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CS

Sol.

```
CREATE TABLE BOOK (
    BookID INT PRIMARY KEY,
    Title VARCHAR(255) NOT NULL,
    PublisherName VARCHAR(255) NOT NULL
);


CREATE TABLE BOOK_AUTHORS (
    BookID INT,
    AuthorName VARCHAR(255) NOT NULL,
    PRIMARY KEY (BookID, AuthorName),
    FOREIGN KEY (BookID) REFERENCES BOOK(BookID) ON DELETE CASCADE
);

CREATE TABLE PUBLISHER (
    Name VARCHAR(255) PRIMARY KEY,
    Address VARCHAR(255) NOT NULL,
    Phone VARCHAR(20) NOT NULL
);

CREATE TABLE BOOK_COPIES (
    BookID INT,
    BranchID INT,
    NumberOfCopies INT NOT NULL CHECK (NumberOfCopies >= 0),
    PRIMARY KEY (BookID, BranchID),
    FOREIGN KEY (BookID) REFERENCES BOOK(BookID) ON DELETE CASCADE,
    FOREIGN KEY (BranchID) REFERENCES LIBRARY_BRANCH(BranchID) ON DELETE CASCADE
);

CREATE TABLE BOOK_LOANS (
    BookID INT,
    BranchID INT,
    CardNumber INT,
    DateOut DATE NOT NULL,
    DueDate DATE NOT NULL,
    PRIMARY KEY (BookID, BranchID, CardNumber),
    FOREIGN KEY (BookID) REFERENCES BOOK(BookID) ON DELETE CASCADE,
    FOREIGN KEY (BranchID) REFERENCES LIBRARY_BRANCH(BranchID) ON DELETE CASCADE,
    FOREIGN KEY (CardNumber) REFERENCES BORROWER(CardNumber) ON DELETE CASCADE
);

CREATE TABLE LIBRARY_BRANCH (
    BranchID INT PRIMARY KEY,
    BranchName VARCHAR(255) NOT NULL,
    Address VARCHAR(255) NOT NULL
);
```

```
CREATE TABLE BORROWER (
    CardNumber INT PRIMARY KEY,
    Name VARCHAR(255) NOT NULL,
    Address VARCHAR(255) NOT NULL,
    Phone VARCHAR(20) NOT NULL
);
```

Q2.1

```
SELECT SUM(NumberOfCopies) AS TotalCopies
FROM BOOK_COPIES BC
JOIN BOOK B ON BC.BookID = B.BookID
JOIN LIBRARY_BRANCH LB ON BC.BranchID = LB.BranchID
WHERE B.Title = 'The Lost Tribe' AND LB.BranchName = 'Sharpstown';
```

Q2.2

```
SELECT LB.BranchName, SUM(BC.NumberOfCopies) AS TotalCopies
FROM BOOK_COPIES BC
JOIN BOOK B ON BC.BookID = B.BookID
JOIN LIBRARY_BRANCH LB ON BC.BranchID = LB.BranchID
WHERE B.Title = 'The Lost Tribe'
GROUP BY LB.BranchName;
```

Q2.3

```
SELECT Name
FROM BORROWER
WHERE CardNumber NOT IN (SELECT DISTINCT CardNumber FROM BOOK_LOANS);
```

Q2.4

```
SELECT B.Title, BR.Name, BR.Address
FROM BOOK_LOANS BL
JOIN BOOK B ON BL.BookID = B.BookID
JOIN BORROWER BR ON BL.CardNumber = BR.CardNumber
JOIN LIBRARY_BRANCH LB ON BL.BranchID = LB.BranchID
WHERE LB.BranchName = 'Sharpstown' AND BL.DueDate < '2018-09-01';
```

Q2.5

```
SELECT B.Title, SUM(BC.NumberOfCopies) AS TotalCopies
FROM BOOK_AUTHORS BA
JOIN BOOK B ON BA.BookID = B.BookID
JOIN BOOK_COPIES BC ON B.BookID = BC.BookID
JOIN LIBRARY_BRANCH LB ON BC.BranchID = LB.BranchID
WHERE BA.AuthorName = 'Stephen King' AND LB.BranchName = 'Central'
GROUP BY B.Title;
```

Q2.6

```
SELECT BR.Name, BR.Address, COUNT(BL.BookID) AS NumberOfBooks
FROM BORROWER BR
JOIN BOOK_LOANS BL ON BR.CardNumber = BL.CardNumber
GROUP BY BR.Name, BR.Address
HAVING COUNT(BL.BookID) > 5;
```

Q2.7 (I will complete it later from here)

```
SELECT DISTINCT B.Title
FROM BOOK_COPIES BC1
JOIN BOOK B ON BC1.BookID = B.BookID
JOIN LIBRARY_BRANCH LB1 ON BC1.BranchID = LB1.BranchID
WHERE LB1.BranchName = 'Sharpstown'
AND B.BookID NOT IN (
    SELECT BC2.BookID
    FROM BOOK_COPIES BC2
    JOIN LIBRARY_BRANCH LB2 ON BC2.BranchID = LB2.BranchID
    WHERE LB2.BranchName = 'Morristown'
);
```

Q2.8

```
SELECT B.Title
FROM BOOK B
WHERE NOT EXISTS (
    SELECT LB.BranchID FROM LIBRARY_BRANCH LB
    WHERE NOT EXISTS (
        SELECT * FROM BOOK_COPIES BC WHERE BC.BookID = B.BookID AND BC.BranchID =
LB.BranchID
    )
);
```