

Relational Schema Mapping

Identify Relations

- Member
- MembershipType
- Item
- Book
- DigitalMedia
- Magazine
- Librarian
- Loan
- Fine
- Reservation

Attributes and Domains

Table: Member

- Attributes: MemberID (PK, INT), Name (VARCHAR), Contact (VARCHAR), TypeID (CHAR, FK), AccountStatus (ENUM)
- Domains:
 - AccountStatus → ENUM('Active', 'Suspended', 'Closed')

Table: MembershipType

- Attributes: TypeID (PK, CHAR), TypeName (VARCHAR), BorrowLimit (INT), LateFeeRate (INT)
- Domains:
 - BorrowLimit ≥ 0 , LateFeeRate ≥ 0

Table: Item

- Attributes: ItemID (PK, INT), Title (VARCHAR), Availability (BOOL)
- Domains:
 - Availability → BOOL (True/False)

Table: Book

- Attributes: ItemID (PK, FK), Title (VARCHAR), Author (VARCHAR), Genre (VARCHAR), PubYear (INT), Availability (BOOL)

- Domains:
 - PubYear: 1800–2025

Table: DigitalMedia

- Attributes: ItemID (PK, FK), Title (VARCHAR), MediaType (VARCHAR), Creator (VARCHAR), Availability (BOOL)

Table: Magazine

- Attributes: ItemID (PK, FK), Title (VARCHAR), IssueNumber (INT), PublicationDate (INT), Status (BOOL)

Table: Librarian

- Attributes: LibrarianID (PK, INT), Name (VARCHAR), Contact (VARCHAR), Role (ENUM)
- Domains:
 - Role → ENUM('Admin', 'Staff')

Table: Loan

- Attributes: LoanID (PK, INT), MemberID (FK), ItemID (FK), ItemType (VARCHAR), LoanDate (DATE), DueDate (DATE), ReturnDate (DATE), FineID (FK), LibrarianID (FK)
- Domains:
 - ItemType → ENUM('Book', 'Magazine', 'DigitalMedia')

Table: Fine

- Attributes: FineID (PK, INT), LoanID (FK), Amount (INT), PaymentStatus (ENUM)
- Domains:
 - PaymentStatus → ENUM('Paid', 'Unpaid')
 - Amount ≥ 0

Table: Reservation

- Attributes: ReservationID (PK, INT), MemberID (FK), ItemID (FK), ItemType (VARCHAR), RequestDate (DATE), Status (BOOL)
- Domains:

- ItemType → ENUM('Book', 'Magazine', 'DigitalMedia')
- Status → BOOL (True/False)

Primary Keys

Table	Primary Key
Member	MemberID
MembershipType	TypeID
Item	ItemID
Book	ItemID
DigitalMedia	ItemID
Magazine	ItemID
Librarian	LibrarianID
Loan	LoanID
Fine	FineID
Reservation	ReservationID

Foreign Keys

Foreign Key	References
Member.TypeID	MembershipType.TypeID
Loan.MemberID	Member.MemberID
Loan.ItemID	Item.ItemID
Loan.FineID	Fine.FineID
Loan.LibrarianID	Librarian.LibrarianID
Fine.LoanID	Loan.LoanID
Reservation.MemberID	Member.MemberID
Reservation.ItemID	Item.ItemID
Book.ItemID	Item.ItemID
DigitalMedia.ItemID	Item.ItemID
Magazine.ItemID	Item.ItemID

Functional Dependencies (FDs)

MemberID \rightarrow Name, Contact, TypeID, AccountStatus

TypeID \rightarrow TypeName, BorrowLimit, LateFeeRate

ItemID \rightarrow Title, Availability

Book.ItemID \rightarrow Author, Genre, PubYear

LibrarianID \rightarrow Name, Contact, Role

LoanID \rightarrow MemberID, ItemID, ItemType, LoanDate, DueDate, ReturnDate, FineID, LibrarianID

FineID \rightarrow LoanID, Amount, PaymentStatus

ReservationID \rightarrow MemberID, ItemID, ItemType, RequestDate, Status