CONCEPTUAL MODELING

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Introduction

Please note that the content of this document may be changed throughout the project's development.

Project Overview

The purpose of this database is to manage, track, and generate various reports of the operations and inventory of a small library.

Scope

From our original project plan:

> "This project encompasses the end-to-end creation of a relational database system tailored for a small library. Specifically, it includes analyzing library requirements, designing data models, implementing the schema in a DBMS, and setting up the rules for borrowing and membership management. The database will track a variety of loanable items, enforce borrowing restrictions, and provide meaningful reports to support library operations."

Glossary

- DBMS: Database Management System
- SQL: Structured Query Language
- PK: Primary Key
- FK: Foreign Key
- IDE: Integrated Development Environment
- ER: Entity-Relationship

ER Modeling Components

Identified Entities

We have identified the following major entities for our database:

- Media Item
- Author
- User
- Fee
- Transaction

Entity Attributes

For the below data items, the following is true:

- Names of both attributes and entities are subject to change
- Attributes are assumed to be NOT NULL unless otherwise specified
- Attributes marked as INT that represent an enumerator will have those enumerator values below them
- Attributes that are primary keys or foreign keys will have a corresponding mark below them
- For string-like attributes, the maximum lengths are subject to change throughout development

Media Item

- media_id: INT
    - PK
- title: NVARCHAR(255)
- author_id: INT
    - FK
- isbn: NVARCHAR(13)
- publication_year: DATE
- media_type: INT
    - Enum values:
        - Other (misc.)

        - Book
        - Magazine
        - Audiobook
- genre: INT
    - Enum values:
        - Other (misc.)
        - Science Fiction
        - Fiction
        - Non-Fiction
        - Biography
        - Autobiography
        - Fantasy
        - Romance
        - Historical fiction
        - Drama
        - Mystery
        - Thriller
        - Young Adult
        - Memoir
        - Self-Help
- availability: BIT

Author

- author_id: INT
    - PK

- first_name: NVARCHAR(100)
- last_name: NVARCHAR(100)

User

The user entity encapsulates both staff members and clients, as they both share very similar attributes. They are separated by the “is_staff” attribute.

- user_id: INT
    - PK
- is_staff: BIT
- first_name: NVARCHAR(100)
- last_name: NVARCHAR(100)
- email: NVARCHAR(320)
- phone: NVARCHAR(10)
- membership_type: INT
    - Enum values:
        - Student
        - Senior Citizen
- account_status: INT
    - Enum values:
        -

Fee

- fee_id: INT
    - PK
- user_id: INT
    - FK

- date_issued: DATETIME
- amount: DECIMAL(10, 2)

Media Transaction

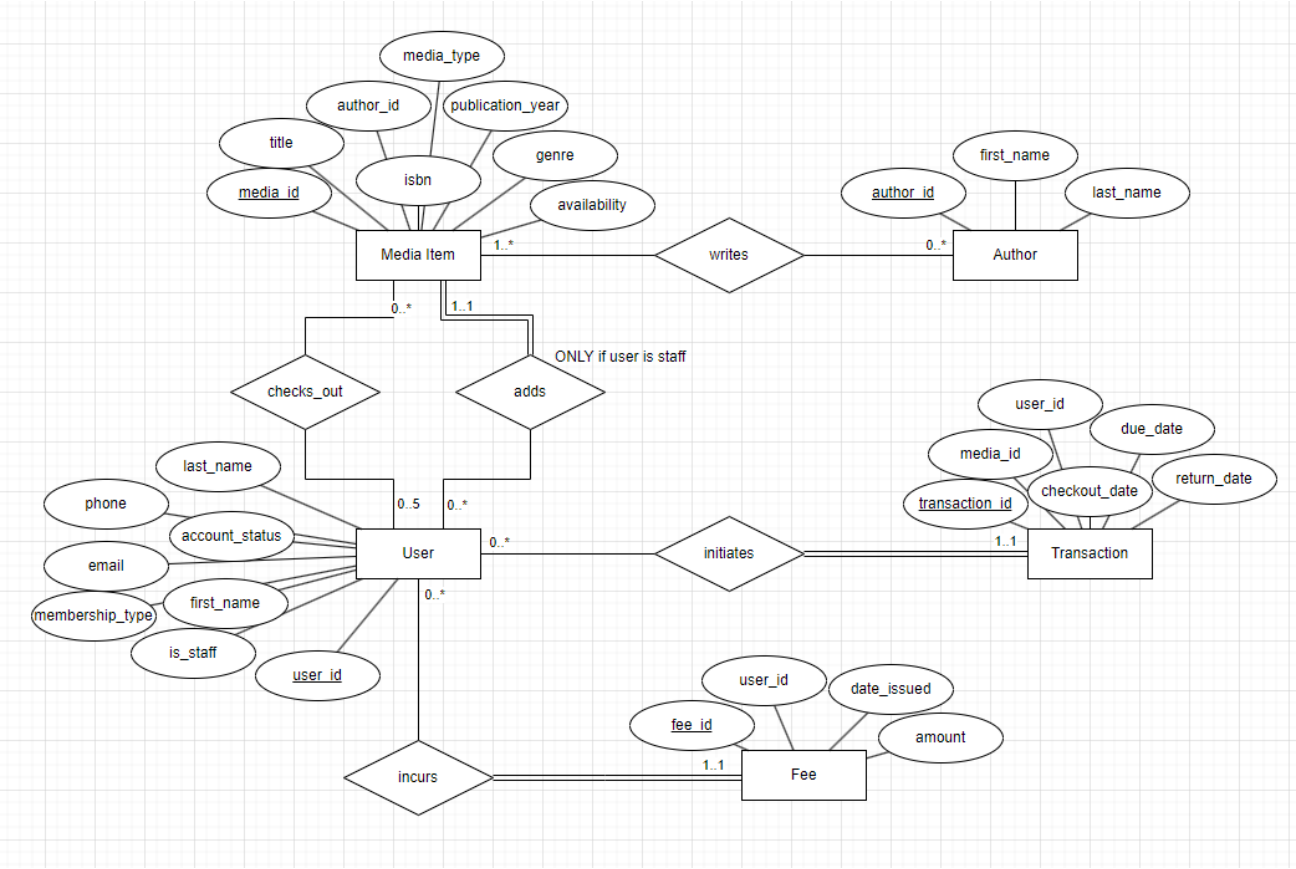
- transaction_id: INT
    - PK
- media_id: INT
    - FK
- user_id: INT
    - FK
- checkout_date: DATETIME
- due_date: DATETIME
- return_date: DATETIME
    - can be NULL

Defined Relationships

- Clients can have a maximum of 5 checked out items at a time
- Clients will incur a fee if their item is not returned by the due date
- Certain items have restrictions/requirements for borrowing

Created ER Model

Our full ER model is here:



A full-resolution PDF of the diagram can be found in the GitHub repository.

Appendices

N/A