Project Requirements Document: CineBook - Next-Gen Movie Ticket Booking Platform

1. Introduction

1.1 Purpose of the Document

This document outlines the comprehensive requirements for the development of "CineBook," a cutting-edge online movie ticket booking platform. It serves as the foundational blueprint for the development team, product owners, and stakeholders, ensuring a shared understanding of the project's vision, scope, and functional and non-functional expectations. This document will be a primary input for our AI/ML-driven sprint planning automation.

1.2 Project Overview

CineBook aims to be the premier digital destination for movie enthusiasts, offering a seamless and intuitive experience for discovering movies, checking showtimes, selecting seats, and purchasing tickets. For cinema partners, it provides an efficient system for managing listings, inventory, and bookings. The platform will leverage modern technology to deliver a highly responsive, secure, and user-friendly service, addressing common pain points in traditional ticket booking processes.

Problem Solved:

- **For Users:** Eliminates long queues, provides real-time seat availability, offers diverse payment options, and simplifies movie discovery.

- **For Cinemas:** Automates ticketing, streamlines showtime management, provides valuable booking analytics, and expands reach to a wider online audience.

1.3 Scope

In-Scope:

- User registration and profile management.
- Movie browsing, search, and detailed information display.
- Showtime listing and filtering by cinema, time, and format.
- Interactive seat selection.
- Secure online payment processing (credit/debit cards, popular digital wallets).
- Booking confirmation via email and SMS.
- Ticket cancellation (with defined policies).
- Basic user review and rating system.
- Admin panel for movie, showtime, and cinema management.
- Basic reporting for cinema partners (e.g., daily sales, occupancy rates).
- Integration with at least one major payment gateway.
- Mobile-responsive web interface.

Out-of-Scope (for initial release):

- Native mobile applications (iOS/Android).
- Dynamic pricing algorithms.
- Loyalty programs or reward points.
- Food and beverage pre-ordering.
- Advanced recommendation engines.
- Integration with multiple cinema chain APIs (initially, a manual input/single integration model).
- Group booking features beyond standard seat selection.

1.4 Target Audience

- **Primary Users:** General public, moviegoers aged 16-65.
- **Secondary Users:** Cinema owners, managers, and staff.
- **Internal Stakeholders:** Product Owners, Development Team, QA, Marketing, and

Support.

2. Business Goals & Objectives

2.1 Strategic Goals

- Achieve a 15% market share in online movie ticket booking within the first 18 months of launch.
- Establish CineBook as the most user-friendly and reliable platform in its target regions.
- Secure partnerships with at least 5 major independent cinema chains within the first year.
- Generate a positive ROI within 24 months.

2.2 Key Performance Indicators (KPIs)

- **User Acquisition:** Monthly active users, new registrations per month.
- **Conversion Rate:** Percentage of users who initiate a booking that complete a purchase.
- **Booking Volume:** Total tickets sold per day/week/month.
- **Revenue:** Gross merchandise value (GMV) and net revenue.
- **Customer Satisfaction:** Average user rating (e.g., 4.5/5 stars), low customer support ticket volume related to booking issues.
- **System Uptime:** 99.9% availability for core booking functionalities.
- **Page Load Time:** Average page load time under 3 seconds.

3. User Roles & Personas

3.1 User Roles

- **Customer:** An individual who browses movies, checks showtimes, selects seats, and purchases tickets.
- **Cinema Partner (Admin/Manager):** A representative from a cinema who manages movie listings, showtimes, seat layouts, and views reports.
- **System Administrator:** Internal team member responsible for overall platform configuration, user management, and system health monitoring.

3.2 High-Level User Stories (Epics)

- **As a Customer, I want to easily find movies playing near me, so I can decide what to watch.**
- **As a Customer, I want to view detailed movie information and trailers, so I can make an informed choice.**
- **As a Customer, I want to see available showtimes and seat maps for my chosen movie and cinema, so I can pick the best option.**
- **As a Customer, I want to securely pay for my tickets online, so I can complete my booking without hassle.**
- **As a Customer, I want to receive my tickets digitally, so I can easily access them at the cinema.**
- **As a Cinema Partner, I want to add and manage movie listings, so I can keep my offerings up-to-date.**
- **As a Cinema Partner, I want to configure showtimes and seat availability, so I can manage my inventory effectively.**
- **As a Cinema Partner, I want to view booking reports, so I can track sales and occupancy.**
- **As a System Administrator, I want to manage user accounts and roles, so I can maintain platform security and access.**

4. Functional Requirements

4.1 User Management

- **FR1.1 User Registration:** Users must be able to register with email/password or social media (Google/Facebook).
- **FR1.2 User Login:** Registered users must be able to log in securely.
- **FR1.3 Profile Management:** Users can view and update their profile information (name, contact details).
- **FR1.4 Password Reset:** Users can reset forgotten passwords via email.
- **FR1.5 Booking History:** Users can view their past and upcoming bookings.

4.2 Movie & Showtime Management

- **FR2.1 Movie Listing:** Display a list of current and upcoming movies.
- **FR2.2 Movie Details:** For each movie, display title, genre, synopsis, cast, crew, runtime, release date, language, censor rating, and trailer link.
- **FR2.3 Search & Filter:** Users can search for movies by title, genre, or language.
- **FR2.4 Cinema Listing:** Display a list of partnered cinemas with their locations.
- **FR2.5 Showtime Display:** For a selected movie, display available showtimes across different cinemas, including date, time, screen number, and ticket price range.
- **FR2.6 Seat Map Display:** For a selected showtime, display an interactive seat map showing available, booked, and selected seats.

4.3 Booking & Ticketing

- **FR3.1 Seat Selection:** Users can select multiple seats from the interactive seat map.
- **FR3.2 Real-time Availability:** Seat availability must be updated in real-time to prevent double-bookings.
- **FR3.3 Booking Hold:** Selected seats are temporarily held for a defined period

(e.g., 5-10 minutes) during the booking process.
- **FR3.4 Booking Summary:** Display a summary of the booking (movie, cinema, showtime, seats, total price) before payment.
- **FR3.5 Ticket Generation:** Upon successful payment, generate a unique e-ticket (QR code/barcode) for each booking.
- **FR3.6 Ticket Cancellation:** Users can cancel tickets up to a certain time before the show (e.g., 2 hours), subject to a cancellation policy (e.g., partial refund).

4.4 Payment Processing

- **FR4.1 Secure Payment Gateway Integration:** Integrate with a PCI DSS compliant payment gateway (e.g., Stripe, PayPal) to accept credit/debit cards.
- **FR4.2 Digital Wallet Support:** Support popular digital wallets (e.g., Google Pay, Apple Pay).
- **FR4.3 Payment Confirmation:** Provide immediate on-screen confirmation of payment success or failure.

4.5 Notifications

- **FR5.1 Email Confirmation:** Send booking confirmation and e-tickets via email.
- **FR5.2 SMS Confirmation:** Send booking confirmation via SMS.
- **FR5.3 Cancellation Notification:** Notify users via email/SMS upon successful cancellation.
- **FR5.4 Reminder Notifications:** Send showtime reminders (e.g., 2 hours before show).

4.6 Search & Discovery

- **FR6.1 Location-based Search:** Allow users to find cinemas and showtimes based on their current location or a specified city.
- **FR6.2 Filter Options:** Provide filters for showtimes (e.g., morning, afternoon, evening), movie formats (2D, 3D, IMAX), and accessibility features.

4.7 Admin & Reporting (Cinema Partner & System Admin)

- **FR7.1 Cinema Management:** Cinema partners can add/edit their cinema details (name, address, contact).
- **FR7.2 Movie & Show Management (Admin):** System administrators can add/edit/delete movies and their details. Cinema partners can link existing movies to their screens.
- **FR7.3 Showtime Scheduling:** Cinema partners can schedule showtimes, define ticket prices per seat category, and manage screen layouts.
- **FR7.4 Booking Overview (Admin):** Cinema partners can view all bookings for their cinema, filter by movie, showtime, or date.
- **FR7.5 Sales Reports:** Generate daily, weekly, and monthly sales reports for cinema partners.
- **FR7.6 Occupancy Reports:** Provide reports on seat occupancy per showtime.
- **FR7.7 User Management (System Admin):** System administrators can manage user accounts, roles, and permissions.

5. Non-Functional Requirements

5.1 Performance

- **NFR1.1 Response Time:** All user-facing pages and API calls (especially search, showtime loading, and seat selection) must respond within 2 seconds under normal load. Payment processing must complete within 5 seconds.
- **NFR1.2 Concurrent Users:** The system must support at least 10,000 concurrent users during peak hours without degradation in performance.
- **NFR1.3 Transaction Throughput:** The booking system must handle at least 50 bookings per second.

5.2 Security

- **NFR2.1 Data Encryption:** All sensitive user data (passwords, payment information) must be encrypted both in transit (TLS 1.2+) and at rest.
- **NFR2.2 Authentication:** Implement strong authentication mechanisms, including multi-factor authentication (MFA) for admin users.
- **NFR2.3 Authorization:** Implement role-based access control (RBAC) to ensure users only access authorized functionalities.
- **NFR2.4 Vulnerability Management:** Regular security audits and penetration testing must be conducted.
- **NFR2.5 PCI DSS Compliance:** The payment processing module must adhere to PCI DSS standards.

5.3 Scalability

- **NFR3.1 Horizontal Scalability:** The architecture must support horizontal scaling of web servers, application servers, and database read replicas to handle increasing user load.
- **NFR3.2 Database Scalability:** The database must be designed to scale to accommodate millions of bookings and movie records.

5.4 Reliability & Availability

- **NFR4.1 Uptime:** The system must maintain 99.9% uptime for core booking functionalities.
- **NFR4.2 Disaster Recovery:** A disaster recovery plan must be in place with an RTO (Recovery Time Objective) of 4 hours and an RPO (Recovery Point Objective) of 1 hour.
- **NFR4.3 Error Handling:** The system must gracefully handle errors, provide informative messages to users, and log detailed error information for debugging.

5.5 Usability & UX

- **NFR5.1 Intuitive Interface:** The user interface must be intuitive and easy to navigate for users of all technical proficiencies.
- **NFR5.2 Mobile Responsiveness:** The web application must be fully responsive and provide an optimal experience across various devices (desktop, tablet, mobile).
- **NFR5.3 Accessibility:** Adhere to WCAG 2.1 AA guidelines for accessibility.

5.6 Maintainability

- **NFR6.1 Code Quality:** Adhere to established coding standards, best practices, and maintain comprehensive unit and integration test coverage.
- **NFR6.2 Modularity:** The system should be designed with a modular architecture to facilitate independent development, testing, and deployment of components.
- **NFR6.3 Documentation:** Comprehensive technical documentation, API documentation, and deployment guides must be maintained.

5.7 Compliance

- **NFR7.1 Data Privacy:** Comply with relevant data privacy regulations (e.g., GDPR, CCPA) regarding user data collection, storage, and processing.
- **NFR7.2 Local Regulations:** Adhere to local ticketing and entertainment industry regulations.

6. Technical Considerations & Integrations

6.1 Technology Stack (High-Level)

- **Frontend:** React.js / Angular / Vue.js (to be decided), HTML5, CSS3.
- **Backend:** Python (Django/Flask) or Node.js (Express) or Java (Spring Boot) (to be decided).
- **Database:** PostgreSQL / MySQL (for transactional data), Redis (for caching/session management).
- **Cloud Platform:** AWS / Google Cloud / Azure (to be decided).
- **Containerization:** Docker, Kubernetes.
- **Version Control:** Git.

6.2 External Integrations

- **Payment Gateway:** Integration with a chosen payment service provider API.
- **SMS Gateway:** Integration with a third-party SMS service for notifications.
- **Email Service:** Integration with an email service provider (e.g., SendGrid, Mailgun).
- **Cinema Management Systems (Future):** API integration with cinema partners' internal systems for automated showtime and seat updates.

6.3 Data Management

- **Database Schema:** Design a robust and normalized database schema to support all functional requirements.
- **Data Migration:** Plan for initial data migration (e.g., existing cinema data, movie catalogs).
- **Backup & Restore:** Implement automated daily backups with a clear restore procedure.

7. Release Strategy & Milestones