Group Members:

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Project title: Library Database Application - CS306 Project

Description: The Library Database Application aims to provide a comprehensive system for managing library resources, including books, library staff, publishers, authors, library branches, checkouts, and library members. This system will enable efficient tracking of book information, staff records, member details, and checkout history.

Entities:

- BOOK,
- AUTHOR,
- PUBLISHER,
- MEMBER,
- CONTACT_INFO,
- CHECKOUT,
- STAFF,
- LIB_BRANCH

Relationships:

- written_by (BOOK and AUTHOR),
- published_by (BOOK and PUBLISHER),
- made_by (CHECKOUT_BOOK and MEMBER),
- in_branch (CHECKOUT_BOOK and LIB_BRANCH),
- checkout_by (CHECKOUT_BOOK and STAFF),
- Is_in (LIB_BRANCH and BOOK)
- Is_contacted (MEMBER and CONTACT_INFO)

BOOK's Attributes: ISBN, title, author, genre, pub_year, copies_av, total_cop

AUTHOR's Attributes: au_id, au_name, au_dateOfBirth, au_nationality

PUBLISHER's Attributes: publisher_id, publisher_name

MEMBER's Attributes: mem_id, mem_firstname, mem_lastname, mem_dateOfBirth, mem_address

CONTACT_INFO's Attributes: mem_id, contact_value, contact_type

CHECKOUT_BOOK's Attributes: ISBN, checkout_id, checkout_date, due_date, return_date

STAFF's Attributes: staff_id, staff_name

LIB_BRANCH's Attributes: branch_id, branch_name, branch_loc, branch_manager

Primary Keys & Foreign Keys:

BOOK's KEYS: Primary: ISBN, Foreign: None

AUTHOR's KEYS: Primary: au_id, Foreign: None

PUBLISHER's KEYS: Primary: publisher_id, Foreign: None

MEMBER's KEYS: Primary: mem_id, Foreign: None

CONTACT_INFO's KEYS: Primary: (mem_id, contact_value), Foreign: mem_id

CHECKOUT's KEYS: Primary: checkout_id, Foreign: mem_id, staff_id, branch_id

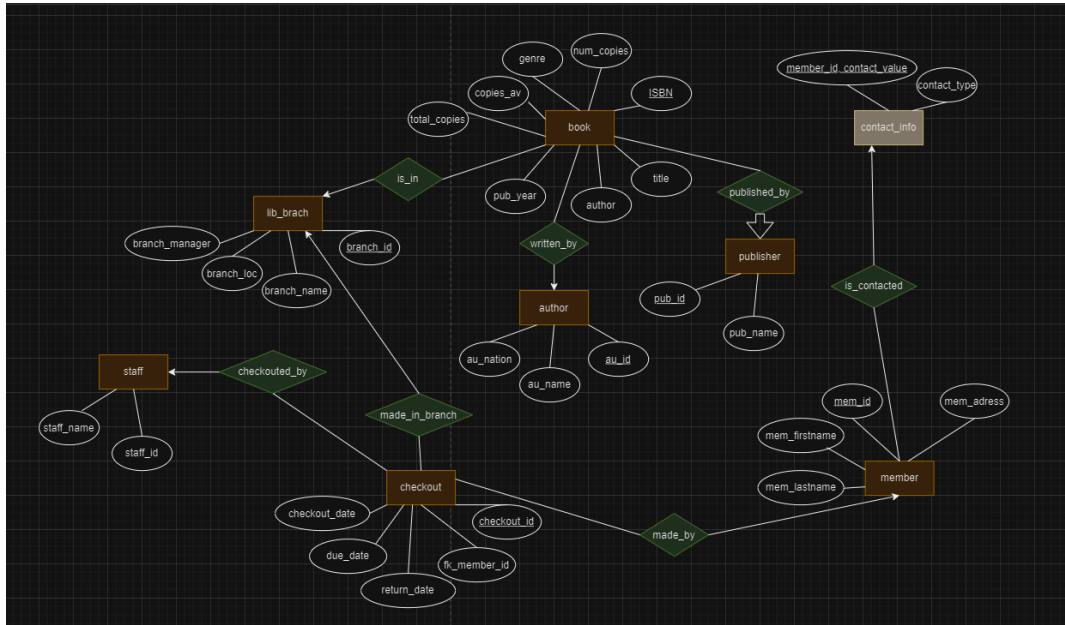**STAFF's KEYS:** Primary: staff_id, Foreign: None

LIB_BRANCH's KEYS: Primary: branch_id, Foreign: None

Participation Constraints:

- BOOK to AUTHOR **(Many to 1)**

- BOOK to PUBLISHER **(Many to 1)**

- CHECKOUT to MEMBER **(Many to 1)**

- CHECKOUT to LIB_BRANCH **(Many to 1)**

- CHECKOUT to STAFF **(Many to 1)**

Weak Entity: contact_info

Our library database application's **Entity-Relationship (ER) diagram:**

Relational Model (as create table statements):

```
CREATE TABLE Book (
    ISBN VARCHAR(15) PRIMARY KEY,
    title VARCHAR(255),
    au_name VARCHAR(255),
    pub_year INT,
    genre VARCHAR(50),
    copies_av INT,
    total_cop INT
);

CREATE TABLE Author (
    au_id INT PRIMARY KEY,
    au_name VARCHAR(255),
    au_dateOfBirth DATE,
    au_nationality VARCHAR(50)
);

CREATE TABLE Publisher (
    publisher_id INT PRIMARY KEY,
    publisher_name VARCHAR(255)
);

CREATE TABLE Member (
    mem_id INT PRIMARY KEY,
    mem_firstname VARCHAR(255),
    mem_lastname VARCHAR(255),
    mem_dateOfBirth DATE,
    mem_address TEXT
);

CREATE TABLE Contact_Info (
    mem_id INT,
    contact_value VARCHAR(255),
    contact_type VARCHAR(50),
    PRIMARY KEY(mem_id, contact_value),
```

```
    contact_type VARCHAR(50) CHECK (contact_type IN ('email', 'phone_num')),
    FOREIGN KEY(mem_id) REFERENCES Member(mem_id)
);

CREATE TABLE Checkout(
    ISBN VARCHAR(15),
    checkout_id INT PRIMARY KEY,
    checkout_date DATE,
    due_date DATE,
    return_date DATE,
    FOREIGN KEY(ISBN) REFERENCES Book(ISBN)
);

CREATE TABLE Lib_Branch (
    branch_id INT PRIMARY KEY,
    branch_name VARCHAR(255),
    branch_loc TEXT,
    branch_manager VARCHAR(255)
);

CREATE TABLE Staff (
    staff_id INT PRIMARY KEY,
    staff_name VARCHAR(255)
);


CREATE TABLE Written_By (
    PRIMARY KEY(ISBN, au_id),
    FOREIGN KEY(ISBN) REFERENCES Book(ISBN),
    FOREIGN KEY(au_id) REFERENCES Author(au_id),
    ISBN VARCHAR(15),
    au_id INT,
);

CREATE TABLE Published_By (
    ISBN VARCHAR(15),
    publisher_id INT,
    PRIMARY KEY(ISBN, publisher_id),
    FOREIGN KEY(ISBN) REFERENCES Book(ISBN),
    FOREIGN KEY(publisher_id) REFERENCES Publisher(publisher_id)
);

CREATE TABLE Made_By (
    checkout_id INT,
    mem_id INT,
    PRIMARY KEY(checkout_id, mem_id),
    FOREIGN KEY(checkout_id) REFERENCES Checkout_Book(checkout_id),
    FOREIGN KEY(mem_id) REFERENCES Member(mem_id)
);

CREATE TABLE Checkout_By (
    checkout_id INT,
    staff_id INT,
    PRIMARY KEY(checkout_id, staff_id),
    FOREIGN KEY(checkout_id) REFERENCES Checkout_Book(checkout_id),
    FOREIGN KEY(staff_id) REFERENCES Staff(staff_id)
);

CREATE TABLE In_Branch (
    checkout_id INT,
    branch_id INT,
    PRIMARY KEY(checkout_id, branch_id),
    FOREIGN KEY(checkout_id) REFERENCES Checkout_Book(checkout_id),
    FOREIGN KEY(branch_id) REFERENCES Lib_Branch(branch_id));
```