Diagnostic Laboratory Reporting System

This program aims to facilitate the process of making appointment and reviewing the reports online.

We aim to have following use cases in the program:

- **Make appointment** - Make an appointment for a particular date and time
- **Cancel/Reschedule appointment** - Appointment can be canceled or rescheduled to any other date and time
- **Add/Update reports** - Reports can be added or updated by the employees
- **Check reports** - View previous reports

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1 INTRODUCTION

1.1 Purpose

This document reports the functional and non-functional requirements of our project ‘DIAGNOSTICS LAB REPORTING SYSTEM’. It gives a description of the software’s scope as well as its requirements and constraints.

1.2 Product Scope

This software is to be used as tool to make appointment and view reports of any person. The employee can view reports, add/update/delete results of customers. It benefits customer by reducing time taken to go to the lab and make appointment.

2 OVERALL DESCRIPTION

2.1 Product Perspective

This product is built with the perspective of any working class people. The product should ease the appointment process and encourage the customer to use such functionality.

2.2 Product Functions

The product will provide the following functions:

1. **Make appointment** - Make an appointment for a particular date and time.
2. **Add/Update reports** - Reports can be added or updated by the employees.
3. **Check reports** - View previous reports.
4. **Cancel/Reschedule appointment** - Appointment can be canceled or rescheduled to any other date and time.

2.3 User Classes and Characteristics

- **Customer** - This user class use the product whenever he/she wants to make any lab test. They will be able to access only their results and details of the tests.

- **Employee** - This user class comprise of all the employees of the laboratory. They will use the product to upload test results or update/delete the test results which they have conducted throughout the day. They can access reports of any customer.

- **Admin** - This user class may be comprise of incharge of managing the laboratory. They will be able to add new employee or remove the employee. They can access all the details about the customer and test reports.

3 FUNCTIONAL REQUIREMENTS AND INTERFACES

3.1 Functional Requirements

It outlines the tasks that the product will be able to perform.

3.1.1 Initial Set Up

The admin have to set up the database for the customers and reports. The admin will also set the employees. The customer have to sign up if he/she is using the product first time or he/she have to login to the system.

3.1.2 Landing Window

After login, the main window consist of option with new appointment will appear from where the customer can book a test slot for particular date and time. At the time of booking a test slot necessary information will be taken from the customer like name, email, contact number etc. After the successful booking an acknowledgement will be sent to the customer via email.

3.1.3 Add Test Results

An employee will click on add reports and he/she will be able to add test results for any tests. The employee also can update or delete the test report if there is any need of it.

3.1.4 Check Reports

The customer can select check report option to view the previous reports if any. They can only see their reports.

3.1.5 Cancel/Reschedule Slot

The customer can also cancel or reschedule the booking slot in case of any emergency.

3.2 Software Requirements

- **Java EE :** It is collection of JAVA APIs that can be used to write server-side application.
- **Local MySQL Server** : The database will interact with the product by responding to queries from the product using SQL.

3.3 Communication Interface

The product will initially work locally, the database will be stored on the client machine which further can be stored on a remote server and accessed using HTTP protocols.

4 NON FUNCTIONAL REQUIREMENTS

4.1 Performance Requirement

Startup of the software must be fast and data retrieval should not take much time.

4.2 Security Requirement

Care needs to be taken to prevent unauthorized changes in test reports by malicious entities. This may be done by using an additional layer of user authentication using Id and Password.

4.3 Software Quality Attributes

The product should be easy to use design. Which means the user must understand every aspect of the product by just looking at the User Interface.

5 PRELIMINARY DESIGN

The preliminary design phase of the project involved creating the following UML diagram using open source UML modeling software LUCIDCHART.

5.1 USE-CASE DIAGRAM

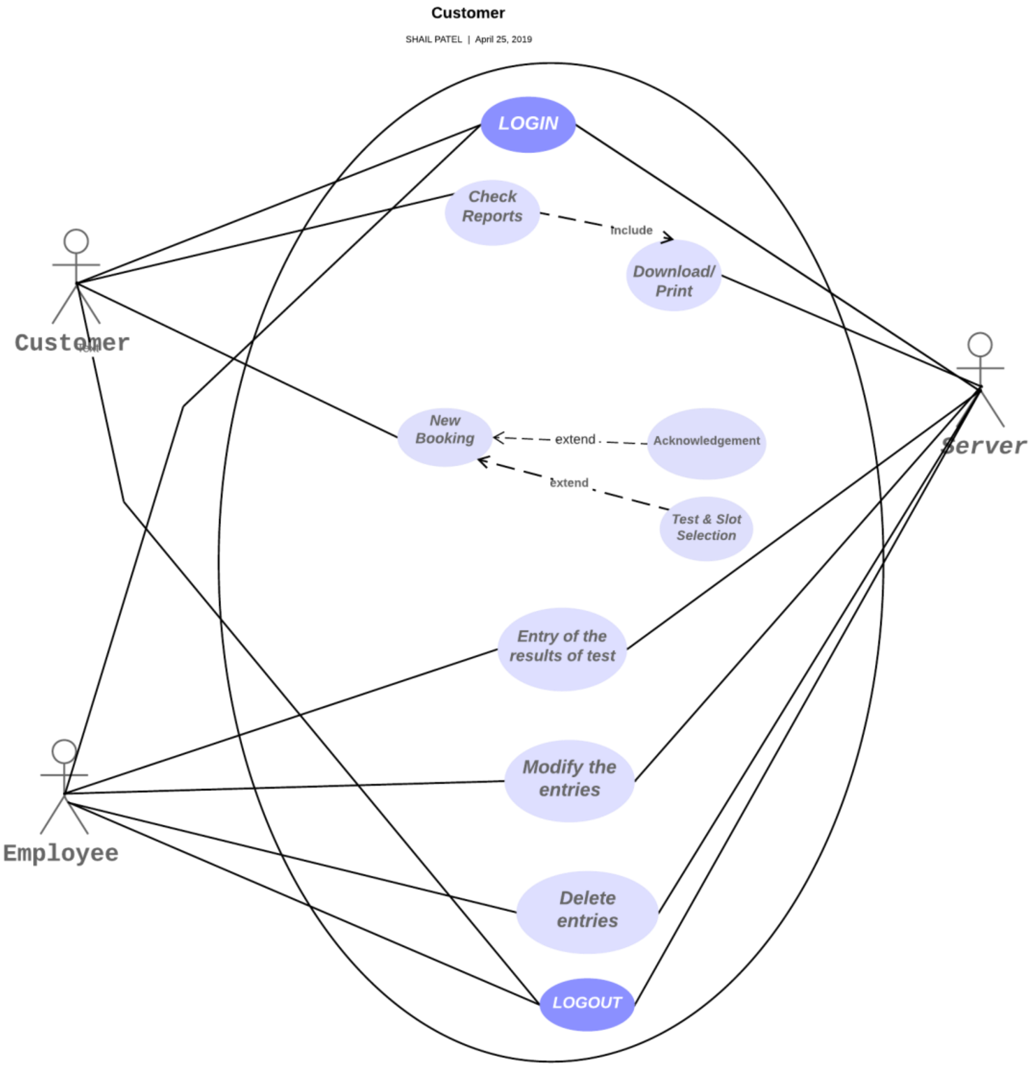

Figure 5.1 Use-case Diagram of Project

6 IMPLEMENTATION

6.1 Database Creation

MySQL has been used for data creation. However, the admin can choose any other database management system of his/her choice. The database includes the following tables:

1. **Customerinfo:** This table contains credentials of the users i.e., Name, username, password, password, CustomerID and Category of users (Customer, Employee, Administrator).
2. **BMtable:** This table stores the records of test “Basic Metabolic Panel”.
3. **LPtable:** This table stores the records of test “Lipid Panel”.
4. **CBCtable:** This table stores the records of test “CBC Panel”.

This structure is flexible and if we want to increase the number of tests provided to the customers, then additional tables for the respective tests are required to be added.

6.2 Database Connectivity Using JDBC

In order to connect the database to the application, Java provides Java Database Connection Drivers. The package java.sql has been imported in order to access 9 the classes present in it for connecting the database. The class used for connection has been named as **MyConnectionProvider.** The credentials required to connect to the database are stored in **MyProvider** class.The MyConnectionProvider class has a method **getCon()** which connects using **DriverManager** methods.

Each Customer retrieved from the database will have an independent object of the Customer class.

For executing queries, **PreparedStatement** and **ResultSet** objects are used.

6.3 User Interfaces

For constructing interfaces, jsp pages are made. Combination of HTML, CSS, JavaScript are used in jsp pages.

For handling requests, all the requests are directed to respective Servlets.

7 FLOW OF THE PROJECT

7.1 HomePage

The homepage has options to Register, Login along with About Us and Contact Us pages.

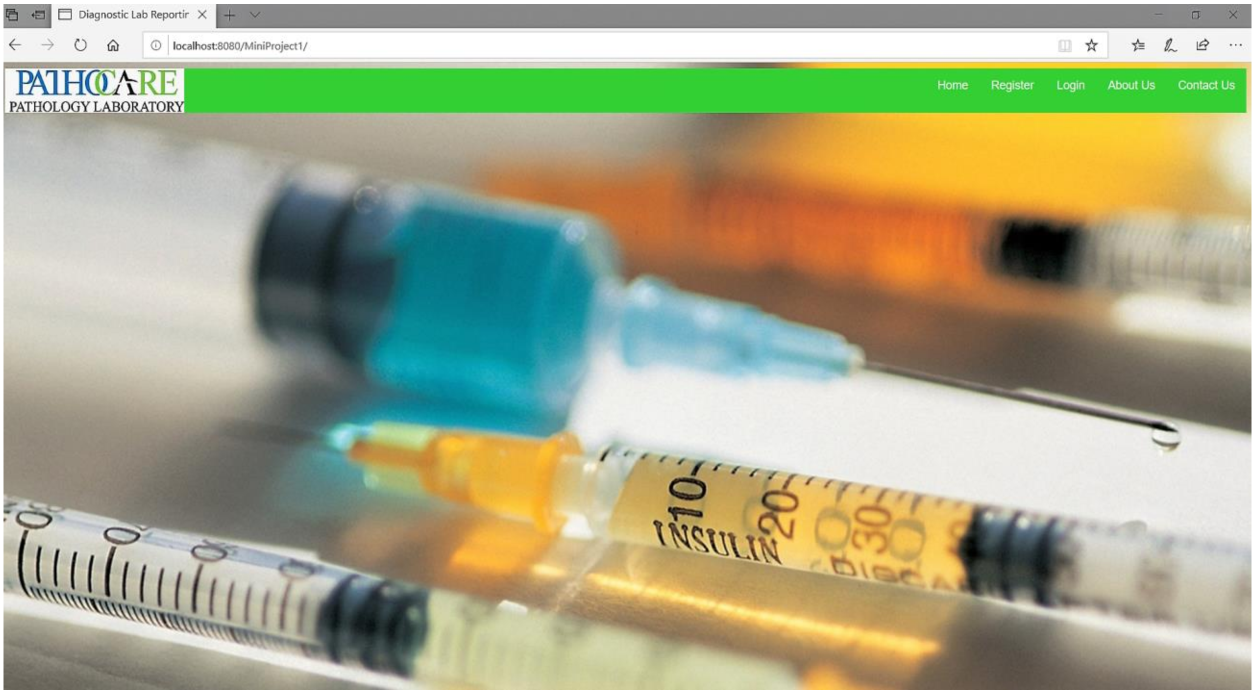

Figure 7.1 Home Page

7.2 Registration Page

The registration page asks for the Name, Username, Password and confirmation field for password.

Password has to be at least 6 characters long and should match with the entered confirmation password.

All the fields are mandatory and violation of any of these conditions will generate an alert from the browser.

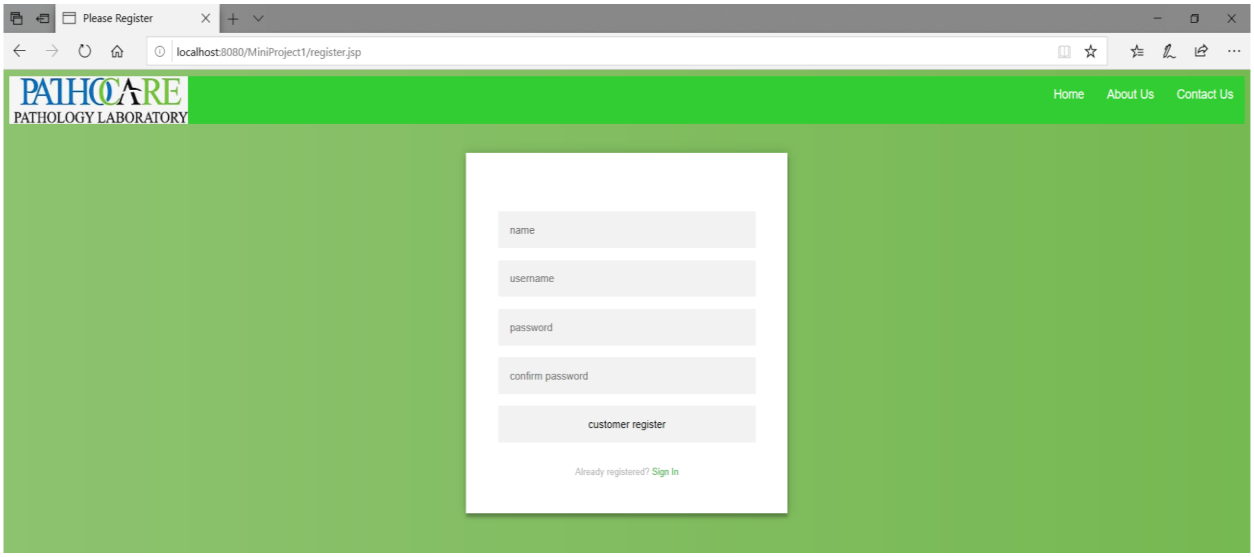

Figure 7.2 Registration Page

7.3 Login Page

If the customer is an existing one, he/she can directly go to the login page and enter the respective credentials.

If the credentials are matched, the system redirects the user to Dashboard.

Upon failing to match the credentials, “Data not Found, Please Register” message will be displayed to the customer.

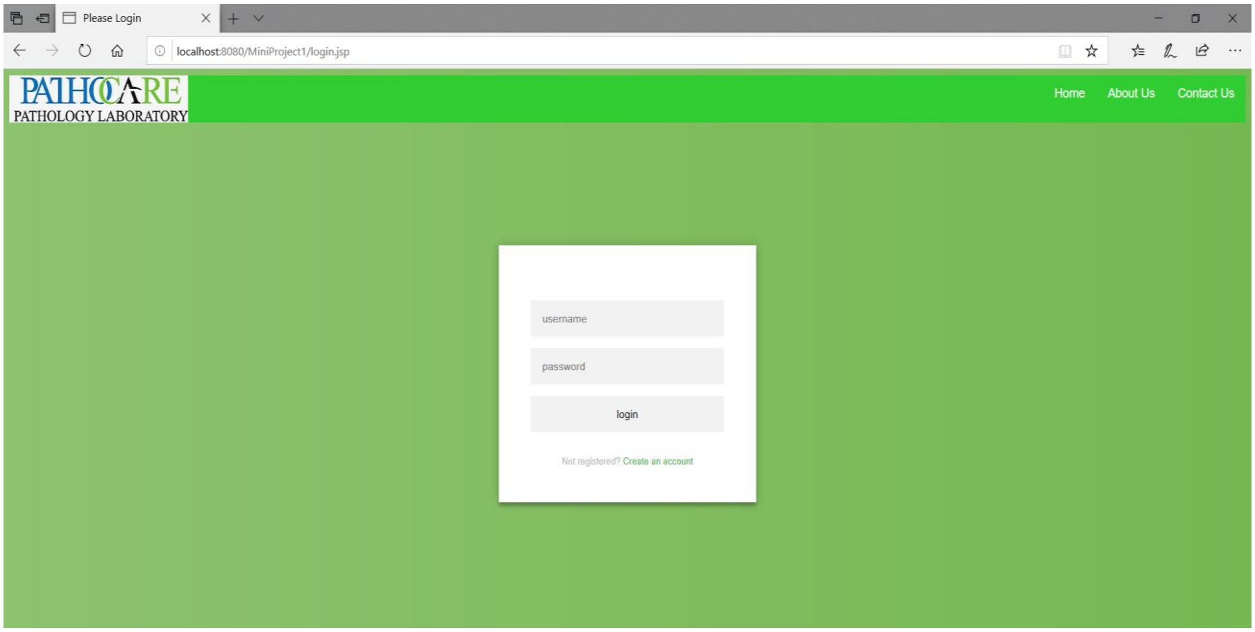

Figure 7.3 Login Page

7.4 Contact Us

A general contact us page is available to the user without having to login.

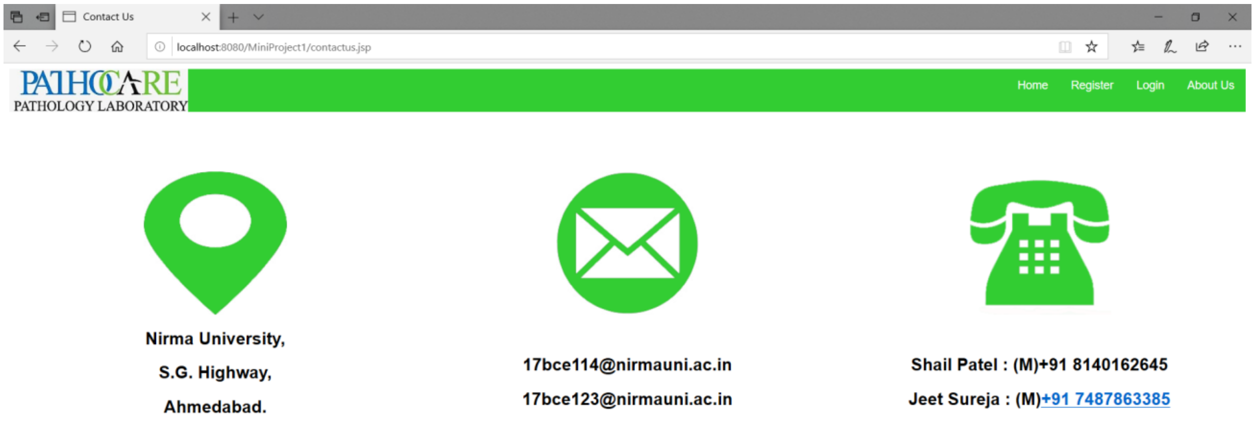

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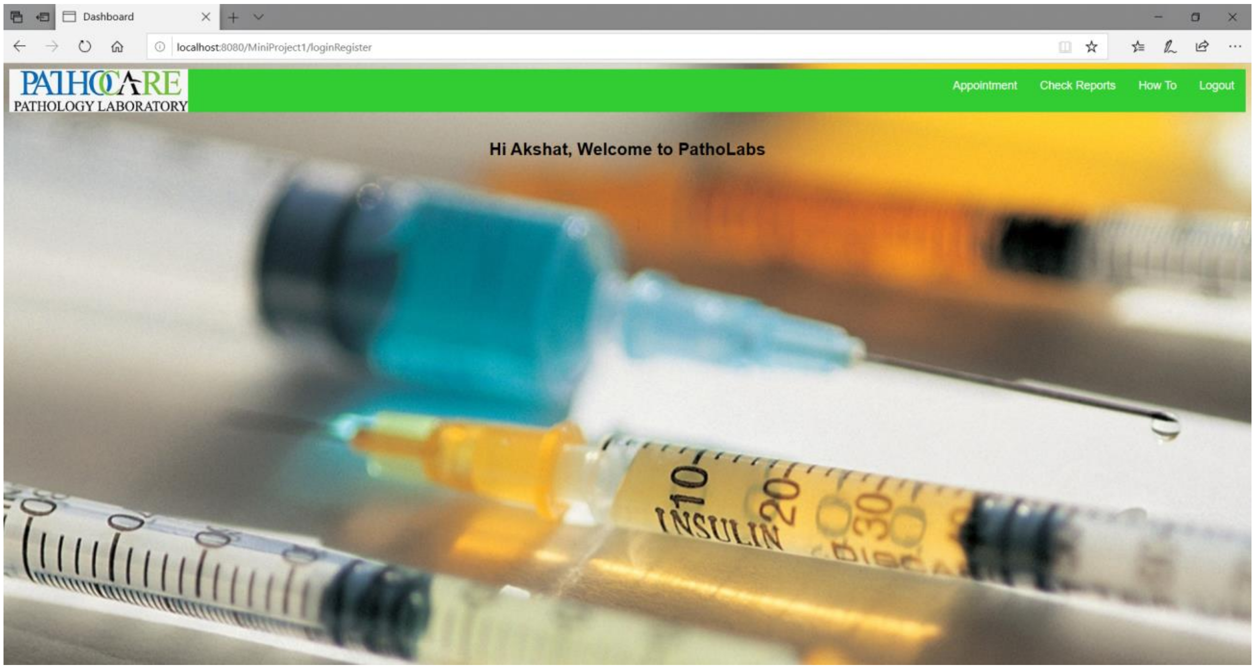
Figure 7.4 About Us

7.5 Customer Dashboard

If the logged in user is an Customer, he/she will have ‘C’ as the category in our database and will be redirected to the Customer Dashboard.

In the Customer Dashboard, user has options to generate a **new booking, check reports** for previous reports, **Logout** button to go back to the homepage.

Customer is greeted with a welcome message on the dashboard.

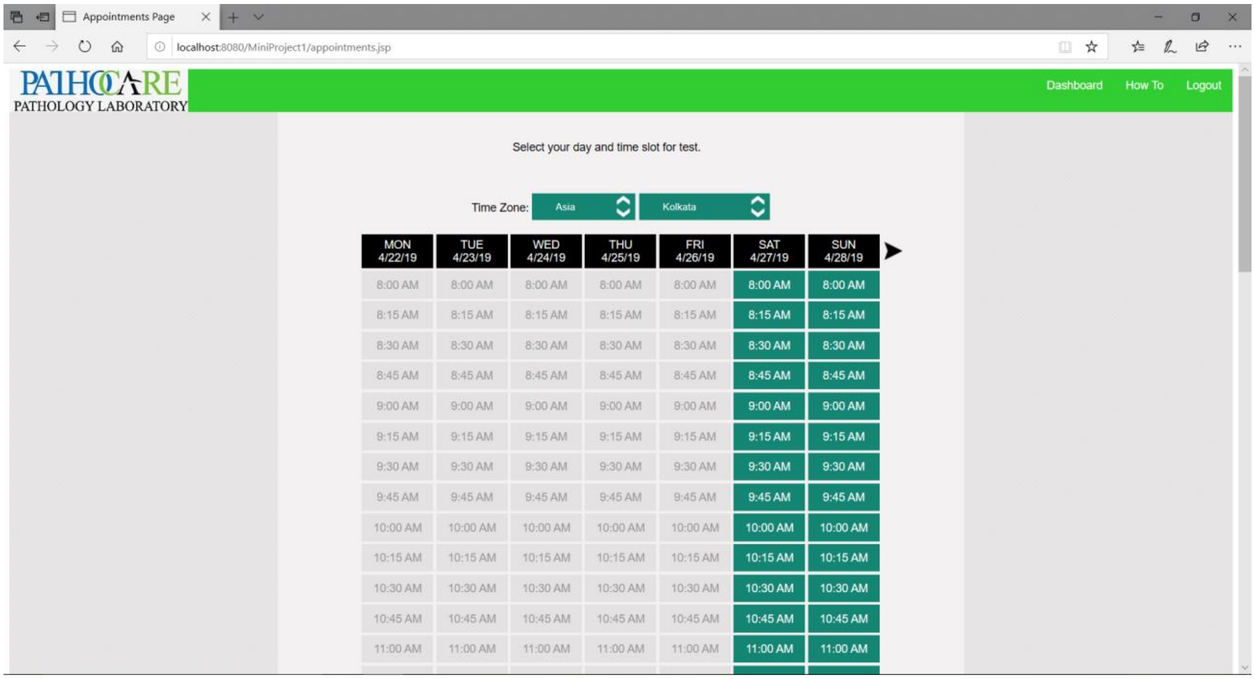


Hi Akshat, Welcome to PathoLabs

Figure 7.5 Customer Dashboard

7.6 New Appointment Page

Upon clicking **Appointment** button in the menu bar, the customer is redirected to a new appointment booking page where he/she can select and appropriate date and time slot.



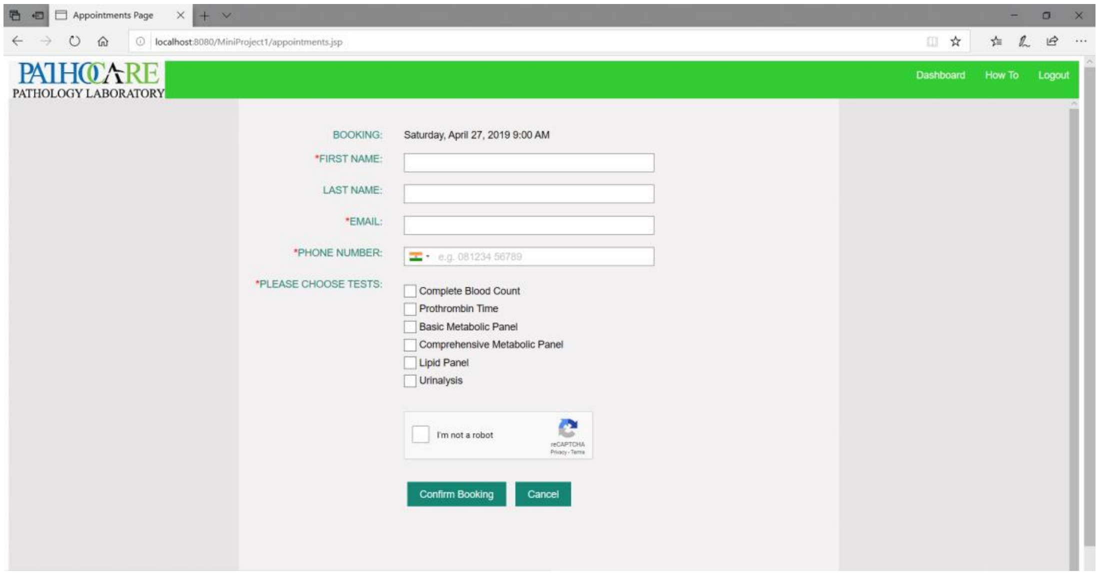
Select your day and time slot for test.

Time Zone: Asia Kolkata

MON 4/22/19	TUE 4/23/19	WED 4/24/19	THU 4/25/19	FRI 4/26/19	SAT 4/27/19	SUN 4/28/19
8:00 AM	8:00 AM	8:00 AM	8:00 AM	8:00 AM	8:00 AM	8:00 AM
8:15 AM	8:15 AM	8:15 AM	8:15 AM	8:15 AM	8:15 AM	8:15 AM
8:30 AM	8:30 AM	8:30 AM	8:30 AM	8:30 AM	8:30 AM	8:30 AM
8:45 AM	8:45 AM	8:45 AM	8:45 AM	8:45 AM	8:45 AM	8:45 AM
9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM	9:00 AM
9:15 AM	9:15 AM	9:15 AM	9:15 AM	9:15 AM	9:15 AM	9:15 AM
9:30 AM	9:30 AM	9:30 AM	9:30 AM	9:30 AM	9:30 AM	9:30 AM
9:45 AM	9:45 AM	9:45 AM	9:45 AM	9:45 AM	9:45 AM	9:45 AM
10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM	10:00 AM
10:15 AM	10:15 AM	10:15 AM	10:15 AM	10:15 AM	10:15 AM	10:15 AM
10:30 AM	10:30 AM	10:30 AM	10:30 AM	10:30 AM	10:30 AM	10:30 AM
10:45 AM	10:45 AM	10:45 AM	10:45 AM	10:45 AM	10:45 AM	10:45 AM
11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM	11:00 AM

Figure 7.6 NewAppointment Page

Upon clicking on an available slot, the user is redirected to another page where he/she is required to enter minimal necessary details to book the slot.



BOOKING: Saturday, April 27, 2019 9:00 AM

*FIRST NAME:

LAST NAME:

*EMAIL:

*PHONE NUMBER: e.g. 081234 56789

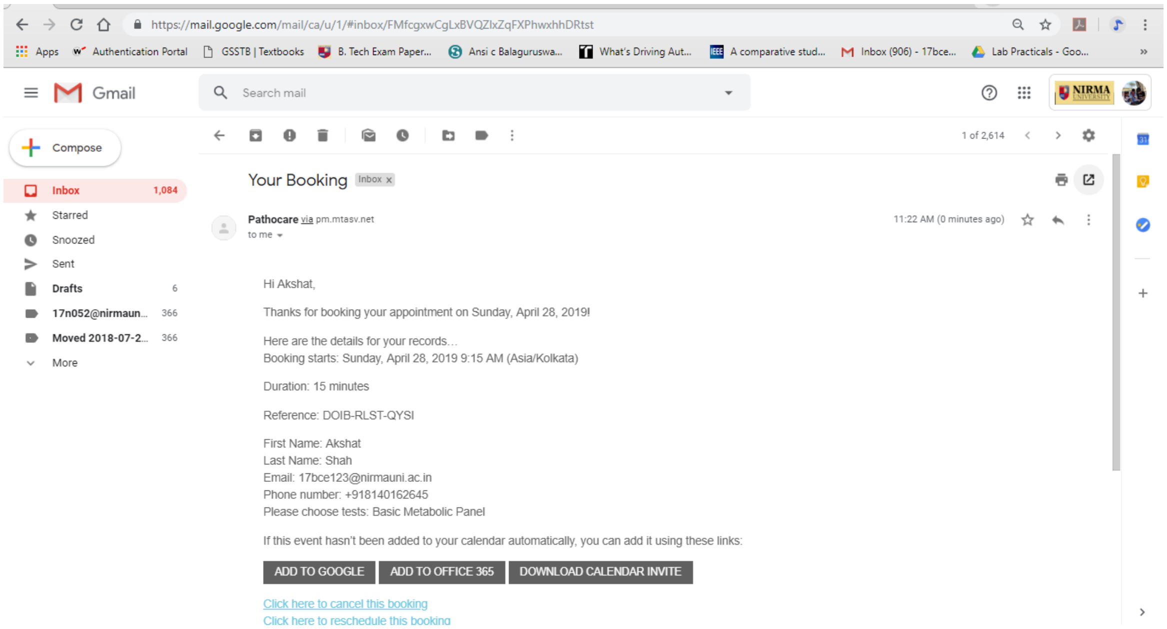
*PLEASE CHOOSE TESTS:

- □ Complete Blood Count
- □ Prothrombin Time
- □ Basic Metabolic Panel
- □ Comprehensive Metabolic Panel
- □ Lipid Panel
- □ Urinalysis

□ I'm not a robot

Figure 7.7 Information Page

Once the user confirms his/her booking, the booking is automatically added to his/her Google Calendar and an acknowledgement mail to send to the given email address.



Your Booking

Pathocare via pm.mtasv.net
to me

11:22 AM (0 minutes ago)

Hi Akshat,

Thanks for booking your appointment on Sunday, April 28, 2019!

Here are the details for your records…
Booking starts: Sunday, April 28, 2019 9:15 AM (Asia/Kolkata)

Duration: 15 minutes

Reference: DOIB-RLST-QYSI

First Name: Akshat
Last Name: Shah
Email: 17bce123@nirmauni.ac.in
Phone number: +918140162645
Please choose tests: Basic Metabolic Panel

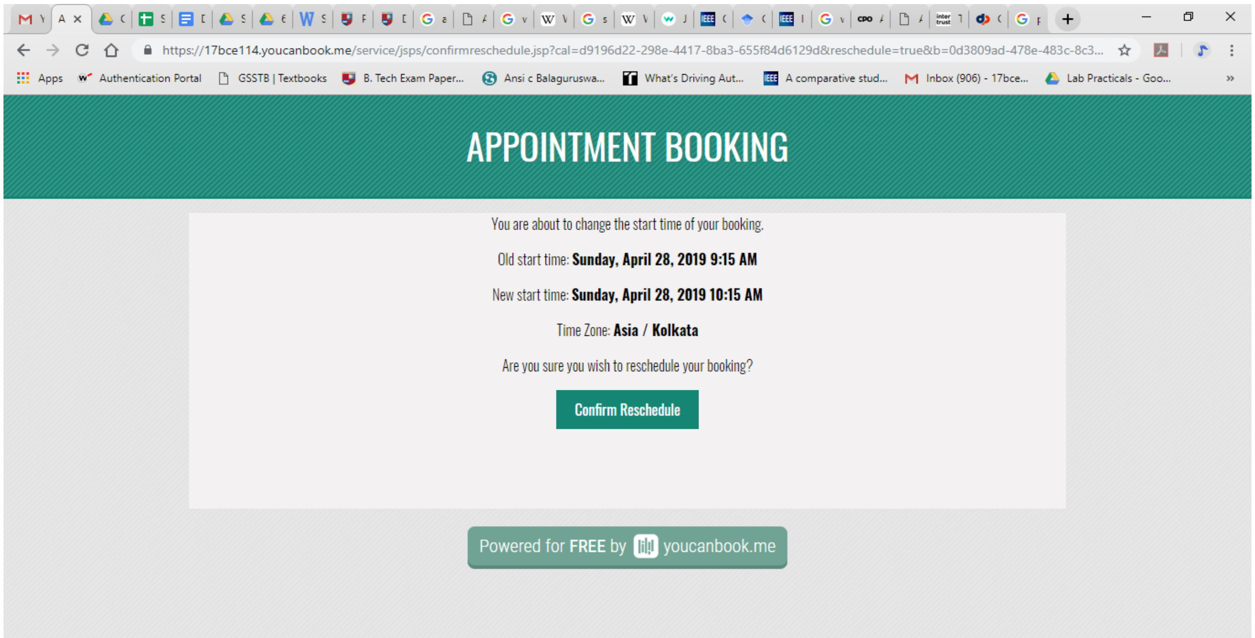
If this event hasn't been added to your calendar automatically, you can add it using these links:

ADD TO GOOGLE | ADD TO OFFICE 365 | DOWNLOAD CALENDAR INVITE

Click here to cancel this booking
Click here to reschedule this booking

Figure 7.8 Acknowledgement

If the user wants to reschedule or cancel the booking, there are options provided in the acknowledgement mail itself.



APPOINTMENT BOOKING

You are about to change the start time of your booking.

Old start time: **Sunday, April 28, 2019 9:15 AM**

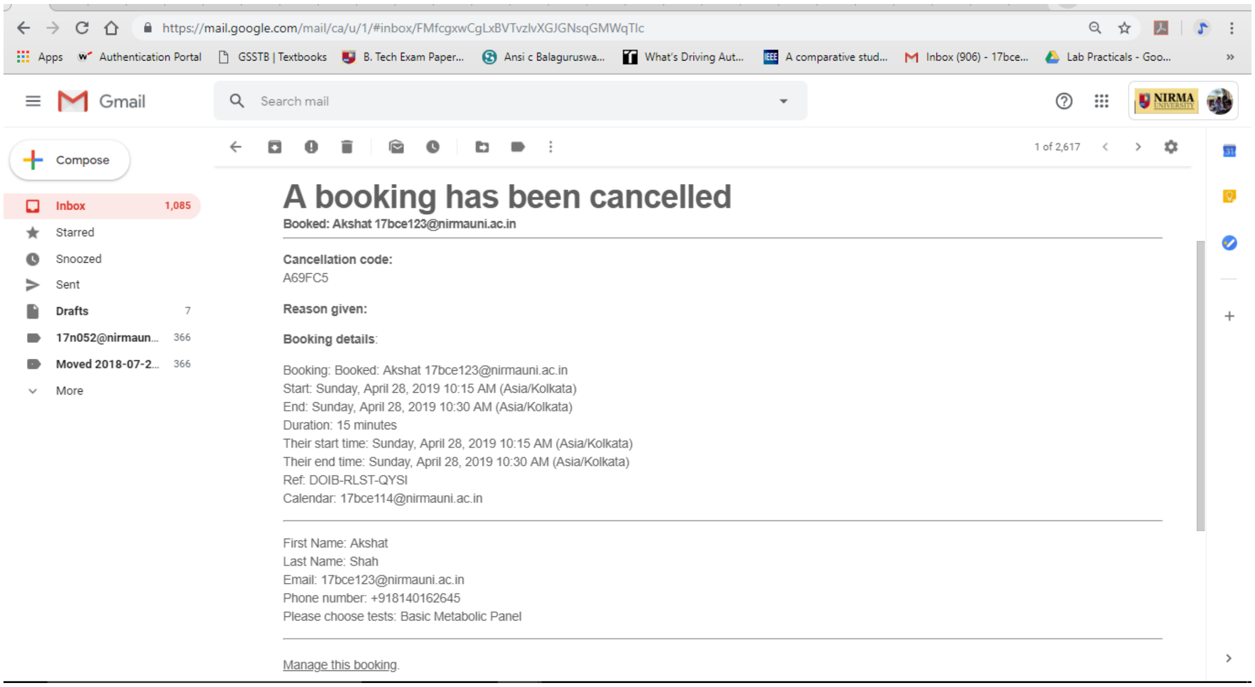
New start time: **Sunday, April 28, 2019 10:15 AM**

Time Zone: **Asia / Kolkata**

Are you sure you wish to reschedule your booking?

Confirm Reschedule

Figure 7.9 Reschedule Page



A booking has been cancelled

Booked: Akshat 17bce123@nirmauni.ac.in

Cancellation code:
A69FC5

Reason given:

Booking details:

Booking: Booked: Akshat 17bce123@nirmauni.ac.in
Start: Sunday, April 28, 2019 10:15 AM (Asia/Kolkata)
End: Sunday, April 28, 2019 10:30 AM (Asia/Kolkata)
Duration: 15 minutes
Their start time: Sunday, April 28, 2019 10:15 AM (Asia/Kolkata)
Their end time: Sunday, April 28, 2019 10:30 AM (Asia/Kolkata)
Ref: DOIB-RLST-QYSI
Calendar: 17bce114@nirmauni.ac.in

First Name: Akshat
Last Name: Shah
Email: 17bce123@nirmauni.ac.in
Phone number: +918140162645
Please choose tests: Basic Metabolic Panel

Manage this booking.

Figure 7.10 Cancellation Acknowledgement

7.7 Employee Dashboard

Whenever an employee login, the system automatically detects his category using the above mentioned mechanism and redirects him/her to Employee Dashboard.

The Employee Dashboard has options to **Add Report, Delete Report** and **Logout.**

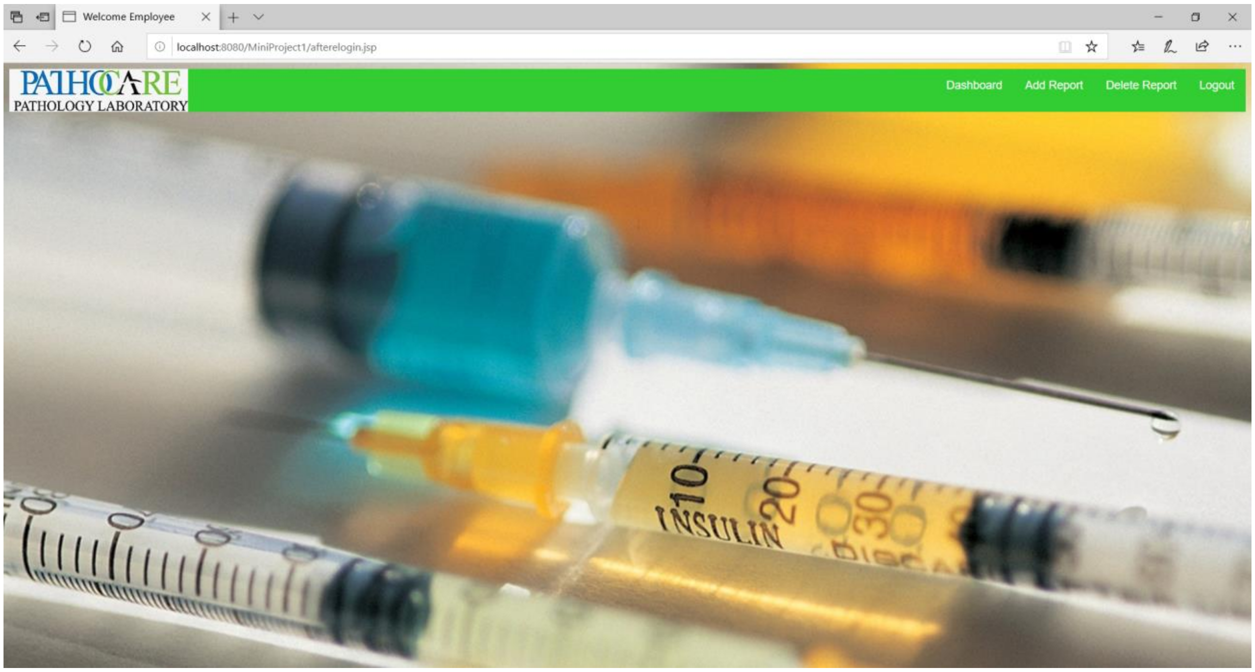
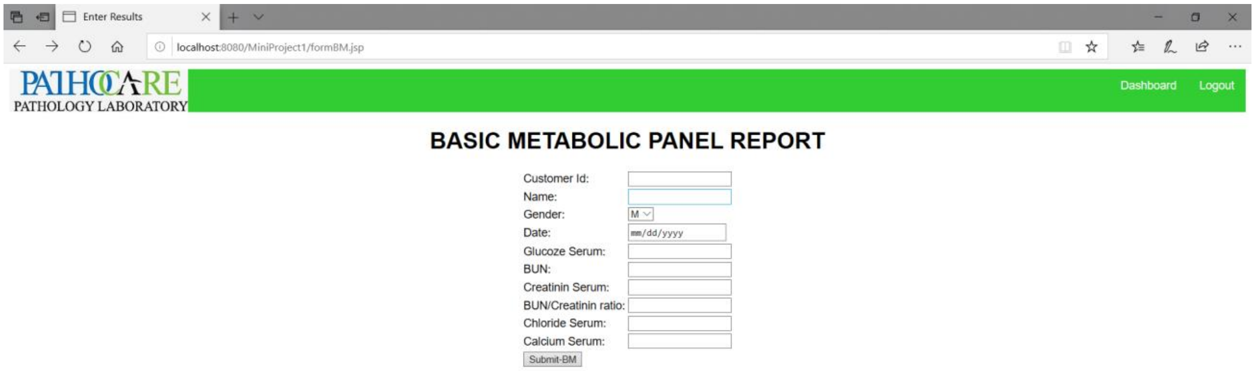


Figure 7.11 Employee Dashboard

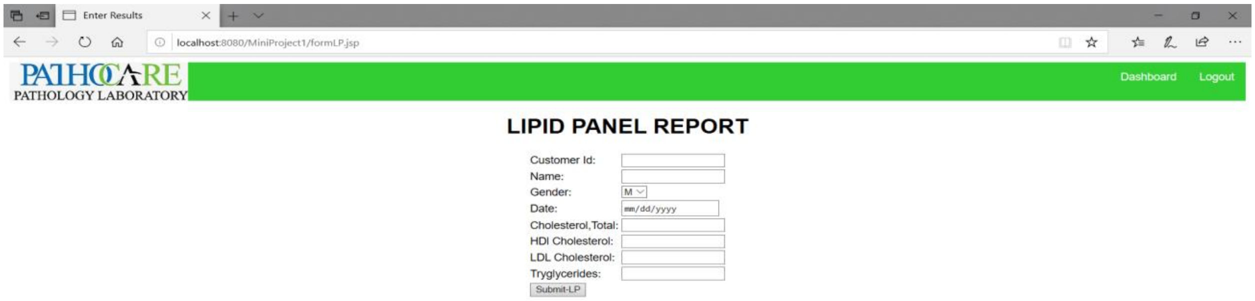
Upon clicking on Add report, employee has to select between tests. After selecting a test, he/she is redirected to a form for that respective test. Employee has to enter the report data into that form which is then stored onto the database and will be used for further retrieval.



BASIC METABOLIC PANEL REPORT

Customer Id:
Name:
Gender: M
Date: mm/dd/yyyy
Glucoze Serum:
BUN:
Creatinin Serum:
BUN/Creatinin ratio:
Chloride Serum:
Calcium Serum:

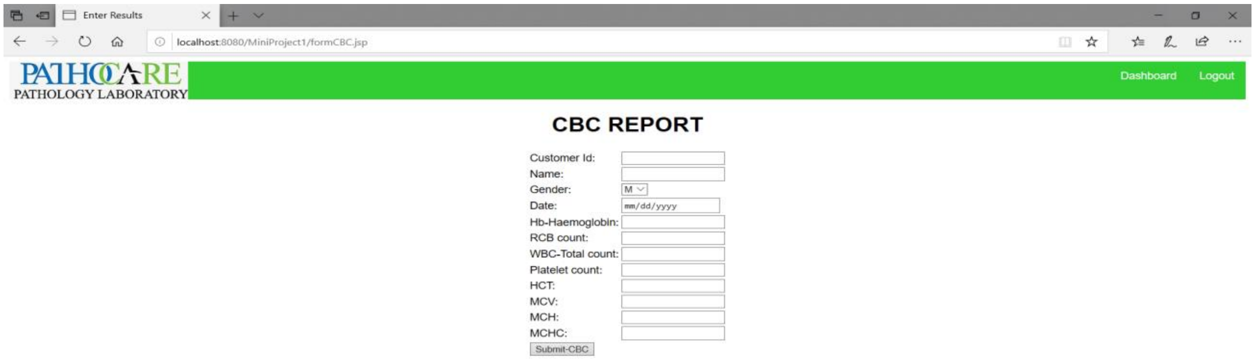
Figure 7.12 Basic Metabolic Panel Report



LIPID PANEL REPORT

Customer Id:
Name:
Gender: M
Date: mm/dd/yyyy
Cholesterol,Total:
HDl Cholesterol:
LDL Cholesterol:
Tryglycerides:
Submit-LP

Figure 7.13 Lipid Panel Report



CBC REPORT

Customer Id:
Name:
Gender: M
Date: mm/dd/yyyy
Hb-Haemoglobin:
RCB count:
WBC-Total count:
Platelet count:
HCT:
MCV:
MCH:
MCHC:
Submit-CBC

Figure 7.14 CBC Report

7.8 Admin Dashboard

Admin Dashboard is just like Employee Dashboard with the exception that Admin has the functionality to add Employees.

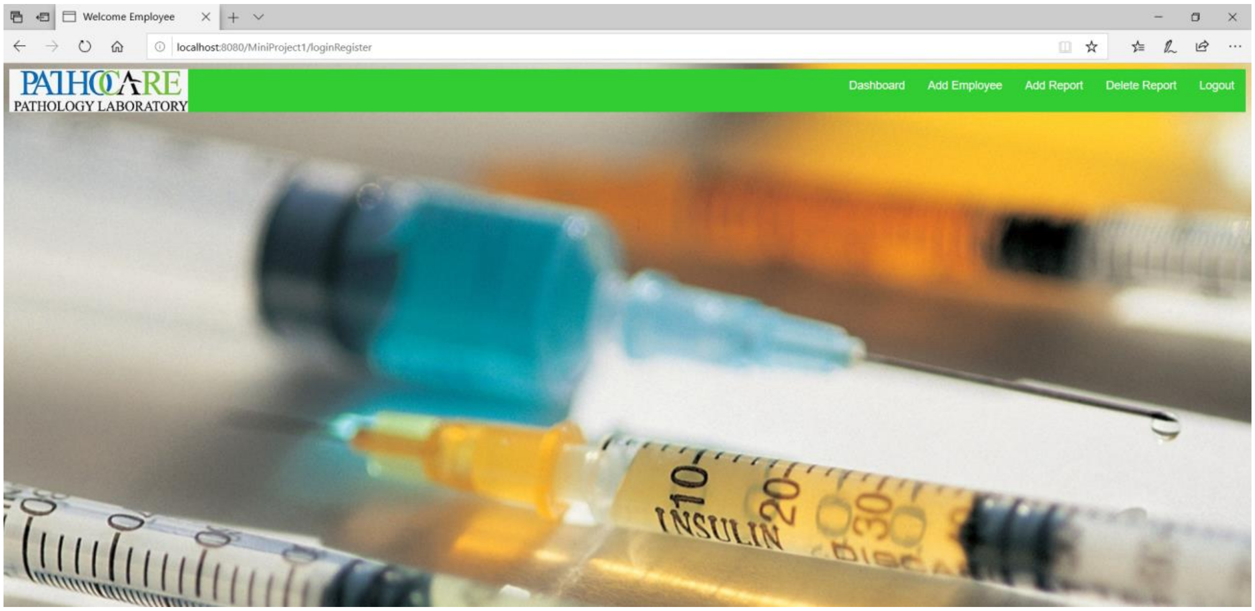


Figure 7.15 Admin Dashboard

7.9 Add Employee page

Add Employee page is just like a regular registration form but upon submission the entry will have category ‘E’ (Employee) in the database.

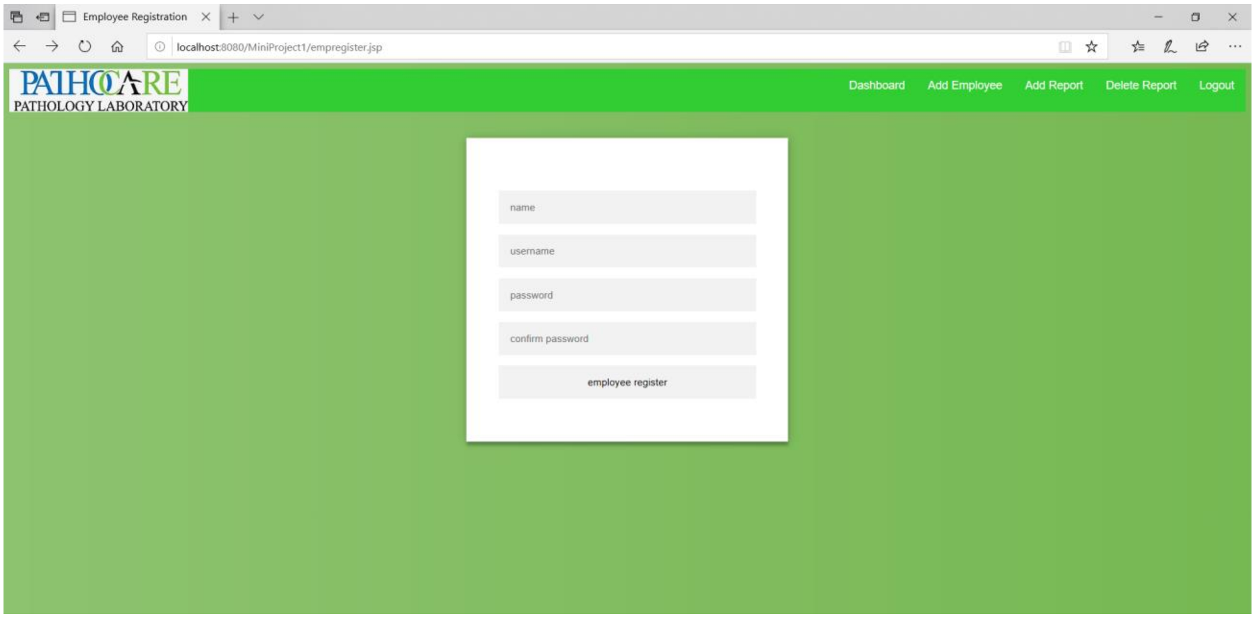


Figure 7.16 Add Employee Page

8 Conclusion & Summary

8.1 Summary

This report discussed our project’s functional requirements, the design process and its successful implementation. We briefly laid out the functioning of the program and how it connects to the external database.

8.2 Conclusion

After successful completion of the project we learned to:

- Acquire practical knowledge of Java EE, JDBC and MySQL Server for project
- development.
- Identify, analyze, formulate and handle programming projects with a
- comprehensive and systematic approach.
- Contribute as an individual or in a team in development of technical projects
- Develop effective communication skills for presentation of project related
- Activities.

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2. Herbert Schildt, **Java Complete Reference**, Tata McGraw-Hill Education
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