Conceptual Modeling

Project Overview:

The overall use of this database is engineered to manage different types of media (books, magazines, digital media) along with clients and different 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 library specified, 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

ER Modeling Components:

The library management system will maintain a collection of books, digital media, and magazines, each uniquely identified and classified based on attributes such as title, genre, publication details, and availability status.

Books are characterized by attributes like title, author, ISBN (which must be unique), publication year, author, and availability status. Digital Media consists of items such as e-books, audiobooks, and videos, with attributes including title, creator, media type, and publication year. Magazines are distinguished by their issue number and publication date.

The system will manage Clients, each with a unique client ID, name, contact information, membership type (e.g., Regular, Student, Senior Citizen), and account status. Some clients may have a borrowing limit defined by the max_books attribute.

Clients can engage with the system by borrowing items or placing reservations. Borrowing Transactions record instances where a client borrows a book, digital media, or magazine, capturing details such as the borrow date, due date, return date (if applicable), and overdue

fines. A one-to-many relationship exists between clients and borrowing transactions, as a client can borrow multiple items over time, but each borrowing transaction is linked to a single item.

Clients can also place reservations for books and digital media. Each reservation links a client to a specific item, with statuses like 'Pending', 'Available', or 'Cancelled.' A client can reserve multiple items, and an item can be reserved by multiple clients, establishing a many-to-many relationship between clients and reserved items.

Borrowed and reserved items are constrained by their availability status. A copy of a book, digital media, or magazine that is 'Checked Out' cannot be borrowed by another client until it is returned, and a reserved item must be available before fulfillment.

The library has library staff with attributes such as staff_id, name, and currently employed status (to keep track of previously employed employees and those currently employed). Library staff work with clients to facilitate reservations and borrowing transactions.

The library can have different branches. Each branch has attributes including branch_id, name, address, and year_established. A branch can house multiple copies of books, magazines, and digital media.

Each copy in the library is uniquely identified by attributes such as copy_id, media_id, branch_id, and availability. Books, magazines, and digital media are generalized into a media entity. Each media item has attributes including media_id, title, publication_date, media type, and genre.

Lastly, library staff can work at different branches of the library.

Project Meeting Log:
Date: March 16, 2025
Time: 3:00 PM
Location: Virtual via Discord

Objective: Create ER diagram, document overview and scope, and identify entity components for the model.

Team Members Present: Evans, Brisa, Jared, Spencer, John

Task Completion Confirmation:

- Spencer: Brainstormed ER diagram structure and helped create diagram, wrote introduction
- John: Brainstormed ER diagram structure and helped create diagram, created project meeting log

- Evans: Brainstormed ER diagram structure and helped create diagram, completed ER modeling components
- Jared: Brainstormed ER diagram structure and helped create diagram, …
- Brisa: Brainstormed ER diagram structure and helped create diagram, …

Brainstorming Session:

- Discussed structure of ER diagram
- Discussed multiplicity of relationships in ER diagram
- Discussed changes, additions, and deletions from our previous database schema.

Tasks Allocated:

- Spencer: Brainstorm the logical model and map the conceptual model to a logical model.
- John: Brainstorm the logical model and map the conceptual model to a logical model.
- Evans: Brainstorm the logical model and map the conceptual model to a logical model.
- Jared: Brainstorm the logical model and map the conceptual model to a logical model.
- Brisa: Brainstorm the logical model and map the conceptual model to a logical model.

Follow-up Actions:

Schedule the next meeting for March 28, 2025 at 4:00 PM to map our conceptual model to a logical relationship schema.