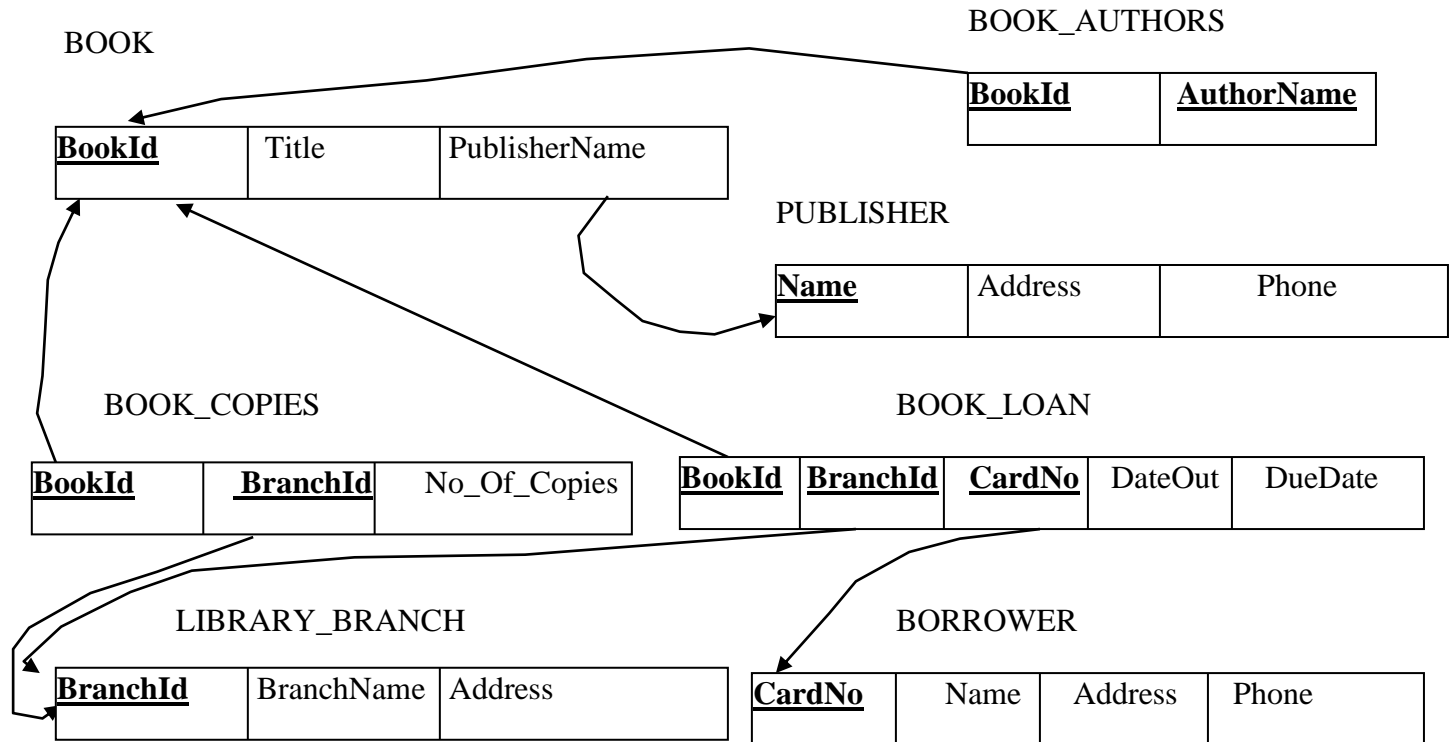


## Example 05: Database Management System

A relational database Schema for LIBRARY database is given below.



Perform the following Queries on the Database.

- How many copies of the book titled DBMS are owned by the library branch whose name is “CSE Seminar library”?

```

SELECT SUM(No_Of_Copies) AS TotalCopies
FROM Book_Copies BC
JOIN Library_Branch LB ON BC.BranchId = LB.BranchId
JOIN Book B ON BC.BookId = B.BookId
WHERE B.Title = 'DBMS' AND LB.BranchName = 'CSE Seminar Library';
  
```

Ans: Total Copies: 2

- How many copies of the book titled DBMS are owned by each library branch?

```

SELECT LB.BranchName, SUM(BC.No_Of_Copies) AS TotalCopies
FROM Book_Copies BC
JOIN Library_Branch LB ON BC.BranchId = LB.BranchId
JOIN Book B ON BC.BookId = B.BookId
WHERE B.Title = 'DBMS'
GROUP BY LB.BranchName;
  
```

**Ans:**

**CSE Seminar Library: 2**

**RU Central Library: 5**

**3. Retrieve the names of all borrowers who do not have any books checked out?**

```
SELECT Name
FROM Borrower
WHERE CardNo NOT IN (SELECT DISTINCT CardNo FROM Book_Loan);
```

**Ans:**

**None (All borrowers have checked out books based on the provided Book\_Loan data.)**

**4. For each book that is loaned out from the “CSE seminar library” branch and whose DueDate is today, retrieve the book title, the borrower’s name, and the borrower’s address.**

```
SELECT B.Title, BO.Name, BO.Address
FROM Book_Loan BL
JOIN Book B ON BL.BookId = B.BookId
JOIN Borrower BO ON BL.CardNo = BO.CardNo
JOIN Library_Branch LB ON BL.BranchId = LB.BranchId
WHERE LB.BranchName = 'CSE Seminar Library' AND BL.DueDate = CURRENT_DATE;
```

**Ans:**

**No books due today (as no DueDate matches CURRENT\_DATE in the provided data).**

**5. For each library branch, retrieve the branch name and the total number of books loaned out from that branch.**

```
SELECT LB.BranchName, COUNT(*) AS TotalLoanedBooks
FROM Book_Loan BL
JOIN Library_Branch LB ON BL.BranchId = LB.BranchId
GROUP BY LB.BranchName;
```

**Ans:**

**CSE Seminar Library: 5**

**RU Central Library: 3**

**DU Central Library: 1**

**6. Retrieve the names, addresses, and number of books checked out for all borrowers who have more than two books checked out.**

```
SELECT BO.Name, BO.Address, COUNT(BL.BookId) AS BooksCheckedOut
```

**FROM Borrower BO**  
**JOIN Book\_Loan BL ON BO.CardNo = BL.CardNo**  
**GROUP BY BO.Name, BO.Address**  
**HAVING COUNT(BL.BookId) > 2;**

**Ans:**

**Masud, Address: CSE, Books Checked Out: 3**

**7. For each book authored by “Ivan BayRoss”, retrieve the title and the no. of copies owned by the library branch whose name is “RU central library”.**

**SELECT B.Title, SUM(BC.No\_Of\_Copies) AS TotalCopies**  
**FROM Book B**  
**JOIN Book\_Author BA ON B.BookId = BA.BookId**  
**JOIN Book\_Copies BC ON B.BookId = BC.BookId**  
**JOIN Library\_Branch LB ON BC.BranchId = LB.BranchId**  
**WHERE BA.AuthorName = 'Ivan BayRoss' AND LB.BranchName = 'RU Central Library'**  
**GROUP BY B.Title;**

**Ans:**

**Title: DBMS, Copies: 5**

**Title: Oracle 2000, Copies: 7**

Book		
BookId	Title	PublisherName
100.001cn	Computer Network	PHI
100.002dsc	Database System	Tata
100.003ds	Digital System	PHI
100.004db	DBMS	PHI
100.005ora	Oracle 2000	Galgotia

Book_Author	
BookId	AuthorName
100.001cn	A S Tanenbaum
100.002dsc	Silberschatz
100.003ds	Ronald J Tocci
100.004db	Ivan Bayross
100.005ora	Ivan Bayross

Publisher		
Name	Address	Phone
PHI	20 Delhi Super Market	01715-454678
Tata	North Kolkata	0156-2345445
Galgotia	Mumbai	0192-203490

Book_Copies		
BookId	BranchId	No_Of_Copies
100.001cn	1001	2
100.001cn	1002	5
100.002dsc	1001	3
100.002dsc	1002	4
100.003ds	1001	3
100.003ds	1003	5
100.004db	1001	2
100.004db	1002	5
100.005ora	1001	2
100.005ora	1002	7

Library_Branch		
BranchId	BranchName	Address
1001	CSE Seminar Library	Rajshahi
1002	RU Central Library	Rajshahi
1003	DU Central Library	Dhaka

Borrower			
CardNo	Name	Address	Phone
10001	Saidur	CSE	01714-400567
10002	Rafiq	PHYSICS	0194-300456
10003	Masud	CSE	0156-345678
10004	Nobir	ICT	01199-203456

BOOK_LOAN				
BookId	BranchId	CardNo	DateOut	DueDate
100.001cn	1001	10001	15-Jan-15	15-Feb-15
100.001cn	1002	10002	25-Jan-15	25-Feb-15
100.002dsc	1001	10003	20-Feb-15	20-Mar-15
100.002dsc	1002	10004	15-Mar-15	15-Apr-15
100.003ds	1001	10001	07-Jun-15	07-Jul-15
100.003ds	1003	10002	15-Oct-15	15-Nov-15
100.004db	1001	10003	25-Oct-15	25-Nov-15
100.004db	1002	10004	15-Nov-15	15-Dec-15
100.005ora	1001	10003	22-Dec-15	22-Jan-16
100.005ora	1002	10001	25-Dec-15	25-Jan-16

```
CREATE TABLE Book (
  BookId VARCHAR(50) PRIMARY KEY,
  Title VARCHAR(100) NOT NULL,
  PublisherName VARCHAR(100) NOT NULL,
  FOREIGN KEY (PublisherName) REFERENCES Publisher(Name)
);
```

```
INSERT INTO Book (BookId, Title, PublisherName)
VALUES
('100.001cn', 'Computer Network', 'PHI'),
('100.002dsc', 'Database System', 'Tata'),
('100.003ds', 'Digital System', 'PHI'),
('100.004db', 'DBMS', 'PHI'),
('100.005ora', 'Oracle 2000', 'Galgotia');
```

```
CREATE TABLE Book_Author (  
  BookId VARCHAR(50),  
  AuthorName VARCHAR(100),  
  PRIMARY KEY (BookId, AuthorName),  
  FOREIGN KEY (BookId) REFERENCES Book(BookId)  
);
```

```
INSERT INTO Book_Author (BookId, AuthorName)  
VALUES  
  ('100.001cn', 'A S Tanenbaum'),  
  ('100.002dsc', 'Silberschatz'),  
  ('100.003ds', 'Ronald J Tocci'),  
  ('100.004db', 'Ivan Bayross'),  
  ('100.005ora', 'Ivan Bayross');
```

```
CREATE TABLE Publisher (  
  Name VARCHAR(100) PRIMARY KEY,  
  Address VARCHAR(200),  
  Phone VARCHAR(15)  
);  
INSERT INTO Publisher (Name, Address, Phone)  
VALUES  
  ('PHI', '20 Delhi Super Market', '01715-454678'),  
  ('Tata', 'North Kolkata', '0156-2345445'),  
  ('Galgotia', 'Mumbai', '0192-203490');
```

```
CREATE TABLE Book_Copies (  
  BookId VARCHAR(50),  
  BranchId INT,  
  No_Of_Copies INT,  
  PRIMARY KEY (BookId, BranchId),  
  FOREIGN KEY (BookId) REFERENCES Book(BookId),  
  FOREIGN KEY (BranchId) REFERENCES Library_Branch(BranchId)  
);  
INSERT INTO Book_Copies (BookId, BranchId, No_Of_Copies)  
VALUES  
  ('100.001cn', 1001, 2),  
  ('100.001cn', 1002, 5),  
  ('100.002dsc', 1001, 3),  
  ('100.002dsc', 1002, 4),  
  ('100.003ds', 1001, 3),  
  ('100.003ds', 1003, 5),  
  ('100.004db', 1001, 2),
```

```
('100.004db', 1002, 5),  
( '100.005ora', 1001, 2),  
( '100.005ora', 1002, 7);
```

```
CREATE TABLE Library_Branch (  
    BranchId INT PRIMARY KEY,  
    BranchName VARCHAR(100),  
    Address VARCHAR(200)  
);  
INSERT INTO Library_Branch (BranchId, BranchName, Address)  
VALUES  
    (1001, 'CSE Seminar Library', 'Rajshahi'),  
    (1002, 'RU Central Library', 'Rajshahi'),  
    (1003, 'DU Central Library', 'Dhaka');
```

```
CREATE TABLE Borrower (  
    CardNo INT PRIMARY KEY,  
    Name VARCHAR(100),  
    Address VARCHAR(200),  
    Phone VARCHAR(15)  
);  
INSERT INTO Borrower (CardNo, Name, Address, Phone)  
VALUES  
    (10001, 'Saidur', 'CSE', '01714-400567'),  
    (10002, 'Rafiq', 'PHYSICS', '0194-300456'),  
    (10003, 'Masud', 'CSE', '0156-345678'),  
    (10004, 'Nobir', 'ICT', '01199-203456');
```

```
CREATE TABLE Book_Loan (  
    BookId VARCHAR(50),  
    BranchId INT,  
    CardNo INT,  
    DateOut DATE,  
    DueDate DATE,  
    PRIMARY KEY (BookId, BranchId, CardNo),  
    FOREIGN KEY (BookId) REFERENCES Book(BookId),  
    FOREIGN KEY (BranchId) REFERENCES Library_Branch(BranchId),  
    FOREIGN KEY (CardNo) REFERENCES Borrower(CardNo)  
);  
INSERT INTO Book_Loan (BookId, BranchId, CardNo, DateOut, DueDate)  
VALUES  
    ('100.001cn', 1001, 10001, '2015-01-15', '2015-02-15'),  
    ('100.001cn', 1002, 10002, '2015-01-25', '2015-02-25'),
```

('100.002dsc', 1001, 10003, '2015-02-20', '2015-03-20'),  
('100.002dsc', 1002, 10004, '2015-03-15', '2015-04-15'),  
('100.003ds', 1001, 10001, '2015-06-07', '2015-07-07'),  
('100.003ds', 1003, 10002, '2015-10-15', '2015-11-15'),  
('100.004db', 1001, 10003, '2015-10-25', '2015-11-25'),  
('100.004db', 1002, 10004, '2015-11-15', '2015-12-15'),  
('100.005ora', 1001, 10003, '2015-12-22', '2016-01-22'),  
('100.005ora', 1002, 10001, '2015-12-25', '2016-01-25');