Logical Relational Model

Purpose

We are developing a Library Management System to maintain a database for a local library, allowing members of the community to effectively and efficiently use library resources. By implementing this system, library workers can track important information on user activity, while also being able to adjust the rules to their needs (like changing membership status), generate reports, etc. In general, this system will provide ease to the community, the staff, and help make people's experience at the library more enjoyable.

Scope

Our Library Management System efficiently tracks books, digital media, and magazines, maintaining key details like title, author, ISBN, publication year, genre, and availability. It also monitors guest desktop computers, recording user sessions and login/logout times. The system manages item availability, loan statuses, due dates, and check-out history while allowing users to search the catalog, reserve and renew items, and check loan statuses. Library staff can process checkouts, returns, add new items, and manage user accounts, which store information on checked-out items and holds. Additionally, the system will only generate reports on borrowing trends by genre.

Data Dictionary

Attribute Name	Data Type	Description
User		
FirstName	VARCHAR	The user's first name
LastName	VARCHAR	The user's last name
Email	VARCHAR	The user's email address, used for communication and login
Address	VARCHAR	The user's residential or mailing address

PhoneNumber	VARCHAR	The user's contact phone number
System Administrator		
StaffID	INT	Unique identifier for the system administrator
Managees	VARCHAR	List or description of staff members managed by this admin
Library Staff		
Salary	INT	The salary of the library staff member
PositionName	VARCHAR	The title of the staff member's position
PositionType	VARCHAR	The category of the position
Report		
ReportID	INT	Unique identifier for the report
StaffID	INT	Identifies the Staff member that generated the report. Foreign key referencing LibraryStaff(StaffID)
BorrowingTrends	VARCHAR	Analysis of borrowing behavior during the report period
NumberOfCheckouts	INT	Total number of checkouts within the reporting time period
Date	DATE	The date the report was made
TimePeriod	VARCHAR	The time range the report covers
Library Member		
LibraryMemberID	INT	Unique identifier for a library member

ItemsCheckoutOut	INT	Number of items currently checked out
DateJoined	DATE	The date the member joined the library
OutstandingBalance	DECIMAL(5,2)	Current unpaid fines or balances owed by the member
Sex	CHAR(1)	Member's gender
DOB	DATE	Date of birth of library member
Status	VARCHAR	Membership status (Active, Suspended, etc.)
Amount		
FineID	INT	Unique identifier for each fine
UserID	INT	ID of the member who received the fine, foreign key referencing to User(UserID)
ItemID	INT	ID of the item associated with the fine, foreign key referencing to Item(ItemID)
Amount	DECIMAL(5,2)	Amount of the fine in USD
TransactionID	INT	ID of the related transaction, foreign key referencing to Transaction(TransactionID)
Copy		
CopyID	INT	Unique identifier for copy of item
ItemID	INT	Foreign key referencing Item(ItemID)
Status	VARCHAR	Availability status of copy (ie available or not available)
Hold		
HoldID	INT	Unique identifier for given hold

CopyID	INT	Foreign key referencing Copy(CopyID)
HoldDate	DATE	Date that hold was placed
ExpirationDate	DATE	Date that hold expires
Status	VARCHAR	Status of hold (ie fulfilled or not fulfilled)
Transaction		
DateCheckOut	DATE	Date item was checked out
DueDate	DATE	Date item is due
NumRenewals	INT	Number of times item has been renewed
ReturnDate	DATE	Date item was returned
Publisher		
PublisherID	INT	Unique identifier for publisher
Name	VARCHAR	Name of publisher
Author		
AuthorID	INT	Unique identifier for author
Name	VARCHAR	Name of author
Genre		
GenreID	INT	Unique identifier for genre
GenreName	VARCHAR	Name of genre
Item		
ISBN	CHAR(13)	Unique identifier for the item
Title	VARCHAR	Title of the item
Author	VARCHAR	Author of the item
PublicationYear	INT	Year item was published
PublisherID	INT	Unique identifier of publisher, Foreign key referencing Publisher(PublisherID)

GenreID	INT	Unique identifier of genre, Foreign key referencing Genre(GenreID)
Quantity	INT	The total number of copies
AuthorID	INT	Unique identifier of author, Foreign key referencing Author(AuthorID)
Book		
ItemID	INT	Unique identifier for the item, Foreign key referencing Item(ItemID)
QuantityAvailable	INT	Total number of available copies of the book
Digital Media		
ItemID	INT	Unique identifier for the item, Foreign key referencing Item(ItemID)
Medium	VARCHAR	Type of media (e.g. DVD, eBook, etc.)