Database Design Document for Theater Ticket Management System

Initial ERD(Conceptual Model) link : Inital ERd.drawio

Final ERD(Logical Model) link : FinalERD.draw.io

Business Problems Addressed

This database is designed to solve several business problems facing traditional theaters, including inefficient ticket sales, seat management, and customer feedback collection. It aims to digitize the ticket booking process, streamline seat and maintenance management, and enhance user engagement through reviews and feedback. By addressing these issues, the theater can improve operational efficiency, customer satisfaction, and ultimately, profitability.

Entities and Relationships

1. Users:
    - Entity: Stores information distinguishing **customers, clerks, and managers**; includes contact information and roles for access control.
    - Relationships: Users can initiate transactions (purchase tickets). **Customers** can submit feedback and write movie reviews.
2. Studios:
    - Entity: Represents individual screening rooms with categorization by screen type (e.g., IMAX, 3D).
    - Relationships: Linked to Seats for seating arrangements; connected to Screen Schedules to organize movie showings.
3. Seats:
    - Entity: Details seating within studios, includes availability and seat condition.
    - Relationships: Tied to Studios and included in Tickets for booking specific seats.
4. Movie Library:
    - Entity: Stores metadata about movies, with genres and actors.
    - Relationships: Connected to Screening Schedules for showtimes and to Movie Reviews for customer feedback, also information of genres and actors, reviews posted by customers.
5. Screening Schedule:
    - Entity: Schedules movie showings, linking Movies to Studios with times and prices.
    - Relationships: Integrates Movies, Studios, and Tickets for booking.
6. Tickets:
    - Entity: Records transaction id, seating, and customer/clerk information, ticket status.
    - Relationships: Links Users to Seats and Screening Schedules for booking.

7. Movie Review:
    - Entity: Allows customers to rate and review movies they have watched.
    - Relationships: Associates **customers** with Movies for feedback.
8. Customer Feedback:
    - Entity: Collects general comments about the cinema experience.
    - Relationships: Optionally linked to **Customers only** for authenticated feedback.
9. Genres:
    - Entity: Categorizes movies into different genres.
    - Relationships: One movie can be associated with multiple genres.
10. Actors:
    - Entity: Keeping records of actors starred in movies
    - Relationships: One movie can be associated with multiple actors
11. Transactions:
    - Entity: Tracks users' transactions, including amount, method, date, and time,
    - Relationships: Each payment is linked to a User and **potentially multiple Tickets**.
12. Events:
    - Entity: Tracks special events, including special movie schedules or events without movie schedules.
    - Relationships: Each event is associated with a mandatory manager and optionally a movie.

Key Design Decisions

1. Multi-Role Users: Users are differentiated by roles for specific functionalities and access within the system.
2. Modular Studios and Seats: Studios and Seats are managed separately for flexibility in screening room and seat management.
3. Comprehensive Movie Library: Detailed movie metadata enriches the content management and user experience.
4. Integrated Screening Schedule: Essential for organizing showtimes, prices, and studio allocations.
5. Transactional Tickets: Mimics the real-life ticket lifecycle, with conditions for sale and refunds. Tickets under transactions can be purchased by a customer or sold by a clerk.
6. Engagement Through Reviews: Movie reviews and feedback are encouraged for community engagement and to gather customer insights.

This design document lays the foundation for a comprehensive theater management system, addressing key business challenges through a structured and relational database approach. The inclusion of detailed entities and relationships ensures a scalable and user-centric solution, promoting efficiency, engagement, and operational excellence in theater management.

Change Logs

1. Improvements on relationships between entities
2. Users Entity:
    - Original: Differentiated by role but not explicitly mentioned if contact information was included.
    - Updated: Explicitly includes contact information and notes for personalized communication and access control, having different user types as subtypes
3. Seats Entity:
    - Original: Details on seat condition were not specified.
    - Updated: Includes details on availability and condition, emphasizing importance for booking and maintenance.
4. Movie Library Entity:
    - Original: No explicit mention of the metadata such as “actors” stored.
    - Updated: Specifies that metadata includes actors and genres to enhance user browsing.
5. Screening Schedule Entity:
    - Original: Not explicitly described as the foundation of ticket sales.
    - Updated: Described as central to operations, highlighting its role in organizing showtimes and studio assignments.
6. Tickets Entity:
    - Original: Detailed conditions of the ticket lifecycle were not mentioned.
    - Updated: Emphasizes the management of the sale and condition of tickets, including refunds.
7. Movie Review Entity:
    - Original: The relationship between Users and Movies was implied but not explicit.
    - Updated: Clearly associates Users with Movies for personalized feedback.
8. Feedback Entity:
    - Original: Feedback to Users’s relationship is not clear.
    - Updated: Optionally linked to Customers for authenticated feedback, enhancing the value of the insights provided.
9. Actor Entity:
    - Original: Relationship between movies and actors was not clearly defined.
    - Updated: Clarifies that one movie can be associated with multiple actors.
10. Transaction Entity:
    - Original: No mention of a Transaction entity.
    - Updated: Included to track transaction details associated with Users and Tickets.
11. Events Entity:
    - Original: No explicit mention of the association with Movies.

- Updated: Specifies that it's optional for an event to be associated with a movie.

Key Design Decisions:

1. Multi-Role Users:
    - Original: Implicit differentiation by role.
    - Updated: Explicitly differentiates users by role for tailored functionalities and access.
2. Modular Studios and Seats:
    - Original: The flexibility of studio and seat management was not mentioned.
    - Updated: Highlights the separate management of Studios and Seats for increased flexibility.
3. Comprehensive Movie Library:
    - Original: The significance of detailed metadata was not emphasized.
    - Updated: Stresses the inclusion of detailed metadata for dynamic content management.
4. Movie Library:
    - Original: Only metadata about movies
    - Updated: Also discussed about other aspects such as providing information for customers' movie reviews
5. Actors:
    - Original: No description of actors
    - Updated: Having a table dedicated to actors, keeping track of their presence in movies
6. Integrated Screening Schedule:
    - Original: Its centrality to operations was not stressed.
    - Updated: Described as central to organizing showtimes, prices, and assignments.
7. Transactional Tickets:
    - Original: The real-world process of ticket lifecycle management was not detailed.
    - Updated: Reflects the real-world ticketing process with conditions for various ticket states. Tickets under transactions can be purchased by a customer or sold by a clerk.
8. Movie Review:
    - Original: Talking about movie reveals
    - Updated: emphasizing only customers with purchased tickets can comment on certain movies
9. Engagement Through Reviews:
    - Original: Community building and customer insights were not emphasized.
    - Updated: Encourages engagement through reviews, highlighting the importance of community and insights.