CURATIVE CARE HOSPITAL MANAGEMENT SYSTEM USING PYTHON WEB WITH FLASK AND DEVOPS

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Abstract – *Hospital Management System is the most effectively used application management in the medical field and health systems. It helps in bringing together all the processed information and hospital operations in a single digital platform. This system automatically generates a very well-organized and systematic approach of managing patients, doctors, billing, appointments, treating various diseases through in-Patients. The Key features of the Curative Care Hospital Management System is its ability to register patients, update data and discharge patients. It also issues new diagnostic tests, features billing details functionality & view patient information for Pharmacists.*

Key Words: **Admission Desk Executive, Pharmacist, Diagnostics Services Executive, Flask, SQLAlchemy, Billing, medicines, diagnostic tests**

1. INTRODUCTION

1.1 AIM

The IT system has ameliorated the field of medicine and aid services. In this swift world of medicine, it is a difficult task to manage a multi-skilled hospital that could manage all hospital operations. To solve the above issues and enable the smooth functioning of the Hospital, a Hospital Management System (HMS) is introduced. It is a computer-based system that facilitates functional management of the hospital setup. The medical system is integration of stakeholder's statistics like staff, patients, hospital administrative details, etc.

1.2 SCOPE

1.Registration/Admission Desk Executive:

Executive allows patient registration to the site where only
genuine and authentic people are allowed to register in the site as Patients. It makes it possible to access all pure and effective patient data via the system database with just a few mouse clicks. The system emphasizes CRUD feature which is Create, Read /View, Update and Delete. Registration Executive can access information like Patient History, current patient illness, names of the doctors involved. The essential task of an executive is to raise the bill for all services rendered and medicines issued to the patients.

2. Pharmacist:

Pharmacists are stakeholders who have proficient, skillful knowledge in medication and play a critical role in providing the best results to people all over the world. They prepare & hand out prescriptions, manage medicines issued to the patients and ensure that the drugs are safe to be consumed.
These stakeholders can observe the Patient details along with the previous prescribed medicines to each patient along with each medicine's composition. They also have the feature of issuing new drugs to the patient after a safe patient check-up.

3. Diagnostics Services Executive:

Diagnostics Services eases the provision of timely, thrifty and premium diagnostic care in a safe and secure hospital system. It manages the diagnostic tests rendered to the patient by doctors. These stakeholders can observe the previous diagnostic service tests conducted for patients. If required they can also add new tests to be conducted to the patient along with the cost details.

2. PROPOSED METHOD

1. For Registration/Admission Desk Executive

1.1 Login Screen <common functionality for any hospital administration stakeholder>:

Login Screen allows a user to login to the site and gain access to the site by entering their unique credentials in the form of username and password. For achieving this functionality there is an RDBMS table that contains username, password and login timestamp columns. The Screen is input validated from the backend where the Username and Password can be alphabetical or both alphanumeric with a maximum of 9 characters. Password query string must contain 1 lowercase letter, 1 uppercase letter and a special character. Only after credentials verification and authentication, the user is then allowed to browse the site or else there is an error message.

1.1 Create Patient Screen (Patient Registration):

This screen allows the admission desk executive to create new patients by the entered patient inputs. The Database table for Patients consists of columns Patient SSN ID, Patient Id (Auto-Increment), Patient Name, Age, Date of admission, Type of bed (General ward, semi sharing, single), Address, City, State, Status (Active/Discharged).

1.2 Update Patient Screen:

The Executive has the full privilege to update the existing patient details. He/ She edit any patient fields except the Patient ID which is the unique ID generated during the patient registration.

1.3 Delete Patient Screen:

The executive should be able to query for existing patients by using query/pull existing patient screen. This function allows him/her to delete patient details.

1.4 View Patients Screen & Search Patient:

Hospital Management System allows the hospital administration staff to view all the existing patients who are currently active i.e not yet discharged in the system.
It also permits the staff to search any patient based on the patient ID.

1.5 Patient Billing Screen:

This screen is used to raise the bill for patient who is currently not active or is getting discharged.

The Generated Patient Bill will constitute the following details:

1. Patient details: name, age, address, date of admission, date of discharge, room type, and number of active days in the hospital.

2. Total room cost will be calculated based on the room type:
General ward: Rs. 2000 per day
Semi sharing: Rs. 4000 per day
Single Room: Rs. 8000 per day

3. Billing for the medicines
List of Medicine details issued by the pharmacist to the patient with amount and the Grand total of medicines.

4. Billing for Diagnostics
List of diagnostics tests conducted for the patient by diagnostics in charge with amount and the Grand total.

The Bill will hold the Grand Bill Total i.e the total of the amounts of room bill, medical bill and diagnostics bill.

2. For Pharmacist

2.1 Get Patient Details Screen:

This screen allows pharmacists to pull patient information from the patient id and issue corresponding medicines after consultation with the doctor.

2.2 Issue Medicines Screen:

The Pharmacist's role is to issue medicines to the patient based on the medicine availability and after doctor consultation. The Final medicines list against each patient SSN id are then forwarded to the Administration Executive To frame the final payment bills.

Database tables for medicines:

Table 1: For tracking medicines issued to the patients
Patient ID, Medicine issued ID, Quantity issued

Table 2: Medicines master file
Medicine ID, Medicine name, Quantity available, Rate of the medicine

3. For Diagnostics Service Executive

3.1 Get Patient Details Screen:

This screen allows diagnostic to pull patient information from patient id and add diagnostics tests after consultation with the doctor.

3.2 Add Diagnostics Screen:

The Diagnostic in charge adds some diagnostic tests to be carried out for the patient after doctor and executive consultation. The Final diagnostics list with the charges of each test against each patient's SSN id is then forwarded to the Administration Executive.

Database tables for diagnostics:
Table 1: Tracking diagnostics conducted to the patients
Patient ID, Test ID

Table 2: Diagnostics master file
Test ID, Test name, Charge for the test

3. SOFTWARE METHODOLOGY & FRAMEWORKS USED

1. PYTHON:

The language used in our system is Python. Python is an extensively and popularly used general-purpose programming language. Python can be used to create web applications on the installed server, connecting to database storage systems to read and store data using query strings.

Python is a free source and is also a portable language i.e platform- independent. The execution of Python is done line by line at a time with easy code syntax and easy debugging for a programmer as compared to other programming languages. Python language is the most popularly used language among developers as it is a interpreted language and provides support to extensive plugins.

2. FLASK:

Flask is a web-based Python framework written in Jinja2 template which makes developer's life easier to code. It represents a group of libraries and modules that enables us to write applications at an easier pace without having to mind about some least priority level details such as protocols, thread management, etc. Flask is generally a popular choice among developers as it provides support for lightweight codebase.

There are certain dependencies that are installed in this system:
1. Flask-SQLAlchemy: It is a flask extension that initiates the connection of the Flask Application with the SQL Database.

2. flask_wtf : It is a WT form library for Python web where it is intended to provide the user with an interactive interface. It enables an efficient way of designing forms in Python-based flask application.

3. flask_wtf.csrf : CSRF module token is a unique and secret code number that protects WT Form and it is easy for integration with our system.

3. SQLite DATABASE:

SQLite is an efficient, fast and highly reliable RDBMS widely used in applications for storing data in databases, reading and viewing data. As this type of DB is independent, so
creation and updates to the database are contained in visual studio as an SQLite file. SQLite Database is the most convenient and popularly used database for flask as each database is located as a single file and there is no need for

independent driven database servers like MySQL, Microsoft SQL Server, PostgreSQL, etc.

4. WEB TECHNOLOGIES:

Web technologies involve the use of HTML, CSS, JS, AJAX, Bootstrap, etc by which the computers interact with each other. It helps in creating responsive and effective web pages which are user-friendly across multiple platforms.

5. DevOps:

It is a combination of principles and practices that involves a combination of software development and IT operations. It provides faster & continuous product delivery with ease and high software quality.In this HMS for team collaboration and better efficiency, I have used "GIT" which is used as a version control tool. It enables many people to work together and is also used to track changes in the source code.

4. IMPLEMENTATION SCREENS

Fig 1. Login Page

The figure above shows the Login page where stakeholders have to register to access the site. The different users are Admission Executive, Pharmacist and Diagnostic Executive.

Fig 2. Admission Executive Dashboard

Admission Executive Dashboard allows stakeholders to exercise their functional roles as Create & Update Patients, Search & View Patients, Delete and serve patients with a bill.
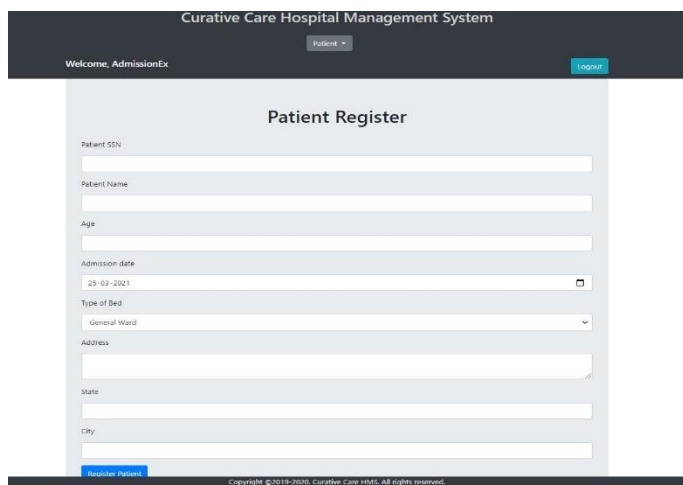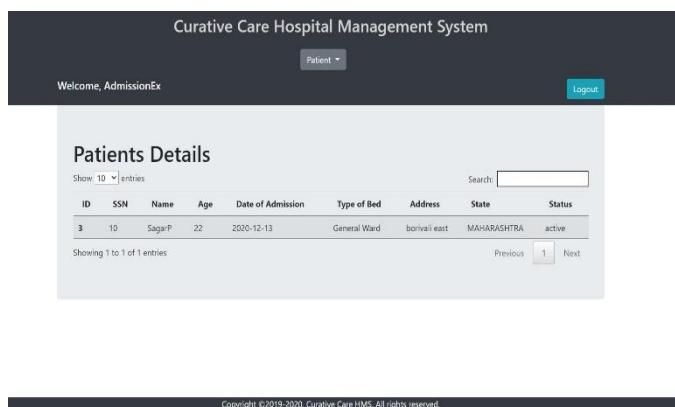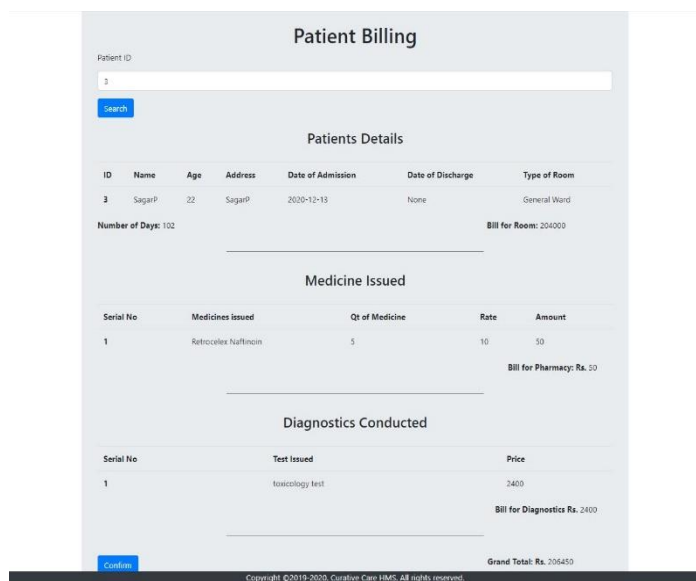

Fig 3. Patient Registration

The above figure is related to Patient Registration where the patients have to submit the following fields like Name, Age, Type of Bed, Admission Date, Address, State and City to the Admission Executive. He/ She would check the availability of beds in the given date and then proceed with the patient registration. After patient registration, the admission executive could also update the patient details using the Patient SSN and also delete the record after the patient has been successfully discharged.

Fig 4. Patient Details

The above figure shows the details of Patients (ID, SSN, Age, Date of Admission, Bed Type, Address, State) that have been registered in the system. The Curative Care Hospital Management System allows the Admission executive to view only the patients who are currently active in the system. The patients record with status as discharged have to be deleted from the system.

Fig 5. Patient Billing

As the patient gets discharged, the Admission Executive would prepare a bill with all the patient's personal details, Medicines issued by the Pharmacist & doctor and the details of the diagnostic tests. The Bill constitutes a Grand Total to be paid by the individual which is the sum of all individual components bill.
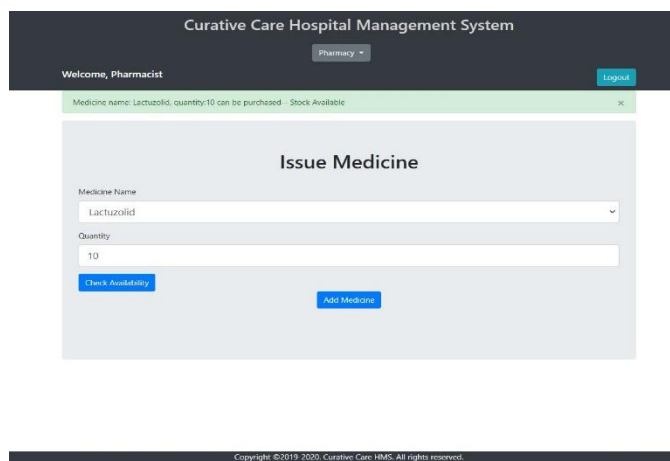

Fig 6. Issue Medicines

This feature screen is accessed by the Pharmacists to issue Medicines to the patient. The Screen constitutes the medicine name and the medicine quantity where the Pharmacist would firstly check the drug availability and then issue it to the patient.
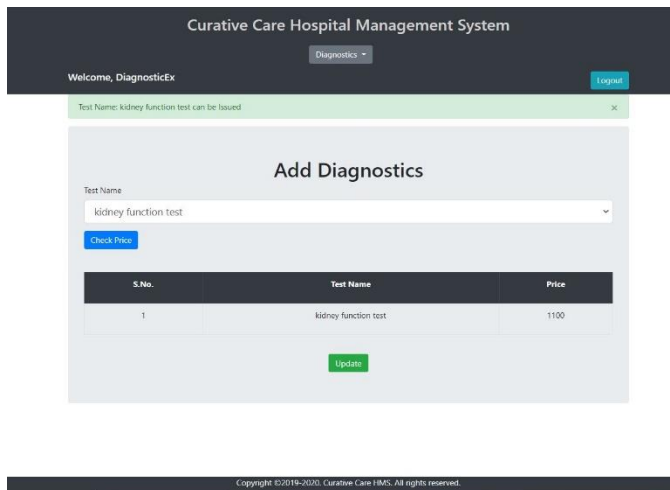
Fig 7. Add Diagnostics

This screen feature could only be accessed by the Diagnostic Executive and it allows them to add diagnostic tests to the patient on doctor's consultation.

5. CONCLUSION

Curative Care Hospital Management was developed to help people related to health care, provide smooth system functionality and sufficient aiding facilities. The system comprised of three stakeholders, Admission Executive who initiated patient details registration, allowed only registered users to access the site and billing, Pharmacist's main role is related to medicines provision to the patient and Diagnostic Executive diagnoses the patient and provided equivalent tests. The main aim for the system development is to promote a cost-effective, high-quality processing speed and effective health care services to the patients.

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BIOGRAPHIES

I am Sagar Prabhu graduated in Information Technology from Thadomal Shahani Engineering College (BE 2020-2021). My key skills include proficiency in Python 3.x tech, Flask, .NET, Angular, Web Tech and Java. My Career objective is to seek challenging assignments with growth opportunities and career upliftment.