Assignment - 1

Analysis and binary design of Library management system:

1. Key issues with the File-based system

Data redundancy:-

Multiply copies of the same data can exist, Leading to excesive storage usage

Data inconsistency:-

Due to redundancy inconsistency data can arise when updates are not propegated properly

Difficulty in data retrieval:-

complex queries require extensive searching and Progressing

Lack of data integrity and security:-

File-based systems lack constraints to ensure data accuracy and validity

2. Main entities and Attributes

Books:-

BOOK ID, Title, Author, ISBN, Publisher, year Published, Genre, copies available

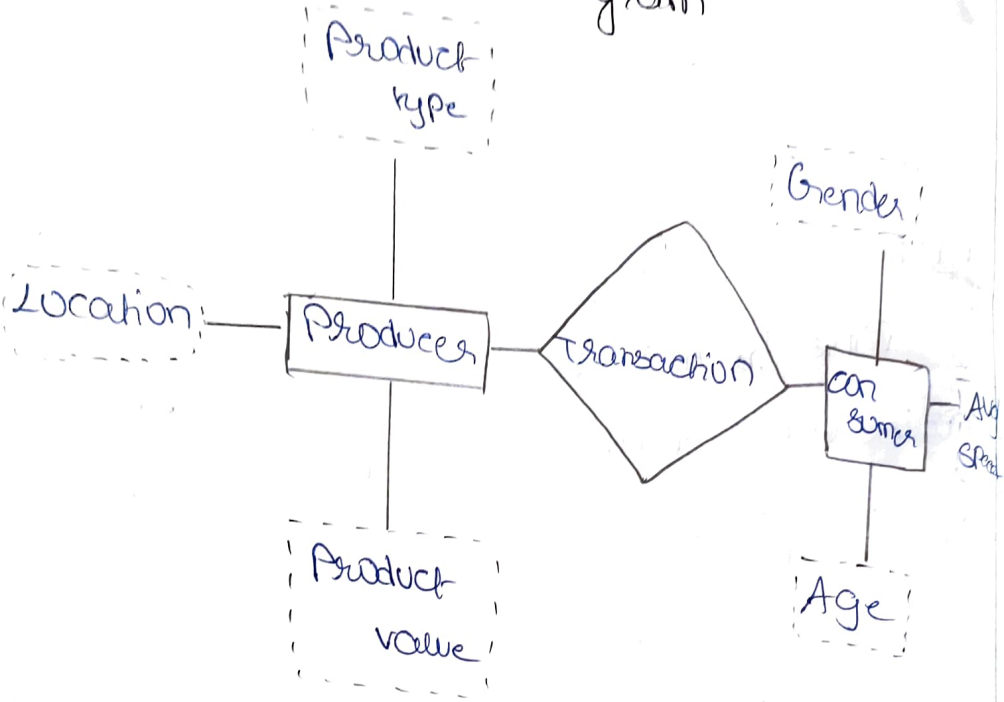
Members:-

Member ID, First name, Last name, Address Phone number, Email.

Transactions:-

Transaction ID, member ID, Book ID, Borrow date, Due date, Return Date

3. Entity relationship (ER) diagram



4. Sql table creation steps

```
CREATE TABLE BOOKS (
    BOOK ID INT PRIMARY KEY,
    Title VARCHAR (255),
    Author VARCHAR (255),
    ISBN VARCHAR (13),
    Publisher VARCHAR (255),
    Year Published YEAR,
    Genre VARCHAR (50),
    Copies Available INT);
```

```
CREATE TABLE MEMBERS (
    Transaction ID INT PRIMARY KEY,
    First name VARCHAR (100),
    Last name VARCHAR (100),
    Address VARCHAR (15),
    Email VARCHAR (100);
```

5. Sample data for each table

```
INSERT INTO BOOKS VALUES (1, 'the
great Gatsby', 'F Scott', 9780743273565',
'Scribner', 1925, 'Fiction', 5);

INSERT INTO BOOKS VALUES (2, '1984',
'GeorgeOrwell', '9780451524935', 'Signet
classic', 1949, 'Dystopian', 3);

INSERT INTO Members values (1, 'John',
'Doe', '123 mainst', '555-1234', 'John
do @Example.com')

INSERT INTO Members values (2, 'Jane',
'Smith', '456 Elmst', '555-5678', 'Jane
Smith @example.com')
```

6. SQL Queries for CRUD Operations

Insert a new record

```
INSERT INTO BOOKS (BOOKID, Title, Author,
                   ISBN, PUBLisher, year,
                   Published, Genre, Copies
                   Available)
VALUES (3, 'To Kill a mocking bird', 'Harper
        Lee', 9780006093546', 'Harper
        Perennial', 1960, 'Fiction', 2);
```

Update an existing record

Update members

```
SET Phone numbers = '555-4321'
WHERE Member ID = 1;
```

Delete a record

```
DELETE From Transactions
WHERE Transactions ID = 1;
```

Retrieve information

```
Select * From Books; Select * From members;
Select * From Transactions;
```

7. Example Queries

List of all books borrowed by a specific members

```
Select Books Title
FROM Transactions
Join Books on Transactions.Book ID =
                                Books.
                                BookID
WHERE Transactions.MEMBER ID = 1;
```

Due dates for all borrowed books

```
SELECT Books.Title, Transactions.Duedate
FROM Transactions
Join Books ON Transactions.BOOKID.
                                Books.BookID
WHERE Transactions.Return Date IS NULL
```

MEMBERS who have overdue books

```
SELECT MEMBERS First name, MEMBERS Last
name
FROM Transactions
Join Members on Transactions.member ID =
Members.member ID
WHERE Transections.Due date < CURDate()
AND Transactions Return date IS NULL;
```

8. Report comparing File-based system and DBMS

Data management :-

File-based system data management is manual and prone to human error

DBMS :-

Centralized data management with automated updates, ensuring data consistency and integrity

Data retrival :-

File-based system :-

Retrieval is slow, requiring manual searching through files.

DBMS :-

Structured Query Language (SQL) allows for efficient and complex data retrieval

Data security :-

File-based system :-

Limited security measures leading to potential unauthorized access and data breaches

DBMS :-

Enhanced security features including user authentication authorization, and encryption.