### Project Title

A Major Project - I

*Submitted in partial fulfillment of the requirements for the degree of*

## Bachelor of Technology

**Computer Science and Engineering**

( 7th Semester )

Submitted by:

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Under the Guidance of

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**Baderia Global Institute Of Engineering & Management, Jabalpur (M.P.)**

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2023

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# Certificate

This is to certify that the **Major Project - I** report entitled “**Room Roots”** submitted by **YASHWANT KUMAR MARAVI**  has been carried out under my guidance & supervision. The project report is approved for submission towards partial fulfillment of the requirement for the award of degree of **Bachelor of Engineering** in **Computer Science and Engineering** from “**Rajiv Gandhi Proudyogiki Vishwavidyalaya”, Bhopal (M.P).**

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# Certificate

This is to certify that the **Major Project - I** report entitled “**Room Roots”** submitted by **YASHWANT KUMAR MARAVI**  for submission towards partial fulfillment of the requirement for the award of degree of **Bachelor of Engineering** in **Computer Science and Engineering** from “**Rajiv Gandhi Proudyogiki Vishwavidyalaya”, Bhopal (M.P).**

**Internal Examiner External Examiner**

**Date Date**

## CANDIDATE’S DECLARATION

I hereby declare that the Major Project I work being presented in this report entitled **“Room Roots”** submitted in the department of Computer Science and Engineering, **Faculty of Technology**, Baderia Global Institute of Engineering & Management, Jabalpur (M.P.) is the authentic work carried out by our team under the guidance of Professor Abhishek Singh, Department of Computer Science and Engineering, Baderia Global Institute of Engineering & Management, Jabalpur (M.P.).

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We would like to express special thanks of gratitude to our Professor Abhishek Singh, who gave us the golden opportunity to do this wonderful project on the topic **“Room Roots”**, which also helped us in doing a lot of research and we came to know about so many new things, we are really thankful to them.

Secondly, we would also like to thank our friends who helped me a lot in finalizing this project within the limited time frame.

Students Name :

**YASHWANT KUMAR MARAVI - 0225CS213D19**

Date / /

**Table of Contents**

1. Title Page
2. Certificate of HOD & Guide
3. Abstract
4. Table of Contents (Chapters)
5. Table of Figures
6. **Chapter 1 : Introduction**
   1. Title of Project 08
   2. Introduction of Project 08
   3. Objective of Project 08
      1. Existing problem 08
      2. solution 09
   4. Project Category 10
      1. Type of Project 10
      2. Frontend used 10
      3. Backend Used 10
   5. Structure of Project
      1. Proposed system 10
         1. Registration 11
         2. Login 11
         3. Administration 11
         4. Customer fees 11
      2. Future scope of project 12
7. **Chapter 2 : Study and Analysis phase**
   1. Feasibility study 12
      1. Statement 12
      2. Recommendations 13
      3. Findings 13
      4. Conclusions 13
   2. Types of studies performed 13
      1. technical feasibility 13
      2. Operational feasibility 13
      3. Economical feasibility 14
      4. Behavioral feasibility 14
   3. Proposed system functionality
      1. Functions & features of project 15
   4. Software engineering applied 15
8. **Chapter 3 : Design & Development phase**
   1. Phases of Project development 16
      1. Requirement analysis 16
      2. Software design 16
      3. Coding 16
      4. Testing 17
      5. Implementation 17
   2. Paradigm applied
      1. model explanation 18
   3. Applications 19
      1. Advantages 19
   4. Project development
      1. Topic understanding 19
      2. Modular breakup of Project 20
      3. DFD (Data flow Diagram) 20
9. **Chapter4: Requirements**

**& Use Case Diagram**

* 1. Study of requirements
     1. User requirements 25
     2. System requirements 25
     3. User Interface 25
  2. AWT(Abstract Windowing toolkit) and Swing 25

1. **Chapter 5 : Conclusion & System requirements**
   * 1. Goal achieved 26
     2. User friendliness 26
     3. Hardware requirements 27
     4. Software requirements 27
2. **Chapter 1: Introduction:**

**1.2 Introduction of Project**

The Room Roots is designed to streamline and simplify the process of managing rental properties. In today's dynamic real estate environment, property owners and tenants face numerous challenges in terms of communication, documentation, and financial transactions. This system aims to provide a comprehensive solution to address these challenges and enhance the overall rental experience.

**1.3 Objective of Project**

**1.3.1 Existing Problem:**

The existing problem in the traditional rental management process includes inefficient communication between landlords and tenants, manual record-keeping, and a lack of transparency in financial transactions. These issues often lead to misunderstandings, delayed payments, and difficulty in tracking property maintenance.

**1.3.2 Solution:**

The Room Roots proposes an integrated platform where landlords, tenants, and administrators can efficiently interact. By automating processes such as rent collection, maintenance requests, and document management, the system aims to provide a seamless experience for all stakeholders. This solution enhances transparency, reduces errors, and ensures timely communication.

**1.4 Project Category:**

**1.4.1 Type of Project**

The Room Roots is a web-based application, providing accessibility across various devices. Users can access the system through web browsers, ensuring convenience and flexibility.

**1.4.2 Frontend Used**

The frontend of the system is developed using React.js, a popular JavaScript library for building user interfaces. The choice of React.js ensures a responsive and user-friendly interface for both landlords and tenants.

**1.4.3 Backend Used**

The backend of the system is powered by Node.js and Express.js, offering a scalable and efficient server-side environment. MongoDB is employed as the database to store and manage property, user, and transactional data.

**1.5 Structure of Project**

**1.5.1 Proposed System**

The Room Roots is structured into key modules to facilitate efficient management and user interaction.

**1.5.1.1 Registration**

The registration module allows property owners and tenants to create accounts, providing necessary details for identification and communication purposes.

**1.5.1.2 Login**

Users can log in securely to access their personalized dashboards, where they can view property details, payment history, and submit maintenance requests.

**1.5.1.3 Administration**

Administrators have access to a dedicated interface for overseeing and managing all properties, user accounts, and financial transactions. This module ensures centralized control and efficient monitoring.

**1.5.1.4 Customer Fees**

This module automates the process of rent collection, providing landlords and tenants with a transparent record of payments and due dates.

**1.5.2 Future Scope of Project**

The Room Roots has the potential for future enhancements, including integration with online payment gateways, advanced reporting features, and AI-driven analytics for property management optimization. Continuous updates will be made to align the system with emerging technologies and user needs.

This expanded introduction provides a detailed overview of the Room Roots, covering its objectives, the problem it addresses, the technology stack used, and the proposed structure of the project.

1. **Chapter 2 : Study and Analysis phase**

**2.1 Feasibility Study**

**2.1.1 Statement**

The feasibility study for the Room Roots was conducted to assess the viability and practicality of implementing the proposed system. This involved an in-depth analysis of various aspects, including technical, operational, economical, and behavioral factors.

**2.1.2 Recommendations**

Based on the feasibility study, it is recommended to proceed with the development and implementation of the Room Roots. The study indicated positive outcomes in terms of addressing existing problems, enhancing efficiency, and providing a user-friendly experience.

**2.1.3 Findings**

The findings from the feasibility study highlighted the potential benefits of the system, including improved communication between landlords and tenants, streamlined rent collection processes, and enhanced transparency in property management. Additionally, the study identified that the proposed technology stack is suitable for the intended functionalities.

**2.1.4 Conclusions**

In conclusion, the feasibility study suggests that the Room Roots is a viable and beneficial solution for addressing the identified problems in rental property management. The positive outcomes and findings support the decision to move forward with the project.

**2.2 Types of Studies Performed**

**2.2.1 Technical Feasibility**

The technical feasibility study focused on assessing the compatibility of the chosen technologies (React.js, Node.js, Express.js, and MongoDB) for developing a robust and scalable Room Roots. The findings indicated that these technologies are well-suited for the project's requirements.

**2.2.2 Operational Feasibility**

Operational feasibility involved evaluating whether the proposed system aligns with the existing operations of property owners, tenants, and administrators. The study concluded that the system integrates seamlessly with daily operations, offering a user-friendly interface and efficient management features.

**2.2.3 Economical Feasibility**

Economical feasibility assessed the financial aspects of implementing the Room Roots. The study considered development costs, potential savings in time and resources, and the overall return on investment. The results demonstrated that the system is economically feasible, with the potential for long-term cost benefits.

**2.2.4 Behavioral Feasibility**

Behavioral feasibility analyzed how well the proposed system aligns with the behavior and preferences of users. The study found that the user-friendly interface and intuitive features contribute to high behavioral feasibility, ensuring user acceptance and satisfaction.

**2.3 Proposed System Functionality**

**2.3.1 Functions & Features of Project**

The Room Roots offers a range of functions and features, including user registration, secure login, property management, rent collection, maintenance request submission, and administrative oversight. The system prioritizes ease of use, transparency, and efficient communication among stakeholders.

**2.4 Software Engineering Applied**

The development of the Room Roots follows established software engineering principles, including requirements analysis, design, implementation, testing, and maintenance. Agile methodologies are employed to ensure flexibility and responsiveness to evolving project needs. Regular testing and quality assurance measures are implemented to guarantee a reliable and effective system.

This chapter provides an overview of the feasibility study conducted for the Room Roots, outlining key findings, recommendations, and conclusions. Additionally, it details the types of studies performed, emphasizing technical, operational, economical, and behavioral feasibility. The proposed system functionality and the application of software engineering principles are also discussed.

**Chapter 3: Design & Development Phase**

**3.1 Phases of Project Development**

**3.1.1 Requirement Analysis**

The requirement analysis phase involved a comprehensive study of the needs and expectations of the users, including property owners, tenants, and administrators. Detailed use cases, user stories, and system requirements were identified to establish the foundation for the Room Roots

**3.1.2 Software Design**

The software design phase translated the gathered requirements into a detailed architectural blueprint. This included defining the system's structure, interfaces, modules, and data management strategies. The design prioritized scalability, flexibility, and an intuitive user experience.

**3.1.3 Coding**

During the coding phase, the actual development of the Room Roots took place. The chosen technologies, React.js for the frontend and Node.js with Express.js for the backend, were utilized to implement the design. Clean and modular coding practices were followed to facilitate maintenance and future enhancements.

3.1.4 Testing

A rigorous testing process was employed to ensure the reliability and functionality of the system. Unit testing, integration testing, and user acceptance testing were conducted to identify and address any bugs or inconsistencies. The testing phase aimed to deliver a stable and error-free Room Roots.

**3.1.5 Implementation**

The implementation phase involved deploying the system to a live environment, making it accessible to users. Data migration, user training, and system monitoring procedures were executed to guarantee a smooth transition from development to real-world usage.

**3.2 Paradigm Applied**

**3.2.1 Model Explanation**

The Room Roots was developed using the Agile software development paradigm. Agile methodologies, including Scrum, were applied to promote flexibility and collaboration throughout the development process. Regular sprint cycles allowed for incremental feature additions, continuous feedback, and adaptability to changing requirements.

**3.3 Applications**

**3.3.1 Advantages**

The application of the Agile paradigm in the development of the Room Roots offered several advantages. These include:

Flexibility: Agile allowed for changes and additions to be incorporated easily, ensuring the system adapted to evolving needs.

User Involvement: Regular feedback loops involved stakeholders, ensuring the final product met user expectations.

Incremental Development: The system was built incrementally, allowing for early delivery of valuable features and continuous improvement.

**3.4 Project Development**

**3.4.1 Topic Understanding**

In the initial stages of project development, a deep understanding of the house rental management domain was established. This involved studying existing property management processes, identifying pain points, and envisioning an improved and efficient solution.

**3.4.2 Modular Breakup of Project**

The Room Roots was developed with a modular structure to enhance maintainability and scalability. Key modules include User Management, Property Management, Rent Collection, Maintenance Requests, and Administrative Oversight. Each module functions independently, contributing to the overall cohesiveness of the system.

**3.4.3 DFD (Data Flow Diagram)**

The Data Flow Diagram (DFD) was used to represent the flow of data within the Room Roots It provided a visual representation of how information moves between different modules, emphasizing the input, processing, and output stages. The DFD helped in understanding and optimizing data flow for enhanced system efficiency.

This chapter outlines the various phases of the development of the Room Roots, from requirement analysis to implementation. The Agile development paradigm was applied, and its advantages in promoting flexibility and user involvement are discussed. The modular breakup of the project and the use of a Data Flow Diagram are highlighted to illustrate the systematic development approach.

**Chapter 4: Requirements & Use Case Diagram**

**4.1 Study of Requirements**

**4.1.1 User Requirements**

User requirements for the Room Roots were identified through extensive consultations with potential users, including property owners, tenants, and administrators.

Landlord Requirements:

User-friendly property listing and management interface.

Transparent financial tracking of rent payments.

Instant notifications for maintenance requests.

Tenant Requirements:

Intuitive and secure login functionality.

Access to property details, lease agreements, and payment history.

Easy submission of maintenance requests.

Administrator Requirements:

Centralized dashboard for overseeing all properties.

Monitoring financial transactions and generating reports.

User management and access control.

**4.1.2 System Requirements**

The system requirements for the Room Roots were derived from user needs and technical considerations.

**Technical Requirements:**

Web-based application accessible through popular browsers.

Compatibility with various devices (desktop, tablet, mobile).

Secure data encryption for user authentication.

Functional Requirements:

User registration and authentication.

Property listing and management functionalities.

Rent collection and transparent financial tracking.

Maintenance request submission and tracking.

**4.1.3 User Interface**

The user interface design prioritizes simplicity and efficiency to ensure a positive user experience.

**Landlord Interface:**

Intuitive property management dashboard.

Visual representation of financial transactions.

Quick access to tenant communication.

**Tenant Interface:**

Easy-to-navigate dashboard displaying property details.

Transparent rent payment history.

User-friendly maintenance request submission.

**Administrator Interface:**

Centralized dashboard for property oversight.

Detailed financial reports and transaction history.

Efficient user management and access controls.

**4.2 AWT (Abstract Windowing Toolkit) and Swing**

In the development of the Room Roots, AWT and Swing were not utilized. Instead, the system was built using modern web technologies, with React.js for the frontend. React.js provides a component-based architecture for building interactive user interfaces, offering a more dynamic and responsive experience compared to traditional desktop-based UI frameworks.

The decision to use web technologies aligns with the goal of providing accessibility across various devices and platforms. AWT and Swing, being Java-based UI frameworks, were not chosen to ensure a more lightweight and versatile application that can be accessed through standard web browsers.

This chapter provides a detailed study of user and system requirements for the Room Roots, outlining the specific needs of landlords, tenants, and administrators. The user interface design principles are also discussed, emphasizing simplicity and efficiency. Additionally, it clarifies that AWT and Swing were not employed in favor of modern web technologies for the project's frontend.

**Chapter 5: Conclusion & System Requirements**

**5.1 Conclusion**

**5.1.1 Goal Achieved**

The primary goal of developing the Room Roots was successfully achieved. The system provides an efficient and transparent platform for property owners, tenants, and administrators to manage rental properties. Key accomplishments include:

Improved Communication: The system facilitates streamlined communication between landlords and tenants, reducing misunderstandings and delays.

Transparent Financial Tracking: Landlords can easily track rent payments, and tenants have access to transparent payment histories.

Efficient Property Management: Administrators benefit from centralized oversight, enabling them to manage properties and financial transactions with ease.

**5.1.2 User Friendliness**

The user-friendliness of the Room Roots has been a priority throughout the development process. Feedback from users during testing and implementation phases has been positive, indicating that the system is intuitive and easy to navigate.

Intuitive Interfaces: The interfaces for landlords, tenants, and administrators have been designed to be user-friendly, ensuring a positive user experience.

Ease of Access: The web-based nature of the system allows users to access it from various devices, contributing to its user-friendly nature.

**5.2 System Requirements**

**5.2.1 Hardware Requirements**

The Room Roots is designed to be lightweight and compatible with standard hardware configurations. The following are the minimal hardware requirements:

Processor: Dual-core processor or equivalent

RAM: 4 GB or higher

Storage: 5 GB free disk space

Network: High-speed internet connection for seamless accessibility

**5.2.2 Software Requirements**

The Room Roots is developed using modern web technologies. Users need standard web browsers to access the system. The following software requirements are necessary:

Web Browsers: Google Chrome, Mozilla Firefox, Safari, or Microsoft Edge

Operating System: Windows 10, macOS, Linux, or equivalent

Internet Connection: Stable high-speed internet connection for optimal performance

7.3 Future Enhancements

The Room Roots has a solid foundation for future enhancements. Potential improvements and features to be considered in future releases include:

Integration with Payment Gateways: To facilitate online rent payments.

Advanced Reporting: Providing in-depth financial and property management reports.

AI-driven Analytics: Implementing artificial intelligence for predictive property management insights.

7.4 Overall Assessment

The Room Roots has proven to be a valuable solution for addressing the challenges in rental property management. It meets the needs of landlords, tenants, and administrators, providing a user-friendly experience and transparent property oversight. Continuous updates and enhancements are planned to ensure the system remains aligned with emerging technologies and user expectations.

This chapter concludes the documentation for the Room Roots, summarizing the achievements, user-friendliness, and system requirements. It also outlines potential future enhancements to keep the system evolving and meeting the needs of users in the dynamic real estate environment.