# <u>ABSTRACT</u>

Room and Roommate Finder is a modern, user-friendly platform designed to simplify the process of finding rooms and compatible roommates. It provides users with customizable search options to find accommodations or roommates based on factors like location, budget, preferences, and lifestyle compatibility. The platform ensures a seamless experience for both individuals searching for accommodation and those looking to share theirs. Built using Node.js with Express.js, MongoDB, HTML, and Tailwind CSS, Room and Roommate Finder is robust, scalable, and designed to cater to users from diverse backgrounds.

## <u>Key Features</u>

### Personalized Room and Roommate Search

- Users can search for rooms or roommates using multiple filters, including location, budget, preferred lifestyle, and more.
- This level of customization ensures users can find accommodations or roommates that align perfectly with their preferences.
- Each listing provides a detailed profile page, allowing users to make informed decisions before contacting the listing owner.

### Dynamic Backend with Node.js and Express.js

- The platform is powered by a Node.js and Express.js backend, providing a fast, secure, and scalable foundation for managing server-side logic and API endpoints.
- The use of Express.js ensures streamlined routing and efficient handling of user requests.

### Real-Time Data Storage with MongoDB

- MongoDB serves as the primary database, allowing efficient storage and retrieval of user data, room listings, and roommate profiles.
- The flexibility and scalability of MongoDB make it ideal for handling the platform's growing data requirements.

### User Authentication and Profile Management

- Room and Roommate Finder features a secure login system, enabling users to create and manage profiles.
- User data, including accommodation preferences and personal details, is stored securely in MongoDB, ensuring data integrity and privacy.

- Future updates will incorporate advanced authentication methods, such as OAuth or JWT, to enhance user security.

## Seamless Roommate Matching Process

- Users can view detailed profiles of potential roommates, including preferences like cleanliness, smoking habits, and lifestyle.
- A secure communication system enables users to connect with matches directly through the platform.

## Contact Us Page for Support

- A dedicated Contact Us page allows users to report issues or request support.
- Feedback is routed through an integrated system that notifies the support team, ensuring timely resolution of user concerns.

## Responsive and Interactive Frontend

- The platform's frontend is built using HTML, Tailwind CSS, and CSS, ensuring a clean, responsive, and modern user interface.
- Tailwind CSS simplifies styling and ensures that the layout adapts seamlessly to all devices, including desktops, tablets, and mobile phones.
- The combination of HTML and CSS ensures compatibility across all major browsers.

## Future Enhancements

- Advanced roommate recommendation algorithms will help users find compatible roommates based on their preferences and past activity.
- Subscription-based room alerts and notifications will keep users updated about new listings in their preferred locations.
- An Admin Dashboard will enable efficient management of listings, user reports, and platform content.

## Security and Data Protection

- Security is a top priority for Room and Roommate Finder. Sensitive user data is encrypted and transmitted securely using HTTPS.
- MongoDB's security features, including access controls and data encryption, ensure user data is handled responsibly.
- Planned enhancements include token-based authentication for added security.

**Performance Optimization and Load Handling**

- The platform is optimized to handle high volumes of traffic and concurrent user actions without performance degradation.
- Node.js enables asynchronous, non-blocking operations, ensuring a fast and responsive user experience.
- MongoDB's ability to scale horizontally ensures efficient handling of increasing data loads as the platform grows.

Room and Roommate Finder is an innovative platform designed to simplify the process of finding rooms and compatible roommates. By integrating scalable technologies and prioritizing user experience, the platform provides a secure and efficient solution for all users.

# DECLARATION

I hereby declare that the work presented in this report entitled "Room and roommate finder ", was carried out by us. We have not submitted the matter embodied in this report for the award of any other degree or diploma of any other University or Institute.

 I have given due credit to the original authors/sources for all the words, ideas, diagrams, graphics, computer programs, experiments, results, that are not my original contribution. I have used quotation marks to identify verbatim sentences and given credit to the original authors/sources.

 I affirm that no portion of my work is plagiarized, and the experiments and results reported in the report are not manipulated. In the event of a complaint of plagiarism and the manipulation of the experiments and results, I shall be fully responsible and answerable.


**Name :**Ayush kumar

**Roll. No. :**2202900100061

**Name :** Ayush Sharma

**Roll. No. :**2202900100062

**Name :** Ayush Singh

**Roll. No. :**2202900100063

**Name :** Chaitanya Balyan

**Roll. No. :**2202900100068

**Department :** Computer Science and Engineering


**(Candidate Signature)**

# <u>CERTIFICATE</u>

Certified that **Ayush Sharma, Ayush Kumar, Ayush Singh** and **Chaitanya Balyan** (Roll no. 220290010062 , 2202900100061,2202900100063 and 2202900100068 ) has carried out the MiniProject Synopsis work presented in this **MiniProject** entitled  **"Room and Roomamte finder"** for the award of **Bachelor of Technology** from Dr. APJ Abdul Kalam Technical University, Lucknow under our supervision. The report embodies results of original work, and studies are carried out by the student herself and the contents of the thesis do not form the basis for the award of any other degree to the candidate or to anybody else from this or any other University/Institution.

**Supervisor Signature**                                    Signature

Mr. Satyendra Singh Godara                     Dr.Hoshiyar Singh Kanyal

Assistant Professor (CSE)                          Head of Department (CSE)

ABES Institute of Technology                    ABES Institute of Technology

Date:

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Date:

Place: Ghaziabad

**Name:** Ayush Kumar

**Roll. No. :**2202900100061

**Name:** Ayush Sharma

**Roll. No. :**2202900100062

**Name:** Ayush Singh

**Roll. No. :**2202900100063

**Name:** Chaitanya Balyan

**Roll. No. :** 2202900100068

**Department :** Computer Science and Engineering


 Signature-_____

# INTRODUCTION

In today's digital age, finding accommodations and compatible roommates has become an increasingly common challenge, with online platforms emerging as the primary solution for individuals looking to streamline this process. **Room and Roommate Finder** is an innovative online platform designed to provide a user-friendly and efficient way for individuals to search for rooms or roommates based on specific criteria such as location, budget, and lifestyle preferences. The platform simplifies the process by enabling users to list, browse, and connect with others through an intuitive interface, with data securely managed using MongoDB.

Built with modern web technologies such as **Node.js, Express.js, MongoDB, HTML, and Tailwind CSS**, **Room and Roommate Finder** delivers a seamless and reliable user experience. The platform integrates essential features like detailed room and roommate profiles, personalized search filters, user authentication, and a contact form for support. By fostering easy communication between users, the platform aims to make the search for rooms and roommates stress-free and effective.

**Room and Roommate Finder** is not only designed to meet the current needs of users but also to scale as more users join the platform. With the ability to handle increasing numbers of room listings and user interactions, it is built with performance and security in mind. By leveraging MongoDB for flexible data management and Node.js for efficient server-side processing, **Room and Roommate Finder** ensures a high-performing and scalable solution for users seeking accommodations or roommates.

## Purpose:

The primary purpose of the **Room and Roommate Finder** platform is to provide a simplified and personalized experience for individuals seeking housing solutions. It achieves this through several key features:

- **Simplified Room and Roommate Search:** Users can filter listings based on location, budget, lifestyle preferences, and other criteria, ensuring they find accommodations or roommates that best match their needs.
- **Efficient Matching Process:** Once a user finds a suitable room or roommate, they can easily connect through the platform's communication system, ensuring a streamlined and user-friendly process.

- **Secure Data Handling:** The platform ensures the safety and privacy of user data by securely storing it in MongoDB. User profiles and preferences are protected using encryption and secure access protocols.

- **Support and Communication:** A dedicated Contact Us page allows users to report any issues or concerns, ensuring timely assistance and a high-quality user experience.

- **Scalability and Real-Time Updates:** The platform is designed to scale effectively, managing a growing number of listings and users. MongoDB's dynamic data management capabilities and Node.js' asynchronous operations ensure that updates are reflected in real time without compromising performance.

Through **Room and Roommate Finder**, the aim is to bridge the gap between those seeking housing and those offering it, providing a digital platform that is accessible, fast, and reliable. By improving the overall search and matching process, the platform seeks to enhance the experience of finding rooms and roommates, making it convenient and accessible to a wider audience.

# INITIAL RESEARCH/LITERATURE SURVEY

Before starting the development of the **Room and Roommate Finder** platform, extensive research was conducted on existing accommodation and roommate-finding platforms, relevant technologies, and user requirements. The goal was to identify key features and best practices while understanding the technical landscape to ensure that **Room and Roommate Finder** would offer an innovative and competitive solution.

This research involved studying various accommodation and roommate-matching platforms, analyzing current trends in web development, and exploring best practices for backend services, user interfaces, and security. The following sections outline the supporting information, comparisons with similar platforms, and the technical background considered for the project.

## 1. Supporting Information

**Roommate-Finding Platforms:**

These platforms help users find rooms or compatible roommates based on preferences such as location, budget, and lifestyle. Common features include:

- **Search Filters:** Allow users to filter listings based on specific criteria, such as budget, location, and preferences (e.g., smoking or pet-friendly).
- **User Authentication:** Enables users to create accounts and manage profiles.
- **Profile Listings:** Detailed user profiles to help match roommates based on preferences and compatibility.
- **Contact Features:** Direct messaging or contact options for secure communication between users.

**Examples of popular platforms:**

- **Roomster:** Provides comprehensive filters and advanced matching tools for finding roommates.
- **SpareRoom:** Focuses on connecting people looking for rooms or roommates through detailed profiles.
- **Craigslist:** A widely used platform for housing searches, though it lacks modern matching tools and security features.

● **BunkUp:** Offers advanced roommate matching based on personal preferences and habits.

## 2. <u>Technologies Used</u>

For developing **Room and Roommate Finder**, a modern and scalable tech stack was selected:

● **Node.js:** Provides a fast and efficient backend for handling user requests and managing API endpoints.
● **Express.js:** A minimal and flexible framework for building RESTful APIs and server-side logic.
● **MongoDB:** A NoSQL database, ideal for storing user data, room listings, and roommate preferences with scalability and flexibility.
● **HTML, CSS, and Tailwind CSS:** Used to create responsive, clean, and visually appealing user interfaces.
● **JavaScript:** Core scripting language for implementing dynamic front-end interactions.

## 3. <u>Discussions & Background Reading</u>

**Key Takeaways from Existing Platforms:**

● **Matching Algorithms:** Platforms like Roomster and BunkUp use advanced algorithms to match roommates based on preferences. While **Room and Roommate Finder** does not yet have such a feature, it is a planned enhancement.
● **Security Considerations:** Protecting user data is crucial. **Room and Roommate Finder** employs MongoDB for secure data storage and plans to implement token-based authentication for enhanced security.
● **Mobile Responsiveness:** Most successful platforms are mobile-friendly. Tailwind CSS was chosen to ensure responsive design and accessibility across devices.
● **User-Centric Design:** Platforms like SpareRoom excel by providing detailed user profiles, enabling better matches. **Room and Roommate Finder** follows this approach by incorporating comprehensive profile details.

# 4. <u>Comparison Table</u>

The following table highlights the features of **Room and Roommate Finder** in comparison with existing platforms:

| Features | Roommate Finder | Spare Room | Craigslist | Roomster |
|---|---|---|---|---|
| **Search Filters** | Budget, Location, LifeStyle | Yes | Limited | Yes |
| **User Authentication** | Yes(Secure Login) | Yes | No | Yes |
| **Profile Listing** | Yes(Detailed Profiles) | Yes | Limited | Yes |
| **Real time Updates** | Yes (Mongo db) | No | No | No |
| **Contact form** | Yes | Yes | No | Yes |
| **Mobile Friendly** | Yes | Yes | Limited | Yes |

## 5. <u>Early Background Reading on Technologies</u>

- **Node.js and Express.js:** These technologies enable the development of scalable and efficient server-side applications. Their asynchronous nature ensures fast responses and smooth handling of user interactions.
- **MongoDB:** The flexibility of MongoDB allows for the efficient organization of user data and listings. Its scalability makes it ideal for handling increasing platform usage.
- **Tailwind CSS:** This utility-first CSS framework facilitates rapid development of responsive and attractive UIs. Its pre-defined classes ensure consistent styling across the application.
- **HTML and CSS:** Foundational technologies for structuring and styling the application's interface, ensuring browser compatibility.

## 6. <u>Conclusion of the Literature Survey</u>

The research highlighted the importance of creating a secure, user-friendly, and scalable platform for finding rooms and roommates. Studying existing platforms helped identify essential features, including search filters, user authentication, and secure data storage. Future enhancements such as advanced roommate-matching algorithms and notification systems will further improve the platform's usability.

The use of technologies like Node.js, Express.js, MongoDB, and Tailwind CSS provided a robust foundation for building a modern, high-performing platform. By continuously evolving, **Room and Roommate Finder** aims to meet the growing needs of its users, making the search for accommodations and compatible roommates seamless and efficient.

**Broad Aims of the Work**

**1. To Create a User-Friendly Roommate-Finding Portal:**

The platform will feature an intuitive interface where users can search for rooms and roommates effortlessly. With options to filter results based on budget, location, and lifestyle preferences (e.g., pet-friendly, smoking preferences), the portal will make the process straightforward and accessible.

**2. To Provide Real-Time Data Management and Processing:**

The platform will leverage MongoDB to implement real-time updates, ensuring that listings and user interactions are reflected instantly. This feature allows users to see up-to-date availability and preferences, making the search process dynamic and reliable.

**3. To Enhance Personalization and Filter Options for Users:**

Advanced filtering options will be provided, enabling users to tailor their searches according to specific criteria. These filters will include room types, rental costs, and personal preferences, helping users find the most compatible options quickly.

**4. To Implement Secure and Scalable User Authentication:**

Security is a top priority. The platform will use secure login methods, such as token-based authentication, to protect user accounts and data. MongoDB's encryption and security rules will ensure that sensitive information is stored and accessed securely.

**5. To Simplify the Room and Roommate Search Process:**

The platform will streamline the process of finding and connecting with roommates. Users will be able to browse detailed profiles and listings, send messages, and finalize their decisions with minimal effort.

**6. To Develop a Contact Support System for User Issues:**

A dedicated **Contact Us** page will allow users to report issues, ask questions, or seek assistance. This feature ensures that any technical or user-related problems are addressed promptly, enhancing overall user satisfaction.

**7. To Build a Scalable and Performant Platform:**

The platform will be built with scalability in mind, using modern technologies like Node.js, Express.js, and MongoDB for the backend. Tailwind CSS and HTML will ensure a responsive

and visually appealing interface, while the platform will handle increasing users and listings without compromising performance.

**8. To Facilitate User Interaction and Compatibility Matching:**

By offering detailed user profiles and compatibility indicators, the platform will help users connect with roommates who share similar lifestyles and preferences. This feature fosters a sense of trust and collaboration between users.

**Visual Representation:**

- A clean, modern web page showing advanced filtering options such as budget sliders, location maps, and roommate preferences.
- Real-time updates represented by dynamic notifications and instantly updated listings.
- Secure login and data protection illustrated by icons like locks and user authentication symbols.
- Simplified search results with visually appealing cards displaying room details and roommate profiles.

Let me generate a concept image to visually represent the essence of the **Room and Roommate Finder** platform.

Here is a visual concept of the **Room and Roommate Finder** platform interface, designed to illustrate the modern and user-friendly features described. It showcases advanced filters, detailed listings, and compatibility indicators for an intuitive user experience.

# 2. <u>System Design and Architecture</u>

**Objective:** To design the overall architecture of the "Room and Roommate Finder" platform, detailing the structure of the database, user interfaces, and interactions.

User Interface Design:

The platform will have a user-friendly and intuitive interface to enable users to easily browse room listings, find roommates, apply for rooms, and manage their profiles. The user interfaces will be designed as follows:

- Job Seeker Interface (Room Seeker): This will allow users (room seekers) to browse available rooms, filter listings based on preferences (e.g., budget, location, etc.), and send requests to room owners. The user can track their applications and communicate with potential roommates.
- Employer Interface (Room Owner): Room owners (landlords) will have a dashboard where they can list their available rooms, manage listings, view incoming applications, and communicate with room seekers. The dashboard will allow for easy addition, removal, and modification of room listings.
- Responsive and Modern Design: The UI will be built using HTML and styled with Tailwind CSS to ensure it is responsive, clean, and modern. Users will have a seamless experience across devices (desktop, tablet, mobile).
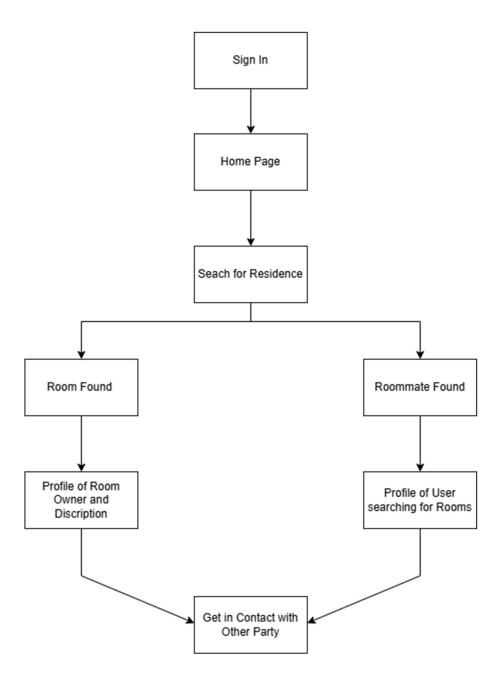

Wireframes and UI mockups will be created for the following screens:

- Home page (room seeker and room owner options)
- Listings page (with filter options)
- Room details page (with application options)
- Profile management page
- Messaging and application management for both room seekers and owners


**Database Architecture:**

The platform will use MongoDB as the database to store all relevant information in a NoSQL document-based format. The following collections will be used to structure the data:

# Flow Chart

```
                    ┌─────────────┐
                    │   Sign In   │
                    └──────┬──────┘
                           │
                           ▼
                    ┌─────────────┐
                    │  Home Page  │
                    └──────┬──────┘
                           │
                           ▼
                 ┌────────────────────┐
                 │ Seach for Residence│
                 └─────────┬──────────┘
                           │
          ┌────────────────┴────────────────┐
          ▼                                  ▼
   ┌─────────────┐                   ┌─────────────────┐
   │ Room Found  │                   │ Roommate Found  │
   └──────┬──────┘                   └────────┬────────┘
          │                                   │
          ▼                                   ▼
   ┌─────────────┐                   ┌─────────────────┐
   │Profile of Room│                 │ Profile of User │
   │  Owner and    │                 │searching for Rooms│
   │  Discription  │                 └────────┬────────┘
   └──────┬────────┘                          │
          │                                   │
          └──────────────┐   ┌────────────────┘
                         ▼   ▼
                  ┌──────────────────┐
                  │ Get in Contact with│
                  │    Other Party    │
                  └──────────────────┘
```

1. Users Collection:
   o This collection will store user profiles, both for room seekers and room owners.
   o Fields:
     ▪ userId (unique identifier)
     ▪ name

- email (for authentication)
- role (room seeker/room owner)
- profilePicture
- bio (optional)
- location
- preferences (for room seekers)

2. Room Listings Collection:
   - Stores information about rooms available for rent.
   - Fields:
     - roomId (unique identifier)
     - ownerId (reference to the user who owns the room)
     - title
     - description
     - price
     - location
     - amenities (e.g., WiFi, AC, etc.)
     - availableFrom (date)
     - photos (URLs or file references)

3. Applications Collection:
   - Stores applications made by room seekers to room owners.
   - Fields:
     - applicationId (unique identifier)
     - seekerId (reference to room seeker)
     - roomId (reference to room listing)
     - message (optional message from seeker)
     - status (pending/accepted/rejected)

4. Messages Collection (Optional):
   - Stores messages exchanged between room seekers and owners.
   - Fields:
     - messageId (unique identifier)
     - senderId (reference to the user sending the message)
     - receiverId (reference to the user receiving the message)
     - message
     - timestamp

## 4. Testing and Quality Assurance

Objective: To ensure the functionality, security, and performance of the Room and Roommate Finder platform through rigorous testing.

1. Unit Testing:
   Conduct unit tests for individual components of the platform, including:
   a. Room search filters
   b. Room application forms
   c. User registration and login
   d. Application management (room seeker and room owner functions)
2. Tools like Jest and Mocha can be used for testing backend logic, while React Testing Library can be used for frontend components.
3. Integration Testing:
   Test the integration between the frontend and backend to ensure smooth data flow. For example, verifying that when a room seeker applies for a room, the data is correctly saved in the backend and reflected on the room owner's dashboard.
4. Security Testing:
   Conduct security assessments, including:
   a. Validating the integrity of user authentication (ensuring no unauthorized access)
   b. Verifying that data storage and retrieval (especially sensitive information like passwords) are secure
   c. Checking for potential vulnerabilities like SQL injection and cross-site scripting (XSS)
5. Usability Testing:
   Perform user acceptance testing (UAT) with real room seekers and room owners to gather feedback on the user experience, UI design, and overall flow of the platform. This will help identify any usability issues and refine the platform before launch.

## 5. Deployment and Launch

Objective: To deploy the application in a production environment and make it accessible to users.

1. Hosting and Deployment:

a. Host the frontend on platforms like Vercel, Netlify, or AWS ensuring that the user interface is responsive and loads quickly.

b. The backend (Node.js/Express.js) will be deployed on platforms such as Heroku or DigitalOcean for efficient scalability and performance.

c. MongoDB Atlas will be used for cloud-based MongoDB hosting to handle the database requirements.

2. Monitoring and Bug Fixing:

Set up monitoring tools (like New Relic or Datadog) to track the performance and health of the platform. Bugs and performance issues will be addressed as they arise, ensuring a smooth user experience and minimal downtime.

## 6. Maintenance and Future Enhancements

Objective: To ensure the platform remains up to date and continuously improves based on user feedback and emerging requirements.

1. Post-Launch Support:

After launch, provide ongoing support for bug fixes, performance improvements, and troubleshooting based on user feedback.

2. Feature Enhancements:

Based on user feedback, new features such as:

a. Room alerts (notifications when a new room matches their preferences)

b. Profile enhancements (roommate preferences, social features)

c. Additional filters for better room matching

3. Scalability Improvements:

As the platform grows, future optimizations will be made to ensure it can handle increasing data and user traffic. Techniques such as database indexing, load balancing, and caching will be implemented to ensure the platform remains fast and reliable.

## 7. Conclusion of Methodology

The methodology for the Room and Roommate Finder project follows a clear structure to ensure a seamless development process. From designing an intuitive and responsive frontend to building a robust backend with Node.js, Express.js, and MongoDB, the platform will be user-centric, secure, and scalable. The integration of real-time data handling ensures that room seekers and room owners can interact smoothly, while authentication and session management with JWT will maintain security and data privacy. The project will undergo thorough testing

to ensure functionality, security, and usability, followed by deployment and continuous maintenance to keep the platform relevant and functional.

Flowcharts (for Workflow Representation)

Flowcharts can be created to represent:

- Room Seekers Workflow (Search, Apply, Track Applications)
- Room Owners Workflow (Create Listings, View Applications, Respond)
- Authentication Flow (Login, Register, Password Reset)

# **CONCLUSION**

The Room and Roommate Finder platform is designed to simplify the process of finding a room and connecting with roommates. By offering an intuitive, secure, and feature-rich application, the platform addresses the key challenges of the current rental market. The use of modern technologies such as Node.js, Express.js, MongoDB, and Tailwind CSS ensures the platform is scalable, responsive, and easy to use. The combination of real-time data management, secure authentication, and a user-friendly interface will greatly enhance the room-seeking experience. Future enhancements and continuous monitoring will ensure that the platform evolves to meet the changing needs of its users.

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