CO303 DATABASE MANAGEMENT SYSTEMS LAB

A REPORT ON THE PROJECT ENTITLED
"HOSTEL MANAGEMENT SYSTEM"

SUBMITTED BY
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1. ABSTRACT

The Hostel Management System is a web application that automates the process of fee payment, room allocation and mess allocation for students and appointing Hostel managers for the administration. This project aims to design a database that maintains records of students, hostel blocks and rooms and hostel managers while providing an interface for users to interact with the database.

The Hostel Management System has made it easy for the administration to allot, vacate hostel rooms, validate fee transactions and receive complaints and suggestions from the students. This website has transformed the tedious process of room allotment into a two-step process.

This report describes the features and working of the Hostel management system in detail. The introduction enlists the fundamentals and role of DBMS in this project. We continue to describe the database design with the help of an entity-relationship diagram, relation schema and a normalized form of the tables. We also present the various modules created in this website with screenshots of the various webpages. Towards the end, we explain the tools utilized in the project and provide our results in brief.

2. INTRODUCTION

Database is an organized collection of data. The data is typically organized to model aspects of reality in a way that supports processes requiring information. A DBMS makes it possible for end-users to create, read, update and delete data in a database. The DBMS essentially serves as an interface between the database and end-users or application programs, ensuring that data is consistently organized and remains easily accessible. The DBMS manages three important things: the data, the database engine that allows data to be accessed, locked and modified and the database schema, which defines the database's logical structure. These three foundational elements help provide concurrency, security, data integrity, and uniform administration procedures. The DBMS can offer both logical and physical data independence. That means it can protect users and applications from needing to know where data is stored or having to be concerned about changes to the physical structure of data.

2.1 Purpose

- The main purpose of maintaining a database for the Hostel Management System is to reduce the manual errors involved in allocating and vacating rooms and make it convenient for the students and managers to maintain the data regarding personal information and available facilities.
- Due to automation many loopholes that exist in the manual registration and allotment of rooms can be removed.
- The speed of obtaining and processing the data will be fast.

2.2 Objective

- The hostel management system has been created to avoid the tedious process of physically paying, registering for and room and hostel allotment to college students.To deal with Hostel Management System in an easy and an efficient manner.
- The goal of this project is to manage the data of students and hostel facilities to provide a well-organized system for fees payment and hostel and room allotment.
- Create strong and secrete database that allows for any connection in a secret way, to prevent any outside or inside attacks.

2.3 Scope of the Project

- Hostel Management System is designed for Hostel (like schools, Universities).
- There will be predefined criteria for the Reservation to the hostels.
- He/She checks the attested application forms of the students obtained from the internet and verify it with the student database.
- If the students are found eligible then they can pay the Hostel and Mess fee and proceed for the allotment of the Hostel Room and Mess.

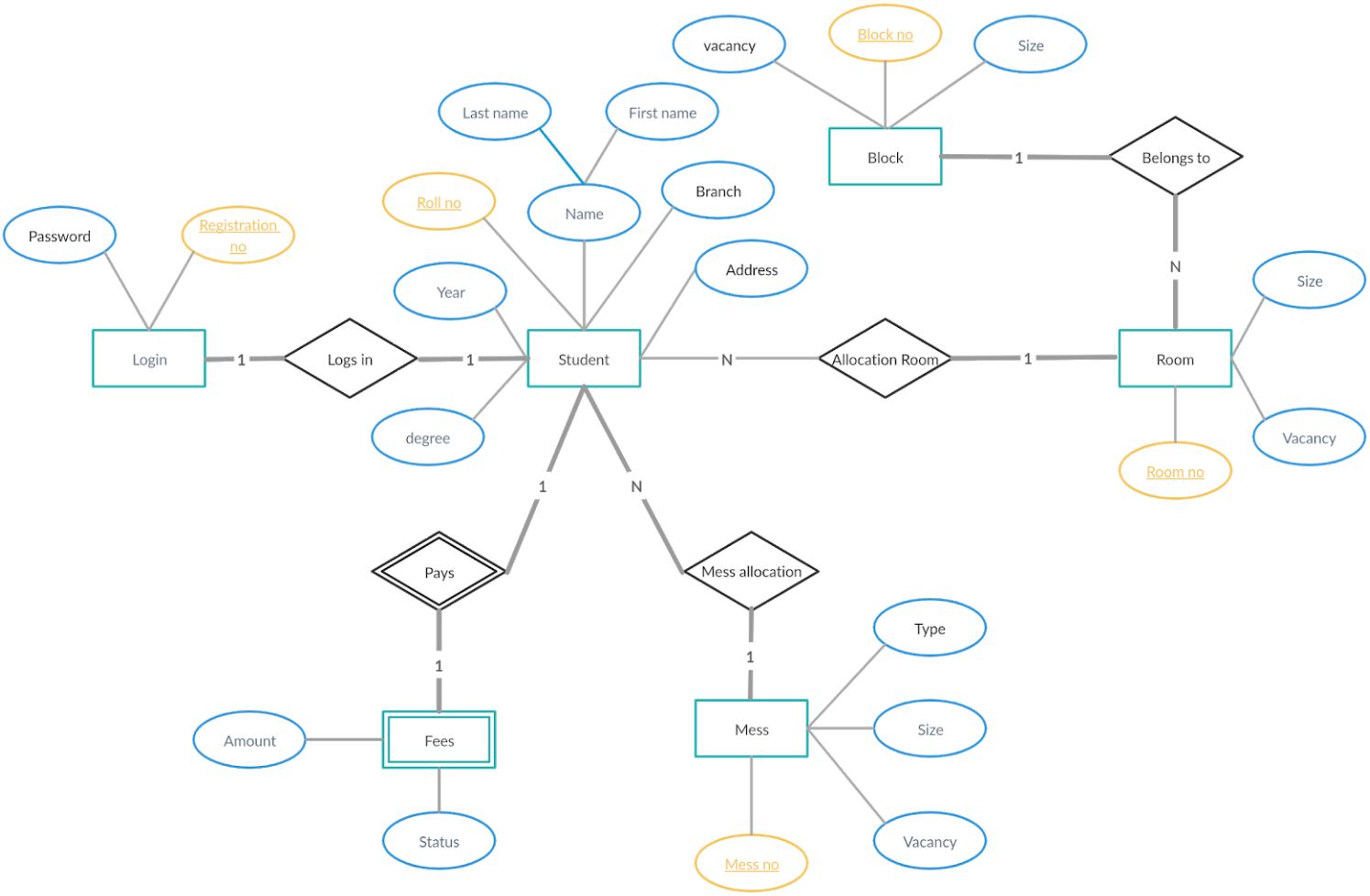
2.4 Overview of Project

- Hostel Room Allocation System is a web application which aims at computerization of the current procedure of allocating hostel rooms and allocating Mess.
- This project is about creating a database for the hostel management system which facilitates the students to pay their fees online and apply for their desired rooms and messes, etc.

- The aim of the case study is to design and develop a database maintaining the records of different rooms, messes, students, and managers. The record of the room includes its number, block number, size, destination, and vacancy, whereas the record of mess includes mess card number, mess type, size, and vacancy.
- Students may only apply for rooms or messes after fee payment is complete. The student may apply for any room or mess which will be allotted based on its vacancy status and the decision of the respective hostel manager. For this, the student must provide authentication and details of the desired room. Before allowing for the creation of a room or mess application, the status of the fee payment is checked.
- Once the fee payment is validated by the system, it is checked whether the room or mess is available. If yes, the application is sent to the respective hostel manager.
- The room once allotted can be vacated or removed by the hostel manager. The hostel managers may be managed by the main administrator of the website.
- The details of the hostel manager are entered while appointing a new hostel manager for a particular hostel.
- Currently, the process involves students filling up the forms and submitting them in respective hostel offices which involves a lot of paperwork, hence less efficient.

3. DATABASE DESIGN

3.A ER DIAGRAM



We have used Creately tool in which total participation is represented using double lines.

3. B RELATIONAL SCHEMA

In this section we give a description of Mapping of ER diagram with Relation schema along with schema diagram of Hostel Management System.

A relational database schema is the tables, columns and relationships that make up a relational database. There are two steps to creating a relational database schema: creating the logical schema and creating the physical schema. The logical schema depicts the structure of the database, showing the tables, columns and relationships with other tables in the database and can be created with modeling tools or spreadsheet and drawing software. The physical schema is created by actually generating the tables, columns and relationships in the relational database management software (RDBMS). Most modeling tools can automate the creation of the physical schema from the logical schema, but it can also be done by manually.

The applicationHostel Management System consists of the entities described below. Some entities are related to other entities with the help of primary key - foreign key pair. The foreign key is used in establishing relations with the other table. Hence it is called a relational database system.

1. Hostel Manager/Admin info

Attributes: Hostel_Manager_id, Username, Fname, Lname, Mob No., Hostel_id, Mess_id, Pwd, Isadmin

Primary key: Hostel_Manager_id

Foreign Key: Hostel_id, Mess_id

2. Student info

Attributes: Student_id, Fname, Lname, Mob No., Dept, Year, Degree, Address, Pwd, Hostel_id, Room_id, Mess_id, Mess_card_id

Primary key: Student_id

Foreign Key: Hostel_id, Room_id, Mess_id, Mess_card_id

Hostel Management

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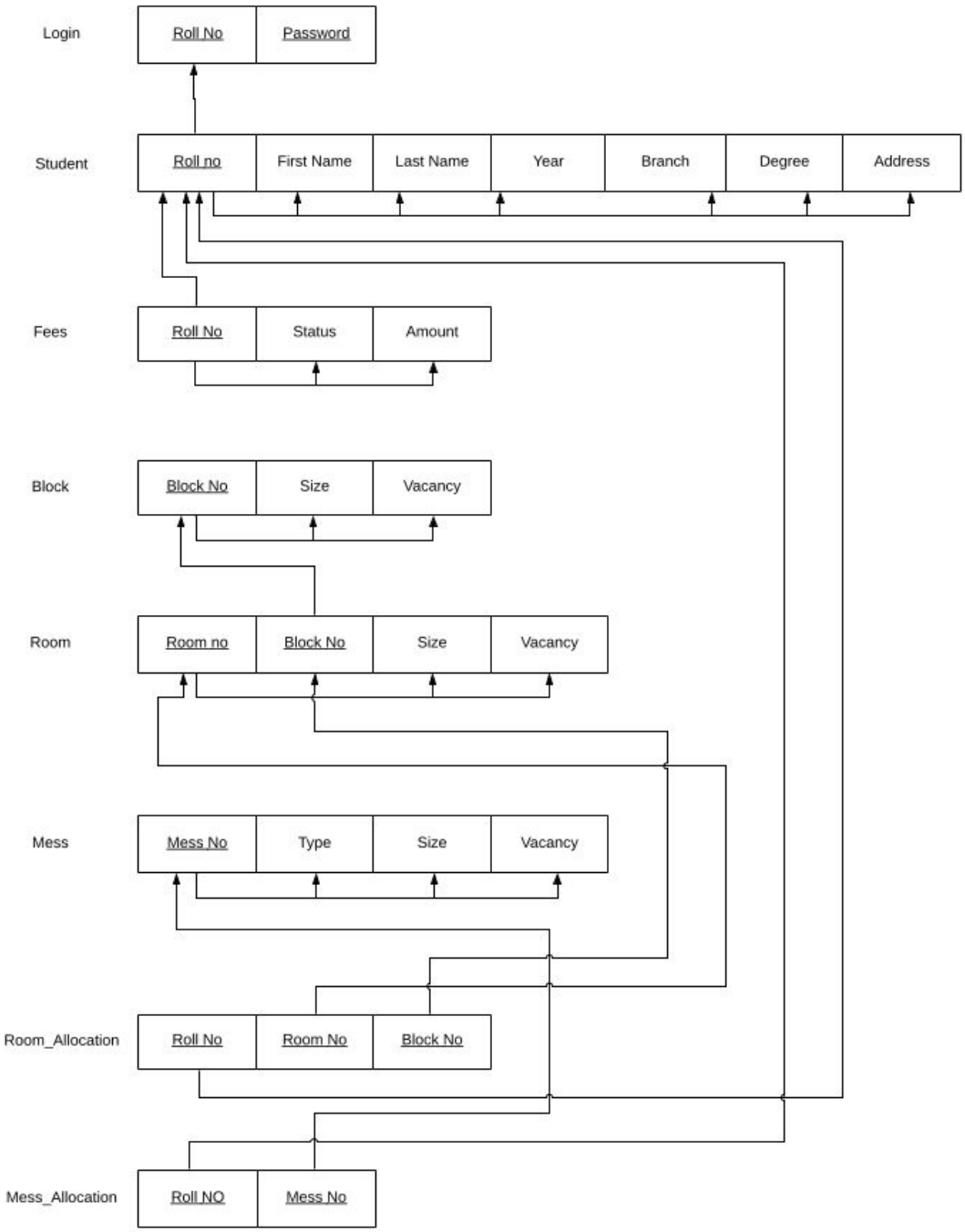


3. Fees info

Attributes: Student_id, Status, Amount

Primary key:

Foreign Key: Sid

4. Block info

Attributes: Hostel_id, Size, Vacancy

Primary key: Hostel_id

Foreign Key:

5. Mess info

Attributes: Mess_id, Type, Size, Vacancy

Primary key: Mess_id

Foreign Key:

6. Room Application info

Attributes: Applictaion_id, Student_id, Hostel_id, Applictaion_Status, Room No

Primary key: Applictaion_id

Foreign Key: Student_id, Hostel_id

7. Mess Application info

Attributes: Applictaion_id, Student_id, Mess_id, Applictaion_Status, Mess card No

Primary key: Applictaion_id

Foreign Key: Student_id, Mess_id

8. Room Allocation info

Attributes: Room_id, Hostel_id, Room No, AllocationStatus

Primary key: Room_id

Foreign Key: Hostel_id

9. Mess Allocation info

Attributes: Mess_card_id, Mess_id, Mess_card_no, AllocationStatus

Primary key: Mess_card_id

Foreign Key: Mess_id

3.C NORMALIZED TABLES

Database Normalization is a technique of organizing the data in the database. Normalization is a systematic approach of decomposing tables to eliminate data redundancy(repetition) and undesirable characteristics like Insertion, Update and Deletion Anomalies. It is a multi-step process that puts data into tabular form, removing duplicated data from the relation tables.

Normalization is used mainly for two purposes,

- Eliminating redundant(useless) data.
- Ensuring data dependencies make sense i.e data is logically stored.

3NF tables

Login table [Attributes: StudentID (Key), Pwd]

StudentId	pwd

Hostel Manager Info table [Attributes: HM_id(Key), Fname, Lname, Mob No., Pwd, Hostel_id(Key), Mess_id(Key),IsAdmin]

HM Id	Username	Fname	Lname	Mob No	Pwd	Hostel id	Mess id	IsAdmin

Student Info table [Attributes: Student_id(Key), Fname, Lname, Mob No., Dept, Year, Degree, Address, Pwd, Hostel_id(Key), Room_id(Key), Mess_id(Key), Mess_card_id(Key)]

S Id	Fname	Lname	Mob No	Dept	Year	Degree	Address	Pwd	H id	R id	M id	M.C .id

Fees Info table [Attributes: StudentID (Key), Amount , Status]

Student Id	Amount	Status

Block info table [Attributes: Hostel_id (Key), Size, Vacancy]

Hostel Id	Type	Size	Vacancy

Mess Info table [Attributes: Mess_id(key), Type, Size, Vacancy]

Mess Id	Type	Size	Vacancy

Room Application table [Attributes: Applictaion_id(key), Student_id(Key), Hostel_id(key), Applictaion_Status, Room No]

Applictaion_id	Student_id	Hostel_id	Applictaion_Status	Room No

Mess Application table [Attributes:Applictaion_id(Key), Student_id(Key), Mess_id(Key), Applictaion_Status, Mess card No]

Applictaion_id	Student_id	Mess_id	Applictaion_Status	Mess card No

Room Allocation table [Attributes: Room_id(Key), Hostel_id(Key), Room No, AllocationStatus]

Room Id	Hostel Id	Room NO	AllocationStatus

Mess Allocation table [Attributes: Mess_id(Key), Mess_card_id(Key), Mess card No, AllocationStatus]

Mess Card Id	Mess Id	Mess Card NO	AllocationStatus

3.D Key Constraints

Entity	Primary key	Foreign key
Hostel Manager info	Hostel_Manager_id	Hostel_id, Mess_id
Student info	Student_id	Hostel_id, Room_id, Mess_id, Mess_card_id
Fess Info		Sid
Block Info	Hostel_id	
Mess Info	Mess_id	
Room Application info	Applictaion_id	Student_id, Hostel_id
Mess Application info	Applictaion_id	Student_id, Mess_id
Room Allocation info	Room_id	Hostel_id
Mess Allocation info	Mess_card_id	Mess_id

4. MODULES

4.1 Generation of Hostel Manager profile :

The hostel management system admin is responsible for creating verified accounts for the hostel managers. The details of the hostel manager such as first name, last name, username, hostel number, password are entered by the admin while creating the account. The password entered by the user is converted to a hash and stored in the database so that even if the database is compromised, external entity cannot access the user's details as a hash cannot be traced back to the password the user entered.

4.2 Login as Student / Hostel manager :

After the admin creates profiles for the hostel manager and students sign up, they can login to access their personal portals using their individual credentials and they will be redirected to their respective pages. Passwords are stored in a secure manner using hashing. The users are authenticated and passwords are verified in the database.

4.3 Home page :

This page is accessible without logging in. It contains links to the college website and a description of the available facilities. It also displays the features of the system and provides links to navigate to the other web pages based on the user type as shown in the results section.

4.4 Payment form :

This module inputs the student authentication details and the amount being payed by the student. This module verifies the password and accepts payment if the password is verified correctly. It changes the payment status of the respective student in the database.

4.5 Blocks page and application form :

This module displays an array of options of different hostel blocks to choose to apply for. It directs the user to a hostel application form which verifies the student credentials and accepts the application along with an optional message. The application is accepted only if the payment has been completed by the student.

4.6 Mess page and application form :

Similar to the mess application, this module displays an array of options of different hostel messes to choose to apply for. It directs the user to a mess application form which verifies the student credentials and accepts the application along with an optional message. The application is accepted only if the payment has been completed by the student.

4.7 Profile Information :

This page is available to both hostel managers and student. It displays personal details such as manager block, name, phone number, payment status, alloted rooms and messes, etc.

4.8 Appoint/remove hostel manager :

These pages are available to the administrator. It allows the admin to create a hostel manager and appoint them to a certain block or to remove a hostel manager by providing the details and remove the manager from the database.

4.9 Allot mess/hostel :

This page is available to the hostel manager. It displays a list of the applications received from the students. The hostel manager is allowed to allocate rooms/messes to students if available in the respective block or mess.

4.10 Logout : This page is available to both hostel managers and student. It allows the user to logout of their profile.

5. TOOLS

FRONT END TOOLS

We have used three main front-end coding languages we have used are HTML, CSS and JavaScript in our project.

HTML

- HTML is the first layer of any website and creates the code version of a wireframe on a webpage. These wireframes exist for the styles in CSS and all the bells and whistles in JavaScript.
- The letters in HTML stand for Hypertext Markup Language. The markup piece of the name is the most important to remember, as markups are the proper name for HTML elements, which are also called HTML tags.
- HTML as a whole is the markup that creates the basic elements we view on a website.

CSS

- Cascading Style Sheets, or CSS, is what gives our HTML visual appeal and draws in the user. To put it simply, style sheets dictate the presentation of HTML elements on a page.
- CSS is what makes everything not look like a white background with a bunch of Times New Roman texts and blue hyperlinks.

JAVASCRIPT

- JavaScript is a runtime language for web browsers. This means that when you open a web page, the page will load both the foundational JavaScript that is standard with the page and any new JavaScript added to a page.

- The new JavaScript will load in parallel with it and can perform actions and make decisions.It’s the true programming language of front-end engineering and the underlying language that ties everything together.

BOOTSTRAP

- Bootstrap is a free front-end framework for faster and easier web development.
- Bootstrap includes HTML and CSS based design templates for typography, forms, buttons, tables, navigation, modals, image carousels and many other, as well as optional JavaScript plugins.
- Bootstrap also gives you the ability to easily create responsive designs

BACKEND TOOLS

PHP

- PHP is a server-side scripting language designed specifically for web development and can be embedded into HTML. Since PHP code executed on the server side so it is called server-side scripting language.
- What distinguishes PHP from something like client-side JavaScript is that the code is executed on the server, generating HTML which is then sent to the client.
- The client would receive the results of running that script, but would not know what the underlying code was. You can even configure your web server to process all your HTML files with PHP, and then there's really no way that users can tell what you have up your sleeve.

MySQL

- MySQL is a relational database management system (RDBMS). Data in the database is organised into tables, each table being organised as rows and columns. Each row in a table is called a record and each column in a table is called a field.MySQL allows us to insert, retrieve, modify or delete

records.MySQL is a DBMS that relates information stored in one table to information stored in another table by looking for elements common to each of them. It has efficient storage and retrieval mechanisms for data and uses normalisation process during design of RDBMS.

- Features of MySQL :
- Speed : MySQL runs very fast and supports clustered servers for demanding applications.
- Ease of use : MySQL is a high-performance, relatively simple database system. It can be configured, monitored and managed from command line.
- Capability : MySQL is a multi-threaded SQL server that supports different backends, client programs, libraries, administrative tools and programming interfaces.
- Connectivity : MySQL is fully networked and can be accessed from anywhere on the internet.
- Portability : MySQL runs on many UNIX and non-UNIX systems (eg. Windows). It runs on hardware from PC to high-end server.

6. CONCLUSION

This online Attendance Management System has 3 modules for proper functioning:

1. Admin : Has the rights to create or remove a new entry for Hostel Manager. He can see the details of all the students registered such as their payment status, Room and Mess allocation status, Mobile Number etc.
2. Student : Can sign-up,Pay their fees, Apply for Hostel and Mess, check their payment, Room Allocation and Mess allocation status through his/her portal. Can also see his/her Hostel Manager's Name and Mobile number.

3. Hostel Manager : Can allocate the Room and Mess to the students applied for their hostel or mess through his/her portal. They can also see the details of students registered for their Hostel or Mess.

Hostels are establishments that provide students food and accommodation away from home for the duration of their study, allowing them to work and attend college far from homes. Hence, automatic hostel and mess allotment becomes an important process in order to take away the pain and labor of manually allocating the rooms and handling of the associated tasks that are encountered such as payment of fees, allotment of mess, etc. The concepts of DBMS allow us to achieve this with an addition of a web application. Shown below are the results of the created system on the web application.

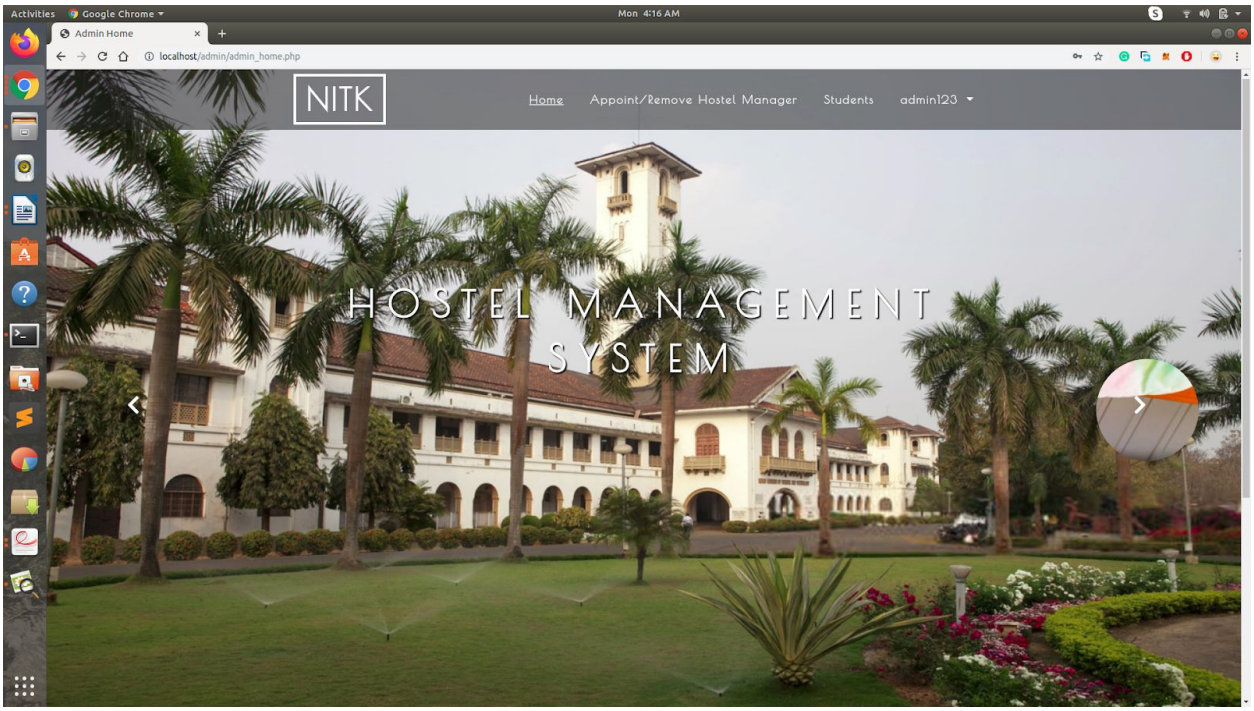
The system is designed in such a way that only authorised people are allowed to access modules. Records of database are modified by the admin only. The User is always in control of the application and not vice versa.

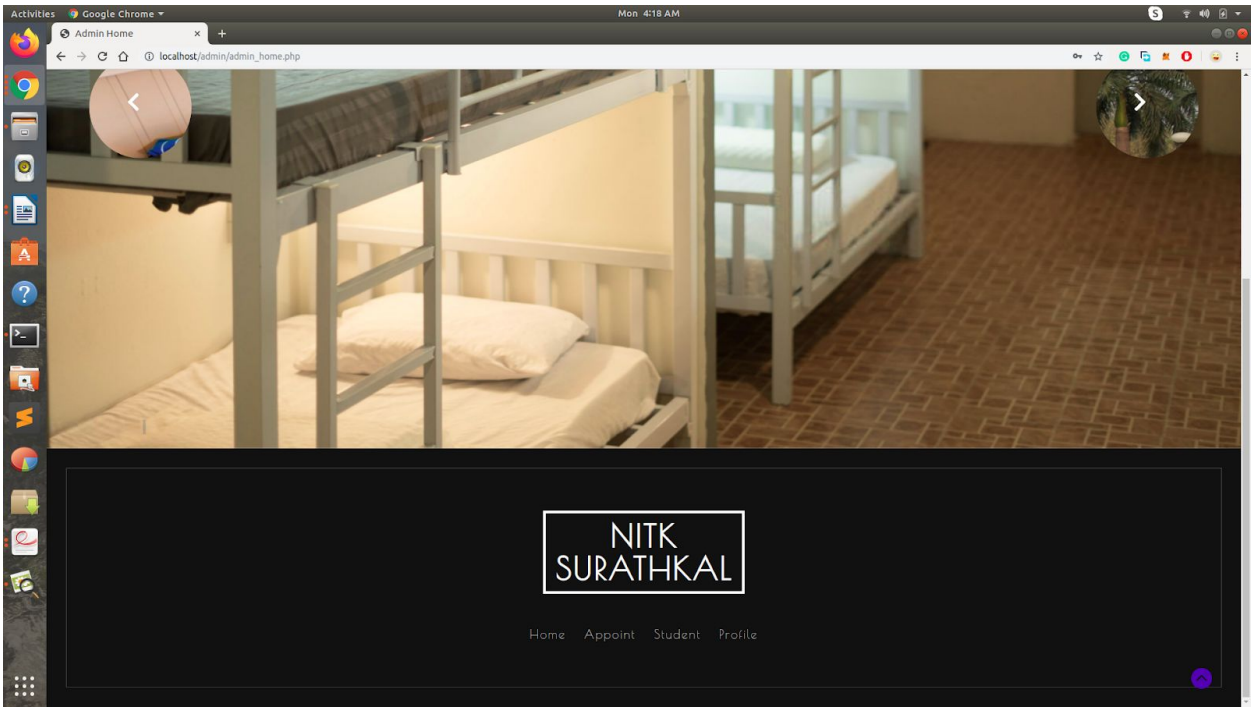
The user interface is consistent so that user can handle the application with ease and speed.

The application is visually and conceptually clear.

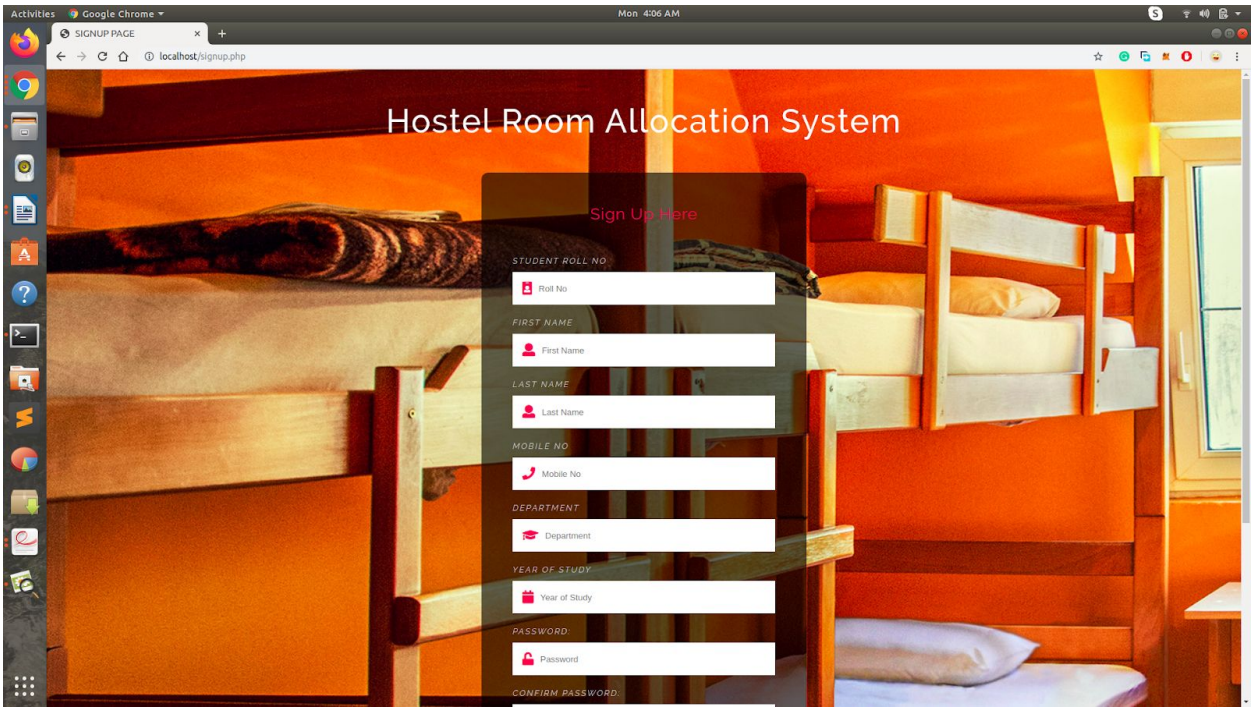
6. RESULTS

Home Page:

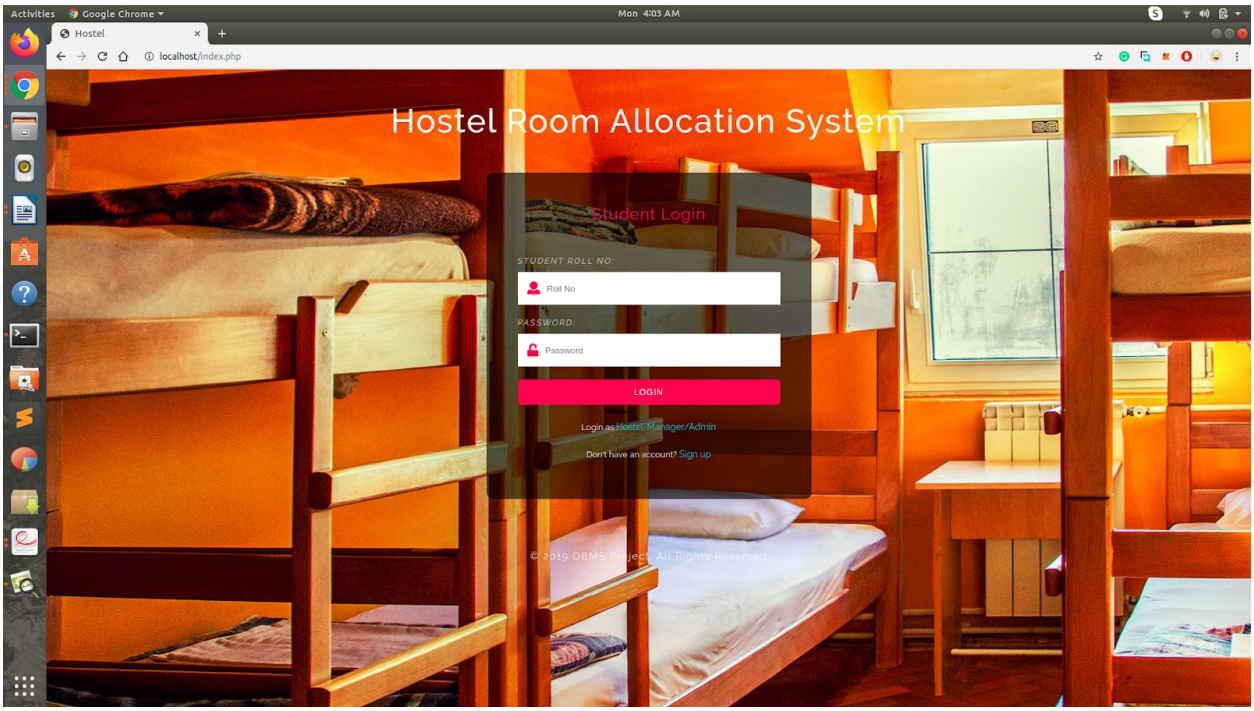




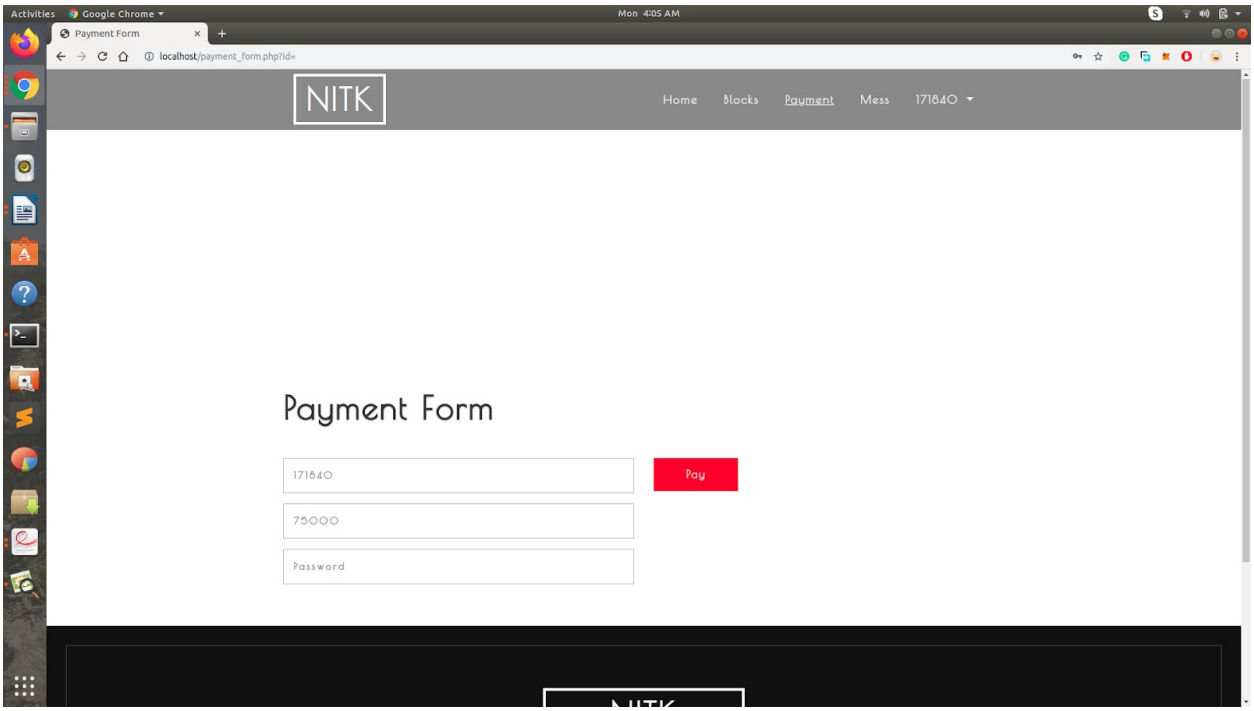
Student Signup:



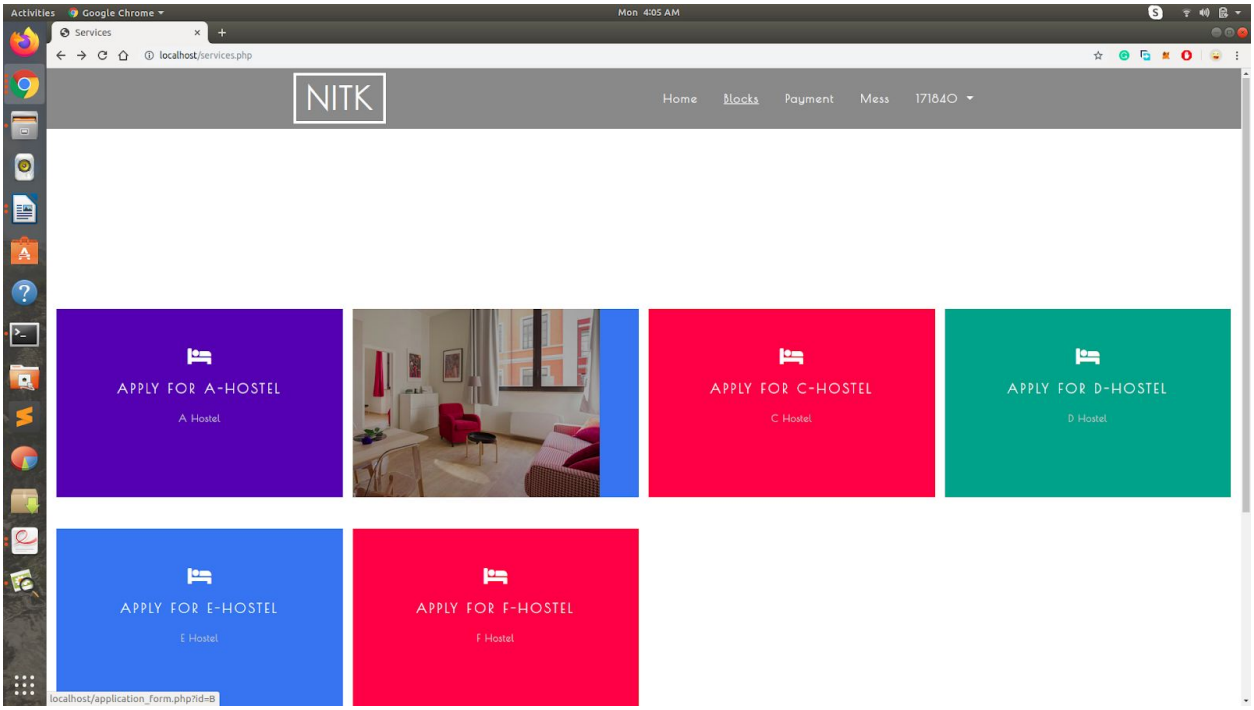
Student Login:



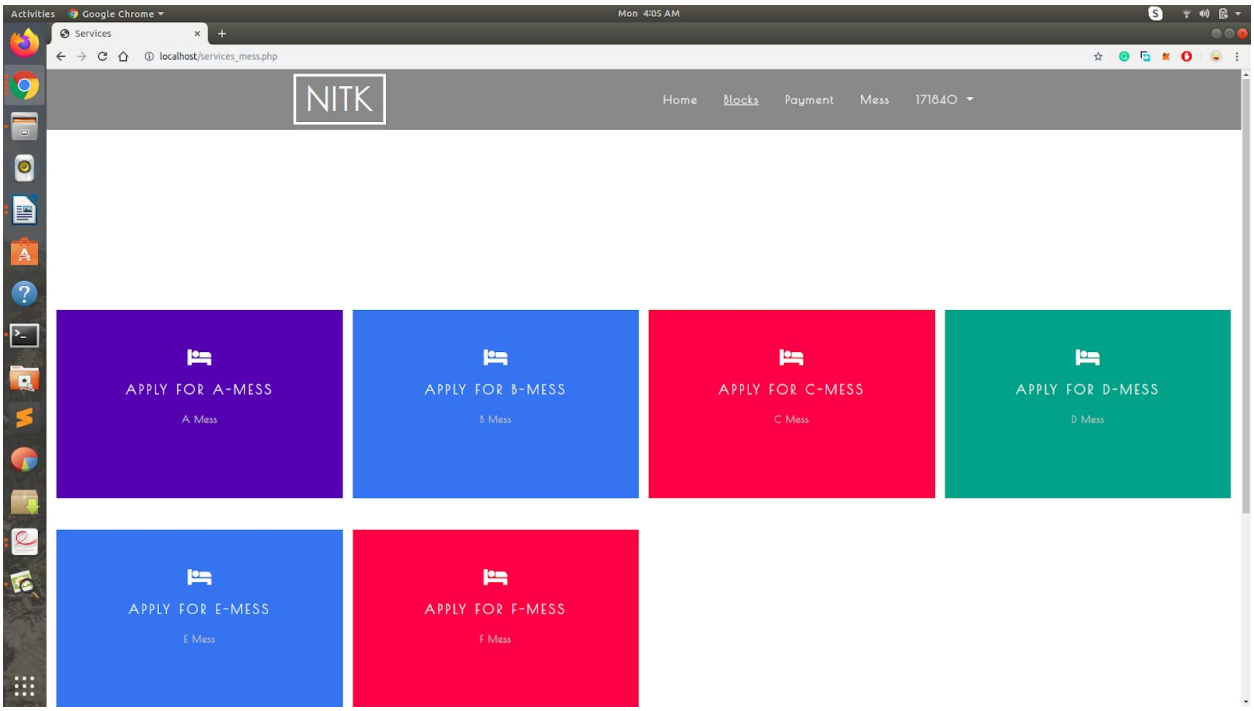
Student Payment:



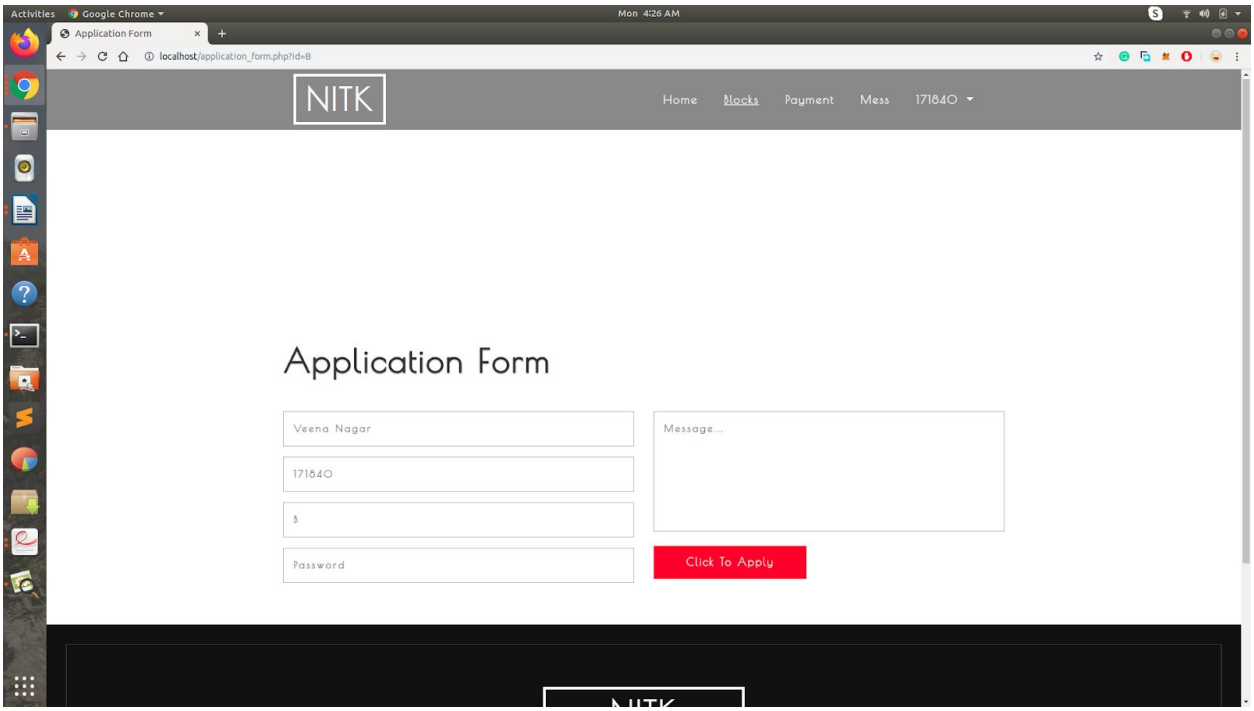
Application For Room:



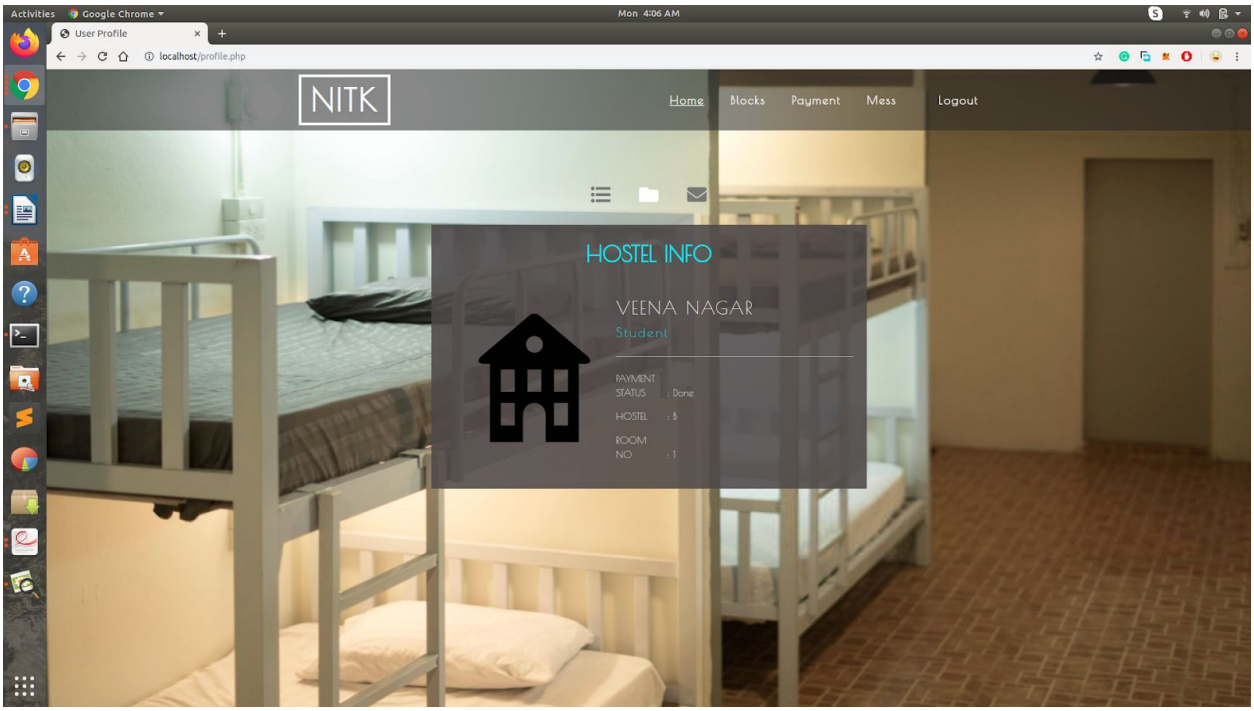
Application For Mess:



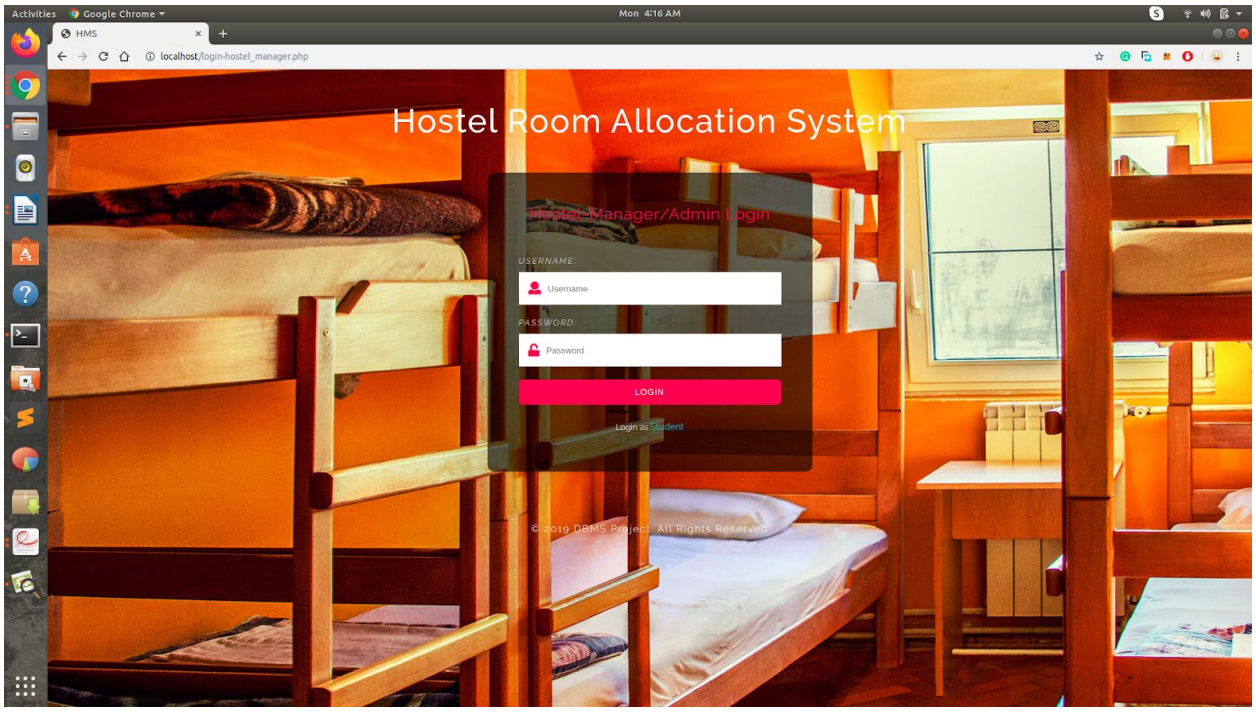
Application For Room/Mess:



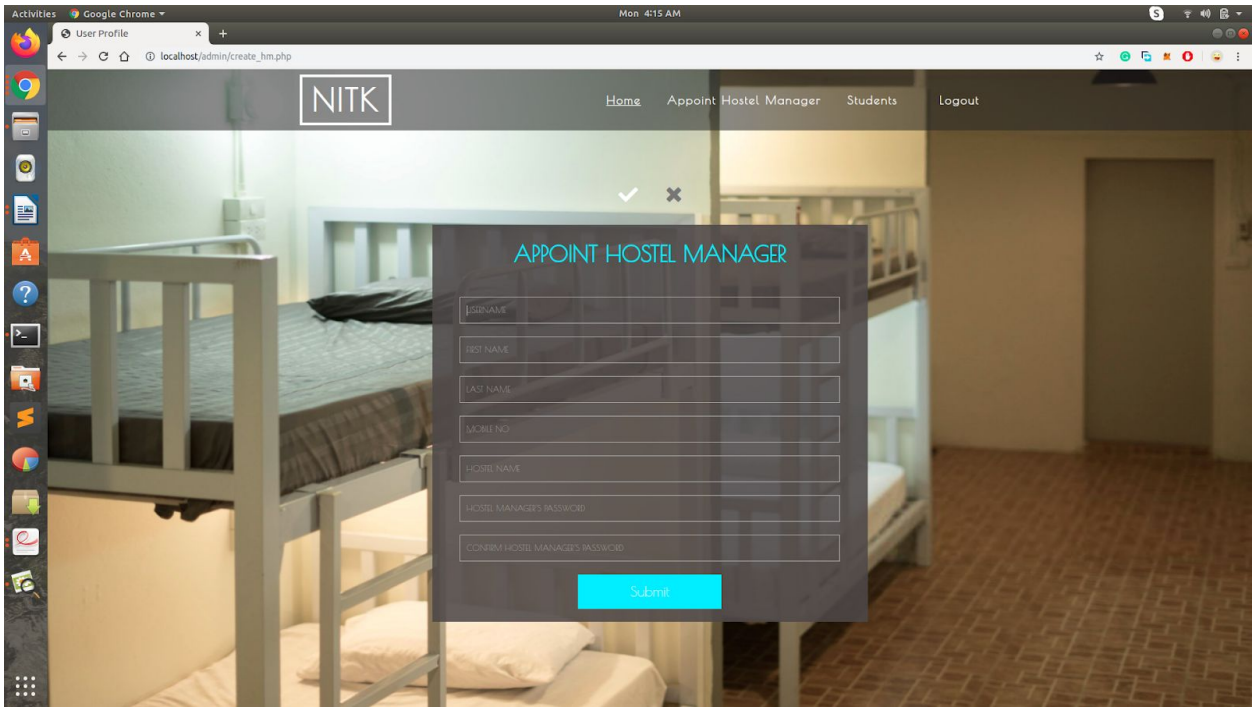
Profile of Student:



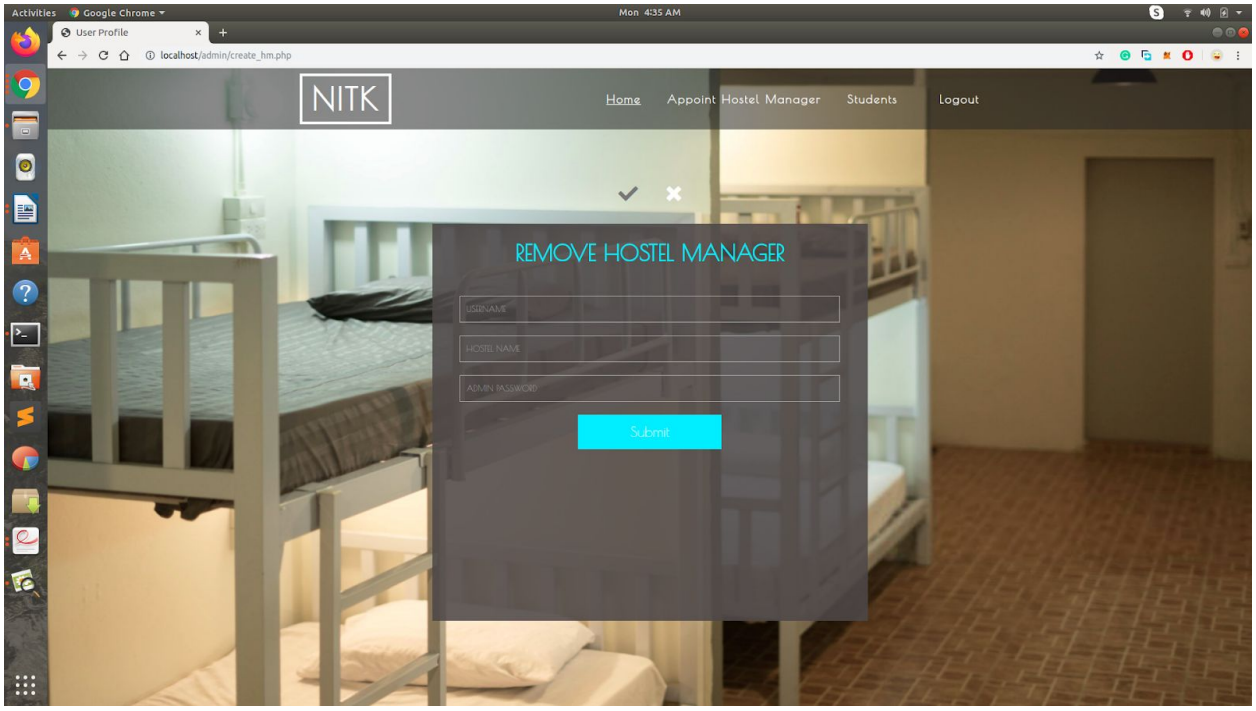
Admin/Hostel Manager Login:



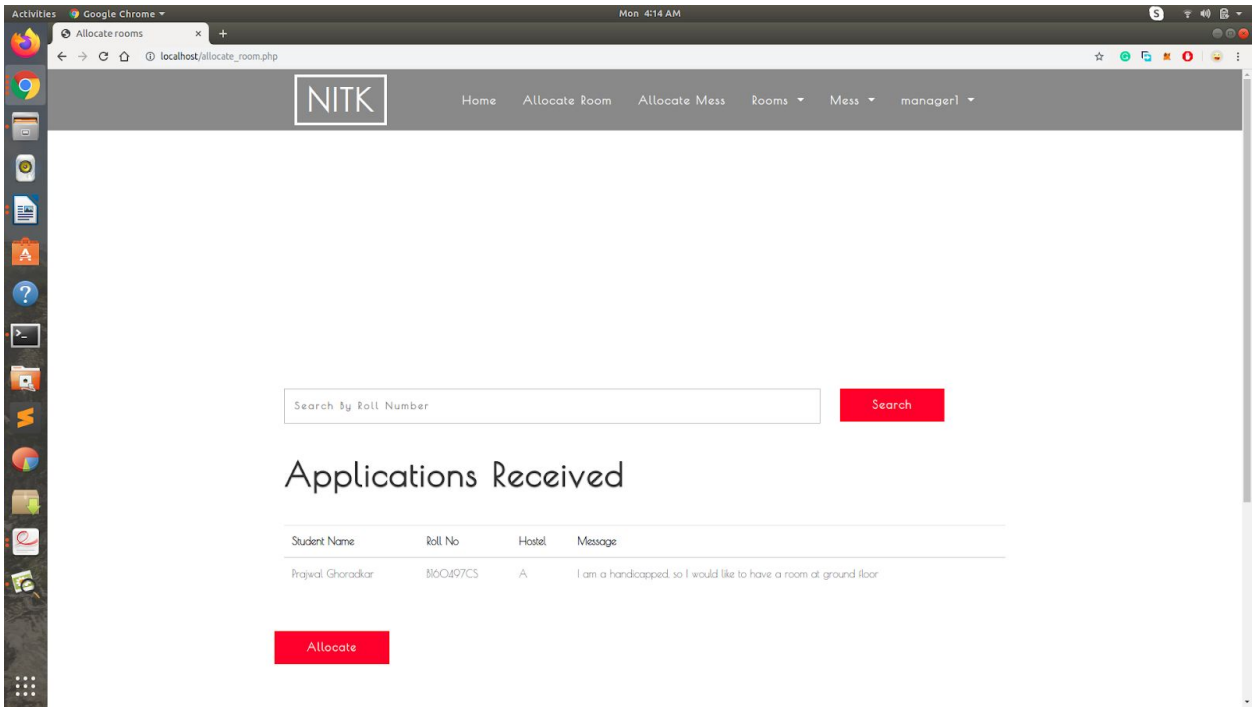
Appoint Hostel Manager by Admin(Sign up for Hostel Manager):



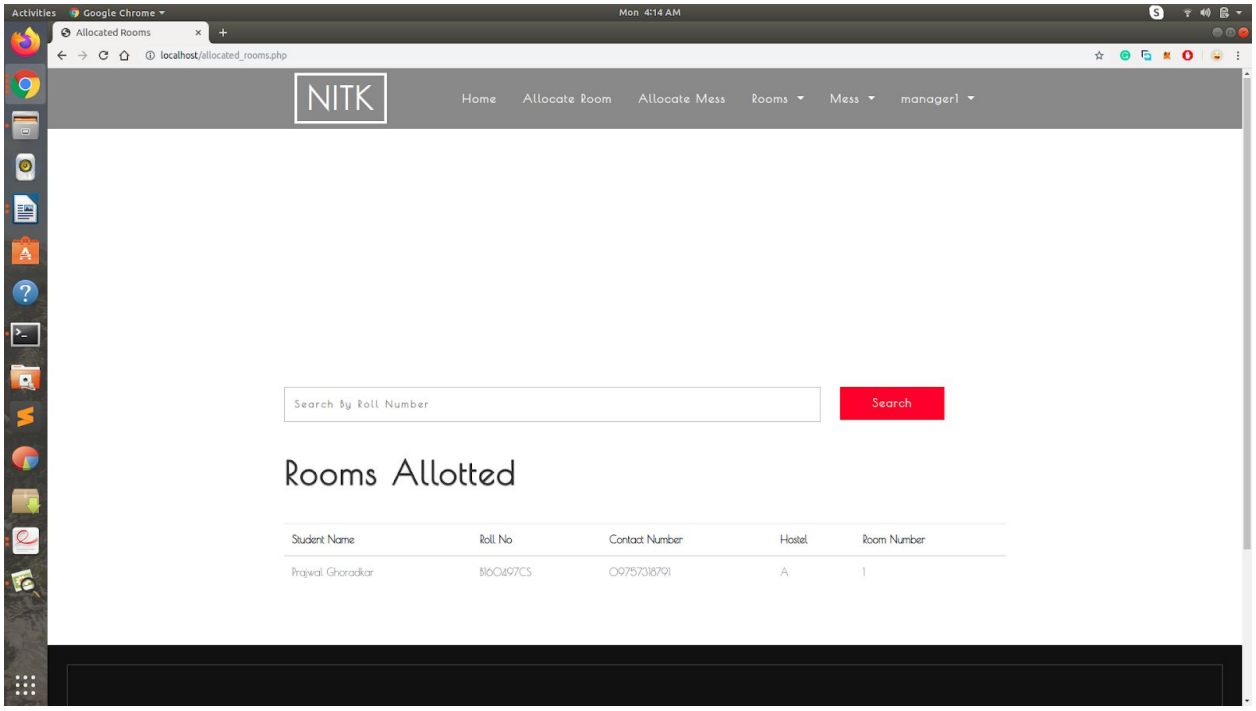
Remove Hostel Manager by Admin(Ressign from Hostel Manager):



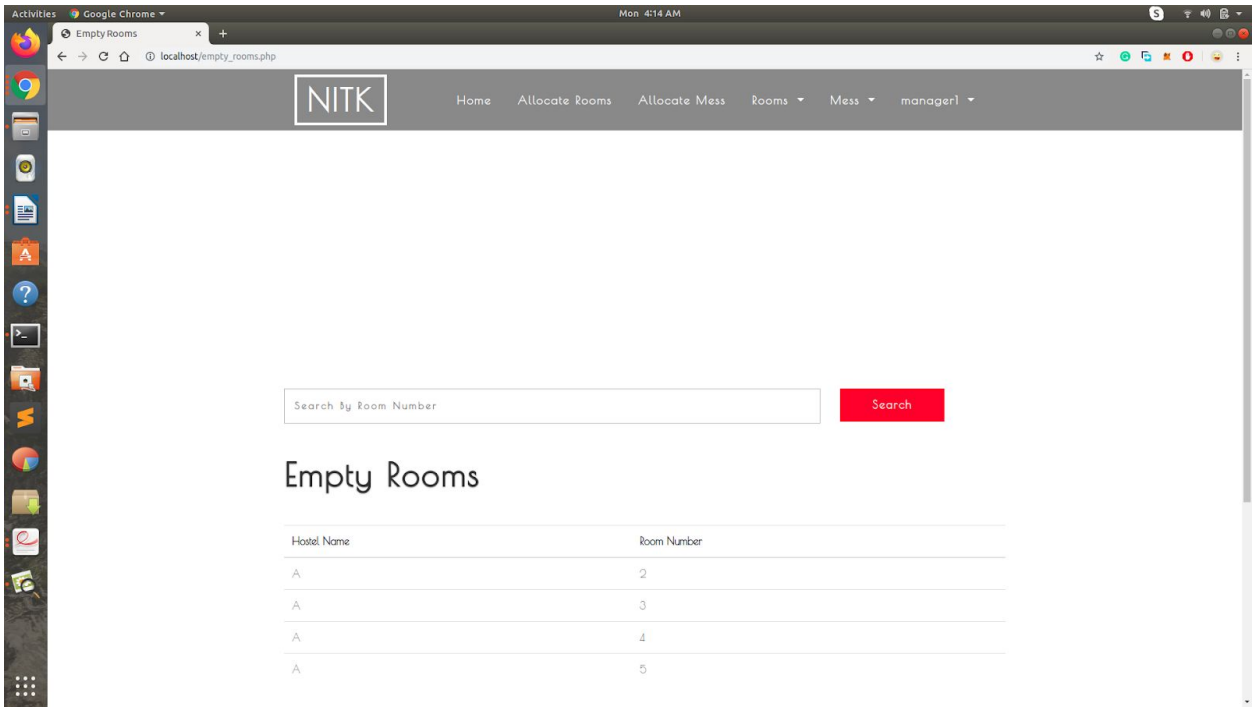
Application Received From Student for Hostel to respective Hostel Manager:



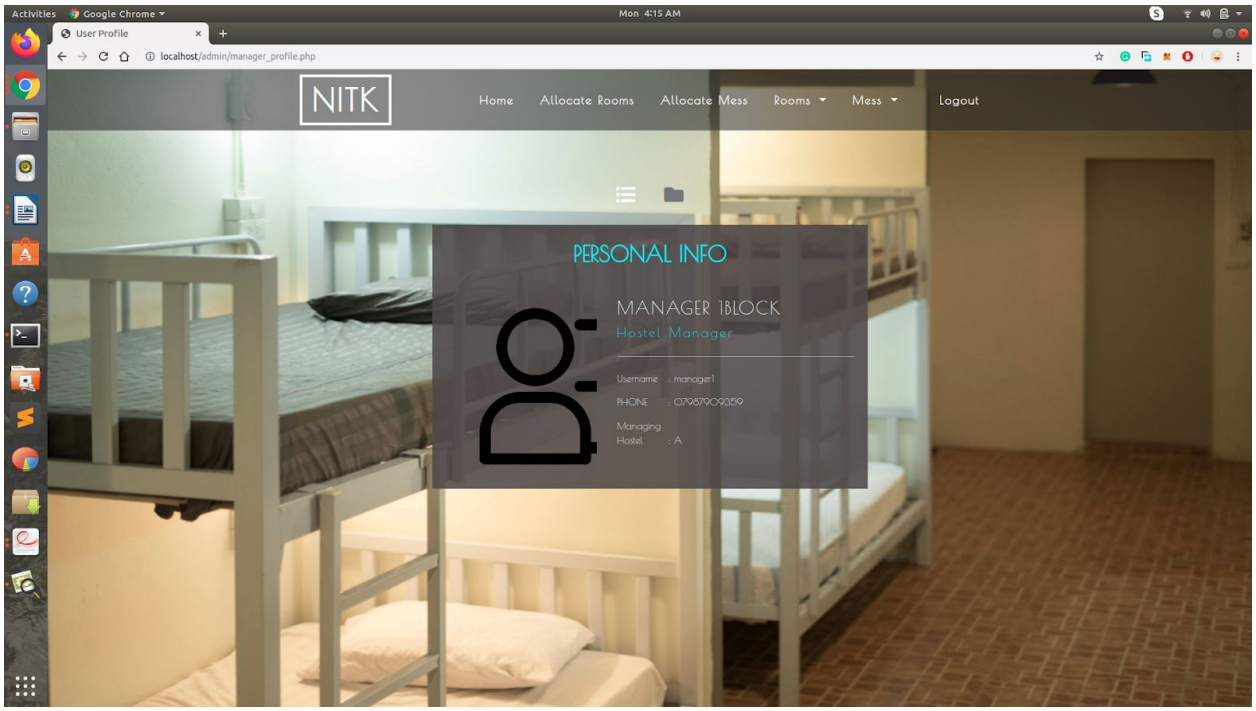
Room/Mess Allocated:



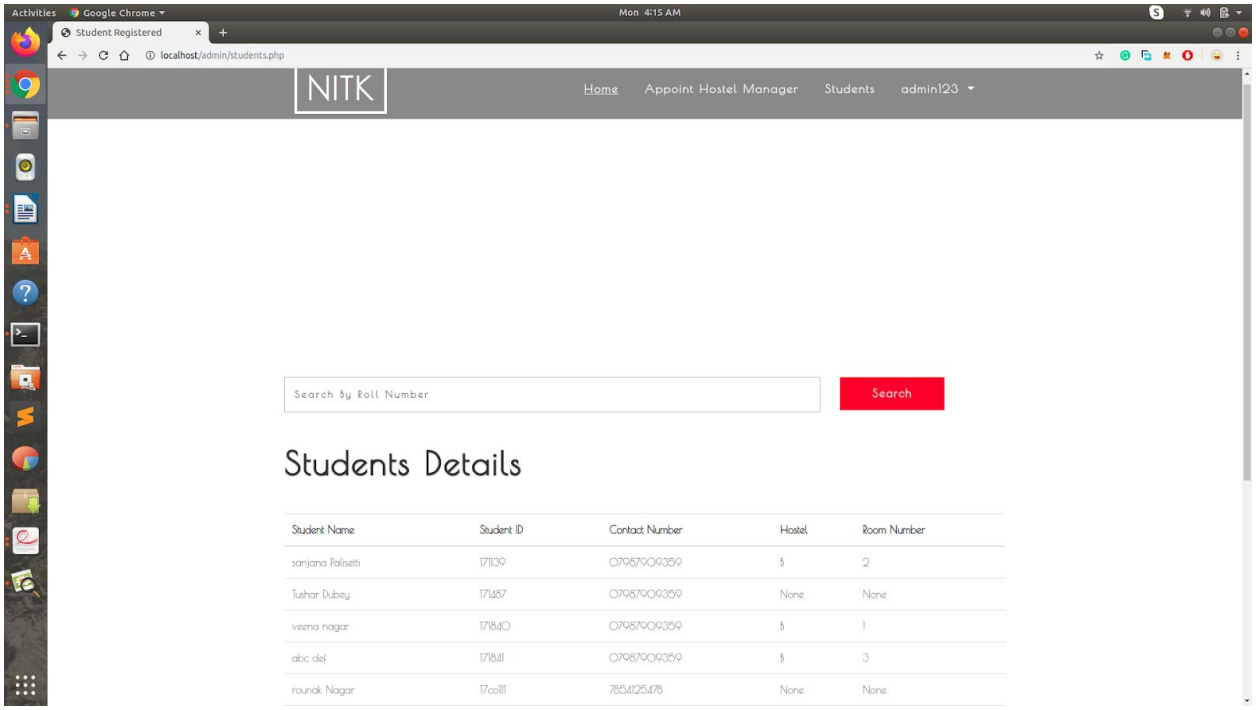
Vacancy (Can be seen by Hostel Manager) :



Hostel Manager's Profile:



Student Enrolled for Hostel will be visible to Hostel Manager of the respective block (Details of all registered students will be visible to Admin(Dean)):



Admin Profile: