

EECS 447 Project Part 4

Project Overview:

The overall use of this database is engineered to manage different types of media (books, magazines, digital media), clients, and library locations. This involves documenting transactions such as borrowing and reserving media, maintaining different types of memberships among clients, keeping track of library staff and locations, and generating reports for given inquiries. The system should efficiently integrate these components so that clients can work with staff members to obtain any desired media.

Scope:

The database will store a collection of books and other media being held at a specified library, along with any relevant information, and allow for the addition, and deletion, along with any needed updates for the database. The database will also house information regarding borrowers, members, and staff of the library, including name, age, membership type, and any other relevant information. The database will keep track of members and their items checked out, as well as any fees they incur or reservations that are placed. It will also keep track of the library inventory, which includes the availability of items stored in the library (some media have multiple copies).

Glossary:

SBN: standard book number

Relational Schema Mapping

Relations

Client

client_id	name	email	phone_number	address	membership	active	max_books
-----------	------	-------	--------------	---------	------------	--------	-----------

Library Staff

staff_id	name	currently_employed
----------	------	--------------------

Borrow Transaction

transaction_id	client_id	copy_id	borrow_date	due_date	return_date	overdue_fine
----------------	-----------	---------	-------------	----------	-------------	--------------

Reservation

reservation_id	client_id	copy_id	reservation_date
----------------	-----------	---------	------------------

Branch

branch_id	name	address	year_established
-----------	------	---------	------------------

Copy

copy_id	media_id	branch_id	status
---------	----------	-----------	--------

Media

media_id	title	publication_date	media_type	genre
----------	-------	------------------	------------	-------

Book

book_id	author	ISBN
---------	--------	------

Magazine

magazine_id	author	ISBN	issue_number
-------------	--------	------	--------------

Digital Media

dmedia_id	creator
-----------	---------

Attributes and Domains

Media

Attribute Name	Domain / Valid Values
media_id	CHAR(6); Must match an ID from Book, Magazine, or Digital Media
title	VARCHAR(50); Any media title
publication_date	DATE; Valid date format YYYY-MM-DD
media_type	ENUM("Book", "Magazine", "Digital Media")
genre	VARCHAR(20); e.g., Fiction, Science, Drama, etc.

Book

Attribute Name	Domain / Valid Values
----------------	-----------------------

book_id	CHAR(6); Unique identifier for book
author	VARCHAR(40); Author's full name
ISBN	CHAR(13); 13-digit ISBN code

Magazine

Attribute Name	Domain / Valid Values
magazine_id	CHAR(6); Unique identifier for magazine
author	VARCHAR(40); Author's full name
ISBN	CHAR(13); 13-digit ISBN code
issue_no	VARCHAR(45); Issue identifier

Digital media

Attribute Name	Domain / Valid Values
dmedia_id	CHAR(6); Unique identifier
creator	VARCHAR(40); Creator's full name

Copy

Attribute Name	Domain / Valid Values
copy_id	CHAR(7); Unique copy ID
media_id	CHAR(6); Must exist in Media
branch_id	CHAR(3); Must exist in Branch
status	ENUM("Available", "Reserved", "Unavailable")

Client

Attribute Name	Domain / Valid Values
client_id	CHAR(4); Unique client identifier
first_name	VARCHAR(20); First name
last_name	VARCHAR(20); Last name
email	VARCHAR(20); Valid email format
phone_number	VARCHAR(20); Standard phone number
address	VARCHAR(45); Mailing address
membership	ENUM("Standard", "Student", "Senior")
active	BOOLEAN; TRUE or FALSE
max_books	TINYINT; 0–255
fines_due	DECIMAL(5,2); e.g., 0.00–999.99

Staff

Attribute Name	Domain / Valid Values
----------------	-----------------------

staff_id	CHAR(3); Unique staff ID
first_name	VARCHAR(20); First name
last_name	VARCHAR(20); Last name
currently_employed	BOOLEAN; TRUE or FALSE

Branch

Attribute Name	Domain / Valid Values
branch_id	CHAR(3); Unique branch ID
branch_name	VARCHAR(40); Name of the library branch
address	VARCHAR(45); Mailing address
year_established	YEAR; 4-digit year, e.g., 1985

Borrow transaction (Relationship: client-copy)

Attribute Name	Domain / Valid Values
transaction_id	CHAR(7); Unique ID for transaction
client_id	CHAR(5); Must exist in Client
copy_id	CHAR(7); Must exist in Copy
borrow_date	DATE; Format YYYY-MM-DD
due_date	DATE; Format YYYY-MM-DD
return_date	DATE or NULL; NULL if not returned
overdue_fine	DECIMAL(5,2); Fine amount, e.g., 0.00–999.99

Reservation (Relationship: Client–Copy)

Attribute Name	Domain / Valid Values
reservation_id	CHAR(7); Unique reservation ID
client_id	CHAR(5); Must exist in Client
copy_id	CHAR(7); Must exist in Copy
reservation_date	DATE; Format YYYY-MM-DD

Primary Keys

- Client: client_id
- Library Staff: staff_id
- Borrow_Transaction: transaction_id
- Reservation: reservation_id
- Branch: branch_id
- Copy: copy_id
- Media: media_id

- Book: book_id
- Magazine: magazine_id
- Digital Media: dmedia_id

Foreign Keys

Table	Foreign Key	References
Borrow_Transaction	client_id copy_id	Client(client_id) Copy(copy_id)
Reservation	client_id copy_id	Client(client_id) Copy(copy_id)
Copy	media_id branch_id	Media(media_id) Branch(branch_id)
Media	media_id	Book(book_id) Magazine(magazine_id) Digital_Media(dmedia_id)

Relational schema diagram and data dictionary are located in their respective files in the documentation folder (See RelationalSchemaDiagram.pdf and DataDictionary.pdf)