Introduction [5 points].

Project Overview:

This database is intended to maintain records of inventory and services for a small town's library. This includes all typical operations expected of a small town's library. The system will cover a variety of library operations such as renting different kinds of literature, managing memberships, handling transactions, and other various actions users and employees take. The project will include designing an Entity Relationship diagram, then mapping it to a real schema and implementation using MariaDB. Then creating a simple user interface that can handle the various queries needed for customers and employees of the library. Finally, wrapping up with some form of testing, possibly unit and integration tests, and documentation/instructions.

Scope:

Items included in the scope: loanable items (Books, DVDs, CDs, Magazines), in library services (computer access, newspaper, microfiche), customers, and librarians. It will include a borrowing/returning system with limits, fees, and reservations. Different user interfaces will be created for staff and clients, allowing book checkouts, catalog searches, and overdue fee tracking. The database will be implemented in MariaDB and will include queries for generating various reports.

The system will not include a fully developed UI, AI-based recommendations, external payment integration, or multi-library support.

Glossary:

- **ISBN** – International Standard Book Number, a unique identifier for books.
- **Loanable Items** – Books, DVDs, CDs, and magazines that members can borrow.
- **Reservation** – The process of placing a hold on a currently checked-out item.
- **Overdue Fee** – A fine charged to a member for returning an item late.
- **MariaDB** – The relational database management system used for implementation.

Identify ER Modeling Components [15 points].

Identify Entities: *Define Attributes*: *Define Relationships*:

Customer borrows rentable item

- One-to-many

- Loan_id
- ItemID [FK: Rentable_Item.Item_ID]
- UserID [FK: Member.User_ID]
- Loan_date
- Due_date
- return_date

Customer uses computer

- One-to-one

Customer uses microfiche

- One-to-one

Microfiche contains newspapers

- One-to-many
- ID [PK/FK: Microfiche.ID]
- ISSN [PK/FK: Newspapers.ISSN]

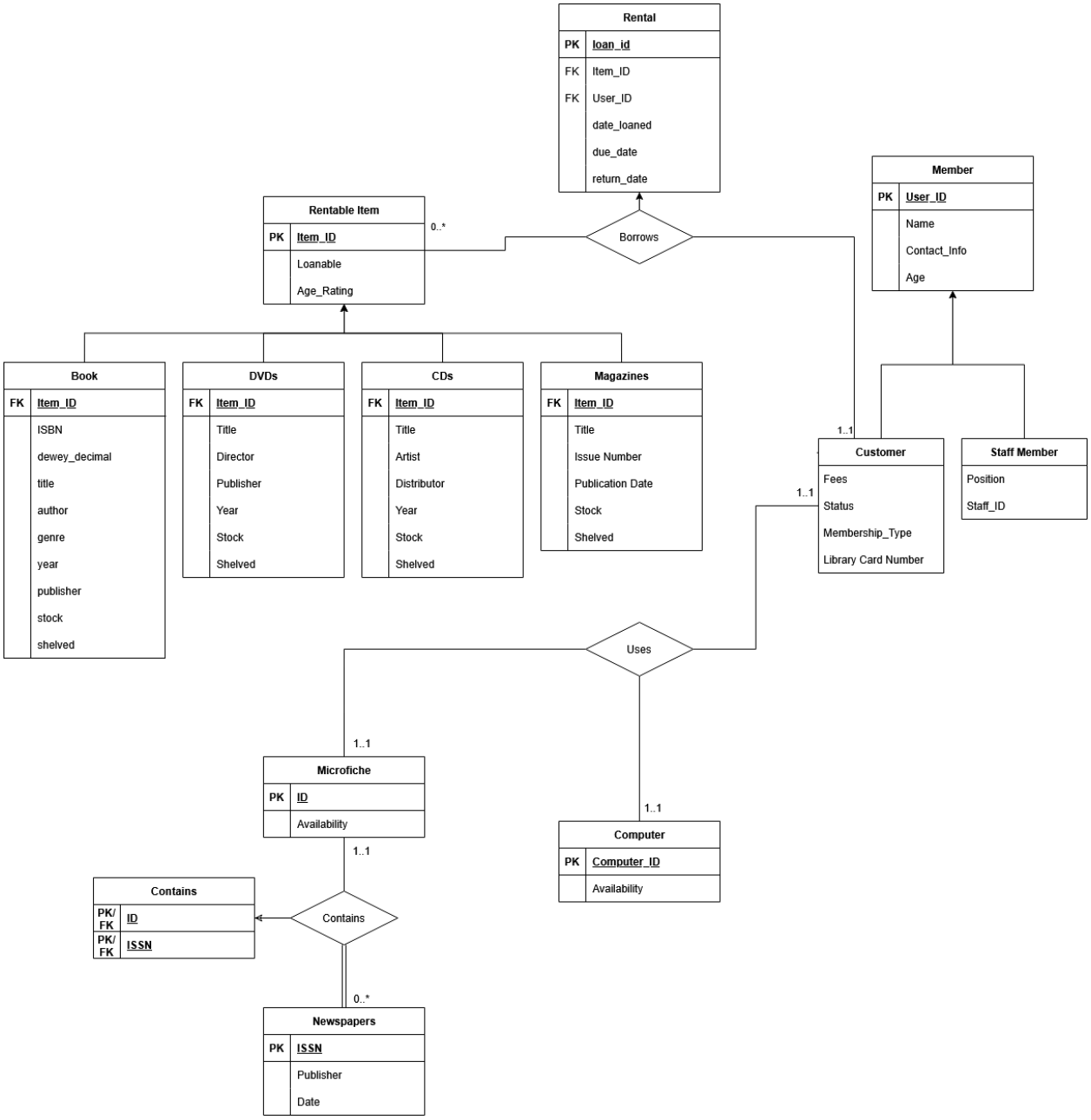
- Rentable_Item
    - Item_ID [Int][Not Null]
    - Loanable [Int]
    - Age_rating [Int]
- Books
    - Item ID [Int] [Not Null] [FK: Rentable_Item.Item_ID]
    - ISBN [Int] [Not Null]
    - Dewey Decimal [Text]
    - Title [Text]
    - Author [Text]
    - Genre [Text]
    - Year [Date]
    - Publisher [Text]
    - Stock [Int] [Not Null]
    - Shelved [Bool] [Not Null]
- DVDs
    - Item ID [Int] [Not Null] [FK: Rentable_Item.Item_ID]
    - Title [Text]
    - Directors [Text]
    - Publisher [Text]
    - Year [Date]
    - Stock [Int] [Not Null]
    - Shelved [Bool] [Not Null]

- CDs
    - Item ID [Int] [Not Null] [FK: Rentable_Item.Item_ID]
    - Title [Text]
    - Performing Artists [Text]
    - Distributor [Text]
    - Year [Int]
    - Stock [Int] [Not Null]
    - Shelved [Bool] [Not Null]
- Magazines
    - Item ID [Int] [Not Null] [FK: Rentable_Item.Item_ID]
    - Title [Text]
    - Issue number [Int]
    - Publication date [Date]
    - Stock [Int] [Not Null]
    - Shelved [Bool] [Not Null]

- Member
    - User_ID [Int]
    - Name [Text]
    - Contact_Info [Text]
    - Age [Int]
- Customer [IS A MEMBER]
    - Fees [Float]
    - Status [Text]
    - Membership_Type [Text]
    - Library Card Number [Int]
- Staff_Member [IS A MEMBER]
    - Position [Text]
    - Staff_ID [Int]

- Computer
    - ID [int] [Not Null]
    - Availability[bool]
- Microfiche(Newspapers)
    - Publisher/Name [Text] [Not Null]
    - Publishing date [Date] [Not Null]

Create the ER Model [30 points]: Use a diagramming tool (such as drawio.com, etc)



- Users cannot rent items if fees > $5 or status = Banned
- Item must be loanable or device must be available to be used by a customer
- Membership_type determines the age_rating that a member can rent out
- Membership_type determines the number of borrowed items a member can have out at one time