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Software Engineering

CEP: ONLINE RESERVATION SYSTEM FOR HOTEL.

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ACKNOWLEDGEMENT

First and foremost, we would like to express our gratitude to Allah Almighty for providing us with the resolve, experience, and bravery necessary to complete our semester project. Furthermore, we appreciate our Instructor, Engr. Hafsa Tanvir for her unwavering support and continuous advice during this project. Finally, we want to express our gratitude to all of our friends and family. Without their help, we may not have been able to reach this point in the project's growth.

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ABSTRACT:

This paper presents an approach to develop Software for Online reservation system for Hotel. It is very difficult for people to find different hotel and rooms in that hotel by call so a good approach can be is to find online hotel, search room over there and reserve the room. So we develop a Website namely "**stockspakistan.com**". Where people can search a room there and easily book room also user can check their reservation and can cancel their booking. For this paper, the technologies that were used to achieve our desired task are **MYSQL**, **PHP**, **JAVASCRIPT**, **HTML** and **NAMECHEAP** for hosting our website.

INTRODUCTION:

Online Reservation System is common nowadays in the era of Internet because there are many problems with booking on call like sometimes line is busy, misunderstanding can be done on reservation details like date. Difficult to get room detail what facilities are there in a specific room. To overcome these entire problems a good approach can be is visit a website, Enter date and find all the available rooms on that date. Check facilities available in the room and if a room is perfect for you, you can easily book your room using online payment. If you book your room after that you can conform your booking or can easily delete your booking. For this system, Following we do follow things for a software.

- Design User Interface to get detail
- Design database to maintain record.
- Host Website (Easily Accessible from anywhere).

First User comes to landing page and find three main functionalities on the landing page that are

- Find for new room
- Check reservation
- Cancel reservation

In finding new room (**New reservation**), users have to enter two dates, From and To date. After that he clicks on the check availability. When he clicks on the button, a query is made to database and find empty room of that date from database. Display all the available rooms of that date with their prices. User then can click on the more detail of every room to find more details of each room.

In **Check reservation**, users have to enter their reservation/Booking Id and along with Booking Id, users have to enter its User id in order to conform that he has book the room. When he enters correct detail, the booking related to that booking id can be displayed.

In **Cancel reservation**, users have to enter their reservation/Booking Id and along with Booking Id, users have to enter its User id in order to conform that he has book the room. When he enters correct detail, the booking related to that booking id is displayed and after that this record is deleted.

OBJECTIVES:

The objective of this complex engineering activity is to carry out research, analysis, design, investigation, and implementation of a real-world complex hardware and software engineering project that has the following attributes:

- The activity requires abstract thinking, originality in analysis to formulate suitable software models of the activity.
- The activity involves creative use of engineering principles and research-based knowledge in novel ways.
- The activity can extend beyond previous experiences by applying principles-based approaches.

GOALS:

The Goal of this project is to launch a product which provides ease in world which people can check and book rooms in any hotel by sitting anywhere from world without going anywhere.

By this online reservation hotel have some benefits and some loss.

Advantages:

- More customers can come by browsing the hotel over internet.
- More online reservation means need less man power. (Less workers).
- Spent less on advertising.
- Don’t need to maintain room records manually.

Disadvantages:

- Online payment deduction fees.
- Need trained staff (Computer).

This Software can be reshaped to any other industry where they can sell their items online by accepting payment using card and get verification email and item can be delivered to within limited time.

Now world is moving towards digital world and everything is getting digital. This product also paying role in making everything digital is maintain record of rooms digital instead of maintain it on paper. Also, by booking on the call, how we assure that this person is not fake or will not come. So, visiting our rooms online and booking them using payment make us assure that this person come.

SOFTWARE REQUIREMENT SPECIFICATION

User Characteristics:

There are two categories of users of the system. One is the Costumer and the other is the Admin.

- Customer can check rooms availability. If available he/she can book room. Customer can also cancel reservations of already booked room. HE /She have to do payment as well
- Admin can book and cancel reservation. Admin can also drop room if it being renovated and unavailable due to any reason and likewise, he can add rooms to list as well if it is available.

Functional Requirement:

User Interface:

We have two options to interact with the Hotel Management System, to make a desktop app or a website. So, in our case all interaction with the System will occur through a website. The website will be accessed through a secure user interface that will be developed using PHP, HTML, CSS, JavaScript. Any unexpected system operation will be announced to the user with an error web page stating the cause of the error. If any issue occurs, the error message will be presented. The layout of the web interface will have following screens.

- Home Page
- Find Rooms
- Booking Time Period
- Rooms available on basis of Beds
    - Check Reservation
- Enter Booking ID
- Enter User ID
    - Cancel Reservation
- Enter Booking ID
- Enter User ID
    - Admin page
- Sign In

- Book and cancel reservation
- List Of Available Rooms
- Drop room if not available due to any reason
- Add room if available
- Payment Page
    - Add Credit Card CVC
    - Add Email

Database Design And Development:

We Started with the Help of ER diagrams, it gave us the idea of all the entities and relation between them. Now moving towards implementation part, we wrote queries using MYSQL Developer. We made Database using XAMPP server. It includes PHP and MySQL server. We run the above Queries on MySQL and then connected it with our Frontend.

Non-Functional Requirements:

Performance Requirements

The website is stable, bug-free, and does not crash under any circumstance. The website is able to handle the peak factor's increased usage when more people are trying to book rooms. There should be a good internet connection to surf our website properly.

Safety Requirements

The website does not contain any malicious or spyware that collects user information without user acceptance. Any resource from the user must be used by his permission only i.e. His Email and Credit Card Info.

Security Requirements

The website is not vulnerable to any outside attacks so that the customer and Admin data must be protected and not vulnerable. The data must be end-to-end encrypted.

Business Rules

The website is cool and user friendly. It easy for customer of any age to easily use it. Customer can cancel their reservation at any time. The admin can add and drop a room at any time.

MAIN ENTITIES:

There are basically two main Entities that uses this software

1. **Users/Customers:**

   Users have different interface and have limited access.

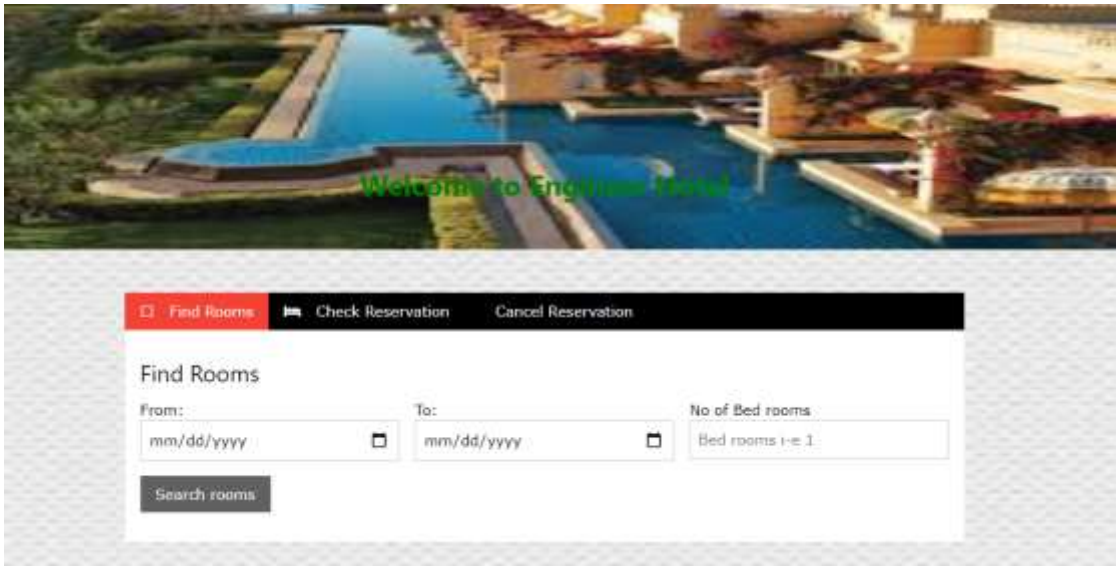


Figure 1: Home Page of hotel management system

- User can find empty room
- Get detail of room
- Book room
- Check reservation
- Cancel reservation

2. **Hotel Staff:**

   Hotel Staff have different interface which can be access by login.

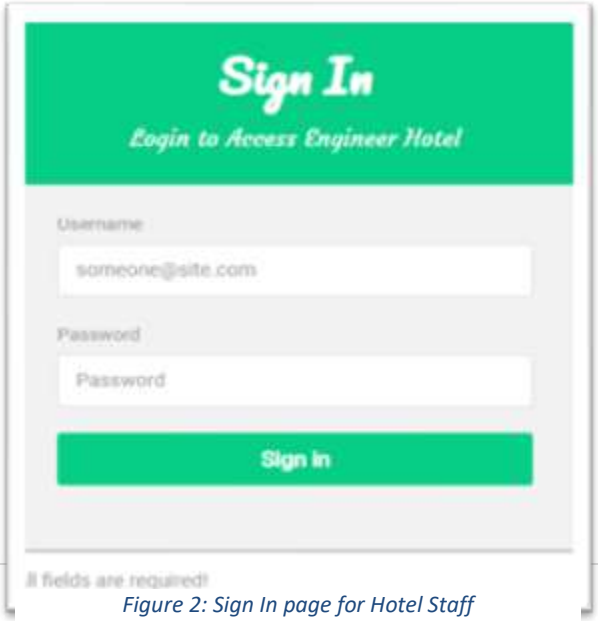


Figure 2: Sign In page for Hotel Staff

Where they have many more access than user like

- Check all reservation
- Add rooms
- Delete room
- Book room
- Delete Booking
- Find empty room
- User info

Work flow:

Basically, there are three main processes doing on our landing page for User.

- Find room and book
- Check Reservation
- Cancel Reservation

Main Page Flow chart:

Figure 3: A view of admin page

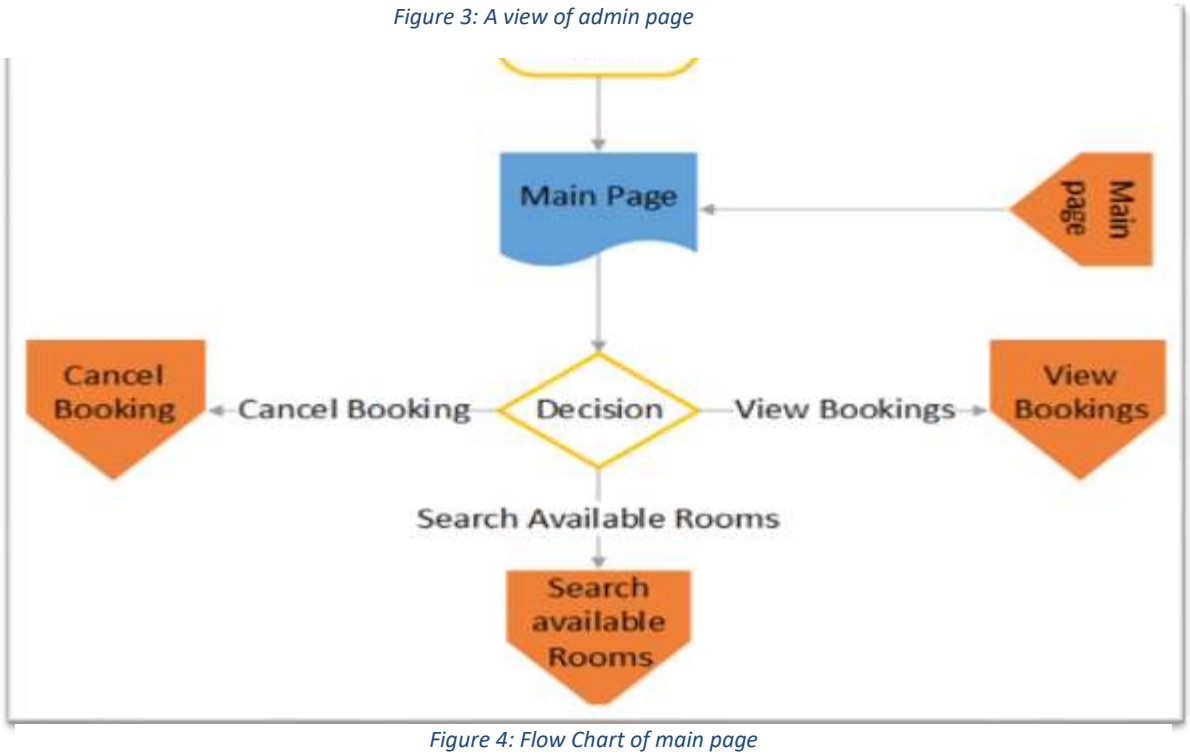
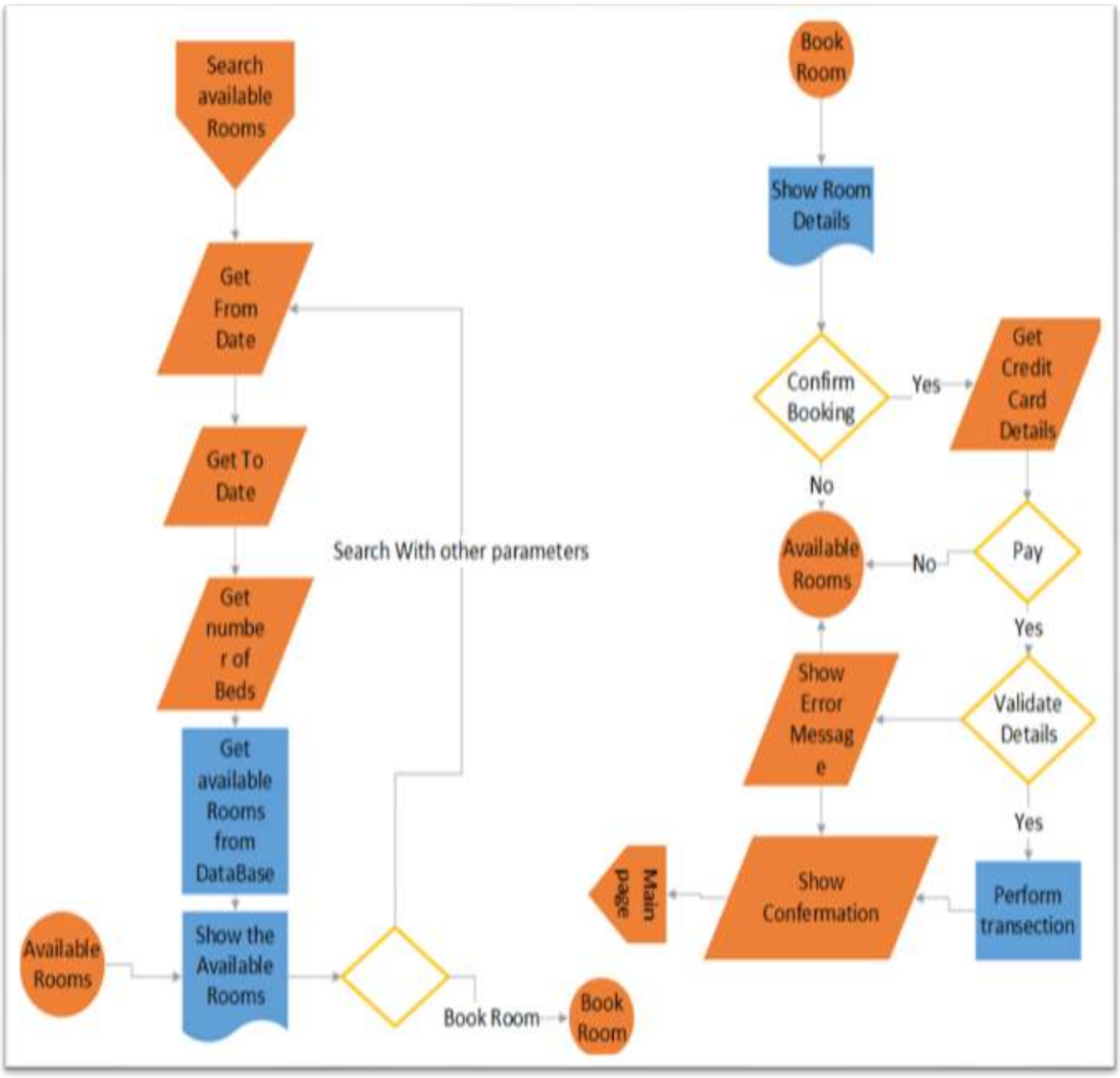


Figure 4: Flow Chart of main page

When user comes on the Main page, he has to make decision on three conditions

- Search Available room(New reservation)
- View Reservation
- Cancel Reservation

Find Room and get booking:



When User go for new reservation

- Enter From date
- Enter To date
- Click Check Room

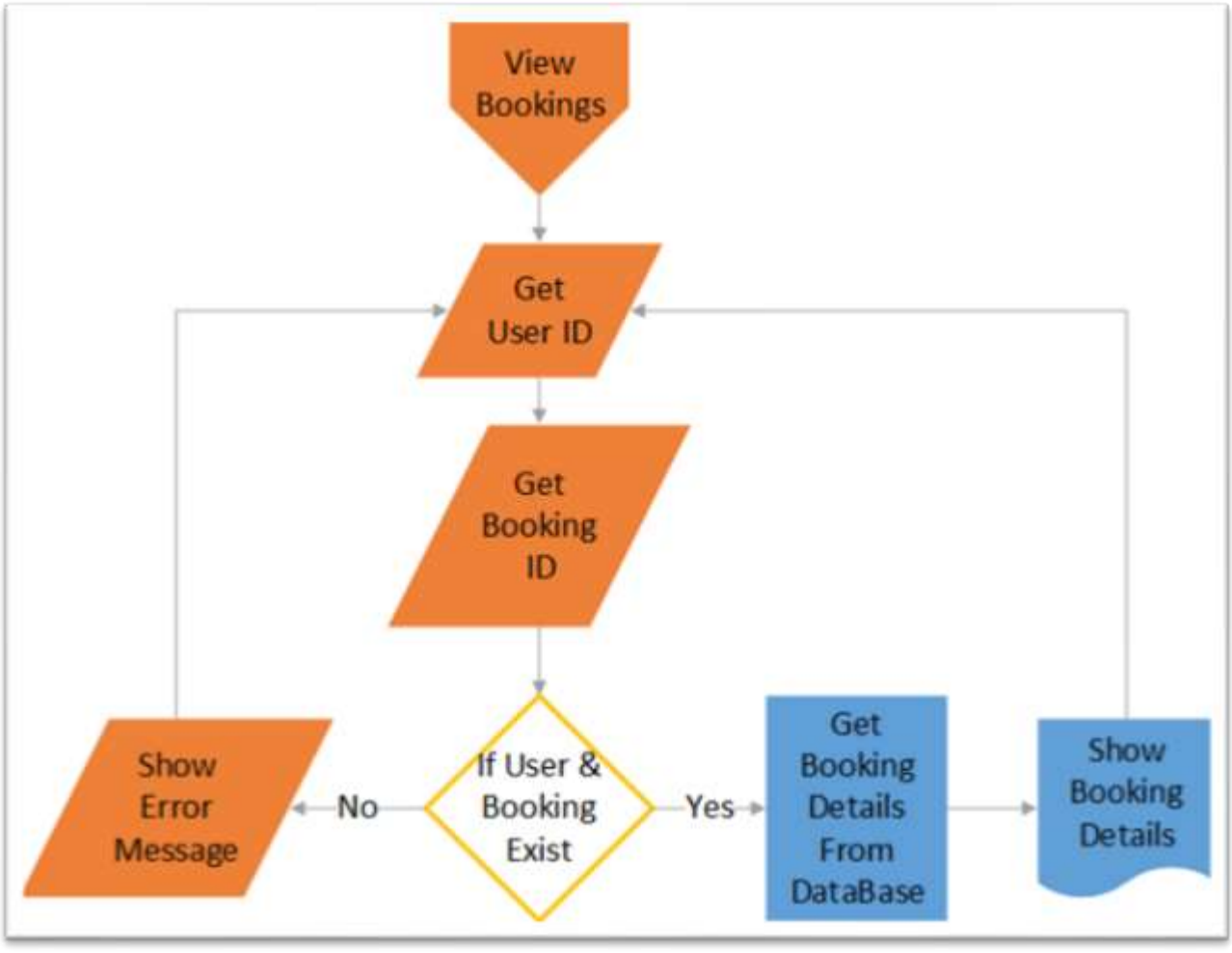
He will get details of all rooms.

Then if he click on Review room

- All details open up with this room
- Booking form

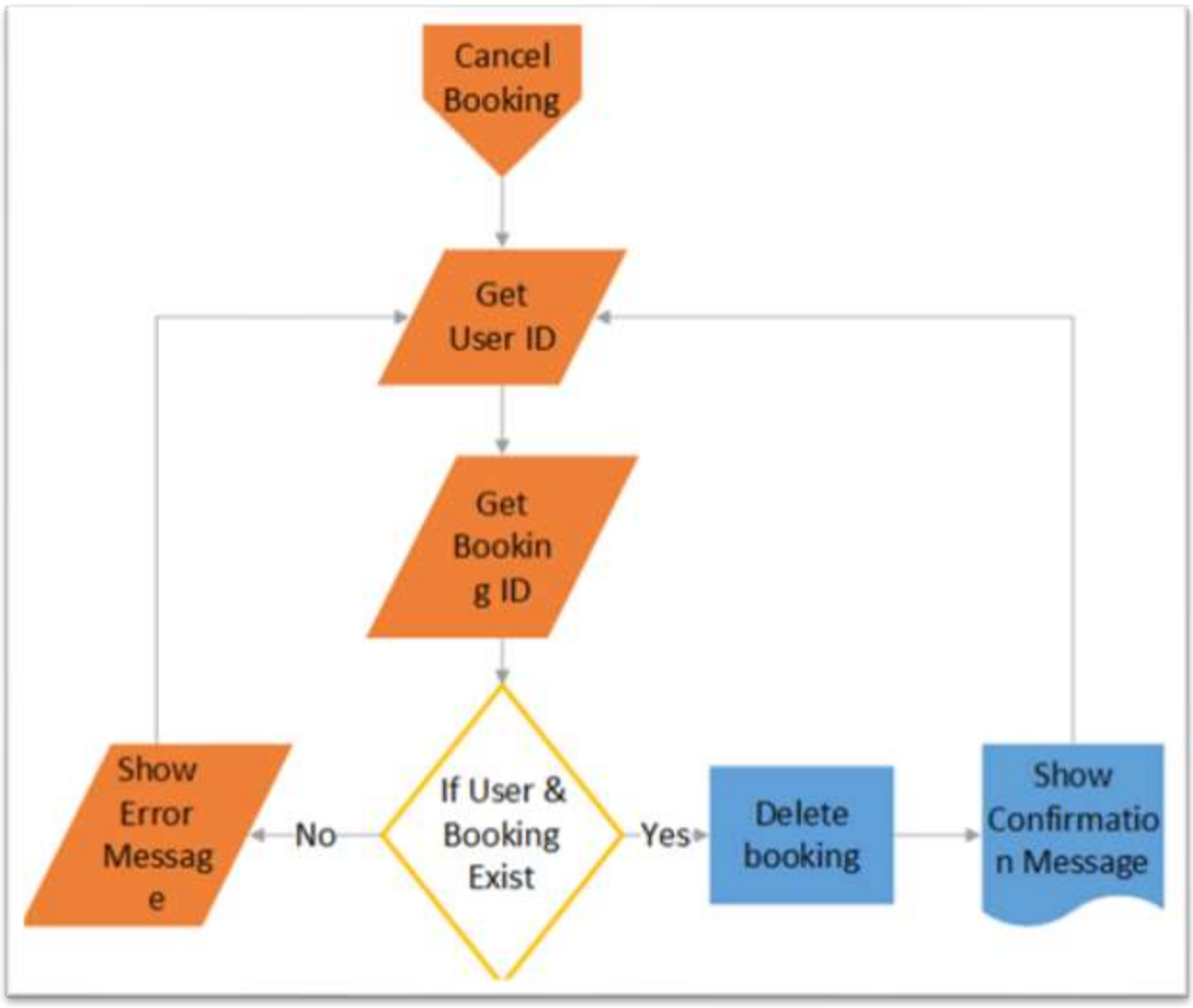
Get all details of user, verify email and verify credit card details and book room.

Check Reservation:



- User Enter Booking ID
- If booking Show booking
- Else show message no booking

Cancel Reservation:



In Cancel Reservation

- User enter User ID(verification purpose)
- User Enter Booking ID
- If booking Show booking and then delete than booking
- Else show message no booking

SYSTEM STUDY:

System Study of software includes 4 main processes.

- Software specification
- Software design and implementation
- Software validation
- Software evolution

SOFTWARE SPECIFICATION

Software specification is also known as requirements engineering and is defined as the identification of the requirements of the system and the limitations within which the system will operate, develop, or can evolve.

How to Access the Software?

So the software/website can be accessed by any browser i-e Chrome or Firefox.

Then after assessing browser User can type the domain in the browser or search for Engineer Hotel in Google.

Specifications of System:

Following are the stages of requirements engineering/Software Specification.

- **Feasibility Studies:**

  This Software consumes following cost

Hosting	$2.98 / per month.
Domain	$5 / per year

  When this software accepts online payment using stripe, stripes take

  Online payment 0.032% from every transaction

  No other extra charges other than Developer charges

- **Requirements Analysis:**

  Following are the requirement of System

  - Search room
    - The system shall enable customer to check the availability of rooms.
  - Charges of room
    - The system shall provide price range of all the rooms.
  - Details of room
    - The system shall enable customer to check and review all the detail of hotel.
  - Booking Process
    - The system shall have next button or cancel button for booking procedure.
    - The system shall enable customer to visit booking page, allow booking the room and confirming the room.
    - The system shall send an email notification of booking confirmation to customer.
    - The system shall redirect customer to payment page if they click the confirmation.
  - Payment Method
    - The system shall calculate the total bill amount.
    - The system shall enable customer to pay the bill online via credit card or PayPal.

- The system shall should verify and accept the credit card.

- **Requirements Specification:**
  - After getting Requirement, we have to plan how these requirements can be fulfilled.
  - Search room can be done using webpage and query into database.
  - Then show all room details with database response.
  - For Booking, user need a booking form and after entering data email is being verified
  - After that payment is accepted using Stripe and conformation email sent to user.

- **Requirements Validation:**

  - Software uses secure protocol.
  - Software must have a user Interface.
  - User can visit page and able to enter TO and from date.
  - After Entering Date user can see available room.
  - If User can like the room, he can see more details of the room.
  - Then Software must have a booking page
  - Booking page is for two types of users.
    - NEW
    - Existing
  - Email verification
  - Online payment Acceptance
  - Booking conformation Email

SOFTWARE DESIGN AND IMPLEMENTATION:

The first step in designing the software is to design a database design and for that first we make Table entries and make relational schema of each classes. According to our research three tables are required for this software.

Database Design:

Following are three Main tables in Database and their attributes.

- Rooms
  - Room Number
  - Area
  - Price
  - Description
  - Internet
  - Bathtub
  - Newspaper
  - Shower
  - Iron
  - Ironing Table

  - User
  - User_ID
  - First_Name
  - Last_Name
  - E_mail_ID

  - Bookings
    - Booking ID
    - From_Date date
    - To_Date
    - Booking_Date
    - Price_of_Booking

- Room Number
- User_ID

Booking_ID	From_Date	To_Date	Booking_Date	Price_of_Booking	Room_Number	User_ID
Booking ID is unique for each booking and auto inc...	From_Date is the starting date of booking	To_Date is the ending date of a booking	Booking_Date is represents the date at which this ...	Price stores the price at which this booking was d...	Forgen Key from Room Table	Forgen Key from User Table
77	2021-12-27	2021-12-29	2021-12-27	7000	102	83

Landing page:

Then we have to Design a webpage using PHP and HTML.

Complete Code (GitHub).

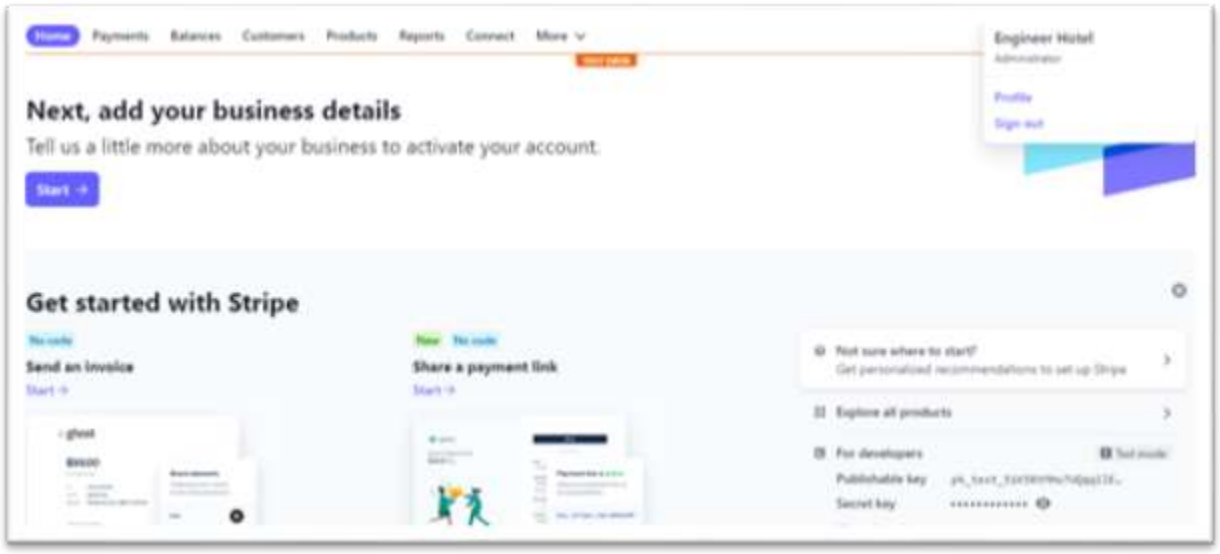
Booking page:

Figure 5: Booking Page

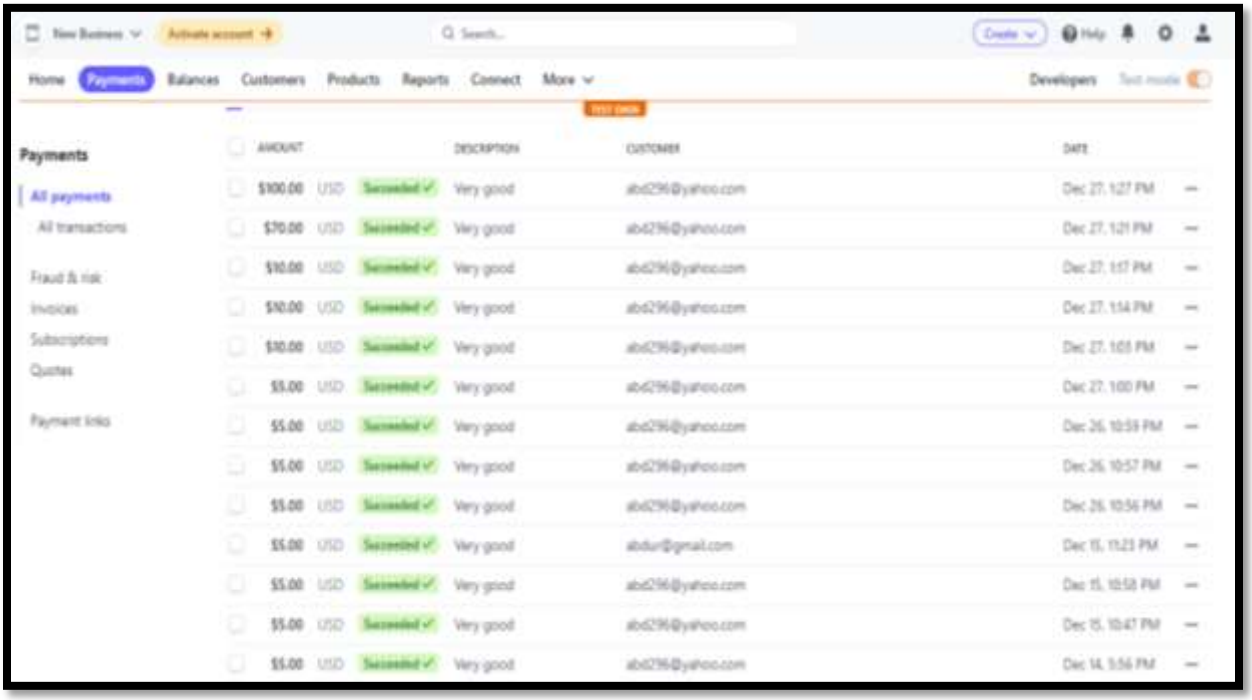
Make Email for Software:

Make Account on Stripe:

Stripe provide APIs for accepting payments both form local as well as international clients. It provides API for accepting credit card and as well as by PayPal.



Link Strip with our software:



SOFTWARE VALIDATION:

Software validation includes checking all the requirement of user can be implemented in a correct manner

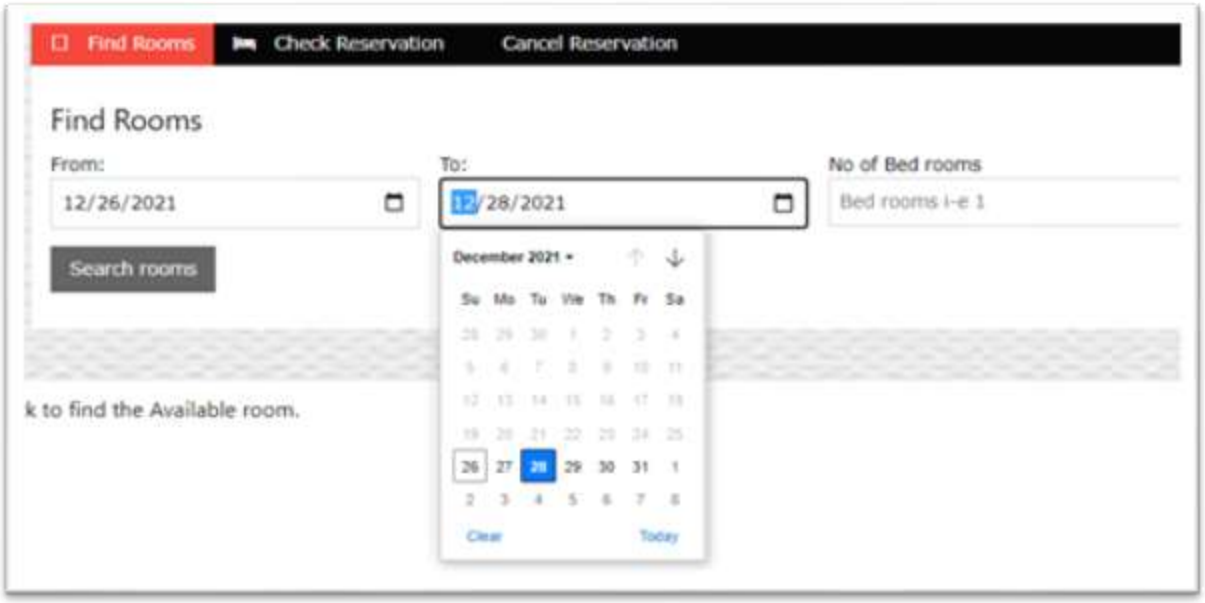
- **Security Issue:**

  Our website uses HTTPS secure version which uses encryption in order to increase security of data transfer and securely load data using secure method.

Figure 7: SSL certificate for website

- **Web page:**

- **Enter Date:**



- **Available room:**

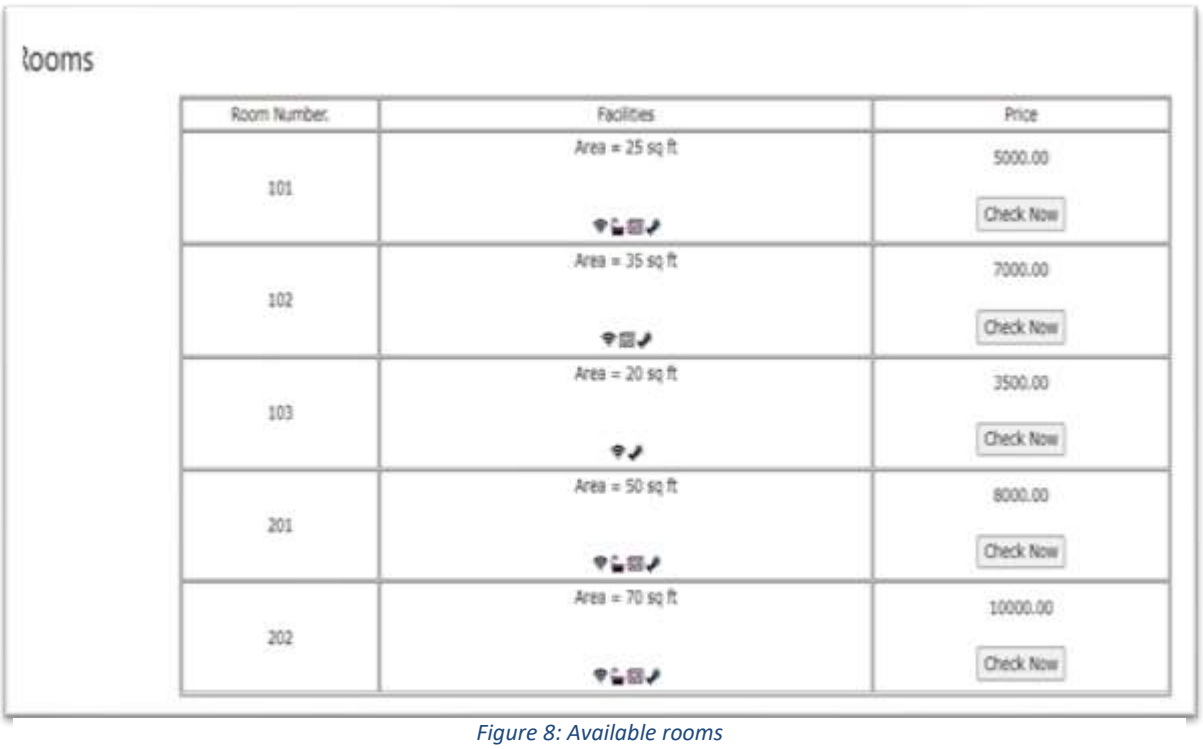
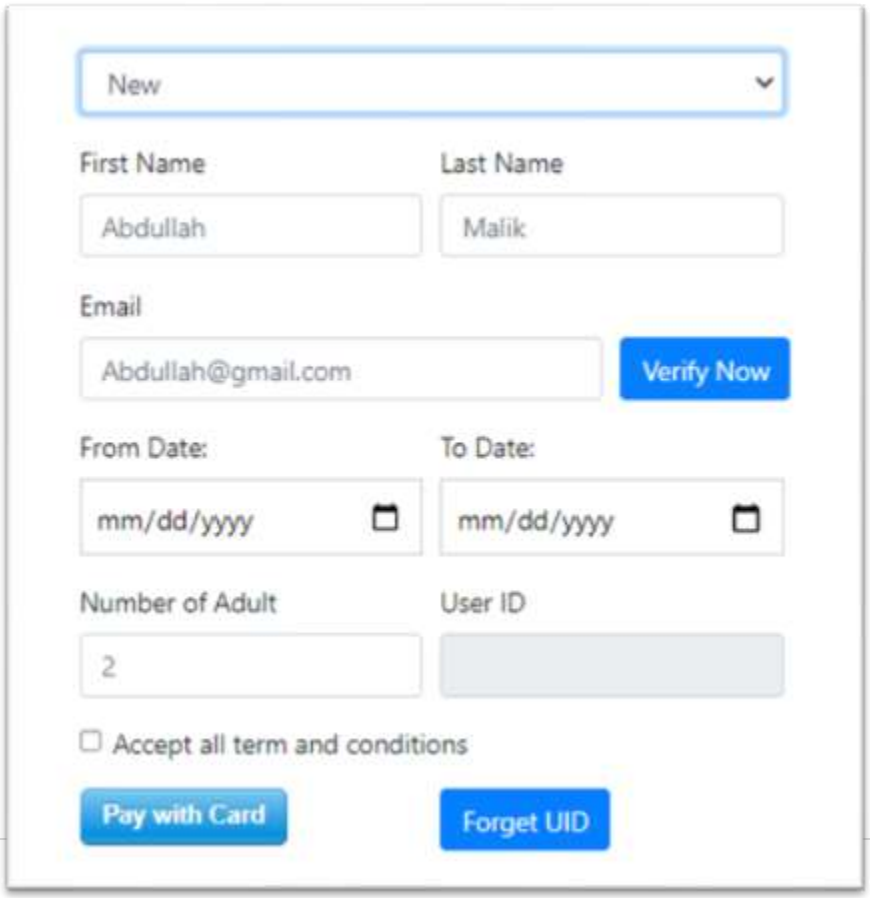


Figure 8: Available rooms

- **Review room Detail:**

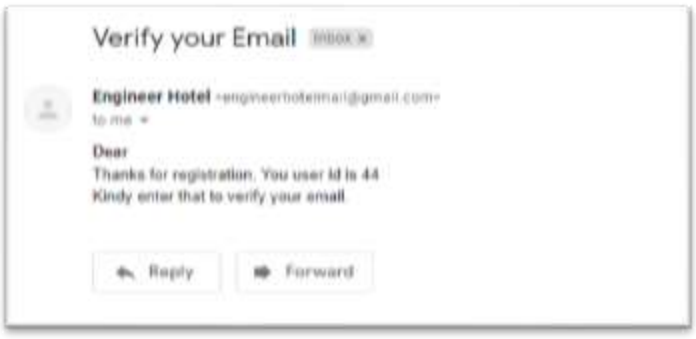
- **Booking Form**

  New User



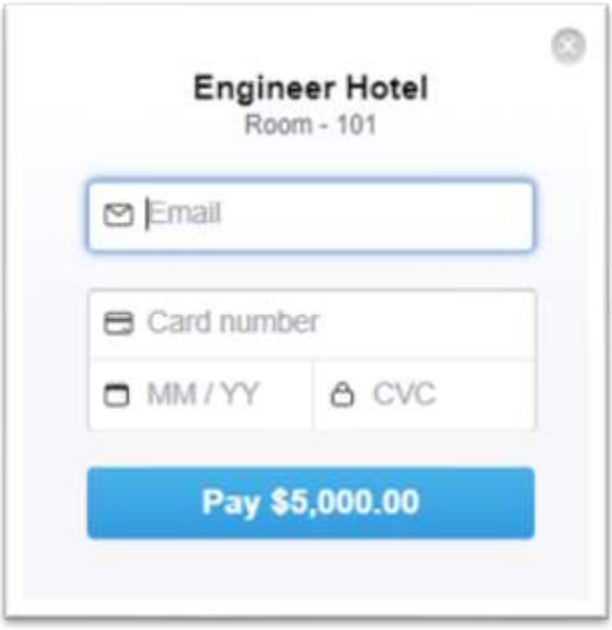
- **Email Verification**

  Send Email to User after he conforms the booking.

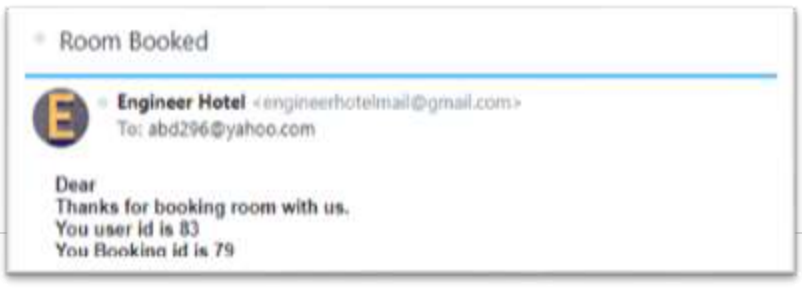


- **Payment Method**

  After that User can securely send request to database to query empty rooms and after that accept securely payment using Stripe.



- **Reservation Successful Email**



SOFTWARE EVOLUTION

This Software can be evolved to many other online reservation systems.

- Online Booking system
- Ecommerce Software

Online reservation is the need of now days because usually people can't prefer go to market and search for thing. They can prefer search the thing over internet and book that thing from site of that store and get the item within 2, 3 days.

SYSTEM REQUIREMENT AND SPECIFICATION

1. **Hardware Requirements**
    - For our Software, there is no such hardware requirement. Our software can be hosted on server.
    - For coding the program, we need a normal computer having apache server installed.
    - For hotel staff to look all the reservation, they need a device through which they can access the site that can be **personal computer, laptop** or **Ipad**.
    - Computer with sound card (desktop or laptop) with 2GB RAM and over 40 GB free disk space can run browser easily.

2. **Software /Language for development**

    Following are language used for coding the software.
    - **PHP**
    - **JavaScript**
    - **HTML + CSS**

FEASIBILITY STUDY:

I. **Market Feasibility**

This software is need of market in the era. Now it's an internet world and many small businesses want blue print of their business on internet where people can search for it and know about their business.

Along with getting details of business, user wants to order from there instead of visiting shop. So they want a form to book and make online transaction. This software is one of the types of this where a user visit hotel website and checks available rooms over there and get the rooms of detail and book online by making payment. This product can be reshape to any other business.

II. Technical Feasibility

This software can be easily developed using 2, 3 software. One of these is apache to run PHP code. This can be made by one developer within 2, 3 days.

III. Financial Feasibility

This software just needs domain and hosting.
Following are the charges for each

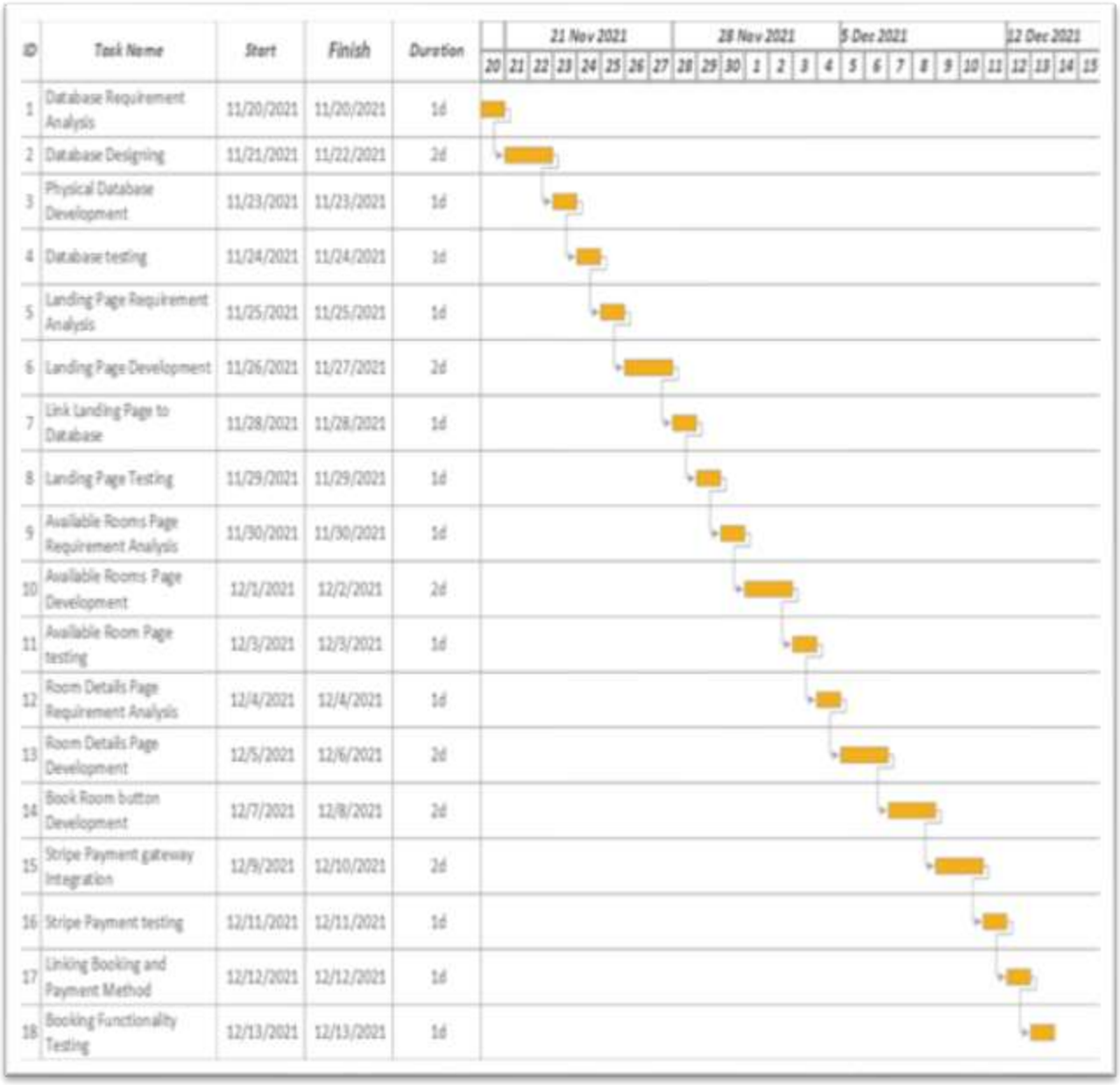
Hosting	$2.98 / per month.
Domain	$5 / per year

IV. Organizational Feasibility

There are many hotels in the world and need this software so that user can book online and this software can be transform and reuse in other industries like book Bus ticket.
Following are the other business where this reservation system can be used.

- Book Bus ticket
- Ecommerce Website

GANTT CHART:



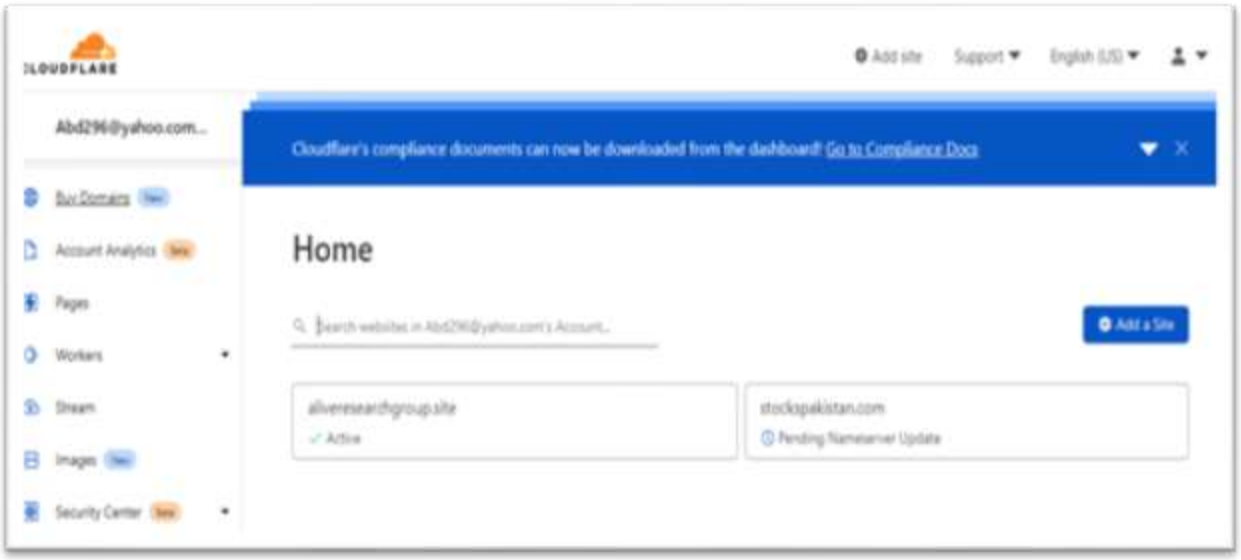
ID	Task Name	Start	Finish	Duration
1	Database Requirement Analysis	11/20/2021	11/20/2021	1d
2	Database Designing	11/21/2021	11/22/2021	2d
3	Physical Database Development	11/23/2021	11/23/2021	1d
4	Database testing	11/24/2021	11/24/2021	1d
5	Landing Page Requirement Analysis	11/25/2021	11/25/2021	1d
6	Landing Page Development	11/26/2021	11/27/2021	2d
7	Link Landing Page to Database	11/28/2021	11/28/2021	1d
8	Landing Page Testing	11/29/2021	11/29/2021	1d
9	Available Rooms Page Requirement Analysis	11/30/2021	11/30/2021	1d
10	Available Rooms Page Development	12/1/2021	12/2/2021	2d
11	Available Room Page testing	12/3/2021	12/3/2021	1d
12	Room Details Page Requirement Analysis	12/4/2021	12/4/2021	1d
13	Room Details Page Development	12/5/2021	12/6/2021	2d
14	Book Room button Development	12/7/2021	12/8/2021	2d
15	Stripe Payment gateway Integration	12/9/2021	12/10/2021	2d
16	Stripe Payment testing	12/11/2021	12/11/2021	1d
17	Linking Booking and Payment Method	12/12/2021	12/12/2021	1d
18	Booking Functionality Testing	12/13/2021	12/13/2021	1d

RISK INVOLVED IN SYSTEM.

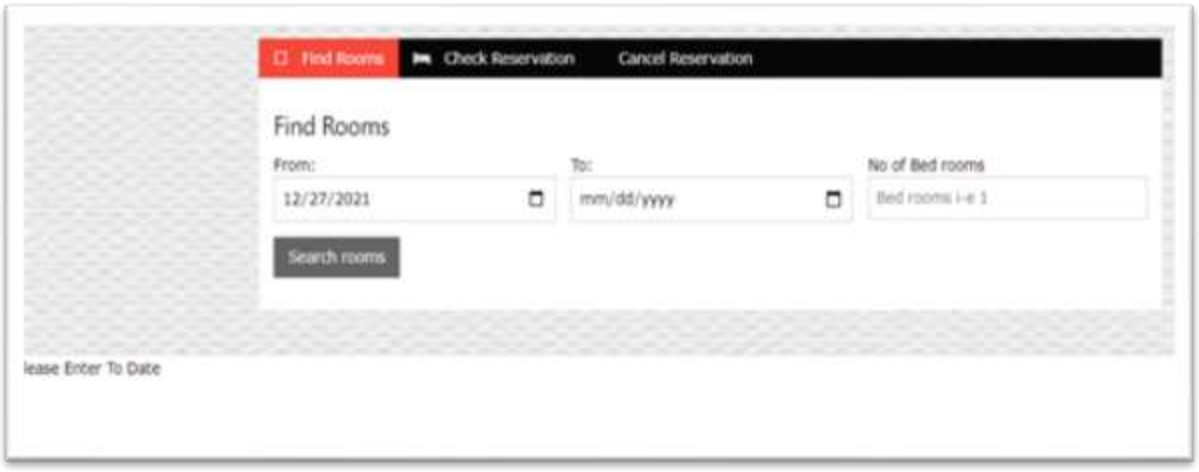
- **Integration with PhpMailer**
  There might be a risk that PhpMailer won't work, so if you PhpMailer are down then New user can't get User id, and wont able to register
  Also Existing can book room but won't get room book Conformation Email

- **Integration with Stripe**
  We integrate Stripe gateway payment method to accept payment on our site. So if Stripe API is down, User can't book room because he is unable to make payment.

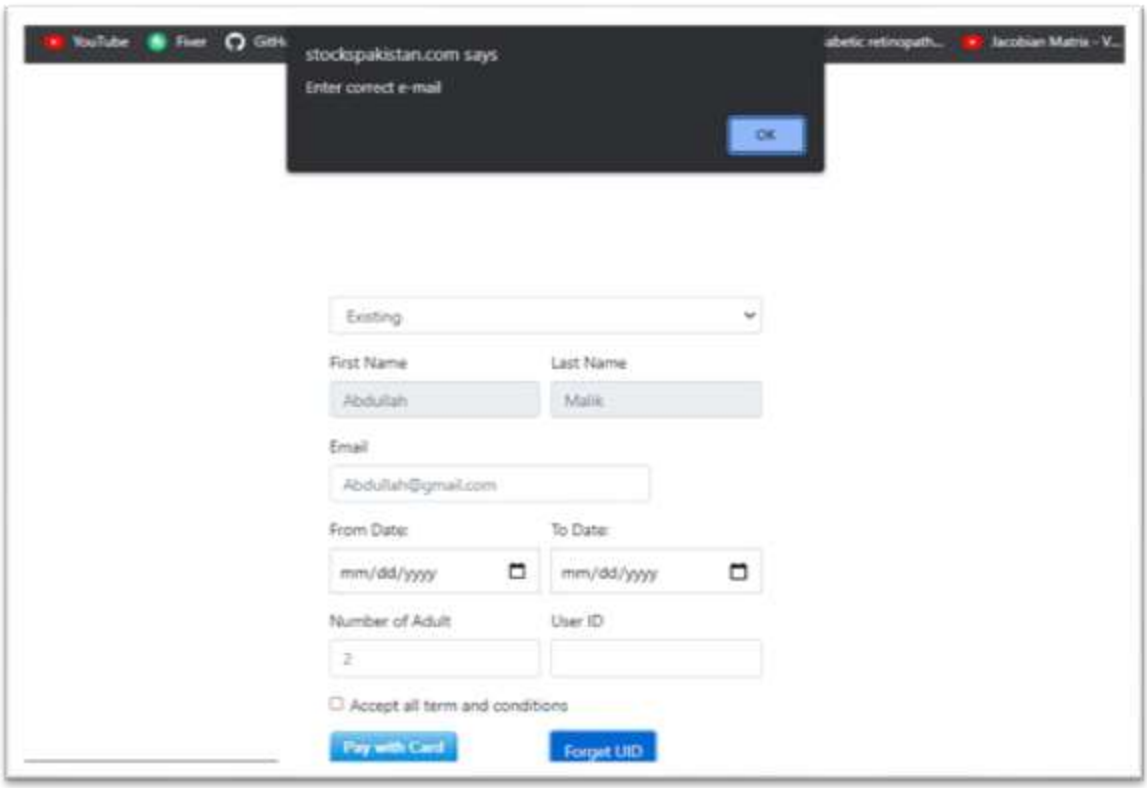
- **Hacking**
  The most common attack for a website is DDOS attack and in return of DDOS attach our website goes down because server can handle too much request.
  To overcome this DDOS Attach we are using Cloud flare software, which first check the request and then reload it to server. So, if there is DDOS Attack, it detects that request and stop sending it to server.



- **Entering wrong inputs**
  What if users don't enter date and search for rooms.
  He will get alert to enter date, so we further proceed.
  Here we don't enter To date.

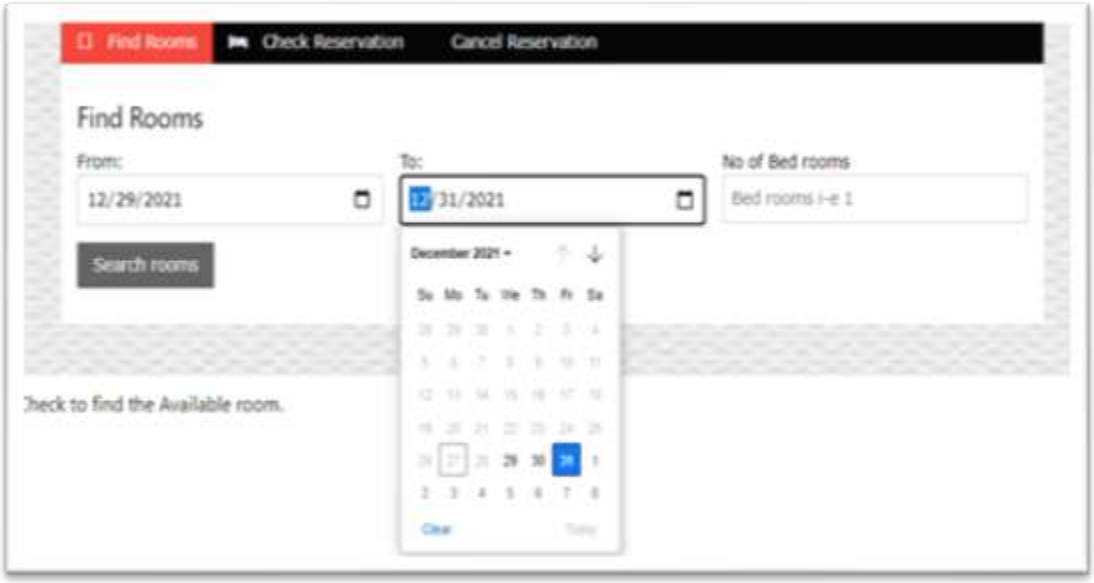


Here we not enter correct email.



- **Enter Correct date**

  If current date is 27, then user can't enter before 27 and if he select 29 in the From date he wont be able to click on the previous date before.

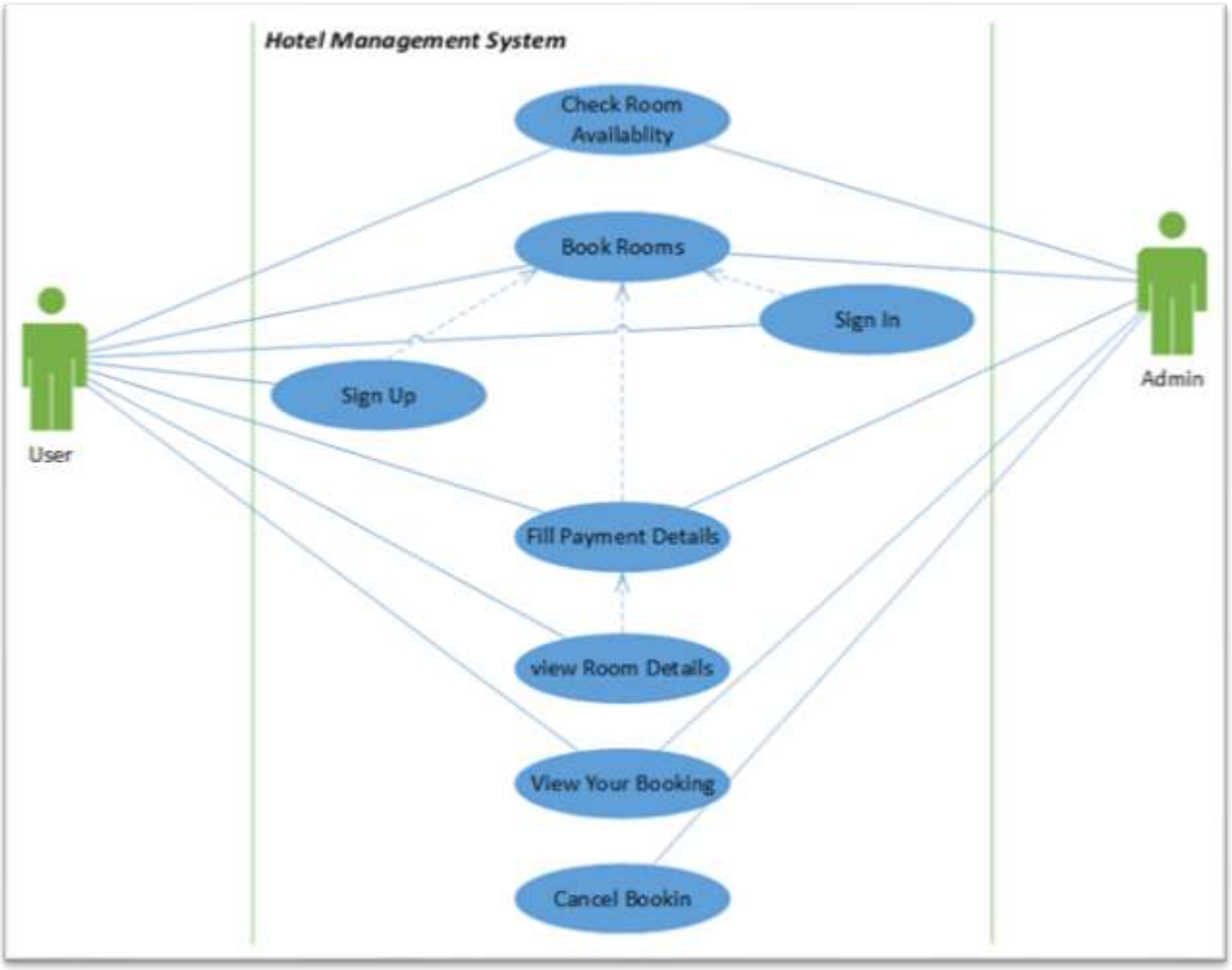


- **Change variable**

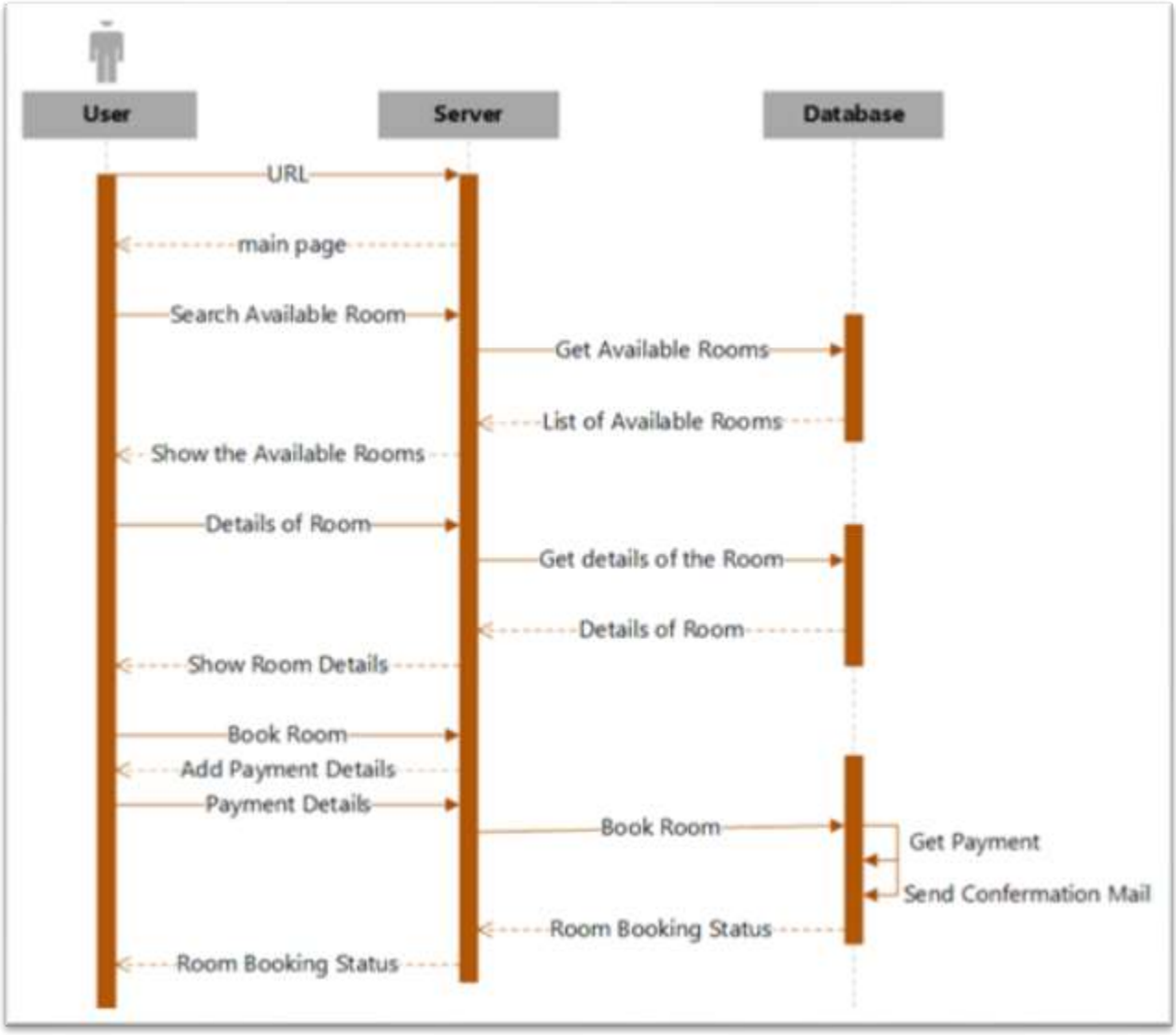
As we are using Get request, we are passing variable in the URL and what if some change it to different room like 104 which doesn't exist. It reloads to Home page back.

SYSTEM DIAGRAM

- **UML Diagram (USE CASE)**



- **UML Diagram(Sequence Diagram)**



- **ERD Diagram**

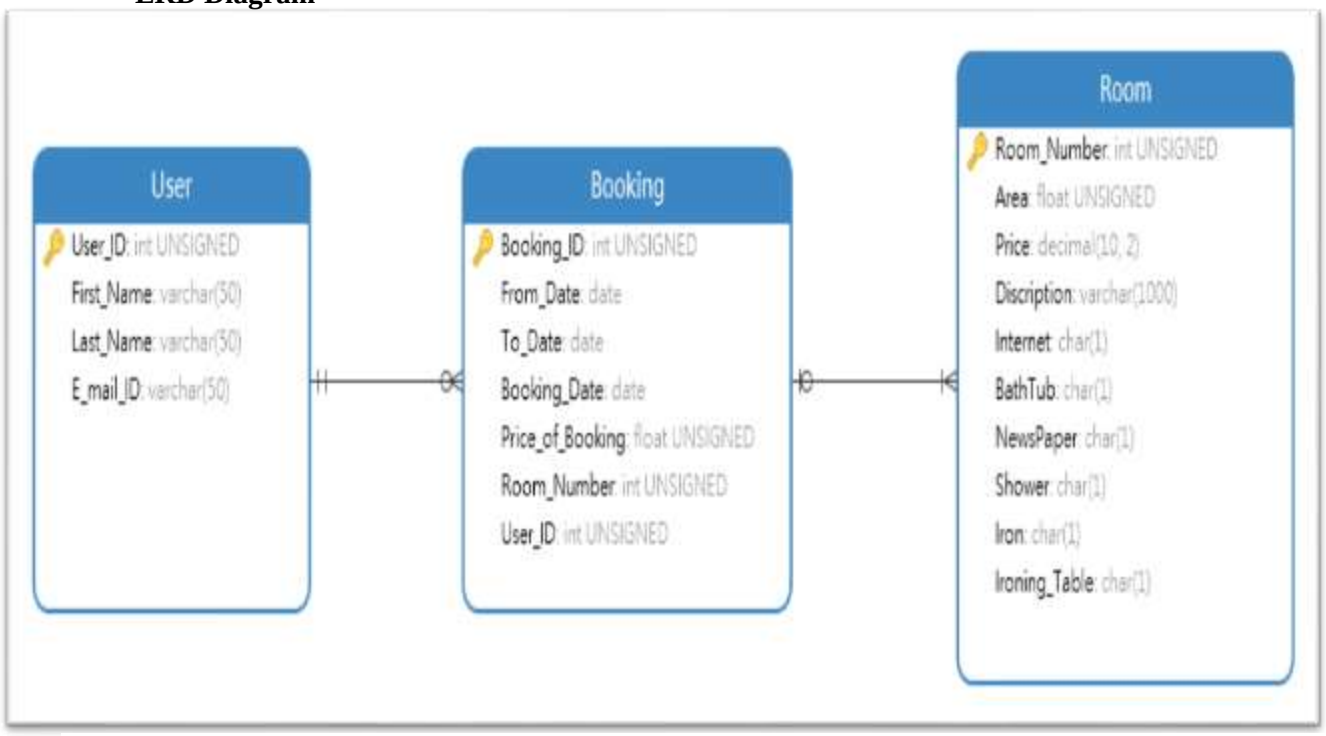
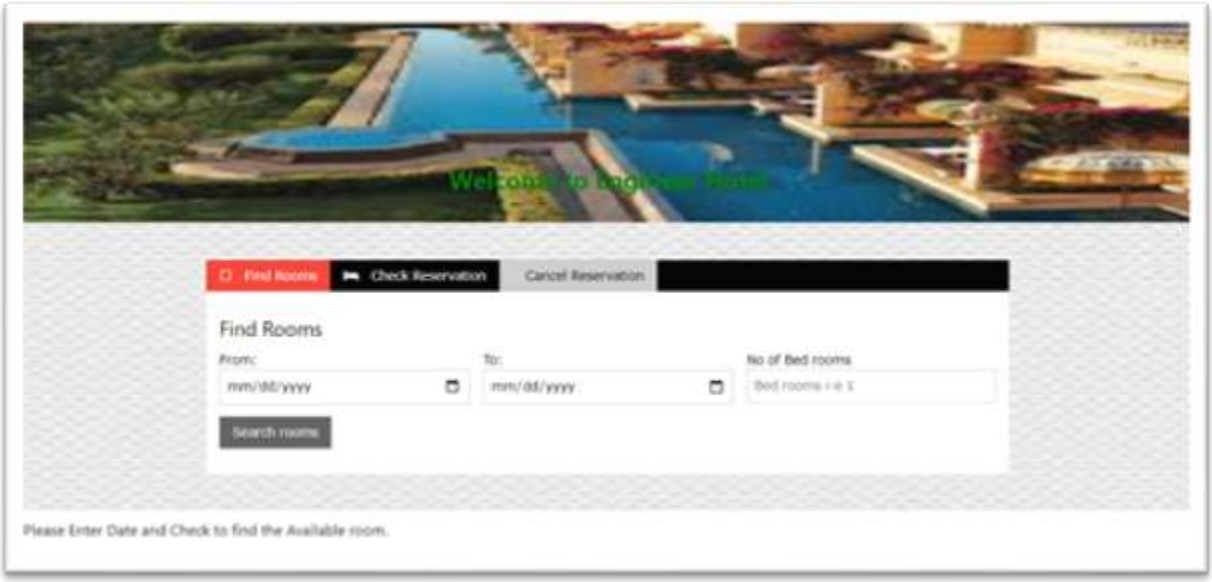


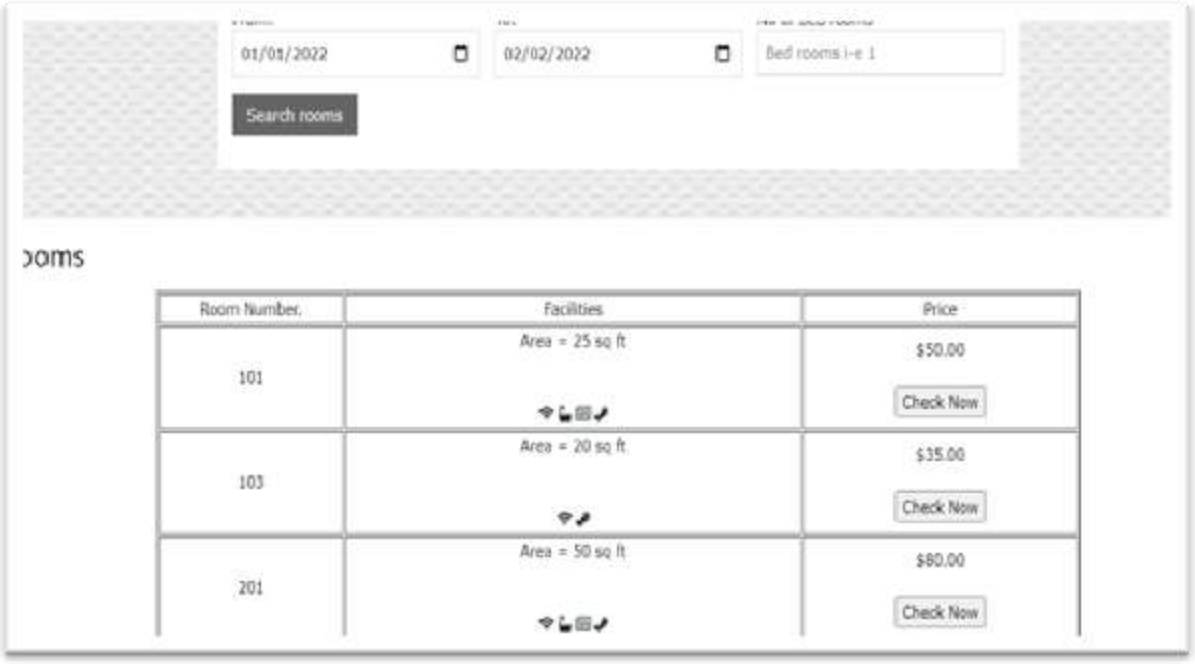
Figure 9: ER diagrame of Database

TESTING:

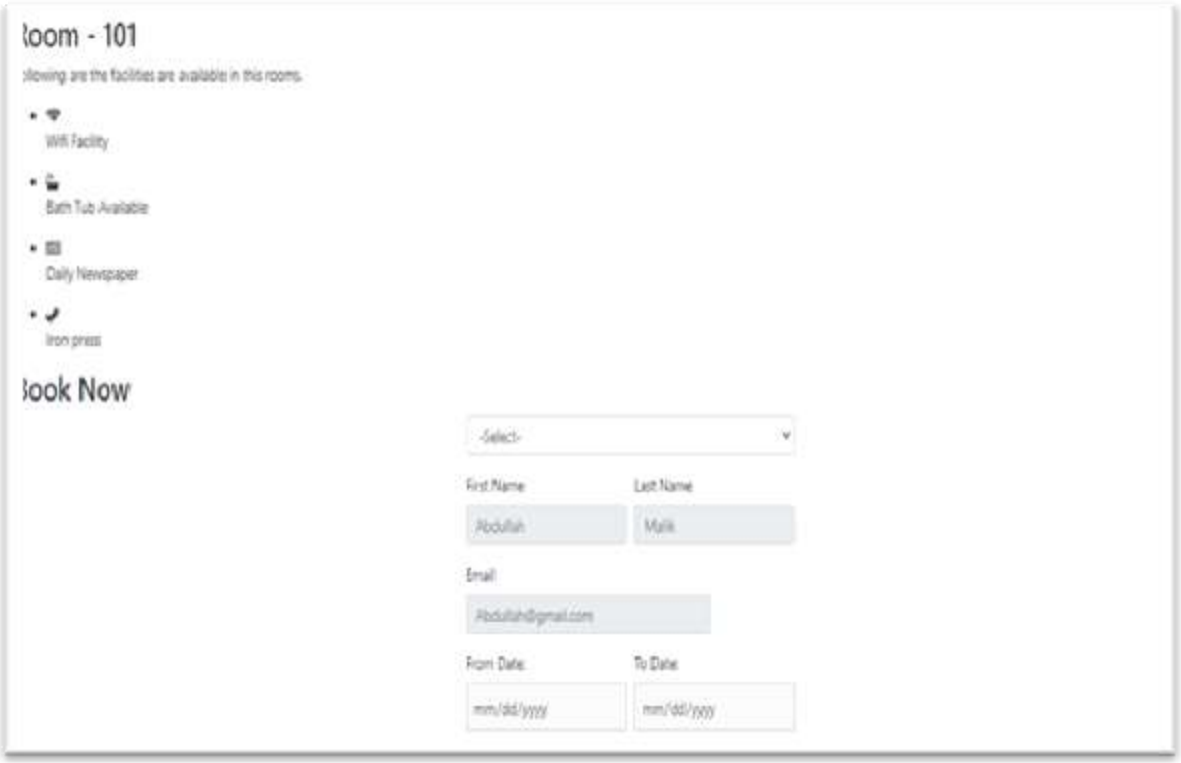
In Testing first we check booking is working or not. For this we enter URL of our website.



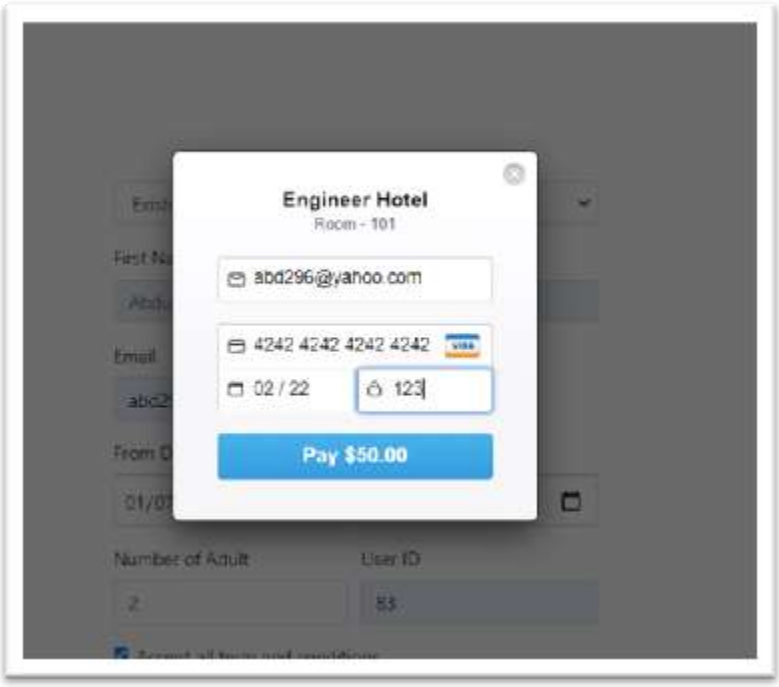
After that we enter Dates and Click Search Room.



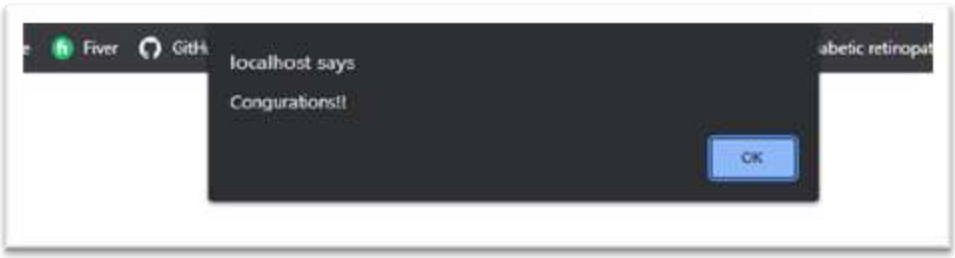
If we like this Room and want to book, we can fill the form and make payment.



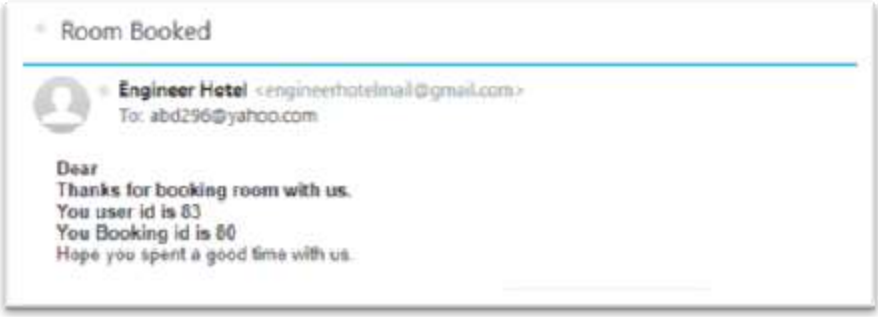
Enter Payment details and click on the Pay button.



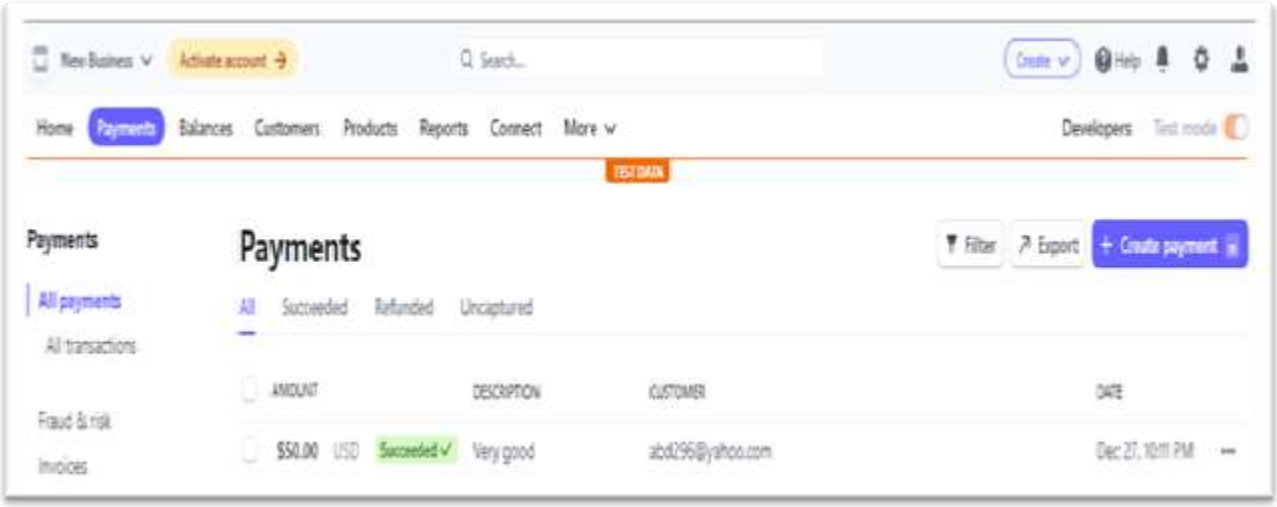
After that we got a congratulations message for booking complete.



Along with Conformation message, we get a confirmatory email.

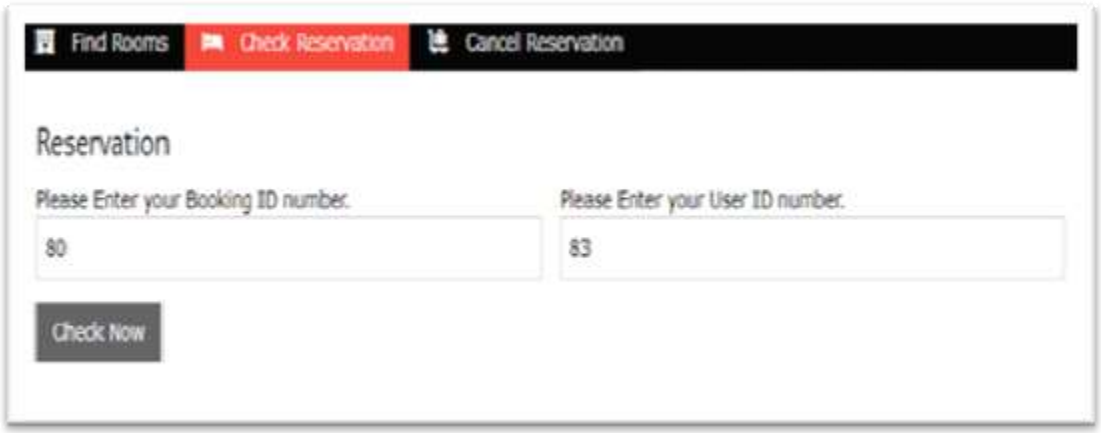


Also we can check payment on Stripe dashboard.



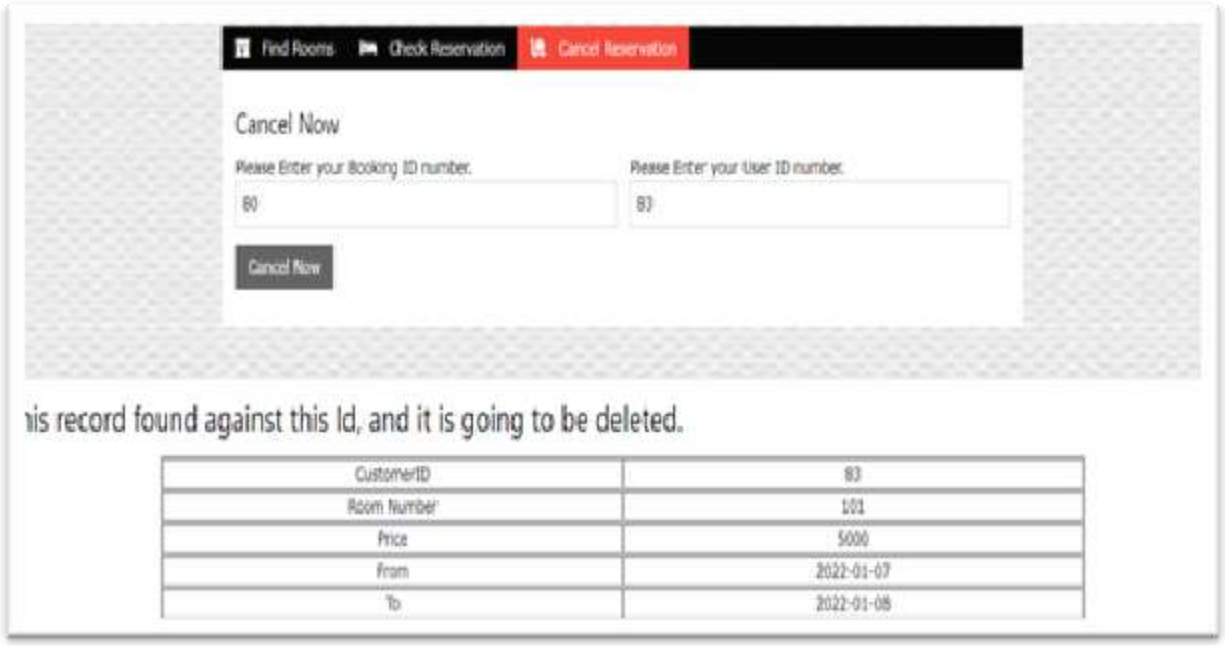
To Verify our Booking, we can do it using check reservation

We enter booking Id and User Id.

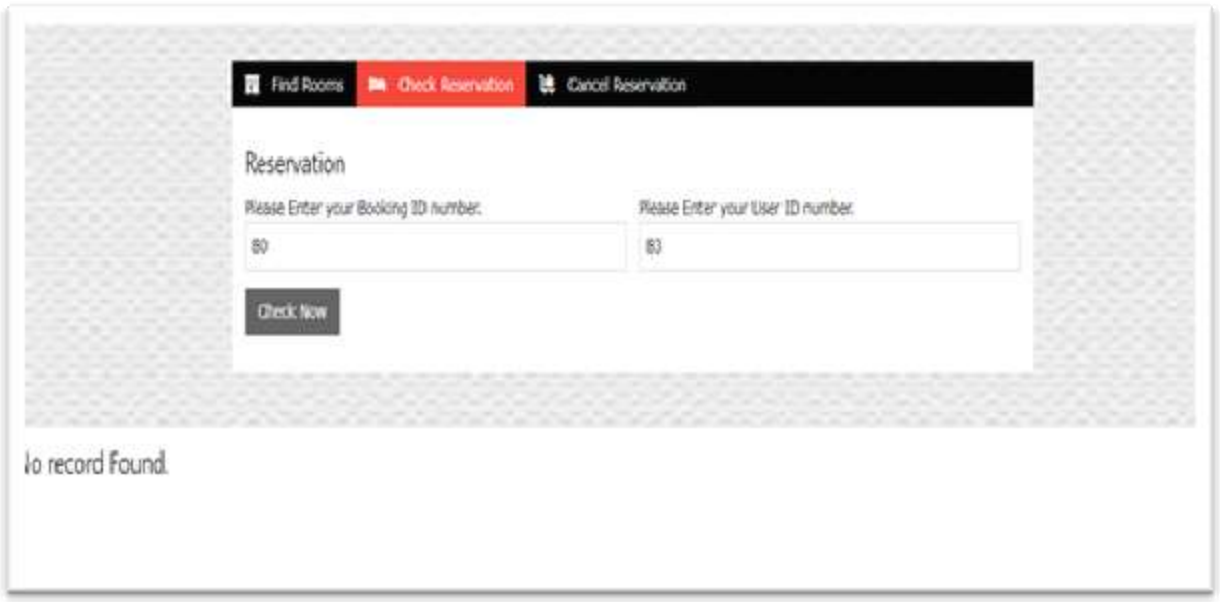


And get the details

And after We have delete booking



And if we Check our Booking again, we go on Check Reservation tab and enter details and it output no booking, because the booking is being deleted.



DATABASE OF SYSTEM

Basically Our System Database contains Four Tables.

- Authenticate User
- Booking
- Room
- User

Creating Table Booking

```
CREATE TABLE Booking (
  `Booking_ID` int UNSIGNED NOT NULL AUTO_INCREMENT COMMENT 'Booking ID is unique for each booking and auto increments. when a booking will be
made this id will be send to client to track his/her booking.',
  `From_Date` date NOT NULL COMMENT 'From_Date is the starting date of booking.',
  `To_Date` date NOT NULL COMMENT 'To_Date is the ending date of a booking.',
  `Booking_Date` date NOT NULL COMMENT 'Booking_Date is represents the date at which this booking were placed.',
  `Price_of_Booking` float(3) UNSIGNED NOT NULL COMMENT 'Price stores the price at which this booking was done.',
  `Room_Number` int UNSIGNED NOT NULL COMMENT 'Forgen Key from Room Table.',
  `User_ID` int UNSIGNED NOT NULL COMMENT 'Forgen Key from User Table',
  PRIMARY KEY (`Booking_ID`)
);
```

Creating Table Room

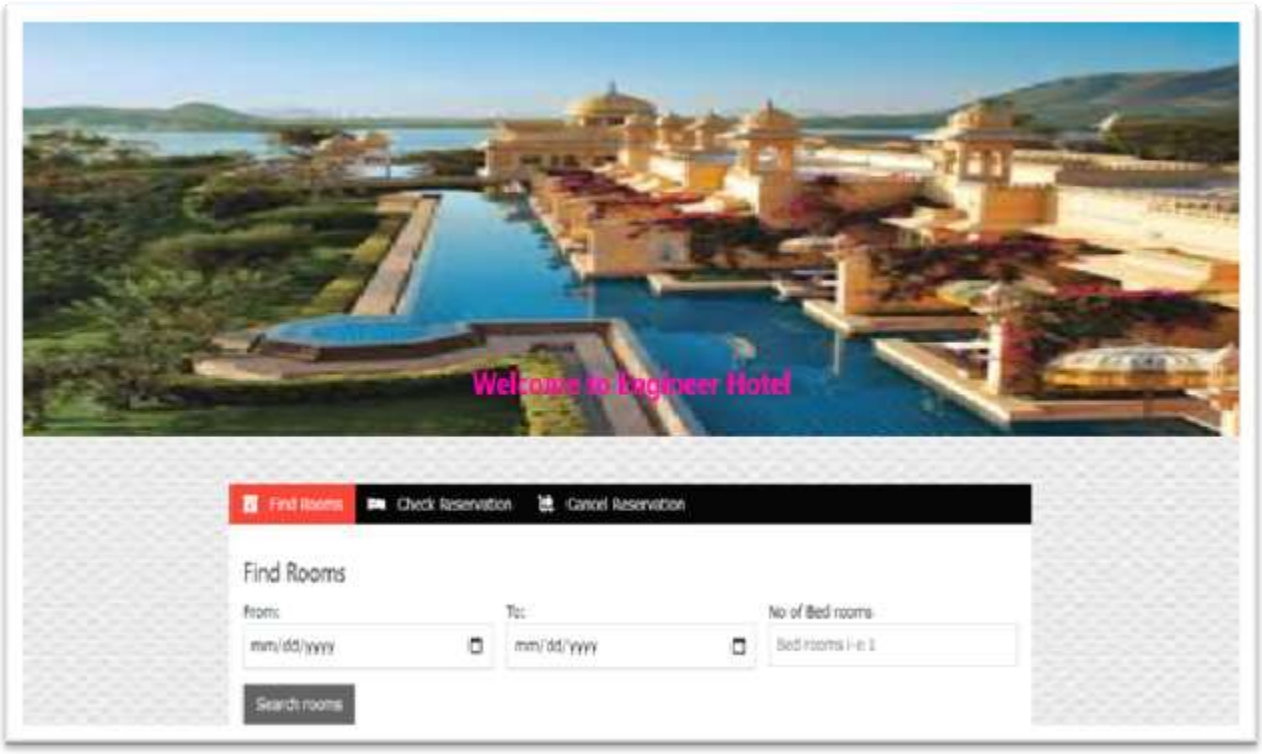
```
  `Room Number` int UNSIGNED NOT NULL COMMENT 'A 3 digit Room number 1st digit shows the floor on which room is located, and other 2 digit show
number of the room on that floor.',
  `Area` float UNSIGNED NOT NULL COMMENT 'Area of the Room in feet squar',
  `Price` decimal(10, 2) NOT NULL COMMENT 'Booking price of the room in PKR.',
  `Discription` mediumblob NOT NULL COMMENT 'Discription contains all the serivices and full details of the room.',
  `Internet` char(1) CHARACTER SET ascii NOT NULL DEFAULT 'T' COMMENT 'Internet is one of the serivices of the room.\r\n\r\nIt is one char long
and can have only two different values T means True and F means False, here True means serivice is available and Flase means service is not
available.\r\n\r\nBy Default its value is T.',
  `BathTub` char(1) NOT NULL DEFAULT 'T' COMMENT 'BathTub is one of the serivices of the room.\r\n\r\nIt is one char long and can have only two
different values T means True and F means False, here True means serivice is available and Flase means service is not available.\r\n\r\nBy
Default its value is T.',
  `NewsPaper` char(1) NOT NULL DEFAULT 'T' COMMENT 'News Paper is one of the serivices of the room.\r\n\r\nIt is one char long and can have only
two different values T means True and F means False, here True means serivice is available and Flase means service is not available.\r\n\r\nBy
Default its value is T.',
  `Shower` char(1) NOT NULL DEFAULT 'T' COMMENT 'Shower is one of the serivices of the room.\r\n\r\nIt is one char long and can have only two
different values T means True and F means False, here True means serivice is available and Flase means service is not available.\r\n\r\nBy
Default its value is T.',
  `Iron` char(1) NOT NULL DEFAULT 'T' COMMENT 'Iron is one of the serivices of the room.\r\n\r\nIt is one char long and can have only two
different values T means True and F means False, here True means serivice is available and Flase means service is not available.\r\n\r\nBy
Default its value is T.',
  `Ironing_Table` char(1) NOT NULL DEFAULT 'T' COMMENT 'Table for ironing is one of the serivices of the room.\r\n\r\nIt is one char long and ca
have only two different values T means True and F means False, here True means serivice is available and Flase means service is not
available.\r\n\r\nBy Default its value is T.',
  PRIMARY KEY (`Room_Number`)
);
```

Creating Table User

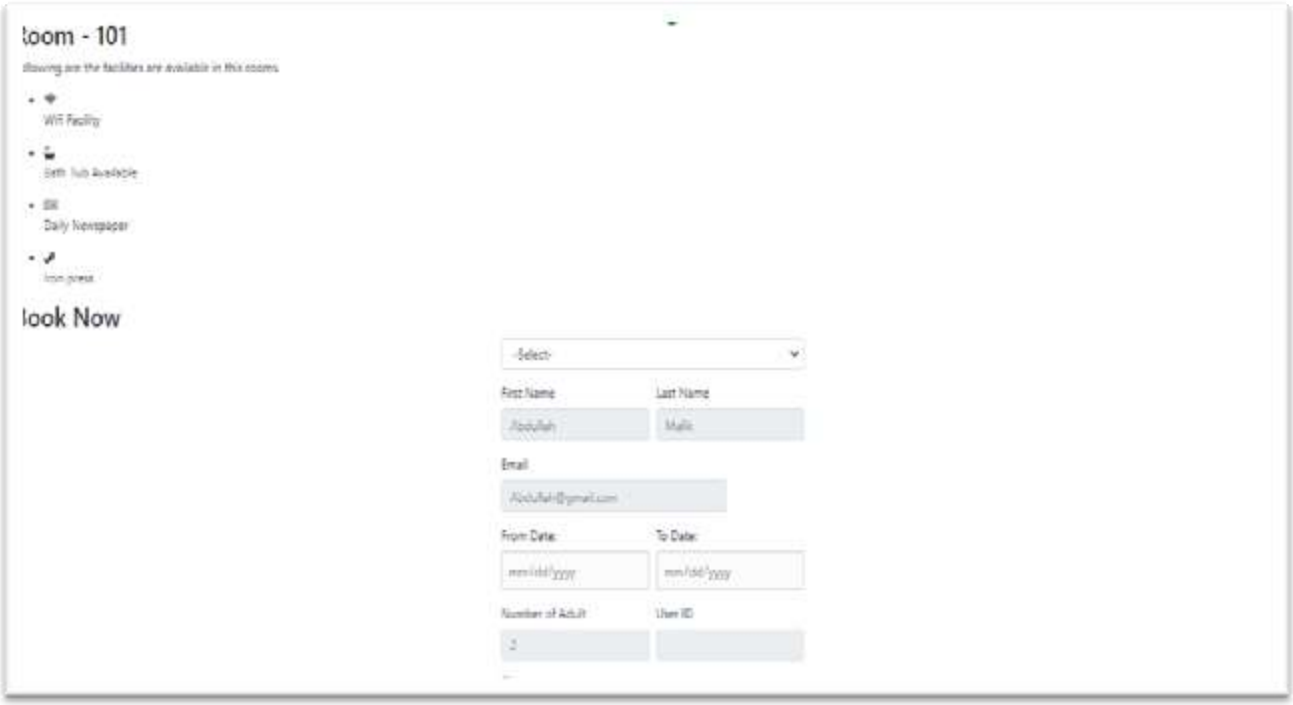
```
CREATE TABLE `User` (
  `User_ID` int UNSIGNED NOT NULL AUTO_INCREMENT COMMENT 'User_ID uniquly identfies a user and auto incremented.',
  `First_Name` varchar(50) NOT NULL COMMENT 'First Name of the user.',
  `Last_Name` varchar(50) NOT NULL COMMENT 'Last Name of the user.',
  `E_mail_ID` varchar(50) NOT NULL COMMENT 'E-mail ID of the user, at this id user will be updated about the booking status.',
  PRIMARY KEY (`User_ID`)
);


ALTER TABLE `Booking` ADD CONSTRAINT `fk_Booking_User_1` FOREIGN KEY (`User_ID`) REFERENCES `User` (`User_ID`);
ALTER TABLE `Booking` ADD CONSTRAINT `fk_Booking_Room_1` FOREIGN KEY (`Room_Number`) REFERENCES `Room` (`Room_Number`);
```

USER INTERFACE

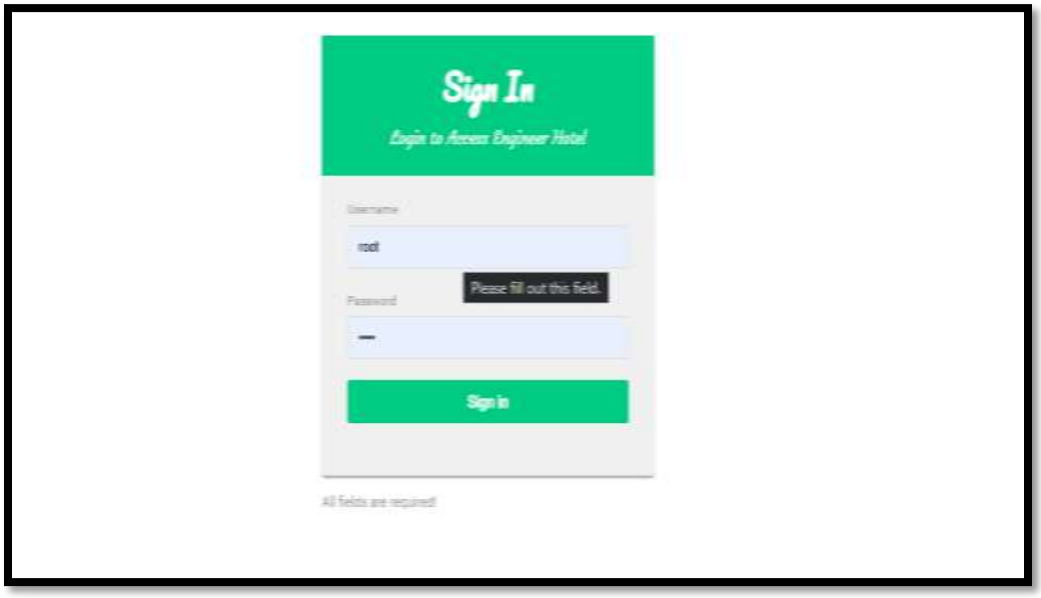
Landing Page:



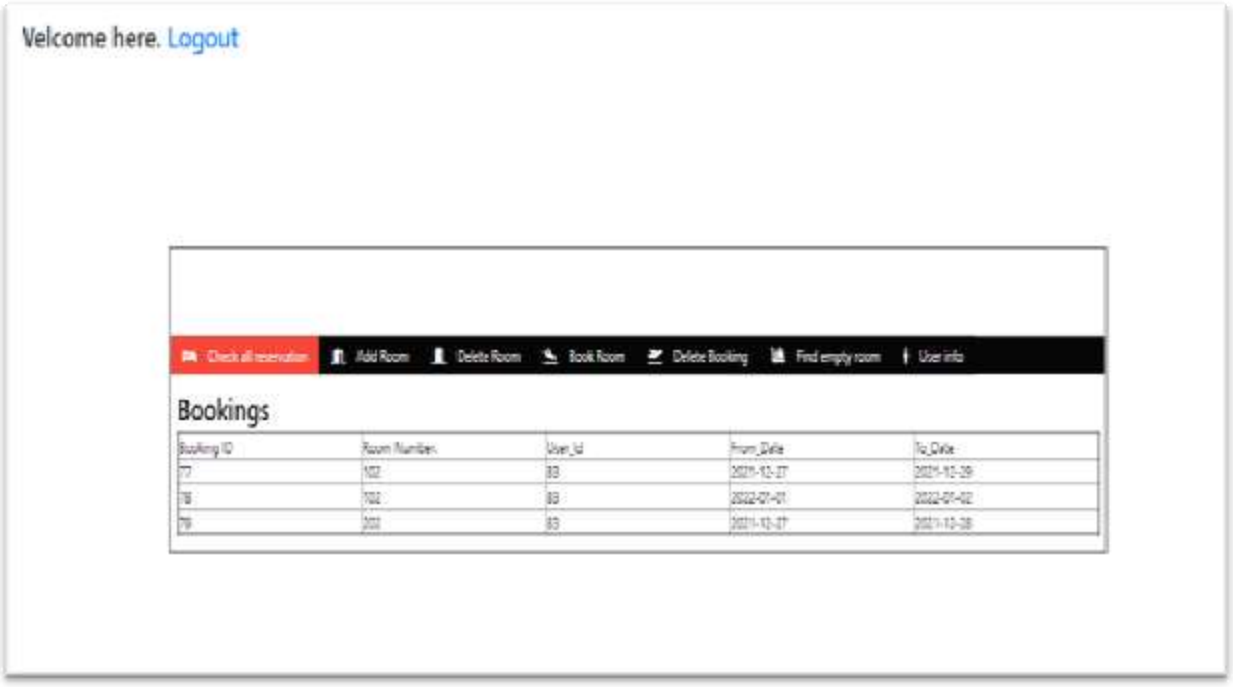
Booking Page:



Admin Sign in Page:



Dashboard:



CONCLUSION:

The main goal of this project was to develop a system where hotel management and customer can interact with each other in a friendly and easy way. We were successfully able to build a user-friendly interface and linked it with database. Customer in our system has all the freedom over things regarding his concerns whereas Admin has full control over the management system. This system will help Customers can easily find rooms at home by not stressing them out with difficulty of finding room at spot.