



# Hospital Patient Management System

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## Overview

The purpose of developing this “Hospital Patient Management System” is for the automation of Hospital Management which includes maintaining patient details, keeping the track and log of prescription, diet and tests along with billing.

In many places, data storage for patient details and records are still done via Books and Ledgers which is not good for the environment as a lot of paper needs to be used, which leads to requiring a lot of trees being cut down if a large number of hospitals use them.

On top of this, retrieving the data and the details after time has passed is a hassle as each book would need to be individually found and searched. Backing them up is also quite a tedious and expensive affair, as the amount of ledgers and books would be doubled.

To help in the data storage for hospitals, this Hospital Patient Management System streamlines the entry and retrieval process to make things easier for the people entering the details and also so that patients can also easily access and modify relevant data.

## Introduction

### Existing System

The present system is a manual system or a semi-automated system. Manual system involves paper work in the form of maintaining various records. Maintaining critical information in the files is full of risk and a tedious process.

A manual system has the following disadvantages:

- **Lack of immediate retrievals:** - It is very difficult to find and retrieve particular information. e.g. - To find out about a patient's history, the user has to go through various registers. This is inconvenient and results in wastage of time.
- **Lack of immediate information storage:** - Information generated by various transactions takes time and effort to be stored at the right place.
- **Lack of prompt updating:** - Various changes to information like patient details or immunization details of a child are difficult to make as paperwork work is involved.
- **Error-prone manual calculation:** - Manual calculations are error-prone and take a lot of time. For example, calculation of a patient's bill based on various treatments.
- **Preparation of accurate and prompt reports:** - This becomes a difficult task as information is difficult to collect from various registers.
- Limited sharing is possible if the data is in the form of paper or disk drives.

- The manual system gives us less security for saving data, some data may be lost due to mismanagement.

## Proposed System

The patient management system aims to provide the patient and hospital staff features equal to or better than the traditional record keeping.

The project maintains two level of users:

1. User level: Patient/Caretaker
2. Administrative level: Data entry operator

Main facilities available in this project are:

- Maintaining records of indoor/outdoor patients.
- Maintaining patient's diagnostic details, advised tests to be done.
- Maintaining patient's prescription, medicine, and diet advice details.
- Providing an interface for a patient to view his appointments, test details etc.
- Providing billing for indoor/outdoor patients.

## Specifications

### User Characteristics

Admin:

- Has complete access to the database.
- Can add or delete any staff/doctor/patient
- Can modify any detail in the database.

Caretaker:

- Can add new patients to the database.
- View any patient's details(reports, medical history, etc.).
- Can update patient's appointment dates, test results, etc.

Patient:

- Can view their medical records.
- Can update their contact details and password.

### Assumptions

The following assumptions have been made while making this project:

1. All users have a basic knowledge of English language.
2. All users have a basic knowledge of computer usage.
3. Admin has a basic knowledge of how to use the system due to previous experience with other systems.
4. Patient and staff are equipped with a computer.
5. Users must have internet connection at all times.

## Dependencies

As it requires data to be fetched from a cloud database. It is dependent on internet connection. A connection is required to send commands and receive answers, usually in the form of a result set.

## Constraints

All users must be logged in order to use the product and access information.

## Requirements

### Functional Requirements

Functional requirements are tabulated as follows accompanied with a priority level.

- **Priority 1:** This requirement is a “must have” as outlined by policy/law.
- **Priority 2:** This requirement is needed for improved processing, and fulfillment of the requirement will create immediate benefits.
- **Priority 3:** This requirement is a “nice to have” which may include new functionality.

Functional Requirement	Priority Level
Nurses must have a userID and password to login	1
Only administrator can register new nurses	1
Patient will login using the ID and password	1

provided to them by the hospital	
Nurses can add/update the medical records, appointment date of a patient	1
Nurses can add contact details of the patient only while creating the record.	2
Patients can only view their medical records and appointments	1
Patients can edit their contact details and password.	2

## Non-Functional Requirements

### Usability Requirements

The most important commands for each type of interface will be visible at first view so the software can be easily accessed. It will be designed in a way that allows modifications to be made, as it has to be updated time after time to fulfill management requirements and to manage possible error occurrences.

### UI Requirements

- A simple, responsive and fast system.
- Web app, consistent in all interfacing screens.
- Details of anything will be displayed quickly.
- Flexible navigation to and displayed panels or pages.

### Learnability

- Our product is user- friendly -- everyone can easily learn how to use the software following the guidelines provided by us.
- The software is in English. It can be understood by someone with basic knowledge of English.

### Portability

The website can be accessed in any platform and browser as long as the user has an Internet connection.

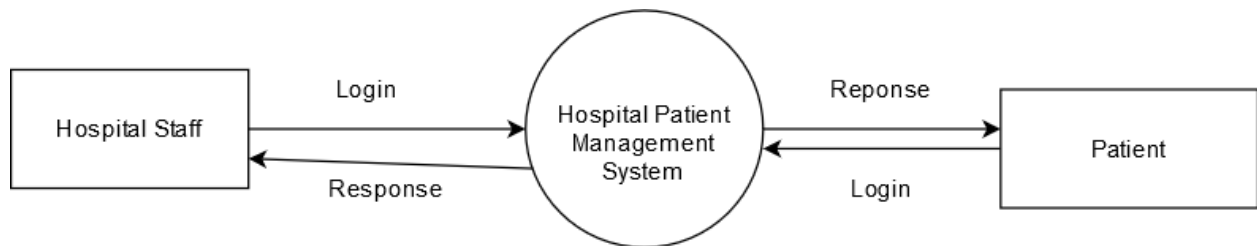


## Security

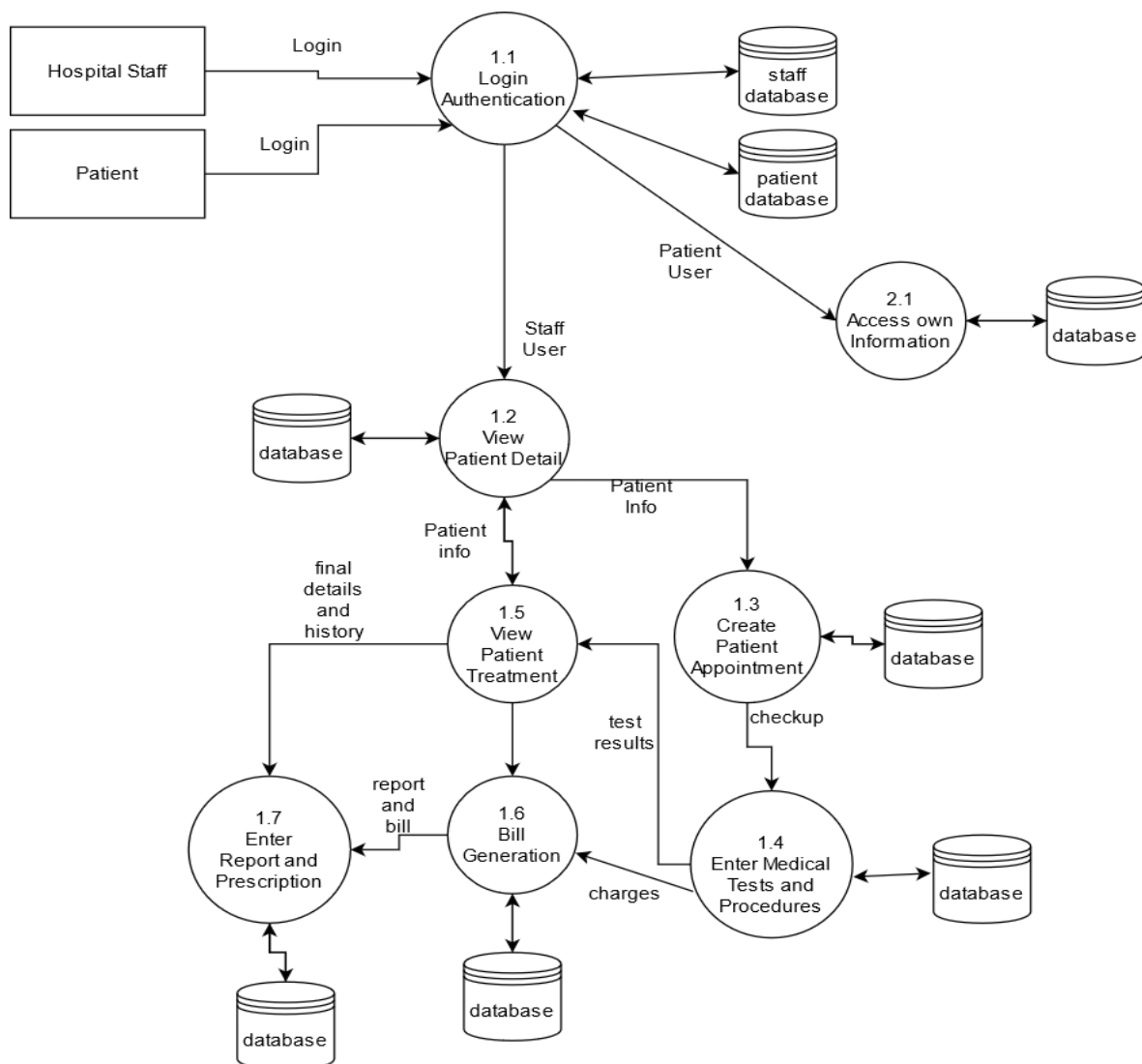
- Ensures that both patient and nurses are registered in the database before they try to login to respective applications.
- Passwords are stored in the database in hashed format in order to provide additional layer security for users in case of data breach.
- A log of all the changes made in the database is kept for data recovery purposes.

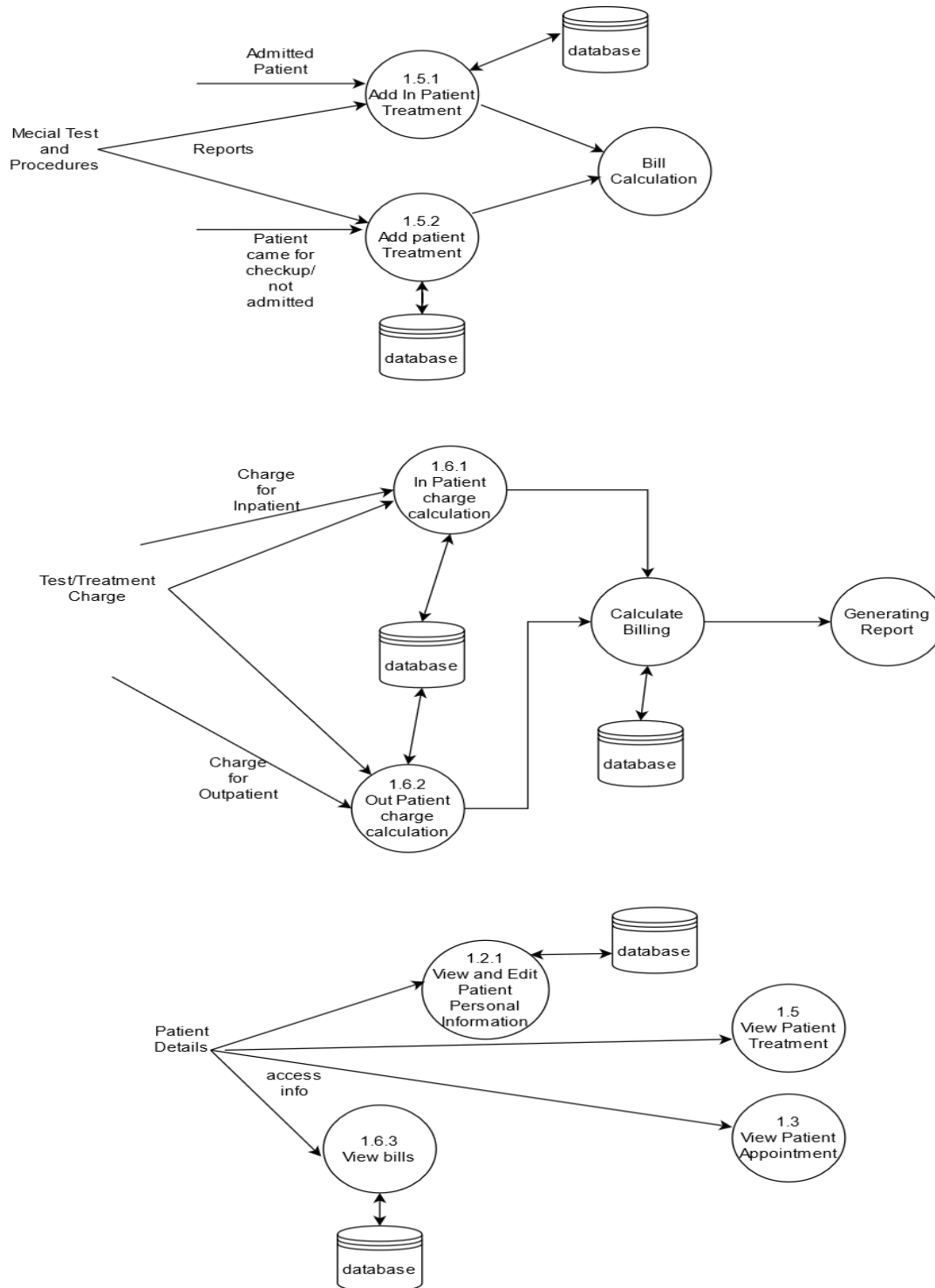
## Data Flow Diagram

L0:



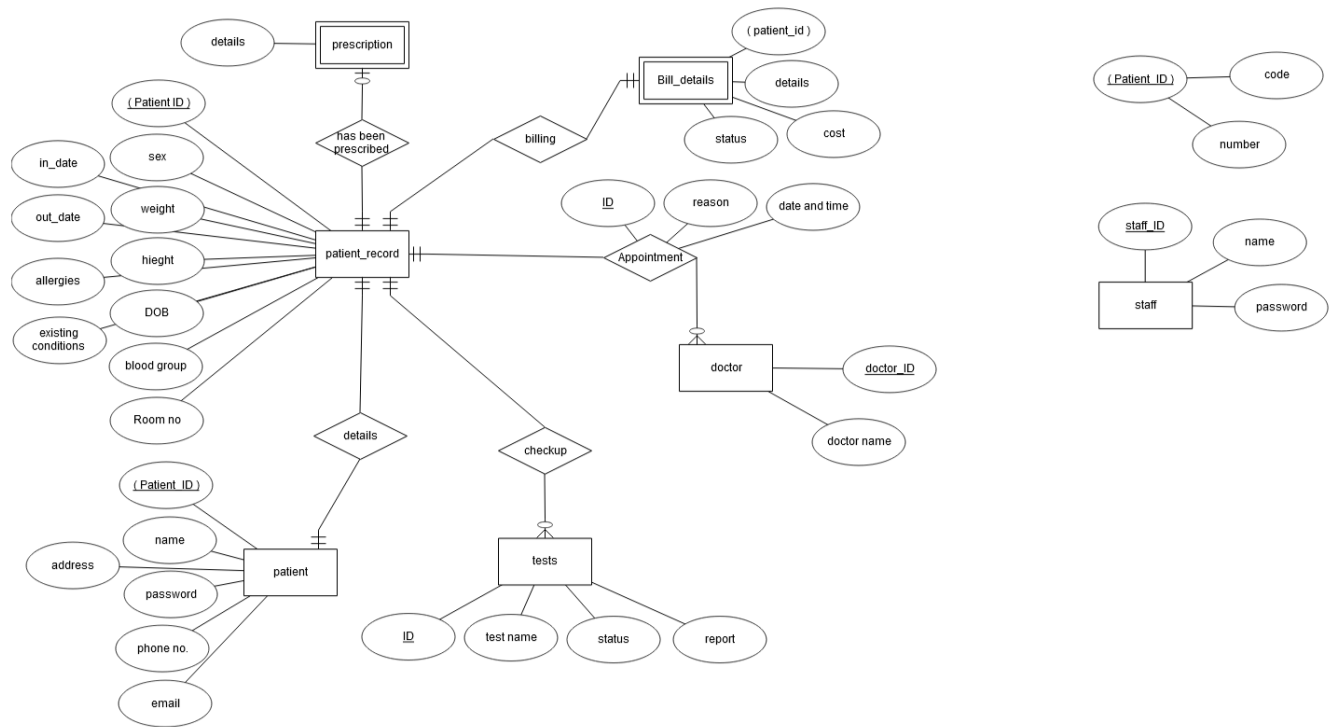
L1:



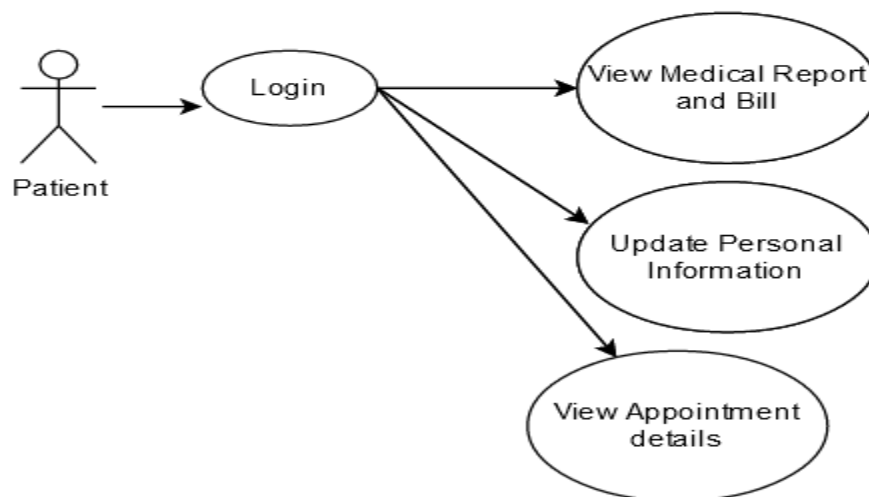
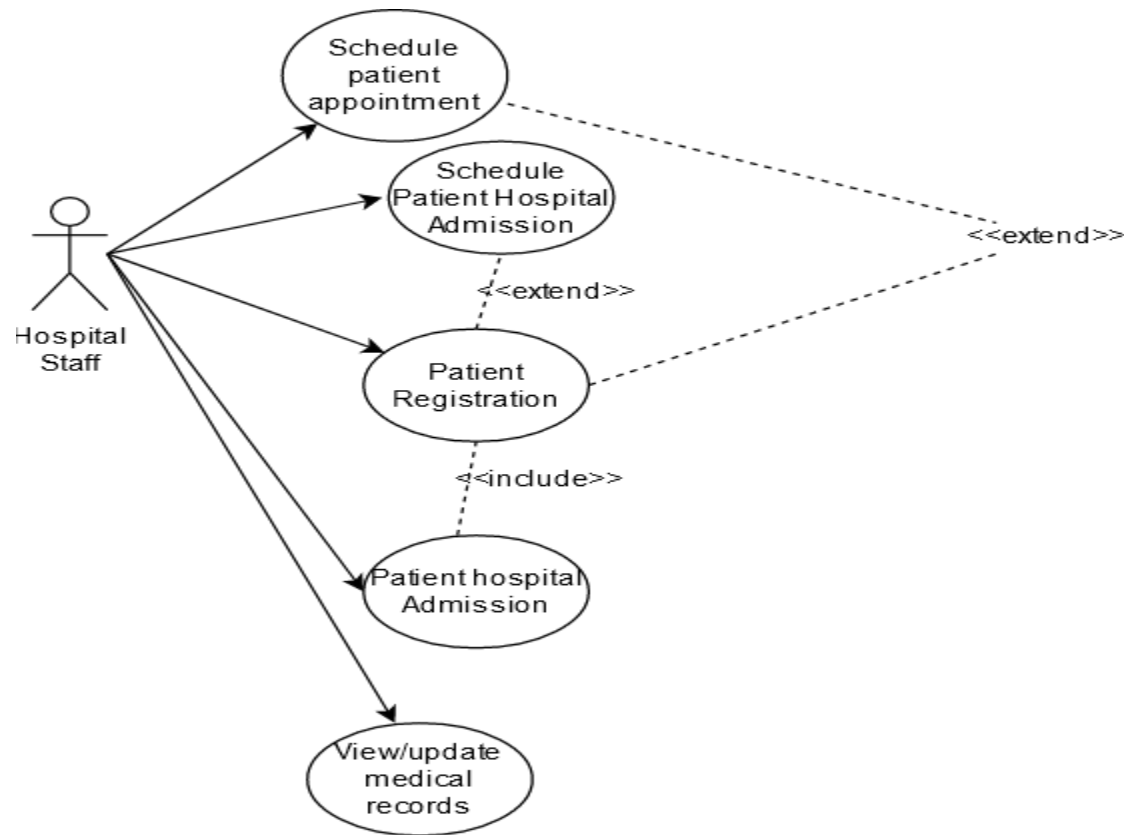




## ER Diagram



## Use Case Diagram



# Testing

The testing for both the applications follows Black Box Testing via manual testing of various inputs in each form for input validation and to check for error handling.

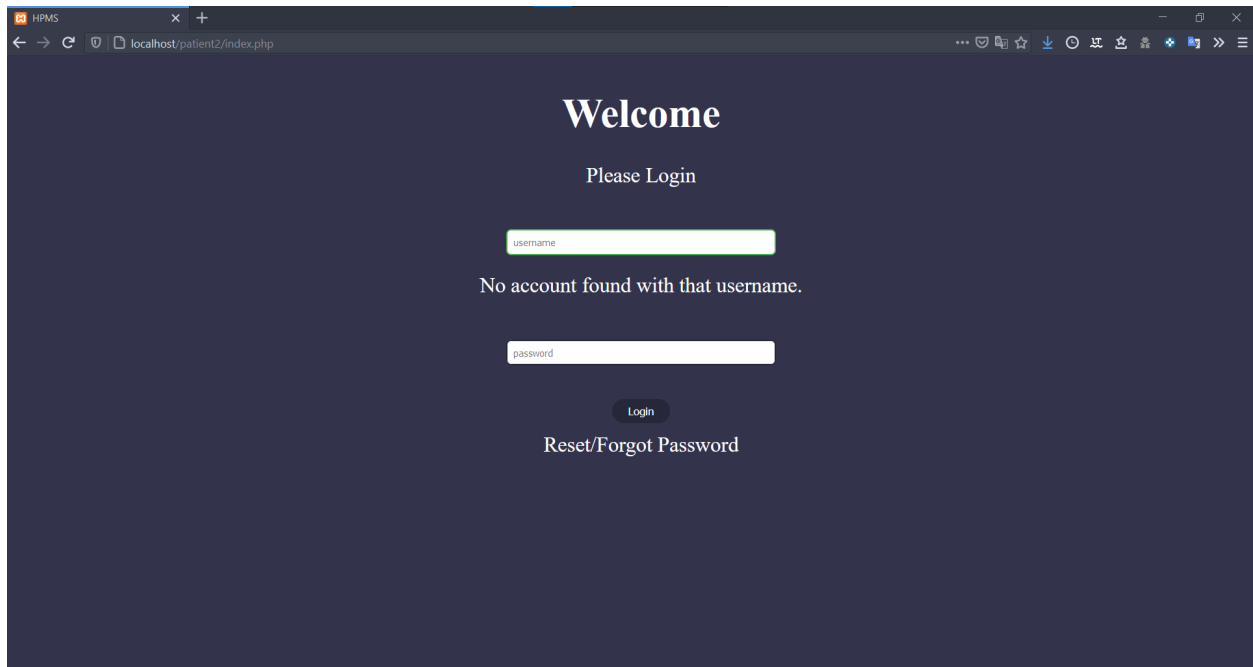
The testing is done as follows:

- Input valid data into each field to confirm dataflow is working as expected.  
Enter garbage data to check for error handling
- Test each input field  
Test that all required fields are filled before accepting input

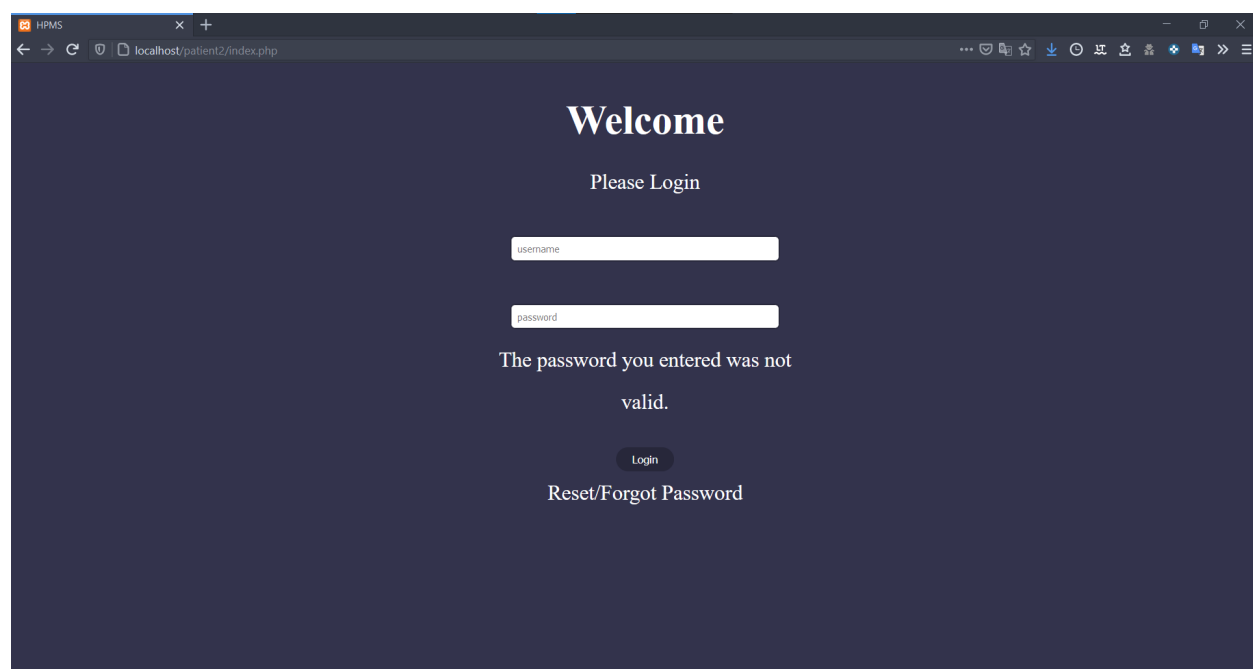
## Website

### Login Page

Tried to enter incorrect username for login.



Password checker to validate if the entered password is correct or not.



## Change contact details page

While changing phone no. it will check if the number is valid or not.

A number can start from 0 or +91, first digit should be 6-9, and it should be 10 digits.

HPMS

localhost/patient2/change\_contact.php

Sign Out

## Change Details

Change Number

Change Email

Change Address

Submit

Web page will show an error message if the phone number is not valid.

HPMS

localhost/patient2/change\_contact.php

Sign Out

## Change Details

Change Number

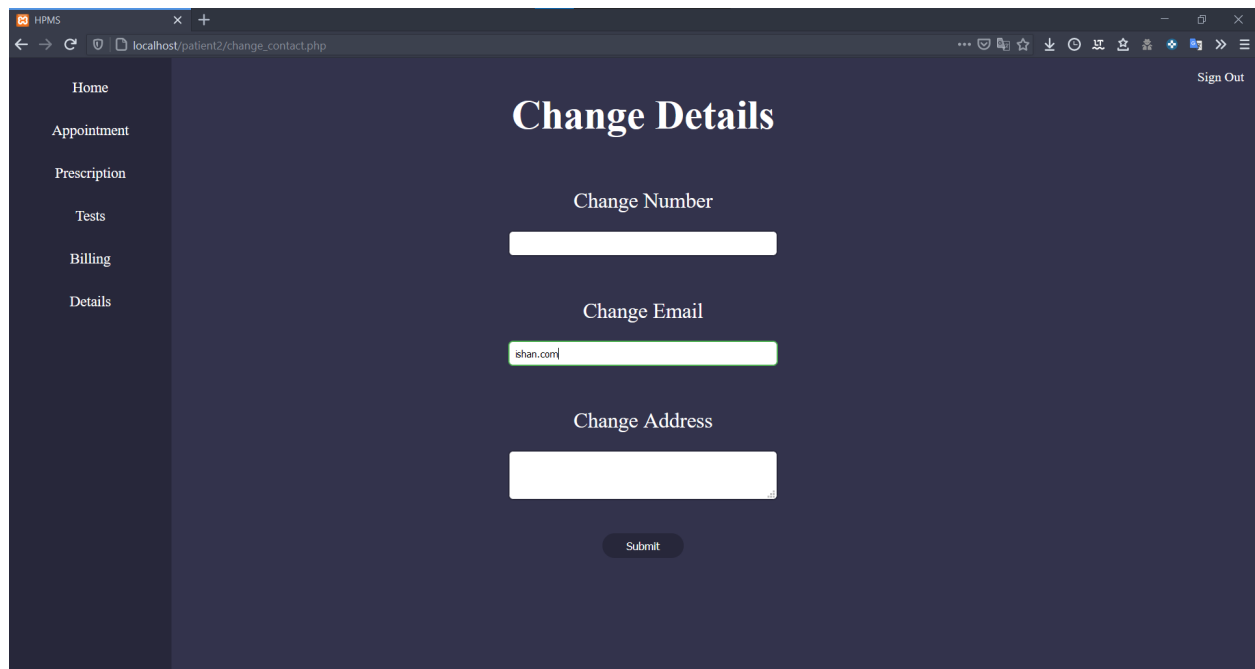
please enter valid phone number

Change Email

Change Address

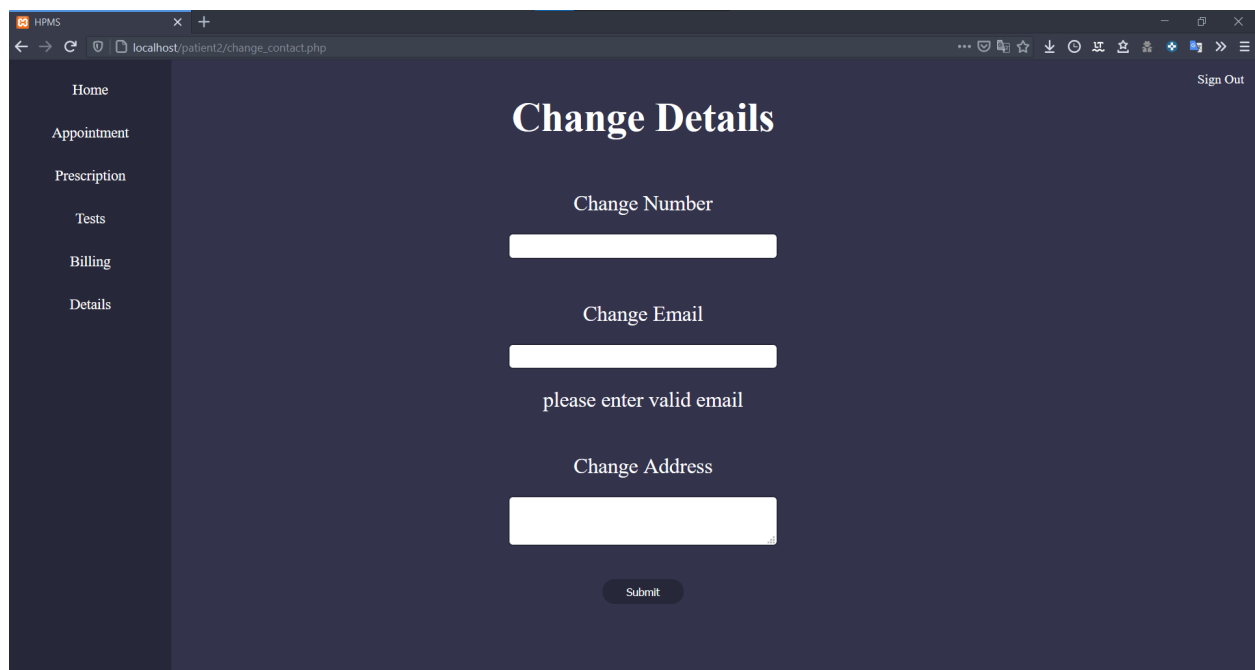
Submit

Similarly email validation is also implemented. Program will check first if the email entered is valid or not before updating.



A screenshot of a web browser displaying the HPMS (Hospital Patient Management System) interface. The browser address bar shows 'localhost/patient2/change\_contact.php'. The page has a dark blue sidebar with navigation links: Home, Appointment, Prescription, Tests, Billing, and Details. The main content area is titled 'Change Details' and contains three input fields: 'Change Number', 'Change Email', and 'Change Address'. The 'Change Email' field contains the text 'shan.com'. Below the input fields is a 'Submit' button. A 'Sign Out' link is visible in the top right corner.

If the email is not valid an error message will be displayed.



A screenshot of the same HPMS 'Change Details' form, but with an error message displayed. The 'Change Email' field is now empty, and the text 'please enter valid email' is shown below it. The 'Change Number' and 'Change Address' fields remain empty. The 'Submit' button is still present at the bottom. The sidebar and top navigation elements are identical to the previous screenshot.

If all the fields have valid input, contact details will be updated. User need not enter all the fields to update, they can selectively update any of the details they want.

HPMS

localhost/patient2/change\_contact.php

Sign Out

## Change Details

Change Number

8776754612

Change Email

lanadel@private.com

Change Address

5th street, house no. 8, GHY

Submit

Updated information is visible in the Details page.

Test Status

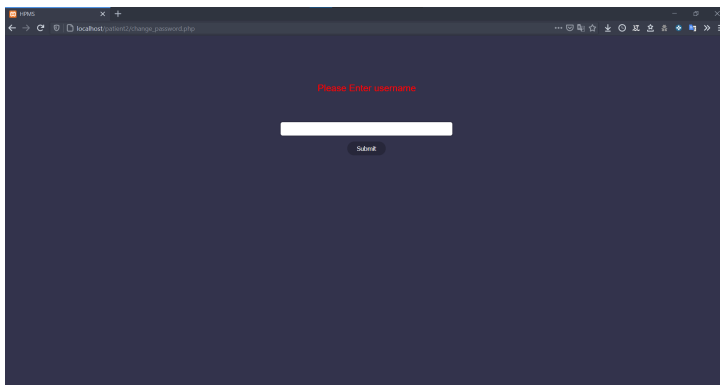
localhost/patient2/Details.php

Hello, Lina Delray Edit Details Sign Out

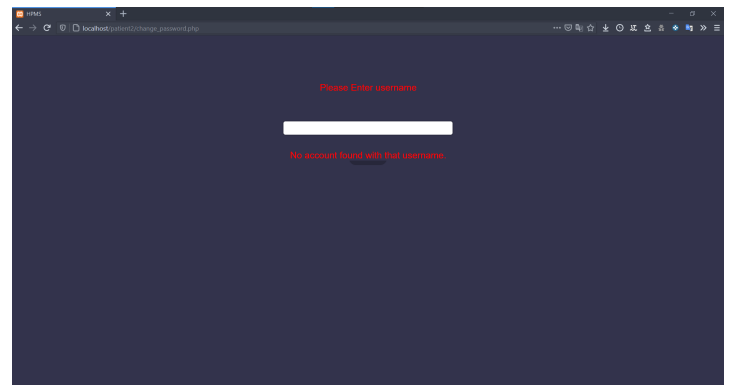
Staying Room No.	101
Admitted Date	2021-04-21 00:00:00
Discharge Date	2021-10-13 00:00:00
Blood Group	AB-
Sex	Female
Date Of Birth	2004-06-08
Height	145
Weight	45
Phone Number	8776754612
Email	lanadel@private.com
Address	5th street, house no. 8, GHY
Allergies	Peanuts
Existing Conditions	Asthma

## Reset/Forgot password page

Users will be asked to enter a username for which they want to change password. If the username is incorrect an error message will be displayed.

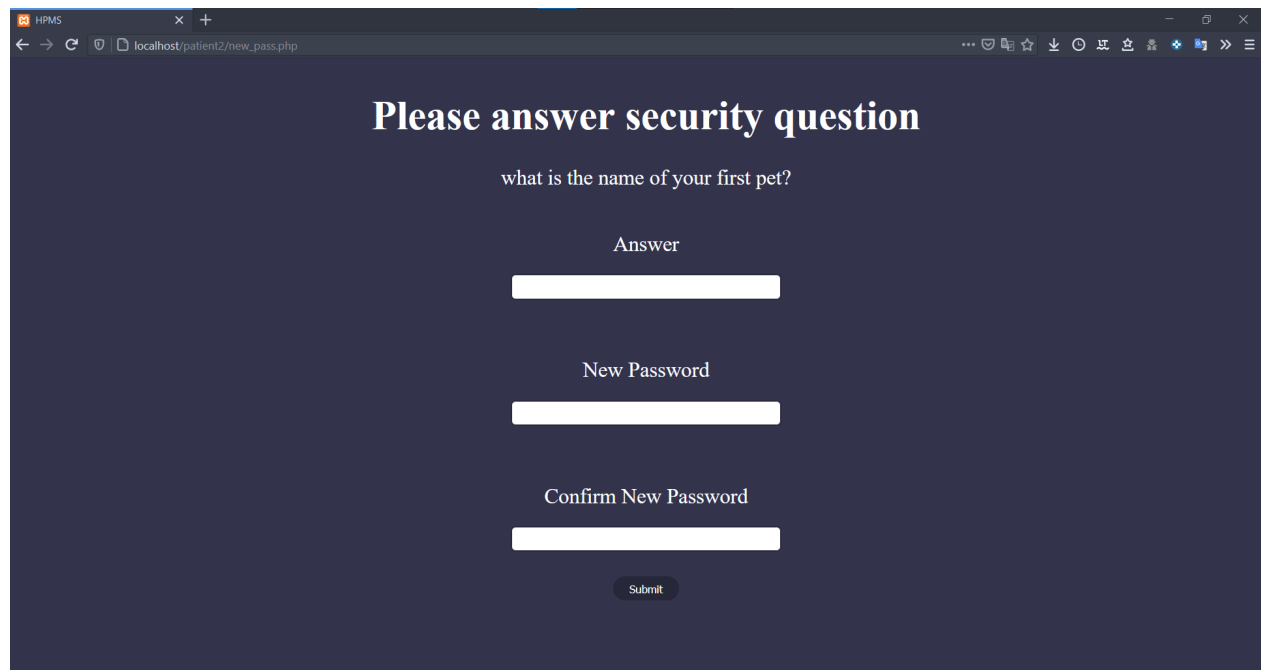


A screenshot of a web browser window showing a password reset page. The page has a dark blue background. At the top, it says "Please Enter username" in red. Below this is a white input field for the username. At the bottom of the input field is a "Submit" button.



A screenshot of a web browser window showing the same password reset page as the previous one, but with an error message. Below the input field, it says "No account found with that username" in red.

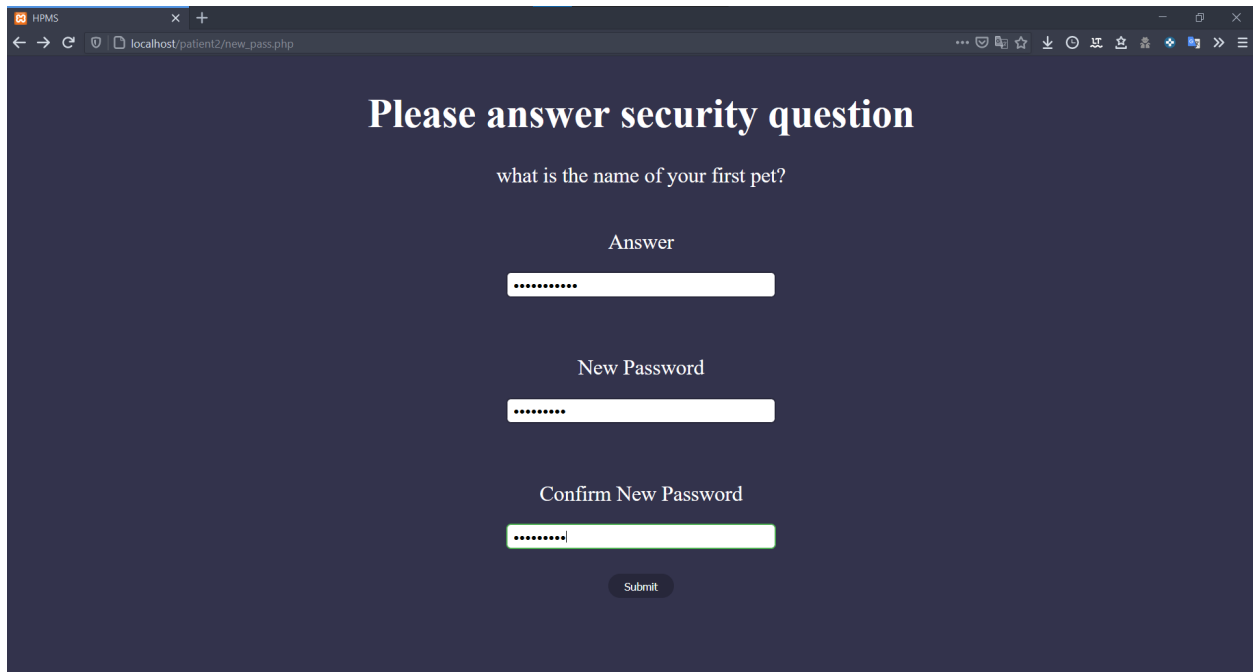
If the username is correct, the user is redirected to a change password page where they need to answer their security question and enter a new password.



A screenshot of a web browser window showing a password change page. The page has a dark blue background. At the top, it says "Please answer security question" in white. Below this is the security question "what is the name of your first pet?". There are three input fields: "Answer", "New Password", and "Confirm New Password". At the bottom is a "Submit" button.

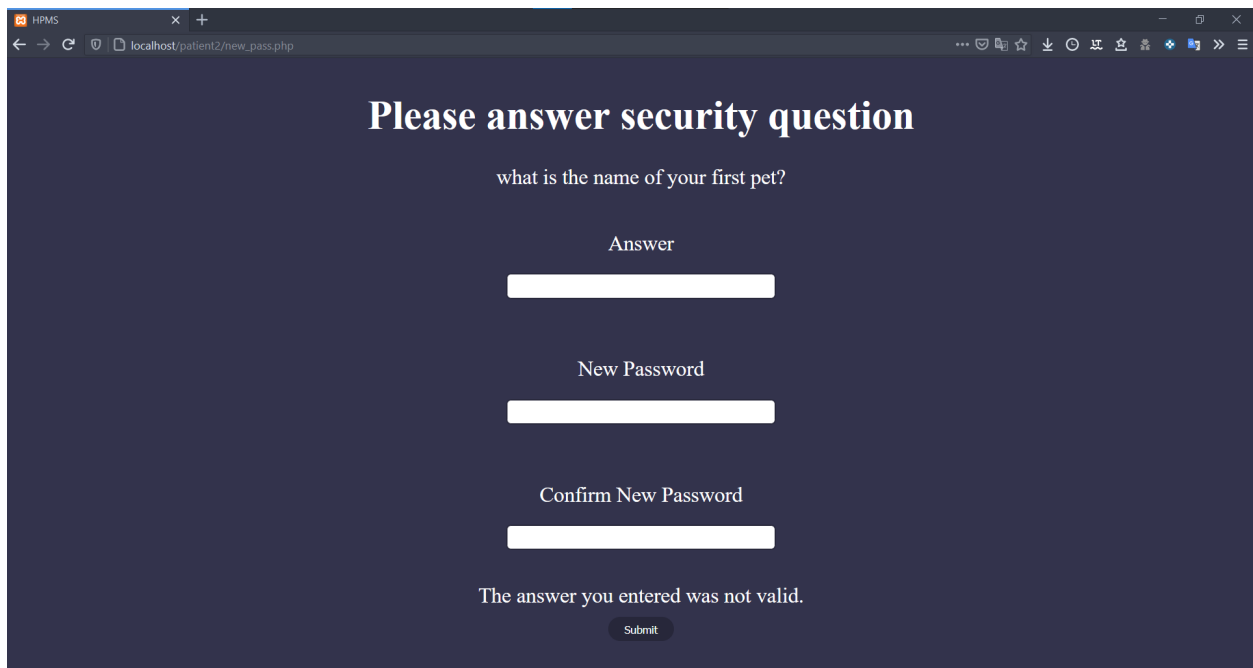


Security question displayed on the top needs to be answered correctly by the user.



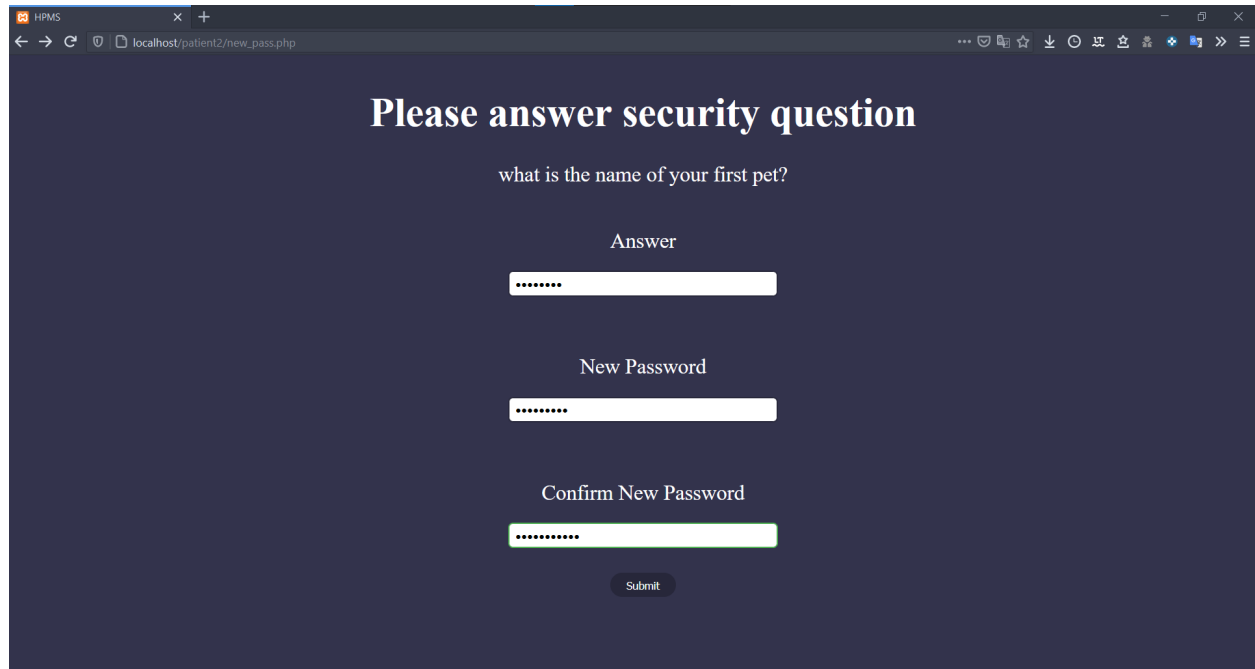
A screenshot of a web browser window with the address bar showing `localhost/patient2/new_pass.php`. The page has a dark blue background and a white title "Please answer security question". Below the title is a question "what is the name of your first pet?". There are three input fields: "Answer" (with a green border and a green dot), "New Password" (with a green border), and "Confirm New Password" (with a green border). A "Submit" button is at the bottom.

If the answer entered by the user is incorrect an error message is displayed.



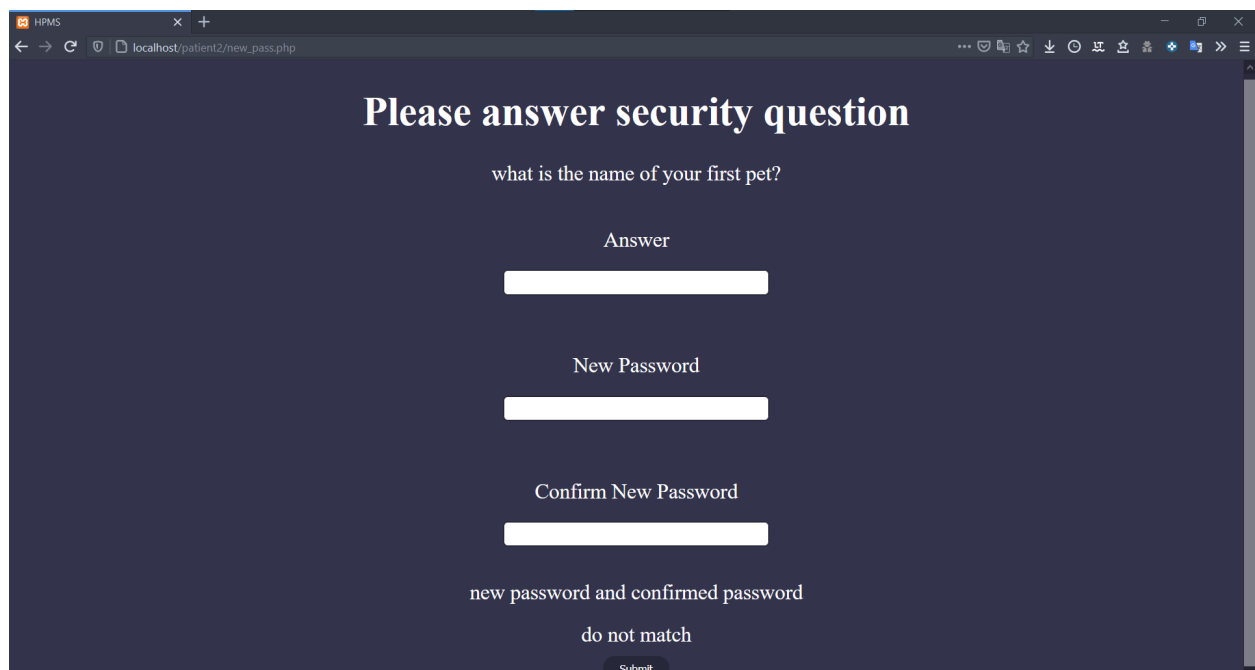
A screenshot of a web browser window with the address bar showing `localhost/patient2/new_pass.php`. The page has a dark blue background and a white title "Please answer security question". Below the title is a question "what is the name of your first pet?". There are three input fields: "Answer" (with a green border), "New Password" (with a green border), and "Confirm New Password" (with a green border). A "Submit" button is at the bottom. Below the button, an error message is displayed: "The answer you entered was not valid."

User is asked to confirm the password to make sure the new password they entered is correct and remembered by the user.



A screenshot of a web browser window with the address bar showing `localhost/patient2/new_pass.php`. The page has a dark blue background and white text. The title is "Please answer security question". Below it is the question "what is the name of your first pet?". There are three input fields: "Answer", "New Password", and "Confirm New Password". The "Answer" and "New Password" fields contain masked text (dots). The "Confirm New Password" field also contains masked text. A "Submit" button is at the bottom.

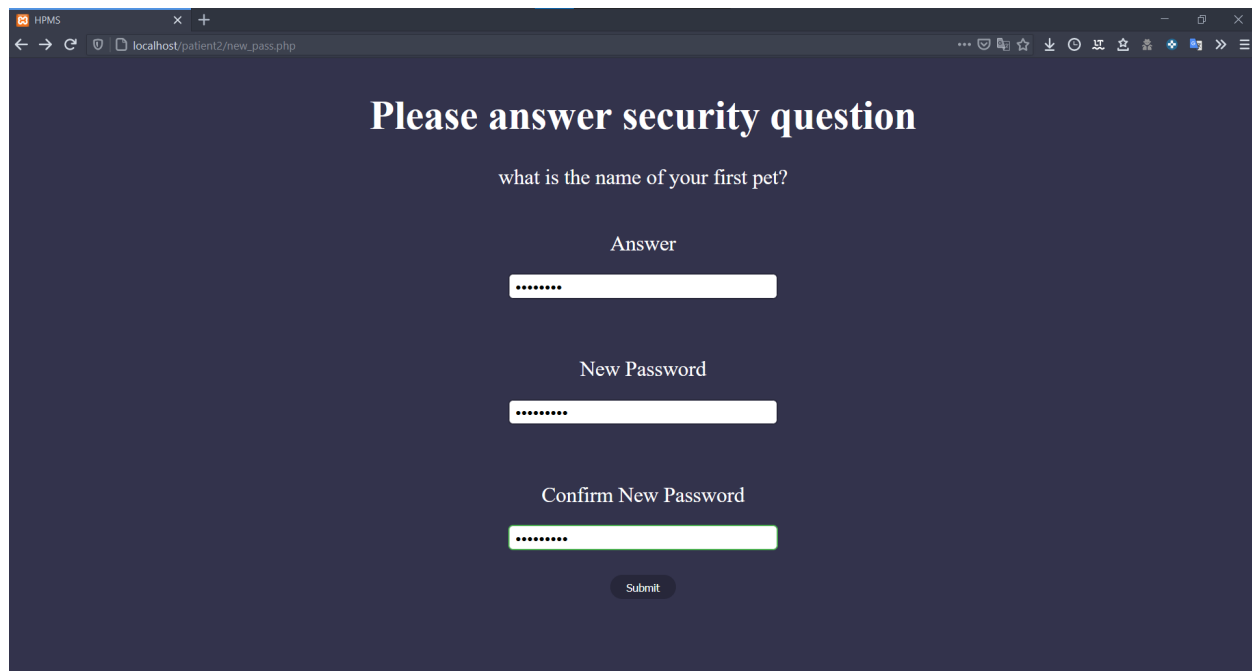
If the new password and confirm password do not match an error message is displayed.



A screenshot of the same web browser window as before, but now showing an error message. The "Answer" field is empty. The "New Password" and "Confirm New Password" fields are also empty. Below the "Confirm New Password" field, the text "new password and confirmed password do not match" is displayed. The "Submit" button is still at the bottom.

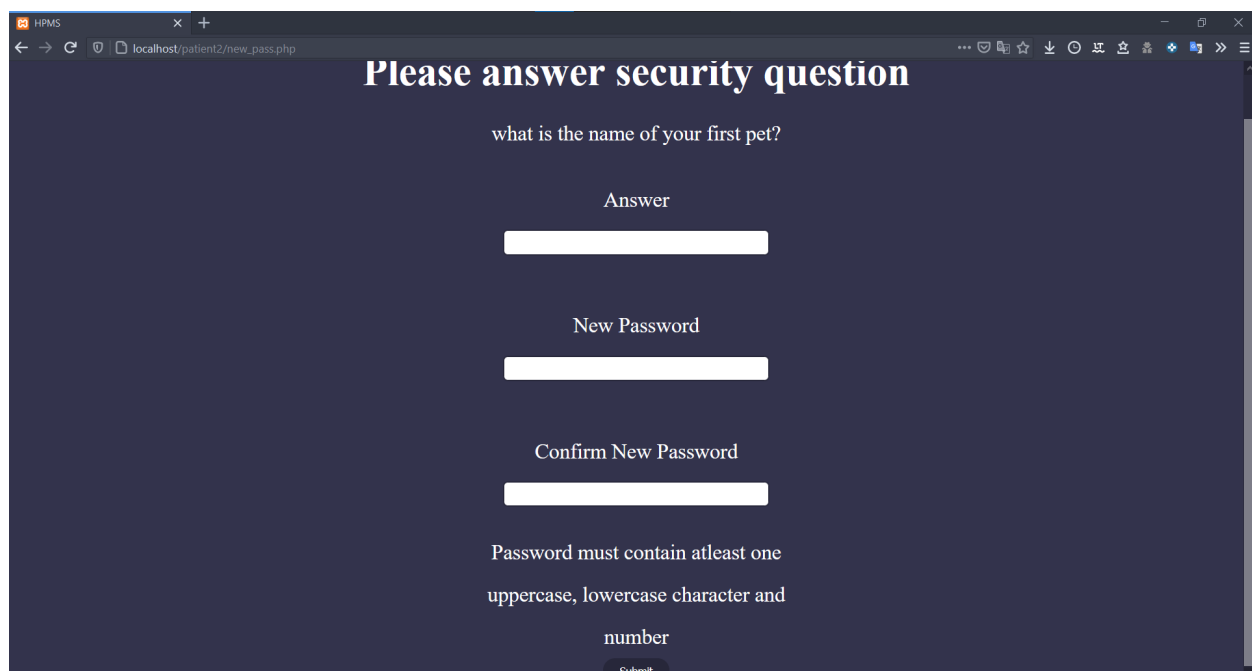
The password entered by the user should be of sufficient strength in order to ensure the security of the system.

Password should be at least 8 characters and must contain at least one uppercase letter, lowercase letter and number



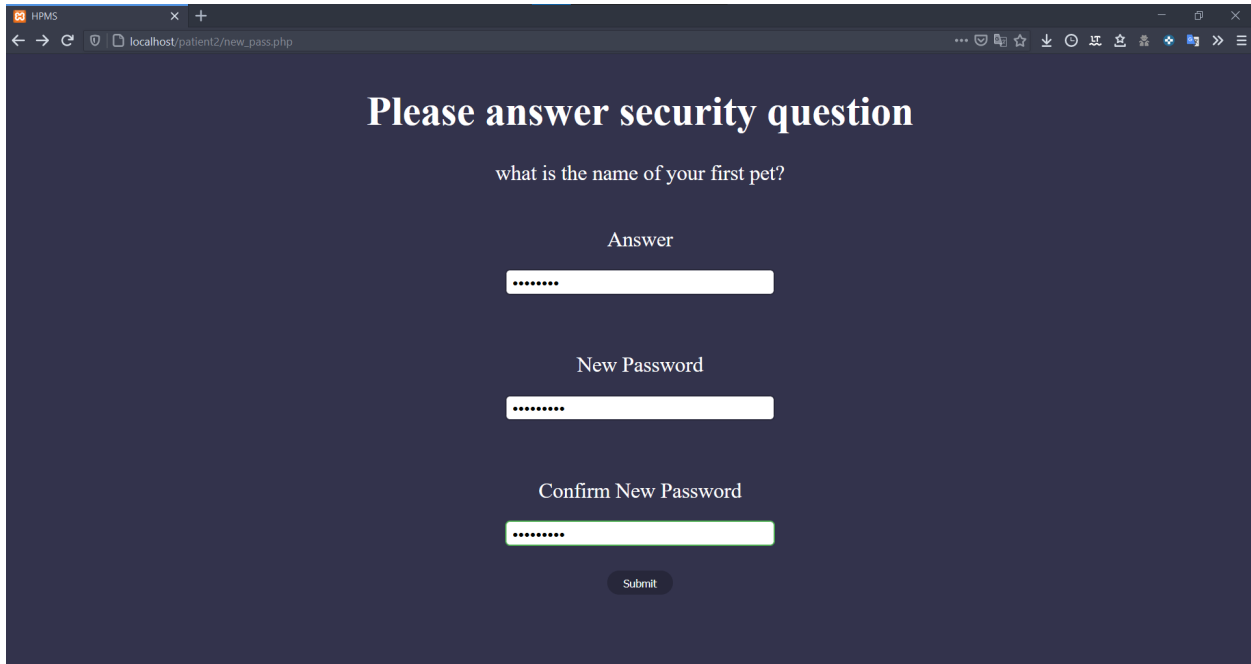
A screenshot of a web browser window with the address bar showing 'localhost/patient2/new\_pass.php'. The page has a dark blue background and white text. The title is 'Please answer security question'. Below the title is the question 'what is the name of your first pet?'. There are three input fields: 'Answer', 'New Password', and 'Confirm New Password'. Each field has a white border and a green outline. The 'Answer' field contains '\*\*\*\*\*'. The 'New Password' field contains '\*\*\*\*\*'. The 'Confirm New Password' field contains '\*\*\*\*\*'. A 'Submit' button is at the bottom.

If the entered password is not of sufficient strength an error message is displayed.



A screenshot of a web browser window with the address bar showing 'localhost/patient2/new\_pass.php'. The page has a dark blue background and white text. The title is 'Please answer security question'. Below the title is the question 'what is the name of your first pet?'. There are three input fields: 'Answer', 'New Password', and 'Confirm New Password'. Each field has a white border and a green outline. The 'Answer' field is empty. The 'New Password' field is empty. The 'Confirm New Password' field is empty. Below the input fields is an error message: 'Password must contain atleast one uppercase, lowercase character and number'. A 'Submit' button is at the bottom.

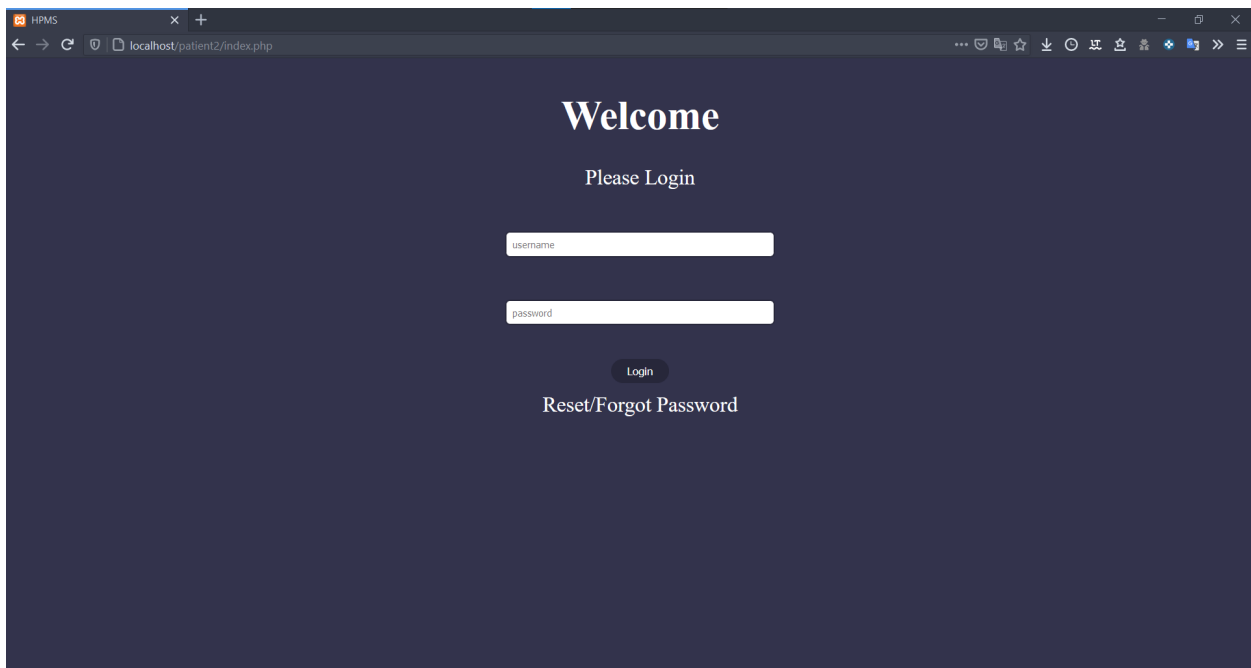
If all the details are provided correctly and bypass the placed constraints the password is changed and updated in the database.



A screenshot of a web browser window with the address bar showing `localhost/patient2/new_pass.php`. The page has a dark blue background and contains the following elements:

- Title:** "Please answer security question" in white serif font.
- Question:** "what is the name of your first pet?" in white sans-serif font.
- Form Fields:**
  - Answer:** A white text input field with a black border and a masked password (seven dots).
  - New Password:** A white text input field with a black border and a masked password (seven dots).
  - Confirm New Password:** A white text input field with a black border and a masked password (seven dots).
- Submit Button:** A dark blue button with the word "Submit" in white sans-serif font.

User is redirected to the login page where they can login again using their new password.

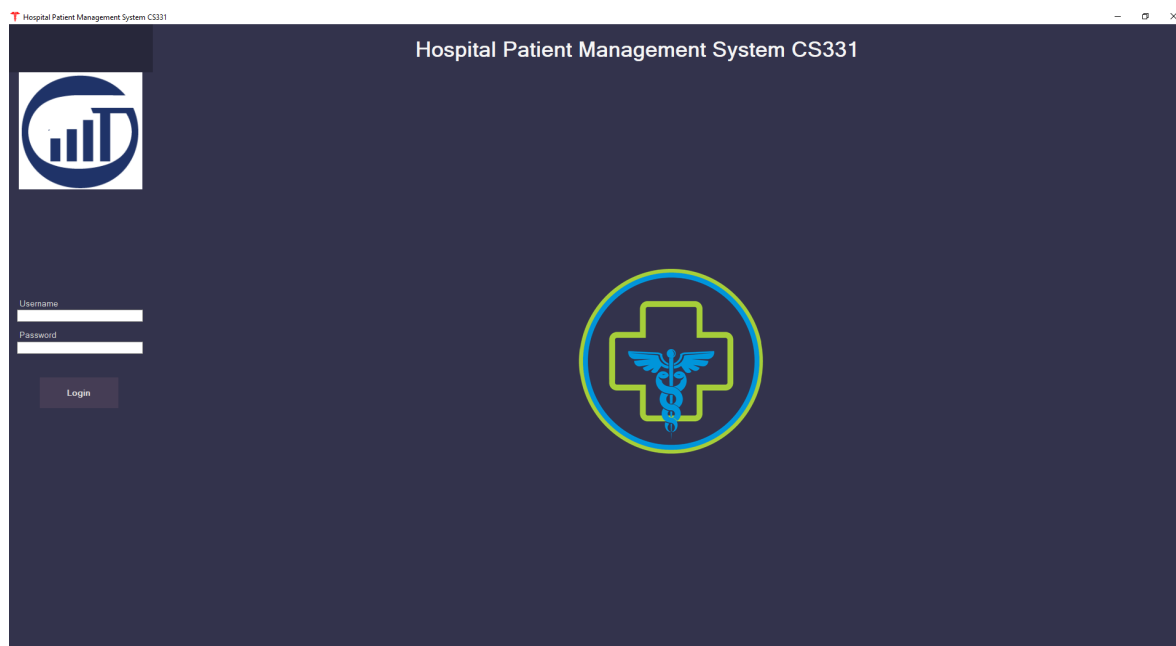


A screenshot of a web browser window with the address bar showing `localhost/patient2/index.php`. The page has a dark blue background and contains the following elements:

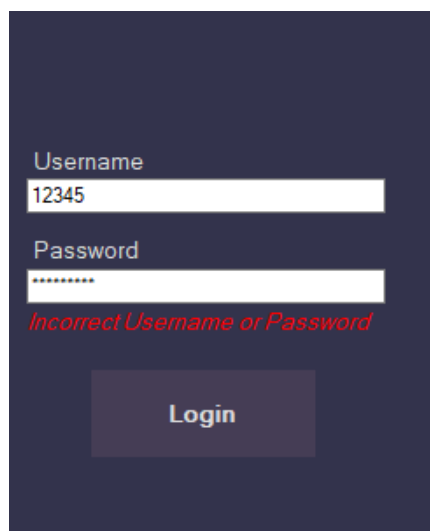
- Title:** "Welcome" in white serif font.
- Text:** "Please Login" in white sans-serif font.
- Form Fields:**
  - username:** A white text input field with a black border.
  - password:** A white text input field with a black border.
- Login Button:** A dark blue button with the word "Login" in white sans-serif font.
- Link:** "Reset/Forgot Password" in white sans-serif font.

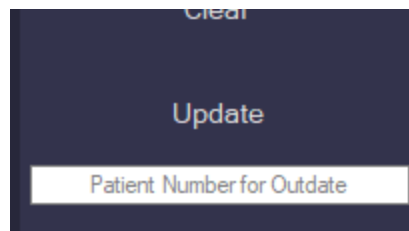
## Windows Application

The program opens with a login page that accepts a username and password that is entered by an administrator into the staff table in the database.

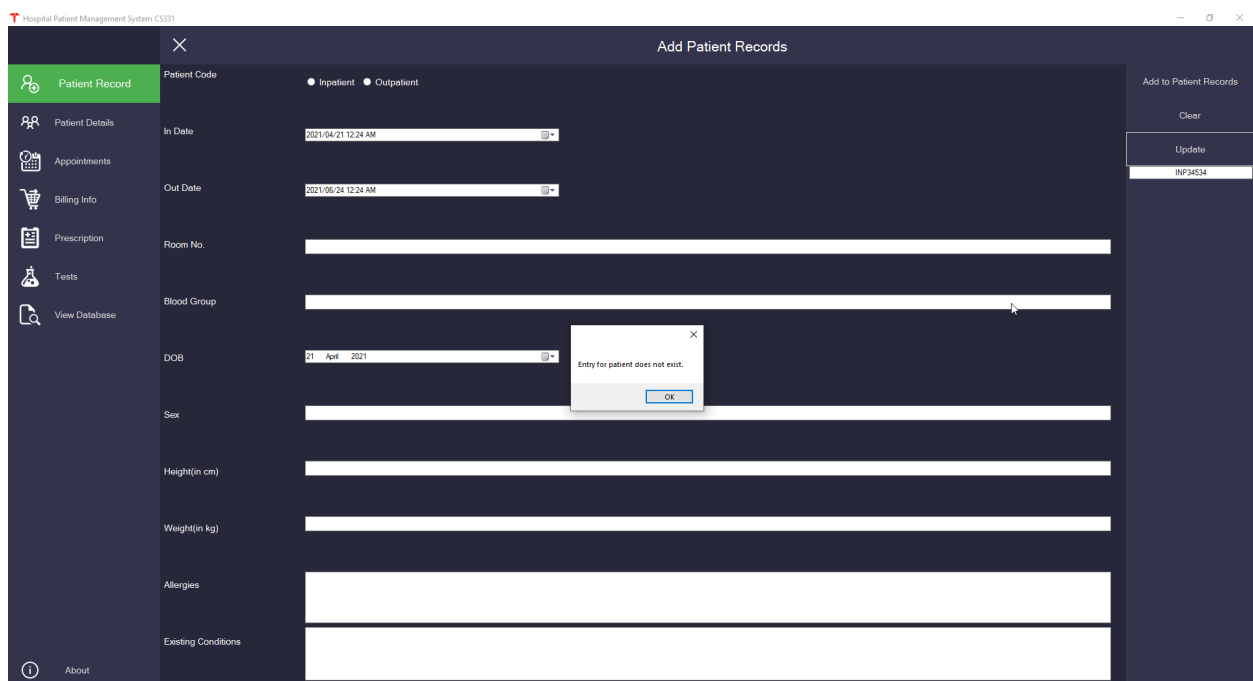


Incase of incorrect password/username, i.e. values which don't exist in the staff table, an error message is displayed.

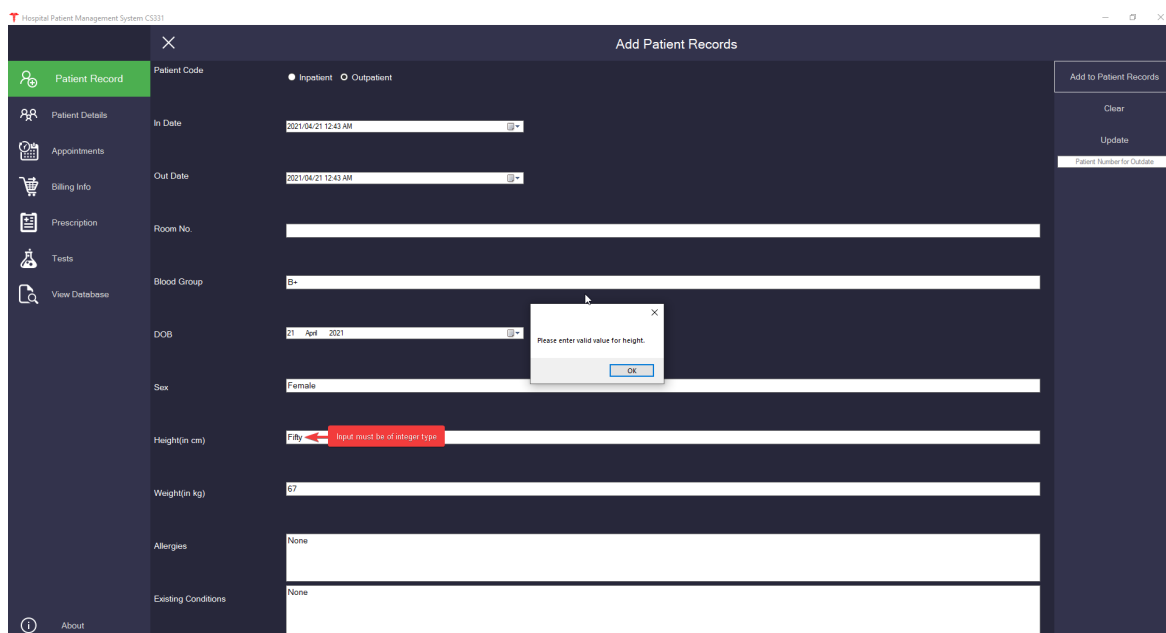




If Patient ID does not match or exist for updating the Outdate(only works for InPatients), an error message is shown.



Height and Weight display error message if input type is incorrect.



Hospital Patient Management System CS301

### Add Patient Records

☒ Inpatient ☐ Outpatient

**Patient Code**

In Date: 2021/04/21 12:43 AM

Out Date: 2021/04/21 12:43 AM

Room No.:

Blood Group: B+

DOB: 21 April 2021

Sex: Female

Height(m cm): 150

Weight(m kg): 50.0

Allergies: None

Existing Conditions: None

Modal Dialog: Please enter valid value for weight. OK

Error Message: Input must be of integer type

Buttons: Add to Patient Records, Clear, Update, Patient Number for Outdate

Patient Record(i.e. Patient ID) must be generated before details can be entered.

Hospital Patient Management System CS301

### Add Patient Details

☐ Inpatient ☒ Outpatient

**Patient Code**

Patient Number: 12223

Name: Test

Password: test

Address: test

Phone Number: 342434234

Email: test@email.com

Modal Dialog: Record for Patient does not exist, please generate Patient ID first. OK

Buttons: Add to Patient Details, Clear

Error Message displayed for wrong input types in respective fields.

Hospital Patient Management System CS301

Add Patient Details

⌕ Patient Record

⚙ Patient Details

📅 Appointments

🛒 Billing Info

📋 Prescription

🧪 Tests

🔍 View Database

ⓘ About

Patient Code

☐ Inpatient ☒ Outpatient

Add to Patient Details

Clear

Patient Number

ssdas

Name

Test

Password

test

Address

test

Phone Number

3424434234

Email

test@email.com

Record for Patient does not exist, please generate Patient ID first.

OK

Hospital Patient Management System CS301

Add Patient Details

⌕ Patient Record

⚙ Patient Details

📅 Appointments

🛒 Billing Info

📋 Prescription

🧪 Tests

🔍 View Database

ⓘ About

Patient Code

☒ Inpatient ☐ Outpatient

Add to Patient Details

Clear

Patient Number

10001

Name

Test

Password

pass

Address

Test

Phone Number

ssdasjdass ←

Email

email@email.com

Please enter valid phone number.

OK



Hospital Patient Management System CS331

### Add Patient Details

⌕ Patient Record

⌕ Patient Details

📅 Appointments

🛒 Billing Info

📋 Prescription

🧪 Tests

🔍 View Database

📄 About

Patient Code ☐ Inpatient ☐ Outpatient

Patient Number

Name

Password

Address

Phone Number

Email

⌕ Add to Patient Details

Clear

Please Enter a valid email

OK

Hospital Patient Management System CS331

### Add Appointments

⌕ Patient Record

⌕ Patient Details

📅 Appointments

🛒 Billing Info

📋 Prescription

🧪 Tests

🔍 View Database

📄 About

Patient Code ☐ Inpatient ☒ Outpatient

Patient Number

Doctor ID

Reason for Appointment

Date and Time

Appointment ID

Automatically Generated, use for Update

⌕ Add to Appointments

Clear

Update

Delete

Doctor ID must exist in Doctor Table

Please enter existing Doctor ID

OK

The screenshot displays the 'Add Appointments' interface of the Hospital Patient Management System CS331. The interface is divided into a left sidebar, a main form area, and a right sidebar.

**Left Sidebar:** Contains navigation icons and labels: Patient Record, Patient Details, Appointments (highlighted in green), Billing Info, Prescription, Tests, View Database, and About.

**Main Form Area:** Titled 'Add Appointments', it contains the following fields:
 

- Patient Code:** Includes radio buttons for 'Inpatient' and 'Outpatient', with a red arrow pointing to 'Outpatient'.
- Patient Number:** A text input field containing '34534', with a red arrow pointing to the text.
- Doctor ID:** A text input field containing '12345'.
- Reason for Appointment:** A text input field containing 'test'.
- Date and Time:** A date and time picker showing '2021/04/21 01:08 AM'.
- Appointment ID:** A text input field containing '5', with a note below it stating 'Automatically Generated, use for Update'.

**Modal Dialog:** A white dialog box is centered on the screen with the message 'Record for Patient does not exist, please generate Patient ID first.' and an 'OK' button.

**Right Sidebar:** Contains a button 'Add to Appointments' and three buttons: 'Clear', 'Update', and 'Delete'.

[illegible]

Hospital Patient Management System CS331

### Add Billing Details

☒ Inpatient ☐ Outpatient

Patient Number: 10001

Details: test

Cost:

Status: ☒ Paid ☐ Unpaid

Buttons: Add to Billing, Clear

Message: Please fill all required fields.

Navigation: Patient Record, Patient Details, Appointments, Billing Info, Prescription, Tests, View Database, About

Hospital Patient Management System CS331

### Add Billing Details

☒ Inpatient ☐ Outpatient

Patient Number: 10001

Details: test

Cost: 43243

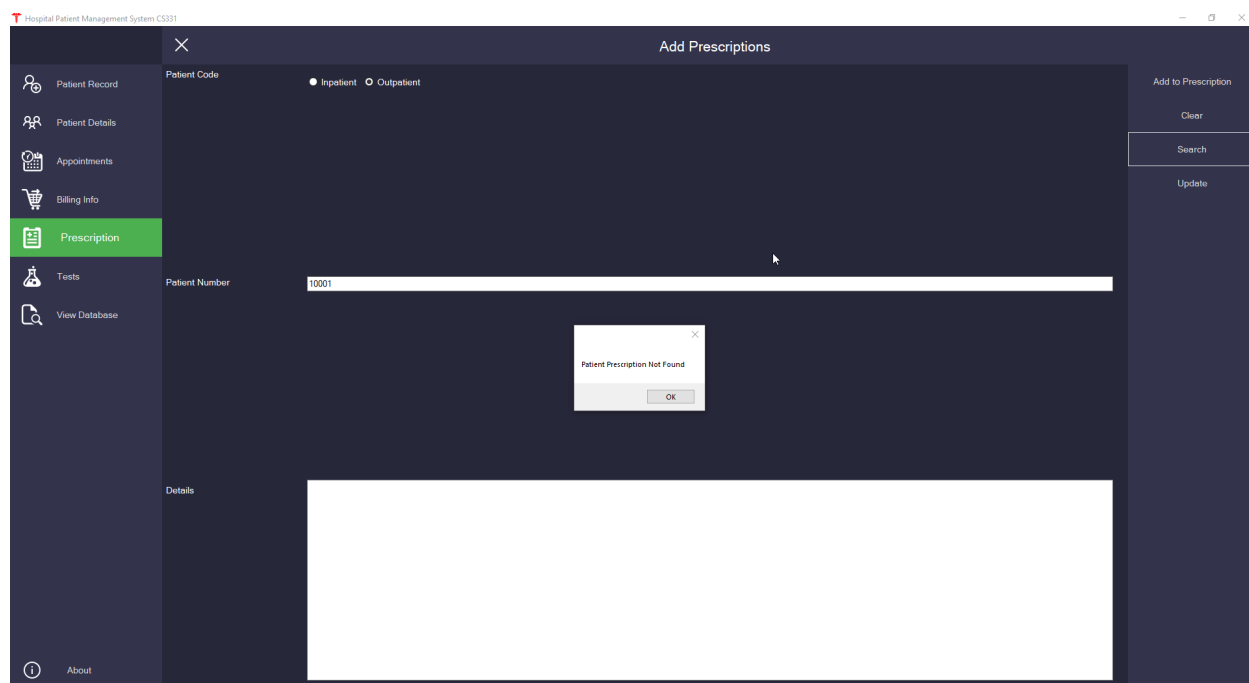
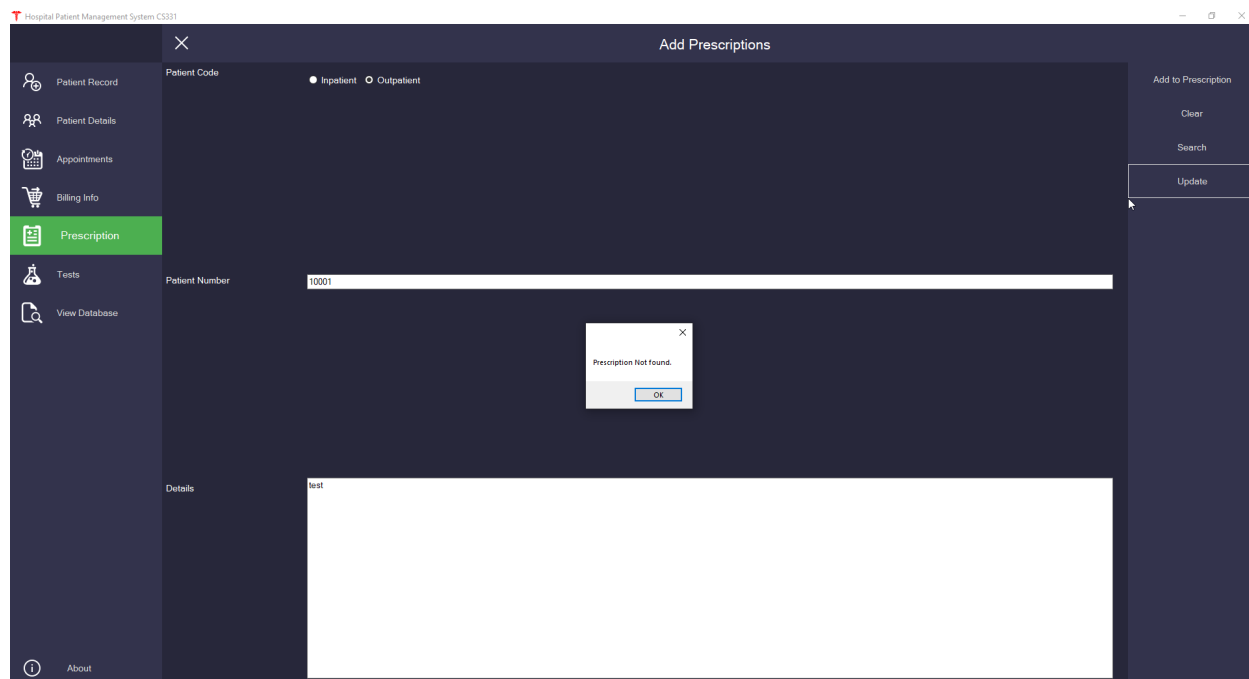
Status: ☒ Paid ☐ Unpaid

Buttons: Add to Billing, Clear

Message: Please fill all required fields.

Navigation: Patient Record, Patient Details, Appointments, Billing Info, Prescription, Tests, View Database, About

Prescription entry must exist to update and search.



Hospital Patient Management System CS331

### Add Tests

⌵

⌵ Patient Record

⌵ Patient Details

⌵ Appointments

⌵ Billing Info

⌵ Prescription

⌵ Tests

⌵ View Database

⌵ About

Patient Code ☐ Inpatient ☒ Outpatient

Patient Number

Test Name

Status ☐ Pending ☒ Available

Report

Test ID

Automatically Generated, use for Update

Add to Tests

Clear

Update

Delete

Record for Patient does not exist, please generate Patient ID first.

OK

Hospital Patient Management System CS331

### Add Tests

⌵

⌵ Patient Record

⌵ Patient Details

⌵ Appointments

⌵ Billing Info

⌵ Prescription

⌵ Tests

⌵ View Database

⌵ About

Patient Code ☒ Inpatient ☐ Outpatient

Patient Number

Test Name

Status ☐ Pending ☒ Available

Report

Test ID

Automatically Generated, use for Update

Add to Tests

Clear

Update

Delete

Test not found.

OK

Test ID must exist in the database to update.

## Error message if PatientID does not exist in database

