DATABASE DESIGN PROJECT

LIBR 554 TERM PROJECT PART1

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ANALYSIS

Cinema is a major source of entertainment for the modern family. People from all walks of lives go to the cinema to watch movies. There is hardly a man who is not fond of movies and this is a cheap source of recreation for the people. The existing ticket booking system is manual and quite cumbersome for the owner and staff. It requires a lot of concentration to manage and retrieve the records on-paper. So, we propose a computerized database to automate the movie ticket booking process for a fictional cinema named Cineplus. This will create an error-free, secure, reliable and fast management system which will help the organization in better utilization of resources without redundant entries.

Cineplus is a small fictional for-profit cinema in the Indian city of Delhi which provides world-class movie experience to the common masses. It has multiple state-of-art movie theatres and it is a growing business which is planning to develop 50 screens over the upcoming years. Each screen in cinema has different category of seats (Premium, Economy, Gold, Silver etc) and currently, the tickets can be booked only over the counter at the cinema.

In the current structure, the cinema has 3 main users: viewers, manager, and owner. The cinema runs its business to provide movie experience to viewers. The cinema has the role of the cashier who manages payment collection. Also, the cinema has the staff to book tickets for users at the ticket booking window. The cinema has a manager to supervise the proper functioning of cinema which is owned by a private owner or a group of owners. The daily recordkeeping of ticket booking is done on the papers by the staff and all the entries are manually entered and updated into the spreadsheet at the end of the day.

PROBLEMS & CONSTRAINTS

The methods we used to define the problems and constraints include interviews and discussion sessions with friends and family. During our data collection activity, we interacted with a small local cinema owner who managed the ticket booking information system via spreadsheet. Keeping the identity anonymous, the person was no less than a subject matter expert in running a small cinema manually without any automated system. He shed light on the problems listed below that plague the current manual movie ticket booking system.

• The current system is not efficient enough to provide reliable details about movie schedules, ticket sales etc as the updation errors crop up while processing the multiple data values.

• The existing system does not provide security as the file does not have any safety mechanism such as password protection nor does it provide the functionality of limited access privileges or restricted access to the data depending on the role of the intended user.

• Another problem highlighted by the owner is that accessing and retaining of information about the movie schedules and the ticket sales is cumbersome as it requires accessing of data from multiple file sources at one point in time. All these files exist with a lot of dependencies and are not properly linked with each other.

• The entire process is very time-consuming. Also, a lot of time is wasted in keeping the records up to date.

After discussion with the intended persons, we have concluded that the major problem in the existing system is related to its scalability and flexibility. The system cannot be modified easily as it does not follow any integrity constraint and requires updation in multiple files with alteration in any single value. Also, it has multiple, duplicate and unnecessary data entries which gives inconsistent results upon retrieval of data.

PROBLEMS

Ticket Pricing

- If the staff is unaware of the price of the different categories of seats available it can be difficult to determine the price for the movie ticket. This can lead to the incorrect billing of the ticket to the viewer.

Ticket Sales

- If the staff is not aware of the number of tickets sold or the number of tickets remaining it can lead to problems of under-selling or overbooking of the seats. This can create problems related to user satisfaction, business profit, and management issues.
- If the staff is not aware of the film certificate(U/A) issued by the censor board or the age restriction imposed on the age of film audience then the staff may sell tickets of movies with violent or adult content to under-age viewers.

Scalability

- If the business owner wants to expand the business into multiple cinemas at different locations then it would be difficult to scale the existing system to suit the requirements of the extended system. The linking of existing files to new files is very difficult and data cannot be reused or shared by operators at different locations.

Flexibility

- Any alteration or modification of the data entries in the current system is a very complex process as it a requires data updation in multiple files to maintain concurrency and integrity of data. There is no single centralized and linked repository of data which lead to various data anomalies.

Contacting customers

- The business can run better by showing appreciation to its loyal customers by offering them discounts or complimentary offers. If the staff does not maintain any customer record that details the frequency of the customer visiting the cinema for the movie or the amount of money spent by the customer then the business is losing the opportunity to promote or expand its customer-satisfaction.

Lost and found

- Customers usually leave their personal belongings behind in the cinema. Staff workers work in shift rotations and different staff members may collect the lost items.
- The lost items found by different staff members are difficult to keep track of as there are communication problems due to shifting changes of different workers. Also, it is difficult to contact the customer to ensure proper return of the lost item to its respective owner.

Payroll

- The current paper-based payroll system makes it very difficult to track the salaries, generate the payslips and manage to leave records of its employees. The salary amount depends on the roles of the employees and number of hours of work done by the employee in the respective role.

Licenses

- If the management is not aware of the required licenses to showcase movies with restricted content then the cinema owner can face multiple problems. The staff needs to keep a track record of the licenses obtained, their issue and expiry dates and the list of new licenses to be acquired or renewed to keep the business running.

Audit & Inspection

- The staff needs to maintain the cinema halls as per the rules and regulations. Audits are carried out at the venue by the external party for smooth and error-free business operations.

Inspections are carried out at regular intervals to keep up with the industry standards. Records need to be maintained to list the results and suggestions from these audits and inspections.

CONSTRAINTS

Cineplus is a small independent business with the mission to expand its operation to multiple locations. However, the information and implementation needs of such a business which has the large customer base from various locations are quite complicated. The major constraints in this system are listed below.

• **BUDGET**: The owner has a limited budget and huge funds cannot be dedicated to designing, implementation and maintenance of the new database. So the proposed system has to be compact and cost-effective.

• **TIME**: The employees are paid on a per hour basis and the movies shows are scheduled throughout the day. To make the process more effective the owner wants quick and efficient delivery of the proposed database system before the holiday season.

• **STAFF**: To keep the system up and running it requires dedicated full-time staff for the maintenance and the implementation of the proposed database. Also, the employed staff will need to undergo training to understand the new database system and to update the system as and when required.

OBJECTIVES

The main objective of the proposed database system is to manage the details of the movies, tickets, bookings, show timings and customers. The purpose of the system is to reduce the manual work to manage the recordkeeping activities efficiently.

Below is the list of the objectives based on the design of this database. We have categorized each objective according to the priority (L=Low, M=Medium, H=High). The priorities have been assigned keeping in mind the core function of the cinema (Cineplus) and the services offered to its viewers. The objectives which do not impact its daily operations have been assigned a low priority. The highest priority objectives are the ones which are crucial to the business and sales operation of the cinema.

Priority	Objective
H	The database will be used to check the details of the seats left and seats reserved.
H	The database will provide the owner the authority to change ticket price and availability.
H	The database will be used to schedule the new movies and their show timings.
H	The database will contain information on ticket category and prices.
H	The database will contain customer's information such as name, address, contact etc.
H	The database will contain information about different screens and their schedules.
H	The database will categorise the movies based on the certificate from censor board.
H	The database will allow access privileges to different administrators.
M	The database will be used to contain information of cinemas from multiple locations.
M	The database will be used to track the offers given to the viewers.
M	The database will keep track of the employee details working at the cinema.
M	The database will contain information about the salaries of the employees such as the rate per hour and number of hours of work done to generate payslips.
M	The database will keep track of licenses acquired, licenses which need to be renewed and expired licenses.
L	The database will contain audit details and inspection history.
L	The database will be used to delete entries of any trailer videos.
L	The database will contain Lost and Found item details.

SCOPE

The scope of our proposed database system spans the entire personnel related to the cinema including the owner, admin, manager and the staff (user/viewer). Customer or viewer will not have the database access. This database will be designed in such a manner that it provides flexibility and scalability features depending on the future business expansion plans of the cinema. The database will serve the functional needs of the organization such as ticket management, movie schedules, assigning the screens etc. Other features will include management of licenses and audit reports.

USERS

The main users of this system are Owner, Admin, Manager, and Viewer (Staff user). We will assign different levels of access privileges to a different category of users depending on their role in the organization. For e.g. the staff member can only make the booking, view the booking or cancel it.

Staff Member (Viewer): The staff member can view the availability of the tickets for a particular film. He can also edit the details of the booking. He can modify the customer details and enter the payment information related to the ticket booking.

Manager: The manager will assign the job duties and shifts to different staff members. He will access details about the staff members working at the cinema. The manager has access to entire employee details or the staff information working at the cinema.

Owner/Admin: The owner has the authority to change the cost of the tickets, ticket availability etc. The owner has the capability to supervise the payment transactions at the end of the day.

BOUNDARIES

There are certain restrictions on the system due to the business constraints. The major limit on the system is the budget or amount that the owner would spare to automate the existing manual database. Another limitation is with regards to the time delivery of the proposed system. The owner wants properly functioning proposed system before the start of the holiday season.

BUSINESS RULES

The following are the business rules created by analyzing the information flow and context and structure of the organisation. These business rules form the basis to create the ERD.

1. An **employee** can access the data of zero, one or many **customers** but a customer data can be accessed by one and only one employee at one point in time.
2. An **employee** can make zero, one or many **reservations** and reservation can be done by one and only one employee.
3. An **employee** can store zero, one or many **payment** details but the payment entry is recorded by one and only one employee.
4. A **reservation** can have one and only one **reservation type** but a particular reservation type can be assigned to zero, one or many reservations.
5. One **reservation** can be done on one or many **seats** and one seat can be booked in one or many reservations. (This M:N relation is resolved by **seat_reserved** bridge entity)
6. A **reservation** can be done for one **screen** but one screen can have zero, one or many reservations.
7. One **movie** can be screened in zero, one or many **auditoriums** and one auditorium can showcase zero, one or many movies. (This M:N relation has been resolved by screen bridge entity)
8. A **seat** is present in one and only one **auditorium** but one auditorium has one or many seats.

ERD- Entity Relationship Diagram

- The movie table contains data about movies which will be shown in the theatre.
- The auditorium table identifies all auditoriums in theatre. All data is mandatory
- The screening table contains data of all screenings and all fields are mandatory. A screening must have a related movie, auditorium and start time.
- The seat table contains a list of all seats we have in auditoriums with each seat assigned to strictly one auditorium.
- The reservation_type table is a dictionary of all reservation types (by phone, online, in person).
- The employee table lists all employees using the system.
- The reservation and seat_reserved tables are the main tables of our system.
- The reservation table stores data about a ticket reservation and/or sale.
- The seat_reserved table enables us to make a reservation or one payment for multiple seats.