

Project Part 4: Logical Relational Model

Introduction:

Project Overview – The library management system detailed in this project will provide all the functionality and features a library might need to track, manage, and maintain their catalogue. It will contain details on media items such as Books, Magazines, and Digital Media. These items will have their own unique attributes as well as the attributes common on any media item. These items will be managed by the system and controlled by transactions. Transactions will be saved in the system with all their respective information, and they are initiated by clients. Clients will exist in the system with all their respective information as they're the driving users of the system.

Glossary -

- GUI – Graphical user interface
- ISBN – International Standard Book Number
- PostgreSQL – A relational database management system designed to efficiently manage structured data with complex relationships
- ACID – A set of principles that ensure database transactions are processed reliably (Atomicity, Concurrency, Isolation, Durability)
- ID (Identity) – A unique identifier assigned to entities such as books, users, or transactions in the database.
- FK – Foreign Key

Relational Schema Mapping:

Client:

<u>Client_ID</u>	Name	Membership_Type	Account_Status	Email_Address	Phone_Number
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Transaction:

<u>Transaction_ID</u>	Date_Borrowed	Expected_Return_Date	Date_Returned	Client_ID	Item_ID
				FK: Client	FK: Media _Item

MediaItem:

<u>ItemID</u>	Availability_Status
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Book:

<u>Item_ID</u>	Title	Author	Genre	ISBN	Publication_Year
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FK:
MediaItem

Magazine:

<u>Item_ID</u>	Title	Issue_Number	Publication_Date
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FK:
MediaItem

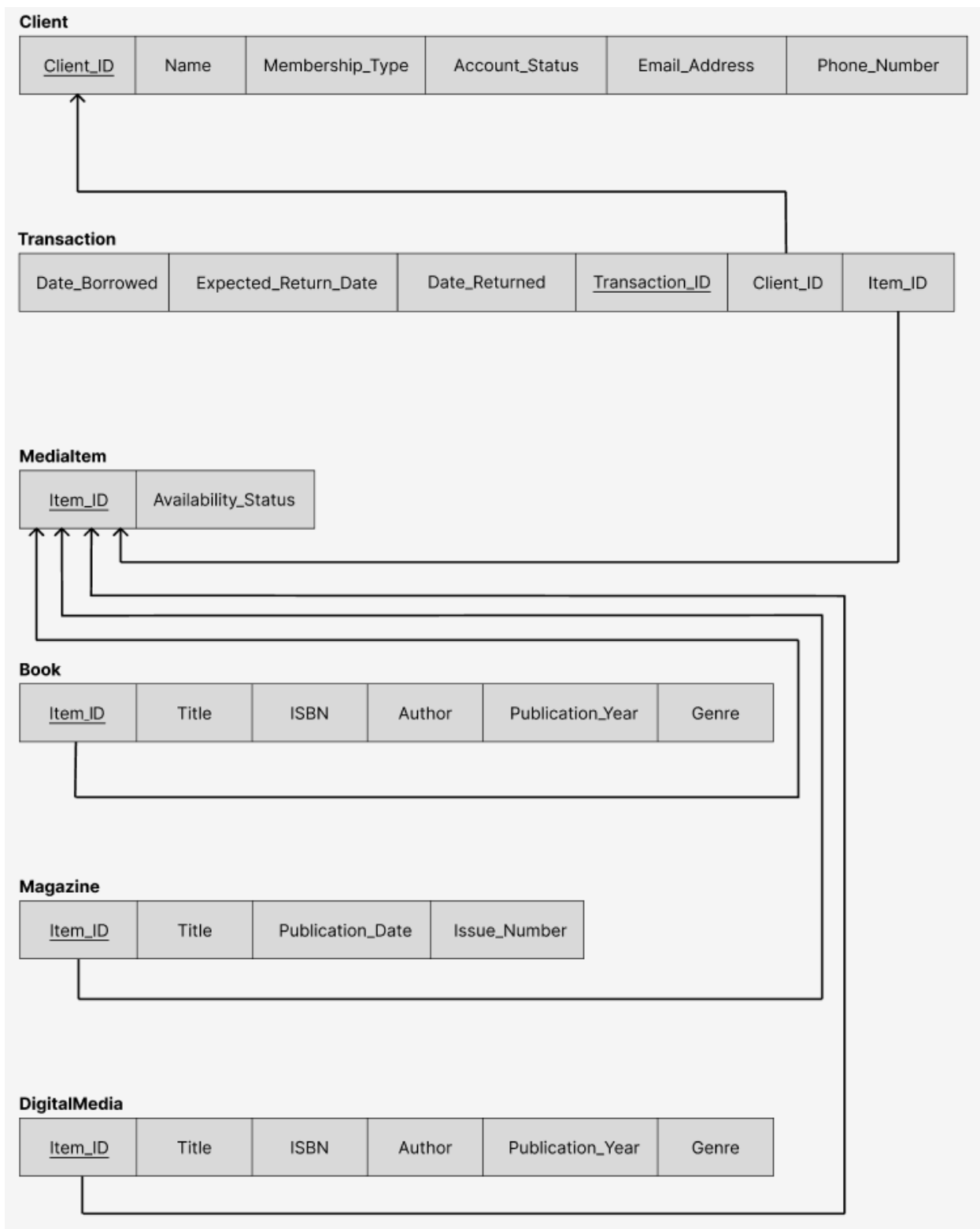
DigitalMedia

<u>Item_ID</u>	Title	Author	Genre	ISBN	Publication_Year
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FK:
MediaItem

Constraints for the given attributes are included in the Data Dictionary below.

Relational Schema Diagram:



Data Dictionary:

Entity Name	Attribute Name	Data Type	Description	Constraint
Media_Item	Item ID	INT	A uniquely identifying number assigned to each item	Primary key, Value >= 0, NOT NULL, Auto increment
Media_Item	Availability	ENUM('Available', 'Unavailable')	An attribute for indicating the availability of an item. Either 'available' or 'unavailable'.	NOT NULL
Book	Item ID	INT	A uniquely identifying number assigned to each item	Primary key, Foreign Key, Value >= 0, NOT NULL, Auto increment
Book	Title	VARCHAR	The title of the book	NOT NULL
Book	Author	VARCHAR	The name of the Author	NOT NULL
Book	ISBN	INT	The ISBN number	Value >= 0
Book	Genre	VARCHAR	The genre of the book	
Book	Publication Year	INT	The publication year of the book	
Magazine	Item ID	INT	A uniquely identifying number assigned to each item	Primary key, Foreign Key, Value >= 0, NOT NULL, Auto increment
Magazine	Title	VARCHAR	The title of the magazine	NOT NULL
Magazine	Publication Date	DATE	The date the issue was published	
Magazine	Issue Number	INT	The issue number	NOT NULL
Digital_Media	Item ID	INT	A uniquely identifying number assigned to each item	Primary key, Foreign Key, Value >= 0, NOT NULL, Auto increment

Digital_Media	Title	VARCHAR	The title of the digital media item	NOT NULL
Digital_Media	Author	VARCHAR	The author of the digital media item	NOT NULL
Digital_Media	ISBN	INT	The ISBN of the digital media item	Value >= 0
Digital_Media	Genre	VARCHAR	The genre of the digital media item	
Digital_Media	Publication_Year	INT	The publication year of the digital media item	
Transaction	Date_Borrowed	DATE	The date the item was borrowed	NOT NULL
Transaction	Expected_Return_Date	DATE	The date the item should be returned	NOT NULL and TIMESTAMP >= Date Borrowed
Transaction	Returned_Date	DATE	The actual returned date of the item.	IS NULL or TIMESTAMP >= Date Borrowed
Transaction	Transaction_ID	INT	A unique number to identify each transaction	UNIQUE, NOT NULL, Auto increment, Value >= 0
Transaction	Client_ID	INT	A client ID to identify which client the transaction belongs to	Foreign Key, Auto increment, NOT NULL, Value >= 0
Transaction	Item_ID	INT	An item ID to identify which media item the transaction involves	Foreign Key, Value >= 0, NOT NULL
Client	Client_ID	INT	A unique number to identify each client	Primary Key, Auto increment, NOT NULL, Value >= 0
Client	Name	VARCHAR	The name of the Client	NOT NULL
Client	Membership_Type	ENUM	The type of membership the client possesses. Ex) standard, business, student, etc.	NOT NULL

Client	Account_Status	ENUM	The status of a clients account. Ex) Good, Suspended, Restricted, etc.	NOT NULL
Client	Email_Address	VARCHAR	The email address of the client	UNIQUE, NOT NULL
Client	Phone_Number	VARCHAR	The phone number of the client	UNIQUE, NOT NULL