DATABASE REQUIREMENTS

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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

Stakeholders

Overall, the major stakeholders for this project are as follows:

- Staff

    - Basic staff
    - Administrators
- General public
    - Students
    - Senior Citizens

Requirements

Functional Requirements

The following functional requirements will be part of the final product of the project:

- All basic SQL operations for most tables/entities
    - Selecting
    - Inserting
    - Updating
    - Deleting
- Managing clients
    - Adding fees
    - Adding transactions
    - Querying a client's transaction time
- Managing media items
    - Sorting/filtering items by:
        - Media type
        - Media genre
        - Length
        - Publishing date

    - Item cataloguing
- Client item grouping
- Generating reports
    - Client borrowing trends
    - Fine calculations
    - Clients with frequent fines
    - Item availability
    - Ranking popularity use of an item by certain time frames

Data Entities

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
- 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
- checkout_date: DATETIME
- due_date: DATETIME
- return_date: DATETIME
    - can be NULL

Constraints

- 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

Hardware and Software Requirements

Hardware

For our hardware, we will be utilizing the provided MariaDB database located on the University of Kansas EECS servers. Each of the team members were given a unique username and password for this database by class administrators.

The only other piece(s) of hardware that we will require are our own personal devices for the project's development.

Software

As for the software, we will be using two main software for this project:

- Microsoft SQL Server Management Studio

    - This is a free application used by many in the industry to create and edit databases.
- Visual Studio
    - This is a free IDE that has built-in SQL database modification support.
- Visual Studio Code
    - This is a free code editor that has official extensions for easily modifying and querying the database.

Internet Services

Additionally, we will utilize GitHub for team collaboration and data sharing for the project.

Appendices

To more easily test and demonstrate our project's requirements, we will attempt to create a very basic web application to query the database. This will be the lowest priority for the project, as it is not necessarily required. In this web app, there will be a page for both staff members and clients.