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**Homework**

**Library Database**

1. **Create Database Library**

SQL Statement

CREATE DATABASE Library ON PRIMARY

(

NAME = 'Library',

FILENAME = 'D:\Desktop\WorkSpace\SQL\InSchool\Week 3\Library.mdf',

SIZE = 3072KB,

MAXSIZE = UNLIMITED,

FILEGROWTH = 1024KB

)

LOG ON

(

NAME = 'Library\_log',

FILENAME = 'D:\Desktop\WorkSpace\SQL\InSchool\Week 3\Library\_log.ldf',

SIZE = 1024KB,

MAXSIZE = 2048KB,

FILEGROWTH = 10%

);

--GO

GO

USE Library;

GO

1. **Create tables – Priamry Key – Foreign Key**

SQL Statement

--=================================

--create table data

--Publisher data

CREATE TABLE Publisher (

Name VARCHAR(20) NOT NULL,

Address VARCHAR(30) NULL,

Phone VARCHAR(10) NULL

);

GO

--Book data

CREATE TABLE Book (

Book\_ID SMALLINT NOT NULL,

Title VARCHAR(30) NOT NULL,

Publisher\_Name VARCHAR(20) NULL

);

GO

--Library Branch data

CREATE TABLE Library\_Branch (

Branch\_ID SMALLINT NOT NULL,

Branch\_Name VARCHAR(20) NOT NULL,

Address VARCHAR(30) NOT NULL

);

GO

--Book Authors data

CREATE TABLE Book\_Authors (

Book\_ID SMALLINT NOT NULL,

Author\_Name VARCHAR(20) NOT NULL

);

GO

--Borrower data

CREATE TABLE Borrower (

Card\_NO SMALLINT NOT NULL,

Name VARCHAR(20) NULL,

Address VARCHAR(30) NULL,

Phone VARCHAR(10) NULL

);

GO

--Book Copies data

CREATE TABLE Book\_Copies (

Book\_ID SMALLINT NOT NULL,

Branch\_ID SMALLINT NOT NULL,

No\_Of\_Copies SMALLINT NULL

);

GO

--Book Loans data

CREATE TABLE Book\_Loans (

Book\_ID SMALLINT NOT NULL,

Branch\_ID SMALLINT NOT NULL,

Card\_NO SMALLINT NOT NULL,

Date\_Out DATETIME NULL,

Due\_Date DATETIME NULL

);

GO

--=================================

--Create primary key for table data

ALTER TABLE Publisher

ADD Constraint pk\_publisher PRIMARY KEY (Name);

GO

ALTER TABLE Book

ADD Constraint pk\_bk PRIMARY KEY (Book\_ID);

GO

ALTER TABLE Library\_Branch

ADD Constraint pk\_lib\_br PRIMARY KEY (Branch\_ID);

GO

ALTER TABLE Book\_Authors

ADD Constraint pk\_bk\_au PRIMARY KEY (Book\_ID, Author\_Name);

GO

ALTER TABLE Borrower

ADD Constraint pk\_bor PRIMARY KEY (Card\_NO);

GO

ALTER TABLE Book\_Copies

ADD Constraint pk\_bk\_cop PRIMARY KEY (Book\_ID, Branch\_ID);

GO

ALTER TABLE Book\_Loans

ADD Constraint pk\_bk\_loans PRIMARY KEY (Book\_ID, Branch\_ID, Card\_NO);

GO

--=====================================

--Create foreign key for table data

ALTER TABLE Book

ADD CONSTRAINT fk\_bk\_publisher\_name FOREIGN KEY (Publisher\_Name) REFERENCES Publisher(Name);

GO

ALTER TABLE Book\_Authors

ADD CONSTRAINT fk\_bk\_author\_bk\_id FOREIGN KEY (Book\_ID) REFERENCES Book(Book\_ID);

GO

ALTER TABLE Book\_Copies

ADD CONSTRAINT fk\_bk\_copies\_bk\_id FOREIGN KEY (Book\_ID) REFERENCES BOOK(Book\_ID);

GO

ALTER TABLE Book\_Copies

ADD CONSTRAINT fk\_bk\_copies\_branch\_id FOREIGN KEY (Branch\_ID) REFERENCES Library\_Branch(Branch\_ID);

GO

ALTER TABLE Book\_Loans

ADD CONSTRAINT fk\_bk\_loans\_bk\_id FOREIGN KEY (Book\_ID) REFERENCES BOOK(Book\_ID);

GO

ALTER TABLE Book\_Loans

ADD CONSTRAINT fk\_bk\_loans\_branch\_id FOREIGN KEY (Book\_ID) REFERENCES BOOK(Book\_ID);

GO

ALTER TABLE Book\_Loans

ADD CONSTRAINT fk\_bk\_loans\_card\_no FOREIGN KEY (Card\_NO) REFERENCES Borrower(Card\_NO);

GO

1. **Insert Data**

SQL Statement

--Insert table data

--Publisher

INSERT INTO Publisher

VALUES ('Amazing Books', '9012 Great Rd', '333-3333');

GO

INSERT INTO Publisher

VALUES ('Plume', '1234 Cool Ave', '555-5555');

GO

INSERT INTO Publisher

VALUES ('Random House', '5678 Neat St', '444-4444');

GO

--Book

INSERT INTO Book

VALUES (1, 'The Lost Tribe', 'Random House');

GO

INSERT INTO Book

VALUES (2, 'Farook', 'Random House');

GO

INSERT INTO Book

VALUES (3, 'Carrie', 'Plume');

GO

INSERT INTO Book

VALUES (4, 'The Dark Tower VII', 'Plume');

GO

INSERT INTO Book

VALUES (5, 'Red Dawn', 'Amazing Books');

GO

INSERT INTO Book

VALUES (6, 'Zepplin', 'Amazing Books');

GO

--Insert Library Branch

INSERT INTO Library\_Branch

VALUES (1, 'Sharpstown', '4321 Wonder Road');

GO

INSERT INTO Library\_Branch

VALUES (2, 'Central', '9876 Flower St');

GO

--Insert Book Authors

INSERT INTO Book\_Authors

VALUES (1, 'Master Nook');

GO

INSERT INTO Book\_Authors

VALUES (2, 'Jardumba Nartangula');

GO

INSERT INTO Book\_Authors

VALUES (3, 'Stephen King');

GO

INSERT INTO Book\_Authors

VALUES (4, 'Stephen King');

GO

INSERT INTO Book\_Authors

VALUES (5, 'John Smith');

GO

INSERT INTO Book\_Authors

VALUES (6, 'Yasunori Mitsugi');

GO

--Borrower

INSERT INTO Borrower

VALUES (1, 'John Doe', '1234 Plain St', '532-2432');

GO

INSERT INTO Borrower

VALUES (2, 'Jane Doe', '1234 Plain St', '532-2432');

GO

INSERT INTO Borrower

VALUES (3, 'Mike Jackson', '1111 nowhere', '222-2222');

GO

--Book Copies

INSERT INTO Book\_Copies

VALUES (1, 1, 10);

GO

INSERT INTO Book\_Copies

VALUES (1, 2, 10);

GO

INSERT INTO Book\_Copies

VALUES (2, 1, 10);

GO

INSERT INTO Book\_Copies

VALUES (2, 2, 10);

GO

INSERT INTO Book\_Copies

VALUES (3, 1, 10);

GO

INSERT INTO Book\_Copies

VALUES (3, 2, 10);

GO

INSERT INTO Book\_Copies

VALUES (4, 1, 10);

GO

INSERT INTO Book\_Copies

VALUES (4, 2, 10);

GO

INSERT INTO Book\_Copies

VALUES (5, 1, 10);

GO

INSERT INTO Book\_Copies

VALUES (5, 2, 10);

GO

INSERT INTO Book\_Copies

VALUES (6, 2, 10);

GO

--Book Loans

INSERT INTO Book\_Loans

VALUES (1, 1, 1, '12/15/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (1, 2, 1, '11/24/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (2, 1, 2, '12/15/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (2, 2, 2, '11/24/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (3, 1, 3, '12/15/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (3, 2, 3, '11/24/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (4, 1, 1, '12/15/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (4, 2, 1, '11/24/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (5, 1, 2, '12/15/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (5, 2, 2, '11/24/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (6, 1, 3, '12/15/2005', NULL);

GO

INSERT INTO Book\_Loans

VALUES (6, 2, 3, '11/19/2009', NULL);

GO

1. **Queries** (include result queries)
2. How many copies of the book titled The Lost Tribe are owned by the library branch whose name is "Sharpstown"?

**Query**:

SELECT Bk.Book\_ID, Bk.Title, Lib\_Branch.Branch\_Name,Bk\_Cp.No\_Of\_Copies

FROM Book\_Copies AS Bk\_Cp, Book AS Bk, Library\_Branch AS Lib\_Branch

WHERE Bk.Title = 'The Lost Tribe' AND Lib\_Branch.Branch\_Name = 'Sharpstown' AND Bk\_Cp.Book\_ID = 1 AND Bk\_Cp.Branch\_ID = 1;

GO

**Equation:**

π No\_Of\_Copies (σ Branch\_Name = ‘Sharptown’ ∧ Title = ‘The Lost Tribe’ (Book\_Copies**⋈**Branch\_ID=Branch\_ID(Library\_Branch**⋈**Book\_ID=Book\_ID Book)))

1. How many copies of the book titled The Lost Tribe are owned by each library branch?

**Query**:

SELECT Bk\_Cp.Book\_ID, Bk.Title, Lib\_Br.Branch\_ID, Lib\_Br.Branch\_Name, Bk\_Cp.No\_Of\_Copies

FROM Book\_Copies AS Bk\_Cp, Book AS Bk, Library\_Branch AS Lib\_Br

WHERE (Bk\_Cp.Book\_ID = 1 AND Bk\_Cp.Book\_ID = Bk.Book\_ID) AND Bk\_Cp.Branch\_ID = Lib\_Br.Branch\_ID;

GO

**Equation:**

π No\_Of\_Copies (σ Tittle = ‘The Lost Tribe’ )

1. Retrieve the names of all borrowers who do not have any books checked out.

**Query**:

SELECT Name

FROM Borrower

WHERE Card\_NO NOT IN (SELECT Card\_NO from Book\_Loans);

GO

1. For each book that is loaned out from the "Sharpstown" branch and whose DueDate is today, retrieve the book title, the borrower's name, and the borrower's address.

**Query**:

SELECT Bk.Title, B.Name, B.Address

FROM Library\_Branch AS Lib\_Br, Borrower AS B, Book\_Loans AS Bk\_L, Book AS Bk

WHERE Lib\_Br.Branch\_Name = 'Sharpstown' AND Lib\_Br.Branch\_ID = Bk\_L.Branch\_ID

AND Bk\_L.Due\_Date = '10/5/2022' AND B.Card\_NO = Bk\_L.Card\_NO AND Bk.Book\_ID = Bk.Book\_ID;

GO

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

**Query**:

SELECT \* FROM Library\_Branch;

GO

SELECT \* FROM Book\_Loans;

GO

SELECT Lib\_Br.Branch\_Name, COUNT(Lib\_Br.Branch\_ID) AS Count\_Lib\_Br

FROM Library\_Branch AS Lib\_Br, Book\_Loans AS Bk\_L

WHERE Lib\_Br.Branch\_ID = Bk\_L.Branch\_ID

GROUP BY Lib\_Br.Branch\_Name;

GO

1. Retrieve the names, addresses, and number of books checked out for all borrowers who have more than five books checked out.

**Query:**

SELECT \* FROM Borrower;

GO

SELECT \* FROM Book\_Loans;

GO

SELECT B.Name, B.Address, COUNT(\*) AS Number\_Of\_Book

FROM Borrower AS B, Book\_Loans AS Bk\_L

WHERE B.Card\_NO = Bk\_L.Card\_NO

GROUP BY B.Name, B.Address

HAVING COUNT(\*) > 5;

GO

1. For each book authored (or co-authored) by "Stephen King", retrieve the title and the number of copies owned by the library branch whose name is "Central".

**Query:**

SELECT \* FROM Book\_Authors;

GO

SELECT \* FROM Library\_Branch

GO

SELECT \* FROM Book\_Copies;

GO

SELECT Book\_Copies.Book\_ID, Book\_Authors.Author\_Name, Library\_Branch.Branch\_Name, Book\_Copies.No\_Of\_Copies

FROM

(Book\_Copies INNER JOIN Book\_Authors ON Book\_Copies.Book\_ID = Book\_Authors.Book\_ID)

INNER JOIN Library\_Branch ON Book\_Copies.Branch\_ID = Library\_Branch.Branch\_ID

WHERE

(Book\_Copies.Book\_ID = Book\_Authors.Book\_ID AND Book\_Copies.Branch\_ID = Library\_Branch.Branch\_ID)

AND Library\_Branch.Branch\_Name = 'Central' AND (Book\_Copies.Book\_ID = 3 OR Book\_Copies.Book\_ID = 4);

GO