COLLEGE HOSTEL BOOKING SYSTEM

A PROJECT REPORT

Submitted by

JAYASHREE S (8115U23AM023)

in partial fulfillment of requirements for the award of the course

CGB1201 - JAVA PROGRAMMING

In

DEPARTMENT OF

COMPUTER SCIENCE AND ENGINEERING

(ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

K. RAMAKRISHNAN COLLEGE OF ENGINEERING

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by AICTE, New Delhi)

SAMAYAPURAM – 621 112

DECEMBER - 2024

K. RAMAKRISHNAN COLLEGE OF ENGINEERING (AUTONOMOUS)

SAMAYAPURAM – 621 112

BONAFIDE CERTIFICATE

Certified that this project report on **" COLLEGE HOSTEL BOOKING SYSTEM"** is the bonafide work of **JAYASHREE. S (8115U23AM023)** who carried out the project work during the academic year 2024 - 2025 under my supervision.

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Submitted for the End Semester Examination held on …….

INTERNAL EXAMINER **EXTERNAL EXAMINER**

DECLARATION

I declare that the project report on "**COLLEGE HOSTEL BOOKING SYSTEM"** is the result of original work done by us and best of our knowledge, similar work has not been submitted to **"ANNA UNIVERSITY CHENNAI"** for the requirement of Degree of **BACHELOR OF ENGINEERING**. This project report is submitted on the partial fulfillment of the requirement of the award of the course **CGB1201 – JAVA PROGRAMMING.**

Signature

_____

JAYASHREE S

Place: Samayapuram

Date:

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INSTITUTE VISION AND MISSION

VISION OF THE INSTITUTE:

To achieve a prominent position among the top technical institutions.

MISSION OF THE INSTIITUTE:

M1: To bestow standard technical education par excellence through state of the art infrastructure, competent faculty and high ethical standards.

M2: To nurture research and entrepreneurial skills among students in cutting edge technologies.

M3: To provide education for developing high-quality professionals to transform the society.

DEPARTMENT VISION AND MISSION

DEPARTMENT OF CSE (ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING)

Vision of the Department

To become a renowned hub for Artificial Intelligence and Machine Learning technologies to produce highly talented globally recognizable technocrats to meet industrial needs and societal expectations.

Mission of the Department

M1: To impart advanced education in Artificial Intelligence and Machine Learning, built upon a foundation in Computer Science and Engineering.

M2: To foster Experiential learning equips students with engineering skills to tackle real-world problems**.**

M3: To promote collaborative innovation in Artificial Intelligence, machine learning, and related research and development with industries.

M4: To provide an enjoyable environment for pursuing excellence while upholding strong personal and professional values and ethics**.**

Programme Educational Objectives (PEOs):

Graduates will be able to:

PEO1: Excel in technical abilities to build intelligent systems in the fields of Artificial Intelligence and Machine Learning in order to find new opportunities**.**

PEO2: Embrace new technology to solve real-world problems, whether alone or as a team, while prioritizing ethics and societal benefits.

PEO3: Accept lifelong learning to expand future opportunities in research and product development.

Programme Specific Outcomes (PSOs):

PSO1: Ability to create and use Artificial Intelligence and Machine Learning algorithms, including supervised and unsupervised learning, reinforcement learning, and deep learning models.

PSO2: Ability to collect, pre-process, and analyze large datasets, including data cleaning, feature engineering, and data visualization..

PROGRAM OUTCOMES (POs)

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in

multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

ABSTRACT

The College Hostel Booking System is a software application designed to simplify and automate the process of hostel room allocation in colleges and universities. This system provides a centralized platform for students to register, view available rooms, and book their accommodation in real-time, ensuring transparency and fairness. It minimizes administrative efforts by automating routine tasks like room status updates, booking confirmations, and record maintenance, replacing traditional manual or paper-based processes. The system incorporates features such as student registration, room management, booking and cancellation functionalities, and reporting tools for hostel administrators. It ensures data accuracy, scalability, and secure handling of sensitive information while promoting sustainability through paperless operations. By providing an efficient and user-friendly interface, the system enhances the overall experience for students and streamlines hostel management for administrators, making it a vital solution for modern campus operations.

ABSTRACT WITH POs AND PSOs MAPPING

ABSTRACT	POs MAPPED	PSOs MAPPED
1. Streamlines the booking process, making it more efficient.	**PO 3**	
2. Ensures accurate tracking of student information and room availability.	**PO 4**	
3. Provides immediate booking and cancellation confirmations to students.	**PO 6**	
4. Reduces administrative overhead for hostel management.		**PSO 1**
5. Improves overall user experience with minimal manual intervention.		**PSO 2**

Note: 1- Low, 2-Medium, 3- High

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CHAPTER 1

INTRODUCTION

1.1 Objective

The objective of a College Hostel Booking System is to streamline and automate the process of hostel room allocation, providing a transparent, user-friendly platform for students and administrators. By digitizing tasks such as room availability checks, bookings, and cancellations, the system reduces administrative overhead and minimizes errors common in manual processes. The system aims to:

1. **Simplification of Processes:** To simplify key processes like student registration, room booking, and cancellation, making them more efficient and less time-consuming.

2. **Real-Time Room Availability:** To provide students and administrators with instant updates on room status, ensuring transparency and eliminating double bookings.

3. **Reduction of Administrative Workload:** To automate routine tasks, such as room allocation and record maintenance, freeing up time for hostel staff to focus on other responsibilities.

4. **Accurate Data Management:** To securely store and manage student details and room information, minimizing errors and improving data.

5. **User-Friendly Interface:** To offer an easy-to-use platform that ensures smooth interaction for users, even without technical expertise.

6. **Scalability for Future Enhancements:** To create a flexible system architecture that can accommodate future upgrades, such as database integration, payment gateways, or advanced reporting features.

7. **Improved User Experience:** To enhance the overall experience for students by providing a seamless and reliable booking system.

The system ultimately aims to address inefficiencies in manual hostel management, improving both operational effectiveness and user satisfaction.

1.2 Overview

The College Hostel Booking System is a digital solution aimed at managing hostel room bookings efficiently within educational institutions. It offers a comprehensive platform where students can register, check room availability, book rooms, and cancel bookings seamlessly. Administrators can use the system to oversee room allocations, monitor occupancy, and maintain records, reducing manual work and potential errors. The system is designed to be user-friendly, enabling students to access real-time information about available rooms and make bookings on a first-come, first-served basis, ensuring fairness and transparency.

It automates key processes like updating room statuses and generating reports, aiding in effective decision-making and planning. Built with scalability in mind, it can accommodate growing student populations and adapt to the addition of new

hostels or room types. Security is a critical aspect, ensuring that student data and booking details are protected. Additionally, by replacing paper-based workflows, the system promotes environmental sustainability. This project not only enhances the user experience for students and administrators but also transforms the management of hostel operations into a streamlined, efficient process.

1.3 Java Programming Concepts

The College Hostel Booking System incorporates several foundational and advanced Java programming concepts. Here's a breakdown of the concepts used in this program:

1. Object-Oriented Programming (OOP)
   - Classes and Objects:
     - Classes like Student, Room, and HostelBookingSystem define the blueprint for entities, while objects are their runtime instances.
   - Encapsulation:
     - Attributes in classes are private (e.g., name, roomNumber), and access is controlled via getter and setter methods, ensuring data integrity.
   - Abstraction:
     - Complex logic (e.g., booking, cancellation) is abstracted into methods like bookRoom() and cancelBooking().
   - Polymorphism (Method Overriding):
     - The toString() method in Student and Room classes is overridden to provide customized string representations.

2. Core Java Collections

- ArrayList:
    - Used to store and manage dynamic lists of students (students) and rooms (rooms), allowing flexible storage and iteration.

3. Control Structures

- Conditional Statements (if-else):
    - Used to check conditions like room availability (if (!room.isBooked())).
- Loops:
    - for loop: Initializes room objects and iterates over them for display.
    - while loop: Implements the main menu logic to keep the program running until the user exits.

4. Exception Handling

- Scanner Input Handling:
    - Used for handling user input (e.g., nextLine(), nextInt()) and preventing runtime errors by handling invalid input gracefully.

5. String Handling

- Manipulation of strings for storing and displaying student names, IDs, and email addresses.
- Methods like nextLine() capture and process string input.

6. Modularity

- Methods:
    - Functions like registerStudent(), viewRooms(), and bookRoom() modularize the code, improving readability and reusability.

7. Basic Input/Output

- Scanner:
    - Used for taking user input from the console.
- System.out.println:
    - Used for displaying messages, menus, and outputs.

8. Data Handling

- Real-time updates to room booking statuses (isBooked attribute).
- Management of dynamic student and room records using ArrayLists.

9. Menu-Driven Programming

- The system employs a menu-driven approach, enabling the user to navigate and execute specific functionalities interactively.

10. Program Flow Control

- Switch Statements:
    - Used in the main menu to handle different user choices efficiently.

11. Overriding and Custom Logic

- The toString() method is overridden to provide meaningful string representations of objects like Student and Room.

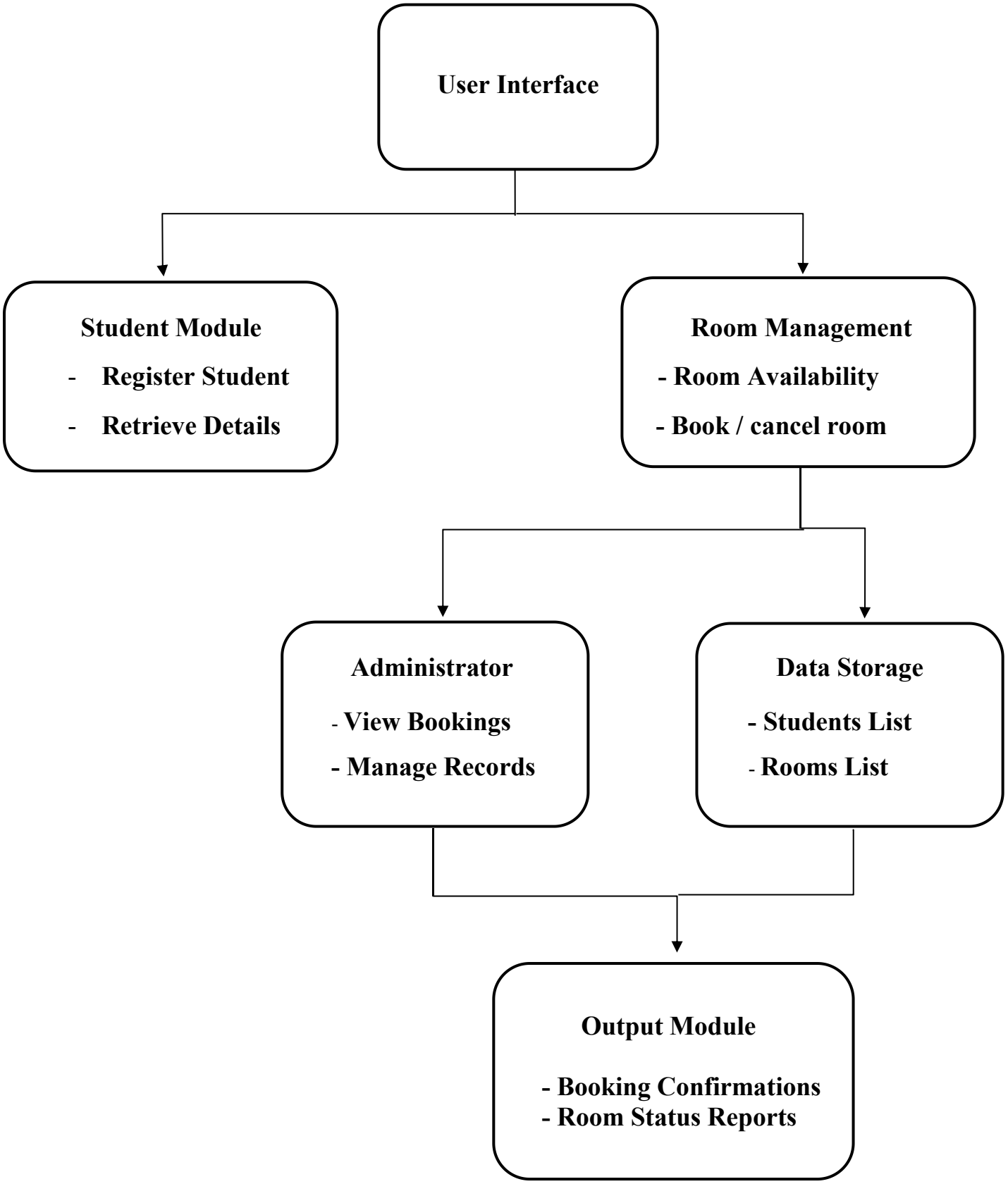
CHAPTER 2
PROJECT METHODOLOGY

2.1 Proposed Work

The proposed College Hostel Booking System aims to create a digital platform to streamline hostel room allocation and management. It will enable students to register, check room availability, book rooms, and cancel bookings, while providing administrators tools to oversee and manage the process. The system will be built using Java with a modular design incorporating key functionalities like student registration, dynamic room status updates, and error handling.

The system will feature a user-friendly, menu-driven interface, with optional future enhancements such as database integration, user authentication, and graphical interfaces. Testing will ensure the system is functional, reliable, and scalable. The project will reduce administrative workload, enhance transparency, and offer a more efficient solution for managing hostel operations in educational institutions.

2.2 Block Diagram



CHAPTER 3
MODULE DESCRIPTION

3.1 Student Module

- Classes/Methods:
    - Class: Student
        - Attributes: name, id, email
        - Methods:
            - getName(): Returns the student's name.
            - getId(): Returns the student's ID.
            - getEmail(): Returns the student's email.
            - toString(): Provides a string representation of the student.
- Functionality:

  This module enables students to register their details, including name, ID, and email, into the system.
- Purpose:

  It ensures accurate record-keeping of student information, which is critical for identifying registered users and linking them to room bookings.
- Process:

  Students input their details via the interface, and the system stores them dynamically in memory (using ArrayList).

3.2 Room Management Module

- Classes/Methods:
    - Class: Room
        - Attributes: roomNumber, isBooked (Boolean to track booking

status)

- Methods:
  - getRoomNumber(): Returns the room number.
  - isBooked(): Returns whether the room is booked or not.
  - bookRoom(): Marks the room as booked.
  - cancelBooking(): Cancels the booking, marking the room as available.
  - toString(): Provides a string representation of the room's status (either booked or available).

- Functionality:

  Displays a list of all hostel rooms along with their current status (Available or Booked).

- Purpose**:**

  Provides an overview of room availability, helping students make informed decisions and enabling administrators to monitor occupancy.

- Process**:**

  The system iterates through the list of rooms, displaying each room's number and status in real-time.

3.3 Hostel Booking System (Main Class)

- Class: HostelBookingSystem
  - Main Method:
    - Initializes a list of rooms (with 10 rooms).
    - Prompts the user with a menu for different functionalities (registering students, viewing rooms, booking rooms, canceling bookings, and exiting).

- Methods:
  - registerStudent(Scanner scanner): Collects student information and registers them.
  - viewRooms(): Displays the status of all rooms (booked or available).
  - bookRoom(Scanner scanner): Allows a student to book a room by entering the room number. Checks if the room is available before booking.
  - cancelBooking(Scanner scanner): Allows a student to cancel a booking by entering the room number. Checks if the room is booked before canceling.
  - menu: The loop where the user is asked to choose from a set of operations: register a student, view rooms, book a room, cancel a booking, or exit the system.

- Functionality**:**

  Allows students to select and book an available room.

- Purpose:

  Automates the allocation of rooms, eliminating manual errors and delays.

- Process**:**

  The student enters the desired room number. The system checks availability and updates the room status if it is free. A confirmation message is displayed.

3.4 User Interface (Console Interaction)

- Functionality:
  - Prompts the user for input choices.

- Accepts user input and invokes the appropriate methods (registerStudent, viewRooms, bookRoom, and cancelBooking).
- Displays relevant messages based on the actions taken (e.g., success or failure in booking a room, student registration success, etc.).

- Purpose**:**

  Simplifies navigation between tasks like registration, booking, viewing rooms, and cancellation.

- Process**:**

  The main menu displays options, and the user selects a task by entering a corresponding choice.

3.5 Data Storage (Using ArrayList)

- Classes/Methods:
  - ArrayList students: Stores the list of all students in the system.
  - ArrayList rooms: Stores the list of all rooms in the hostel.
- Functionality:
  - The system uses ArrayList to dynamically add and store student and room data.
  - This allows for easy addition of new students and rooms during runtime.
- Purpose**:**

  Ensures efficient, in-memory management of data during runtime, enabling smooth operations.

- Process**:**

  The system maintains separate lists for students and rooms, updating them dynamically with each operation.

3.6 Error Handling and Validation

- Purpose: To ensure that invalid or incorrect inputs are handled gracefully.
- Functionality:
    - The system checks whether the room number entered by the user for booking or cancellation is valid.
    - If a user tries to book an already booked room or cancel a room that isn’t booked, appropriate error messages are shown.
    - User inputs are validated using if statements to ensure correct behavior (e.g., booking only available rooms).

CHAPTER 4
RESULTS AND DISCUSSION

Results:

1. Efficient Hostel Room Management:
   The system automates the booking and cancellation processes, reducing manual errors and improving efficiency.

2. Real-Time Room Availability:
   Students can view updated room statuses instantly, ensuring transparency in the allocation process.

3. Streamlined Registration:
   The student registration process ensures proper record-keeping, aiding in identification and communication.

4. User-Friendly Interface:
   A menu-driven structure provides easy navigation and enhances the overall user experience.

5. Dynamic Data Handling:
   The use of ArrayList for managing data ensures flexibility and smooth operation during runtime.

Discussions:

1. Impact on Administrative Work:
   The system significantly reduces the workload for hostel management by automating routine tasks such as room allocation and record maintenance.

2. Scalability:
   While the current implementation uses in-memory storage, integrating a database in the future can make the system scalable for larger hostels.

3. Real-World Usability:
   The modular design ensures that the system can be extended to include features like online payments or notifications, increasing its practicality.

4. Limitations:
   Currently, the system runs as a standalone program without persistent storage, meaning data resets after each run. This can be addressed by integrating database support.

5. Future Improvements:
   Discussions highlighted the potential for adding features such as student login, reports generation, and payment integration to enhance functionality further.

This system demonstrates a practical and efficient solution for managing hostel bookings, with potential for future enhancements to meet evolving user needs.

CHAPTER 5
CONCLUSION & FUTURE SCOPE

5.1 Conclusion:

The College Hostel Booking System provides an efficient, user-friendly, and automated solution for managing hostel room bookings. By integrating key features such as student registration, room management, booking, and cancellation, the system simplifies the traditional manual process and improves operational efficiency. The program employs Object-Oriented Programming (OOP) concepts such as classes, encapsulation, and methods to create modular and maintainable code. The use of ArrayLists for dynamic data storage ensures scalability, while input validation and error handling enhance the system's robustness and user experience. Additionally, the console-based interface allows for easy interaction with students and administrators, ensuring a seamless process for booking and managing rooms.

This system streamlines hostel room allocation, reduces administrative workload, and ensures transparency in the booking process. As a result, it provides a reliable solution for educational institutions to manage hostel facilities efficiently. In the future, this system can be expanded with features such as database integration, a graphical user interface (GUI), and enhanced security to support a larger number of users and further improve its usability. Overall, the College Hostel Booking System is a functional, scalable, and effective tool that meets the needs of students and hostel administrators, paving the way for smoother management of hostel accommodations.

5.2 Future Scope:

1. **Database Integration**:
   Transition from in-memory storage (ArrayList) to a relational database to enable persistent storage of data.

2. **Online Access**:
   Develop a web or mobile-based platform for remote booking and management, increasing accessibility.

3. **Payment Gateway Integration**:
   Add online payment features to handle booking fees or hostel charges directly through the system.

4. **User Authentication**:
   Implement secure login systems for students and administrators to ensure privacy and access control.

5. **Notifications System**:
   Introduce email or SMS notifications to alert students about booking confirmations, reminders, or cancellations.

6. **Advanced Reporting**:
   Generate detailed reports on room occupancy, student details, and administrative summaries for better decision-making.

7. **Enhanced Room Allocation**:
   Add features like room preference selection (e.g., shared or single rooms) and waitlist management.

8. **Scalability for Larger Institutions**:
   Adapt the system to manage hostels with multiple buildings or campuses, allowing for broader usage.

By implementing these features, the system can evolve into a comprehensive and robust hostel management solution, catering to the growing needs of educational institutions.

APPENDIX A
(SOUORCE CODE)

```
import java.util.ArrayList;
import java.util.Scanner;

// Class to represent a student
class Student {
    private String name;
    private String id;
    private String email;

    public Student(String name, String id, String email) {
        this.name = name;
        this.id = id;
        this.email = email;
    }

    public String getName() {
        return name;
    }

    public String getId() {
        return id;
    }

    public String getEmail() {
        return email;
```

```
    }
    @Override
    public String toString() {
        return "Student Name: " + name + ", ID: " + id + ", Email: " + email;
    }
}
// Class to represent a room
class Room {
    private int roomNumber;
    private boolean isBooked;

    public Room(int roomNumber) {
        this.roomNumber = roomNumber;
        this.isBooked = false;
    }

    public int getRoomNumber() {
        return roomNumber;
    }

    public boolean isBooked() {
        return isBooked;
    }

    public void bookRoom() {
        isBooked = true;
    }

    public void cancelBooking() {
```

```
        isBooked = false;
    }

    @Override
    public String toString() {
        return "Room Number: " + roomNumber + ", Status: " + (isBooked ? "Booked" : "Available");
    }
}

// Main class for the Hostel Booking System
public class HostelBookingSystem {
    private static ArrayList<Student> students = new ArrayList<>();
    private static ArrayList<Room> rooms = new ArrayList<>();

    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        // Initialize some rooms
        for (int i = 1; i <= 10; i++) {
            rooms.add(new Room(i));
        }

        while (true) {
            System.out.println("\n==== College Hostel Booking System ====");
            System.out.println("1. Register Student");
            System.out.println("2. View All Rooms");
            System.out.println("3. Book a Room");
            System.out.println("4. Cancel a Booking");
```

```
        System.out.println("5. Exit");
        System.out.print("Enter your choice: ");
        int choice = scanner.nextInt();
        scanner.nextLine(); // consume newline

        switch (choice) {
            case 1:
                registerStudent(scanner);
                break;
            case 2:
                viewRooms();
                break;
            case 3:
                bookRoom(scanner);
                break;
            case 4:
                cancelBooking(scanner);
                break;
            case 5:
                System.out.println("Exiting... Thank you!");
                return;
            default:
                System.out.println("Invalid choice! Please try again.");
        }
    }
}

private static void registerStudent(Scanner scanner) {
    System.out.print("Enter Student Name: ");
```

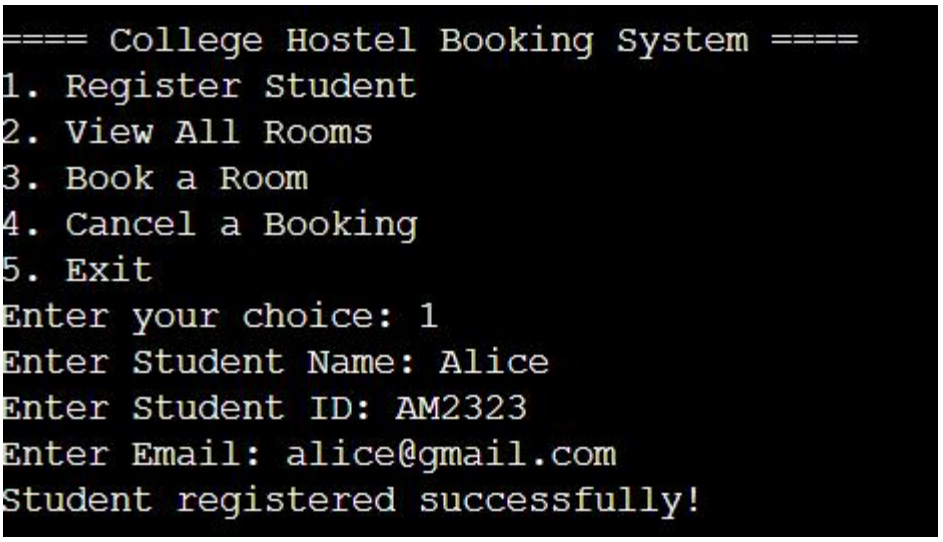
```
    String name = scanner.nextLine();
    System.out.print("Enter Student ID: ");
    String id = scanner.nextLine();
    System.out.print("Enter Email: ");
    String email = scanner.nextLine();

    students.add(new Student(name, id, email));
    System.out.println("Student registered successfully!");
}

private static void viewRooms() {
    System.out.println("\n==== Room List ====");
    for (Room room : rooms) {
        System.out.println(room);
    }
}

private static void bookRoom(Scanner scanner) {
    System.out.print("Enter Room Number to Book: ");
    int roomNumber = scanner.nextInt();

    for (Room room : rooms) {
        if (room.getRoomNumber() == roomNumber) {
            if (!room.isBooked()) {
                room.bookRoom();
                System.out.println("Room " + roomNumber + " booked successfully!");
                return;
            } else {
                System.out.println("Room " + roomNumber + " is already booked!");
```

```
                return;
            }
        }
    }
    System.out.println("Invalid Room Number!");
}

private static void cancelBooking(Scanner scanner) {
    System.out.print("Enter Room Number to Cancel Booking: ");
    int roomNumber = scanner.nextInt();

    for (Room room : rooms) {
        if (room.getRoomNumber() == roomNumber) {
            if (room.isBooked()) {
                room.cancelBooking();
                System.out.println("Booking for Room " + roomNumber + " canceled
successfully!");
                return;
            } else {
                System.out.println("Room " + roomNumber + " is not booked!");
                return;
            }
        }
    }
    System.out.println("Invalid Room Number!");
}
}
```

APPENDIX B

(SCREENSHOTS)

Student registration:



Check availability:

```
==== College Hostel Booking System ====
1. Register Student
2. View All Rooms
3. Book a Room
4. Cancel a Booking
5. Exit
Enter your choice: 2

==== Room List ====
Room Number: 1, Status: Available
Room Number: 2, Status: Available
Room Number: 3, Status: Available
Room Number: 4, Status: Available
Room Number: 5, Status: Available
Room Number: 6, Status: Available
Room Number: 7, Status: Available
Room Number: 8, Status: Available
Room Number: 9, Status: Available
Room Number: 10, Status: Available
```

Book a room:

```
==== College Hostel Booking System ====
1. Register Student
2. View All Rooms
3. Book a Room
4. Cancel a Booking
5. Exit
Enter your choice: 4
Enter Room Number to Cancel Booking: 2
Booking for Room 2 canceled successfully!
```

Cancel a booking:

```
==== College Hostel Booking System ====
1. Register Student
2. View All Rooms
3. Book a Room
4. Cancel a Booking
5. Exit
Enter your choice: 3
Enter Room Number to Book: 2
Room 2 booked successfully!
```

Exit:

```
==== College Hostel Booking System ====
1. Register Student
2. View All Rooms
3. Book a Room
4. Cancel a Booking
5. Exit
Enter your choice: 5
Exiting... Thank you!
```

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