HOSPITAL MANAGEMENT SYSTEM

(EC 782) Project Stage – I

A Project Report Submitted in Partial Fulfillment of the Requirements

For the degree of Bachelor of Technology

In Electronics and Communication Engineering by:

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Certificate (for 8th Sem)

This is to certify that **Sohini Roy, Rajashree Ghosh, Moupiya Ghosh & Madhusmita Misra** has carried out his project work entitled "**HOSPITAL MANAGEMENET SYSTEM**" as a part of the curriculum for the B.Tech Degree in Electronics & Communication Engineering (ECE) under Maulana Abul Kalam Azad University of Technology for the year 20xx-20xx.

This project report is approved by the undersigned only for the purpose for which it is submitted. The candidate is entirely responsible for the statements, opinions and conclusions contained herein.

_____

(Prof. xxxxxx)

(Signature of the Mentor)

_____

(Signature of HOD, ECE Dept,
Techno Main Salt Lake, with date)

ACKNOWLEDGEMENT

We express our special thanks of gratitude to **Prof. xxxxxxxxxxxx** of the Department of Electronics & Communication Engineering (ECE) for her/ his able guidance and valuable support in completing our project.

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Contents:

Page No.

3. ABSTRACT

Hospital Management Software is a vital business tool, especially in the healthcare industry. Having a hospital that is automated with Hospital Management Software is now easy. In the midst of this technologically upgraded and model world, every hospital should make use of the machines and system to take care of every manual activity. The current technological world makes use of the people to monitor the devices and network, whereas the systems are busy helping the people in controlling various tasks.

Our Hospital Management system follows a module-based approach which not only aims at reducing manual paper-based work but at the same time provides integrated one-platform interface for doctor-patient-admin interactions. Unlike other Hospital Management Software platforms, which are mostly patient-admin oriented, this software also provides one seperate doctor module.Additionally we have blood donation, organ donation and inventory modules along with health scheme application facilities as well.

Our system allows admin to store and manage the doctor and patient data in a well-defined manner. Admin can easily check bed availability and immediately allot it whenever any patient arrives. Doctors can manage their booking slots online according to their date and time.Doctors can view the patients' details and their medical records history easily. It facilitates patients to book empty slots online and those slots are reserved in their name which they can cancel anytime. Patients do not have to carry medical prescription or lab reports whenever he visits the doctor. It even generates an instant bill.It saves time of both doctor and patient.The system is convenient and flexible to be used.

4. INTRODUCTION

Hospital management system was introduced with the cause for helping hospitals speed up their processes. Hospital management system is a computer system that helps manage the information related to health care and aids in the job completion of health care providers effectively. They manage the data related to all departments of healthcare such as Clinical, Financial, Laborator, Inpatient, Outpatient, Operation theater, Materials, Nursing, Pharmaceutical, Radiology, Pathology etc. HMS was introduced to solve the complications coming from managing all the paper works of every patient associated with the various departments of hospitalization with confidentiality. HMS provides the ability to manage all the paperwork in one place, reducing the work of staff in arranging and analyzing the paperwork of the patients. HMS does many works like:

- Maintain the medical records of the patient
- Maintain the contact details of the patient
- Keep track of the appointment dates
- Save the insurance information for later reference
- Tracking the bill payments.

The advantages of HMS can be pinpointed to the following:

- Time-saving Technology
- Improved Efficiency by avoiding human errors
- Reduces scope for Error
- Data security and correct data retrieval made possible
- Cost effective and easily manageable
- Easy access to patient data with correct patient history
- Improved patient care made possible
- Easy monitoring of supplies in inventory
- Reduces the work of documentation
- Better Audit controls and policy compliance.

5. LITERATURE SURVEY

A hospital information system (HIS) is an element of health informatics that focuses mainly on the administrational needs of hospitals. In many implementations, a HIS is a **comprehensive, integrated information system** designed to manage all the aspects of a hospital's operation, such as **medical, administrative, financial, and legal issues and the corresponding processing of services**. Hospital information system is also known as hospital management software (HMS) or hospital management system.

According to a blog published by MocDoc Hospital Management System[1], HMS came into the picture of hospital management **as early as 1960** and have ever since been evolving and synchronizing with the technologies while modernizing healthcare facilities. Information technology has transformed the field of medicine. In the fast-paced medical industry, it is difficult to manage and operate a multi-specialty hospital. Across the globe, various health organizations have installed hospital management software in order to streamline their business and operation process, better manage projects of all sizes, and boost their work efficiency across the management or board. This in turn is expected to increase the demand for hospital management software during the forecast period 2018- 2026. In today's world, the management of healthcare starts from the hands of the patients through their mobile phones and facilitates the needs of the patient. Hospital management has greatly changed over the last decades. Business expertise, modern technologies, connected devices, mobile apps, and knowledge of healthcare are key elements for the implementation of hospital management system project. The number of healthcare providers has increased and the patients have a wide choice of medical specialists. The interactions between the hospital and the patient can be simplified for the convenience of both sides. Each institution has the opportunity to create the efficient, clear and fast delivering healthcare model.

According to a blog published by MocDoc[2], some of the latest Hospital Management Systems are as follows:-

1. MocDoc: MocDoc Hospital Management Software is the best solution which is completely integrated for any type of hospitals from small to multi-chain hospitals. The Hospital Management Software for OP includes Doctor Discovery, Check-In, Mobile apps, Prescription, Appointments, Billing, and more. When considering the IP management role of Hospital Management Software, it deals with Visual Bed Management, Discharge Summary, Insurance Management, Ward Request, Integrated IP billing, and more. The Pharmacy benefits included in the Hospital Management Software includes Stock Management, FSN Analysis, Purchase Management, Sale Bill, MIS, and more. While considering the Lab benefits in HMS, it handles Custom reports, Smart Notification, Order Management, Email Reports, Invoice generation, and more.

2. Insta: Insta is known for monitoring and controlling the moving pieces of the hospitals without any hindrances. It also helps in improving hospital productivity by managing all your patients, departments, staffs with ease. The software enhances the experience of patients by making use of better systems for decision making. Hospitals prefer Insta Hospital Management Software for effective operations, enhanced patient retention by 30%, for making better decisions, and more.

3. Attune: The main benefits of choosing Attune Hospital Management Software is that they help in increasing revenue, simplified operations, optimize productivity, etc. The features of Attune HMS includes TPA billing, Insurance, Credit tracking, Patient referral, Radiology information system, in-patient management, Central sterile supply department tracking, MIS reports, Doctor Scheduling and appointments, E-Prescriptions, Integrations with PACS, Nursing care and ward management.

4. ITDose Infosystem: HMS is one of the complete tools that controls every aspect of management, marketing, and administration of a hospital to enable them and the doctor software to act better. It holds important features like allocation of duties and staff management, bed allocation and managing ward, correct billing, and accounting, multiple user accessibilities for effective all-around performance, controls doctor system availability, scheduling, controlling laboratory equipment, inventory management with a timely warning system, appointment management, and lead management, and more.

5. Suvarna HIS: The Hospital Management Software from Suvarna is developed for people who need value-based solutions at affordable rates. The features of Hospital Management Software includes Hospital module, In-Patient Services, Laboratory information system, Billing, Inventory, Gastro-Enterology, Operation Theater, Nephrology, Food, and beverages, Out-patient services, Admission transfer and discharge, Blood bank, Online scheduling, Doctors Organizer, Bio-Medical, diabetes module, Nursing, and more.

Fig: 5.1 Hospital Information System Market - Growth, Trends

The hospital information systems market is projected to grow at a **CAGR of 8.4% during the period 2018 - 2026** as per a report published by MARKET

INTELLIGENCE AND ADVISORY FIRM [3]. The ongoing pandemic is putting healthcare systems under strain worldwide and forcing hospitals and other medical facilities to scramble to make sure data can be shared effectively. The '**digital front door**' is really key to how providers should be responding to the COVID-19 situation in terms of access, triage, and even treatment. With the surge in the demand for hospital capacity, one of the challenges faced by hospital IT staffers is figuring out how to quickly deploy EHR systems to alternative care locations.

Moreover, the healthcare facilities such as hospitals, diagnostic centers, and clinics are showing interest towards clinical decision support systems, electronic health records (EHRs) and other systems in minimizing medication prescription errors, adverse drug events monitoring and other medical errors. COVID-19 is acting as a trigger for a sharp uptake of teleconsultations. The restrictions on free movement and travel, the limitation of medical services to emergency situations, and the overall increase in suspected and confirmed COVID-19 infections have contributed to the recent surge in teleconsultation platforms.

6. METHODOLOGY

6.1 : PROBLEM DEFINITION

1. Absence of Blood Bank Module: Blood Bank and Blood donation is an inseperable part of medical field. Unfortunately, in most of the cases blood donation processes are handled manually. Although some blood donation management system softwares are available nowadays, but they are not incorporated in a single platform along with hospital management system. The need for blood affects us all. Eight out of ten people need blood or blood products at some time in our lives. One out of every ten patients in hospital requires blood transfusion. The number of blood donations that patients receive depends on their medical condition. Although an average of three donations is transfused to a patient, some patients require many more. Blood is in constant demand for the treatment of patients involved in accidents, patients with anaemia, malaria, cancer or a bleeding disorder such as haemophilia. Many surgical operations would not be possible without the availability of blood. Blood may be needed during or following childbirth or for an exchange transfusion in newborn babies. According to a research paper by Vikas Kulshreshtha and Dr.Sharad Maheshwari [4], blood banks play an important role to donors, seekers ad blood banks. It helps in the process of collecting blood and managing blood stocks, approving blood requests, updating donations and updating available blood types. It can address the issues and problems encountered in collecting information about donors, blood camps, inventories of blood bags, and blood transfusion services, etc, including donor screening, inventory management, blood ordering, blood usage review and compatibility testing. Blood Bank Management system will greatly increase the safety and quality of the blood supply as well as provide logistics data for the optimal supply chain management if incorporated in Hospital Management Platform.

2. Absence of Organ Donation Module: In the healthcare context, organ transplantation has raised to great importance in the last years. Improvements in medical techniques and pharmacological anti-reject therapies have made transplantation a powerful and valid way to treat diseases. Currently, the way in which the procurement phase tasks are performed is still largely non-automated and non-coordinated. The main pitfalls in the transplant process are:

- Medical experts have to consider one by one all the possible receivers and evaluate the matching with weak supports to process large amount of data.
- Information is usually not stored in a compact, re-usable way, therefore the coordination between medical experts and surgeons has to pass through telephone and facsimile.
- Finding the best route involves looking up several timetables of means of transport (such as trains or planes) and making spatial and temporal reasoning to provide the

most efficient solution

- Scheduling the teams involves looking up the timetables of operating theatres and medical personnel to find solutions which are available at the required times.

Although many people are accessing Hospital Management Platforms, but most people are **unaware of the availability of online Blood Donation Management Systems**. Studies have shown that nearly **72% people visits online hospital websites but only 1% are visiting blood donation management platforms**. Blood is in constant need but according to NCBI resources[5], **lack of knowledge** troubles both donor and recepient parties to find a place to donate and a suitable donor respectively. **Lack of awarness** and some **misconceptions** also restricts people from blood donation activities. Thus incorporating a blood donation module will help people know more about blood donation procedures, clear misconception by providing expertise solutions to FAQs, provide platform to systematically organize blood donation records and help hospital authorities, donors as well as receipents to access the same in case of emergencies.

Organ Donation modules are also absent in existing hospital management platforms. Organ transplantation has raised to great importance in the last years. Although, the rate of donation has been increasing from the past few years but it is still not enough as **only 0.01% of people donate their organs after death**[6]. The main reason is lack of awareness and incorporating this module in this hospital management platform rather than creating a seperate platform will create more awareness among people as this platforms are mostly visited by users nowadays.

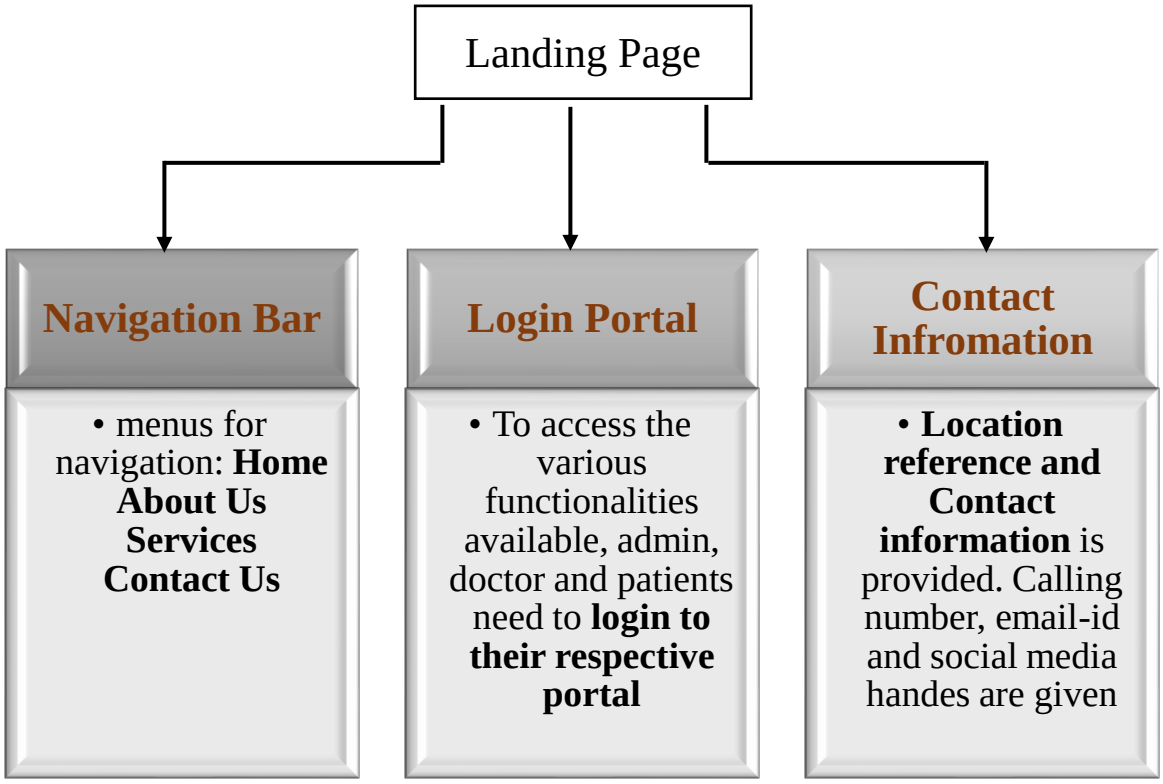
Moreover, scarcity and exigency for blood and organs has created many discrepancies in current approaches. These have created the criteria for **malpractices such as organ trafficking and black market selling.**

Thus, all the above-mentioned problems encountered so far in the existing platforms can be overcomed by our integrated, one-platform hospital managemnet system

6.2: PLANNING AND APPROACH

FUNCTIONAL BLOCK DIAGRAM:

- One platform service
- Same landing page for users (patient),doctors and admin



- Another **additional module** on the landing page comprises three segments:

Vaccination module	Blood bank	Organ donation/ receiving module
• user **can register themselves** for receiving any vaccine available in the hospital on **any particular date**, and accordingly **book their slots**	• any **donor** can register themeselves **to donate blood**. Similarly, any **person in need of emergency blood can request via this portal**	• any person, wishing to donate certain organ after death, may register here. Similarly, incase of **organ transplantation**, registration is mandatory

- Once admin, doctor and user logs in, a number of options are available.
- At the backend all these modules are interlinked.
- They share common sql databases and the data is retrieved via 'join' queries

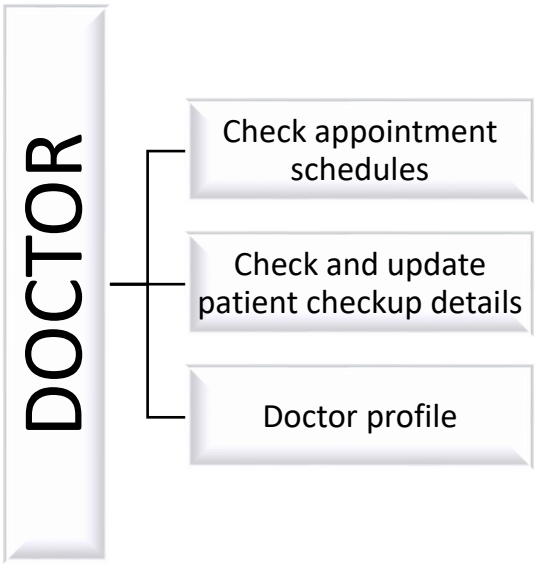


Fig 6.2.1 Block Diagram for Doctor's portal

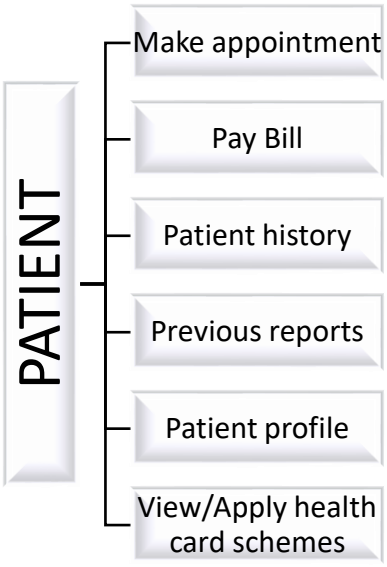


Fig 6.2.2 Block Diagram for Patient portal

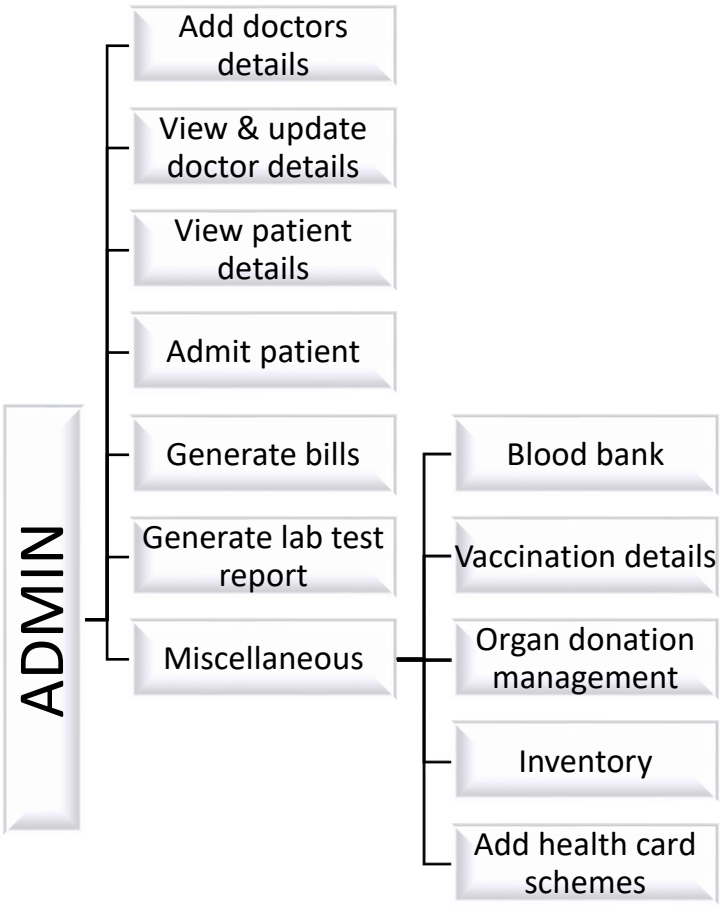


Fig 6.2.3 Block Diagram for Admin's portal

DETAILED DESCRIPTION:

First, the **admin (receptionist/ in charge of the hospital)** needs to add certain data which are to be accessed by the doctors and patients respectively, according to their requirements.

- **Add doctor details:** The doctors providing service to that hospital need to be added to the portal. Each of them would be given respective email id and password, so that they can login to their portal when needed and access the various options available. Options will also be available to add certain personal details of doctor, like his qualifications, department associated with, fees, dates for which he is available and so on. However, these features can also be updated by doctor himself/herself from his/her profile.

- **View and update doctor details:** Admin can view the entire doctor list associated with that particular hospital, and also their respective details. In case of any changes in their personal details, admin may update them, and the new changes made will be saved in the database, and the changes will be reflected in admin's end as well as doctor's end.

- **View patient details:** Admin can see all the names of the patients with their respective patient id. Appointments done by the patient (for both checkup and any kind of lab test available) will be displayed as well as all the details (date, time, checkup under which doctor, payment completed or not) of such appointment will be available. Any past medical history of the patient can also be accessed by admin.

- **Admit patient:** In case of admitting any patient, a particular bed has to be allocated to him/her. The list of all the beds available/booked will be available with the admin. Admin can allot a particular bed to a patient, and that information will be saved in the database, to be accessed later when needed. Once the patient is discharged, the bed will again be added to the list of available beds.

- **Generate bills:** Bill of the total payable amount has to be generated from the admin for the patient at the time of discharge (if admitted), or in case of any checkup booking, lab test booking or vaccination.

- **Generate lab test report:** The test reports for the patients who have booked for any lab test are generated by the admin. Once generated, patients can view them under a specific module in their dashboard.

- **Blood bank:** The blood bank of the hospital has to be maintained by the admin. Bottles of which blood groups are available and their respective quantity needs to kept in records. The rare blood groups should be maintained in stock for emergency. The bottles which are being used also need to be kept in record, and the name of the patients to whom blood is given are stored in database. There will be a portal open to all, where any person can register himself/herself if he /she wishes to donate blood. Then after going through the required tests, he/ she can donate blood.

- **Vaccination details:** The list of vaccines available in the hospital is maintained by the admin. A portal will be there open to all, whereby one can register himself/herself and book slots to get a particular vaccine on the dates available (which are updated by the hospital authority).

- **Organ donation management:** Both the donors and receivers register themselves through the portal available in the landing page. They fill in requirements and upload certain required medical reports. These can be accessed by the admin at the backend which help the admin to map a receiver in need with an appropriate donor. On checking the portal, both the donor and receiver can access all the information. Then after going through required tests the process is completed with ease.

- **Inventory:** Numerous suppliers are associated with a hospital, whereby the hospital gets its things (medicines, saline bottles, cotton, syringes, equipment, stretcher, and many more) delivered on time. The list of the suppliers and products they are delivering are kept in records of the hospital. Other details like the date of delivery, total cost, and time of delivery are also maintained.

- **Add health card schemes:** The various health card schemes which will be provided by the hospital to its registered patients are updated in the portal by the concerned authority. The various details of such schemes, documents required to apply for them, and their long term benefits will be updated by the admin from their respective portal. Patients will have an option to view these available health card schemes from their dashboard, go through the details and apply for them.

Next, the **doctors associated with the hospital** need to have their respective portals, where they can login and access their personal information and do the other needful. Here they can view all their patient details, upcoming appointments at once.

- **Check appointment schedules:** Once any patient books a checkup appointment, he/she is given the option to choose from the doctors available under a particular department among which patient may choose as per his/her convenience. Once booked, he/she is given the booking id and date and time for his booking. At the same time, the name of the particular patient and day and date of his appointment booking is added in that particular doctor's portal so that he can check all is appointments on a particular day.

- **Check and update patient checkup details:** A doctors needs to keep record of all the patients under him/her, so that when needed doctor can access previous medical history of the patient. After a checkup doctor may update certain key points of the health issues and the medicines prescribed to a particular patient in the portal.

- **My profile:** Doctor may view and update his/her profile. Under the profile, he may or may not add some of the personal information of his choice. He/she may also update his/her photo if he/she wishes to. Other information include contact information, date of birth, present age, personal email id, qualifications, specializations, present studies or researches (if presently pursuing), and many more.

Last but not the least, there comes an integral part of any health management system, **the patients (the users)** without whom it makes no sense to create a software for any medical institute. They would have their own respective dashboard from where they can access the several options available to them.
The users need to login to their respective dashboard with their respective email id and password. If they are new and want to register themselves to avail the facilities of a

patient, they can register (sign up) themselves with mail id and password. Once they are landed onto their dashboard page –

- **Make appointment:** Patient can book their date for two facilities – regular checkup and lab test.

For checkup, they will be given options for all the departments available in the hospital, once they choose they are given the option for the doctors available for a particular department with their fees and qualifications. They can then book their appointment upon selecting the particular day on which the doctor is available.

For lab test, they are given options for the lab tests done in the hospital with the cost to be incurred and also available date. Based on their preference they may book theirs. Upon being successful, they receive a successful message.

- **Pay bill:** Once the patient books for a regular checkup or any lab test, he/she may choose to pay the amount once he/she visits the hospital or may opt for online payment mode for contactless payment. The total amount for that particular lab test or the fees of the doctor whose consultation has been booked can be paid via this portal.

- **Patient history:** Under this module, patient can see his/her previous medical history. All the previous checkup bookings and lab test bookings can be seen along with the details of the respective bookings.

- **Previous reports:** All the previous reports of the lab test booked by the patient can be seen under this module. The reports once generated by the admin, will be visible to the patient, and can be downloaded as and when needed.

- **My profile:** This module will be the module, where one can update his/her personal information according to one's wish. There will be option to update one's picture and other information like, default contact number, default mail id, date of birth, chronic health issues, and so on. Some of the information will be mandatory to complete the profile, while others will be as per their choice.

- **Apply for health card schemes:** Once the health card schemes are updates by the admin, patient can see them, go through the details and apply for them as per their convenience. This health card scheme facility is strictly for the registered patients of the hospital.

6.3: **DESIGN ISSUES:**

While implementing a part of this project, we have faced certain issues and constraints. To name a few, it would be:

- To determine the flow of working of a particular module, so that the web pages can be designed accordingly as per the requirement.
- The database is not hosted remotely. It is there locally on our machine, so there arises little problem to share a common database, so that all can access data from the updated tables, amongst all the group members.
- Versions of the softwares used amongst the group members should comply with one another, as each version has got some different features and constraints at the same time.
- Different browsers (chrome, Mozilla Firefox, Microsoft edge) support different types of features. Making the entire design platform independent is difficult.

7. RESOURCE UTILIZATION

Software specification

Software Name	version	Use	Price	Compatible with new version
Xampp	3.2.4	It helps us to make use of the same system as both host and server. It is a platform that furnishes a suitable environment to test and verify the working of projects based on Apache, Perl, MySQL database, and PHP through the system of the host itself.	Open source	yes
Visual Studio code	1.6.3	It provides basic inbuilt support for HTML, CSS & JS programming. There is syntax highlighting, smart completions with IntelliSense, and customizable formatting. It also includes great Emmet support.	Open source	yes
Sublime text editor	3.2.1	It is a full featured Text editor for editing local files or a code base. It provides basic support for HTML, CSS & JS programming out of the box. It includes various features for editing code base which helps developers to keep track of changes	Open source	yes

Sql database	Mysql 5	It helps us to create tables which stores information related to the different modules. Information can be added, removed or fetched using different sql queries.	Open source	yes
GitHub desktop	2.9.4	It is an application that enables us to interact with GitHub using a GUI. It encourages our team to collaborate using best practices with Git and GitHub. We can push to, pull from, and clone remote repositories.	Open source	yes
Google chrome/Firefox	96.0.4664.110/91.0	It helps us to see our designed scripts in the desired format i.e. in the form of a webpage.	Open source	yes

System specification

- Device name : DESKTOP-FGRK0FP
  Processor : Intel(R) Core (TM) i5-8250U CPU @ 1.60GHz 1.80 GHz
  Installed RAM : 8.00 GB
  System type : 64-bit operating system, x64-based processor
  Os Edition : Windows 10 Pro
  Version: : 20H2
  OS build : 19042.1348
  Experience : Windows Feature Experience Pack 120.2212.3920.0

8. FUTURE PLANNING

Our final year project was to design a one platform-based hospital management system.
For this, we decided to implement mainly 6 modules:

- Admin module
- Doctor module
- Patient module
- Blood bank module
- Organ donation module
- Vaccination module

In 7th semester, we have designed the landing page, the about us section and the services section which will appear when we open our website. We have also designed the admin's, patient's and the doctor's dashboard where the options of the tasks available can be seen. From the above block diagram, we can see that there is a make appointment section available in the patient's module. The implementation part (both backend and frontend) has been completed.

In the 8th semester, the implementation of the rest of the part of the project will be done. At first we will implement the admin module where the Add doctor details, view & update doctor details, view patient details, Admit patient, Generate bills, Generate lab test report and Miscellaneous (which includes Blood bank, Vaccination details, Inventory and Add health card schemes) sections are to be implemented. Next, the implementation of the doctor's module is also to be done. This includes the check appointment schedules, check and update patient check-up details and doctor profile module. We have to implement the pay bill section, patient history section, previous report section, patient profile section and view/apply health care schemes section in patient's module. Our other three module includes the Blood bank, Organ donation and the vaccination module. The frontend and backend implementation part of the above stated modules are to be done in the 8th semester.

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