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HOMEWORK 6
Join

Create a table of library system consist of three tables, i.e. books, user, and flow with these column:

- Books: **bookID**, bookTitle, authorName, borrowedStatus
- Flow: **flowID**, *userIDBorrowing*, *bookIDBorrowed*, borrowDate, returnDate
- User: **userID**, userName, numberOfBorrowing, numberOfReturning

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Answer:

Attributes Details:

Books:

1. BookID : Book ID (Distinct, Primary Key)
2. BookTitlle : Title of the book (String)
3. authorName: The author who written the book (String)
4. borrowedStatus: Is the book currently borrowed by a person? If yes (Borrowed) otherwise (Not Borrowed)

Flow:

1. FlowID: Flow ID (Distinct, Primary Key)
2. userIDBorrowing : The User ID that currently borrowed the book (Foreign Key)
3. bookIDBorrowed : The Book ID that currently borrowed by the user (Foreign Key)
4. borrowDate: The date where the book was borrowed
5. returnDate: The date where the book must/should be return

User:

1. userID: User ID (Distinct, Primary Key)
2. numberOfBorrowing: Number of book/s that was borrowed by the user
3. numberOfReturning: Number of book/s that was already returned

Creating the table

```sql
CREATE TABLE bookTable(
    bookID INT(100) NOT NULL AUTO_INCREMENT PRIMARY KEY,
    bookTitle VARCHAR(255) NOT NULL,
    authorName VARCHAR(255) NOT NULL,
    borrowedStatus VARCHAR(100) NOT NULL
);

CREATE TABLE flowTable(
    flowID INT(100) NOT NULL AUTO_INCREMENT PRIMARY KEY,
    userIDBorrowing INT(100) NOT NULL,
    bookIDBorrowed INT(100) NOT NULL,
    borrowDate DATE,
    returnDate DATE
);

CREATE TABLE userTable(
    userID INT(100) NOT NULL AUTO_INCREMENT PRIMARY KEY,
    userName VARCHAR(255) NOT NULL,
    numberOfBorrowing INT(50),
    numberOfReturning INT(50)
);

```

Altering the table to add foreign key

```sql
ALTER TABLE flowtable
ADD FOREIGN KEY (userIDBorrowing) REFERENCES userTable(userID),
ADD FOREIGN KEY (bookIDBorrowed) REFERENCES bookTable(bookID);
```

Altering the table to set the initial value of ID (AUTO_INCREMENT)

```sql
ALTER TABLE booktable AUTO_INCREMENT=111;
```

```sql
ALTER TABLE flowtable AUTO_INCREMENT=222;
```

```sql
ALTER TABLE usertable AUTO_INCREMENT=333;
```

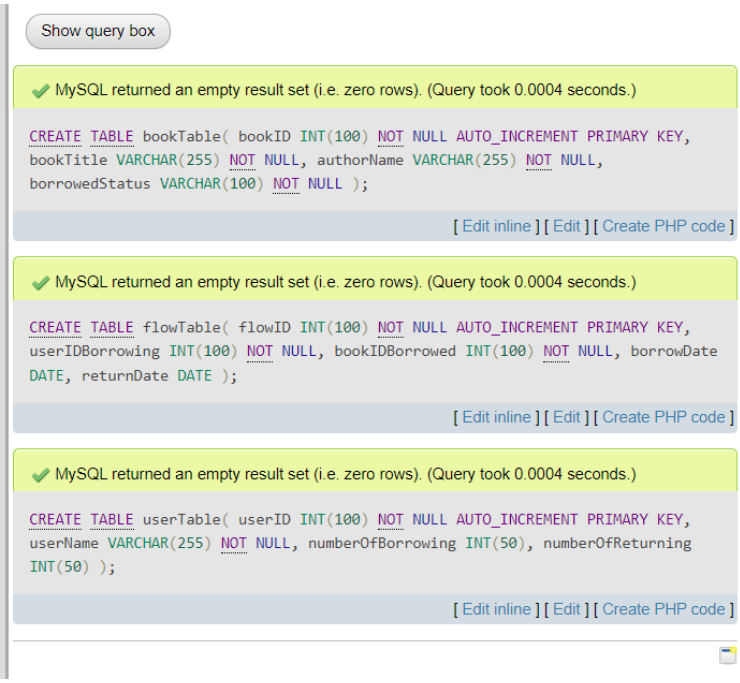

Table and its attributes

BookTable

Field	Type	Null	Key	Default	Extra
bookID	int(100)	NO	PRI	*NULL*	auto_increment
bookTitle	varchar(255)	NO		*NULL*	
authorName	varchar(255)	NO		*NULL*	
borrowedStatus	varchar(100)	NO		*NULL*	

FlowTable

Field	Type	Null	Key	Default	Extra
flowID	int(100)	NO	PRI	*NULL*	auto_increment
userIDBorrowing	int(100)	NO	MUL	*NULL*	
bookIDBorrowed	int(100)	NO	MUL	*NULL*	
borrowDate	date	YES		*NULL*	
returnDate	date	YES		*NULL*	

UserTable

Field	Type	Null	Key	Default	Extra
userID	int(100)	NO	PRI	*NULL*	auto_increment
userName	varchar(255)	NO		*NULL*	
numberOfBorrowing	int(50)	YES		*NULL*	
numberOfReturning	int(50)	YES		*NULL*	

Inserting Data

BookTable

```
INSERT INTO booktable(bookTitle, authorName, borrowedStatus)
VALUES
    ("Computer Networking: A Top-down Approach", "Jim Kurose", "Not Borrowed"),
    ("Cisco Networking All-in-One for Dummies", "Edward Tetz", "Not Borrowed"),
    ("Artificial Intelligence: A Modern Approach", "Peter Norvig", "Borrowed"),
    ("Deep Learning", "Aaron Courville", "Borrowed"),
    ("Database Systems: The Complete Book", "Jeffrey Ullman,", "Borrowed"),
    ("Database System Concepts", "Avi Silberschatz", "Borrowed"),
    ("Python 3 Object Oriented Programming", "Dusty Phillips", "Not Borrowed"),
    ("Clean Code", "Robert Cecil Martin", "Borrowed"),
    ("Time Complexity Analysis", "Aditya Chatterjee", "Not Borrowed"),
    ("The Algorithm Design Manual", "Steven Skiena", "Not Borrowed");
```

UserTable

```
INSERT INTO usertable(userName, numberOfBorrowing,
numberOfReturning)
VALUES
    ("ramzy-izza", 0,0),
    ("thor-odinson", 1, 1),
    ("tony-stark", 0, 0),
    ("peter-parker", 0,0),
    ("steve-rogers", 4, 0),
    ("jane-foster", 0, 0),
    ("nick-fury", 0, 0),
    ("steven-strange", 0, 0);
```

FlowTable

```
INSERT INTO flowtable(userIDBorrowed, bookIDBorrowed, borrowDate,
returnDate)
VALUES
    (337, 113, "2021-12-12", "2021-12-15"),
    (337, 114, "2022-05-15", "2022-05-25"),
    (337, 115, "2022-07-01", "2022-07-11"),
    (337, 116, "2022-10-21", "2022-10-25"),
    (337, 118, "2022-01-20", "2022-02-02");
```

Books:

	bookID	bookTitle	authorName	borrowedStatus
Edit Copy Delete	111	Computer Networking: A Top-down Approach	Jim Kurose	Not Borrowed
Edit Copy Delete	112	Cisco Networking All-in-One for Dummies	Edward Tetz	Not Borrowed
Edit Copy Delete	113	Artificial Intelligence: A Modern Approach	Peter Norvig	Borrowed
Edit Copy Delete	114	Deep Learning	Aaron Courville	Borrowed
Edit Copy Delete	115	Database Systems: The Complete Book	Jeffrey Ullman,	Borrowed
Edit Copy Delete	116	Database System Concepts	Avi Silberschatz	Borrowed
Edit Copy Delete	117	Python 3 Object Oriented Programming	Dusty Phillips	Not Borrowed
Edit Copy Delete	118	Clean Code	Robert Cecil Martin	Borrowed
Edit Copy Delete	119	Time Complexity Analysis	Aditya Chatterjee	Not Borrowed
Edit Copy Delete	120	The Algorithm Design Manual	Steven Skiena	Not Borrowed

Flow:

	flowID	userIDBorrowing	bookIDBorrowed	borrowDate	returnDate
Edit Copy Delete	234	337	113	2021-12-12	2021-12-15
Edit Copy Delete	235	337	114	2022-05-15	2022-05-25
Edit Copy Delete	236	337	115	2022-07-01	2022-07-11
Edit Copy Delete	237	337	116	2022-10-21	2022-10-25
Edit Copy Delete	242	334	118	2022-01-20	2022-02-02

User:

	userID	userName	numberOfBorrowing	numberOfReturning
Edit Copy Delete	333	ramzy-izza	0	0
Edit Copy Delete	334	thor-odinson	1	1
Edit Copy Delete	335	tony-stark	0	0
Edit Copy Delete	336	peter-parker	0	0
Edit Copy Delete	337	steve-rogers	4	0
Edit Copy Delete	343	jane-foster	0	0
Edit Copy Delete	344	nick-fury	0	0
Edit Copy Delete	345	steven-strange	0	0

1. Show all book titles where status is borrowed and date of borrow is yesterday

```
SELECT booktable.bookTitle, booktable.borrowedStatus FROM booktable
INNER JOIN flowtable
ON booktable.bookID = flowtable.bookIDBorrowed
WHERE borrowDate = DATE_SUB(CURDATE(), INTERVAL 1 DAY);
```

bookTitle	borrowedStatus
Database System Concepts	Borrowed

Steve rogers borrowed Database System Concept book yesterday

2. Show all book title even its not borrowed and its userID borrower for which it is borrowed

```
SELECT booktable.bookTitle, booktable.borrowedStatus, flowtable.userIDBorrowing
FROM booktable
LEFT JOIN flowtable
ON booktable.bookID = flowtable.bookIDBorrowed
```

bookTitle	borrowedStatus	userIDBorrowing
Artificial Intelligence: A Modern Approach	Borrowed	337
Deep Learning	Borrowed	337
Database Systems: The Complete Book	Borrowed	337
Database System Concepts	Borrowed	337
Clean Code	Borrowed	334
Computer Networking: A Top-down Approach	Not Borrowed	*NULL*
Cisco Networking All-in-One for Dummies	Not Borrowed	*NULL*
Python 3 Object Oriented Programming	Not Borrowed	*NULL*
Time Complexity Analysis	Not Borrowed	*NULL*
The Algorithm Design Manual	Not Borrowed	*NULL*

Book Title with status not borrowed means no user that is currently borrowing; therefore it is null.

3. Show all book borrowed and all user ID whether he/she is borrowing or not

```
SELECT booktable.bookTitle, booktable.borrowedStatus, usertable.userID
FROM booktable
LEFT JOIN flowtable
ON flowtable.bookIDBorrowed = booktable.bookID
RIGHT JOIN usertable
ON usertable.userID = flowtable.userIDBorrowing
```

bookTitle	borrowedStatus	userID
NULL	*NULL*	333
Clean Code	Borrowed	334
NULL	*NULL*	335
NULL	*NULL*	336
Artificial Intelligence: A Modern Approach	Borrowed	337
Deep Learning	Borrowed	337
Database Systems: The Complete Book	Borrowed	337
Database System Concepts	Borrowed	337
NULL	*NULL*	343
NULL	*NULL*	344
NULL	*NULL*	345

User with null book title means they do not borrow anything

4. Using one query, list all book titles and usernames in which book is borrowed and user borrow more than 3 books.

```
SELECT booktable.bookTitle, usertable.userName
FROM booktable
INNER JOIN flowtable
ON flowtable.bookIDBorrowed = booktable.bookID
INNER JOIN usertable
ON usertable.userID = flowtable.userIDBorrowing
WHERE usertable.numberOfBorrowing > 3;
```

bookTitle	userName
Artificial Intelligence: A Modern Approach	steve-rogers
Deep Learning	steve-rogers
Database Systems: The Complete Book	steve-rogers
Database System Concepts	steve-rogers

Steve rogers borrowed 4 books.