Room Booking System for Student Dormitories

Project Report

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Abstract

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I. Introduction

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II. Functional and Non-Functional Requirements

II. 1. Functional Requirements

FR-1: Registration

Description	Users should be able to register with their academic credentials (ID, name, etc.)
Justification	Key "root" in allowing rooms to be assigned to people in the first place (e.g., users are the ones completing actions on the website)

FR-2: Administrator Designation

Description	Users should be able to be designated as system administrators who can approve/disapprove room bookings, room assignments, and occupancy reports.
Justification	Key "root" in allowing rooms to be assigned to people in the first place (e.g., administrators are the ones to figure out room assignments at all)

FR-3: Student Designation

Description	Users should be able to designated as students who can request certain rooms, make roommate requests, reserve lounges, submit maintenance requests, etc.
Justification	Key "root" in allowing rooms to be assigned to people in the first place (e.g., students are the ones who want to be assigned to rooms)

FR-4: Maintenance Request System

Description	Students must be able to submit and track maintenance requests for the room they've been assigned.
Justification	Ensures proper room maintenance and student satisfaction

FR-5: Room Search and Filtering

Description	Students must be able to search and filter rooms based on type, facilities, and availability

Justification	Enables efficient room selection process and filtering based on student preferences

FR-6: Real-time Booking Management

Description	System must handle room bookings in real-time with immediate availability updates
Justification	Prevents double bookings, ensures data accuracy, and allows for a much snappier user experience

FR-7: Roommate Requests

Description	Description: Students must be able to make and respond to roommate requests
Justification	Facilitates student preferences and social arrangements

FR-8: Booking History

Description	Users must be able to view their booking history and current reservations
Justification	Users must be able to view their booking history and current reservations

FR-9: Compliance Tracking

Description	System stores data related to each and every dorm room (names, safety compliance, max limit on occupancy, maintenance, etc.)
Justification	Administrators must keep track of how each room is being used, whether rules are being violated (and, if so, how often they are)

FR-10: Automated Notification System

Description	Website must send automatic notifications for booking confirmations, move in/out dates/times, maintenance updates, and inspections

Justification	Ensures that students receive important communications in a reliable, effective, and timely manner, to prevent students from missing important dates and times

FR-11: Data Analytics and Reporting

Description	Website should aggregate data to generate reports on room occupancy, bookings, and maintenance records
Justification	Provides administrators with valuable insights necessary for critical decision making, planning, and optimization.

II. 2. User Stories

1. As a user I want to register with my credentials
2. As a user I want to be designated as an admin who can approve/disapprove room bookings, etc.
3. As a user I want to be able to be designated as a student who requests certain rooms, etc.
4. As a student I want to be able to submit and track maintenance requests
5. As a student I want to be able to search and filter rooms based on criteria.
6. The system mush handle room bookings in real-time with immediate updates
7. As a student I want to make and respond to roommate requests
8. As a user I want to be able to view my booking history and current reservation
9. As the system it should store data related to each and every dorm room
10. As the website it should send auto notifications for booking confirmations
11. As the website, it should aggregate data to generate reports on room occupancy, etc.

II. 3. Non-Functional Requirements

1. **Secure** - the website should be reasonably secure, such as preventing user information from being leaked; at the same time, users should as be prevented from doing actions outside their "jurisdiction" (e.g., students shouldn't be allowed to handled administrator tasks).
2. **Responsive** - the website should be reasonably responsive and "snappy"; e.g., it should take as little time as possible for user pages to load or be updated after submitting data changes.
3. **Scalable** - the website should handle a reasonable number of current users, and be able to scale to handle high-traffic periods
4. **Data Validation** - website must validate all input data before processing
5. **Error Resistant** - the website must provide clear error messages with suitable recovery options
6. **FERPA Compliant** - the website must abide by standard FERPA regulations
7. **Reliable** - the system must have a high percentage uptime (99% or higher)
8. **Auditable** - the system should log all key actions (e.g., bookings, cancellations, admin overrides) to an audit log for security and compliance purposes.

9. **Configurable** - the system should allow administrators to configure certain parameters (e.g., booking limits, dorm policies, blackout dates) without requiring code changes.
10. **Accessible** - the website (particularly the frontend) should be usable by as many people as possible, from "regular" users who have no hearing or sight impediments, to blind or deaf users who would have a harder time using the website otherwise

III. Database Design

III. 1. ER Diagram

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III. 2. Tables (from ER Diagram)

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