Movie Ticket Booking System

1. Introduction

Team Details

The following table includes the team member details.

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Project Overview

The Movie Booking System is a terminal-based application developed to streamline the process of booking movie tickets. Leveraging the interoperability between C++ and Java via JNI, the system provides an efficient and modular design for managing user profiles, available movies, seat selection, and ticket bookings. This implementation ensures simplicity and functionality

Scope

Current Scope:

- **Core Features**:
  - Displaying available movies and showtimes.
  - User registration and authentication for secure access.
  - Seat selection and ticket booking through a terminal-based interface.
  - Generating and displaying booking receipts.
- **Technology Integration**:
  - Combining C++ for backend logic with Java for the main interface using JNI (Java Native Interface).
  - Streamlined execution of cross-language function calls to achieve modular and efficient operations.

Future Scope:

- Transition to a Graphical User Interface (GUI) for enhanced user experience.
- Integration of **real-time payment systems** and e-wallet support.
- Implementation of **cloud-based data storage** for scalability and multi-user operations.
- Expansion to support **multiple concurrent users** and advanced ticketing options.
- Development of features for **personalized recommendations** based on user history.

2. Objectives

The main objectives of this project are:

- Streamline the Movie Ticket Booking Process:
  - Develop an efficient system for browsing available movies, selecting seats, and booking tickets.
- Leverage Language Interoperability:
  - Utilize C++ for backend logic and Java for the main interface, connected via JNI, to demonstrate the effective integration of two programming languages.
- Provide a Modular Design:
  - Create a system with well-structured modules for user management, movie management, and booking functionalities, ensuring clarity and scalability.
- Ensure System Efficiency:
  - Design a terminal-based interface that minimizes resource usage while maintaining functionality.
- Demonstrate Practical Application of Concepts:
  - Showcase proficiency in object-oriented programming, file handling, and JNI integration for real-world problem-solving

3. System Overview

Technical Specifications

- Programming Languages:
  - **Java**:
    - Used for the main function and user interaction.
    - Handles the terminal-based interface and orchestrates calls to the backend.
  - **C++**:
    - Used for implementing backend logic.
    - Manages core operations like data processing, ticket booking, and database management.

- **JNI (Java Native Interface)**:
  - Bridges communication between Java and C++.

Input/Output Requirements

- **Input Requirements:**
  - **User Inputs:**
    - Movie selection (e.g., movie title or ID).
    - Theatre And Show Selection based on date filter.
    - Seat selection (e.g., row and seat number).
    - Personal details for booking confirmation.
  - **Administrative Inputs:**
    - Movie schedule and details (title, duration, available seats).
    - Updates to movie availability or pricing.
    - Adding theatre details
- **Output Requirements:**
  - **User Outputs:**
    - Display of available movies and showtimes.
    - Seat layout and availability.
    - Confirmation message with ticket details (movie name, time, seat number).
  - **Administrative Outputs:**
    - Updated movie schedules.
    - Logs of completed bookings for record-keeping.

4. Detailed Features and Use Cases

- **User Management:**
  - **Features:**
    - Secure user registration and login.
    - Profile management with access to booking history.
  - **Use Cases:**
    - User Registration:
      - Actor: User
      - Flow: User registers with credentials, which the system validates and stores.
    - Login:
      - Actor: User
      - Flow: User logs in with email and password for access to features.
- **Movie Management:**
  - **Features:**
    - Display available movies with schedules.
    - Search and filter movies by genre or language.
  - **Use Cases:**
    - View Movies:
      - Actor: User

        - Flow: User browses the list of movies with details provided by the system.
    - Filter Movies:
        - Actor: User
        - Flow: User applies filters to refine movie selection.

- **Booking System:**
    - **Features:**
        - Select seats from available options.
        - Generate and display booking confirmation.
    - **Use Cases:**
        - Book Tickets:
            - Actor: User
            - Flow: User selects a movie, chooses seats, and confirms the booking.
        - Cancel Booking:
            - Actor: User
            - Flow: User cancels an existing booking from "My Bookings."
- **Administrative Features:**
    - **Features:**
        - Add, update, or remove movies.
        - Maintain booking logs for record-keeping.
    - **Use Cases:**
        - Add a Movie:
            - Actor: Administrator
            - Flow: Admin logs in, adds movie details, and updates the schedule.
- **Error Handling:**
    - **Features:**
        - Validate inputs and prevent duplicate bookings.
        - Display appropriate error messages.
    - **Use Cases:**
        - Handle Invalid Input:
            - Actor: User
            - Flow: System identifies and prompts for correction when an invalid input is entered.

5. Non-functional Requirements

Performance :

The system is designed to handle operations efficiently in a terminal-based environment, with quick response times for user actions like seat selection and booking confirmation.

Scalability:

Provides a modular structure, making it easy to scale the system for future enhancements, such as adding more functionalities or transitioning to a graphical interface.

Interoperability:

Demonstrates seamless interaction between Java and C++ through JNI, ensuring smooth communication between the interface and backend logic.

Maintainability:

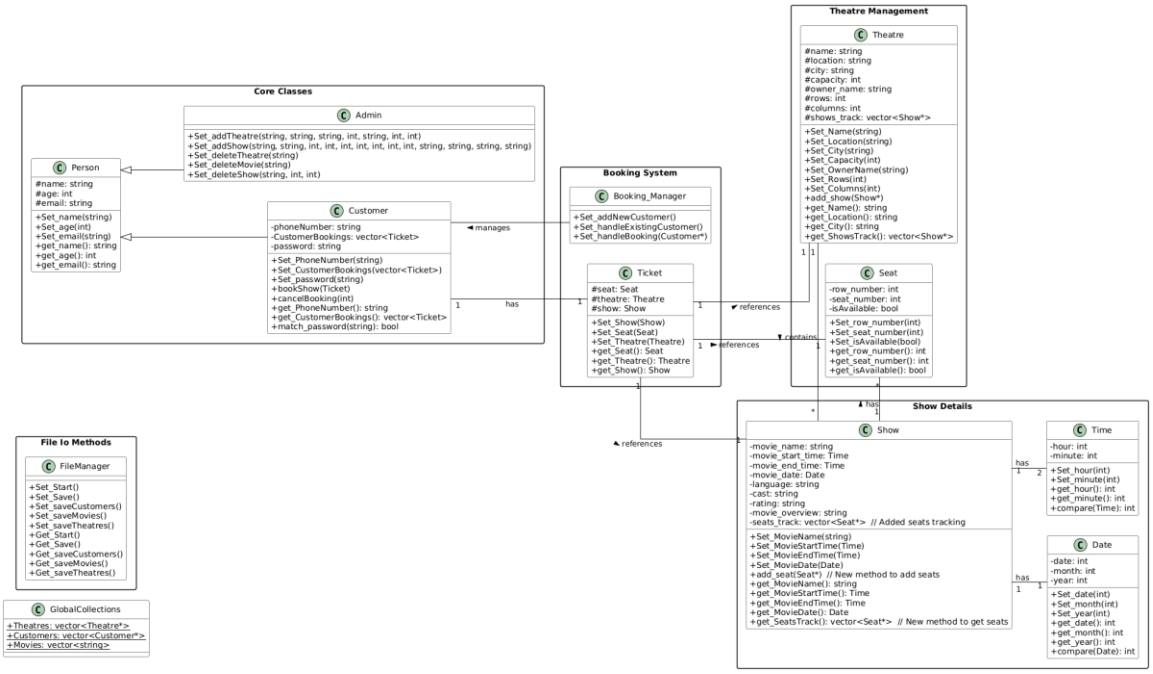
The system uses modular code design, making it easier to debug, update, and enhance specific components like movie management or seat selection.

Extensibility:

Built with a foundation that supports future additions, such as integration of payment systems, GUI, and real-time database support.

6. Development Setup

- Languages and Technologies:
  - **C++**: Core backend logic (core.cpp, core.so).
  - **Java**: Frontend and integration via JNI (BookYourShow.java).
- Key Components:
  - Text Files: (`Customers.txt`, `movies.txt`, `Theatres.txt`) store customer data, movie listings, and theatre details.
  - Shared Libraries:
    - `core.so` (Linux) / `BookYourShow.dll` (Windows): Links Java with C++ backend.
  - Diagrams: UML design (`Final UML Diagram.png`)



7. Workflow:

The workflow diagram illustrates the system's process flow, showing the interactions between different components of the Movie Ticket Booking System, including:

- User registration and login
- Movie selection process
- Seat booking workflow
- Ticket confirmation steps
- Administrative operations

Flow chart:

8. Important Files & Folders

- Key files in the project include:
  - BookYourShow.java:
    - Contains the main Java application logic and user interface for the terminal.
    - Acts as the entry point of the program.
  - core.cpp:
    - Implements the core backend logic for movie and seat management in C++.
    - Used for performance-critical operations.
- Data Files:
  - Customers.txt:
    - Stores user information, such as login credentials and booking history.
  - movies.txt:
    - Contains details about available movies, such as titles, genres, and showtimes.
  - Theatres.txt:
    - Holds information about theaters, including seating arrangements and availability.

9. Testing & Logging

We will implement unit tests for the core classes (Movie, Show, Seat, Booking) and use logging mechanisms to record booking failures and payment errors.

10. Conclusion

This project aims to develop a user-friendly movie ticket booking system with real-time seat availability, secure payment, and efficient booking confirmation. We expect to deliver a robust system that simplifies the movie ticket booking process for users.

11. GitHub Repo Link:

https://github.com/svnsaisathvik/CPP-Project