



Hospital Management System

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1. Abstract

Hospital Management System provides the benefits of easy operations, patient care, and cost control. Hospital Management System is powerful, and easy to use and is designed and developed to deliver many benefits to hospitals. Traditionally, Hospital Details store in manually in the hospital. This system helps to store the hospital Details properly.

I have used Java language to design for the Hospital Management system and have used SQL databases in NetBeans to store data. And also, to manipulate these details meaningfully System input contains details while system output is to get these details on to the “Java JFrame”.

The real motivation for the hospital management system is to make the easy process of all the management processes like data storing, billing, channelling, etc. Hospitals currently use a manual system for the management and maintenance of information. This system avoids these problems in the hospital. Hospital Management System is designed considering main objectives. System Overview has System Design, GUI Design, and Data Modelling.

2.System Introduction

The Hospital Management system has Login and Main window. The Hospital Management system includes Details of patients, Details of Doctor, Details of Staff and so on. The Hospital Management system has computerized billing in the Hospital. And also, this hospital Management system has Medicine information window and Manage Channels window. Login details, Manage Patient Details, Manage Doctor details, Manage Staff Details, Manage Channels, Manage Payment, Manage Medicine and Insert Hospital Details are main functions of the system.

The Hospital Management System can be entered using a username and password as every system and it is accessible by an administrator. Only admin can add data into the database. The data can be retrieved easily. The interface is very user-friendly. The hospital details are well protected for personal use. It makes the data processing very fast. The “Hospital Management System” is to computerize the NetBeans software which is user friendly, simple, fast.

Traditionally, Hospital Details store in manually in the hospital. This system helps to store the hospital Details properly. The target of this system is to make hospital program better than we currently have. Other problem that difficult to find the detail in working time in the hospital. Hospital staff waste lot of times to do their works. So, main focus is to manage hospital details easier. The main function of the system is to store Hospital details and retrieve these details as and when required. And also, to manipulate these details meaningfully System input contains details while system output is to get these details on to the “Java JFrame”.

3. System Motivation

The real motivation for the hospital management system is to make the easy process of all the management processes like data storing, billing, channelling, etc. We can see that to find out the patient's history, the user has to go through various registers in the hospital. This results in a wastage of time and it affects hospital work. So, using this system it will become easy to manage these all processes. I am designing this system which can be benefited for the patients and hospital staff. This system help hospital to do work fast and effective.

Health is the most important aspect of our society. Many health care providers face challenges to active services to patients. Many people enter and exit the hospital in a day and maintaining their records safely is difficult. This system helps to reduce this situation, to manage the financial, hospital administration, and channel aspects.

So, using this system these factors also affect the success of hospital works.

- Processing Speed and Results

The hospital follows the traditional methods for hospital management and there are no chances for begin to happen in effective Hospital Management Systems. With the implementation of Hospital Management Systems in hospitals, it is able to reach hospital details in a better way and accessing channels regarding the patients, calculating patient payment and more can be done quickly. The hospital management system makes admin' work more securable and improves the speed for proses with better results.

- Cost-Effective

A hospital management system helps to manage payments, reduce manual work. Therefore, there is no requirement for human workforce. The hospital management system helps to remove the manual work done by user in the hospitals. A hospital management system helps to reduce human resources costs because many functions are done by the system. This system helps to decrease hospital document using unnecessarily.

- Reduction in Errors

This hospital management system will help in reducing different types of errors. It is made through interventions like missing billing, operational failure, cost leakages, missing channels, and much more. This system runs automatically, which reduces the error significantly. This hospital management system will make the billing and storing sections easier, accurate, and more transparent.

- Data Security

In a hospital management system, anyone cannot change data in the system without knowing the password and user name of the administrator and therefore there are no chances for breaches to occur as they have data security.

- Improved Patient Care

Enhanced work efficiency and improved patient data access mean it makes faster and better hospital decisions.

4.Problem and Objectives

4.1. Problem

Since the hospital is associated with the lives of common people and their day-to-day routines. So, I decided to create this hospital management system. Hospitals currently use a manual method for the management and maintenance of hospital details. The current system requires more paper forms in the hospital. The manual handling of the record is time-consuming and affect to error. The purpose of this system is to automate, the process of day-to-day hospital activities like create a Patient Record List, calculate the payment, etc. All of this information must be managed for get proper effective result. I have tried my best to make the complicated process of the Hospital Management System. The main purpose of my exercise is to perform Hospital activity in a hospital.

- The information is difficult to be retrievals immediately.

The information is very difficult to find from particular information.

E.g. - To find out about the patient's Information, the user has to go through various registers. This results, we have to waste our time.

- The information is not able to be storage immediately.

The information takes time and effort to be stored in right place.

- Information is not updating promptly.

Various changes to the information are difficult to make as paperwork is involved.

- Manual calculation leads to errors and mistakes.

Manual calculations are error prone. It takes a lot of time to calculate the relevant parts. This may result in incorrect information. For example, calculation of patient's payment based on treatments.

- Reports create without accuracy and prompt

This becomes a difficult work as information is difficult to gather from various registers.

These are the main problems of the hospital. This hospital management system help to avoid these problems.

4.2. Objectives

A hospital information system is a comprehensive technology system that allows hospitals to manage all aspects of patient information and their operation. It can be viewed as a system that helps manage their information. Hospital Management System is designed considering main objectives.

- Design a system for patient care.
- Reduce hospital operating costs.
- Provide report for better decision making.
- Better co-ordination among the different departments.
- Provide management for control are main objectives of the system.

Hospital management System handles activities in the hospital.

Ex:

1. Staff details management
2. Patient details management
3. Patient channelling
4. Doctor details management

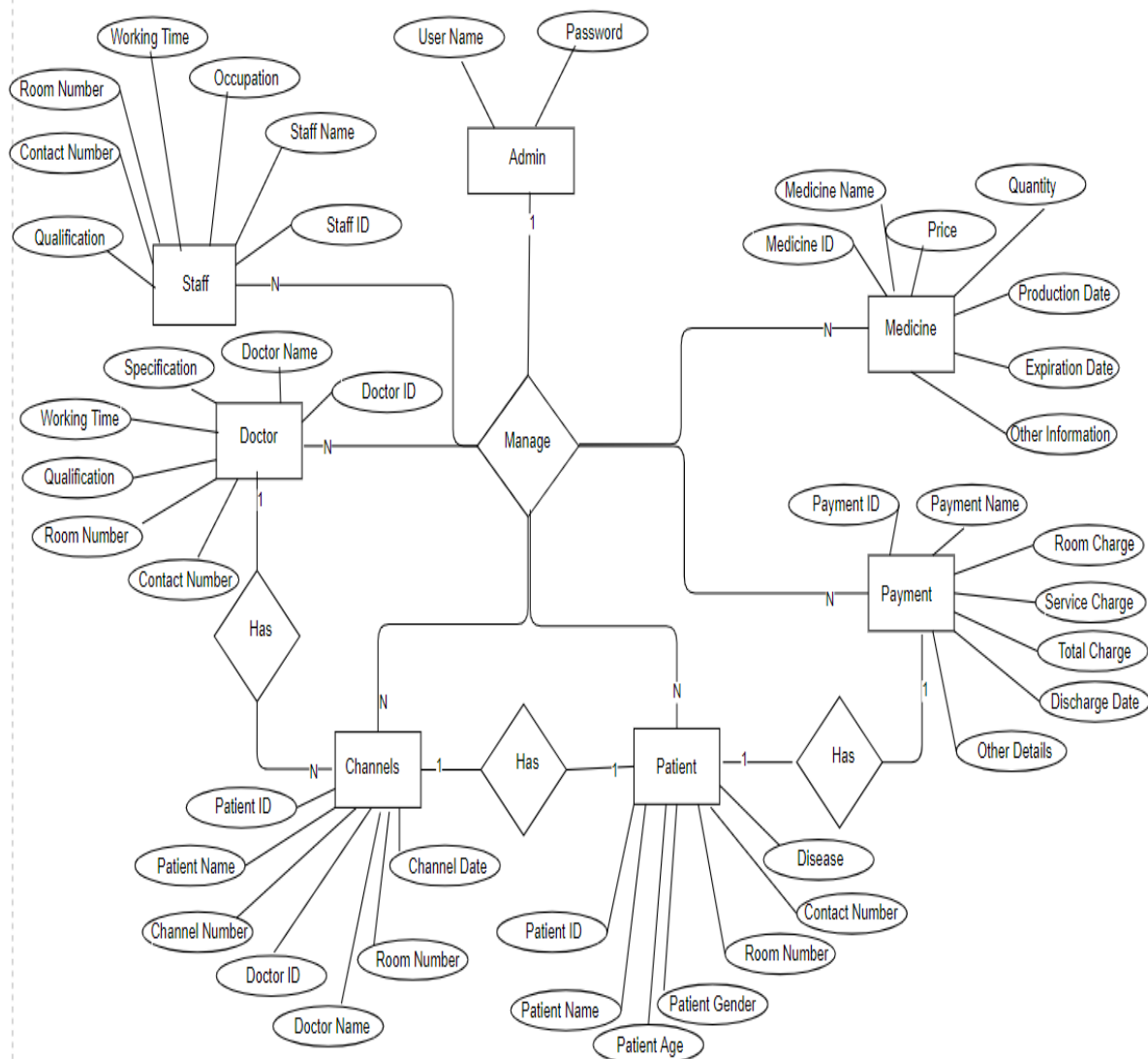
This hospital management system helps to avoid difficulties and They are an objective of Hospital Management System.

5. System Overview

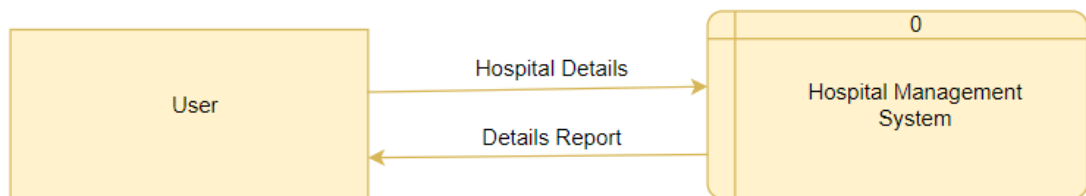
5.1. System Design

5.1.1. Entity Relationship Diagram

An Entity Relationship (ER) Diagram is a type of flowchart that illustrates how “entities” such as people, objects or concepts relate to each other within a system [1]. This Diagram show how is relationship between entities of the system.

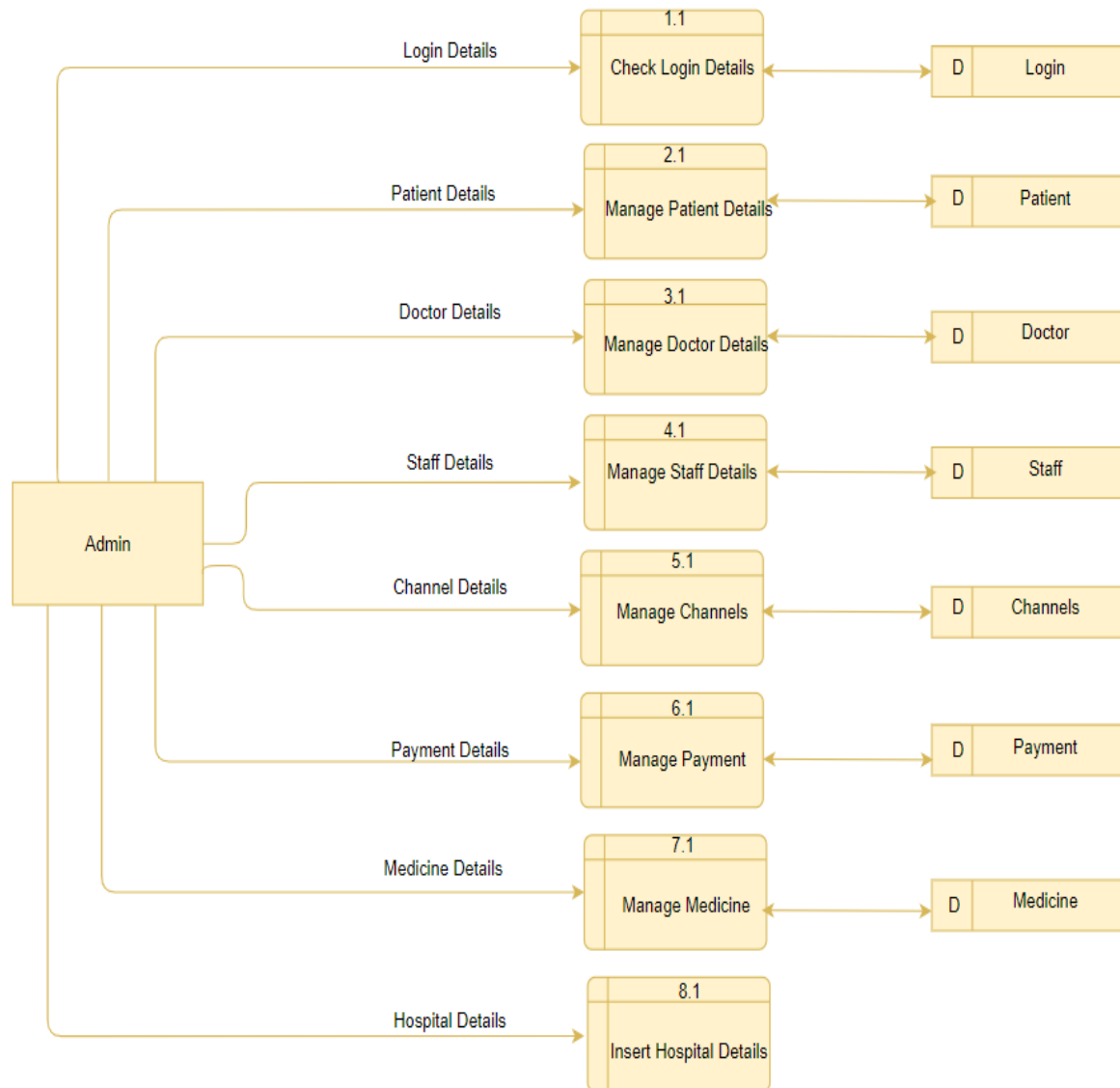


5.1.2. Context Diagram



It is also known as a level 0 diagram. It's designed to be an abstraction view, showing the system as a single process with its relationship to external entities. It represents the entire system as a single bubble with input and output data indicated by incoming/outgoing arrows. [2]. Admin is an external entity of the system. Admin include hospital details as input and admin can get these inserting data as a details report.

5.1.3. Level 01 Data Flow Diagram



In 1-level DFD, the context diagram is decomposed into multiple bubbles/processes. In this level, we highlight the main functions of the system and breakdown the high-level process of 0-level DFD into subprocesses [2]. Login details, Manage patient details, Manage Doctor details, Manage Staff Details, Manage Channels, Manage Payment, Manage Medicine and Insert Hospital Details are main functions of the system.

5.2. GUI Design

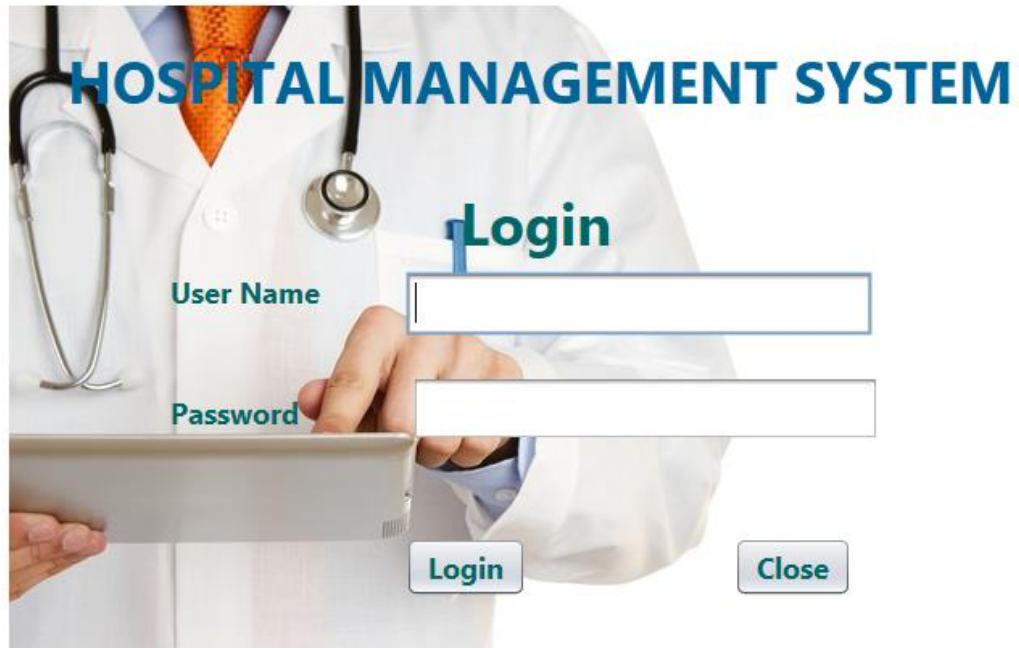
The IDE's GUI Builder makes it possible to build professional-looking GUIs without an intimate understanding of layout managers. We can lay out our forms by simply placing components where we want them. I used JFrame to design interfaces of the system in java NetBeans IDE. Eleven interfaces have included in this system. Splash window, Login Window, Main Window, Patient, Doctor, Staff, Medicine Information, Payment Information, Manage Channel, Hospital Information and Login are the Interfaces of this Hospital Management System.

01. Splash Window



This window is the first interface of Hospital Management System. It gave a great start for this system and it helps to get user attention.

02. Login Window



A simple login page for all users as an administrator. After providing the relevant user's name and password to log in and enjoy all those features that are designed. This is a single interface for administrator associated with the system.

03. Main Window



Only can administrator to login to the main window. This window shows all features of the Hospital Management System. Patient Details, Doctor Details, Staff Details, Medicine Information, Payment Information, Manage Channel and Hospital Information are main feature of this Interface.

04. Patient Details Window

The screenshot displays a software window titled "Patient Details". On the left, there is a form with the following fields: "Search" (with a text input), "Patient ID", "Patient Name", "Age", "Gender", "Room Number", "Contact Number", and "Disease" (with a text area). To the right of the form is a vertical panel containing five buttons: "Add", "Clear", "Update", "Delete", and "Exit". Below the form, there is a table showing a list of patients.

PATIENTID	PATIENTNAME	AGE	GENDER	ROOMNUMBER	CONTACTNUMBER	DISEASE
123	Y.E.Hasinika	23	Female	22	774562389	High blood Press...
124	U.H. Lakshani	45	Female	4	774562222	Cholesterol
125	T.H. Perera	35	Male	4	774578905	allergic
126	T.G. Siriwardhana	67	Male	5	787578967	Eye disease
127	T.G. Herath	87	Male	10	787578967	Eye disease

This window can manage patient data in the hospital. Management will add patients to the database by this page. They have to take full details of the patient. And also add their id, name, age, gender, room number, contact number, disease. Patient ID is the unique key for the patient. It has been assigned as the primary key. Admin can add patient details into the patient database and they show using table. And also, admin can change the patient details using update Button that helps to correct mistakes. Admin can delete an unnecessary detail in the database. Admin can clear the input data using clear button for add and update. And also, after the Inserting data admin can exit using exit button.

05. Doctor Details Window

The screenshot displays a software window titled "Doctor Details". On the left, there is a form with the following fields: "Doctor ID", "Doctor Name", "Specialization", "Working Time", "Room Number", "Contact Number", and "Qualifications". A "Search" input field is located at the top right of the form. To the right of the form is a vertical panel containing six buttons: "Add", "Clear", "Update", "Delete", and "Exit". Below the form and buttons is a table listing existing doctors.

DOCTERID	DOCTERNAME	SPECIALIZATION	WORKINGTIME	ROOMNUMBER	CONTACTNUMB...	QUALIFICATIONS
124	Dr.Gayani Samar...	Surgery	10.00-12.00 a.m.	13	775443367	MBBS
120	Dr.Tihan Gamage	Surgery	12.00-4.00 p.m.	10	775343360	MBBS Master in s...
121	Dr.Tihan Gamage	Surgery	12.00-4.00 p.m.	10	775343360	MBBS Master in s...
125	Dr.Chanu Perera	Psychiatry	1.00-5.00 p.m.	14	773434567	MBBS Master in ...
127	Dr.Vidura Umaya...	Surqerv	7.00-12.00 a.m.	16	775343789	MBBS

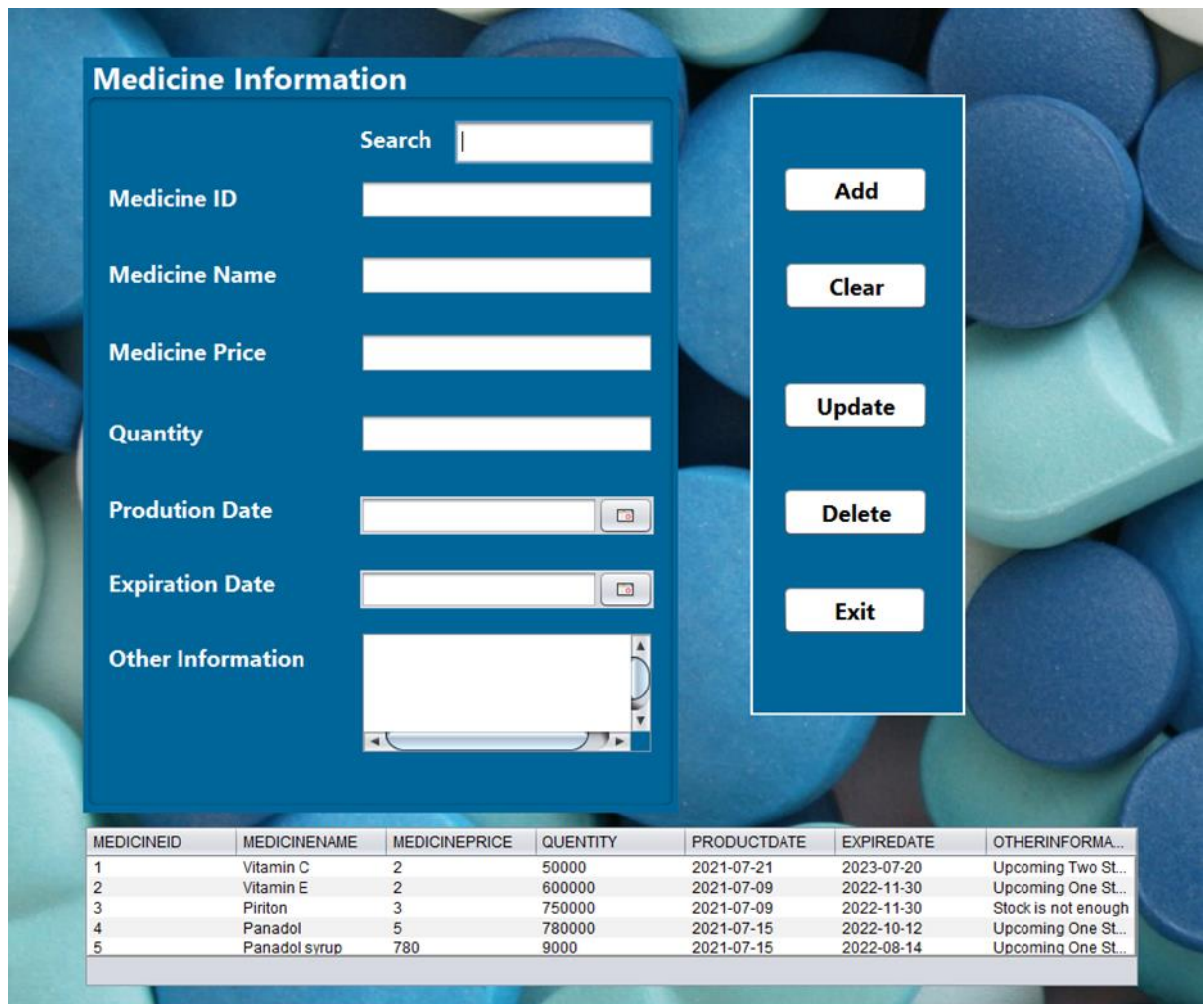
This window can manage doctor data in the hospital. Management will add doctors to the database by this page. They have to take full details of the doctor. And also add their id, name, specialization, working time, room number, contact number and qualification. Doctor ID is the unique key for the doctor. It has been assigned as the primary key. Admin can add doctor details into the doctor database and they show using table. And also, admin can change the doctor details using update Button that helps to correct mistakes. Admin can delete an unnecessary detail in the database. Admin can clear the input data using clear button for add and update. And also, after the Inserting data admin can exit using exit button.

06. Staff Details Window

STTAID	STAFFNAME	OCUPATION	WORKINGTIME	ROOMNUMBER	CONTACTNUMB...	QUALIFICATIONS
234	G.Madhavi Perera	Nurse	10.00 - 12.00 a.m.	5	764532457	Bechelor of Scien...
235	C.E. Suresh	Nurse	1.00 - 2.00 p.m.	6	764578565	Bechelor of Scien...
236	F.L. Hansika	Nurse	6.00 - 8.00 p.m.	6	764523453	Bechelor of Scien...
237	C.S. Perera	Nurse	1.00 - 2.00 a.m.	7	774568565	Bechelor of Scien...
238	R.S. Gamage	Nurse	8.00 - 12.00 a.m.	10	774564567	Bechelor of Scien...

This window can manage staff data in the hospital. Management will add staff details to the database by this page. They have to take full details of the staff. And also add their id, name, occupation, working time, room number, contact number and qualification. Staff ID is the unique key for the staff. It has been assigned as the primary key. Admin can add staff details into the doctor database and they show using table. And also, admin can change the staff details using update Button that helps to correct mistakes. Admin can delete an unnecessary detail in the database. Admin can clear the input data using clear button for add and update. And also, after the Inserting data admin can exit using exit button.

07. Medicine Information Window



MEDICINEID	MEDICINENAME	MEDICINEPRICE	QUANTITY	PRODUCTDATE	EXPIREDATE	OTHERINFORMA...
1	Vitamin C	2	50000	2021-07-21	2023-07-20	Upcoming Two St...
2	Vitamin E	2	600000	2021-07-09	2022-11-30	Upcoming One St...
3	Piriton	3	750000	2021-07-09	2022-11-30	Stock is not enough
4	Panadol	5	780000	2021-07-15	2022-10-12	Upcoming One St...
5	Panadol syrup	780	9000	2021-07-15	2022-08-14	Upcoming One St...

This window can manage medicine data in the hospital. Management will add medicine information to the database by this page. Admin have to take full details of the medicine information. And also add its id, name, price, quantity, production date, expiration date and other information. Medicine ID is the unique key for the medicine. It has been assigned as the primary key. Admin can add medicine information into the medicine information database and they show using table. And also, admin can change the medicine information using update Button that helps to correct mistakes. Admin can delete an unnecessary detail in the database. Admin can clear the input data using clear button for add and update. And also, after the Inserting data admin can exit using exit button.

08. Payment Information Window

The screenshot displays a software window titled "Payment Information". It features a search bar at the top. Below it are input fields for "Patient ID", "Patient Name", "Room Charge", "Service Charge", and "Discharge Date" (which includes a calendar icon). A larger text area labeled "Other Details" is at the bottom of the input section. To the right of these fields is a vertical panel with five buttons: "Add", "Clear", "Delete", and "Exit". Below the input fields, a table displays existing payment records.

PATIENTID	PATIENTNAME	ROOMCHARGE	SERVICECHARGE	TOTALCHARGE	DISCHARGEDATE	OTHERDETAILS
1	Saduni kaushalya	2000	3400	5400	2021-07-14	Payed
2	Y.N. Ranasinha	4500	7800	12300	2021-07-01	Payed
3	D.S.Gunathilaka	8500	10800	19300	2021-07-10	Payed
4	U.W. Hansa	2500	5600	8100	2021-07-22	Payed
5	I.N. kavinda	5000	5700	10700	2021-07-14	Payed

This window can manage payment data in the hospital. Management will add payment information to the database by this page. Admin have to take full details of the payment information. And also add patient id, patient name, room charge, service charge, discharge date, and other details. Patient ID is the unique key for the medicine. It has been assigned as the primary key.

Admin can add payment information into the payment information database and they show using table. Calculate total charge using patient room charge and patient service charge. Admin can delete an unnecessary detail in the database. Admin can clear the input data using clear button for add new one. And also, after the Inserting data admin can exit using exit button.

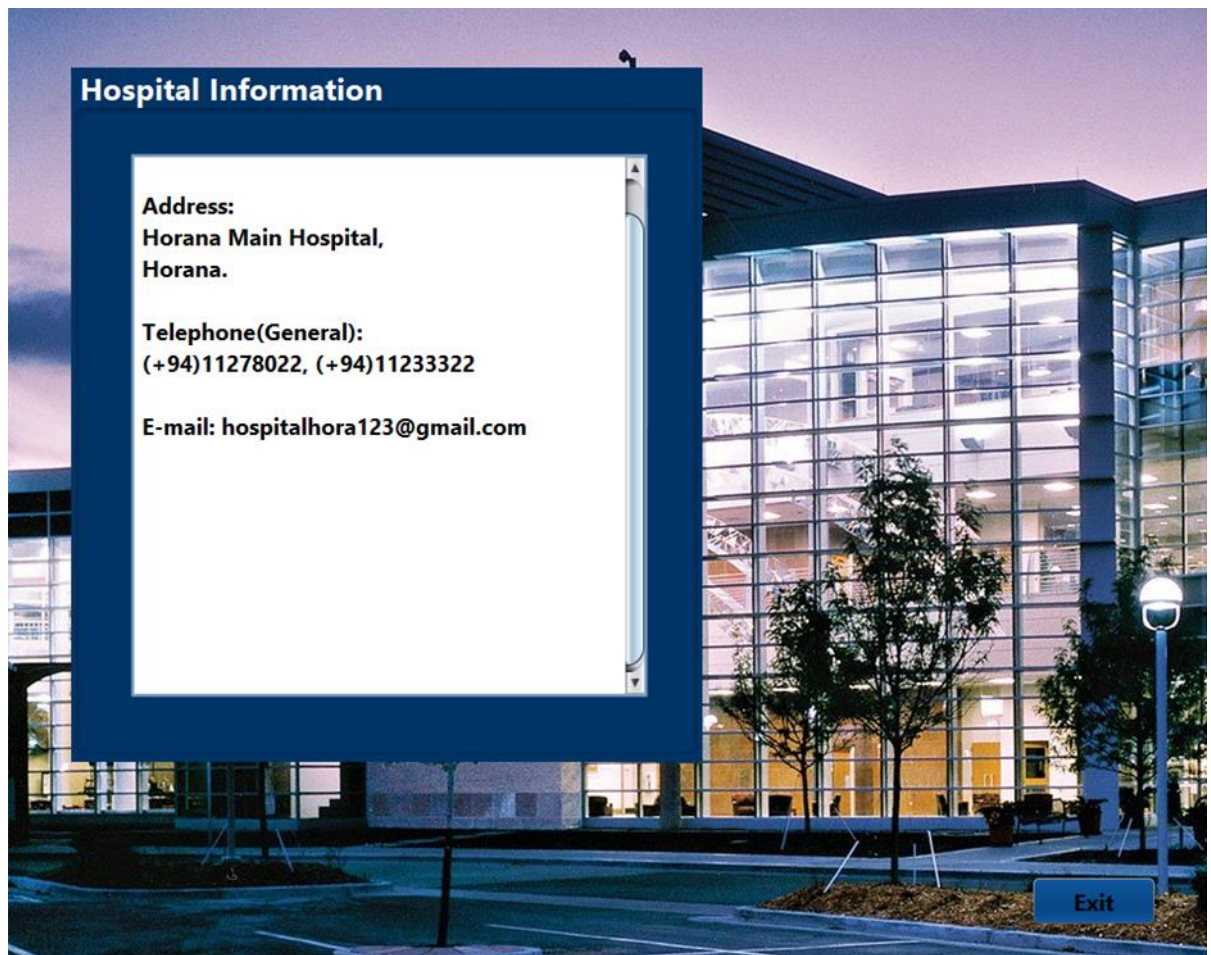
09. Manage Channels Window

The 'Manage Channels' window is a blue-themed interface. It features a search bar at the top right. Below it, there are seven input fields with labels: 'Patient ID', 'Patient Name', 'Channel Number', 'Doctor ID', 'Doctor Name', 'Room Number', and 'Channel Date'. The 'Channel Date' field includes a calendar icon. To the right of these fields is a vertical stack of five buttons: 'Add', 'Clear', 'Update', 'Delete', and 'Exit'. At the bottom of the window is a table displaying channel data.

PATIENTID	PATIENTNAME	CHANNELNUMB...	DOCTORID	DOCTORNAME	ROOMNUMBER	CHANNELDATE
1	Y.S. Disanayaka	1	12	Dr.Yasas Siriwar...	10	2021-07-31
2	Y.N.Gamage	2	15	Dr.Gayani Gunath...	10	2021-08-04
3	C.N.Gunawardha...	3	15	Dr.Gayani Gunath...	10	2021-08-04
4	S.G. Thakshila	4	12	Dr.Yasas Siriwar...	10	2021-08-19
5	S.J. Prathiba	5	12	Dr.Yasas Siriwar...	10	2021-07-22

This window can manage channel data in the hospital. Management will add channel data to the database by this page. Admin have to take full details of the channels. And also add its patient id, patient name, channel number, doctor id, doctor name, room number and channel date. Patient ID is the unique key for the medicine. It has been assigned as the primary key. Admin can add channels into the manage channels database and they show using table. And also, admin can change the channels using update Button that helps to correct mistakes. Admin can delete an unnecessary detail in the database. Admin can clear the input data using clear button for add and update. And also, after the Inserting data admin can exit using exit button.

10. Hospital Information Window



Admin will be able to check hospital information whenever admin want to find hospital information.

11. Login Settings Window



This window can change user name and password in the Hospital Management System. Admin will add user name and password that want to change. Admin have added User ID before change the user's name and password. User ID has been assigned as the primary key. Finally, Admin have to change user name and password using change button. After the change, the new data insert into the login database.

5.3. Data Modelling

Java DB is a fully transactional, secure, standards-based database server, written entirely in Java, and fully supports SQL, JDBC API, and Java EE technology. The Java DB database is packaged with the GlassFish application server, and is included in JDK 6 as well[3].

This system has Seven databases relevant to the hospital management system. I create databases using MySQL database in NetBeans IDE. Patient Details, Doctor Details, Staff Details, Medicine Information, Payment Information, Manage Channels and Login are the databases that I created for Hospital Management System.

01. Patient Details

SELECT * FROM USER1.PATIE... X							
Max. rows: 100 Fetched Rows: 5							
#	PATIENTID	PATIENTNAME	AGE	GENDER	ROOMNUMBER	CONTACTNUMBER	DISEASE
1	123	Y.E.Hasinika	23	Female	22	774562389	High blood Pressure
2	124	U.H. Lakshani	45	Female	4	774562222	Cholesterol
3	125	T.H. Perera	35	Male	4	774578905	allergic
4	126	T.G. Siriwardhana	67	Male	5	787578967	Eye disease
5	127	T.G. Herath	87	Male	10	787578967	Eye disease

02. Doctor Details

SELECT * FROM USER1.DOCTO... X							
Max. rows: 100 Fetched Rows: 5							
#	DOCTERID	DOCTERNAME	SPECIALIZATION	WORKINGTIME	ROOMNUMBER	CONTACTNUMBER	QUALIFICATIONS
1	124	Dr.Gayani Samarakon	Surgery	10.00-12.00 a.m.	13	775443367	MBBS
2	120	Dr.Tihan Gamage	Surgery	12.00-4.00 p.m.	10	775343360	MBBS Master in surgery
3	121	Dr.Ranjith Ekanayaka	Psychiatry	1.00-5.00 p.m.	12	773443360	MBBS Master in Psychiatry
4	125	Dr.Chanu Perera	Psychiatry	1.00-5.00 p.m.	14	773434567	MBBS Master in Psychiatry
5	127	Dr.Vidura Umayanga	Surgery	7.00-12.00 a.m.	16	775343789	MBBS

03. Staff Details

SELECT * FROM USER1.STAFF... X							
Max. rows: 100 Fetched Rows: 5							
#	STTAFID	STAFFNAME	OCUPATION	WORKINGTIME	ROOMNUMBER	CONTACTNUMBER	QUALIFICATIONS
1	234	G.Madhavi Perera	Nurse	10.00 - 12.00 a.m.	5	764532457	Bechelor of Science in Nursing Two years work experience
2	235	C.E. Suresh	Nurse	1.00 - 2.00 p.m.	6	764578565	Bechelor of Science in Nursing
3	236	F.L. Hansika	Nurse	6.00 - 8.00 p.m.	6	764523453	Bechelor of Science in Nursing
4	237	C.S. Perera	Nurse	1.00 - 2.00 a.m.	7	774568565	Bechelor of Science in Nursing
5	238	R.S. Gamage	Nurse	8.00 - 12.00 a.m.	10	774564567	Bechelor of Science in Nursing

04. Medicine Information

SELECT * FROM USER1.MEDIC... X							
Max. rows: 100 Fetched Rows: 5							
#	MEDICINEID	MEDICINENAME	MEDICINEPRICE	QUANTITY	PRODUCTDATE	EXPIREDATE	OTHERINFORMATION
1	1	Vitamin C	2	50000	2021-07-21	2023-07-20	Upcoming Two Stock
2	2	Vitamin E	2	600000	2021-07-09	2022-11-30	Upcoming One Stock
3	3	Piriton	3	750000	2021-07-09	2022-11-30	Stock is not enough
4	4	Panadol	5	780000	2021-07-15	2022-10-12	Upcoming One Stock
5	5	Panadol syrup	780	9000	2021-07-15	2022-08-14	Upcoming One Stock

05. Payment Information

SELECT * FROM USER1.PAYME... X							
Max. rows: 100 Fetched Rows: 5							
#	PATIENTID	PATIENTNAME	ROOMCHARGE	SERVICECHARGE	TOTALCHARGE	DISCHARGEDATE	OTHERDETAILS
1	1	Saduni kaushalya	2000	3400	5400	2021-07-14	Payed
2	2	Y.N. Ranasinha	4500	7800	12300	2021-07-01	Payed
3	3	D.S.Gunathilaka	8500	10800	19300	2021-07-10	Payed
4	4	U.W. Hansa	2500	5600	8100	2021-07-22	Payed
5	5	I.N. kavinda	5000	5700	10700	2021-07-14	Payed

06. Manage Channels

SELECT * FROM USER1.MANAG... X							
Max. rows: 100 Fetched Rows: 5							
#	PATIENTID	PATIENTNAME	CHANNELNUMBER	DOCTORID	DOCTORNAME	ROOMNUMBER	CHANNELDATE
1	1	Y.S. Disanayaka	1	12	Dr.Yasas Siriwardhana		10 2021-07-31
2	2	Y.N.Gamage	2	15	Dr.Gayani Gunathilaka		10 2021-08-04
3	3	C.N.Gunawardhana	3	15	Dr.Gayani Gunathilaka		10 2021-08-04
4	4	S.G. Thakshila	4	12	Dr.Yasas Siriwardhana		10 2021-08-19
5	5	S.J. Prathiba	5	12	Dr.Yasas Siriwardhana		10 2021-07-22

07. Login

SELECT * FROM USER1.USER... X

Max. rows: 100 Fetched Rows: 1 Matching Rows:

#	USERID	USERNAME	USERPASSWORD
1		1 admin	

6. System Specifications

Hardware Requirements: -

- Processor : Intel(R) Core(TM) i5-10210U CPU @ 1.60GHz 2.11 GHz
- Ram : 8,00 GB (7,72 GB usable)
- Memory : 8192MB RAM
- BIOS : V1.18

Software Requirements: -

- Operating System : Windows 10
- Programming language : Java
- Front-End : Java
- Back-End : Java, My SQL database in NetBeans IDE

7.Summary

The “Hospital Management System” is to computerize the NetBeans software. It is very user friendly, simple, fast. And also, to manipulate these details meaningfully System input contains details while system output is to get these details on to the “Java JFrame”.

Processing Speed and Results, Cost-Effective, Reduction in Errors, Data Security and, Improved Patient Care are motivational points in the system. This system avoids many problems that hospital is facing in today. The information is difficult to be retrievals immediately, the information is not able to be storage immediately, Information is not updating promptly are some problems that hospital is facing today. The main objectives of a Hospital Management System are design a system for better patient care, reduce hospital operating costs, provide report on demand to management for better decision making and so on.

The Hospital Management system has Login and Main window.

The Hospital Management system has Login and Main window. The Hospital Management system includes Details of patients, Details of Doctor, Details of Staff and so on. The Hospital Management system has computerized billing in the Hospital. And also, it includes Manage Channel and Medicine Information window. This system has data bases that create using Java DB database in NetBeans IDE.

8. References

- [1]. “What is an Entity Relationship Diagram (ERD)?,” *Lucidchart*. [Online]. Available: <https://www.lucidchart.com/pages/er-diagrams>. [Accessed: 30-Jul-2021].
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