RFID BASED PAPERLESS HOSPITAL

BY

Pramit Ganguly
ID 151-15-5061

Md. Ibrahim Khan
ID 151-15-4739

Md. Hisham
ID 151-15-5092
AND

Md. Inzamam Ul Hossain
ID 151-15- 4851

This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering.

Supervised By
Fahad Faisal
Senior Lecturer
Department of CSE
Daffodil International University

Co-Supervisor By
Aniruddha Rakshit
Lecturer
Department of CSE
Daffodil International University

DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

APPROVAL

This Project titled **"RFID BASED PAPERLESS HOSPITAL"**, submitted by Pramit Ganguly, Md. Ibrahim Khan, Md. Hisham and Md. Inzamam Ul Hossain to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering (BSc) and approved as to its style and contents. The presentation has been held on 26 November, 2018.

BOARD OF EXAMINERS

_____

Dr. Syed Akhter Hossain — **Chairman**
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Faculty of Science & Information Technology
Daffodil International University

_____

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Associate Professor & Associate Head
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Faculty of Science & Information Technology
Daffodil International University

_____

Md. Zahid Hasan — **Internal Examiner**
Assistant Professor
Department of Computer Science and Engineering
Faculty of Science & Information Technology
Daffodil International University

_____

Dr. Mohammad Shorif Uddin — **External Examiner**
Professor
Department of Computer Science and Engineering
Jahangirnagar University

DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Fahad Faisal, Senior Lecturer, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

Supervised by:

_____

Fahad Faisal
Senior Lecturer
Department of CSE
Daffodil International University

Co-Supervised by:

_____

Aniruddha Rakshit
Lecturer
Department of CSE
Daffodil International University

Submitted by:

_____

Pramit Ganguly
ID: 151-15-5061
Department of CSE
Daffodil International University

_____

Md. Inzamam Ul Hossain
ID: 151-15-4851
Department of CSE
Daffodil International University

_____

Md. Ibrahim Khan
ID: 151-15-4739
Department of CSE
Daffodil International University

_____

Md. Hisham
ID: 151-15-5092
Department of CSE
Daffodil International University

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ABSTRACT

Our government has taken many steps to transform our country into Digital Bangladesh. But the health sector is still lagging behind on the digitalization. Despite government hospitals being the primary source of health service of Bangladesh, they are run still run with the legacy system relying on the paper documents. The problem with the existing system is that, medical data is lost almost all the times and we cannot reuse this huge amount of data for further research. Also, the existing system takes long time to process because it takes time and extra man-power for authorization and calculation of information. Our main goal of this project is to eliminate the paper system and implement a digital system for long term storage of medical data and facilitate medical research. By using our system, patients will be able to get better health care in less time and in an organized way. Data sharing between departments and sections will be done in seconds and without needing any extra man-power or time. Finally, our goal is to implement digitalization in the most neglected heath care system so that it doesn't fall behind from the current digital trend.

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CHAPTER -1

INTRODUCTION

1.1 Introduction

Health care sector is now significant financial resources in almost every country in the world. Technological development in this sector is the most premising factors of all. The major reason of the health facility are to provide patients with proper diagnosis and treatment. This process is still dependent on documentation. RFID can improve this diagnostic system and perform several actions automatically

In this context, there is a solution to improve medical & patient facility using RFID technology that will provide safe and secure services for both patients and medical stuffs with a lower operational cost.

RFID, stands for Radio Frequency Identification, Radio-recurrence distinguishing proof or known as RFID utilizes electromagnetic fields to naturally recognize and track labels connected to objects. The labels contain electronically-put away data. Aloof labels gather vitality from an adjacent RFID per user's questioning radio waves. Dynamic labels have a neighborhood control source, (for example, a battery) and may work many meters from the RFID per user. Not at all like a scanner tag, the label requires not be inside the observable pathway of the per user, so it might be implanted in the followed question. A fundamental RFID has three parts:

1. An Antenna or curl
2. A transmitter (with decoder)
3. A transponder (RF tag)

RFID tags will be helpful for contribute in hospital system. Everywhere in this world, RFID is an important part in digital factory or Industry, RFID has also been found to be of great help in

improving the records of patients, medicines where the digital of these operations improves their efficiency and safety. This contribution reviews the state-of-the-art of RFID for hospital applications, describing the contributions to improve medical services and discussing the limitations. We already know that a lot of effort has been put into software development, but most of the time a detailed study of the physical layer is not properly conducted. It describes a basic RFID system for tracking and managing system in hospitals & provide additional details about implementation aspects that must be considered to ensure proper functionality of the system. The scope of the RFID system described in this contribution is restricted to a little area but the architecture is fully scalable to cover the needs of the different medical services in the hospital.

RFID is a growing trend in the hospital ensuring the safety of every patient's treatment and services they pay for. The method of authentication by typing is ineffective in hospital environment. Using of smart cards improves the authentication system between patients and employees reducing time costs which makes this technology more efficient. RFID technology can improve medical facility by ensuring the link between the samples and the patients. This paper presents RFID based paperless activity to improve hospital facility.

1.2 Motivation

We have already chipped away at different ventures that include inserted gadgets, for example, PIC microcontroller, Raspberry Pi, Fingerprint Device and RFID label per users. So, we needed to accomplish something identified with installed gadget for our last task. As we as a whole know our legislature is executing numerous things for digitalizing Bangladesh, however there is still no plans for the administration doctor's facilities. There are numerous Hospital Management System effectively done before us however none of them makes it less demanding to give the best support of a patient. For the most part since they have muddled framework for ID framework for the patient. Likewise, such a large number of papers are utilized and squandered for such a significant number of purposes it makes everything bit complex. We as a whole realize that papers are produced using wood thus numerous trees are being chopped down which isn't useful for our condition. So, we needed to make the framework smoother and simpler by incorporating RFID based card ID. In our framework, the patient requires no login and just needs an ID card given by the doctor's facility. The healing center will have the capacity to utilize that ID card for the patients

each activity. Each datum from test results to remedies and everything else will be put away in a committed database.

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1.3 Objectives

First of all, the most important objective of our project is to make a paperless hospital. As we all know that a hospital uses a lot of papers such as for prescription, reports, test etc. By using the card that we will provide to the patients they don’t have to get new prescriptions or reports every time they go the hospital, they can just simply use the cards. Also, doctors don’t have to write a new prescription for the same patient every time the doctors can just use the cards instead. Even if the same patient has different disease, he or she don’t need another new prescription he or she can use the card instead. To make this more obvious we can state that:

- Utilizing the RFID card that we will give to the patients they don't need to get new solutions or reports each time they go the clinic they can basically utilize the cards.

Additionally, specialists don't need to compose another solution for a similar patient each time the specialists can simply utilize the cards.

- It likewise makes work less demanding for specialists since utilizing the card they can get all information about a specific patient on the double. For instance, the specialist can think about various maladies of that patient and tests the patient have done and dependent on that the specialist can give the patient appropriate treatment.

- Regardless of whether a similar patient have distinctive ailment him or she needn't bother with another new remedy he or she can utilize the card.

- Every one of the information in about the patients can be utilized to for research like - viability of a particular medication, sickness in a particular area, number of patients, readmission rate of patients, human services look into and some more.

- Utilizing this framework there is no possibility of losing any data as it's put away in our database and in the event of database disappointment, we additionally have reinforcement database so zero chance of losing any sort of data.

1.4 Expected Outcome

- Putting away all information in a committed database and utilizing the RFID card for all the task of clinic, there won't be any utilization of paper.

- It will make things simpler for patient as he or she can get to everything in with card, he or she doesn't need to oversee medicines for each time they go to doctor's facility. Likewise understanding doesn't have to login. All tests and reports and every last trace of the detail will be put away in the clinic's database.

- Commonly the patient loses past papers of restorative records which limits the consistency of the specialist. By keeping every one of the records in a database and expelling the paper from the procedure, there will be no loss of data.

- Specialists will have the capacity to give better treatment as they will have the capacity to get to every single restorative record, test results and endorsed meds of the patients.

This proposed project system provides different facilities for activities of different users So this task offers a viable answer to make a hospital paperless.

1.5 Report Layout

The initial part of the report consists of title page, declaration page, abstract, list of tables, list of figures.

Then in chapter 1 we talked about RFID technology and how it works. We also discussed what motivated us to make this project, our main goal of the project and the expected outcome of our project.

In chapter 2 we discussed a little bit about our project. We talked about current medical facilities and their current system of work then we also briefed about related works that has been done which means RFID based other projects and also compared with another candidate system. Then we talked about the scope of the problem in details.

In chapter 3 we specified the requirements of the project and briefly talked about business processing model. Then we talked about how we collected and analyzed with those specified requirements. We also defined use case diagram, data flow and logical data model. At the end of the chapter 3 we also mentioned the design requirements.

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In chapter 4 we specified the front-end design of our system in details as it's one of the most important part of our project and we also specified about the back end too. Then we briefly talked about interaction design, UX and implementation requirements.

In chapter 5 we talked about the implementation of the whole project. First, we have shown how we implemented our database. Then we exhibited the implementation of our front design using HTML, CSS, Node.js, Angular, JavaScript, typescript. Then we exhibited the implementation of interactions in details. At the end of chapter 5 we have talked about testing implementation and test results and project.

In chapter 6 we discussed about conclusion and scope for further developments.

In the final part of the report we give all the related references that we referred in our report.

CHAPTER –2

BACKGROUND

2.1 Introduction

In the present mechanical propelled time individuals and associations are putting their confidence and cash on task administration framework. Most recent few years just a couple of ventures were occupied with undertaking administration framework yet now individuals in each area and fields are considerably more engaged with task administration. With the utilization of current cutting-edge innovation many association's workplace has changed totally. In this part we endeavor to give a related thought regarding RFID based paperless doctor's facility application framework.

2.2 Related Works

RFID technology is starting to make progress into health sector, literature that systematically examines its potential in healthcare is still lacking as compared to those in the retail and the supply chain industry. On the other hand, RFID is not widely adopted in healthcare. Health sector is a complicated application domain and presents its unique features. A few studies were contributed to review in this area. For example, reviewed different ways how RFID systems are being used in hospitals. They watched on the applications and failed to discuss about the benefits and barriers. Their study isn't very helpful for making decision. Their review is more industrial oriented and doesn't follow a natural research framework. If we consider other studies, then it will also give an overview of the current research in applications of RFID in hospitals. Existing studies and research works were not included. Obviously, there is an urgent need to create a systematic review of knowledge toward RFID applications, benefits and barriers in health system. Our review aims not only to provide an assessment for other researchers but also to offer a useful guidance for implementing RFID-enabled systems for hospital administrators.

2.3 Comparative Studies

In this framework it makes things simple for specialists as they utilized RFID card per user to separate patient's id and patient's entire medicinal data to work with. It's likewise simple for patient to counsel specialist and see their entire medicinal data. The procedure is simple and basic and there is no possibility of losing any data.

2.4 Scope of the problem

In any hospital doctors and patients are the necessary part. the more they have the facilities they will give high attention on the hospital. The are some issues that hospital are facing and those are:

Medical mistakes: The IOM says that “tens of thousands of deaths and injuries are caused by medical mistakes every year” [1]. These medical mistakes can come from patient misidentification which is can be a serious risk for patient safety, infant missing or mismatch

Lost papers: It is known to all that many patients’ losses their medical papers such as prescription, test reports and others, if they don't have backup papers then they have to go again to that hospital and do all the past tests and furthermore need to go the specialist once more.

Inefficient workflow: It exists in every hospital because of the difficulty in allocating resources in real time. For that time, as the demands on doctor’s team increase and so decreasing time is needed to maintain proper system.

This all problems can be avoided by using our systems. As we will provide a RFID cards to each patient so that they will not face any trouble regarding the prescription, test reports and others because everything will be on that card. There’s also a chance to loss their card accidently but in our system that is not a issue because we have every information of each patient in our database. So that every patient can reissue card as many times they want if they losses their previous one.

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Inefficient workflow: It exists in every hospital because of the difficulty in allocating resources in real time. For that time, as the demands on doctor's team increase and so decreasing time is needed to maintain proper system.

The most important objective of our project is to make a paperless hospital. As we all know that a hospital uses a lot of papers such as for prescription, reports, test etc. By using the card that we will provide to the patients they don't have to get new prescriptions or reports every time they go the hospital, they can just simply use the cards. Also, doctors don't have to write a new prescription for the same patient every time the doctors can just use the cards instead. Even if the same patient has different disease, he or she don't need another new prescription he or she can use the card instead.

In this framework it makes things simple for specialists as they utilized RFID card per user to separate patient's id and patient's entire medicinal data to work with. It's likewise simple for patient to counsel specialist and see their entire medicinal data. The procedure is simple and basic and there is no possibility of losing any data.

Regardless of whether a similar patient have distinctive ailment him or she needn't bother with another new remedy he or she can utilize the card.

2.5 Challenges

We face many challenges at every aspects of our life. There is no work without challenges and there is no success without overcoming challenges. Applying RFID technology in the hospital system for promoting patient safety is a complex issue since it involves technological, economic, social, and managerial reasons. Some main issues are as follows

1) Technical issues: Technological limitations of RFID can harm its capacity especially for hospital. First, it is possible that RFID may interfere with the hospital environment e.g., medical devices. Secondly,, it is possible that RFID systems are not always reliable. It read accuracy depends on a variety of reasons such as tagged object, tag placement, angle of rotation, and read distance. Last, lack of commonly accepted proper standards prohibits RFID deployment in large scale, including standards of RFID data structure, air-interface, and local interface.
2) Cost: Costs include with hardware and software training, as well as the continuously high costs of infrastructure maintenance and upgrade. RFID requires not only tags and readers, but also additional servers, databases and applications. The difference in total cost can be real if all equipment and patients are tagged.
3) Privacy concerns: The benefits of using RFID are only if patients are confident that the data being transmitted will not be misused. When an RFID tag is associated with a patient, it contains the unique identification number that associates with any type of personal information, such as patient name, gender, home address, and medical history. This information is highly mobile and sensitive. Hospital organizations should ensure neither personal nor confidential information is transmitted via RFID. It is Data must be stored in a secure server. We also need to relieve the anxiety of hospital staff and patient. It's important to tell them about the purpose of this data collection. As the technology is regulated by more legislative bodies, public concerns will be neutral.

Other barriers: Other barriers to RFID adoption include the lack of organizational support, trust issues, security concerns etc.

CHAPTER -3

REQUIREMENT SPECIFICATION

3.1 Business Process Modeling

For organizations business processes this model act as an analytical illustration. Along with business process discovery, process modeling is widely viewed as a critical component in successful business process management [2]. Business process modeling is the graphical representation of a workflow, [3] as a means of identifying potential improvements. This is usually done through different graphing methods, such as the flowchart, data-flow diagram, etc.

BP modeling is used to map 2 different states of the process: As-is, the state of the process as it is right now, without making any changes or improvements, and To-be, the future state, after making the changes or improvements.

Business process modeling is usually used interchangeably with business process mapping – and they can be pretty much the same, depending on who you ask. They're both used to graphically represent processes as a means of identifying potential weaknesses or improvements. The popular distinction between the two, however, Business Process Mapping – dealings with both high-level and low-level mapping. i.e., it can be a very generic representation of a process, without getting into too much detail, or pretty much the exact opposite. [4]

3.2 Requirement Collection & Analysis

For software under development, requirement specification is an extensive description of the intended purpose and environment [5]. For applications, requirement specification is a perfect description for its purpose. In this section, we will identify what we need to do to complete or analysis our system. Here patient is main controller of this application. They will have full control of this card system. Doctor & other section will use this system for implementation & update. All process will be done without using any paper. The general requirements are business model, use case model, data model and implementation requirements. The system will contain the following models

• Have a login window

• Have separate windows for patients, doctors, pharmacists and others.

• Have a predefined username and password for every card holder.

• Privilege to change their password by own from the card user profile.

We developed a system that can meet every requirement as per as our analysis. In our project we have used some specific hardware to minimal the difficulties of our system. We used

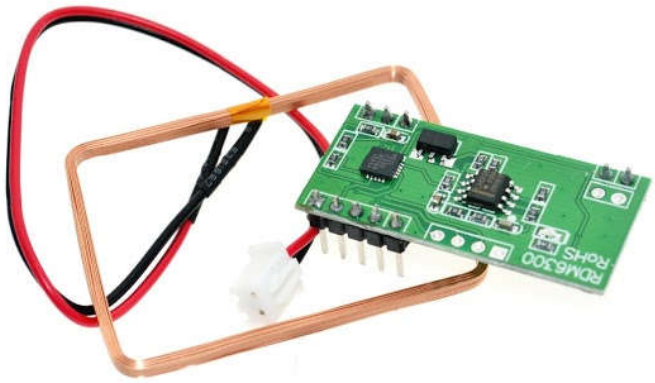

Fig 3.2.1: 125Khz RFID Module – UART. [6]

Fig 3.2.2: MFRC-522 RFID Module. [7]

Fig 3.2.3: RFID Tag. [8]

Fig 3.2.4: Raspberry Pi 3 Model B. [9]

3.3 Use case modelling and description

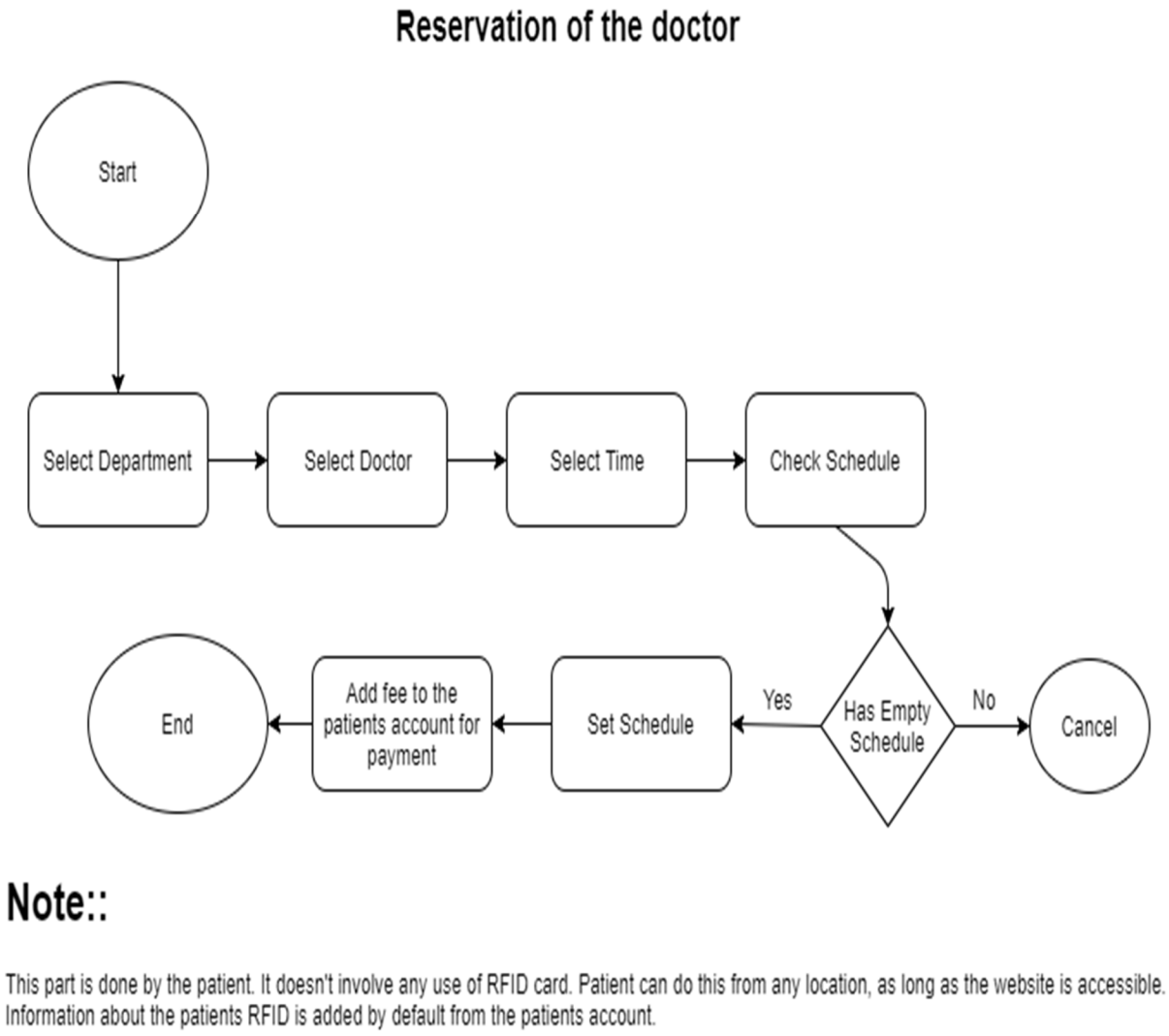

Fig 3.3.1: Use case model of doctor reservation.

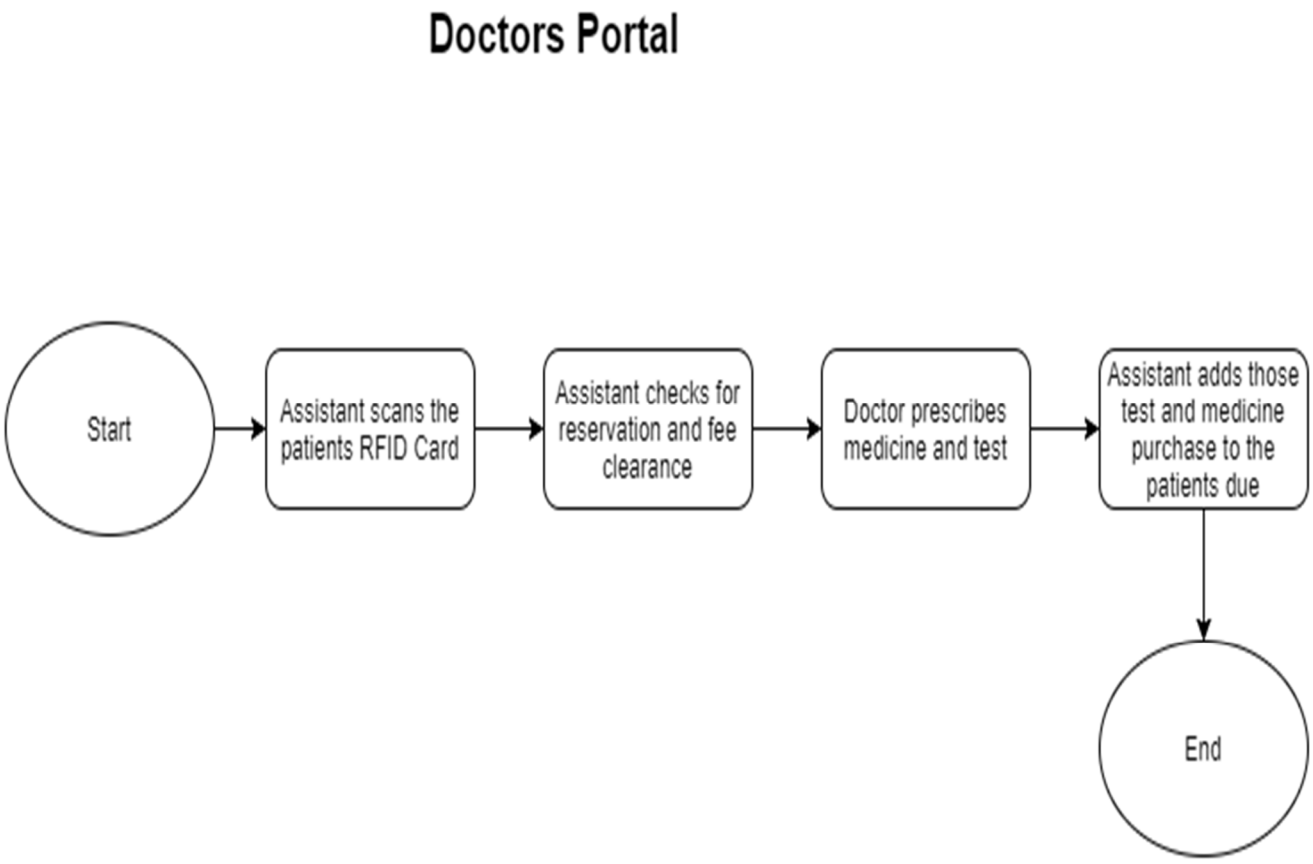

Fig 3.3.2: Use case model of doctors' portal.

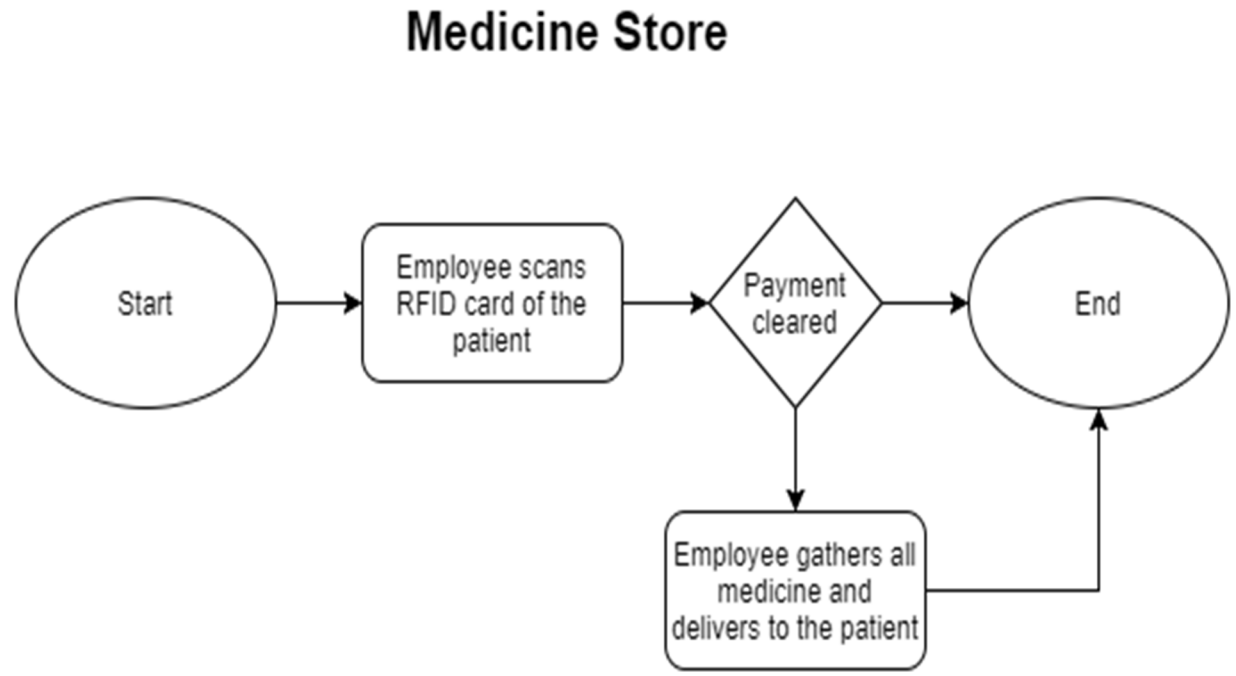

Fig 3.3.3: Use case model of medicine store.

3.4 Logical data model

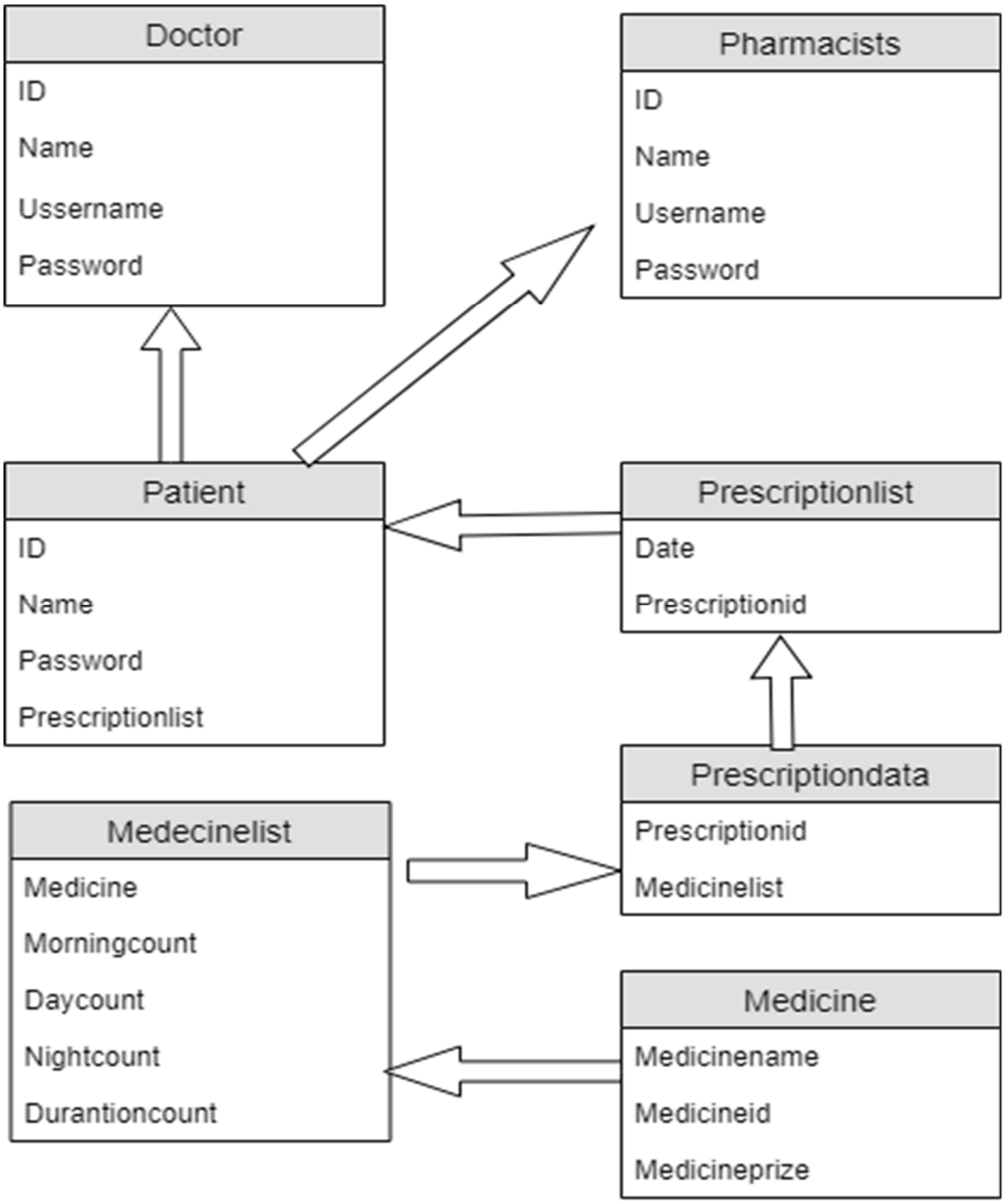

Fig 3.4.1: Data Model

3.5 Design Requirements

A design specification gives details information about the project characteristics to set criteria of the developers will need to meet. Its use is called where a structure or a product has to be specially made to meet a need [10]. Use case diagram has given a review of a framework by demonstrating the working procedure figure and use case is demonstrating the relationship of the framework by their capacity.

CHAPTER -4

DESIGN SPECIFICATION

4.1 Front-end Design

The front-end is everything involved with what the user sees. Fundamentally front-end dealt with presentation layer. It is the only way to interact with our system. Front-end is the most crucial part of our system because people tend to associate the visual appeal and that's why it is known as client-side area. The main objective of a front-end design ensures that when a user open the site, they can find all the information in an easy format. We developed our front-end by

- HTML
- CSS
- JAVASCRIPT
- TYPESCRIPT
- Angular
- Node.js

4.2 Back-end Design

A back-end design is a type of programming where creates a logical data implementation of website, software or any kind of information system. Back end Development refers to the server side of development where you are fundamentally centered around how the site functions. Rolling out updates and changes in addition to monitoring functionality of the site will be your primary responsibility. This type of web development usually consists of three sections: a server, an application, and a database. Code written by back end developers is the thing that conveys the database data to the program. Anything you can't see effectively with the eye, for example, databases and servers is crafted by a back-end developer [11]. Our back-end is done by

•Node.js

•Express framework

Node.js is an open source server condition. Node.js executes JavaScript code utilizing Google V8 motor. Not at all like other JavaScript mediators, V8 motor aggregates the JavaScript code into local machine code. Consequently, it empowers the runtime condition to support the execution of web server applications by executing JavaScript code in a quicker and more effective way[12]. Node.js furthermore plays out all I/O tasks no concurrently through a solitary treaded occasion look. The cutting edge approach influences the Node.js application to perform I/O activities by sending the offbeat undertaking to an occasion circle alongside a get back to work. In the wake of sending the offbeat task to the occasion circle, the application continues executing whatever is left of the code. In the wake of completing the nonconcurrent action, the occasion circle comes back to the undertaking, and executes the get back to work. Notwithstanding devouring less memory, the component empowers Node.js to manage a sweeping number of simultaneous associations proficiently. The software engineers can utilize the runtime condition to perform regular assignments like perusing or keeping in touch with the database, record framework or system associations.

Express is a minimal and flexible Node.js framework that provides a robust set of features for web and mobile applications, that provides a wide range of functions for building single-page, multi-page and hybrid web applications[13]. It's a given that Express is the greatest arrangement for Node.js business. Each Node.js player has known about it and is utilizing it with or without taking note. It's right now on its fourth era, and there are many Node.js systems manufactured dependent on it or propelled by its ideas.

4.3 Interaction design and UX

In this section, sequence process was used to show interaction for user utilizes & interacts with a product and also the theory of how to design the process of interaction that between a user and a product. For this appointment process, components include appointment system interface for web

services & database for information. We showed some sequence diagrams to represent this whole process as start activity, collecting user details, storing user requirements & arranging an application.

4.4 Implementation Requirements

Login page contains login for patients, specialist, drug specialist and for conclusion. First the patient needs to login utilizing their username and secret key for reservation of a specialist. After login they will be coordinated to patient's landing page from where they will have the capacity to hold a specialist. The specialist will have their own login page where they have to login utilizing their username and secret word given by the doctor's facility expert. At that point they need to filter the patient's card to get quiet data to gain admittance to patient's subtle elements. Same way the drug specialist needs to login utilizing their certifications to take a shot at further process.

Association design is the demonstration of organizing clever propelled things, circumstances, structures, and organizations. Past the propelled perspective, association arrangement is moreover significant while making physical things, exploring how a customer may speak with it. Essential subjects of correspondence setup fuse structure, human– PC affiliation, and programming headway. While joint effort setup has an energy for casing, its key region of focus lays on direct. Instead of inspecting how things seem to be, affiliation arrangement mixes and imagines things as they could be. This segment of association arrangement is the thing that depicts it as a structure field rather than a science or planning field. While trains, for instance, programming building have a staggering focus on organizing for specific accomplices, coordinated effort setup is intended for satisfying most of customers. [14] Usage is the doing, execution, or routine concerning a course of action, a method, or any arrangement, thought, appear, specific, standard or system for achieving something. Everything considered, use is the movement that must seek after any groundwork dissuading the objective for something to truly happen. [15]

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CHAPTER -5

IMPLEMENTATION AND TESTING

5.1 Implementation of Database

The execution stage is the place you introduce the DBMS on the required equipment, streamline the database to run best on that equipment and programming stage, and make database and load the information [14]. The underlying information could be either new information gotten clearly or existing data imported from any DBMS. Developers additionally build up database security in this stage and give the different clients that developers identified access applicable to their necessities.

The following are steps in the implementation phase:

1. Install the DBMS.
2. Tune the setup factors as indicated according to the hardware, software and usage conditions.
3. Create the database and tables.
4. Load the data.
5. Set up the users and security.
6. Implement the backup regime.

5.2 Implementation of Front-end design

Front end development is how a fluent design actually gets implemented on the web. Brad Frost says “Somewhere between design—a world of personas, pixels, and polish—and engineering—a world of logic, loops, and Linux—lies frontend design. Frontend design involves creating the HTML, CSS, and presentational JavaScript code that makes up a user interface.” [15]. We have built up our front-end by HTML, CSS, Node.js, Angular, JavaScript, typescript.

Our core design is in angular because Angular is the most preferred framework for building inventive parts of the site. As it is the sort of JavaScript, it was structured as a full-included JavaScript framework simplicity and efficiency. Developers find Angular extremely successful regarding making dynamic, single page application, and supporting MVC(Model-View-Controller) programming structure. At a present span of time, in the competitive business environment, Angular development has emerged as the superhero due to its intuitiveness and rich features. in the aggressive business condition, Angular improvement has developed as the superhuman because of its instinct and rich highlights. These days, Angular is one of the systems that don't make the Model View Controller look skewed and together alongside NodeJS development, it essentially works incredible with both the innovation understanding same documentations. A few systems basically package together the current instruments which make application improvement extremely troublesome. In any case, Angular was deliberately built to guarantee that each instrument works ideally and conveys incredible outcomes. It can be asked that why we used angular. The reasons are

1. It is time saving
2. It is easy to learn and get started
3. Binding data is made easy.
4. Declarative expression of UI.
5. Affordability.
6. Two-way Data binding.
7. Ready to use Template
8. Dependency Injection

Alongside, with angular we used HTML, CSS and others to make the front-end more effective and efficient.

5.3 Implementation of Interaction

Despite the fact that devices for creating graphical UIs are winding up progressively well known, this is bolstered by a toolbox where the accessible cooperation objects are at first arranged by their semantics though in most current tool compartments they are researched by their appearance, this encourages creators and engineers in recognizing the interactors required with the end goal to acquire an Interactive System supporting client errands [16]. In this project we have efficiently implemented different derivatives for combinations of features from each group. A group of features are implemented by using the inheritance of features modules.

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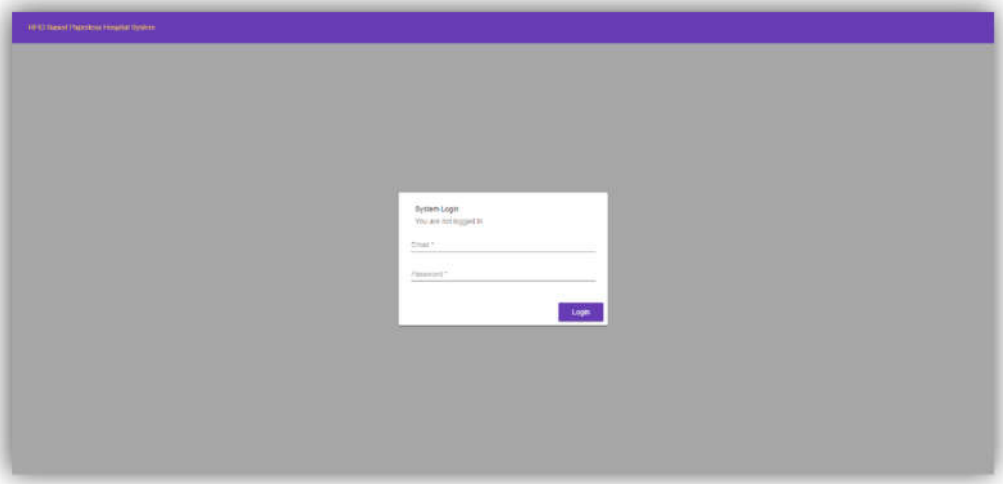
Patient's interaction:

Reservation of a doctor

Fig 5.3.1: Login page (Patient have to login by using user name and password to make the reservation)



Patient's homepage

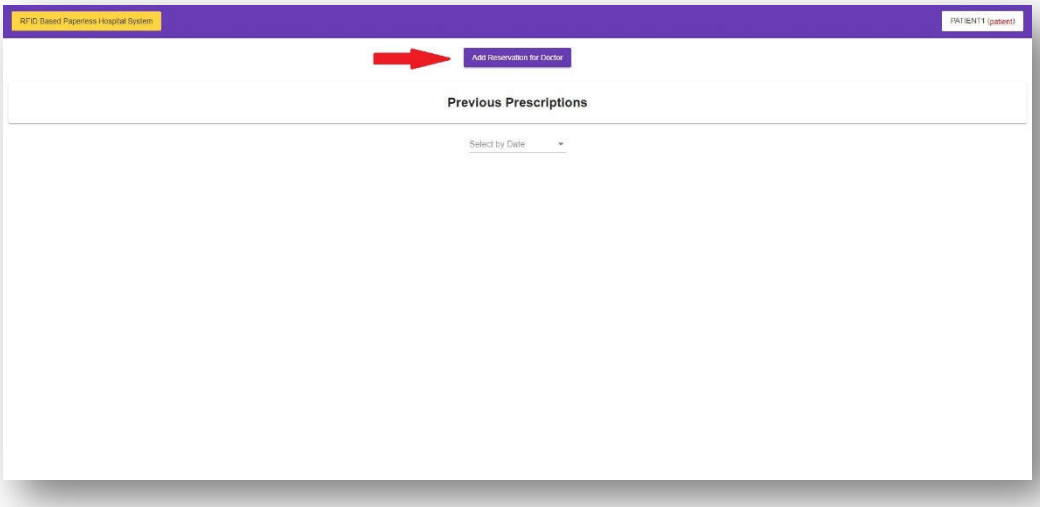


Fig 5.3.2: Have to click add reservation to make a reservation

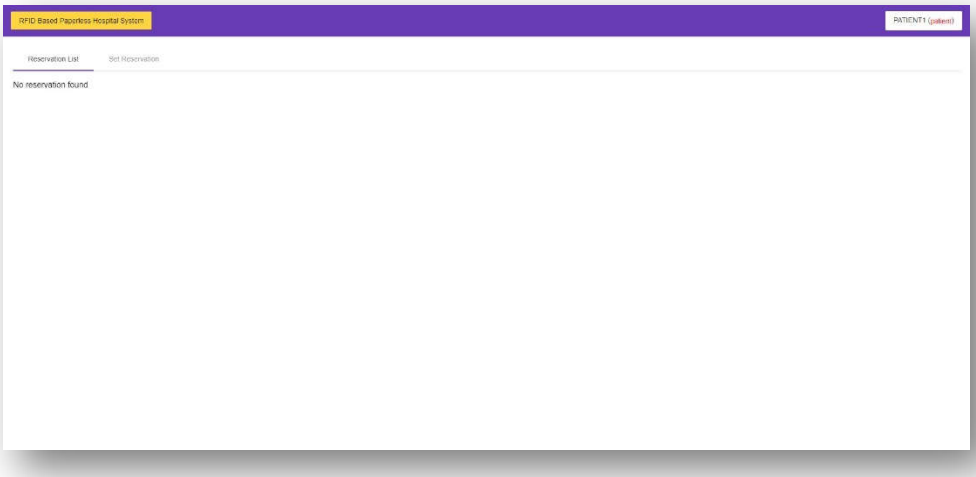
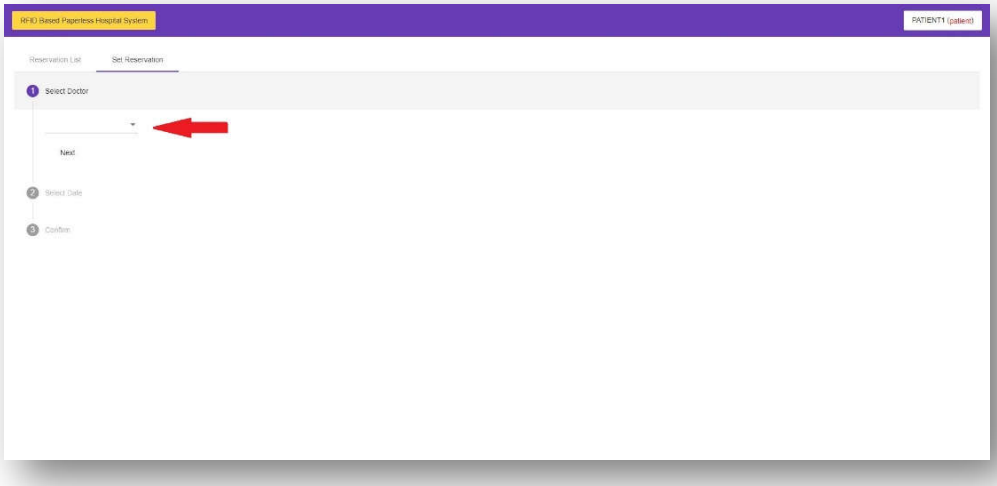
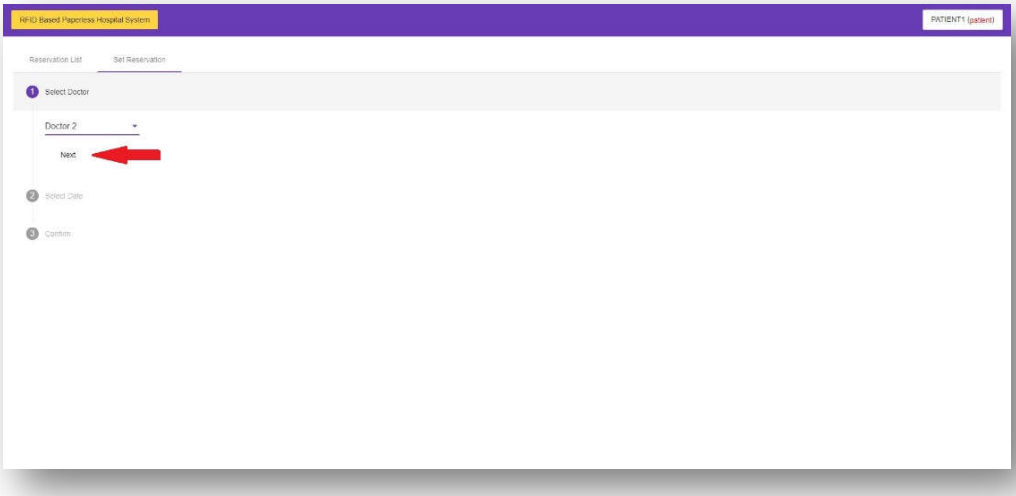


Fig 5.3.3 : To make reservation select ‘set reservation’ tab and select a doctor then click next to continue.


RFID Based Paperless Hospital System
PATIENT1 (patient)
Reservation List
Set Reservation
1 Select Doctor
Next
2 Select Date
3 Confirm


RFID Based Paperless Hospital System
PATIENT1 (patient)
Reservation List
Set Reservation
1 Select Doctor
Doctor 2
Next
2 Select Date
3 Confirm

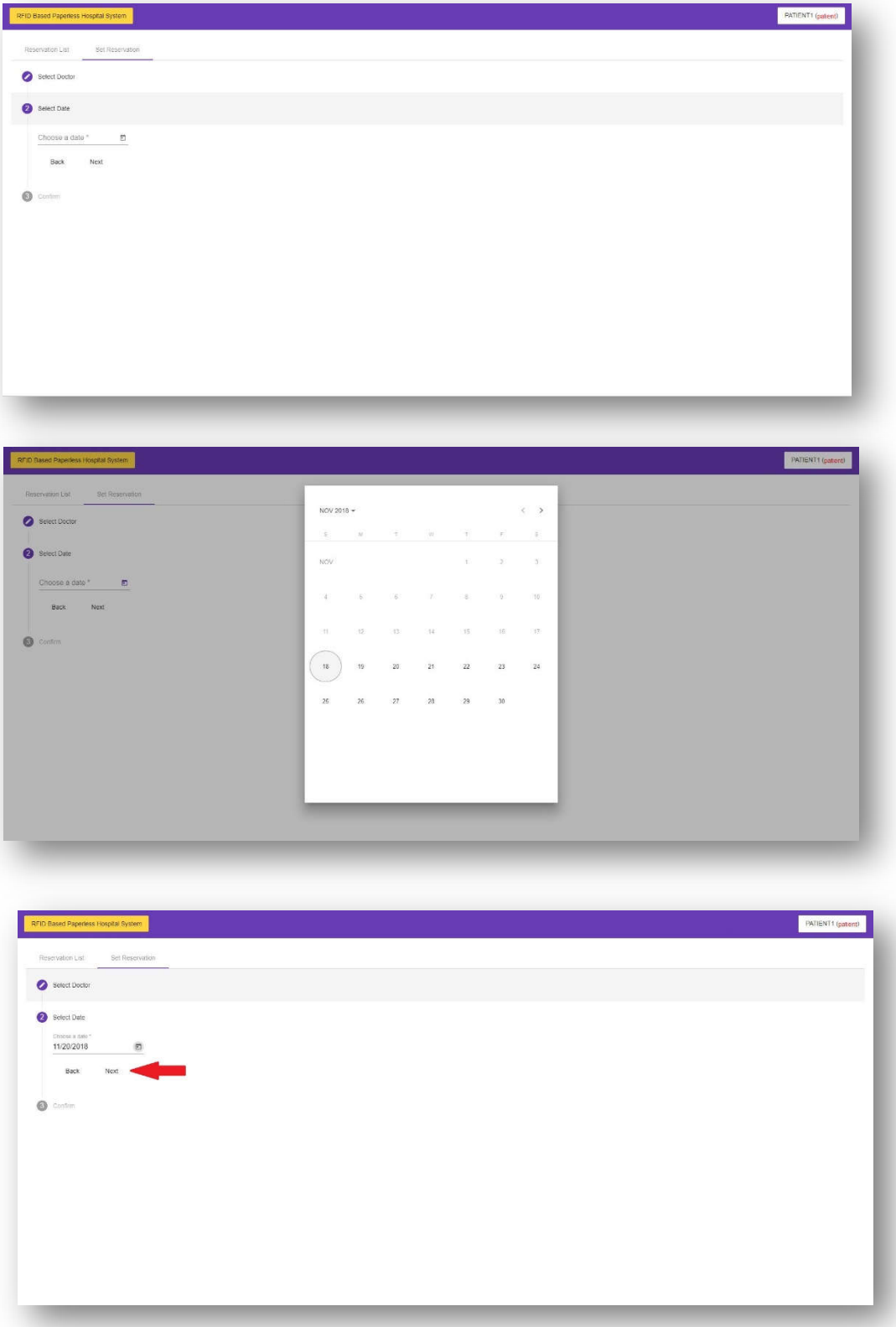


Fig 5.3.4: Then select the date and click next to confirm

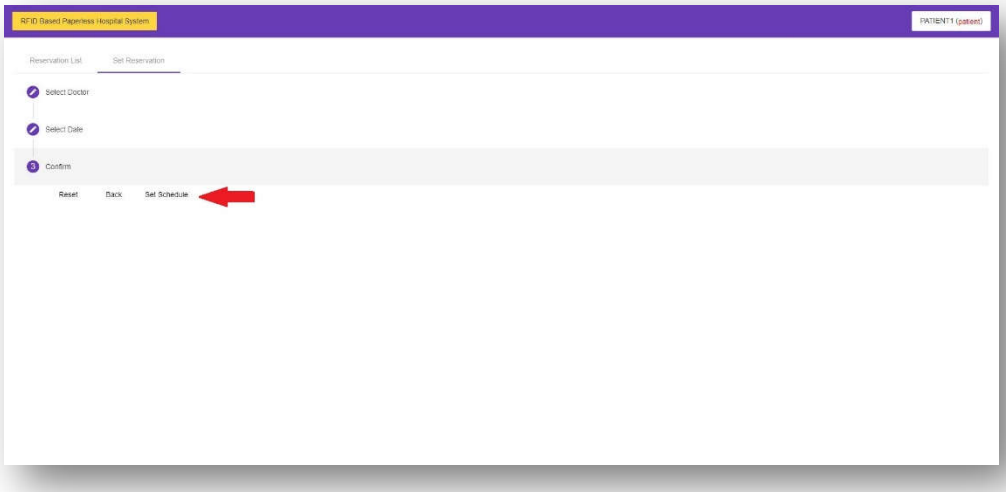


Fig 5.3.5: After confirming the date and doctor a pop massage will display if serial is available that day.

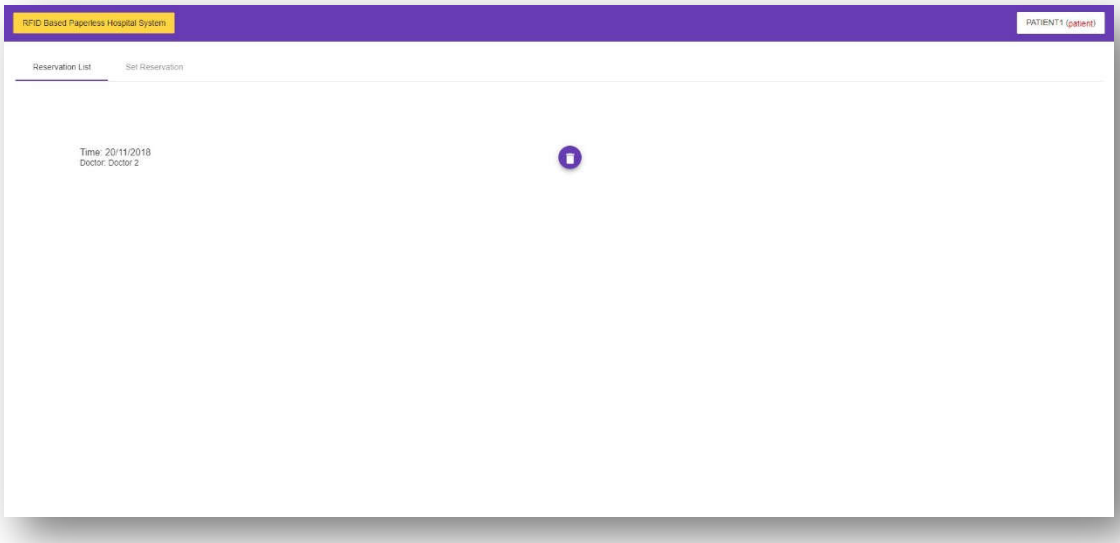


Fig 5.3.6: In reservation list section the reservation details will be shown.

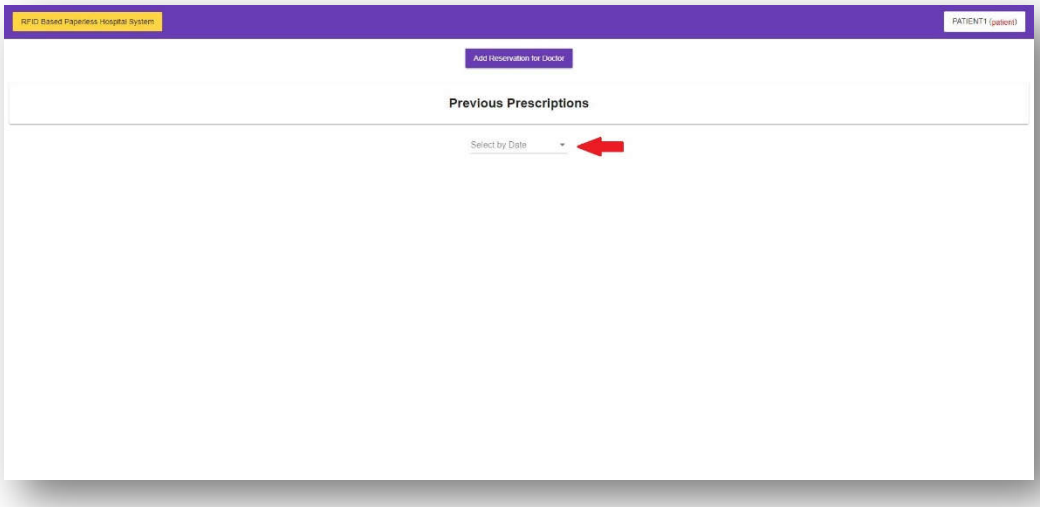


Fig 5.3.7: Patient can view previous prescription details by selecting that date

Doctor's Interaction:

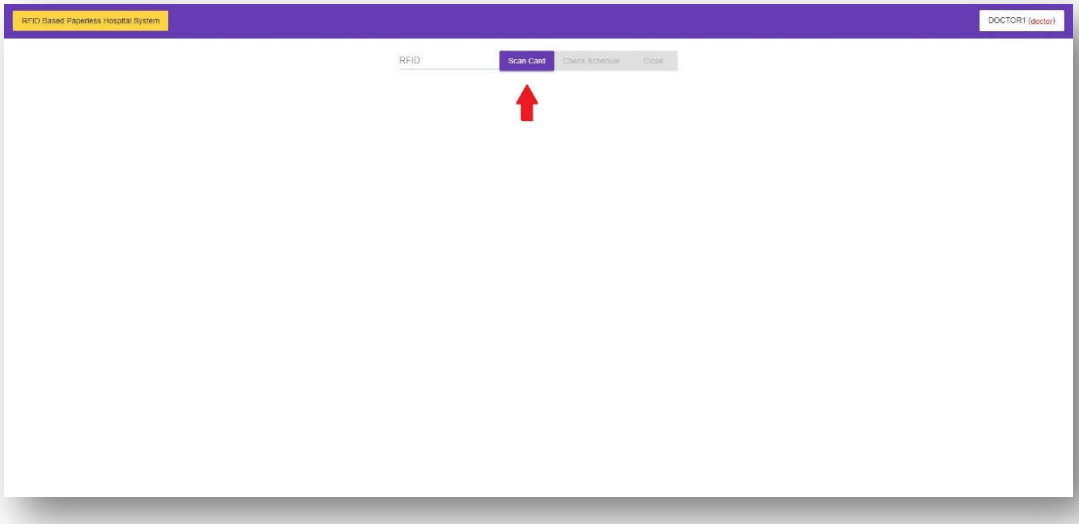


Fig 5.3.8: Doctor have to scan patient card to prescribe him/her.

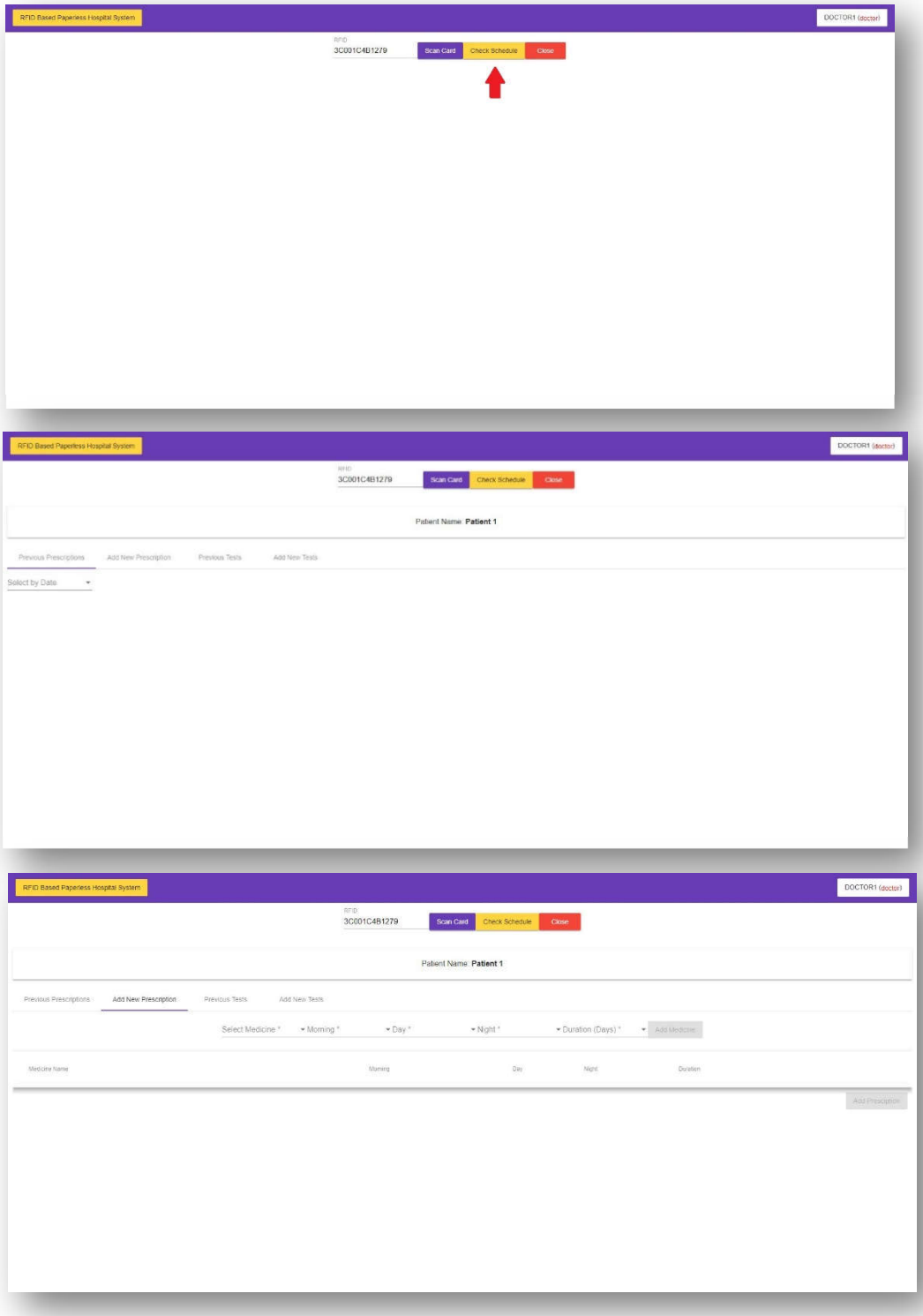
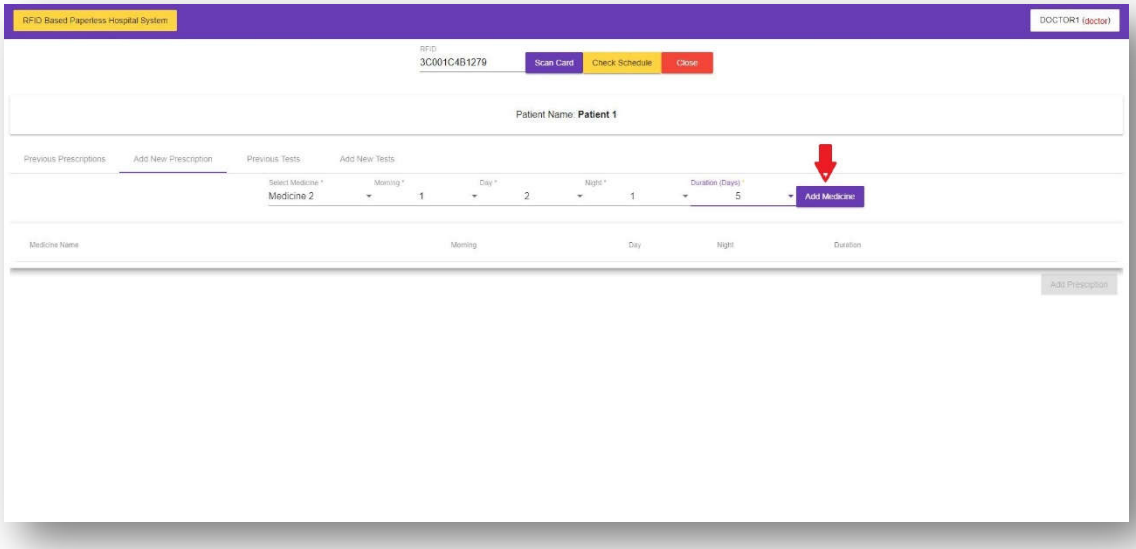


Fig 5.3.9: Doctor will first check the schedule then he/she can add prescription by giving medicine and medical test.



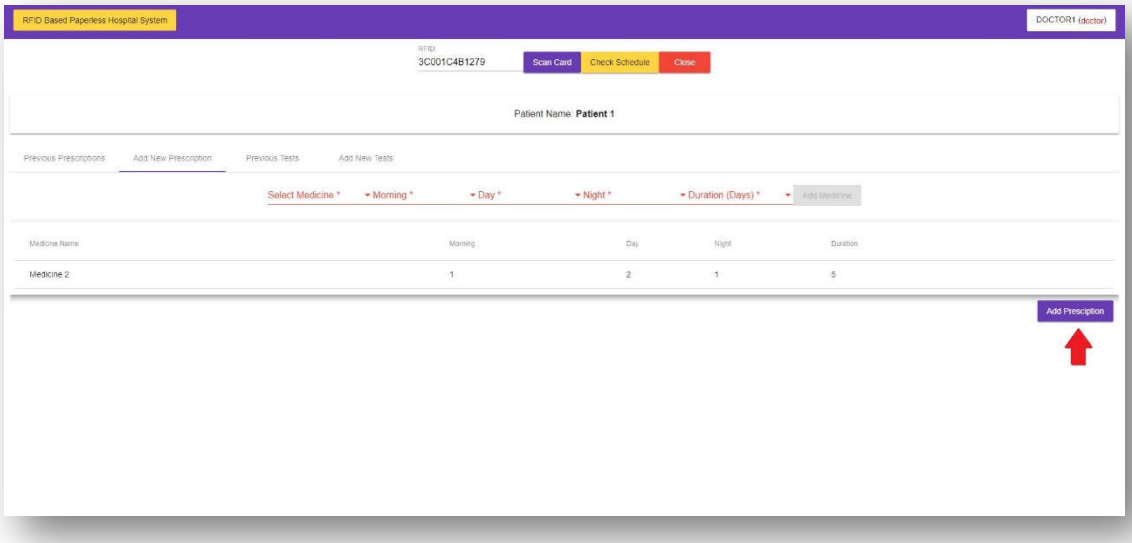


Fig 5.3.10: Doctor will provide the details of medicine and have to click add prescription to make the prescription.

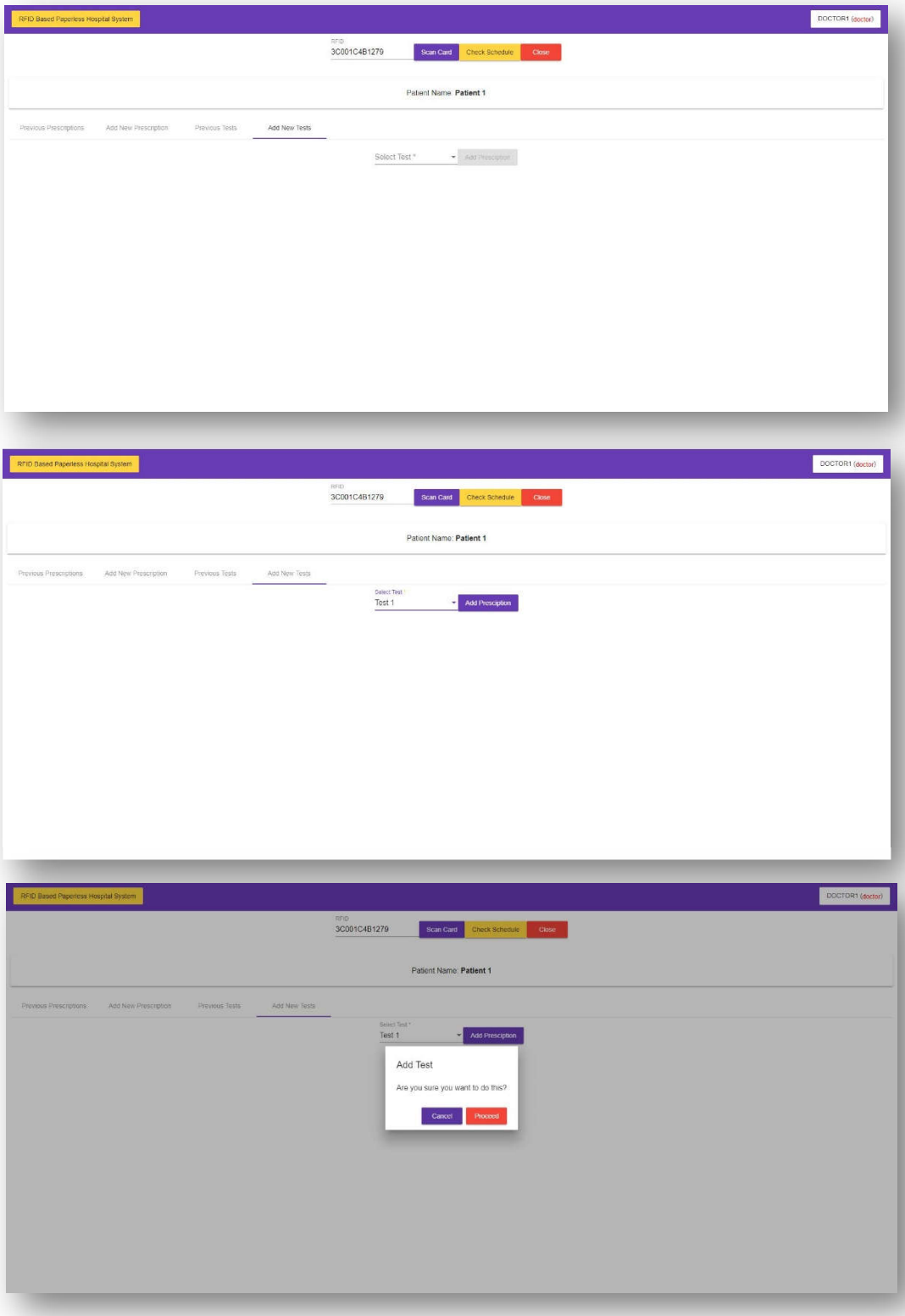
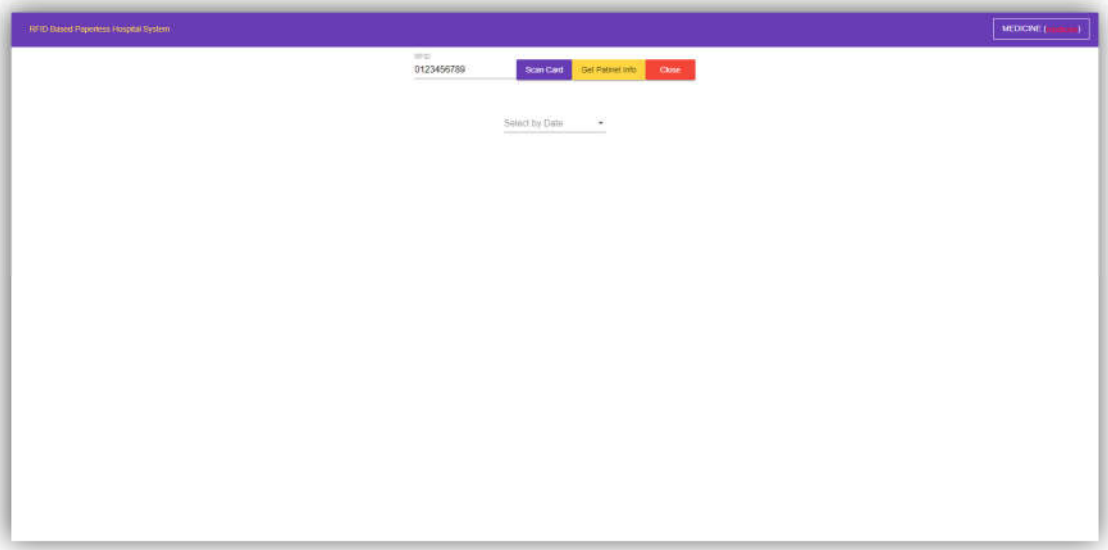
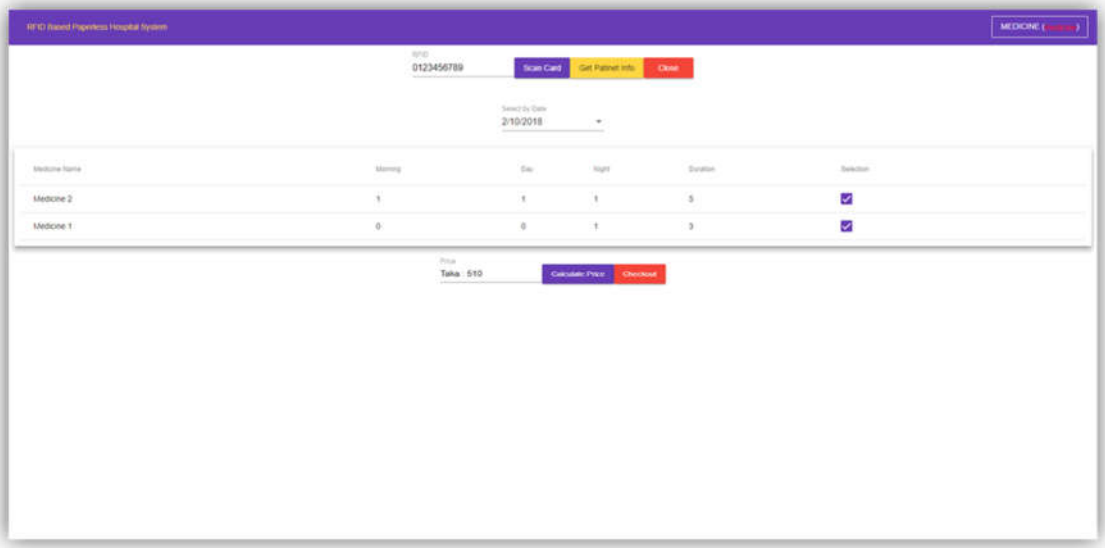


Fig 5.3.11 : To give medical tests doctor will select the test name.

Pharmacist's Interaction:

As same as doctors and patient the pharmacist have to login also by using their username and password which will created by the authority. And to sell the medicine for a specific patient the pharmacist needs to scan the card and have to click get patient info as like as doctors after that the give page will appear





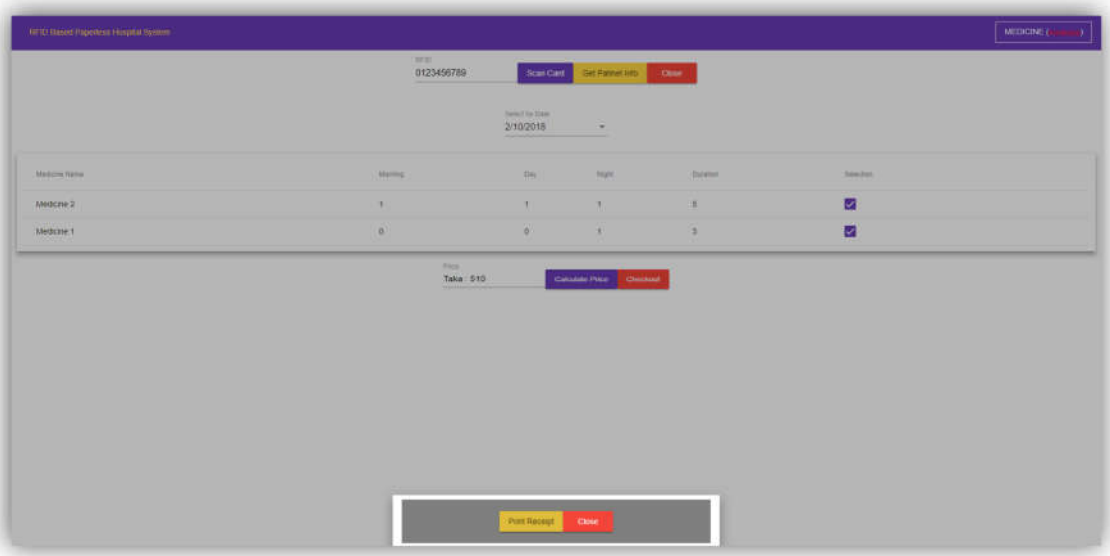
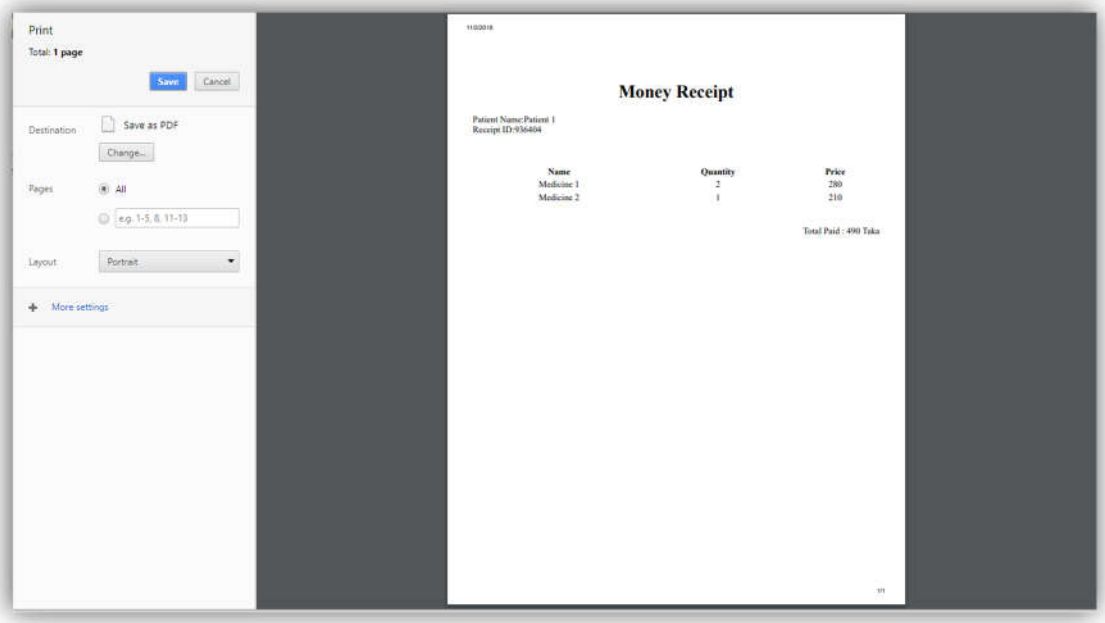


Fig 5.3.12: Here pharmacists have to select a date of prescription to sell those medicine of that specific prescription. Pharmacists will select the medicine that the patient want and click calculate price to get the price to those given medicine after that he/she have to click checkout to get the money receipt. Then by clicking the print receipt the system will generate a money receipt of those given medicine and will be ready to print.

The money receipt looks like:



Diagnostic's Interaction:

As same as doctors, patients and pharmacist they have to login also by using there username and password which will created by the authority.

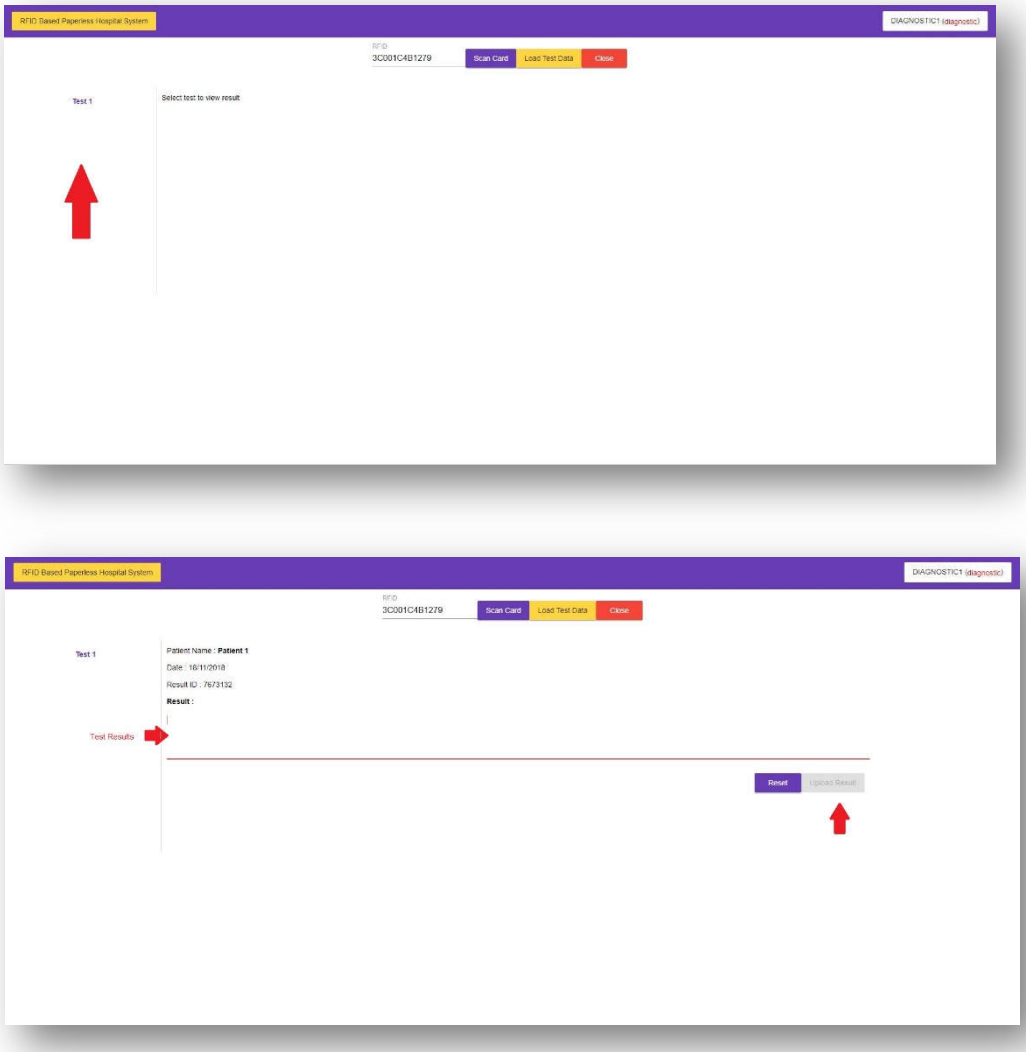


Fig 5.3.13: Pending tests name will be shown in a sidebar by clicking the test name the result can be uploaded.

Doctor can view those test results by the card of patient and those test tests results will be stored for lifetime. This is our simple and effective implementation of interaction.

5.4 Testing implementation

Implementation testing generally refers to the way toward testing implementations of technology specifications. Implementation is the process of putting an action for the formulated plan. Before we implement, the plan should have been completed and our objectives should be clear Testing each one of those actions formulated in the plan is said to be implementation testing.

The Testing process involved:

1. Testing of the login pages of doctors, patient and pharmacists
2. Testing of that is doctor can scan the card of the patient and get the details of patient.
3. Testing of the doctor adding new prescription of that patient and prescribing new medicine along with the time when to take those and duration.
4. Testing that the patient can view the medicine of a selected date prescription.
5. Testing of the reservation of doctor by patient.
6. Testing of the patient can make the reservation easily.
7. Testing of the pharmacist homepage and the ability to scan the patient card and get the information.
8. Testing of the pharmacists can view the medicine details of a selected date.
9. Testing of the pharmacists can select medicine that the patient want only and can calculate the prices of those medicine.
10. Testing of the pharmacists can print the money receipt using our system.
11. Testing of the diagnosis results can be uploaded to server without any hassle.
12. Testing of if our server is handling every operation perfectly.

5.5 Test Results and Reports

By directing the recently made reference to test on our product creation, we discovered that it finished all tests. Other than that, we likewise led unit test on individual parts. The test was done on 2 stages. On the principal stage, 2 of the tests had positive consequence of defenselessness. In the wake of settling those vulnerabilities, we directed the second period of test. On the second period of the testing, there was no defenselessness present in the product creation rendition. Through numerous thorough testing stages, we have tried to de. termine any sort of defenselessness at the product creation. In the following table, the result of all test conducted previously are given:

Table 5.5.1: Test Result

PHASE-1		
Test No.	*Result*	*Action*
1	Negative	None
2	Negative	None
3	Negative	None
4	Negative	None
5	Negative	None
6	Negative	None
7	Negative	None
8	Positive	Resolving of the issue
9	Negative	None
10	Negative	None
11	Positive	Resolving of the issue
12	Negative	None
PHASE-2		
Test No.	*Result*	*Action*
1	Negative	None
2	Negative	None
3	Negative	None

4	Negative	None
5	Negative	None
6	Negative	None
7	Negative	None
8	Negative	None
9	Negative	None
10	Negative	None
11	Negative	None
12	Negative	None

CHAPTER -6

CONCLUSION & FUTURE SCOPE

6.1 Discussion & Conclusion

Finally, we completed our project. This work displayed the arrangements of healing facility computerization framework that utilization RFID innovation as an instrument of connection among patients and the framework. The utilization of shrewd cards and RFID labels advanced the operational procedures by changing the type of association with the patient. A safe and enthusiastic technique for holding the patient's distinguishing proof can be given through the RFID tag and the electronic database takes into account the centralization of every single patient record. This framework stores quiet records and builds the security of patient information. Utilizing a fitting username and secret word, proprietor of card can recover any patient information and records, joined with the patient's label number. Enhancing the quality and control of the computerization of the clinical research facility we can reach of a specific patient.

6.2 Scope for Further Developments

Ongoing research will include further experimentation to assess, explore and develop the full potential of the RFID based automation system. Our system has a lot of future scope to make it more user friendly. At this moment if we want to implement this in real world, we have to do in the hospitals outdoor only. To implement this system in hospital's outdoor and indoor we have to do some work and those are:

Payment System: We will include the payment system in our project. Patient can pay the bills of pharmacy when buying medicines and also can pay the medical test fees by that only card.

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