Software Requirements Specification

for

Online Hostel Management

Version 1.0 approved

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Revision History

Name	Date	Reason for Changes	Version

1. Introduction

This document is intended to provide the requirement for a web based Online Hostel Management System, which in turn provide the basis of architectural models and development of application. Large increase of strength of students enrolling every year lead to the rise in the accommodation lead to the issue of their management.

1.1 Purpose

The overall purpose is to develop website that provide an efficient pathway for managing the hostels, reduces inconsistency and redundancy in the data entries, provide ease of access to both student and warden/administration and security at its tip. It will provide the user-friendly interface for both student and administration and thereby provide an ease of access and reduction in the manual input, manual error and a way to reduce the wastage of paper. It serves as a step to the Digital World in this era of Digitalization.

1.2 Document Conventions

- *Light weighted italics fonts are marked for the various software and dependencies.*
- *Highlighted texts are available in Index.*
- *The words marked like "**word**" are the modules used in the project.*
- *The words like **word** represents each use-case*
- *Priorities are based on star symbols where 5 star are more prioritize one*

1.3 Intended Audience and Reading Suggestions

This document is design to illustrate the Specified Requirements which in-turn help to understand various modelling diagrams and Blueprint of the entire system intended for readers who want are keenly interested to understand the requirement for Hostel Management System for NIT, Puducherry and understand the various conventions used in the blue prints of the application by understanding the specification of requirements drawn as a result of requirement analysis.

1.4 Product Scope

The 'Online Hostel Management System' is web development module that provide an efficient way to manage various tasks in the hostels of National Institute of Technology, Puducherry. It consists of eight modules- Student Allocation System, Mess Feedback System, Attendance and Entry/ Exit System, Notice Display System, Grievance/Complaint System, Medicine and sports Accessing System and Sick room/ Visitor room/Common room accessing system and along with hostellers and Wardens Repository.

1.5 References

[1] *I. K. Chaniotis, K.-I. D. Kyriakou, and N. D. Tselikas, "Is Node.js a viable option for building modern web applications? A performance evaluation study," Computing, vol. 97, no. 10, pp. 1023–1044, Mar. 2014.*

[2] *S. Tilkov and S. Vinoski, "Node.js: Using JavaScript to Build High-Performance Network Programs," IEEE Internet Computing, vol. 14, no. 6, pp. 80–83, Nov. 2010.*

[3] *W. Cui, L. Huang, L. Liang and J. Li, "The Research of PHP Development Framework Based on MVC Pattern," 2009 Fourth International Conference on Computer Sciences and Convergence Information Technology, Seoul, 2009, pp. 947-949.doi: 10.1109/ICCIT.2009.130*

2. Overall Description

2.1 Product Perspective

This web-based system on "Online Hostel Management System" provides efficient way to handle hostel tasks in National Institute of Technology, Puducherry. It provides a user-friendly interface, ease of accessibility for hostellers, wardens, chief warden, security and administrators, thereby reduces the inconsistency, redundancy and misplacing of data in the administration and efficiently handles the various issues like attendance, room allocations and mess feedback in an entire academic year.

2.2 Product Functions

The intention of the entire project was to develop a web-based module for managing the various hostel tasks in NIT, Puducherry. It consists of eight modules-

- ***"Student Allocation System"*** *will consist allocating two/three students in each room depend on criteria this will extends to store the information of accessories in each room-fans, cots, chairs etc.*
- ***"*Sick room/ Visitor room/Common room accessing system*"*** *will comprise of the allocation of sickroom or visitor room or Common Room in a hostel*
- ***"Hostellers and Wardens Repository"*** *will comprise of individual information about each and every hosteller, wardens, security as well as the chief warden in the institute.*
- ***"Grievance/Complaint System"*** *will consist of an online Grievance Registration Form in which the student is going to fill any sort of Grievance or complaint with later on will be addressed by wardens or chief warden.*
- ***"Mess Feedback and menu System"*** *will consist of feedback of mess in a semester along with display Mess Menu.*
- ***"*Notice Display System*"*** *will comprise of the anonymous student feedbacks for the courses that he/she has registered, and the display of the corresponding feedback to the respective faculties*
- **"Medicines and sports accessories Accessing System"** *will comprise of managing the medicines and sports accessories in the hostels.*
- **"Attendance and Entry/Exit System"** *will comprise of Attendance and determine the entry and exit of the hostel.*

2.3 User Classes and Characteristics

The entire project consists of the five perspective-hostellers, wardens, security, chief warden and administration each having a separate login and profile view. The entire project consists of five use cases –

- ***Hostellers Use Case****: To access the hosteller repository, to view the notice, draft a Grievance or complaint, provide thee rating to mess, access sickroom/common room, medicines and sport accessories.*
- ***Wardens/Care Taker Use Case****: to verifies the entry and exit within hostels, access repositories, address grievance, draft a notice, allocates the room and take a action with respect to mess rating.*
- ***Security Use Case****: To verify the Medicine/sport accessories, to verify the entry and exit, to verify sick room, common room, visitor rooms and view notices.*
- ***Chief Wardens Use Case****: To check the room allocation, and have access of repository*
- ***Admin Use Case****: To manage the entire system, to verify the user, ensure the security and proper-functioning of the services provided by the system.*

2.4 Operating Environment

MEAN is a software bundle that stands for MongoDB, Express JS, AngularJS, and NodeJS. Together in a stack, these free programs enhance the simplicity of the web development process MEAN basically describes an application stack:

- *MongoDB (data storage)*
- *Express.js (server-side application framework)*
- *AngularJS (client-side application framework)*
- *Node.js (server-side language environment although Express implies Node.js)*

Apart from this other application were being used in our project:

- *Apache (web server)*
- *PHP Python (scripting language)*

2.5 Design and Implementation Constraints

All the five views used in this web-based module should have separate area of concerns. The repository should be secured and the server scripting should be designed to reduce the threads and vulnerability in the system. The web module should be responsive and scalable to handle large number of clients and to run on various platforms and devices.

2.6 Assumptions and Dependencies

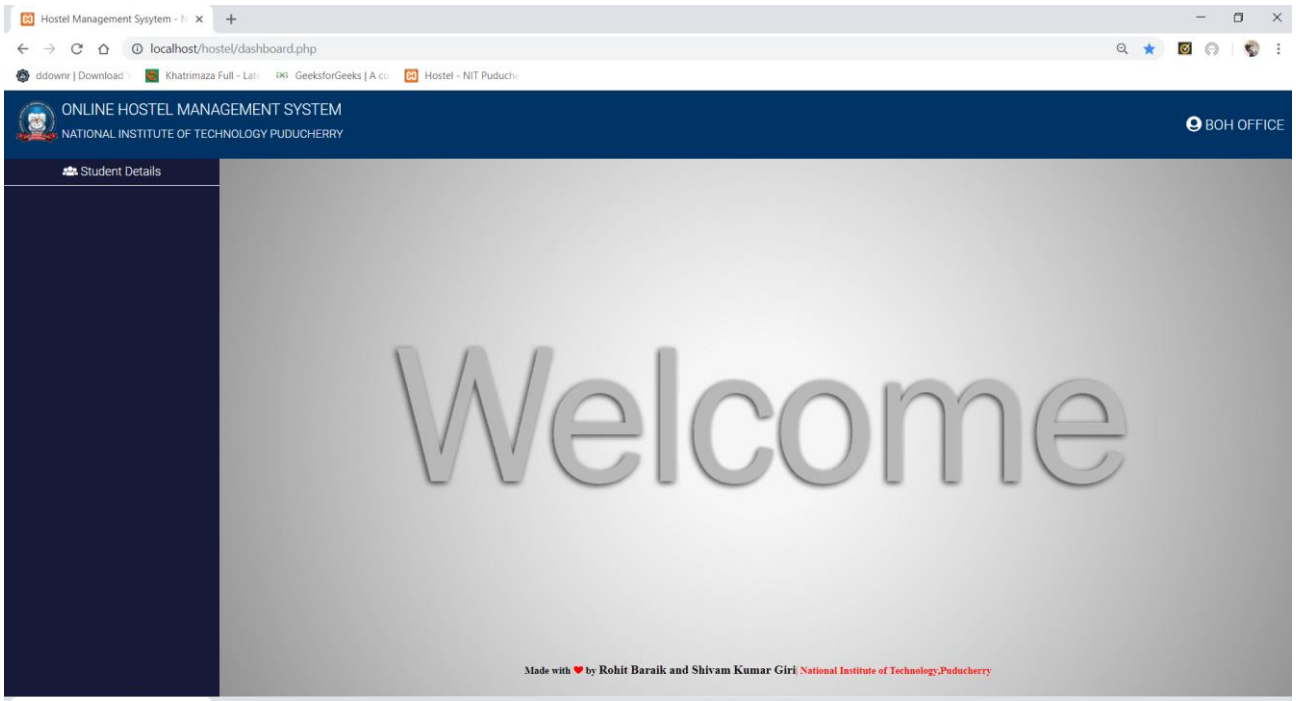
As a client the following assumptions are needed to be fulfilled:

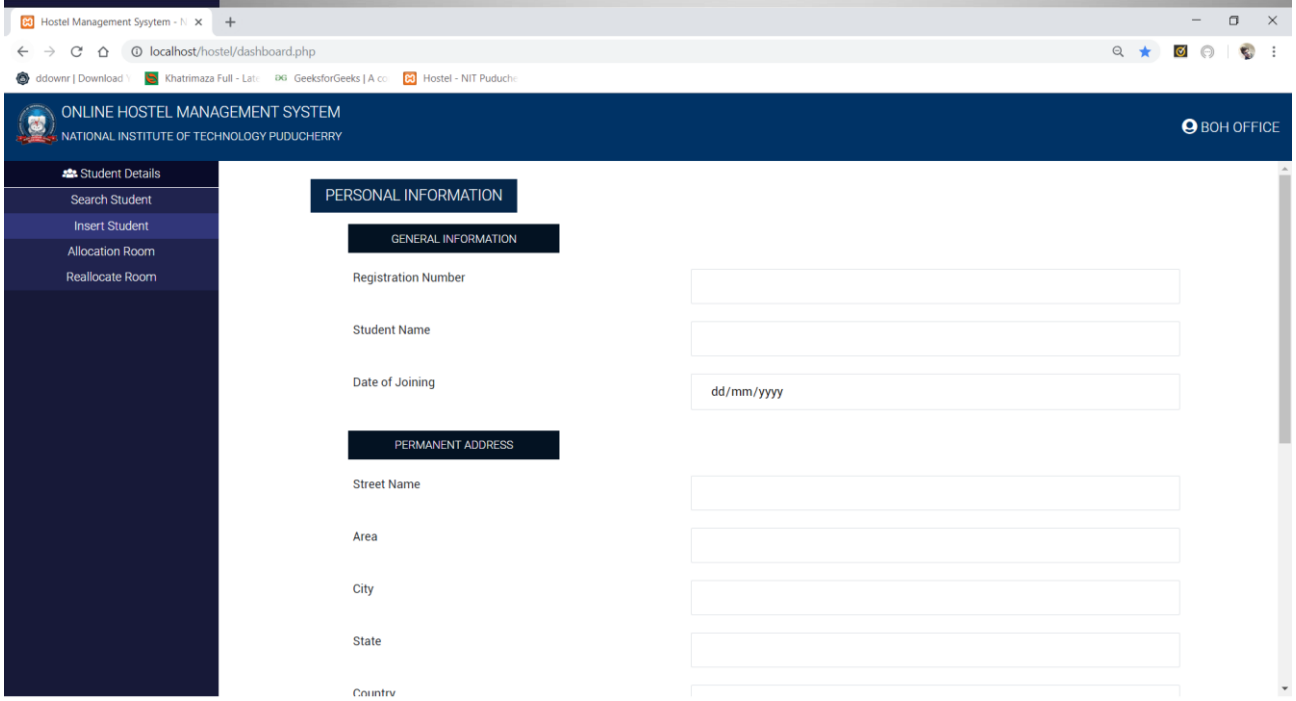
- *The client must have the updated browsers Version 55.0.3497.100 or above in Chrome, Microsoft Edge 32.17124.1.0 or above, 55.0.2 or above in Firefox or Version 49.0.3051.100 or above in Opera in windows and equivalent versions across the other platform or updated android/iOS/Plasma /blueberry/windows OS phone.*
- *The Server must have accessibility to the Entire MEAN Stack software- Mongo-DB, node.js, angular.js and Express.js. It is assumed that PHP is installed with a driver for connecting Mongo-DB database. The Apache Server is Expected to be installed. The basic storage space of 1.5 Mb/user is expected to be provided.*
- *Our project consists of following other dependencies:*
  - *Way2sms for SMS provider for verification and contact messaging needs*
  - *Driver to connect PHP and Mongo-DB*
  - *make2pdf for converting text to pdf for downloading.*

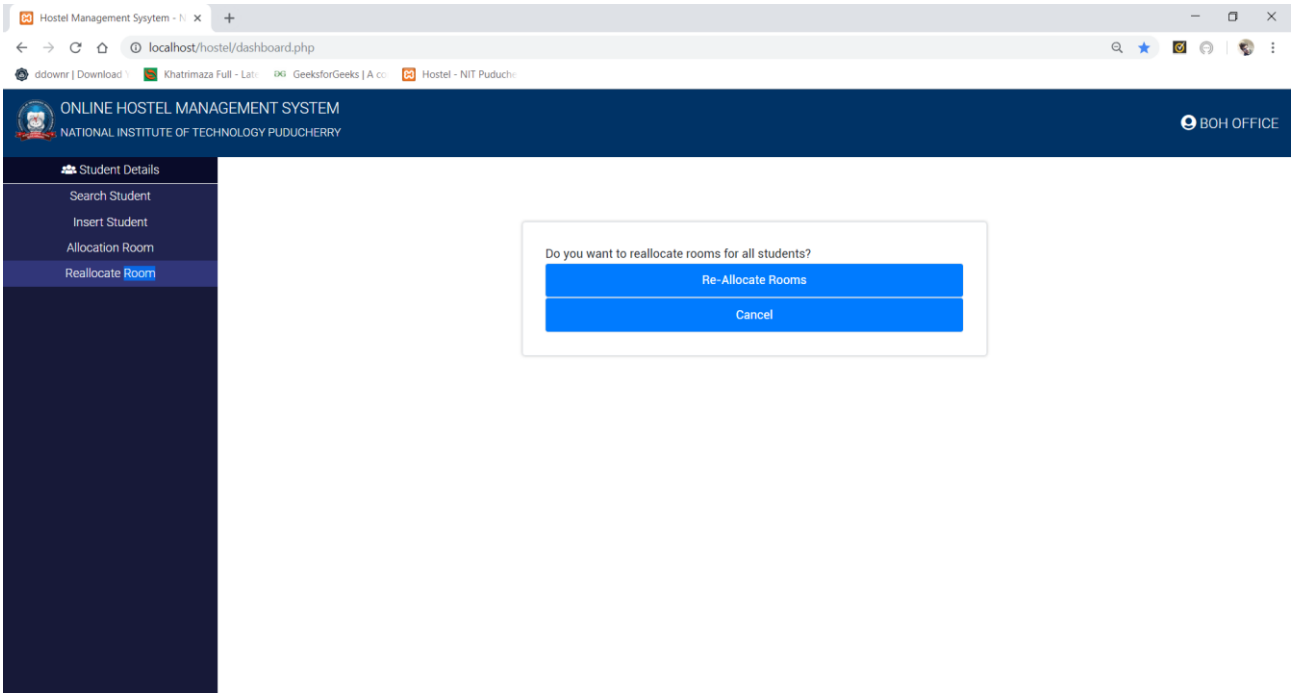
3. External Interface Requirements

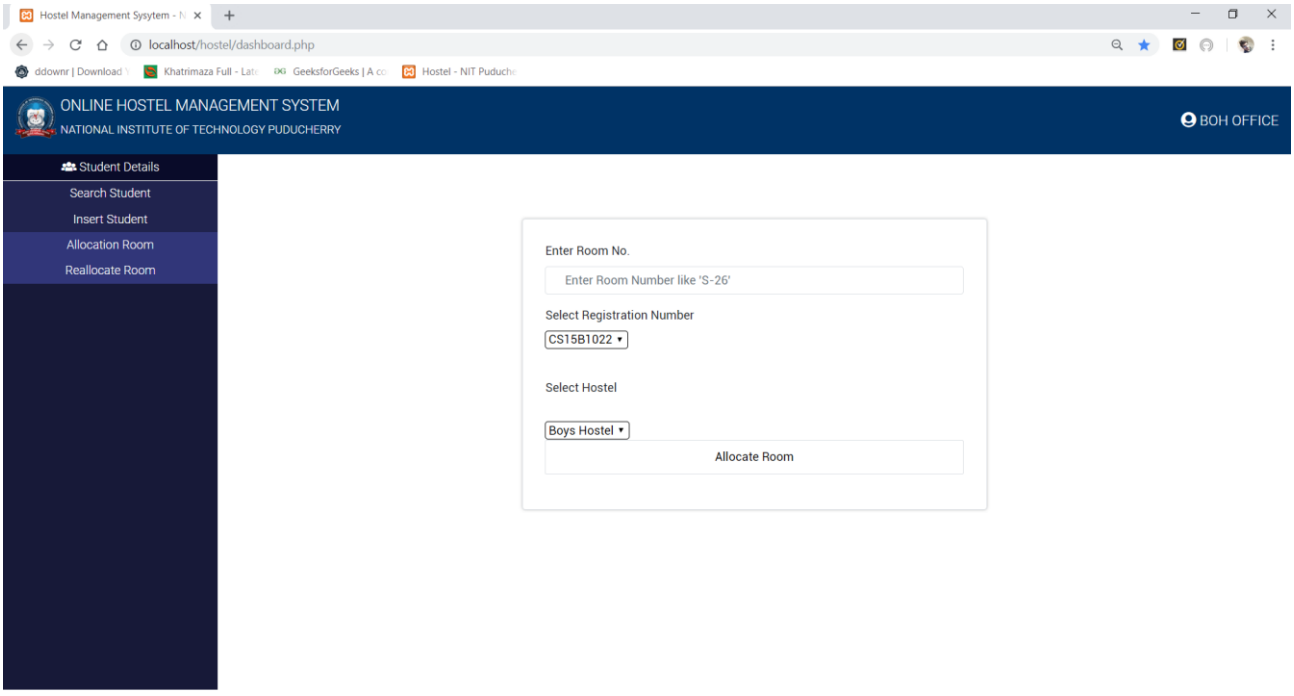
3.1 User Interfaces

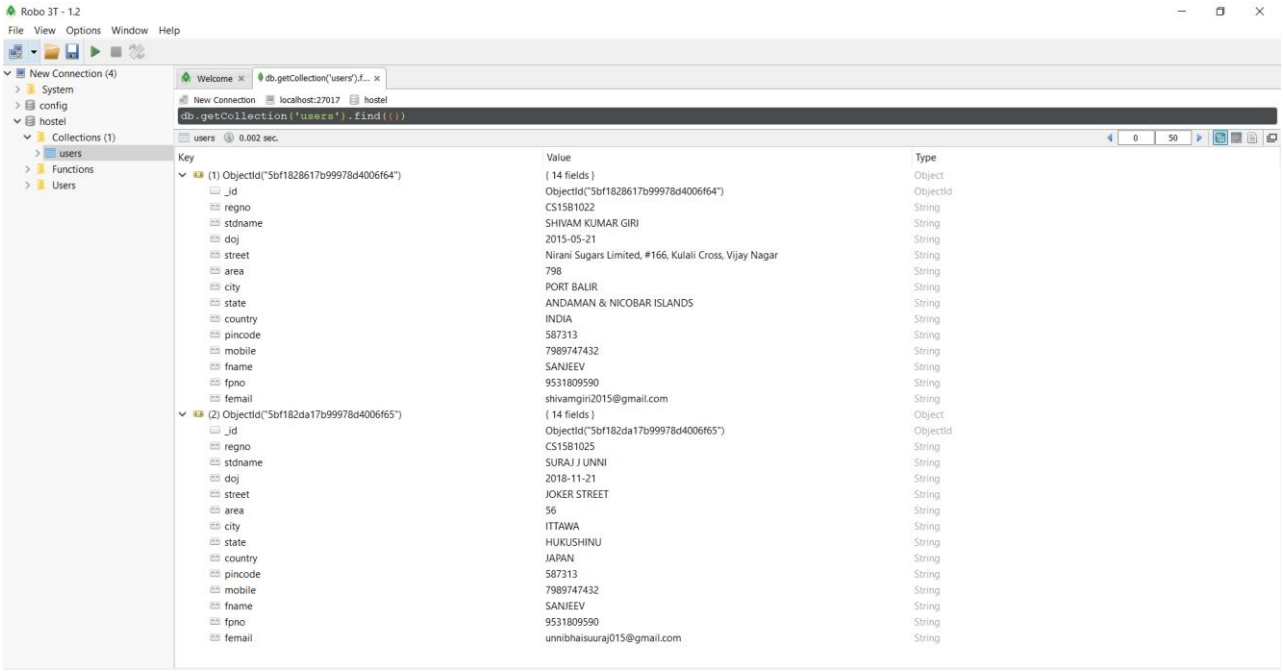
The web-based module of Hostel Management System consists of a login screen which checks for validation of credentials of the user. Beyond this screen various modules are accessible to the user on a role-based privilege basis. A session is created as soon as the user logs in and it ends after the user logs out of his/her respective profile.


Hostel Management Sysytem - N
localhost/hostel/dashboard.php
ONLINE HOSTEL MANAGEMENT SYSTEM
NATIONAL INSTITUTE OF TECHNOLOGY PUDUCHERRY
BOH OFFICE
Student Details
Welcome
Made with ❤ by Rohit Baraik and Shivam Kumar Giri National Institute of Technology,Puducherry


Hostel Management Sysytem - N
localhost/hostel/dashboard.php
ONLINE HOSTEL MANAGEMENT SYSTEM
NATIONAL INSTITUTE OF TECHNOLOGY PUDUCHERRY
BOH OFFICE
Student Details
Search Student
Insert Student
Allocation Room
Reallocate Room
PERSONAL INFORMATION
GENERAL INFORMATION
Registration Number
Student Name
Date of Joining
dd/mm/yyyy
PERMANENT ADDRESS
Street Name
Area
City
State
Country


Hostel Management Sysytem - N
localhost/hostel/dashboard.php
ONLINE HOSTEL MANAGEMENT SYSTEM
NATIONAL INSTITUTE OF TECHNOLOGY PUDUCHERRY
BOH OFFICE
Student Details
Search Student
Insert Student
Allocation Room
Reallocate Room
Do you want to reallocate rooms for all students?
Re-Allocate Rooms
Cancel


Hostel Management Sysytem - N
localhost/hostel/dashboard.php
ONLINE HOSTEL MANAGEMENT SYSTEM
NATIONAL INSTITUTE OF TECHNOLOGY PUDUCHERRY
BOH OFFICE
Student Details
Search Student
Insert Student
Allocation Room
Reallocate Room
Enter Room No.
Enter Room Number like 'S-26'
Select Registration Number
CS15B1022
Select Hostel
Boys Hostel
Allocate Room


Robo 3T - 1.2
File View Options Window Help
New Connection (4)
System
config
hostel
Collections (1)
users
Functions
Users
Welcome
db.getCollection('users').f...
New Connection localhost:27017 hostel
db.getCollection('users').find({})
users 0.002 sec.
Key
Value
Type
(1) ObjectId("5bf1828617b99978d4006f64")
{ 14 fields }
Object
_id
ObjectId("5bf1828617b99978d4006f64")
ObjectId
regno
CS15B1022
String
stdname
SHIVAM KUMAR GIRI
String
doj
2015-05-21
String
street
Nirani Sugars Limited, #166, Kulali Cross, Vijay Nagar
String
area
798
String
city
PORT BALIR
String
state
ANDAMAN & NICOBAR ISLANDS
String
country
INDIA
String
pincode
587313
String
mobile
7989747432
String
fname
SANJEEV
String
fpno
9531809590
String
femail
shivamgiri2015@gmail.com
String
(2) ObjectId("5bf182da17b99978d4006f65")
{ 14 fields }
Object
_id
ObjectId("5bf182da17b99978d4006f65")
ObjectId
regno
CS15B1025
String
stdname
SURAJ J UNNI
String
doj
2018-11-21
String
street
JOKER STREET
String
area
56
String
city
ITTAWA
String
state
HUKUSHINU
String
country
JAPAN
String
pincode
587313
String
mobile
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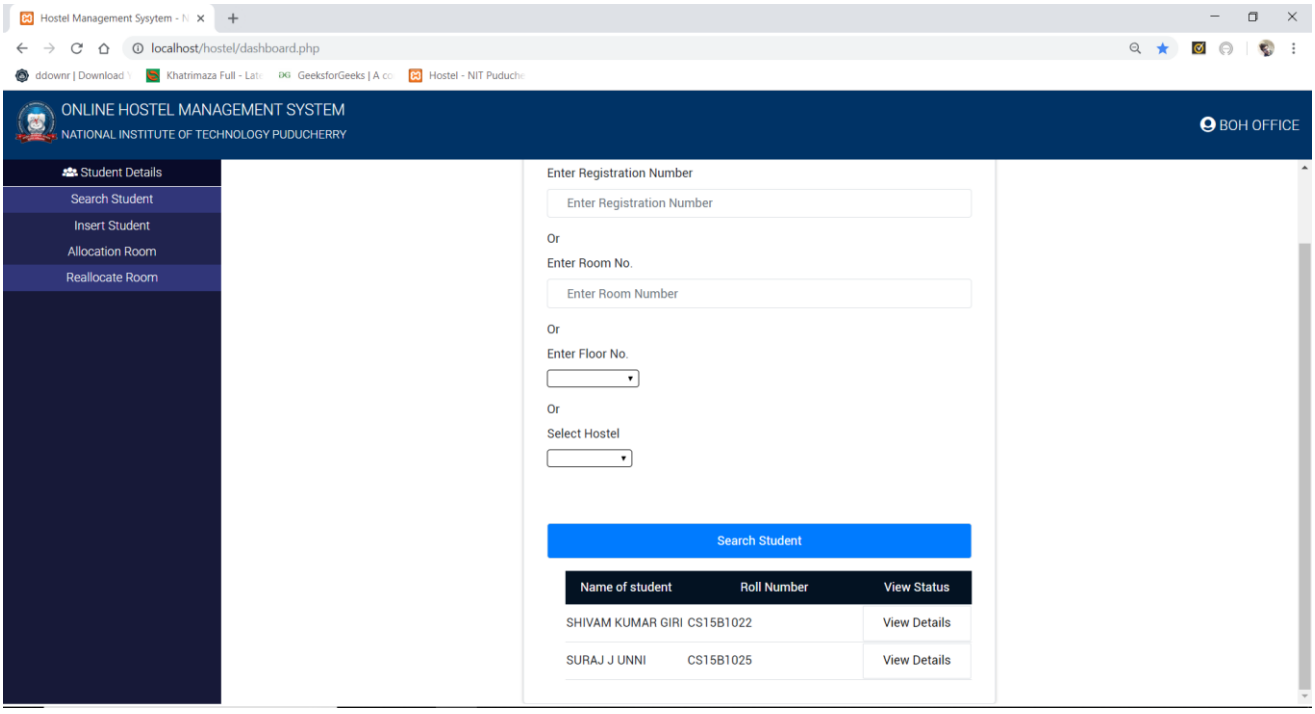
String
fname
SANJEEV
String
fpno
9531809590
String
femail
unnibhaisuuraj015@gmail.com
String


Hostel Management Sysytem - N
localhost/hostel/dashboard.php
ONLINE HOSTEL MANAGEMENT SYSTEM
NATIONAL INSTITUTE OF TECHNOLOGY PUDUCHERRY
BOH OFFICE
Student Details
Search Student
Insert Student
Allocation Room
Reallocate Room
Enter Registration Number
Enter Registration Number
Or
Enter Room No.
Enter Room Number
Or
Enter Floor No.
Or
Select Hostel
Search Student
Name of student
Roll Number
View Status
SHIVAM KUMAR GIRI
CS15B1022
View Details
SURAJ J UNNI
CS15B1025
View Details

3.2 Software Interfaces

Th web-based module is built on MEAN Stack software- Mongo-DB, Node.js, Angular.js and Express.js. It is assumed that PHP is installed with a php-mongodb.dll driver for connecting Mongo-DB database. The Apache Server is expected to be installed. PHP driver extension has been included in the Apache as well as the PHP php.ini file. Composer has been installed and all PHP related dependencies are handled via Composer. Robo 3T Database Administration Software has been installed and management of the database is regulated using this software. Bootsparap.js and jquery.js files may be required for Responsiveness and advance JavaScript approaches

3.3 Communications Interfaces

- A web-browser is required having *Version 55.0.3497.100 or above in Chrome, Microsoft Edge 32.17124.1.0 or above, 55.0.2 or above in Firefox or Version 49.0.3051.100 or above in Opera in windows and equivalent versions across the platform or updated android/iOS/Plasma /blueberry/windows OS phone.*
- *An SMTP server is required to be installed that takes care of the whole email delivery process.*
- *Reliable Web-server to handle the request*

4. System Features

*The web-based development module on Online Hostel Management System focuses on five perspectives - **hostellers, wardens, Chief Wardens, Security and administration.** There are 10 features will be illustrated by our system:*

4.1 System Feature 1: Allocation of Students

4.1.1 Description and Priority

Students are allotted based on the availability of Room and allotted student can again can be re-allotted in the hostel after a semester or two. The room allocation data can also contain the information about the room accessories like cots, tables, chairs etc.
Priority: ☆ ☆ ☆ ☆ ☆

4.1.2 Functional Requirements

REQ-1: Php Libraries for accessing the form data
REQ-2: MongoDB database for storing the data and retrieve and update it

4.2 System Feature 2: Accessing Sick room/Common rooms

4.2.1 Description and Priority

Student can access the sick room/common room by registering online along with the durations which will0 again be verified by security while providing key of the rooms.
Priority: ☆ ☆ ☆

4.2.2 Functional Requirements

REQ-3: Display Notification of the present key-holders

4.3 System Feature 3: Separate Login for Warden, hostellers, Chief Warden, Security and administration

4.9.1 Description and Priority

Separate the list of User into three categories: student, faculties and administration each having separate area of concern. Each of them must have the separate accessibility based on their Responsibilities.
Priority: ☆ ☆ ☆ ☆ ☆

4.1.2 Functional Requirements

REQ-11: A collection in the database to handle the login and other details.
REQ-12: "Phpmailer" library to carry out various email activities with SMTP server
REQ-13: "way2sms" module to carry out various SMS activities

4.4 System Feature 4: Accessing Visitor Room

4.4.1 Description and Priority

Visitor Room can be accessed by student in case of any visitor visits or can be accessed by warden/chief warden for any chief visitor visiting the hostel.
Priority: ☆ ☆ ☆

4.4.2 Functional Requirements

REQ-5: *PhpMailer* for mailing from php via SMTP Server provided

4.5 System Feature 5: Giving Mess feedback

4.5.1 Description and Priority

Mess feedback system is for giving the feedback to the mess based on various Criteria and then taking the cumulative average of the responses and display it to the wardens/ chief warden for further actions
Priority: ☆ ☆ ☆ ☆

4.5.2 Functional Requirements

REQ-6: jQuery libraries to accumulate the various feedback on each Criteria
REQ-7: Angular.js to give modular approach to the web module

4.6 System Feature 6: Accessing Mess Menu

4.6.1 Description and Priority

Students can see the mess menu and any changes of mess menu can be displayed immediately
Priority:. ☆ ☆ ☆

4.6.2 Functional Requirements

REQ-8: A database collection for mess menu

4.7 System Feature 7: Displaying the Notices

4.7.1 Description and Priority

Wardens/Chief wardens draft the notice which can be displayed to all users/hostellers/ particular user via this module.
Priority: ☆ ☆ ☆ ☆

4.7.2 Functional Requirements

REQ-9: jQuery libraries to accumulate the various feedback on each Criteria

4.8 System Feature 8: Accessing Medicine and Sport accessories

4.3.1 Description and Priority

Student gets the details of the medicines available and sport accessories that are accessible and available and can register if required.
Priority: ☆ ☆ ☆

4.3.2 Functional Requirements

REQ-4: A separate collection for storing medicine a sports information

4.9 System Feature 9: Collecting of Grievance and complaint

4.8.1 Description and Priority

Student fill the grievance form and submitted form will be displayed to warden/Chief warden for further actions.

Priority: ☆ ☆ ☆ ☆

4.8.2 Functional Requirements

REQ-10: A separate collection in Database

4.10 System Feature 10: Attendance, Entry and Exit System

4.10.1 Description and Priority

On each entry and exit of the hostel the response would be recorded and attendance will be calculated leading to spontaneous attendance of students. The entry and exit will be verified by wardens and security staffs
Priority: ☆ ☆ ☆ ☆

4.10.2 Functional Requirements

REQ-1: Ajax for calculating attendance on each the entry and exit of hostellers in the hostel

REQ-2: TBD (To Be Determine)

5. Other Nonfunctional Requirements

5.1 Performance Requirements

Since this software is going to web-based, it does require a reliable server machine with high band internet access. Server machine should have a powerful Processing Unit and high-speed internet access so that it can handle multiple users at the same time. Another performance requirement is the storage space. Higher storage space means more user information can be stored, leads to the better performance.
Performance requirement by the user side is, web application should be developed as a lightweight web app so that it can work on almost any platform even with slower internet connections. Refactoring of code in PHP and reduction in database entry size lead to overall optimization of the system leading to faster access, responsiveness and a scalable website which reduces the overall server access time and lead to faster server response

5.2 Security Requirements

The Web based application uses PHP Library's SHA-256 hashing protocol for the passwords of each login along with secure design patterns which tend to make more secure database access for this web module. The various in built php libraries and No-SQL features of MongoDB can reduce the various SQL attacks and various other database vulnerabilities to a very greater extent, hence providing a secured and reliable database which can withstand three objectives of Security of Web Applications: Confidentiality, Integrity and Availability for the Centralized Management System.

5.3 Software Quality Attributes

***Portability and Responsiveness**: Main purpose of developing web-based module is to improve the portability of software development process. To improve portability, software should run on variety of platforms and variety of connection speeds. As explained in the performance requirements section, software should be lightweight so that it can run on a machine with slow internet connection. To make the web application lightweight, simple libraries and tools should be used at developing phase. Such as using JavaScript and HTML5. This system can also run across various devices including mobile devices, cross platform web browsers due to the Bootstrapping features of the web modules in the projects.*

Appendix A: Index

Sl No.	Term	Explanation	Indexed
1)	Responsive web	Responsive web design is an approach to web design that makes web pages render well on a variety of devices and window or screen sizes.	2.5, 5.3, 5.1
2)	SHA-256	The SHA (Secure Hash Algorithm) is one of a number of cryptographic hash functions. A cryptographic hash is like a signature for a text or a data file. SHA-256 algorithm generates an almost-unique, fixed size 256-bit (32-byte) hash.	5.2
3)	Refactoring	Refactoring is the process of changing a software system in such a way that it does not alter the external behavior of the code yet improves and optimizes its internal structure	5.1
4)	No-SQL	A NoSQL (originally referring to "not only SQL" or "non-relational") database provides a mechanism for storage and retrieval of data that is modeled in means other than the tabular relations used in relational databases.	5.2
5)	Portability	Portability in high-level computer programming is the usability of the same software in different environments. The pre-requirement for portability is the generalized abstraction between the application logic and system interfaces.	5.3
6)	Web-server	A **Web server** is a program that uses **HTTP** (Hypertext Transfer Protocol) to serve the files that form **Web** pages to users, in response to their requests, which are forwarded by their computers' **HTTP** clients.	2.4,2.6, 3.3, 3.2
7)	Scalable Web	Scalability is the capability of a system, network, or process to handle a growing amount of work, or its potential to be enlarged to accommodate that growth	5.1
8)	SMTP server	An SMTP server is the machine that takes care of the whole email delivery process: that's what to send your messages with an email client or software	4.4.2, 3.3

Appendix B: Case Studies

PRESENT SYSTEM ANALYSIS

Hostel Allocation

In the current scenario, the hostel warden creates an excel sheet containing the details of all the registered students who wish to get rooms allocated to them in the hostel. The warden then manually allocates each and every one of them their respective rooms based on the current status and availability of the rooms.

Hosteller and Wardens Repository

At the moment, such a repository does not exist hence provides no firm ground for comparison.

Mess Feedback system

This is carried out in the form of leaflets that are circulated among the students to fill in and rate the quality of the mess food as well as the caterer.

Medicine/Sport Accessories

There is no regulation and improper maintenance regarding medicine and sports Accessories available in the hostel.

Grievance/complaint

In the event that a hosteller faces any grievance or has any complaint regarding anything, he/she is requested to contact the concerned faculty or representative to address the issue.

Other Room Management

A register is maintained with the security regarding current status of the room – who has the key to the given room along with his details.

Entry and Exit Management system

The students enter their names and their destination in the in/out or local register maintained with the security guard in the hostel.

Appendix C: To Be Determined List

- *https:// server for the Web Based Centralized Management System*
- *way2sms SMS provider for mobile number verification and messaging the parents and student contacts needed in Emergency.*
- *Biometric/Barcode Reader for the hostel Entry and exit.*
- *Whether the system will be intranet or internet.*
- *How the online system will be managed in the time of Extreme Power cut or a situation of Epidemic.*

Appendix D: Analysis Model

The Use Case Diagram, Data Flow Diagram, Activity diagram for Each Activity is attached on the following pages.