CS 4347.001 Database Systems
Database Project Phase Two
Team 9

Project details:

Project Name: Library Management System
Team Name: Vibecoders
Team Members:

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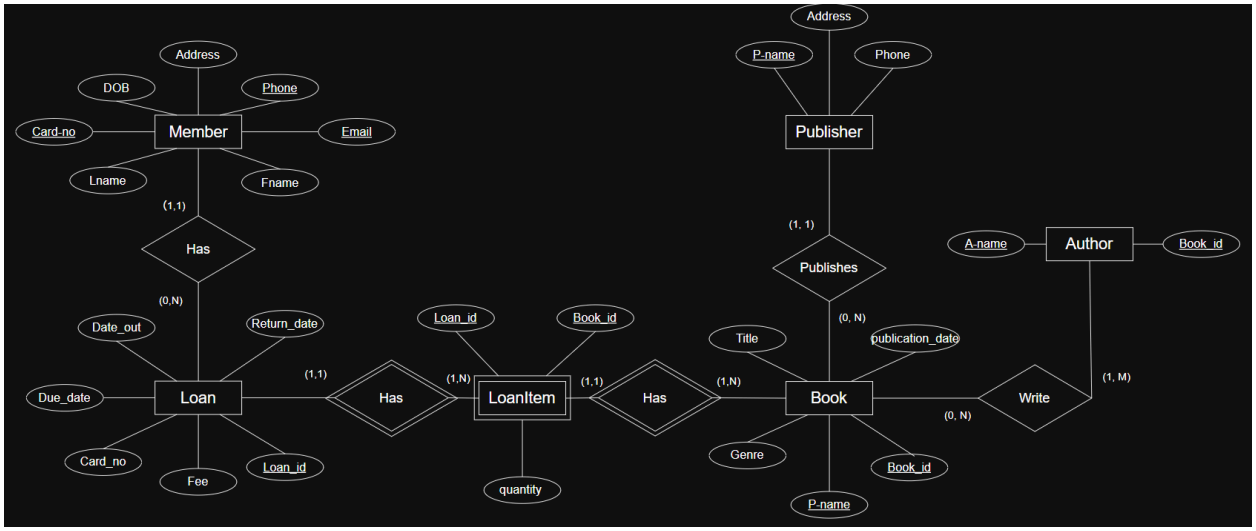
Task A:



Entities:

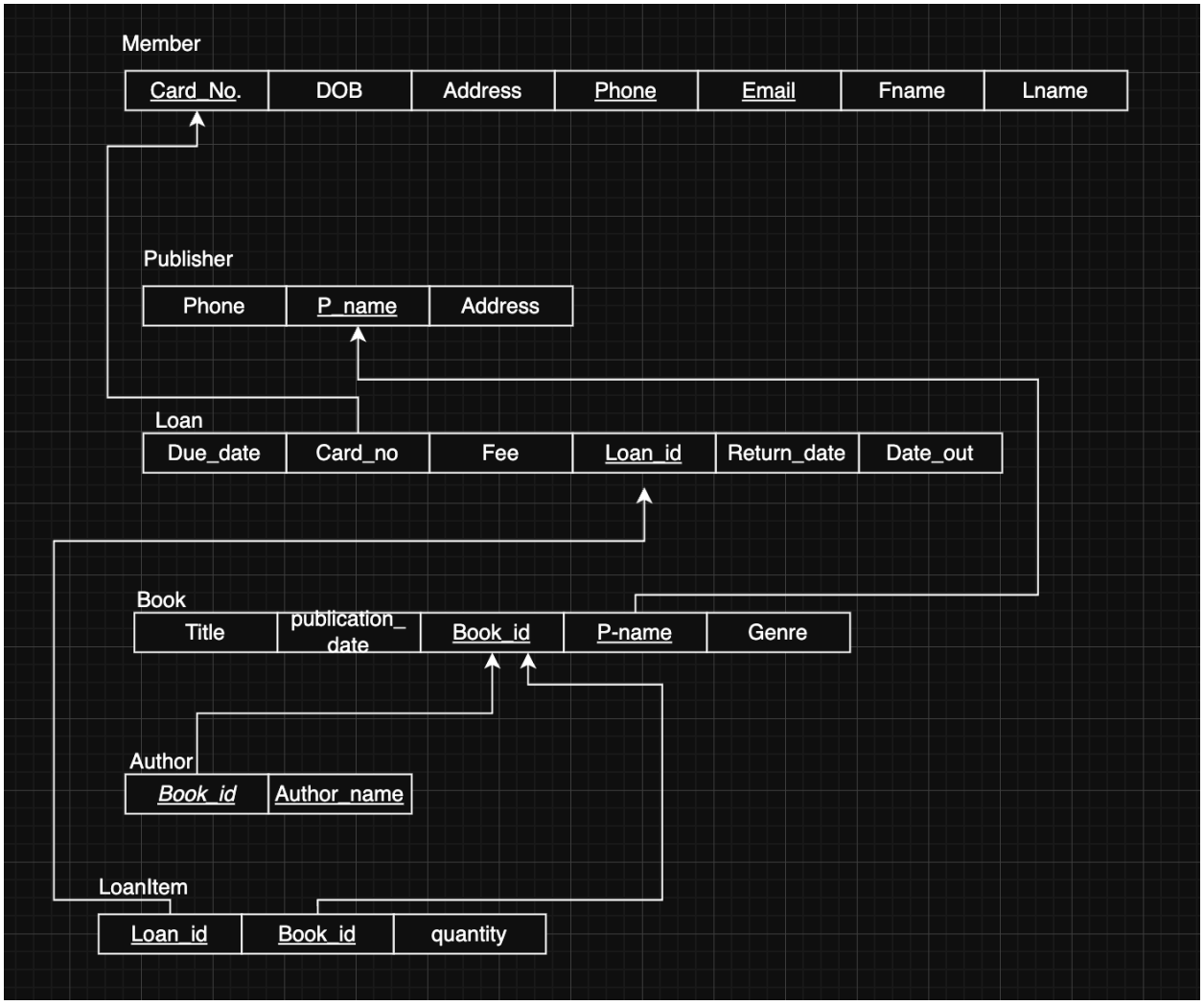
Member(card_no, fname, lname, dob, address, phone, email)
PK: card_no
Publisher(p_name, address, phone)
PK: p_name
Book(book_id, title, genre, publication_date, p_name)
PK: book_id; FK p_name→Publisher.p_name
Loan(loan_id, card_no, date_out, due_date, return_date, fee)
PK: loan_id; FK card_no→Member.card_no
LoanItem(loan_id, book_id, quantity)
PK: (loan_id, book_id); FKs loan_id→Loan.loan_id, book_id→Book.book_id

Author(book_id, a_name)
PK: (book_id, a_name); FK book_id→Book.book_id

Relation:

Member–Loan: Member (1, 1) — Loan (0, N).
Total on Loan (every Member can have 0 or many Loans).
Loan–LoanItem: Loan (1, 1) — LoanItem (1, N).
Total on LoanItem (every LoanItem belongs to exactly one Loan).
Book–LoanItem: Book (1, N) — LoanItem (1,1).
Total on LoanItem (every LoanItem has 1 or many Books)
Publisher–Book: Publisher (1, 1) — Book (0, N).
Total on Book (every Book has a Publisher).
Book–Author: Book (0, N) — Author (1, M)
Total on from both sides (every Book has 1 or many Authors)

Task B:



Entities:
Member(card_no PK, fname NOT NULL, lname NOT NULL, dob NULL, address NULL, phone UNIQUE NOT NULL, email UNIQUE NOT NULL)

Publisher(p_name PK, address NULL, phone NULL)

Book(book_id PK, title NOT NULL, genre NULL, publication_date NULL, p_name FK NOT NULL → Publisher.p_name
FK actions: ON UPDATE CASCADE ON DELETE RESTRICT)

Loan(loan_id PK, card_no FK NOT NULL → Member.card_no, date_out NOT NULL, due_date NOT NULL, return_date NULL, fee DEFAULT 0 CHECK fee≥0
FK actions: ON UPDATE CASCADE ON DELETE RESTRICT)

LoanItem((loan_id, book_id) PK, quantity DEFAULT 1 CHECK quantity≥1,
loan_id FK → Loan.loan_id ON UPDATE CASCADE ON DELETE CASCADE,

book_id FK → Book.book_id ON UPDATE CASCADE ON DELETE RESTRICT)

Author((book_id, a_name) PK,
book_id FK → Book.book_id ON UPDATE CASCADE ON DELETE CASCADE)

Attribute purpose:
Member: card_no int (library card id); fname/lname varchar; dob date; address/phone/email contact details.
Publisher: p_name varchar (publisher name key); address/phone contact.
Book: book_id int; title/genre varchar; publication_date date; p_name FK to publisher.
Loan: loan_id int; card_no FK to Member; date_out/due_date/return_date dates; fee decimal(8,2).
LoanItem: loan_id + book_id (which book is on which loan); quantity int ≥1.
Author: author_id + book_id.

Draft SQL

```
CREATE TABLE Member (
  Card_no       INT                 PRIMARY KEY,
  Fname         VARCHAR(40)         NOT NULL,
  Lname         VARCHAR(40)         NOT NULL,
  Dob           DATE,
  Address       VARCHAR(120),
  Phone         VARCHAR(20)         UNIQUE,
  Email         VARCHAR(80)         UNIQUE
);

CREATE TABLE Publisher (
  P_name        VARCHAR(80)         PRIMARY KEY,
  Address       VARCHAR(120),
  Phone         VARCHAR(20)
);

CREATE TABLE Book (
  Book_id           INT             PRIMARY KEY,
  Title             VARCHAR(120)    NOT NULL,
  Genre             VARCHAR(40),
  Publication_date  DATE,
  P_name            VARCHAR(80)     NOT NULL,

FOREIGN KEY (P_name) REFERENCES Publisher(P_name)
    ON UPDATE CASCADE ON DELETE RESTRICT
);

CREATE TABLE Author (
  Book_id       INT                 NOT NULL,
  A_name        VARCHAR(80)         NOT NULL,

  PRIMARY KEY(Book_id, A_name),
  FOREIGN KEY (Book_id) REFERENCES Book(Book_id)
    ON UPDATE CASCADE ON DELETE RESTRICT
);

CREATE TABLE Loan (
  Loan_id       INT                 PRIMARY KEY,
  Card_no       INT                 NOT NULL,
  Date_out      DATE                NOT NULL,
  Due_date      DATE                NOT NULL,
  Return_date   DATE,
  Fee           DECIMAL(8,2)        DEFAULT 0 CHECK (Fee >= 0),
```

```
  FOREIGN KEY (Card_no) REFERENCES Member(Card_no)
     ON UPDATE CASCADE ON DELETE RESTRICT,
  CONSTRAINT CHK_Date CHECK (Date_out < Due_date)
);

CREATE TABLE LoanItem (
  Loan_id       INT             NOT NULL,
  Book_id       INT             NOT NULL,
  Quantity      INT             NOT NULL DEFAULT 1 CHECK (quantity >= 1),

  PRIMARY KEY (Loan_id, Book_id),
  FOREIGN KEY (Loan_id) REFERENCES Loan(Loan_id)
    ON UPDATE CASCADE ON DELETE CASCADE,
  FOREIGN KEY (Book_id) REFERENCES Book(Book_id)
    ON UPDATE CASCADE ON DELETE RESTRICT
);
```