***Assignment 2:*** *Design a database schema for a library system, including tables, fields, and constraints like NOT NULL, UNIQUE, and CHECK. Include primary and foreign keys to establish relationships between tables.*

***database schema for a library system:***

***Tables:***

1. ***Libraries***

*LibraryID (Primary Key)*

*Name*

*Address*

*City*

*State*

*Zip*

1. ***Books***

*BookID (Primary Key)*

*Title*

*Author*

*Publisher*

*PublicationDate*

*ISBN*

*LibraryID (Foreign Key)*

1. ***Borrowers***

*BorrowerID (Primary Key)*

*Name*

*Email*

*Phone*

*Address*

1. ***Loans***

*LoanID (Primary Key)*

*BookID (Foreign Key)*

*BorrowerID (Foreign Key)*

*LoanDate*

*DueDate*

*ReturnDate*

1. ***Fines***

*FineID (Primary Key)*

*LoanID (Foreign Key)*

*FineAmount*

*FineDate*

***Constraints:***

1. ***NOT NULL:***

*Libraries.LibraryID*

*Books.BookID*

*Borrowers.BorrowerID*

*Loans.LoanID*

*Fines.FineID*

*Books.Title*

*Books.Author*

*Books.ISBN*

*Borrowers.Name*

*Borrowers.Email*

*Loans.LoanDate*

*Loans.DueDate*

1. ***UNIQUE****:*

*Books.ISBN*

*Borrowers.Email*

1. ***CHECK****:*

*Books.PublicationDate < CURRENT\_DATE*

*Loans.DueDate > Loans.LoanDate*

*Fines.FineAmount > 0*

***Primary Keys:***

*Libraries.LibraryID*

*Books.BookID*

*Borrowers.BorrowerID*

*Loans.LoanID*

*Fines.FineID*

***Foreign Keys:***

*Books.LibraryID references Libraries.LibraryID*

*Loans.BookID references Books.BookID*

*Loans.BorrowerID references Borrowers.BorrowerID*

*Fines.LoanID references Loans.LoanID*

***Relationships:***

*A library can have multiple books (One-to-Many).*

*A book is associated with one library (Many-to-One).*

*A borrower can have multiple loans (One-to-Many).*

*A loan is associated with one borrower and one book (Many-to-One).*

*A fine is associated with one loan (Many-to-One).*

***SQL Code:***

*CREATE TABLE Libraries (*

*LibraryID INT PRIMARY KEY,*

*Name VARCHAR(50) NOT NULL,*

*Address VARCHAR(100) NOT NULL,*

*City VARCHAR(50) NOT NULL,*

*State VARCHAR(50) NOT NULL,*

*Zip VARCHAR(10) NOT NULL*

*);*

*CREATE TABLE Books (*

*BookID INT PRIMARY KEY,*

*Title VARCHAR(100) NOT NULL,*

*Author VARCHAR(50) NOT NULL,*

*Publisher VARCHAR(50) NOT NULL,*

*PublicationDate DATE NOT NULL CHECK (PublicationDate < CURRENT\_DATE),*

*ISBN VARCHAR(20) UNIQUE NOT NULL,*

*LibraryID INT NOT NULL,*

*FOREIGN KEY (LibraryID) REFERENCES Libraries(LibraryID)*

*);*

*CREATE TABLE Borrowers (*

*BorrowerID INT PRIMARY KEY,*

*Name VARCHAR(50) NOT NULL,*

*Email VARCHAR(100) UNIQUE NOT NULL,*

*Phone VARCHAR(20) NOT NULL,*

*Address VARCHAR(100) NOT NULL*

*);*

*CREATE TABLE Loans (*

*LoanID INT PRIMARY KEY,*

*BookID INT NOT NULL,*

*BorrowerID INT NOT NULL,*

*LoanDate DATE NOT NULL,*

*DueDate DATE NOT NULL CHECK (DueDate > LoanDate),*

*ReturnDate DATE,*

*FOREIGN KEY (BookID) REFERENCES Books(BookID),*

*FOREIGN KEY (BorrowerID) REFERENCES Borrowers(BorrowerID)*

*);*

*CREATE TABLE Fines (*

*FineID INT PRIMARY KEY,*

*LoanID INT NOT NULL,*

*FineAmount DECIMAL(10, 2) NOT NULL CHECK (FineAmount > 0),*

*FineDate DATE NOT NULL,*

*FOREIGN KEY (LoanID) REFERENCES Loans(LoanID)*

*);*