Simple application is a combination of objects such as forms and controls, procedures that can respond to events and other procedures for general purposes. The hospital management system is a computer system that helps to efficiently organize health care-related information and helps health care providers complete their work. Healthcare management begins in today's world from the hands of patients via their cell phones and facilitates the patient's needs. It is possible to use the Hospital Management System by entering the appropriate username and password. Either an administrator or a receptionist can access it. Data may only be added to the database by the appropriate user. The data can easily be retrieved. The GUI(Graphical User Interface) is really easy-to-use. The data is well protected and the processing of information is very quick, precise and important. Hospital administration and medical activities computer application framework for knowledge management and online activity, the English abbreviation HIS. HIS is an information management system that contains all of

the hospital's procedures and facilities. Factors such as the level of the medical theory, the level of the medical business existence, the level of the technological realization means, and the level of the system operation must also be considered in the case of limited capital expenditure, in order to achieve a good hospital information organization impact, in addition to technical factors in the project establishment process. As in many other countries, health care in Bangladesh is facing a growing demand for medical treatments and facilities, due to factors such as a 'growing' population and higher individual quality of life standards. This thesis focuses on the implementation of a computer-aided hospital management system and on hospital information systems in particular (IS). In terms of effect, coordination, and strengthening, an important question is how operational, managerial and IT innovations take place in hospitals, and how these developments affect each other. By transforming to 'functional specialization,' hospitals will adapt to these pressures. The company aims to minimize costs and increase the quality of specialty medical services in this way. The switch to 'network management' is a more recent response from hospitals. A networked hospital is seeking to strengthen its 'input-output' or 'business' relationships with doctors in primary care. In our research, individuals in hospital management have demonstrated that technology can have a huge effect on hospital operations and services. Health care costs are also projected to rely substantially on advanced patient treatment and diagnosis operations. The use of IT in diagnostics and treatment processes would lead to the growth of clinical, hospital and health care process networks. Until recently, the focus of IT in health care was on workers and finance in Bangladesh. We centered on the treatment processes in our suggested approach, including electronic medical files and patient quality management. The older information systems are expected to become more integrated with the modern, primary IT process-oriented applications. Hospital management systems allow us to simplify and digitize all of the institution's processes that help enhance customer care, minimize process costs, streamline the search for medical records, bills, patients, physicians, etc., while incorporating a database of each module. A hospital management system is a web or mobile system designed for businesses who want their processes to be handled, incorporating modules for each of the areas needed. It is necessary to note that the data is monitored by qualified workers. Lots of critical decisions are the key features of a well-tuned online hospital management system. These choices need to be made quickly and in the most thorough way. Without having an integrated software pattern, the successful execution of decisions is becoming increasingly difficult. The automated hospital management program takes care of various parts, from appointment to discharge in IPD, such as birth reports to death reports. All areas of a hospital can be handled by a Web-based Hospital Management System. The Hospital Management System (HMS) is an interactive software that manages clinic workflows in various directions. It regulates the smooth performance of healthcare, along with administrative, medical, legal and financial regulation. That is a pillar of the healthcare facility's efficient operation. Management of hospitals is based on distributed architecture. This includes the web services receiving the request from the web-based application and the service processing the request and sending back the response to the request. Web services conduct database operations, such as adding, removing and upgrading patient records, physicians, etc. In order to control all hospital operations, E-Hospital Systems is a flexible,

comprehensive, and integrated hospital management system. E-ideal Hospital's user base is nursing centers, multi-specialty hospitals, and medical practitioners. Multi-Location functionality facilitates the interconnection of your hospitals, satellite clinics, and medical stores. Text, IM(International Management), and email notifications are sent through the flexible warning app and patient care quality is enhanced. Hospitals are key institutions, and as good health is vital to a happy community, efficient service delivery in the hospital is important. There is a need for a framework that will enable hospital management to make efficient and effective decisions as a result of this. The hospital management system is an integrated web or cloud server platform that simplifies a hospital's management. A paperless complex management mechanism can be implemented in the hospital through this program. It incorporates all data related to patients, doctors, staff, authoritative hospital, functional information. The device helps you note the finger ends with revenue stream, patient information and alternate primary indicators. Electronic Health Record allows Patient Information to be exchanged online with designated parts, so medical personnel can run for a safe result. To control all aspects of hospital operations, we provide a hospital management system. The best health care pharmacy, laboratory, mobile application, appointment system, secure electronic communications, doctor portal, patient and family portals, medical electronic request, accounting, HR(Human Resources)/payroll are associated with this customizable hospital management program. The text or email is sent by this automatic warning system, which increases the quality of patient care. You will enjoy getting my programming task services at once. I hope you'll enjoy the services you give me. I operated with more than 1500 customers. Hospitals play a significant role in a human's life. On earth, there is no human being who will not suffer any form of illness. Hospital Management System is a hospital web program that handles physicians and patients. We are using PHP and MySQL databases for this project. As science and engineering advanced, medicine became an integral part of the analysis. Medical science has increasingly become an entirely new field of science. As of today, the health sector is composed of research and development institutions and medical institutions. Colleges in Pharmacy. The Government of India still intends to provide medical services through the establishment of a hospital. Compared to hospitals in European countries where computers have been put in to assist hospital staff in their work, the basic work of different hospitals in India is still on paper. In the US, hospitals and other healthcare facilities try to respond promptly to the care needs of patients. However, several records in healthcare networks include the hospital management processes leading to treatment provision and billing. In the patient care structure, the workforce, patients, doctors, dispensary management system, labs, stakeholders, and payers are all involved. Drawbacks will slow down the entire network in either of these sections of a clinical management system. For in-patients, hospital process management is extremely tedious. The patient management system may lack efficacy if there is no hospital management strategy in place. This is where the method of hospital management (HMS) is useful. HMS is nothing but an integrated hospital management system that allows US healthcare organizations to handle the workforce smoothly and achieve better healthcare analytics with revenue control. It is a clinic management system that offers a set of technology tools for hospital management that make it easier to manage hospital networks. By introducing a clinic management

framework, hospital networks will provide an enhanced patient management system and hospital employee management. Using health management technologies, medical lab management is streamlined. The workers only need to enter patient information into the framework of lab management. The hospital information management system is electronic, and the system tracks all medications. In this way, a clinic management system, along with healthcare systems, such as hospital network management, hospital patient management, and hospital process management, assists with medical lab management. The system generates a highly-efficient process automatically and makes it quick. Thus, enabling hospitals, in addition to skilled medical services, to offer quality service. Hospitals are a vital part of our lives, supplying people with different illnesses with the best medical care, which could be due to changes in climatic conditions, increased workload, mental distress stress, etc. It is essential for the hospitals to preserve track of its day-to-day actions & records of its patients, doctors, nurses, and other staff personals that keep the hospital running smoothly & successfully. The software will look after patients, patients with OPD, information, database treatments, status disease, and Admin, Doctor, Nurse, Staff and Patient or Consumer billings system. Customer or patient history records of payroll and attendance or medical notes may be preserved. Inside the web or mobile application, messages can be sent. The patient can submit an appointment request online. It is possible to maintain an updated inventory record of drugs. Our program provides each patient with a unique ID and automatically stores the information of each patient and the staff. It includes a search facility to recognize each room's current status. Users will check for a doctor's availability and a patient's information using the id. A username and password can be used to access the Hospital Management System. AIMS is the only software system in India available on the same platform and framework that has a hospital management system, pacs, record management system, video imaging system, mobile apps, computer integration and website integration. Multiple applications from various vendors are not needed and there are no integration nightmares. HMS thoroughly automates and incorporates the entire catering phase of the healthcare provider into specific clinical, administrative, support, finance, supply chain and billing functions. The Ace e-Health Suite is fully modular. Customization is simple. So, you can pick your favorite modules and add as many as you like in the future. It is also possible to easily add any third party or home grown modules. Our HMS allows you to transform and excel in patient care based on value that improves health and results at a lower cost. The framework that has been introduced is clinic management. In the care of hospitals. The management of the hospital has been split into a few Registration process, ward, blood bank, pharmacy, EMR (electronic medical report), OPD (Out Patient Department), radiology, ICU, rehabilitation and management of personnel. The hospital's use of the electronic system is still new and not very common. Just two (2) such hospitals currently exist, namely Selayang Hospital and Putrajaya Hospital. The third will be Hospital Sultan Ismail, when completed and fully operational by early next year. Only a certain module was used by other hospitals in a certain section of the system management. Many hospitals have used the use of paper to log all the medical reports Concerning any patient. If the doctor wants the data, the staff must find the details. And send it to the doctor. This approach only takes a couple of times to scan for medical records of all patient treatments. The data must be entered by the user or doctor using a clearly specified work flow. All the

information about the patient has been collected from the other department instance from the blood bank, ICU, wards, radiology and other department in the EMR(Electronic Medical Reports) system. It also provides the specifics of medications that the patient has taken. This information is really helpful for doctors or consumers to refer all the information to Details about the patient's past. There is a search section of the EMR framework that helps the user locate the particular patient and then they can access all the patient information. The EMR framework must also be equipped with a manageable database that can easily record the database. Online technology has become very relevant nowadays because of sophisticated terminology. It describes both design and coding approaches, so we use simple as well as advanced web techniques here. Its significance is likely to grow rapidly as all technologies shift towards an API orientation. The scope of the project is to incorporate multiple apps into one web application. It offers elegant management of the databases of doctors and patients. The main aim of this project is to enable patient database access to

To all authorized physicians so that they can review the medical information of the patient. Subtasks of these applications are the nearest search for hospitals, blood banks, physicians, specialist or non-specialized doctors so that users can deal with most medical facilities at one location. Hospital managers have a wide variety of information needs, from information needs for quality, finance and access to educational, resource and decision support needs. In this environment, management engagement represents a major imposition on hospital managers or administrators in terms of the time needed to train and use systems and the incorporation of knowledge given to them. For instance, think of the managers in a key hospital area (e.g. Unit for Intensive Care (ICU)). Such a position needs full or partial responsibility to be taken for the procurement decisions of the clinical and management system and the consequences of such decisions. For the hospital information technology department alone, these are not decisions in the real world. The value of such a model is that, in the sense of an environment well defined by the model, the knowledge and decision support needs (in relation to the acquisition, implementation and maintenance of appropriate management systems) of hospital managers referred to earlier may be better understood and supported. Importantly, the recent work on technical ecosystems does not have much depth in linking the core lessons of ecological science to the space of the information system. Management of health information is the study of the compilation, preservation and security of the quality of patient health data. This data may be either paper-based, a mixture of paper and digital (hybrid) or a completely Electronic Health Record(EHR), as is more often the case. The role of a specialist in Health Information Management (HIM) is more relevant than you can initially think. They are important for ensuring that your healthcare experience goes smoothly from your doctor's and patient's appointments or hospital visit to your insurance claim. Health institutions are often well-organized, adopting rigid and dynamic procedures, much like other organizations. For proper management of their operations, these institutions need effective and strong manpower. Their primary aim is to give patients quality healthcare in a proper and cost-effective manner. The country's health sector has seen rapid growth in recent years, which in turn has created a need to develop an application that will solve most of the problems discussed in this research work. For the medical sector, this research work will be

of vital importance as it will be designed to solve most of the problems that delay some of the administrative work. Doctors and other senior hospital personnel will be able to concentrate their valuable time on simple clerical duties in other clinical operations. It also happens that accounting is really difficult and pathetic. All such complexities can be eliminated by using the program as it allows you to accurately retrieve your details. His framework is aimed at promoting decision-making in order to increase the quality and level of patient management and medical work at the hospital. In the case of limited capital expenditure, factors such as the level of the medical concept, the level of the medical business existence, the level of the technological realization means, and the level of the device feature must also be considered in order to achieve a good hospital knowledge impact, in addition to technical factors in the project establishment process.

In this block, the emphasis is not on improving the Hospital Management Framework, but on providing practical-oriented information on how to work with the resources available in Visual Basic to build the tables, forms, reports and queries that are the basic elements of any application. In its demands and goals, each hospital is special. The HOSPITAL, hence The Management Method (HMS) includes many activities in hospitals. Also, it enables To meet their particular needs, hospitals can choose from the various modules. When a hospital's resources are limited, it is crucial for managers to know how the costs are generated and how they relate to the therapeutic operation. Economic methods and analysis offer multiple choices for the most efficient way of designing successful strategies for operating the available resources. On the other hand, maintaining the relevant standard of quality of medical services is critical. In the field of health economics, the evaluation of the actions or wellbeing of people, businesses and markets related to the use of pharmaceutical goods, medical services and programs is carried out. Economics indicates that these various methods offer different incentives, with consequences for the effective and fair distribution of health services, for decision-making about economic actions. A research may be done from the viewpoint of patients, doctors, wards, hospitals, health insurance funds, government bodies, etc., based on these methods. This variety of viewpoints makes it very difficult to compare various studies, because depending on the time frame, the chosen model, the type of costs used, etc., different authors address the problems differently. The key concern that was answered was whether health services were affected by the strategy of reducing healthcare costs. Traditionally, the Electronic Medical Record (EMR) of a patient, which is their history of medical records, has been kept and 'held' by the facility that delivered the care, examinations, diagnosis, treatments etc. An successful EMS lets you gain control in a coordinated way of the medical, legal, and administrative aspects of hospital operations. The OPD Management Platform provides useful features to control asset management, case management, management of patient location/monitoring, management of disease/surgery/discharge, appointment/admission/bed/prescription management of patient flow management to help healthcare centers provide patient-centered services. Most generally, diabetes mellitus and blood pressure are Chronic diseases have spread and are particularly prevalent in elderly people. The Android operating system is an open source software framework that allows users to build several different types of apps, and many leading developers of phones have implemented Android operating systems for their smart phones, such as Huawei nova 3i or Huawei Y7 pro 2018. In order to build the application, test it on an emulator and finally run the application on a phone, Android offers the Software Development Kit (SDK). A hospital management system based on mobile phone will be an excellent platform for designing an application and enabling patients to improve their experience. Android operating system is therefore chosen to implement the hospital management system. My Care is planned, developed, introduced and validated in this project, a smart phone-based patient health care management system, an effective operation that can support patients and health professionals in many ways.

Project Objectives

- 1. To analyze existing physical service processes and procedures and switch most of them to computerize processes and procedures
- 2. To analyze user requirements for the new Hospital Management System in line with the new processes and procedures
- 3. To analyze potential development technologies and deployment solutions
- 4. To implement the new Hospital Information system in line with new processes and procedures.
- 5. To provide interoperability between the new Hospital Management System, and the existing manual system
- 6. To provide efficient service to users (doctor, nurse, staff, patient, admin).
- 7. To reduce unnecessary paper works.
- 8. The test records of patients performed in the pathology laboratory of the hospital should be able to manage this.
- 9. Whenever a purchase is made, the inventory should be updated automatically. When the stock level of such drugs exceeds the minimum level, the device should be able to ring an alarm (Reorder Limit). A Computer Assisted Hospital Management System, an integrated Hospital Information System that addresses all the key functional areas of modern multi-specialty hospitals, is the general goal.
- 10. Keep the documents-For historical reasons, it would be easier for management to keep the patients' records.
- 11. Appointment- The visits would be simpler for both the doctors and the patients. It's just about two clicks away.
- 12. After going through this block you should be able to: Brief the very basic needs for an Information System in a Hospital; Use the tools needed to develop tables, forms, reports

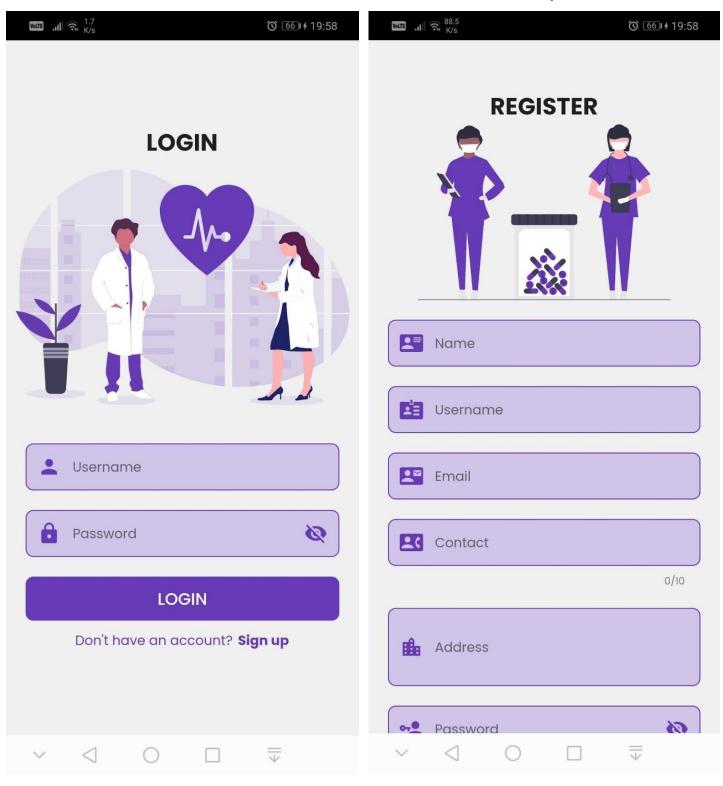
and queries; Work with various tools to create a sample system, and Identify the problems encountered during the implementation of an Information System.

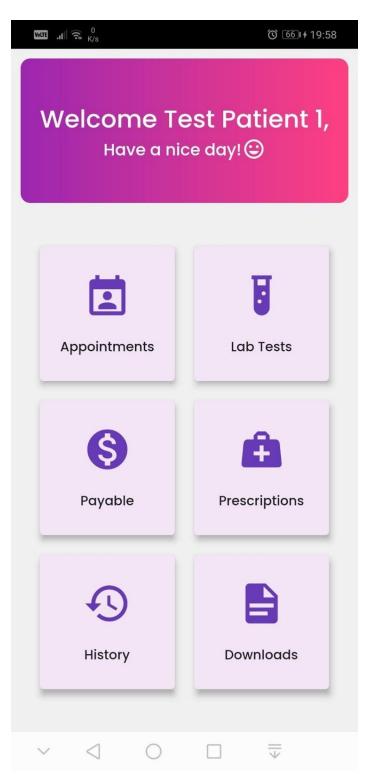
The purpose of this project is to develop hospital management software with structured query language (SQL Server as a database) based on XAMPP or Wamp application as the back-end database hospital from a file-based system to a computer database system. This software would allow the organization to be more effective in managing their patients' everyday activities and registration. The aim of this project is to provide full documentation of the specifications, design and implementation of the program. The user interface, hardware and software and various models that could be used to build software like this are also described. Hospitals are an important part of our lives, providing people with different illnesses with the best medical services, which could be due to changes in climatic conditions, increased workload, etc. Hospitals need to keep track of their everyday activities and records of their patients, physicians, nurses, ward boys and other personnel staff who keep the hospital running efficiently and effectively. The main objective of our project is to have up to 90 percent of a paperless hospital. It also aims to provide efficient automation of existing systems at a low cost. At any stage of user-machine interaction, the system also provides excellent data protection and also provides robust & secure storage and backup facilities.

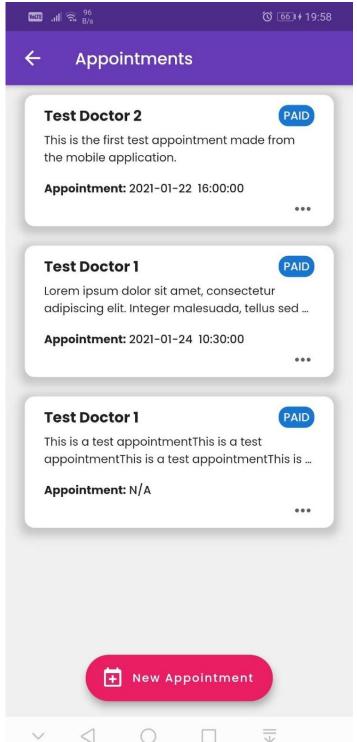
Tasks Undertaken and Outcomes

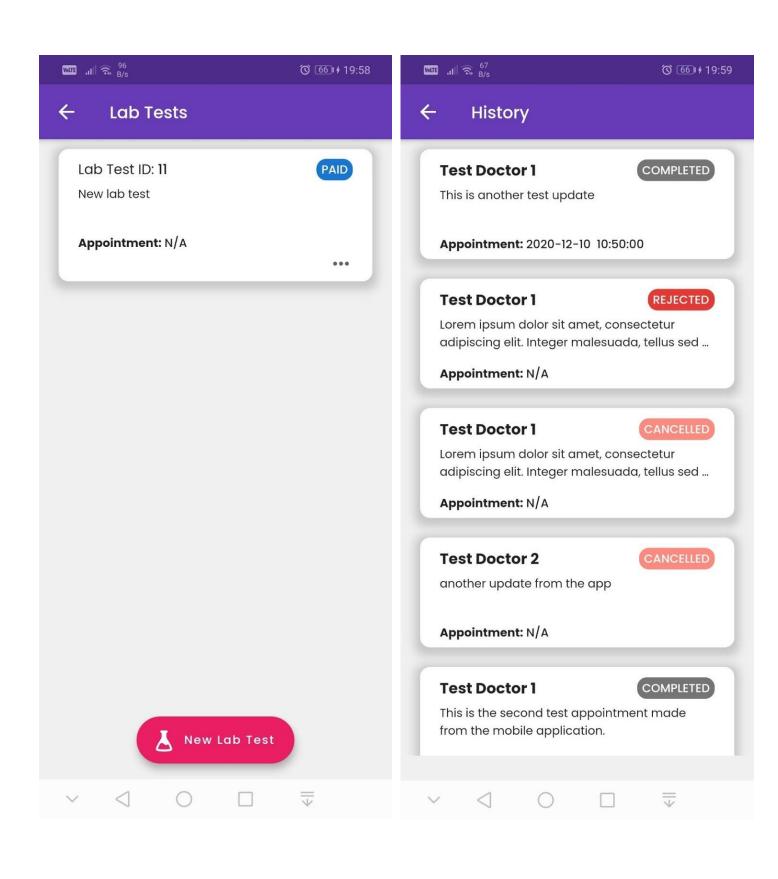
As of right now I have finished the entire web application and have implemented all of its functionalities correctly. All the records are being stored in the database correctly. More than a decade ago, role change was identified by the World Health Organization (WHO), As "a rational re-distribution of tasks among teams of health workers". "The WHO, however, goes on to describe this, saying that "specific duties are transferred from highly qualified health workers to health workers with less qualifications, where possible, in order to make more effective use of the HRH [human resources for health] accessible. It implies that the most suitable person is either the one who is already doing it or one with less abilities and, again inferred, who is less costly.

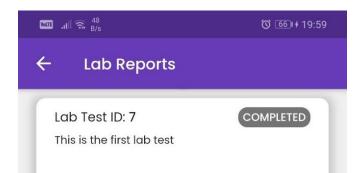
Products Produced and Product Quality

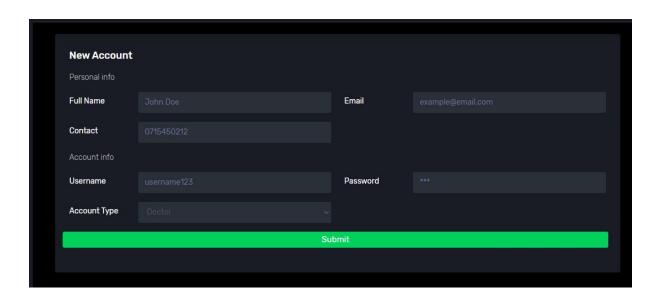


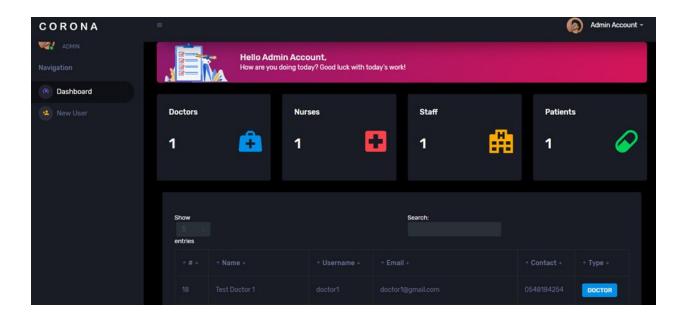


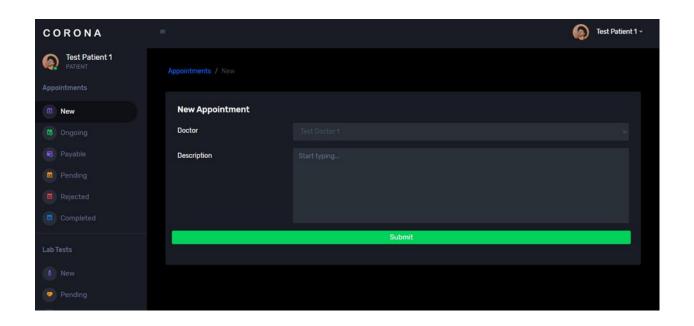


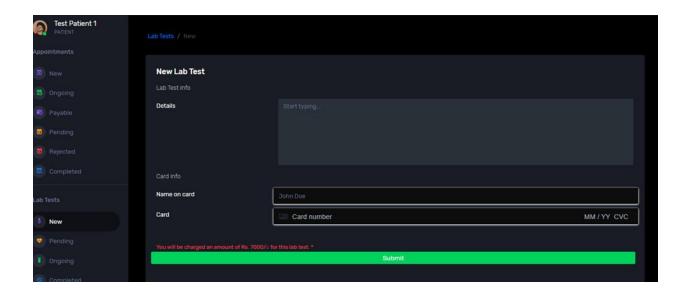


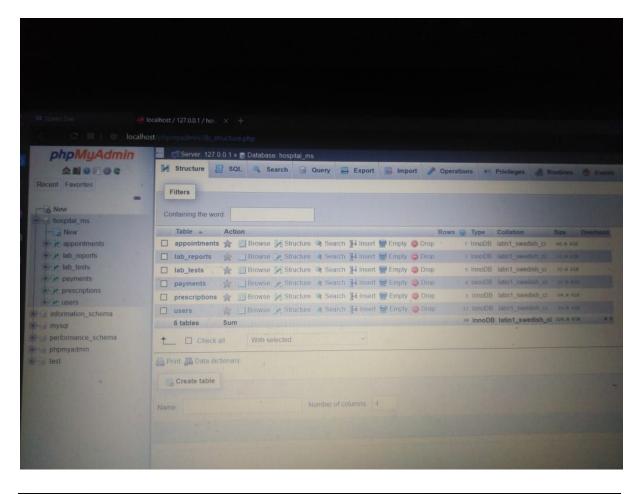


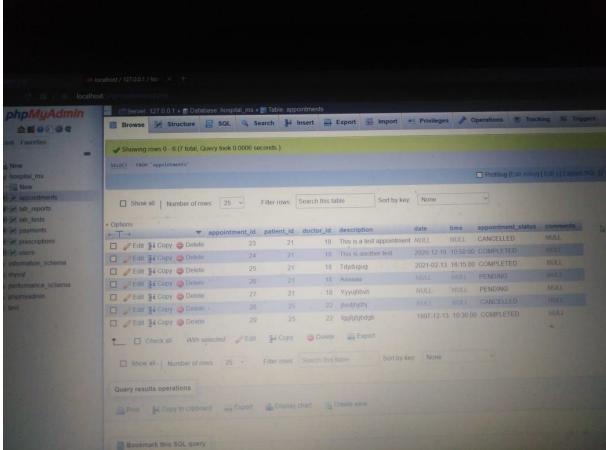


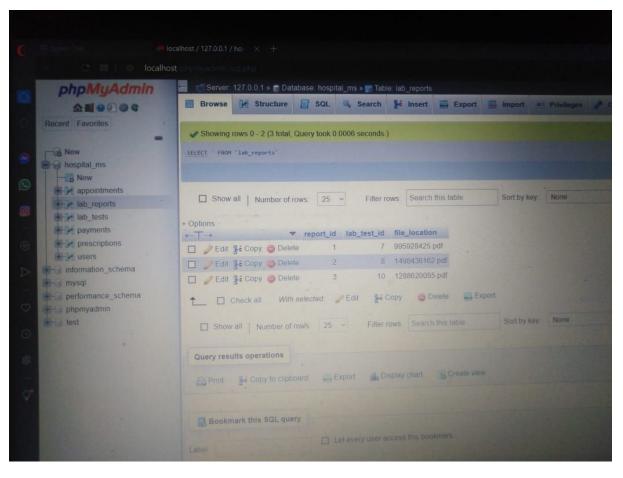


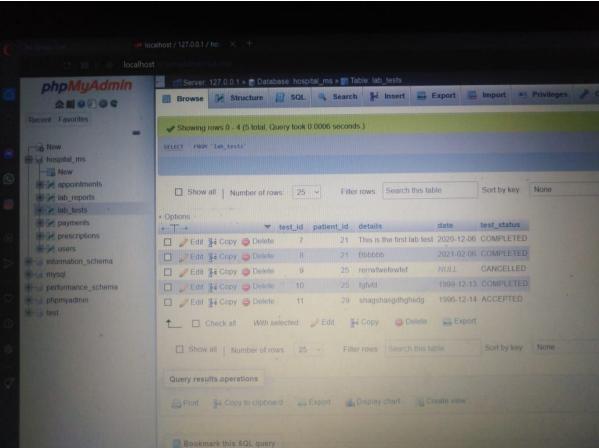


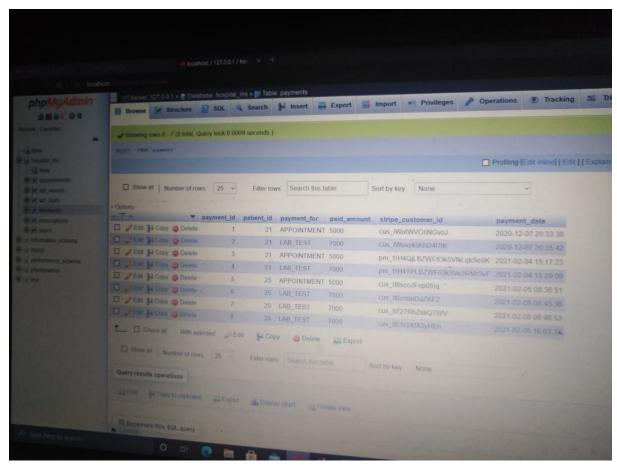


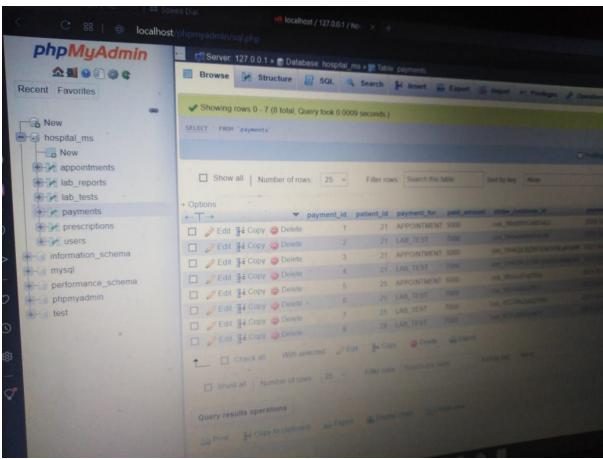


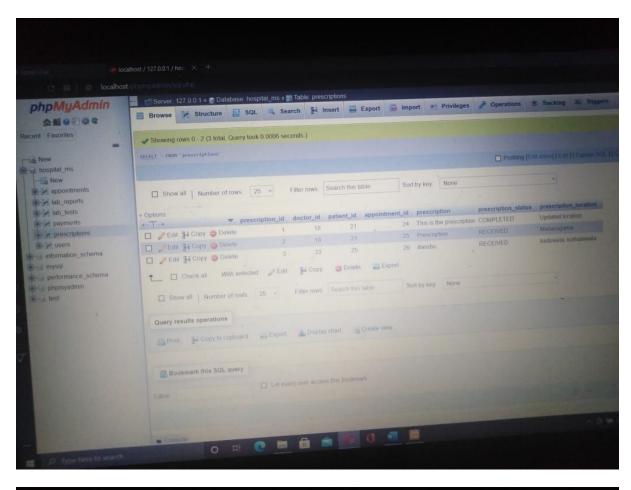


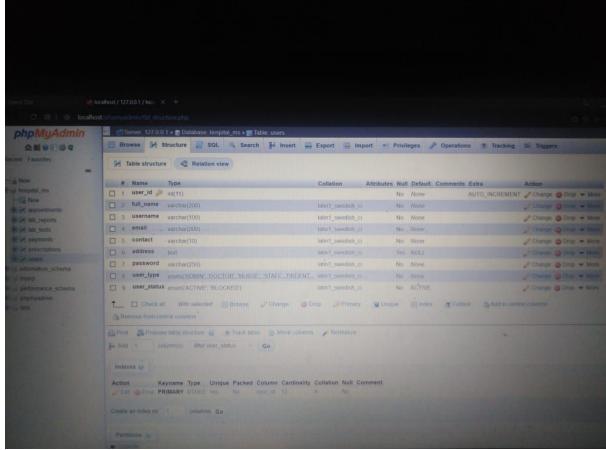












These are screenshots from the mobile application and the web application. Simplicity was the main focus when developing it and it has been achieved. The mobile application and the web application have also met all other quality requirements that I needed.

Risks that have Materialized

This is my final year project second app(mobile app) done in Flutter(Android Studio or VS Code) and since this is somewhat of a new technology, I wasn't entirely familiar with it. Therefore, I had to go through quite a lot of tutorials on YouTube as well as LinkedIn. And I also read the documentation provided by the Flutter team.

The next risk was the lack of a powerful laptop. I tried to test the mobile application in a virtual device but my laptop could not power it up. Therefore, I had to use my real device to test the application.

The tutorials, forums and blog posts took a bit more time than I initially thought. However, I sped up my workflow and managed to get the application done ahead of the deadline.

Using PHP and MySQL was also a challenge. However, I was able to use the previously developed web application as a reference.

The payment gateway was also a challenge. However, I managed to use the same payment gateway for both applications and they are in sync. Stripe has provided a very detailed documentation on how to integrate the gateway into Flutter application.

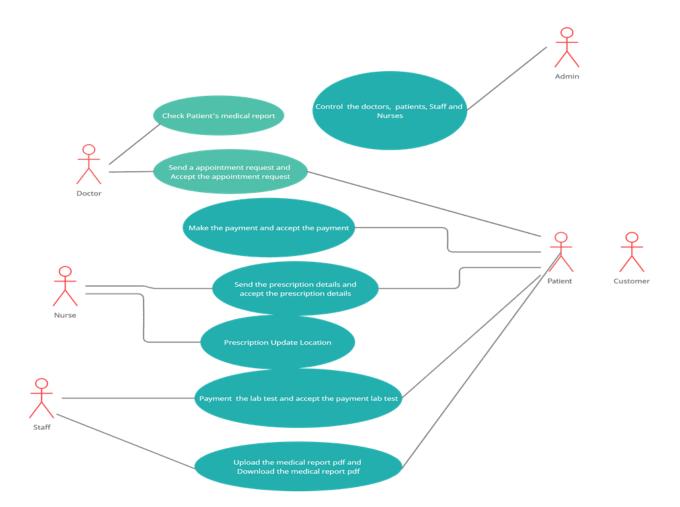
Schedule

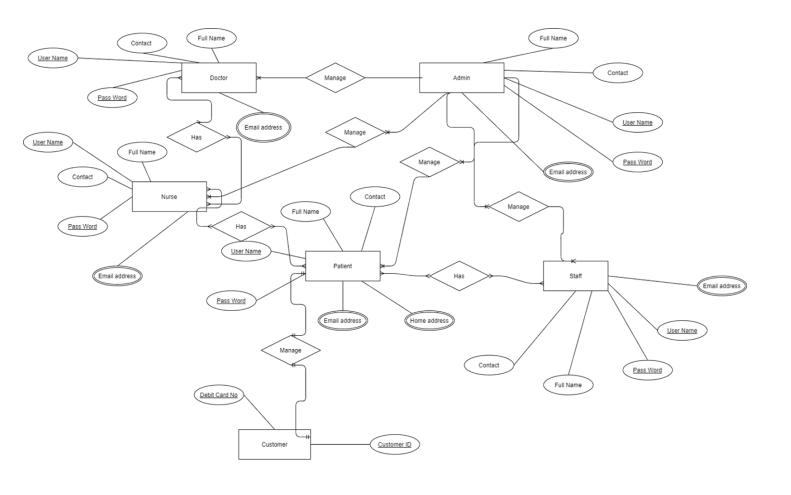
Stage	Deadline	Products/Deliverables/Outcome
1. Initiation	05/11	PID
2. Investigation and	12/11	Analysis of existing business
requirements		processes
		Requirements document
		Evaluation of possible
		development technologies
3. High level design	15/11	Design documents (Architecture,
		DB schema, GUI style guide)
4. Increment1	11/12	Hospital management side of the
		website
5. Increment2	14/12	Patient's account in the web
		application
6. Increment3	15/02	Mobile application for the patient
7. System testing	12/3	Final system testing deployment
8. User testing	15/3	User experience testing
9. Assemble and complete	31/3	PRCO303 Report
final report		

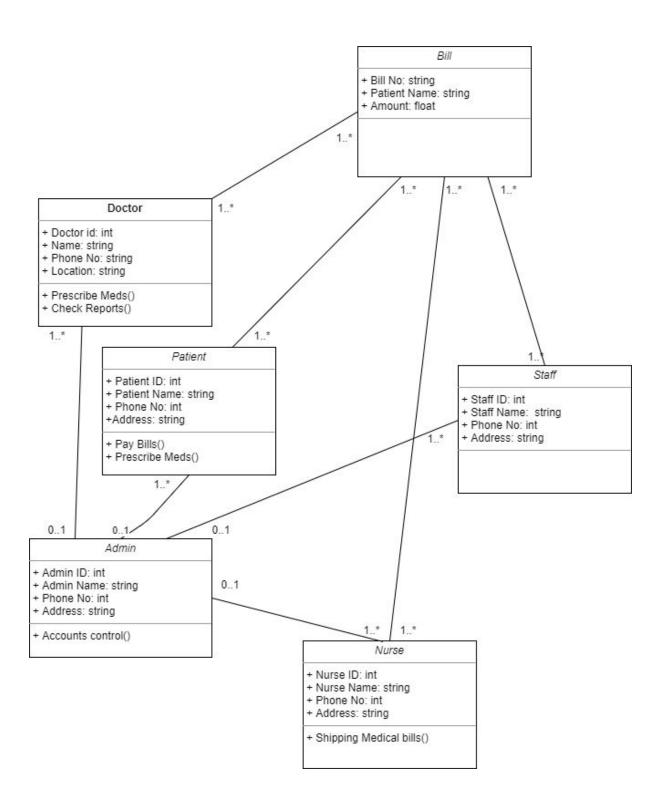
As of now, I am way ahead of the schedule. And I have managed to finish almost everything. All that's left is testing the application.

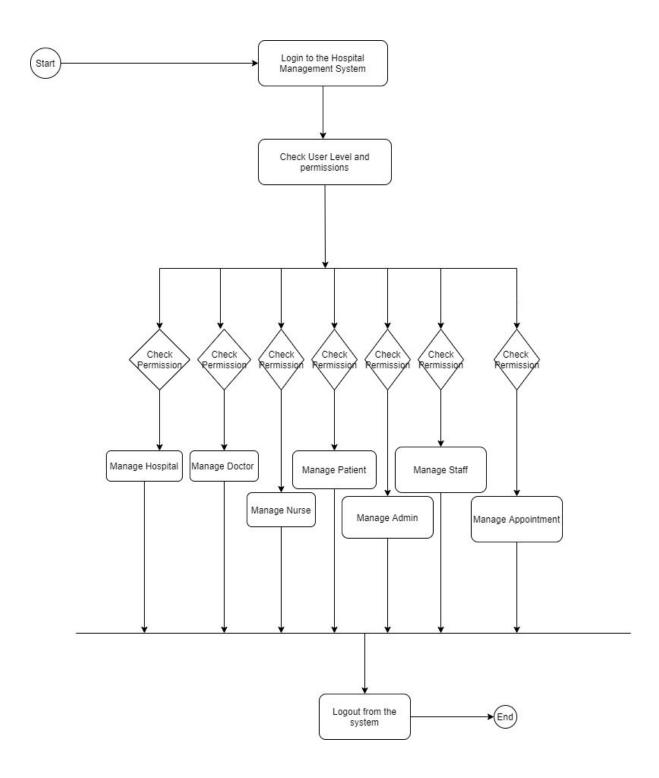
Resources (IT Resources, Use Case Diagram, ER Diagram, Class Diagram, Activity Diagram and Data Flow Diagrams)

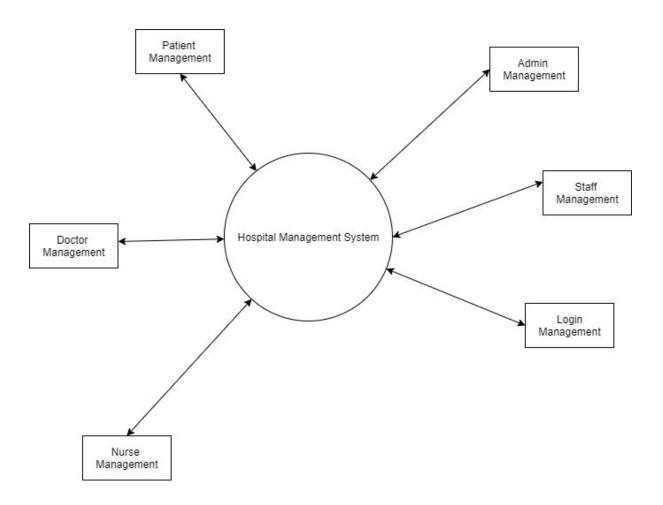
- Huawei Y7 pro 2018 or Huawei Nova 3i(Emulator)
- USB Cable or Data Cable
- Wamp or XAMPP control panel server
- Visual Studio Code or Android Studio(Flutter)
- Boot Strap

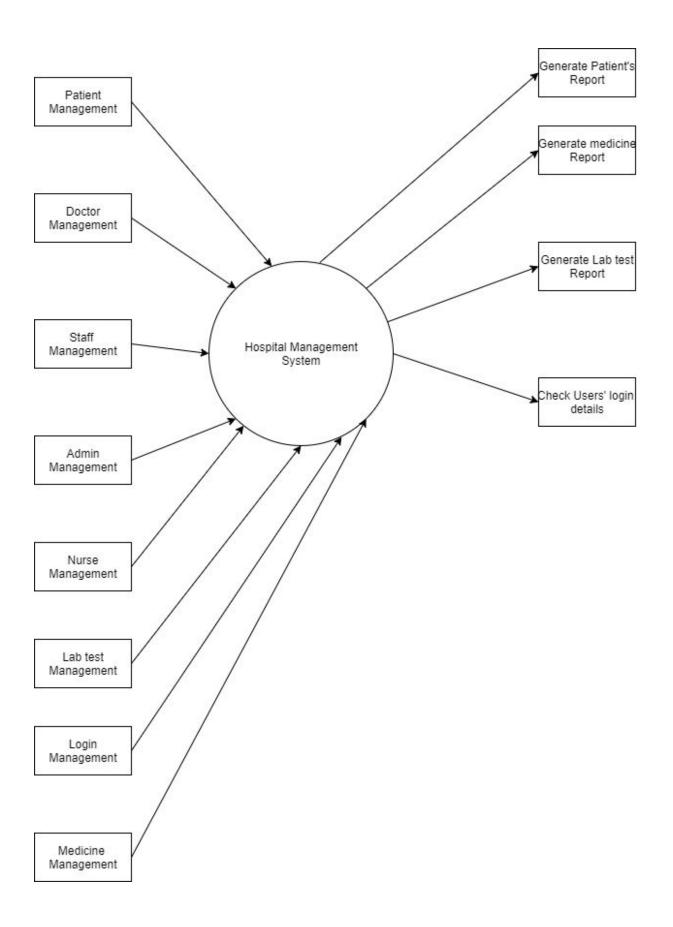


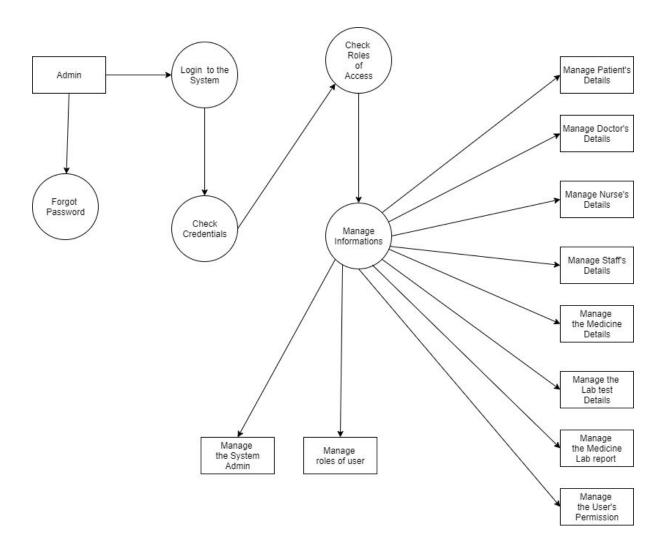












Student Learning Undertaken

As mentioned earlier, this is my final year project second part done with the mobile API. Therefore, I went through quite a lot of tutorials to familiarize myself with the API. And I also read the documentation. This was very helpful in getting to know how the API works. And for development I used both Visual Studio Code as well as Flutter. And since I am new to Android Studio, I had to go through some tutorials to really familiarize myself with the IDE. Patient-centered treatment, holistic practice and value-for-money emphasis mean that there is a greater need to ensure that health managers or staff have the expertise and skills to strengthen and improve patient services. Analysis shows that there is a scarcity of information and a significant ability among clinicians and managers or staff is the barrier to improving healthcare quality. Instead of services like books, mentoring, fellowships or other

learning tools, the emphasis was on accredited education and continuing training through courses and workshops. Much has been written about techniques to improve the protection of patients and there have been courses explicitly built with this in mind. This scan was not specifically based on safety measures, but on a safety initiative. Number of curricular for quality enhancement or efforts as a primary goal to increase quality in healthcare use protection. Some training that most healthcare adverse events are the product of the combined effects of human mistakes and errors in organizational and administrative processes should be taken so that variation can be minimized. The drawback of these kinds of follow-up surveys is that they provide little knowledge of the value applied to the function of the learner by the online approach or how they used what they learned to strengthen health services. The courses were common among coordinators of quality, managers or staff of healthcare. I was able to learn how to integrate payment gateways such as Stripe with a mobile application. This was something new to me and I haven't done it before. Therefore, I studied several tutorials on the matter and managed to learn something new. Using pure PHP and MySQL as the backend for the mobile application was also tricky. But some researches and critical thinking allowed me to integrate the API with the application pretty easily. This part allowed me to learn how Flutter deals with APIs. I also studied several MySQL queries and to find out how I can make the queries more efficient.

References[Meeting Minutes SS(Screen Shots)]

