

Health Services Administration

PROJECT REPORT

B.TECH. PROGRAMME

WINTER SEMESTER 2017-2018

Submitted by:

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SCOPE

J Component Project

Software Engineering– CSE3001



CERTIFICATE

It is certified that this project is the bonafide work for J component of Software Engineering by the following students: Daksh Bardia, Aditya Khandelwal, Mahak Gupta of Computer Science branch under my supervision in F1 slot of Course CSE 3001 during the Winter Semester 2017-18 at VIT University.

Faculty Signature:

Date:

INTRODUCTION

The aim of the application is to computerize the Front Office Workplace Management of Hospital and develop software package (Web Service Application) that is user friendly, simplistic, efficient and secure. The main function or work of the system is to register and store patient details and retrieve them as and once needed, and concurrently to control or manipulate these details meaningfully. The design has been made as simple as possible. The complete Web Service Based Application is a single page application to make the work process faster and efficient. On the top, i.e., header the name of the hospital is displayed. On the left, a menu is present for navigation. The Software Development Model used is Incremental Model. The main content is loaded in the main section as per menu selection.

The Health Services Administration consists of various module. Users will access the different modules via the main interface as an independent module. This will include several modules with features such as Add, Update and Delete Operations, Backup Modules, Password change and Reset Module.

AIM

The main purpose of our system is to make hospital patient management task easy and is to develop software that replaces the manual hospital system into automated hospital management system.

The product is titled Health Services Front Office Administration and it is a Hospitals Records Management Application. The product will perform the following tasks:

- Allow either a doctor or an administrator to view patient details.
- Allow the administrator to modify the detail of a patient, doctor.
- Allow the doctor to add the records for a treatment.
- Allow the doctor or administrator to create and edit backup of records.

It can be used in any Hospital, Clinic, Dispensary or Pathology labs for maintaining patient details and their test results.

Intended Audience

Hospital Management System is a process of implementing all the activities of the hospital in a computerized automated way to fasten the performance. The SRS contains an analysis of the requirements necessary to help in an easy and efficient design. This project is to maintain the patient details, lab reports and to calculate the bill of the patient. You can also manually edit any patient details and issue bill receipt to patient within few seconds.

OPERATING ENVIRONMENT

1. Hardware Requirements:

- Processor: Pentium III or higher
- RAM: 64 MB or higher
- Disk Space: 20 MB
- Keyboard
- Mouse

2. Software Requirements:

- Operating System: Windows XP or higher, Mac OS X Series or Linux
- A Web Browser: Preferably Mozilla Firefox or Google Chrome
- Local Web Server: Preferably XAMPP
- Database: MySQL

Users and Characteristics

- The intended users of this software need not have specific knowledge as to what is the internal operation of the system.
- Thus, the end user is at a high level of abstraction that allows easier, faster operation and reduces the knowledge requirement of end user
- The Product is absolutely user friendly, so the intended users can be the naive users.
- The product does not expect the user to possess any technical background. Any person who knows to use the mouse and the keyboard and can understand English language can successfully use this product.
- The operator will be provided with Login ID and Password.
- Mainly Doctors will be the main users of the Application and they can: View/Add/Delete/Edit the records of the patients.
- Create/Delete/Restore
Backup o Change Passwords

Users of this software:

- Admin, where he can access the complete system i.e., he can create user (add doctors), manage the registered users and doctors.
- Other is Doctor, where a particular doctor can add, update, view and delete patient records. Doctor can also take the backup and use a backup the way he likes. Also, he can reset the application i.e., clear his records and use the help manual.

Product Perspective

This Health Services Front Office Administration Application is a self-contained system that manages activities of the hospital as Patient Information. Various Stakeholders are involved in the Administration Application. The Health Services Administration consists of various module. Users will access the different modules via the main interface as an independent module. This will include several modules with features such as Add, Update and Delete Operations, Backup Modules, Password change and Reset Module.

Product Functionality

The main functionalities of the Health Services Front Office Administration System are:

- Multi User Interface
- User Authentication
- Add, Update and Delete Records
- Import and Restoration of Backup
- Authentication Change Allowed
- Live Search
- Single Page Application for efficient Workflow
- Instruction and Manual Page

External Interface Requirements

User Interfaces

- User interface is designed in a user-friendly manner.
- Simplistic and Elegant User Interface so that doctors with least knowledge of working with Computer Application can also use the Administration System.
- Home: This will display all the menus as a navigation bar along with headers, footers and content section.
- Add Records
- Modify/Update Records
- Delete Records
- Export Backup
- Import Backup
- Installation Help & Manual
- Change Password
- Reset Application

Design and Implementation Constraints

- GUI is only in English
- Login and password is used for identification of user and there is no facility for guest.
- Database Constraint: Only MySQL and no other Database can be used.
- Web Based: The Application is Web Service Based Application
- Not Mobile User Friendly: The Web Based Application cannot be used on Mobile Devices or Tablets
- Memory Constraints: There are no as such specific memory constraints.

User Documentation

The Application will contain an Installation Help and Manual Section in a proper user-friendly format for the Users and/or Doctors.

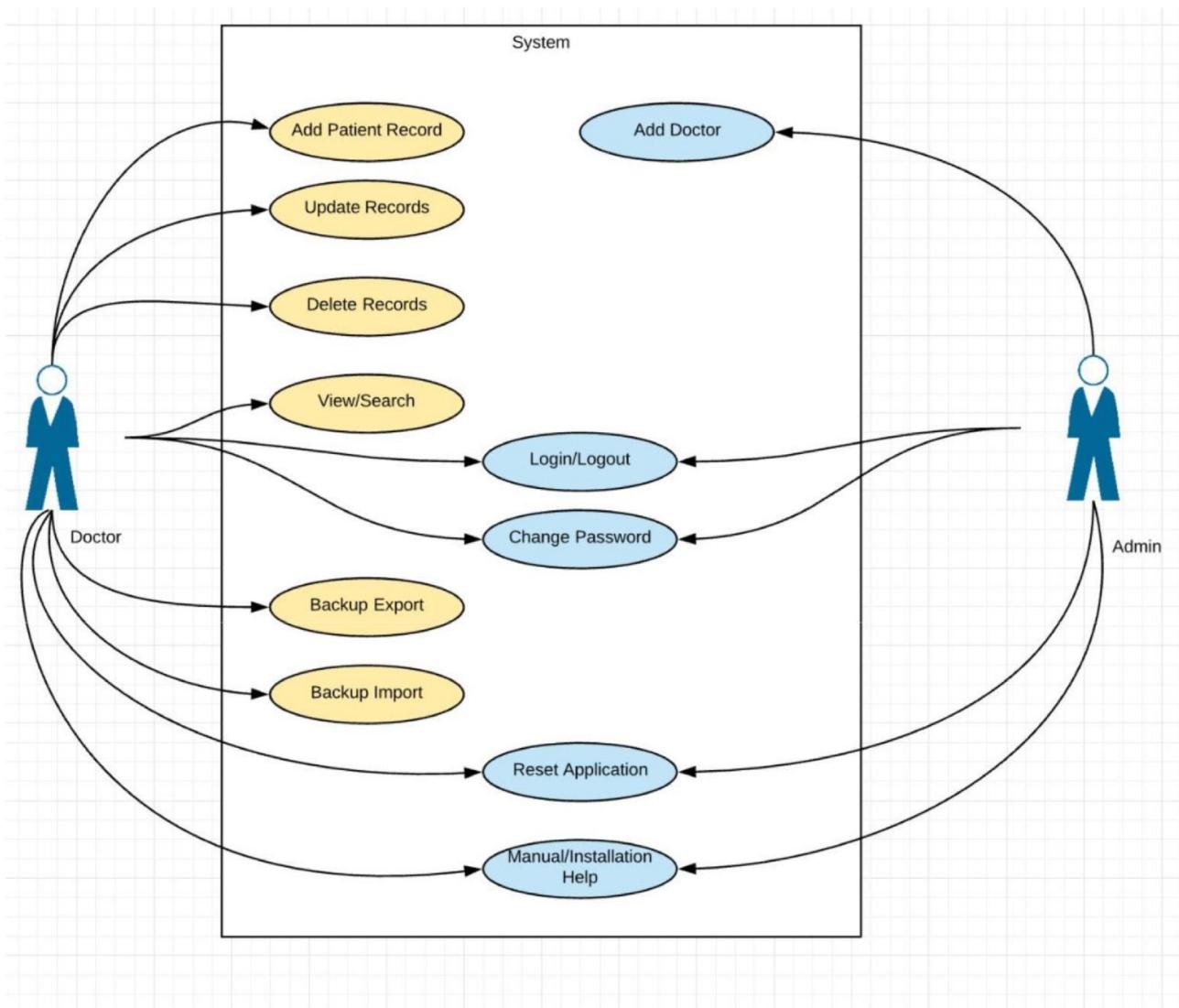
Assumptions and Dependencies

- The modules in the Application does not depend on any external services.
- It is assumed that the hospital will have basic computer trained staff which can operate a computer.
- It is assumed that the users are comfortable with basic English.

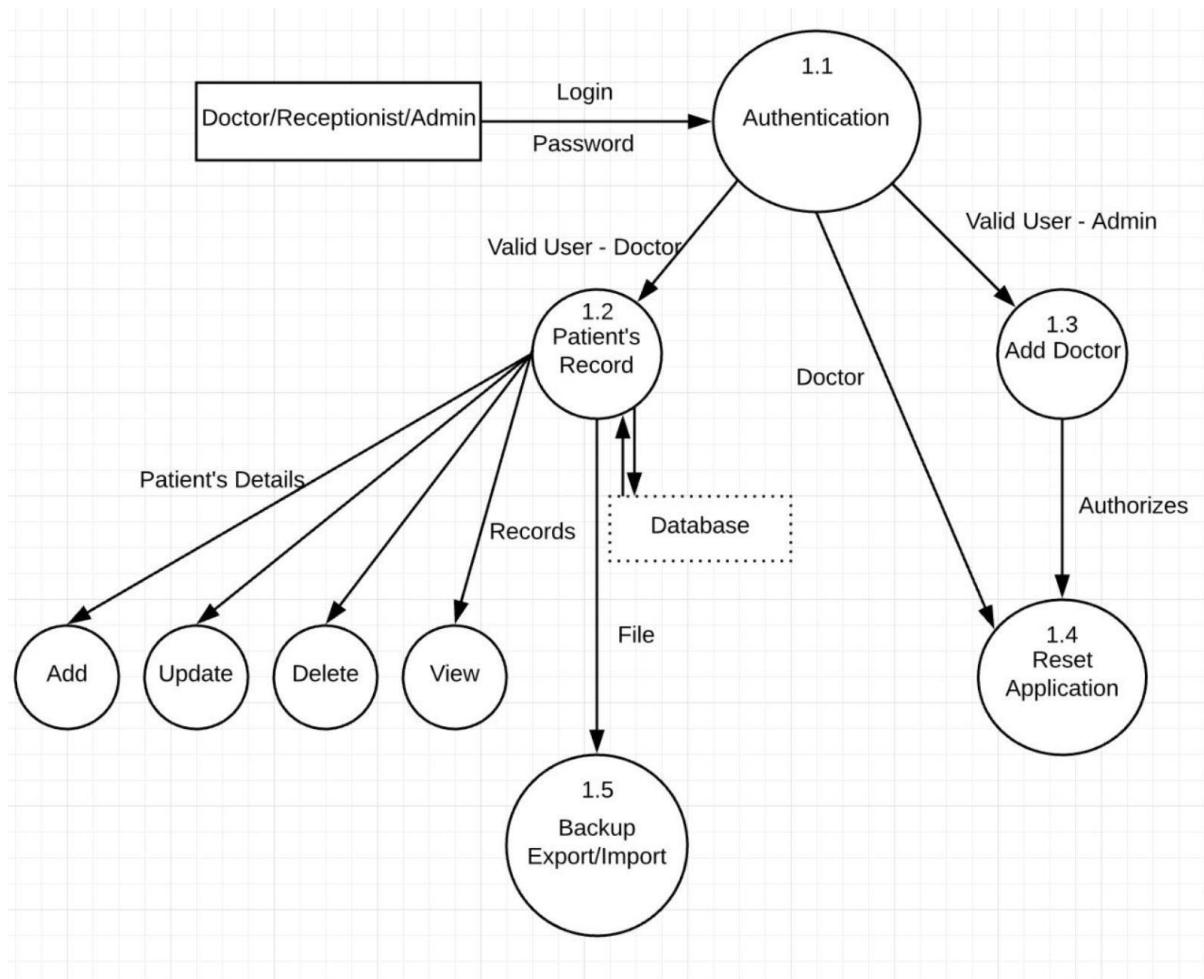
There are mainly two types of users in this software.

- One is admin module where he can access the complete system i.e., he can create user (add doctors), manage the registered users and doctors.
- Other is Doctor module where a particular doctor can add, update, view and delete patient records. Doctor can also take the backup and use a backup the way he likes. Also, he can reset the application i.e., clear his records and use the help manual.

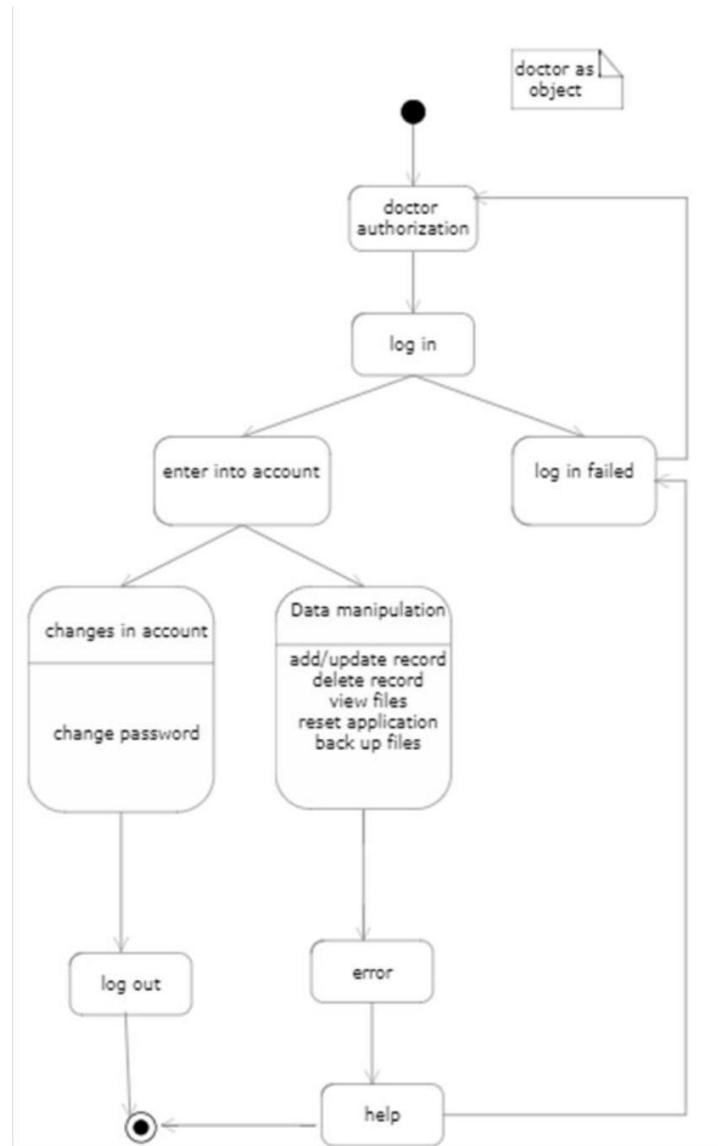
Use Case Diagram:



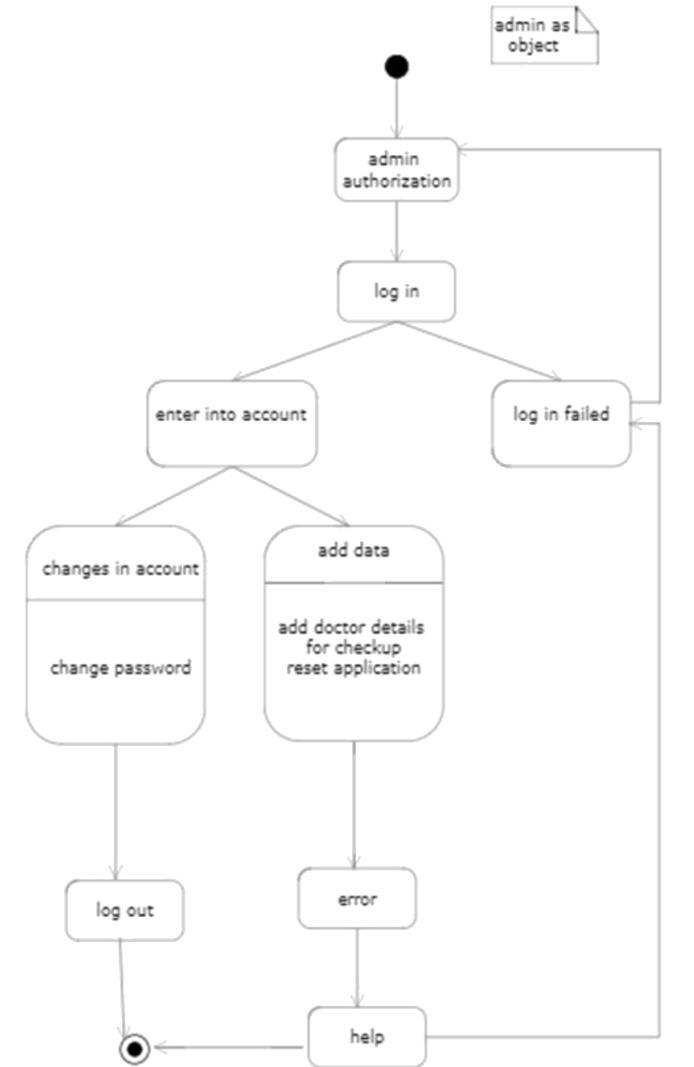
Data Flow Diagram:



State Chart Diagram:



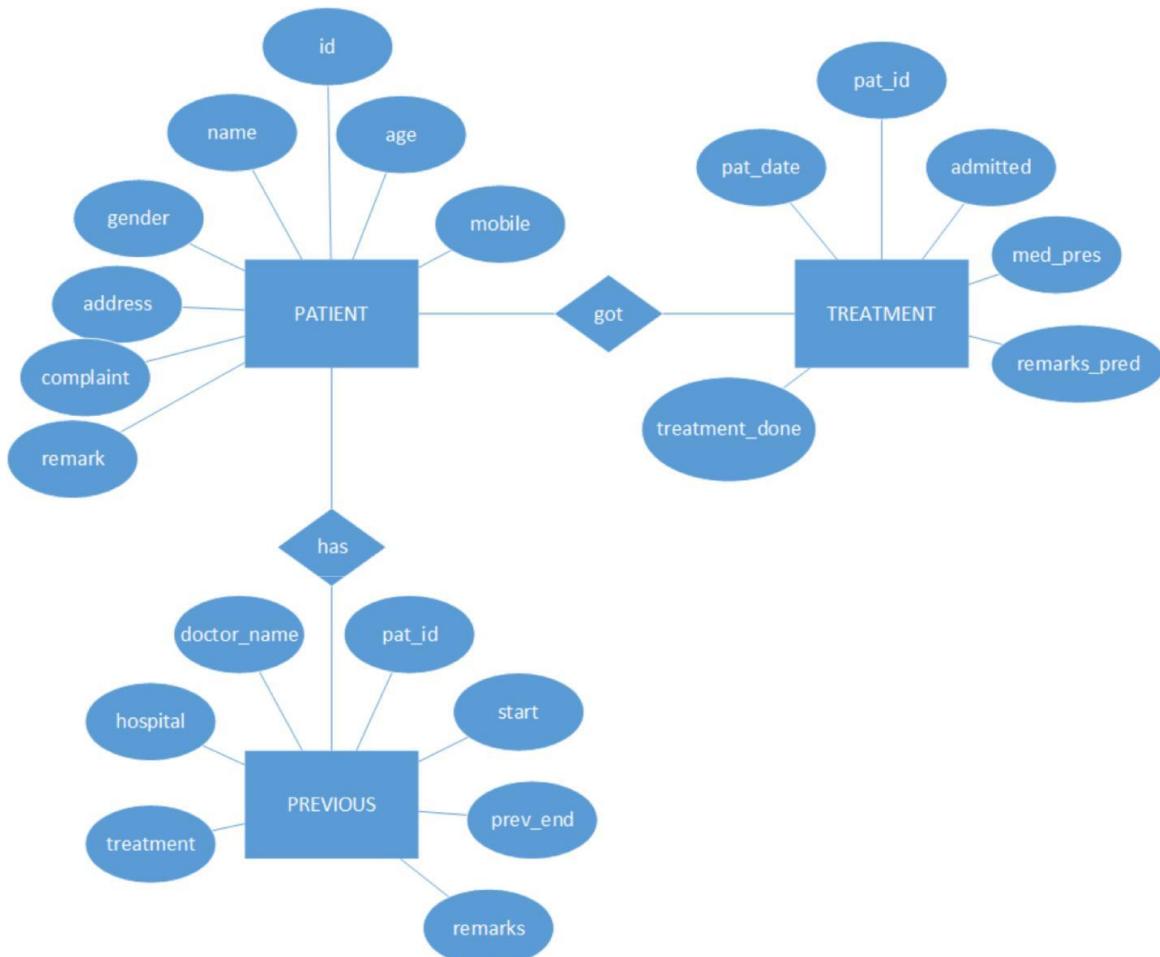
State Chart Diagram for Doctor



State Chart Diagram for Admin

The tables to be developed are:

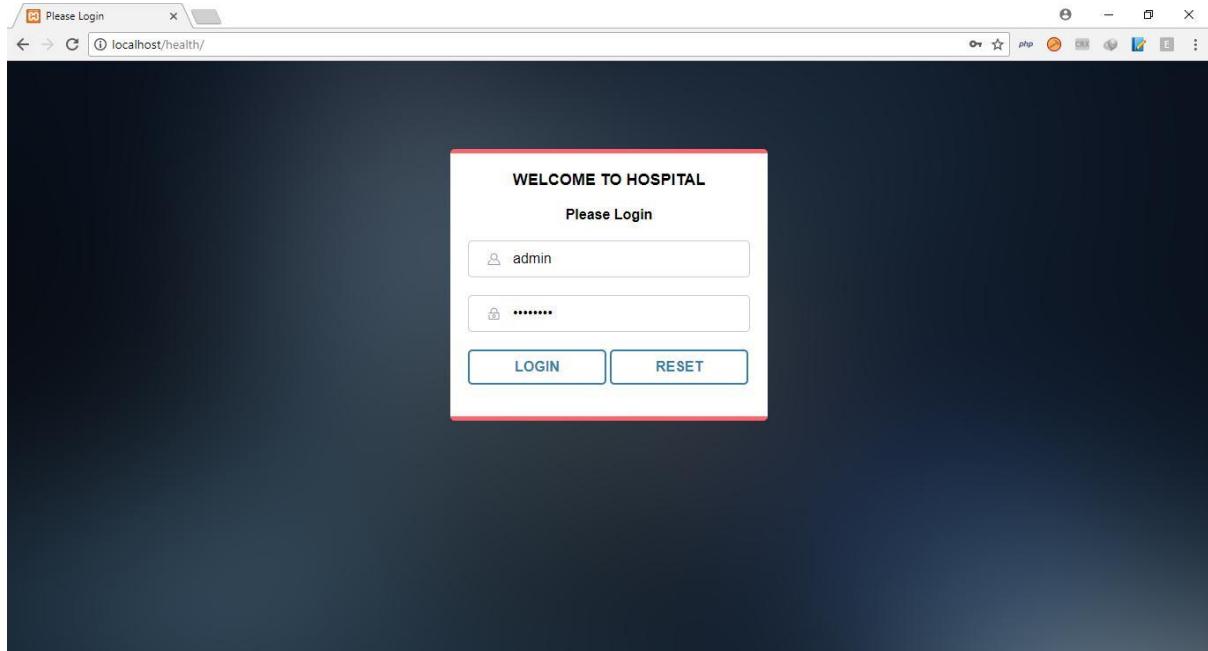
- Patient Table
 - Information on Patient's ID, name, age, gender, address, mobile, complaints and remarks.
- Previous Treatment Table (previous)
 - Information on previous treatments of the patient. Attributes to be included are patient's ID, name of doctor, hospital name, start and end treatment dates, treatment done and remarks.
- Current Treatment Table (treatment)
 - Information on current treatments of the patient. Attributes to be included are patient's ID, date of treatment, whether the patient is admitted or not, what treatment is done, medicines prescribed and remarks.



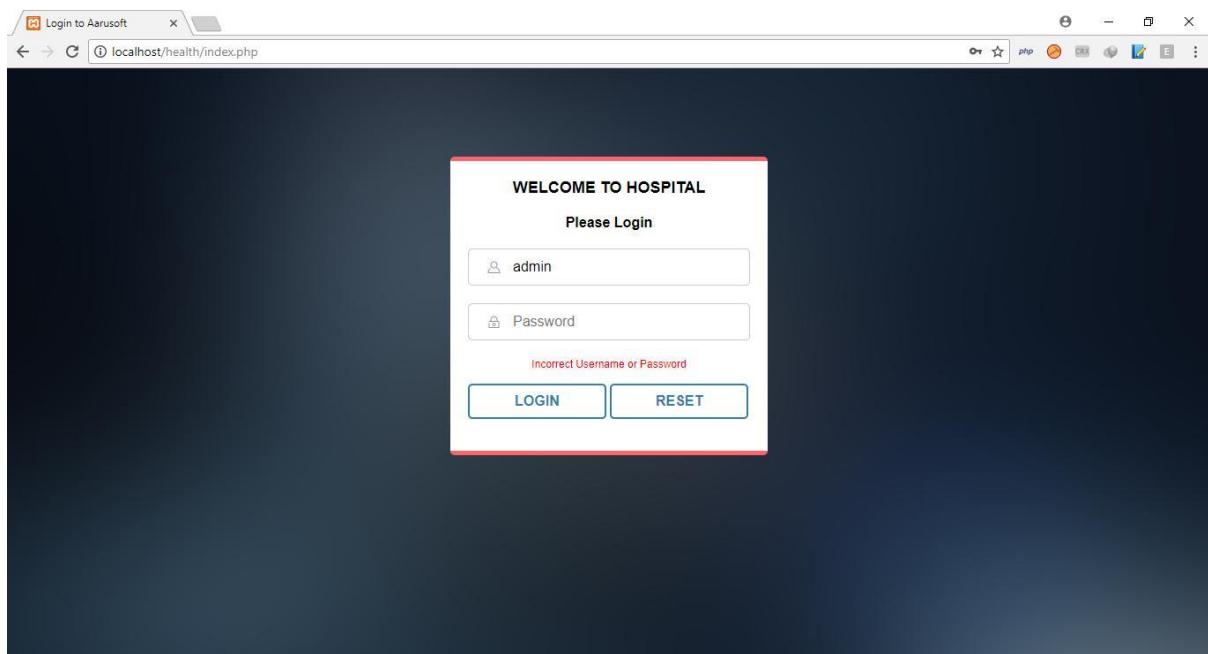
Modules

- **Login Module**

- ❖ The system allows the Doctors to login under a secure system by providing their valid Username and Password.
- ❖ The Login has been secured with PHP SessionIDs.



Incorrect Login:



- **Backup Modules (Both Create and Use)**

- ❖ The Health Services Front Office Administration System shall allow doctors to take backup of their patient records.
- ❖ The System shall also allow doctors to import or use the previously created backup to add the patient records to their Database.

Create Backup

The screenshot shows a web browser window titled 'Aarsoft' with the URL 'localhost/health/index2.php'. The main content area is titled 'Welcome to Health Services Administration'. On the left, there is a vertical sidebar menu with the following options: Add Patients, Update Records, Delete Records, View Records, Create Backup (which is highlighted in blue), Restore Backup, Reset App, Installation & Help, Medical Images, Change Password, and Logout. The main content area has a title 'Create Backup' and a section titled 'CSV Format' containing a bulleted list: Download Patient Details, Download Treatment Details, Download Previous Treatment Details, and Download Image Count Details. Below this, there is an 'OR' option followed by a button labeled 'Export Backup to SQL Files'. At the bottom of the page, there is a copyright notice: '© 2018 da_sh. Designed and Developed by Daksh Bardia.'

Restore Backup

The screenshot shows a web browser window titled 'Aarsoft' with the URL 'localhost/health/index2.php'. The main content area is titled 'Welcome to Health Services Administration'. On the left, there is a vertical sidebar menu with the following options: Add Patients, Update Records, Delete Records, View Records, Create Backup, Restore Backup (which is highlighted in blue), Reset App, Installation & Help, Medical Images, Change Password, and Logout. The main content area has a title 'Restore Backup' and a button labeled 'Import Backup from SQL File'. At the bottom of the page, there is a copyright notice: '© 2018 da_sh. Designed and Developed by Daksh Bardia.'

- **Add Patient Image module**

- ❖ This feature allows the upload of images of patients which are taken by the doctor for the future comparison of results.

Welcome to Health Services Administration

Add / View Medical Images of Patients

Search by: Name

da

You have searched for Patients whose name contain substring da. Here are the results:

PATIENT ID	NAME	CONTACT NUMBER	DATE	COMPLAINTS	ADD	VIEW
1	Daksh Bardia	1234567894	25-3-2018	Acne	<input type="button" value=""/>	<input type="button" value=""/>

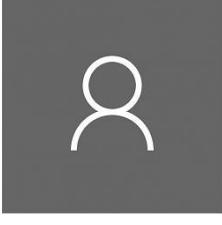
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Welcome to Health Services Administration

Add Patients

Add Images for Daksh Bardia

Choose Files thumb_1440...30User.png



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Aarsoft

localhost/health/index2.php

Welcome to Health Services Administration

Add Patients

Update Records

Delete Records

View Records

Create Backup

Restore Backup

Reset App

Installation & Help

Medical Images

Change Password

Logout

Add Images for Daksh Bardia

No file chosen

1 file(s) are successfully uploaded.

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Aarsoft

localhost/health/index2.php

Welcome to Health Services Administration

Add Patients

Update Records

Delete Records

View Records

Create Backup

Restore Backup

Reset App

Installation & Help

Medical Images

Change Password

Logout

Add Images for Daksh Bardia

No file chosen

Errors:

- Comparision.docx: File size is larger than the 1 MB.
- Comparision.docx: Invalid file type. Only png, jpg and gif file types are allowed.

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Aarsoft

localhost/health/index2.php

Welcome to Health Services Administration

Add Patients

Update Records

Delete Records

View Records

Create Backup

Restore Backup

Reset App

Installation & Help

Medical Images

Change Password

Logout

View Medical Images of Daksh Bardia

Images are sorted by the date they were uploaded.

$F(x,r) = \frac{1}{4} \sum_{n=0}^{\infty} C(n) C(r) f(n,r) \cos\left[\frac{\pi(2n+1)x}{16}\right] \cos\left[\frac{\pi(2r+1)y}{16}\right]$
Where
 $C(n), C(r) = \begin{cases} \frac{1}{2} & \text{for } n, r = 0 \\ \sqrt{\frac{1}{2}} & \text{for } n, r \neq 0 \\ 1 & \text{otherwise} \end{cases}$

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• Add Patient Module

- ❖ The Health Services Front Office Administration System shall allow doctors to add new patients to the system.
- ❖ The records will be based on different patient details which have been specified as in the ER Diagram.

The screenshot shows a web-based application titled "Welcome to Health Services Administration". On the left, there is a vertical sidebar with a dark purple background containing various menu items: "Add Patients", "Update Records", "Delete Records", "View Records", "Create Backup", "Restore Backup", "Reset App", "Installation & Help", "Medical Images", "Change Password", and "Logout". The main content area has a light gray background and features a horizontal navigation bar with tabs: "Patient Details" (which is selected and highlighted in blue), "Treatment Details", "Previous Medical Records", "Reset", and "Submit". Below the tabs, there are several input fields and dropdowns for patient information: "Name" (text input), "Age" (text input with value "18"), "Gender" (radio buttons for "Male" and "Female" with "Male" selected), "Weight (in kg)" (text input), "Height (in cm)" (text input), "Address" (text area), "Contact Number" (text input), "Complaint(s)" (text area), and "Remark(s)" (text area). At the bottom of the page, a copyright notice reads "© 2018 da_sh. Designed and Developed by Daksh Bardia."

This screenshot shows the same application interface as the previous one, but with a completed patient record. The "Name" field now contains "Aditya Khandelwal", "Age" is "19", "Gender" is "Male" (selected), "Weight (in kg)" is "50", "Height (in cm)" is "50", "Address" is "Delhi", and "Contact Number" is "7412589630". The "Complaint(s)" and "Remark(s)" fields are empty. The rest of the interface, including the sidebar and navigation bar, remains the same as in the first screenshot.

Aarsoft

localhost/health/index2.php

Welcome to Health Services Administration

Add Patients Patient Details Treatment Details Previous Medical Records Reset Submit

Date: 27-3-2018

Admitted: Yes No

Treatment(s): None

Medicines Prescribed: None

Remark(s): None

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Aarsoft

localhost/health/index2.php

Welcome to Health Services Administration

From localhost
Patient Details Added !

OK

Add Patients Patient Details Treatment Details Previous Medical Records Submit

Name:

Age: 18

Gender: Male Female

Weight (in kg):

Height (in cm):

Address:

Contact Number:

Complaint(s)

Remark(s)

Waiting for localhost...

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• Update/Modify Records Module

- ❖ The Health Services Front Office Administration System shall allow doctors to edit/update/modify patient records as per requirement.
- ❖ The System should already show the previous details and give doctor the option to edit or modify them.

The screenshot shows a web browser window titled 'Aarsoft' with the URL 'localhost/health/index2.php'. The main title is 'Welcome to Health Services Administration'. On the left, there is a vertical sidebar menu with options: Add Patients, Update Records (which is selected), Delete Records, View Records, Create Backup, Restore Backup, Reset App, Installation & Help, Medical Images, Change Password, and Logout. The main content area is titled 'Update Patient Records'. It features a search bar with dropdown menus for 'Search by' (set to 'Name') and a text input field containing 'da'. Below the input field is a 'Search' button. A dropdown menu shows the suggestion 'Daksh Bardia'. At the bottom of the page, a copyright notice reads '© 2018 da_sh. Designed and Developed by Daksh Bardia.'

This screenshot is from the same application as the previous one. The browser window is titled 'Aarsoft' with the URL 'localhost/health/index2.php'. The main title is 'Welcome to Health Services Administration'. The sidebar menu is identical to the first screenshot. The main content area is titled 'Update Patient Records'. It shows a search bar with 'Name' selected and 'da' entered. Below the search bar is a 'Search' button. A message says 'You have searched for Patients whose name contain substring da. Here are the results:'. A table is displayed with the following data:

PATIENT ID	NAME	CONTACT NUMBER	DATE	COMPLAINTS	Update
1	Daksh Bardia	1234567894	25-3-2018	Acne	

At the bottom of the page, a copyright notice reads '© 2018 da_sh. Designed and Developed by Daksh Bardia.'

A Aarsoft

localhost/health/index2.php

Welcome to Health Services Administration

Add Patients

Update Records

Delete Records

View Records

Create Backup

Restore Backup

Reset App

Installation & Help

Medical Images

Change Password

Logout

Update Patient Records

Search by: Name

Search... Search

Showing ALL Records

PATIENT ID	NAME	CONTACT NUMBER	DATE	COMPLAINTS	Update
1	Daksh Bardia	1234567894	25-3-2018	Acne	
2	Aditya Khandelwal	2147483647	27-3-2018	None	

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A Aarsoft

localhost/health/index2.php

Welcome to Health Services Administration

Add Patients

Update Records

Delete Records

View Records

Create Backup

Restore Backup

Reset App

Installation & Help

Medical Images

Change Password

Logout

Reset Password

Old Password:

New Password:

Retype New Password:

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• Delete Records Module

- ❖ The Health Services Front Office Administration System shall allow doctors to delete patient records as per requirement.
- ❖ The System shall allow to delete multiple records on one click by providing checkbox like options.
- ❖ Also, the system shall ask again to delete the records in a conformation box.

The screenshot shows a web-based application titled "Welcome to Health Services Administration". On the left, there is a vertical sidebar menu with the following items: Add Patients, Update Records, Delete Records (which is currently selected), View Records, Create Backup, Restore Backup, Reset App, Installation & Help, Medical Images, Change Password, and Logout. The main content area is titled "Delete Patient Records". It features a search bar with dropdown menus for "Search by: Name" and "Search...". Below the search bar, it says "Showing ALL Records". A table displays two patient records:

PATIENT ID	NAME	CONTACT NUMBER	DATE	COMPLAINTS	Delete
1	Daksh Bardia	1234567894	25-3-2018	Acne	<input type="checkbox"/>
2	Aditya Khandelwal	2147483647	27-3-2018	None	<input type="checkbox"/>

At the bottom of the page, there is a copyright notice: "© 2018 da_sh. Designed and Developed by Daksh Bardia."

This screenshot shows the same application interface as the previous one, but with a modal dialog box overlaid. The dialog box has a title "From localhost" and the message "Are you sure, you want to delete the selected patient record(s) ?" with "OK" and "Cancel" buttons. The rest of the interface, including the sidebar menu and the patient list table, remains visible in the background.

• Display Records Module

- ❖ The Health Services Front Office Administration System shall allow doctors to display patient records as per their search queries.
- ❖ The System shall give at least 7 search filters on the basis of which doctors can search from.
- ❖ Also, the System shall provide a live search method to search for patients without reloading the page.

The screenshot shows a web application interface for "Health Services Administration". The title bar says "Welcome to Health Services Administration". On the left, there's a vertical sidebar with links: "Add Patients", "Update Records", "Delete Records", "View Records", "Create Backup", "Restore Backup", "Reset App", "Installation & Help", "Medical Images", "Change Password", and "Logout". The main content area has a heading "View Patients Records and their Treatment Details". It includes a dropdown "Search by: Name" and a search input field. Below that, it says "Showing ALL Records" and displays a table with two rows of patient data:

PATIENT ID	NAME	AGE	GENDER	ADDRESS	CONTACT NUMBER	COMPLAINTS	REMARKS
1	Daksh Bardia	18	Male	India	1234567894	Acne	None
2	Aditya Khandelwal	19	Male	Delhi	2147483647	None	None

At the bottom, it says "© 2018 da_sh. Designed and Developed by Daksh Bardia."

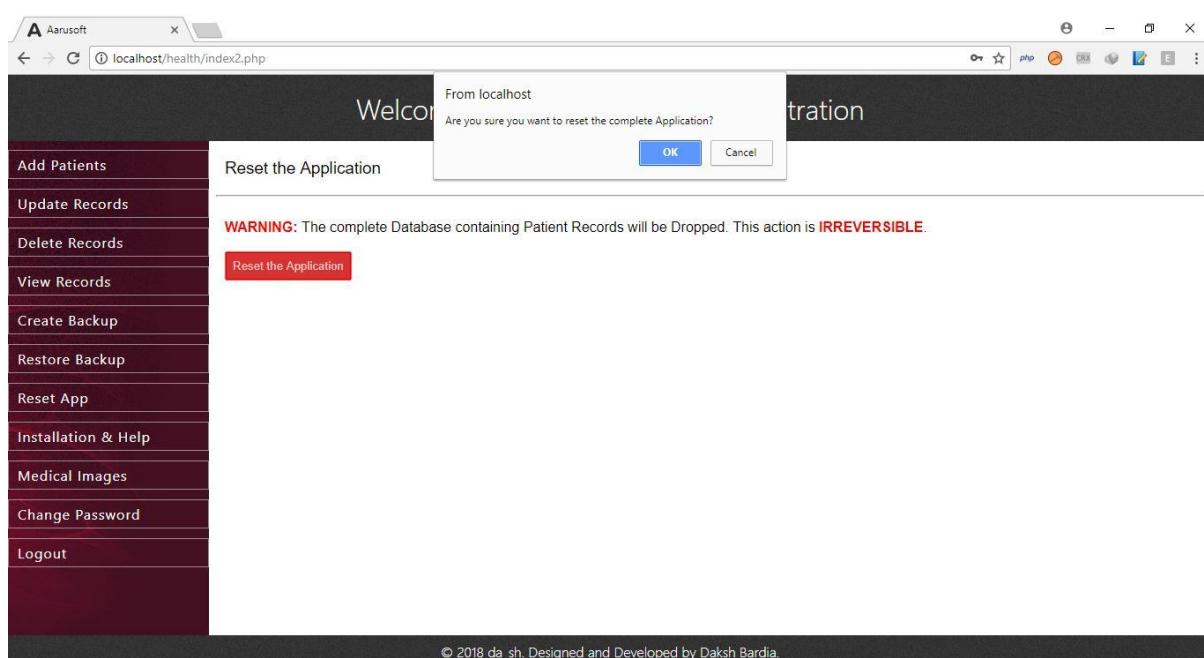
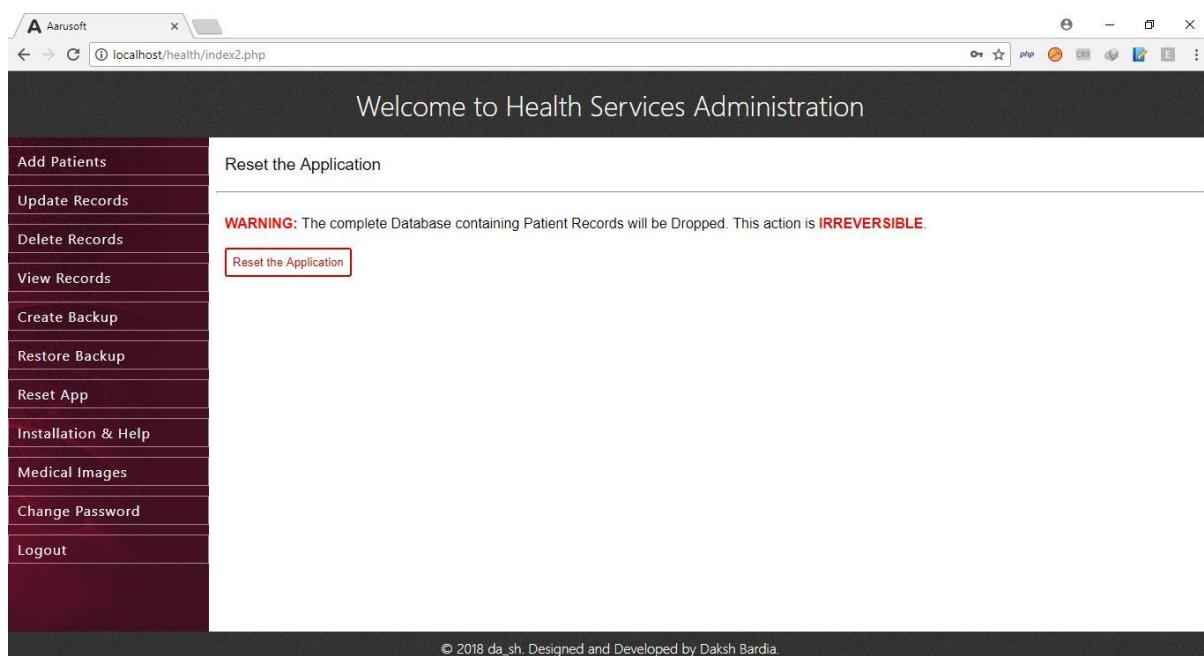
This screenshot is similar to the one above, showing the "View Patients Records" page. However, a modal dialog box is open over the table, containing treatment details for a selected patient. The dialog box has an "OK" button at the bottom right. The treatment details listed are: Date: 25-3-2018, Weight: 45, Height: 45, Admitted: N, Treatment Done: Acne Medicines, Medicines Prescribed: Tablets, and Remarks: None. The table below shows the same two patient records as the first screenshot.

PATIENT ID	NAME	AGE	GENDER	ADDRESS	CONTACT NUMBER	COMPLAINTS	REMARKS
1	Daksh Bardia	18	Male	India	1234567894	Acne	None
2	Aditya Khandelwal	19	Male	Delhi	2147483647	None	None

At the bottom, it says "© 2018 da_sh. Designed and Developed by Daksh Bardia."

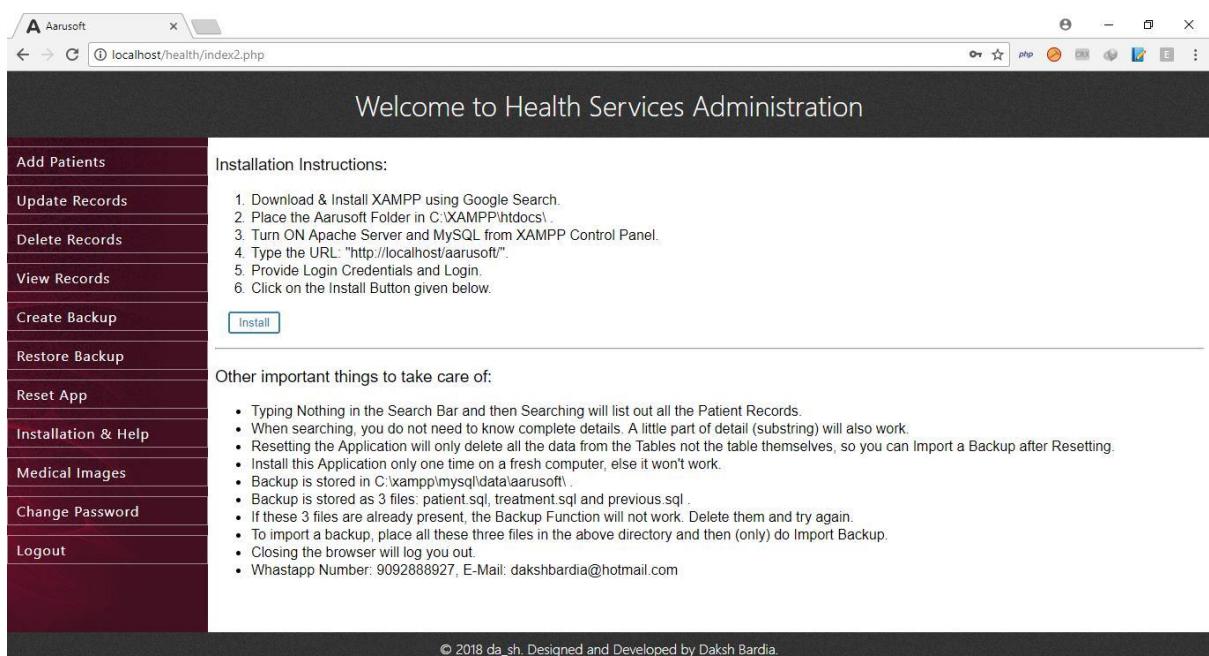
- **Reset Application Module**

- ❖ The Health Services Front Office Administration System shall allow admin and doctors to reset the Database by deleting all the records of the patients.
- ❖ The System shall ask for a confirmation before resetting the complete application.
- ❖ Although all the records of the patient are deleted, the system shall still maintain the structure of the database, i.e., the tables and constraints present in the Database.



• Installation and Help Module

- ❖ The Health Services Front Office Administration System shall provide the doctors with a help or a manual section through which the doctors can take help on how to use the application and how to perform various tasks through the application.
- ❖ The system shall allow an install application button inside the web application for admins so as to make installation of the application on multiple devices faster and smoother.



The base Homepage of our application showing all modules:

A screenshot of a web browser window titled "Aarsoft". The address bar shows "localhost/health/index2.php". The page content is as follows:

Welcome to Health Services Administration

Welcome

Please use the navigation bar in the left

07:59:14 PM
Tuesday, 27 March 2018

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The left sidebar contains the following navigation links:

- Add Patients
- Update Records
- Delete Records
- View Records
- Create Backup
- Restore Backup
- Reset App
- Installation & Help
- Medical Images
- Change Password
- Logout

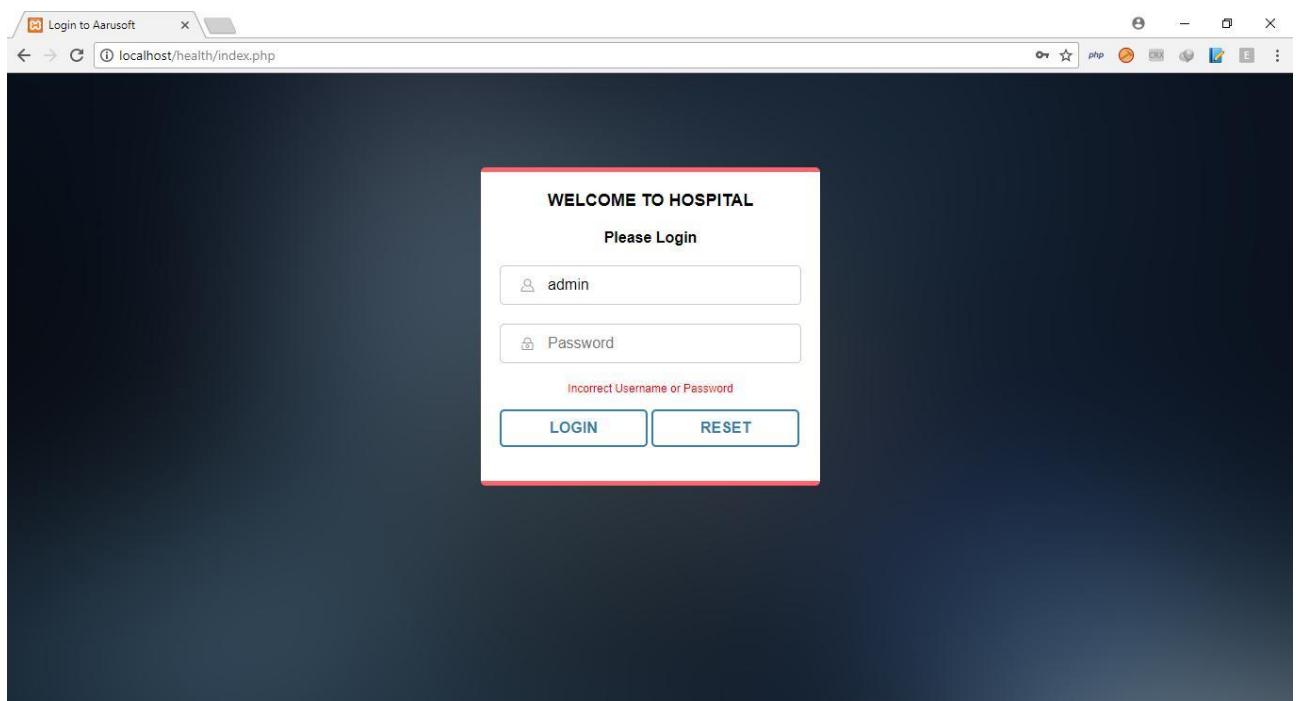
Test cases done module wise:

Module: - Login

Test plan 1: - How does the application responds when a wrong password is entered, or a wrong username is entered, or both of them is wrongly entered.

- 1) Login with the valid credentials i.e., correct username and password.
- 2) Login with valid username and invalid password.
- 3) Login with invalid user name and valid password

Result: The Application did not give away the information easily that a password is wrong or a username is wrong.



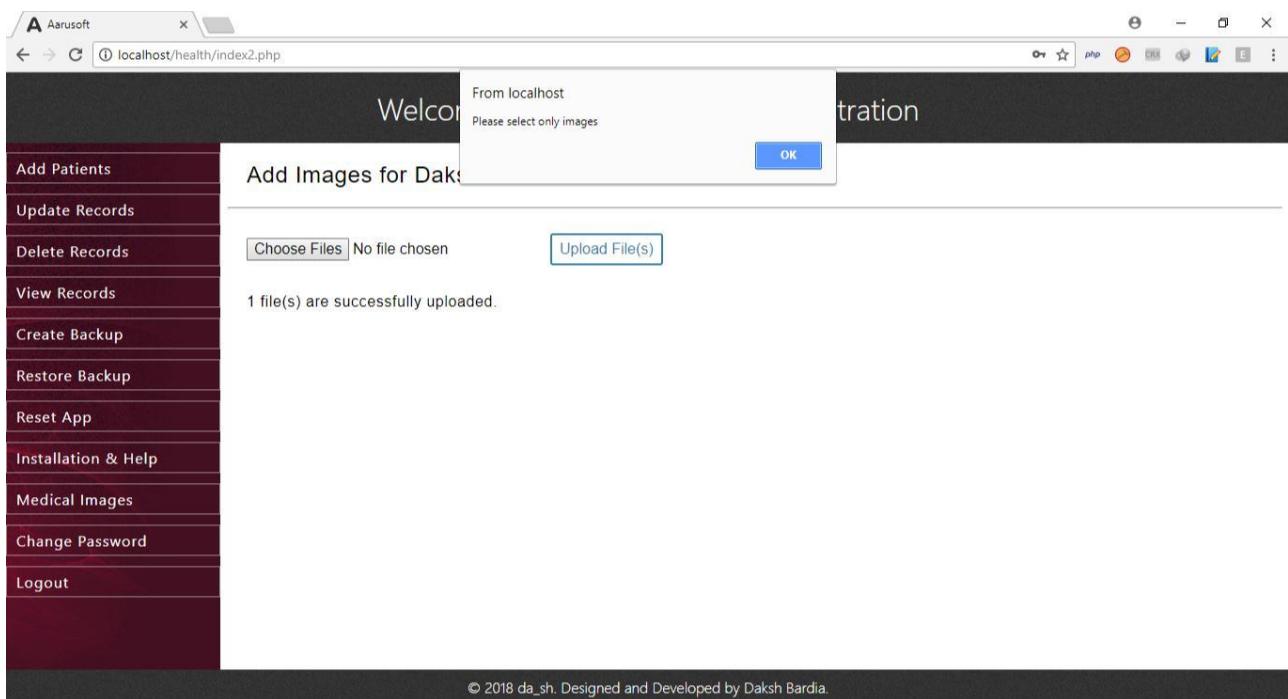
Module: - Medical images

Test plan:

- 1) Trying to add files other than jpeg or PNG.
- 2) Check image upload with image size greater than the maximum allowed size. Proper message should be displayed.

Test case: Trying to upload a pdf file.

Result: The result showed that the application does not accept any other file/format than mentioned.



Module: - Update patient details.

Test case: -After searching patient details by name we got all the patient details from records. After that we updated the details of particular patient.

Result: -The app work successfully without interfering with other patient records.

Module: - Deleting the patient record

Test case 1: -To delete the patient record without interfering with other records.

Result: -Application successfully deleted the patient record.

A screenshot of a web browser window titled "Aarushsoft". The address bar shows "localhost/health/index2.php". The main content area is titled "Welcome to Health Services Administration". On the left, there is a vertical sidebar with the following menu items: Add Patients, Update Records, Delete Records, View Records, Create Backup, Restore Backup, Reset App, Installation & Help, Medical Images, Change Password, and Logout. The "Change Password" item is currently selected. The main content area is titled "Reset Password". It contains three input fields: "Old Password", "New Password", and "Retype New Password". Below these fields are two buttons: "Change Password" and "Show Passwords". Red validation messages are displayed next to the "New Password" and "Retype New Password" fields, stating "New passwords do not match.". At the bottom of the page, a copyright notice reads "© 2018 da_sh. Designed and Developed by Daksh Bardia."

Module: Verifying patient record

Test case 1: - checking the details of added patient in the records.

Result: - Application showing the details of patient.

Module: - Add Patient Details

Test Plan 1: Trying to fill out incomplete form and clicking submit button. It is very important that the form is filled properly so that the database stays complete. Test Case: adding no personal comments

Result: The form gave an error and did not submit it.

Test plan 2: trying to Change password but not giving same password in confirm password field.

Result: The application gave an error saying that the password did not match the confirm password field.

Test case 3: Adding a wrong date in date field.

Test Plan: adding a year 0002 as the input in years field.

Result: It gave a pop up error asking to enter the date properly in correct format.

Test plan 4: entering 9-digit phone number.

Result: it showed an error and asked for correction.

The purpose of testing is to make our application robust, so all the failed cases are corrected.

Test Report: -

Test ID	Test Module	Test Objective	Expected Results	Actual Results	Test Pass/Fail
001	Login	How does app respond by giving invalid details.	The app did not give away the information	The app did not give the information	Pass
002	Medical images	Add images of another format	Application should not accept other file format.	Application did not accept another file format	Pass
003	Add patient details	Trying to fill incomplete form and submitting it.	Application shows an error and application did not submit the form.	Application shows error and shows incomplete details	Pass
004	Patient details	Adding 9 digit patient phone number	Application shows an error with message phone number not valid	Application shows an error with message phone number not valid.	Pass
005	Verifying patient records	Checking the details of patient in the records	Application shows the detail of patient when searched by patient	Application shows the details of particular patient.	Pass
006	Deleting patient records.	Deleting the record of patient.	Application deleted patient record.	Application deleted patient record	Pass
007	Updating patient record	Updating record of particular patient	Application deleted record without interfering with other records	Application deleted record without interfering with other records.	Pass
008	Software installed	Clicking on install when already software is installed	Cannot create or already installed	Cannot create database	Fail
009	Image uploading again	Selecting option again to upload image	If image already uploaded should not show option	After uploading image showing option that may create the confusion in user (bad UI/UX)	Fail
010	Records	Viewing the records	To show no records in total.	Showing the table with no records in total this may create confusion of loading table Between user.	Fail

Conclusion

The group successfully completed a working version of Health Services Administration Web Application. The Gantt Chart was followed properly. The testing phase was conducted after the coding phase. Each and every module was tested successfully. There were few errors found during the testing phase which were rectified afterwards. The tests also proved that the interface was smooth and user friendly and the web application is robust. The tests showed that there is proper software communication between different modules of the web application. Tests showed that the database transactions were performing as expected and without any errors.

The simple design has been inspired by the single page application design technique. The web application is secure to use and has been tested for various web attacks. The Health Services Administration Application can be used by hospitals, doctors as well as pathology labs.

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