HEALTHCARE AND MONITORING SYSTEM

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CENTER FOR DEVELOPMENT OF ADVANCED COMPUTING

NOIDA

CERTIFICATE

This is to certify that Project Report entitled **“ Healthcare and Monitoring System”** which is submitted by Sayali Gautam Gajbhiye is fulfillment of the requirement for the award of Diploma in Advanced Computing, Center For Development of Advanced Computing, Noida is a record of the candidate own work carried out by him under our supervision. The matter embodied in this report is original and has not been submitted for the award of any other degree,

Date: Supervisior:

DECLARATION

I hereby declare that this submission is our own work and that, to the best of our knowledge and belief. It contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where the acknowledgement has been made in the text.

Date:

Signature:

Name: Sayali Gajbhiye

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We also do not like to miss the opportunity to acknowledge the contribution of all faculty members of the department for their kind assistance and cooperation during the development of our project. Last but not the least we acknowledge our friends for their contribution in the completion of the project.

Date: Place:

Signature:

Name: Sayali Gautam Gajbhiye (200220520048)

ABSTRACT

The Healthcare Monitoring System is designed to provide a platform for the interaction between Patients, Doctors, and Pathologists. This portal is basically designed for the ease of finding the nearby Doctors. It provides various modules like Admin module, Patients module and Doctors module. Further, it includes Pathologists, cloud storage, and Report format converter. In this portal, two modules like Patients and Doctors module use an Aadhaar card as user id and confirmation will generate and same for Pathologist and Admin. This application stores the information efficiently in the cloud. Now a day we find that many patients are not able to search good and nearby hospitals and Doctors in their area and even most of the hospitals provides Hardcopy of the reports after diagnosing the patients. Due to this many of the patients are not able to keep the reports properly for long time with them which is wastage of papers or if they provide a CD/DVD, moreover the limited space in CD/DVD can get corrupt. So this is very difficult to maintain all the records for the patients.

Healthcare and Monitoring System

Table of Contents

1. INTRODUCTION

Healthcare and Monitoring System is basically a system which deals with the interaction between patients, doctors and pathologists. . The system consist of doctor login, pathologist login and patient login through which they will be able to register into the system using a Adhaar card number. Using a web site patient will be able to view his or her reports. In case if the reports are lost or damaged the patient can easily be able to view his or her reports through EHR(Electronic Health Record) at any time.

A software requirements specification (SRS) is a document that captures complete description about how the system is expected to perform. It is usually signed off at the end of requirements engineering phase. It lays out functional and _non-functional requirements, and may include a set of use cases that describe user interactions that the software must provide.

2. PROBLEM STATEMENT

Now a day we find that many patients are not able to search good and nearby hospitals and Doctors in their area and even most of the hospitals provides Hardcopy of the reports after diagnosing the patients. Due to this many of the patients are not able to keep the reports properly for long time with them which is wastage of papers or if they provide a CD/DVD, moreover the limited space in CD/DVD can get corrupt. So this is very difficult to maintain all the records for the patients. Thus, this becomes a matter of concern for the Patients to access their reports anytime anywhere through website .

So, in our project we are providing cloud storage of reports to the patients so that they can get an access from anywhere to their previous history of medical.

3. OBJECTIVE AND SCOPE

In this project we are going to overcome all the flaws. All the patients can access his or her reports from anywhere at any time and even can book appointments through our website. Every patients and doctors will have login id (UID NUMBER). Which will be also easy for them to remember and will help to solve the problem of repeating of the id. By doing this project there will be no wastage of papers and handwritten work will get decreased and will help our nation to grow digitally. The patients can check the EHR as a when needed with proper authorization.

Smart Healthcare and Monitoring System provides ease to the doctors for patient diagnosis. The system consist of doctor login and patient login through which they will be able to register into the system using a unique ID (UID NUMBER). Unique ID could be the aadhaar card number.Using a website patient will be able to view the near by hospitals. After the diagnosis of the patient the prescription is given to the patient, whereas here we will be using Cloud service to maintain EHR of Patients. The system will keep the record of all patients in cloud. In current system the reports are lost or damaged but in proposed system. The doctor and patient can easily access it and record will be kept secured.

4.HARDWARE & SOFTWARE SPECIFICATIONS

Software Requirement

s. no.	Requirement	Tools used
1.	Operating system	Windows
2.	Frontend	ASP.NET
3.	Backend	SQL SERVER 2014
4.	Server	

Hardware Requirement

s. no.	Requirement	Hardware used
1.	Operating system	Windows 7,8,10 Google Chrome OS
2.	RAM	2 GB
3.	HARD DISK	250 GB SATA
4.	Processor	i3 , i5,i7

Data Collection

A database is a separate application that stores a collection of data. Each database has one or more distinct APIs for creating, accessing, managing, searching and replicating the data it holds.Other kinds of data stores can also be used, such as files on the file system or large hash tables in memory but data fetching and writing would not be so fast and easy with those type of systems.

Nowadays, we use relational database management systems (RDBMS) to store and manage huge volume of data. This is called relational database because all the data is stored into different tables and relations are established using primary keys or other keys known as Foreign Keys.

MySQL is a fast, easy-to-use RDBMS being used for many small and big businesses. MySQL is developed, marketed and supported by MySQL AB, which is a Swedish company. MySQL is becoming so popular because of many good reasons.
Following figure explain the structure of database created.

Table Name: Admin_Login

Field Name	Data Type	Key
AUsername	Text	Primary Key
APassword	Text	-
Status	Text	-

Fig. 4.1.1 Admin Login

Table Name: Organisation_Login

Field Name	Data Type	Key
OUsername	Text	Primary Key
OPassword	Text	-
Status	Text	-

Fig. 4.1.2 Organisation_Login

Table Name: Department_Login

Field Name	Data Type	Key
DUsername	Text	Primary Key
DPassword	Text	-
Status	Text	-

Fig 4.1.3 Department Login

Table Name: User_Login

Field Name	Data Type	Key
UUsername	Text	Primary Key
UPassword	Text	-
Status	Text	-

Fig 4.1.4 User Login

Table Name: Doctor/Department

Field Name	Data Type	Key
Name	Text	Primary Key
Address	Text	-
Contact No	Text	-
Education Details	Text	-
Designation	Text	-
Email	Text	-
UID	Text	-
Password	Text	-

Fig 4.1.5 Doctor/Department

Table Name: Organization

Field Name	Data Type	Key
Name	Text	Primary Key
Address	Text	-
Type	Text	-
Help Line Number	Text	-
Registration	Text	-
Manager Email ID	Text	-
Manager UID	Text	-
Manager Password	Text	-

Fig 4.1.6 Organisation

Table Name: User

Field Name	Data Type	Key
Name	Text	Primary Key
Gender	Text	-
Address	Text	-
Contact	Text	-
DOB	Text	-
Email	Text	-
Patient UID Number	Text	-
Patient Password	Text	-

PROJECT PLANNING AND SCHEDULING

Project planning is part of project management, which relates to the use of schedules such as Gantt charts to plan and subsequently report progress within the project environment.

Initially, the project scope is defined and the appropriate methods for completing the project are determined. Following this step, the durations for the various tasks necessary to complete the work are listed and grouped into a work breakdown structure. Project planning is often used to organize different areas of a project, including project plans, workloads and the management of teams and individuals. The logical dependencies between tasks are defined using an activity network diagram that enables identification of the critical path. Project planning is inherently uncertain as it must be done before the project is actually started. Therefore the duration of the tasks is often estimated through a weighted average of optimistic, normal, and pessimistic cases. The critical chain method adds "buffers" in the planning to anticipate potential delays in project execution. Float or slack time in the schedule can be calculated using project management software. Then the necessary resources can be estimated and costs for each activity can be allocated to each resource, giving the total project cost.

At this stage, the project schedule may be optimized to achieve the appropriate balance between resource usage and project duration to comply with the project objectives. Once established and agreed, the project schedule becomes what is known as the baseline schedule. Progress will be measured against the baseline schedule throughout the life of the project. Analyzing progress compared to the baseline schedule is known as earned value management.

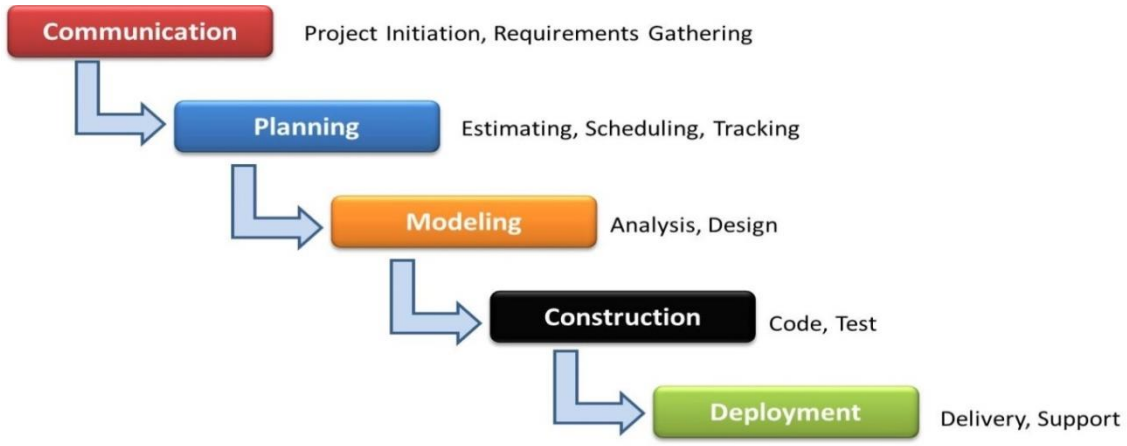


Figure Waterfall model

1) Communication - In communication phase the major task performed is requirement gathering which helps in finding out exact need of customer. Once all the needs of the customer are gathered the next step is planning.

2) Planning - In planning major activities like planning for schedule , keeping tracks on the processes and the estimation related to the project are done. Planning is even used to find the types of risks involved throughout the projects. Planning describes how technical tasks are going to take place and what resources are needed and how to use them.

3) Modeling - This is one the important phases as the architecture of the system is designed in this phase. Analysis is carried out and depending on the analysis a software model is designed. Different models for developing software are created depending on the requirements gathered in the first phase and the planning done in the second phase.

4) Construction - The actual coding of the software is done in this phase . This coding is done on the basis of the model designed in the modeling phase. So in this phase software is actually developed and tested.

5) Deployment - In this last phase the product is actually rolled out or delivered & installed at customer's end and support is given if required. A feedback is taken from the customer to ensure the quality of the product.

SYSTEM ANALYSIS AND DESIGN

The system analysis/requirements gathering process is intensified and focused specifically on software. To understand the nature of the program(s) to be built, the software engineer ("analyst") must understand the information domain for the software, as well as required function, behavior, performance, and interface. Requirements for both the system and the software are documented and reviewed with the customer.

It is a process of collecting factual data, understand the processes involved, identifying problems and recommending feasible suggestions for improving the system functioning. This involves studying the business process, gathering operational data, understand the information flow, finding out bottlenecks and evolving solutions for overcoming the weaknesses of the system so as to achieve the organizational goals. System Analysis also includes dividing the complex process involving the entire system, identification of data store and manual processes.

The major objectives of system analysis are to find answers for each business process; what is being done, how it is being done, who is doing it, when is he doing it, why is it being done and how can it be improved? It is more of thinking process and involves the creative skills of the system analyst. It attempts to give birth to a new efficient system that satisfies the current needs of the user and the scope for future growth within the organizational constraints.

The result of this process is the logical system design. System analysis is the iterative process that continues until a preferred and acceptable solution emerges. Requirement analysis also provide software designer with a representation of information, function, and behavior that can be translated to data, architectural, interface, and component-level designs.

Finally, the requirements specification provides the developer and the customer with the means to assess quality once software is built. Software requirements analysis may be divided into five areas of effort: (1) Problem recognition, (2) evaluation and synthesis, (3) modeling, (4) specification, and (5) review. Initially, the analyst studies the system specification (if one exist) and the software project plan.

5.1. SYSTEM ARCHITECTURE

A system architecture is a conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. The architecture is not operational software. Rather ,it is a representation that enables a software engineer to analyze the effectiveness of the design in meeting its stated requirements, consider architectural alternatives at a stage when making design changes is still relatively easy, and reducing the risk associated with the construction of the software.

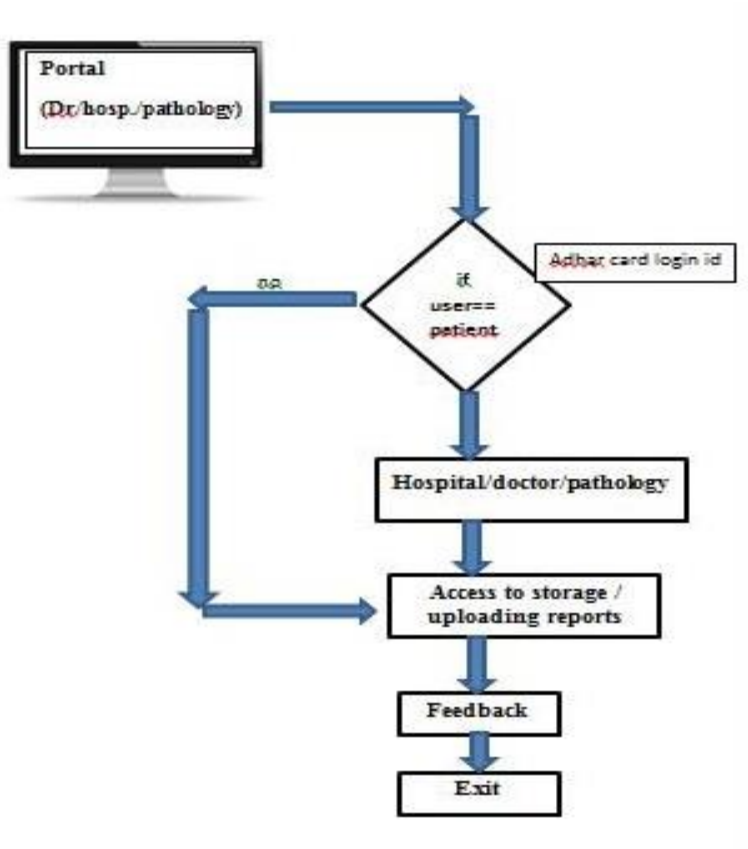


Fig .5.1 System Architecture

5.2. SEQUENCE DIAGRAM

A sequence diagram shows object interactions arranged in time sequence. It depicts the objects involved in the scenario and the sequence of messages exchanged between the objects needed to carry out the functionality of the scenario. Sequence diagrams are typically associated with use case realizations in the Logical View of the system under development. Sequence diagrams are sometimes called event diagrams or event scenarios.

The sequence diagram for project follows –

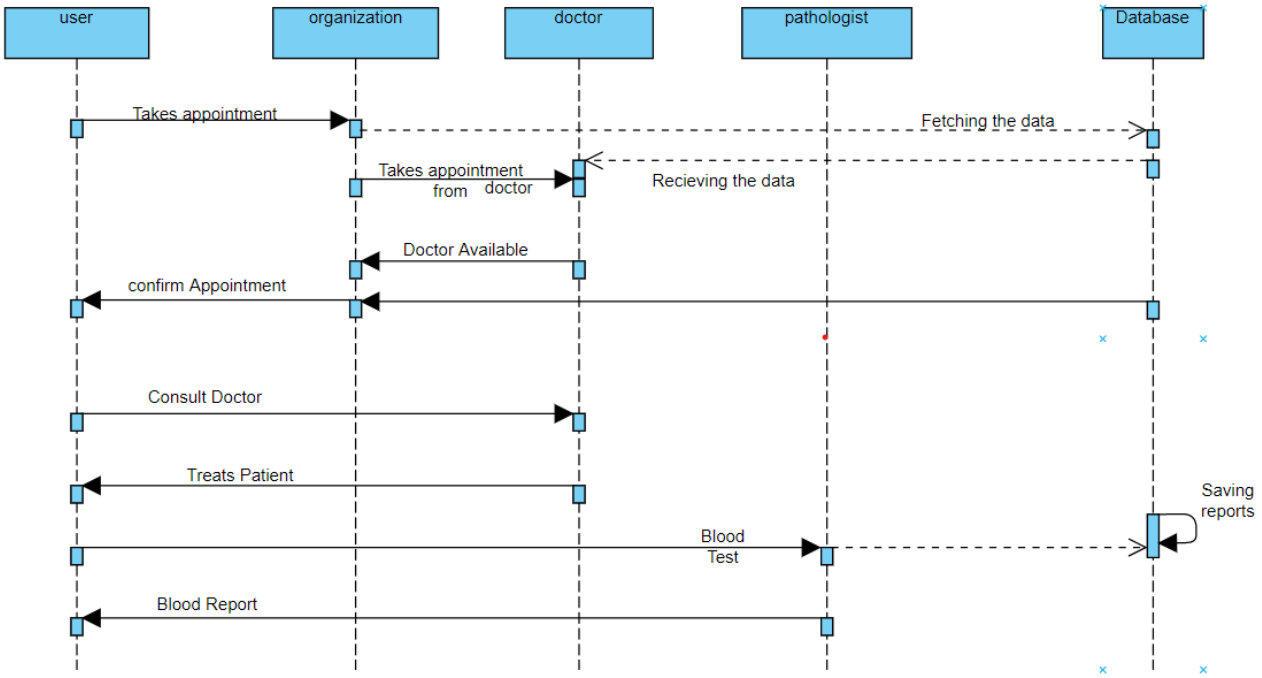
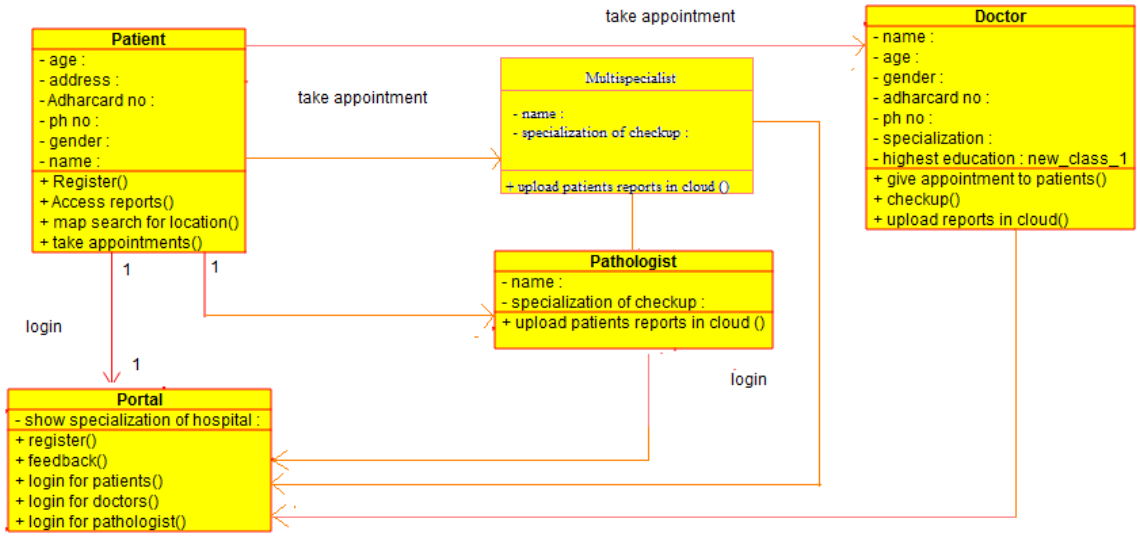


Figure 5.1: Healthcare and Monitoring System Sequence Diagram

5.3. CLASS DIAGRAM

The class diagram is the main building block of object-oriented modelling. It is used both for general conceptual modelling of the systematics of the application, and for detailed modelling translating the models into programming code. Class diagrams can also be used for data modeling.

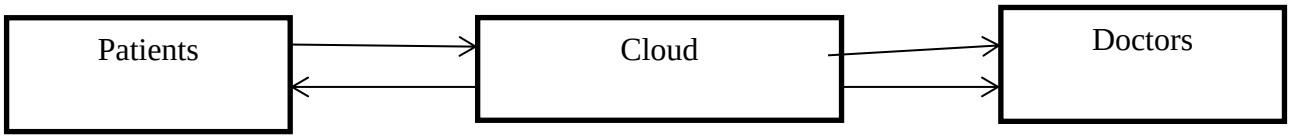


5.3 CLASS DIAGRAM

In the above figure there are four classes as alcohol sensor, raspberry pi, relay board, motor with there specific attributes and operations that they will perform. In this class diagram, associations between two classes are one to one associations.

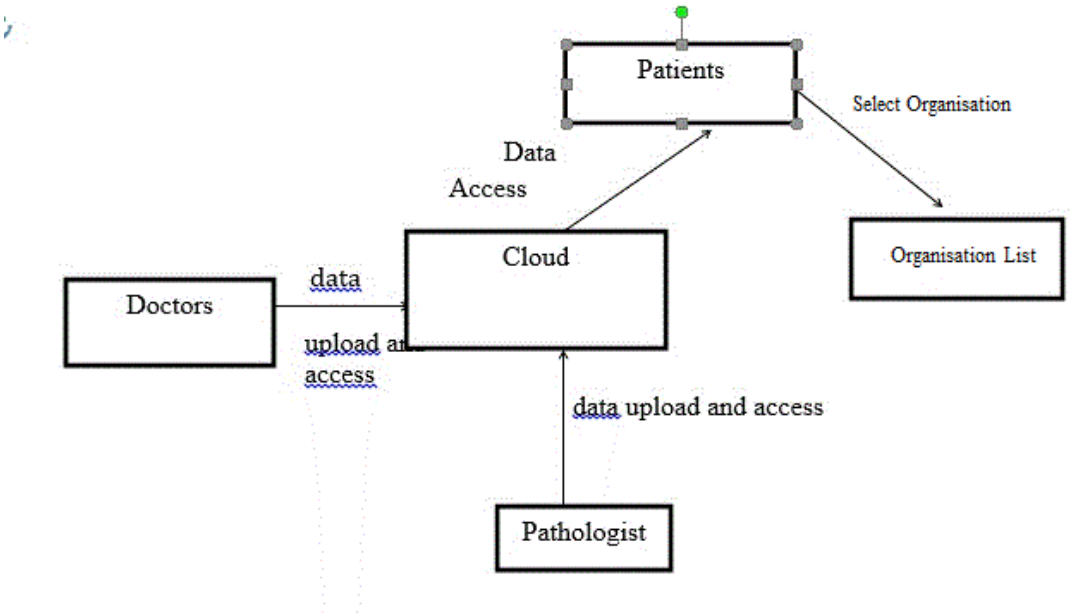
5.4.DATA FLOW DIAGRAM

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modelling its process aspects. A DFD shows what kind of information will be input to and output from the system, how the data will advance through the system, and where the data will be stored. It does not show information about the timing of process or information about whether processes will operate in sequence or in parallel unlike a flowchart which also shows this information.



Level 0- DATA FLOW DIAGRAM

A context diagram is a top level (also known as "Level 0") data flow diagram. It only contains one process node ("Process 0") that generalizes the function of the entire system in relationship to external entities.



Level 1- DATA FLOW DIAGRAM

The next stage is to create the Level 1 Data Flow Diagram. This highlights the main functions carried out by the system. As a rule, we try to describe the system using between two and seven functions - two being a simple system and seven being a complicated system. This enables us to keep the model manageable on screen or paper.

Figure 5.4: Healthcare and Monitoring Level-1 DF

6.SNAPSHOT OF ALL INTERFACES

6.1.1. Home screen of website

Figure 6.1.1. : Home screen of website

This is the User Interface of the website which is seen when the user opens the home page.

6.1.2. About us

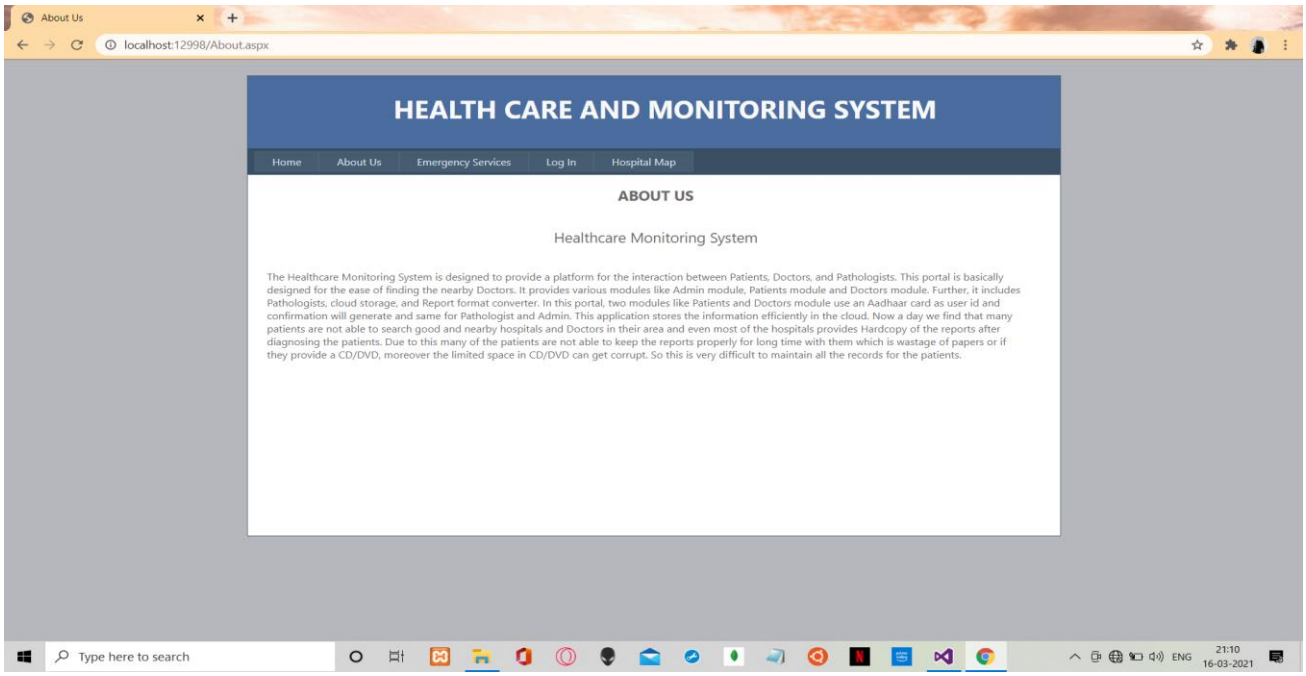


Figure 6.1.2. : About us screen

In this screen , we are just putting the examples of system organizers for the helping of the patients / use

6.1.3. Login Screen

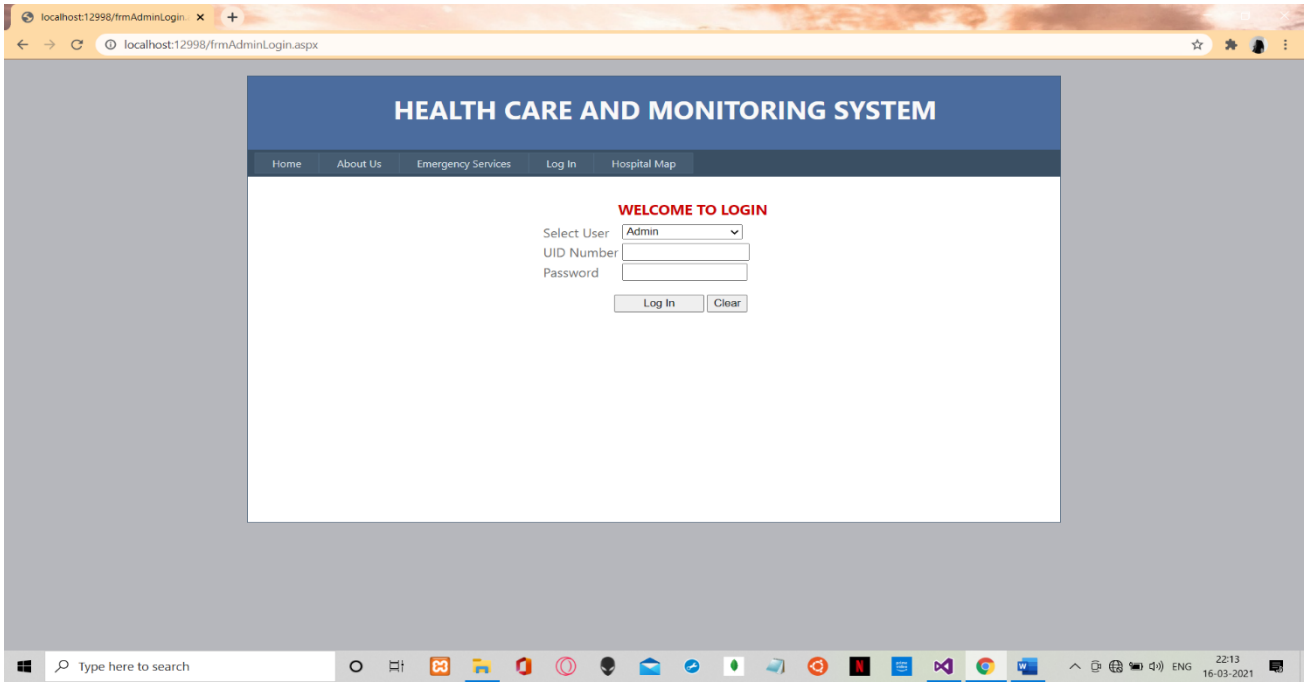
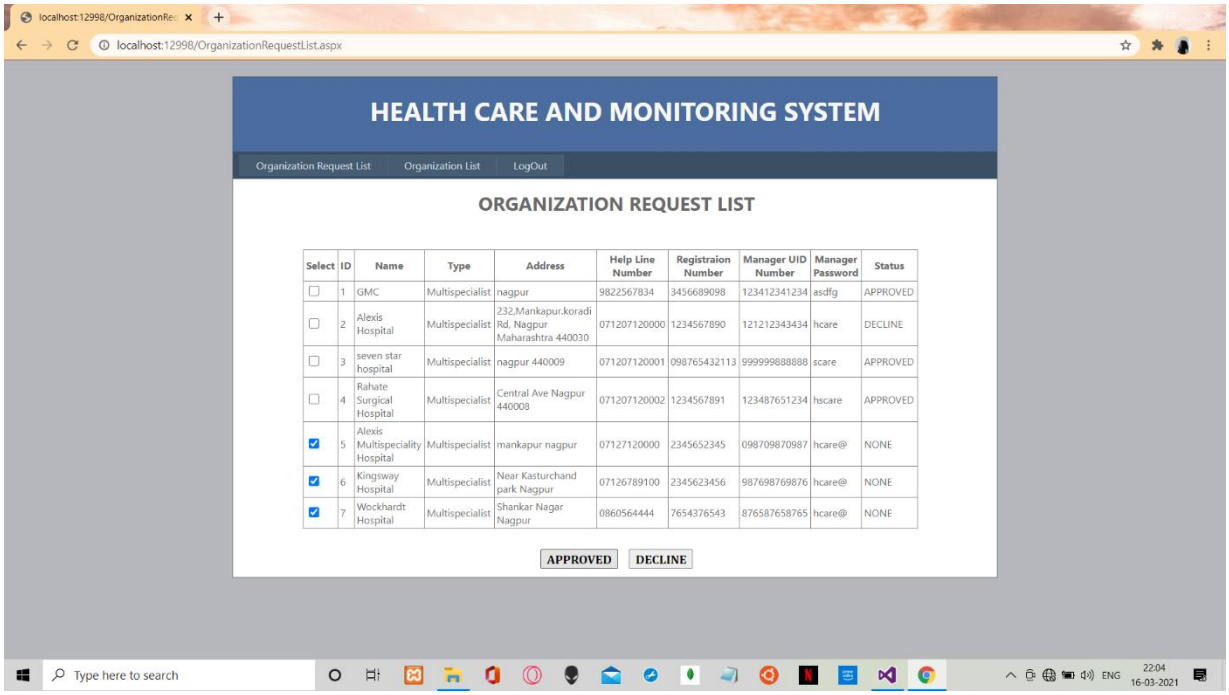


Figure 6.1.3. : Login Page

In the login screen, a user can register his or her id in the website by using its own adhar number.

6.1.4. An organization list view

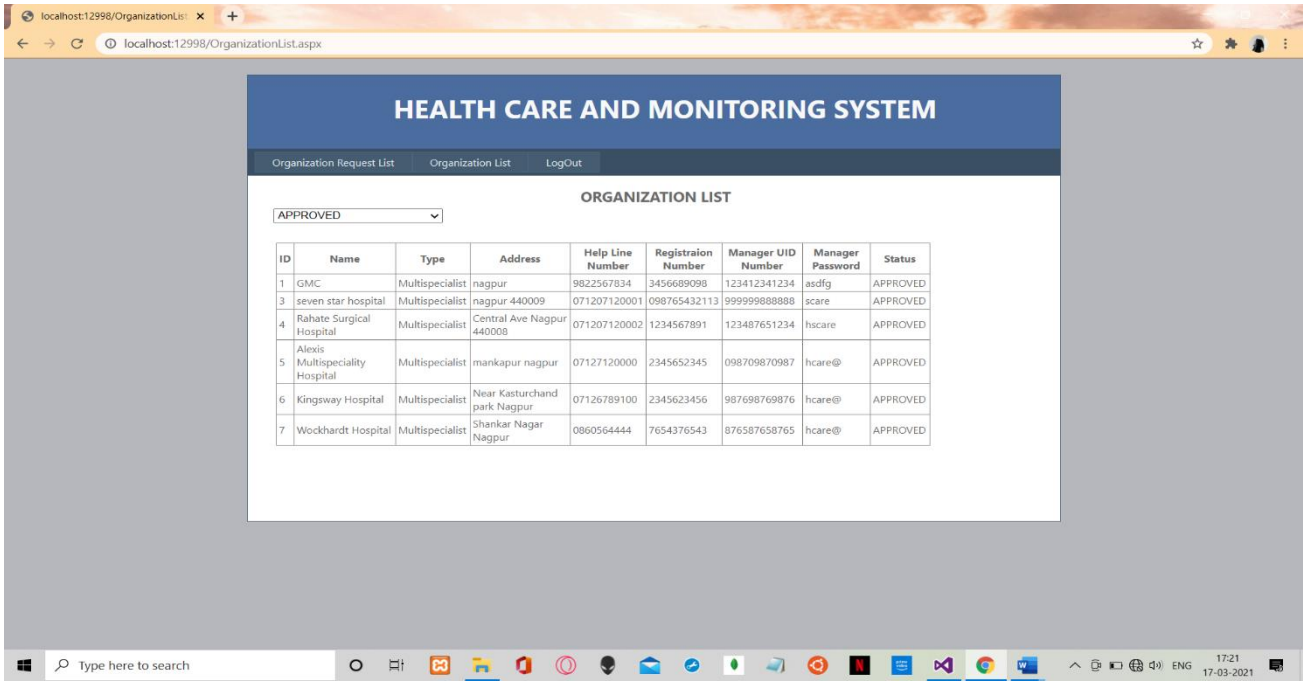


Select	ID	Name	Type	Address	Help Line Number	Registraion Number	Manager UID Number	Manager Password	Status
☐	1	GMC	Multispecialist	nagpur	9822567834	3456689098	123412341234	asdfg	APPROVED
☐	2	Alexis Hospital	Multispecialist	232,Mankapur,koradi Rd. Nagpur Maharashtra 440030	071207120000	1234567890	121212343434	hcare	DECLINE
☐	3	seven star hospital	Multispecialist	nagpur 440009	071207120001	098765432113	999999888888	scare	APPROVED
☐	4	Rahate Surgical Hospital	Multispecialist	Central Ave Nagpur 440008	071207120002	1234567891	123487651234	hscare	APPROVED
☑	5	Alexis Multispeciality Hospital	Multispecialist	mankapur nagpur	07127120000	2345652345	098709870987	hcare@	NONE
☑	6	Kingsway Hospital	Multispecialist	Near Kasturchand park Nagpur	07126789100	2345623456	987698769876	hcare@	NONE
☑	7	Wockhardt Hospital	Multispecialist	Shankar Nagar Nagpur	0860564444	7654376543	876587658765	hcare@	NONE

Figure 6.1.4. : Request List

In this view or screen , an organization wants to approved or may be decline the request of the patient.

6.1.5. Organization List View



ID	Name	Type	Address	Help Line Number	Registraion Number	Manager UID Number	Manager Password	Status
1	GMC	Multispecialist	nagpur	9822567834	3456689098	123412341234	asdfg	APPROVED
3	seven star hospital	Multispecialist	nagpur 440009	071207120001	098765432113	999999888888	scare	APPROVED
4	Rahate Surgical Hospital	Multispecialist	Central Ave Nagpur 440008	071207120002	1234567891	123487651234	hscare	APPROVED
5	Alexis Multispeciality Hospital	Multispecialist	mankapur nagpur	07127120000	2345652345	098709870987	hcare@	APPROVED
6	Kingsway Hospital	Multispecialist	Near Kasturchand park Nagpur	07126789100	2345623456	987698769876	hcare@	APPROVED
7	Wockhardt Hospital	Multispecialist	Shankar Nagar Nagpur	0860564444	7654376543	876587658765	hcare@	APPROVED

Figure 6.1.5. : Request List

In this view or screen , an organization wants to approved or may be decline the request of the patient.

6.1.6. Login screen of organization

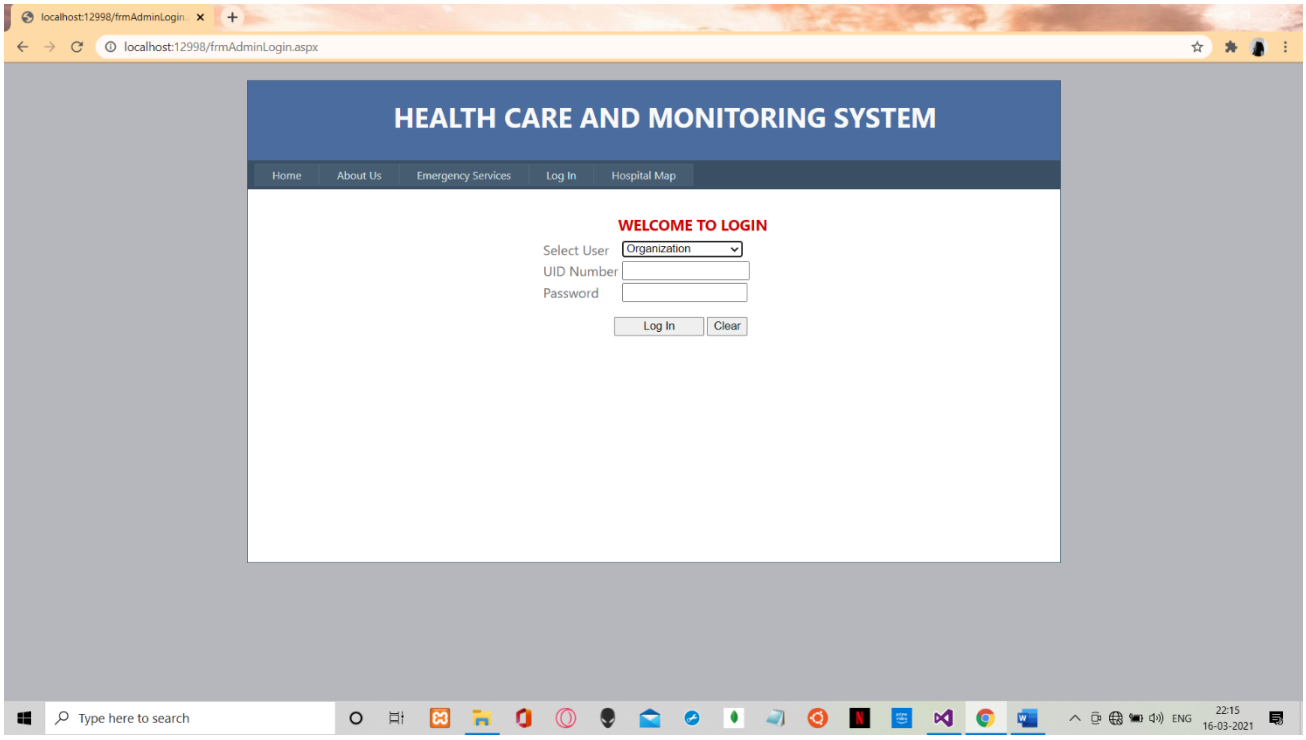


Figure 6.1.6. : Login For Organization

In this screen, an organization log in its own unique id using (adhar card) and password

Through website.

6.1.7. Organization Doctors Registration

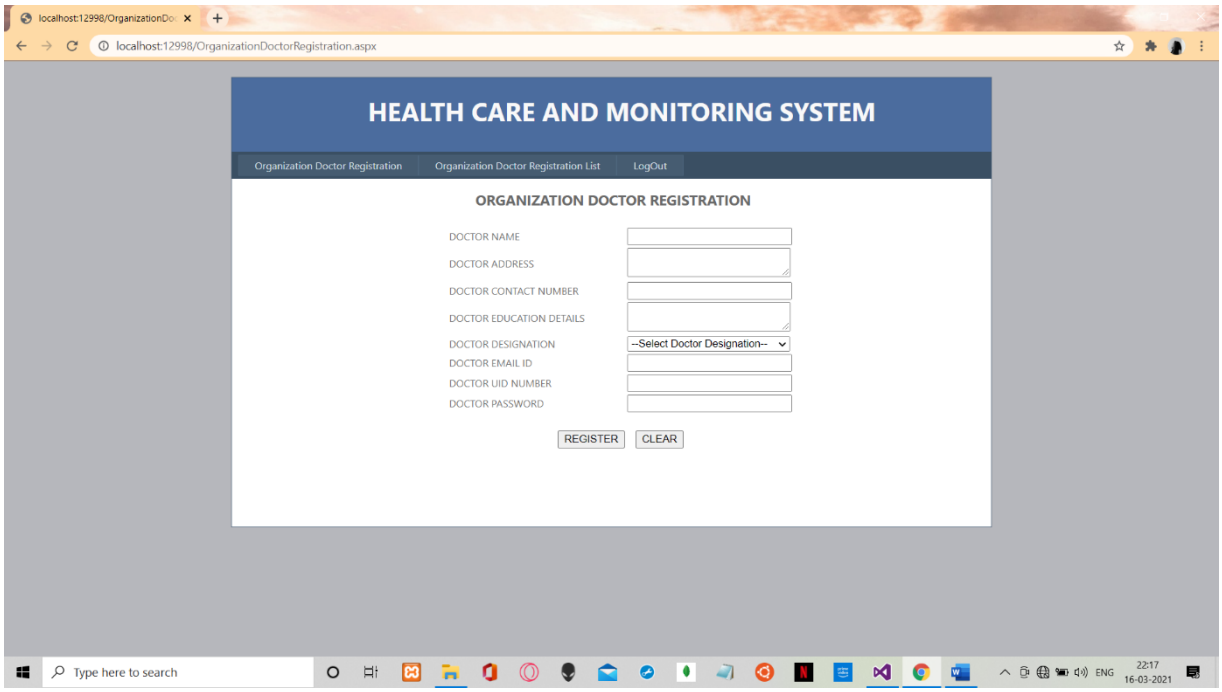


Figure 6.1.7. : Registration Form for organization doctors

Here in this screen an organization registered the doctors according to its specialty for the diagnose.

6.1.8. Specialty of doctors

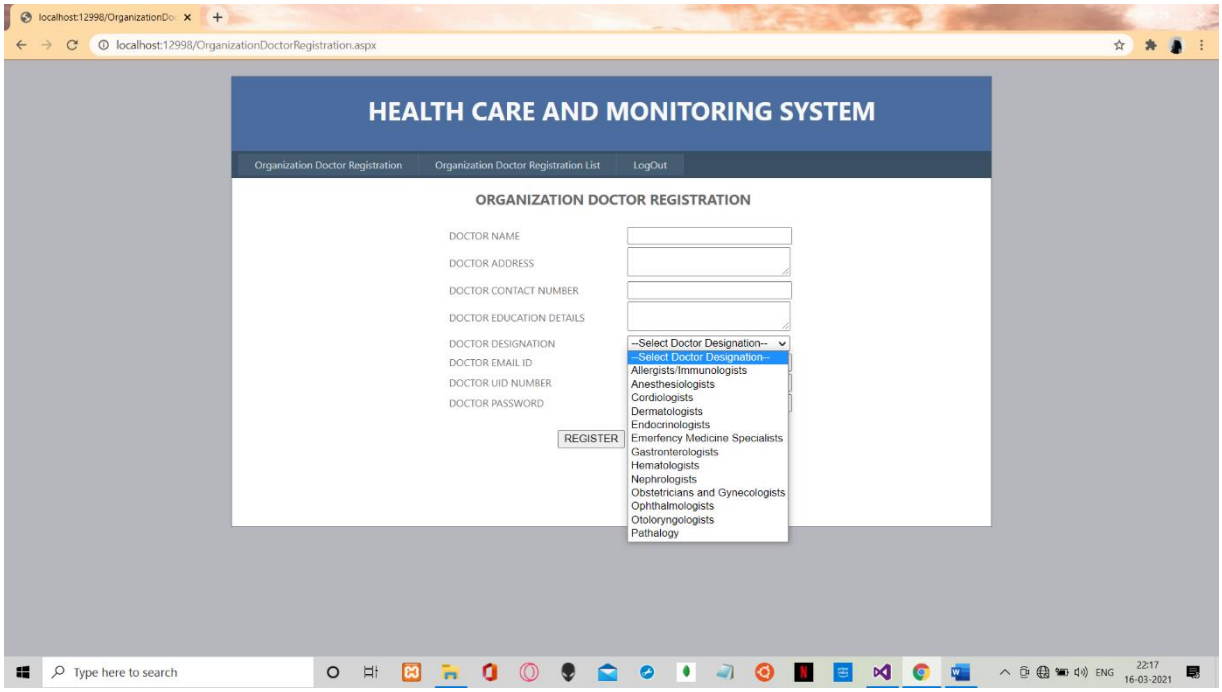


Figure 6.1.8.：Specialty Of Doctors

Here, an organization will registered the doctors according to its specialization in that only registered doctors are allowed.

6.1.9. Login page of department

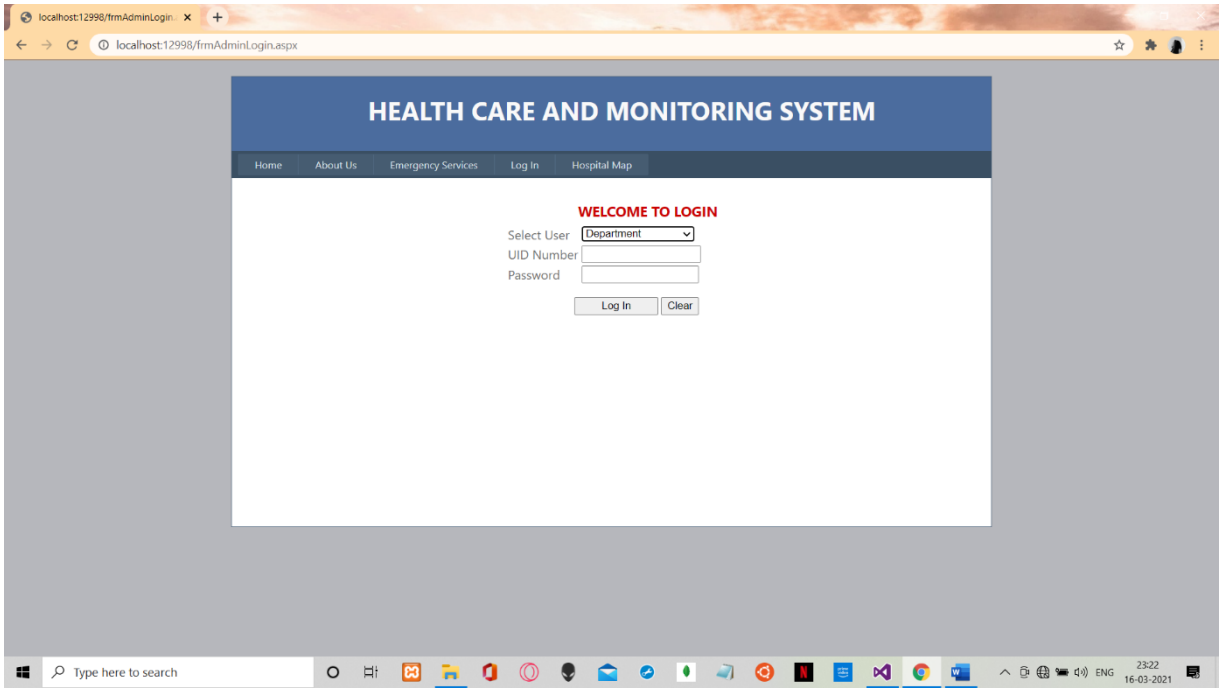


Figure 8.1.9.: login page for department

Here department will allow to login using UID Numbers and password.

6.1.10. Patient registration on website

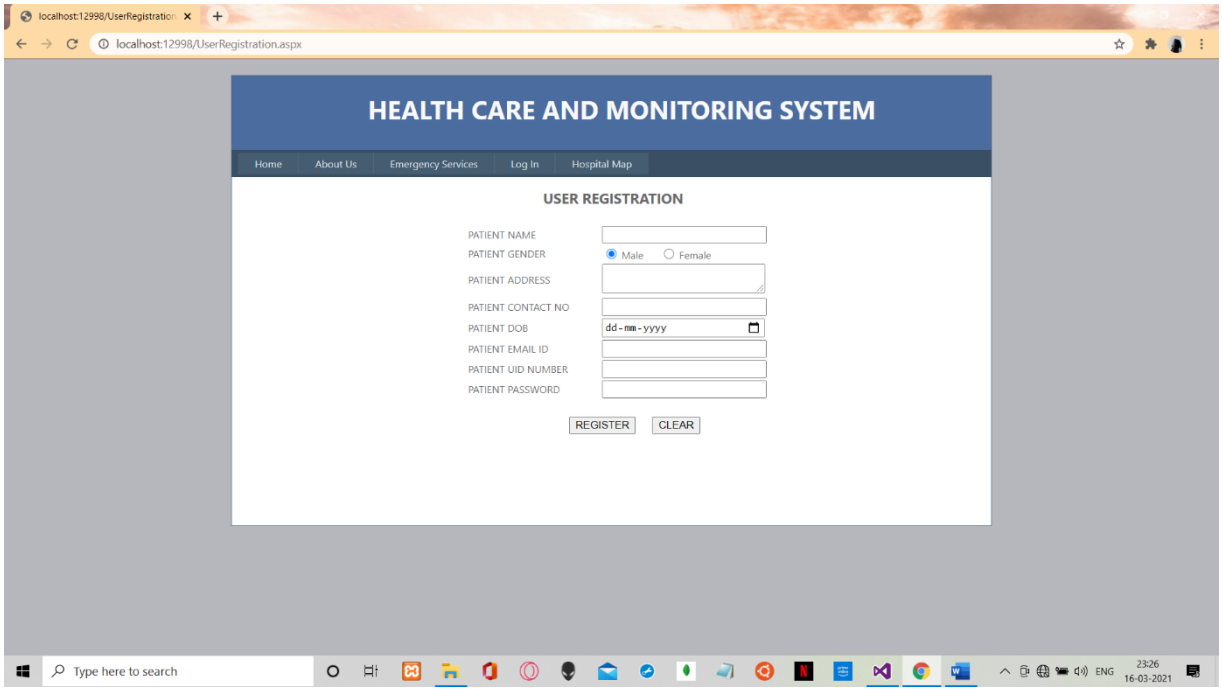


Figure 8.1.10. : Registration Page For Patient/User

In this page, patient can registers first by filling the form.

6.1. 11. Organization Registration Request

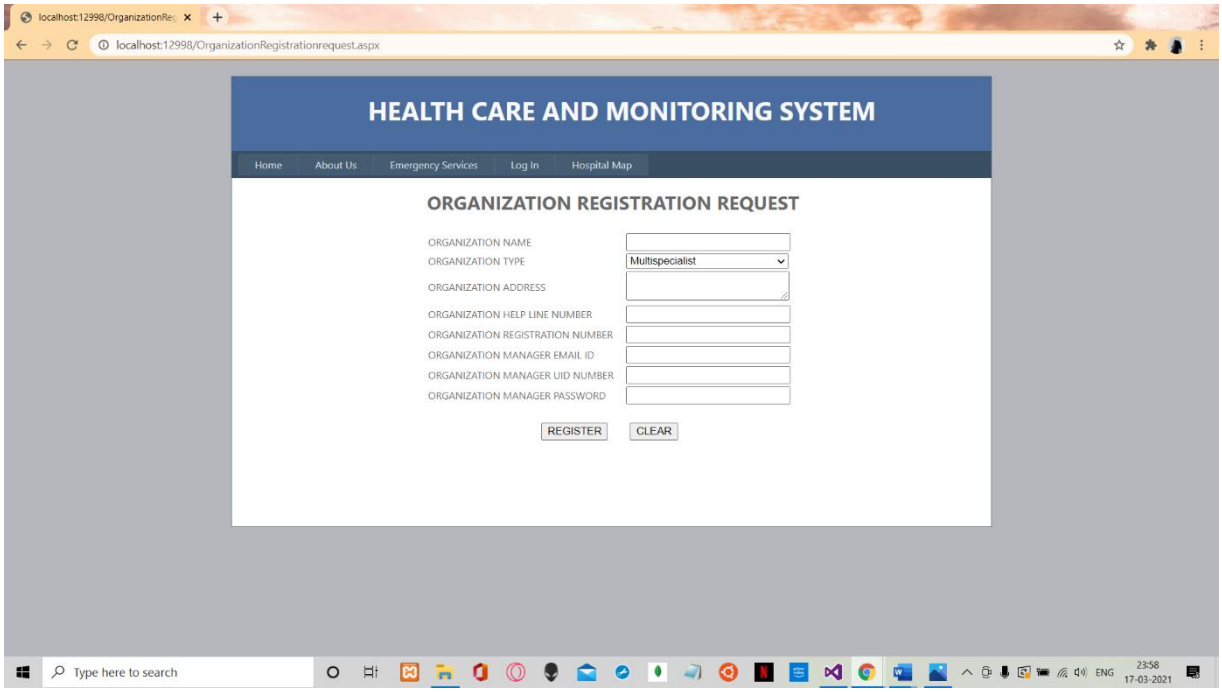


Figure 6.1.11. : request page for organization

It is necessary to fill up the form while registering on the website

8.1.12. User / patient registration

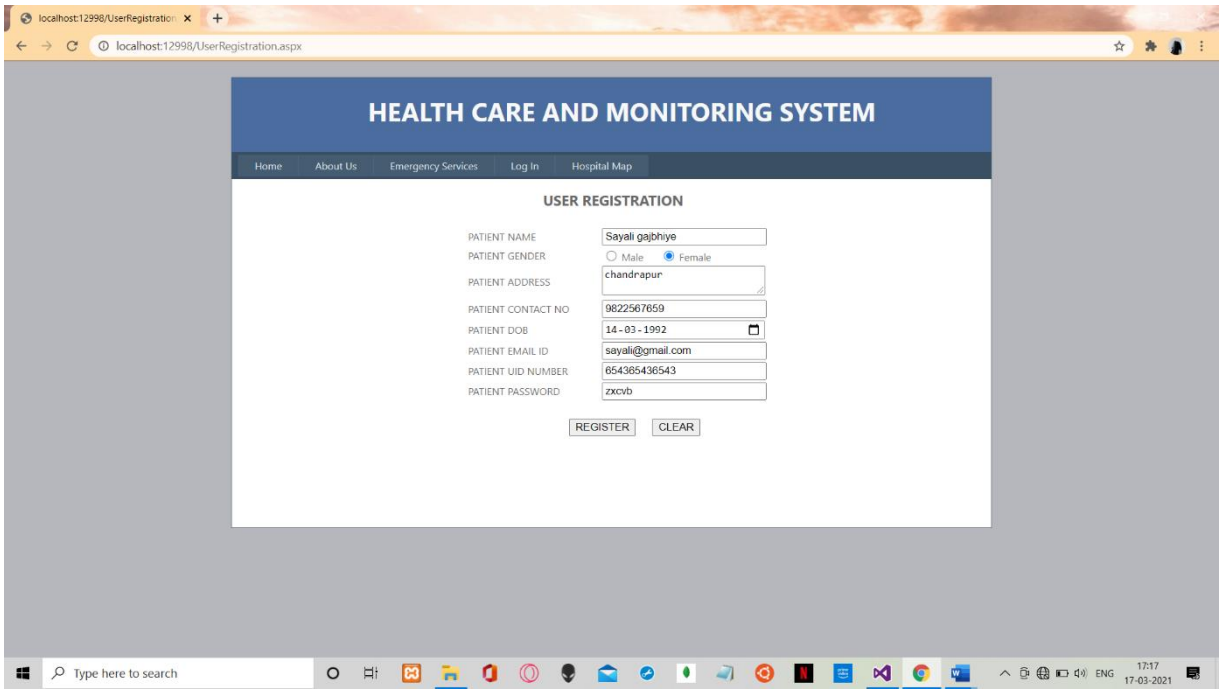


Figure 8.1.12. : User Filling The Form

User /patient registering on the website for selecting the appointment with the doctor.

This is an acknowledgement return to user when he or she entered its own email-id in the user registration form.

6.1.13. Appointment request

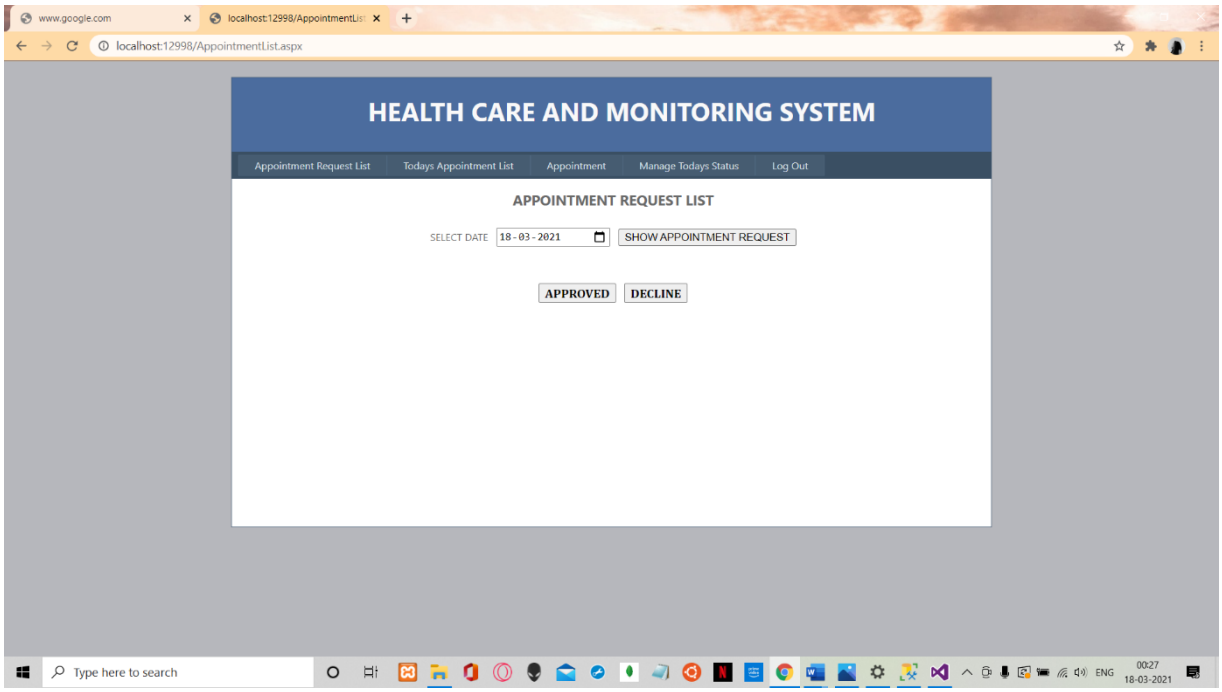


Figure 6.1.14. : Selecting Appointment Date

6.1.15. Appointment request

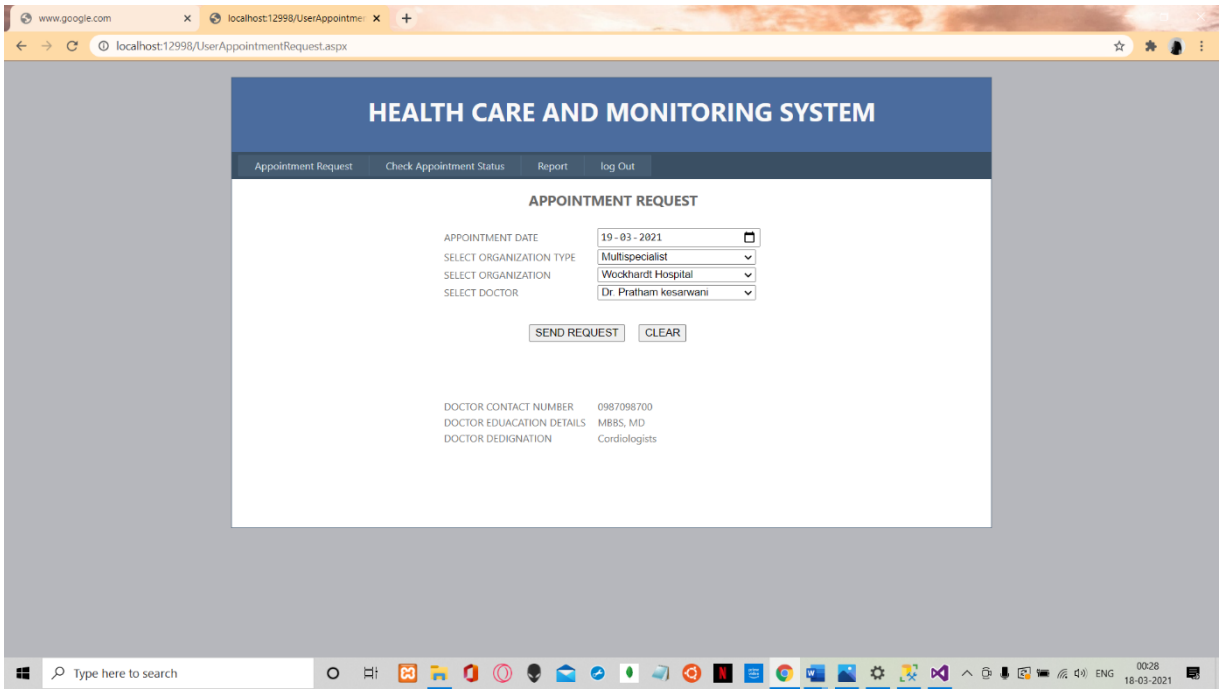


Figure 6.1.15.: Sending Appointment Request To Doctor

This is a request of the user when he or she sends request to the particular doctor for the appointment.

6.1.16. Users Appointment list

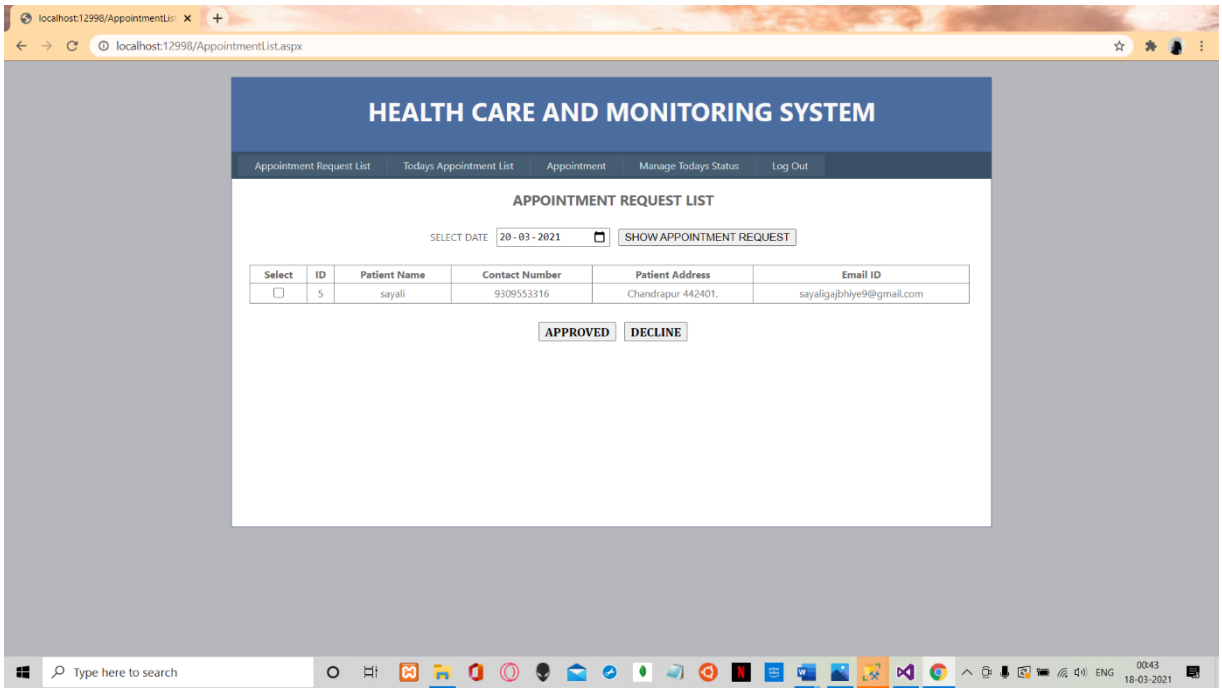


Figure 8.1.16. : appointment list of users

This is the final appointment list of the patient.

8.1.17. Status

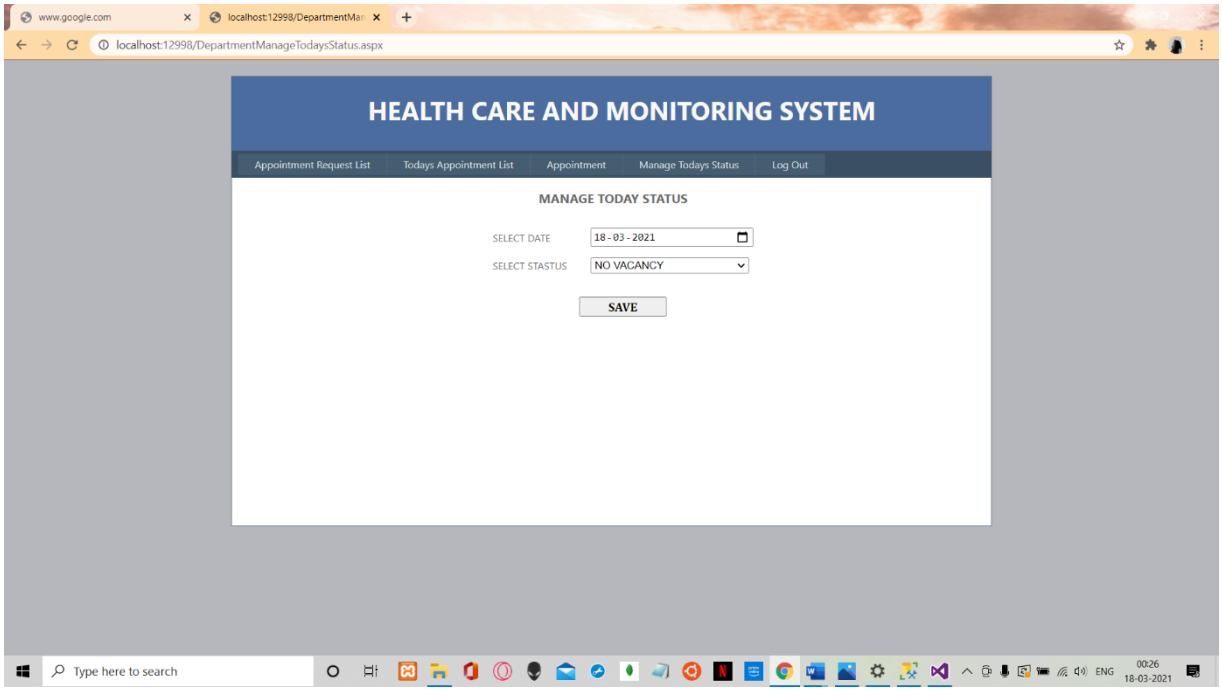


Figure 8.1.17. : status

It is the status of the present day.

6.1.18. Tests for the patients

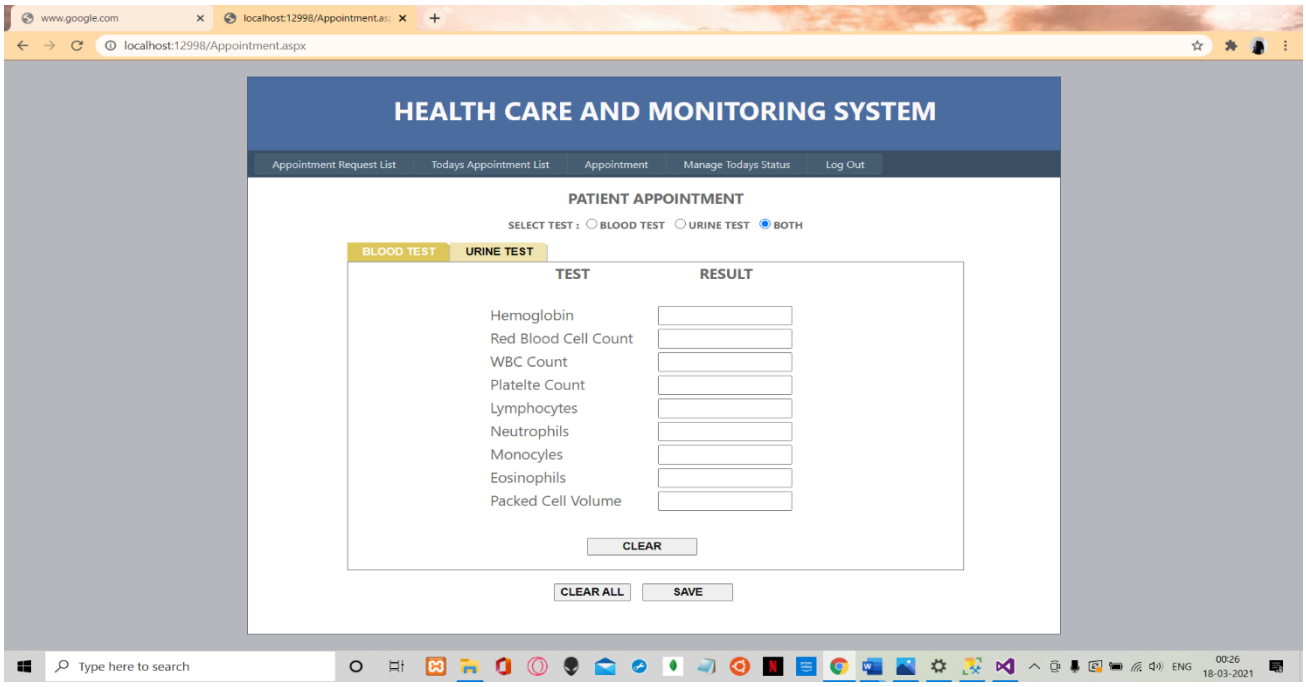
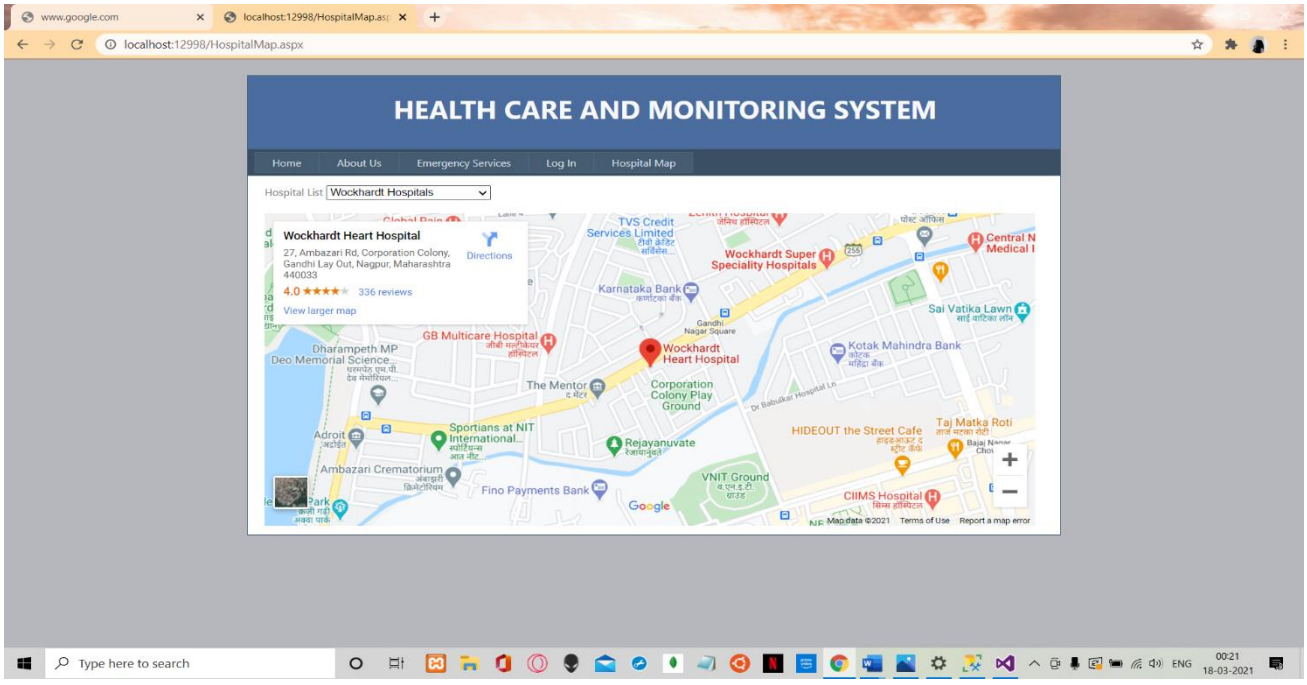


Figure 6.1.18. : Contents Adding Page For Doctor



After fixing appointment with the doctor a patient is going to the doctor for the checkup. Then if patient wants to test the blood then doctor will perform its formality then the blood samples are collected from the patient body .And after that doctor will put patient blood test contents on the patient id using the cloud. Also user can access its own report anywhere anytime. Due to this it also helps the patient to store its own backup on his or her registered id . And there is no need to carry all the reports manually.

1. TESTING

The healthcare and monitoring system is a process website by which the software developed for desktops is tested for its functionality, usability and consistency.

The website was tested for its functionality after the completion of each of the four modules. In the admin module testing was done for proper approval and decline of the request is coming from organization and this happens at when the organization is register on the website for the next procedure .

After the completion of an organizations registration also like this the organization will register the doctor in its selected department which depends on the specialty of the doctor for checking the patients diagnose.

But for that, there is a main role of patient module who will select his appointment through website and all these information will stored in the cloud . Every module will depend on one another. All the four modules are tested one by one and sequentially for its functionality, usability and consistency.

Testing is the process of executing the program with the intention of finding out errors. During testing, the program to be tested is executed with a set of test cases and the output of the programs for the test case is evaluated to determine if the program is performing as it is expected to be.

The success of testing in revealing errors in program depends critically on the test cases. In software system the use of testing is not limited to the testing phase. The results of testing are used later on during maintenance also. During testing a test suite can be used to see that modification doesn't have any undesirable effect

The basic levels of testing are:

- Unit testing
- Integration testing
- System testing
- Acceptance testing

These different levels of testing attempt to detect different types of faults. The relation of faults introduced in different phases and the different levels of testing are as shown in figure:

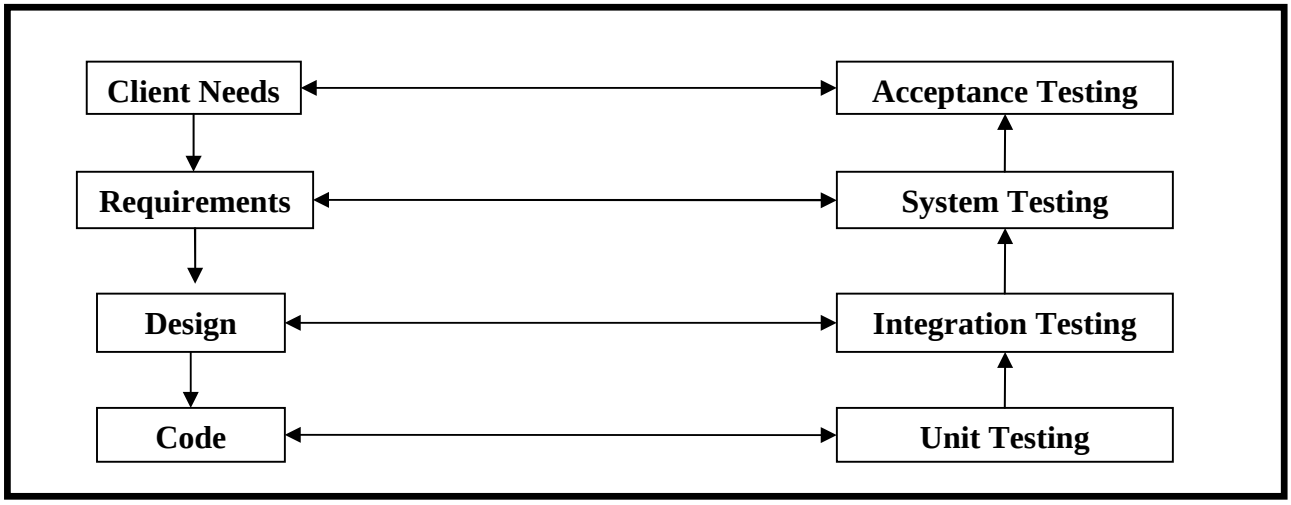


Figure 7.1: Level of Testing

1. Unit Testing

The level of testing is called unit testing. In this, different modules are tested against the specifications produced during design for the modules. Unit testing is essential for verification of the code produced during the coding phase, and hence the goal is set to test the internal logic of the modules.

2. Integration Testing

The next level of testing is often called the integration testing. In this, many tested modules are combined into subsystems, which are then tested. The goal here is to see if the modules can be integrated properly, the emphasis being on testing interface between modules. This testing activity can be considered as testing design, and hence the emphasis on testing modules interactions.

3. System Testing

During system testing, the system is used experimentally to ensure that the software doesn't fail, i.e. it will run according to its specifications and in the way users expect, special test data input for processing, and the results examined. A limited number of users may be allowed to use the system can see whether they try to use it in unforeseen ways.

4. Acceptance Testing

It is sometimes performed with realistic data of the client to demonstrate that the software is working properly. Testing here focuses on the external behavior of the system. The internal logic of the program is not emphasized.

5. Validation Check

During testing section validations checks are made. Appropriate actions are taken after testing.

8. CONCLUSION FUTURE WORK

With the wide use of internet this work is focused to implement the internet technology to establish a system which would communicate through internet for better health. The main idea of the proposed system is to provide better and efficient health services to the patients by implementing a networked information cloud so that the experts and doctors could make use of this data and provide a fast and an efficient solution.

The Smart Healthcare Monitoring System is designed to provide a platform for the patients to find nearby hospital and pathology And also book appointment for particular hospital. .Doctor will diagnose patients and upload their reports in cloud, so the patient will access their reports anytime anywhere and there is no need to carry all the reports manually.

9.REFRENCES & BIBLIOGRAPHY

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