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Language: MySQL

Set 1: GoodReads Database:

The database is created with the help of starter code. Following screenshots are the results of the queries along with their values.

Book: ISBN, Title, AuthorID, NumPages, AverageRating.

Input : create table book (isbn varchar(255), title varchar(20), authorId int, numpages int not null, avgrating decimal(3,2), primary key(isbn), constraint fk1 foreign key(authorId) references author(authorId));
Output: Select * from book;

This will display the book table.

```
mysql> select * from book;
+------+------------+----------+----------+-----------+
| isbn | title      | authorId | numpages | avgrating |
+------+------------+----------+----------+-----------+
| 9731 | ASOS       |        3 |      150 |      4.60 |
| 9732 | ACOK       |        3 |      150 |      3.47 |
| 9733 | The Hobbit |        2 |      366 |      3.30 |
| 9734 | LOTR 1     |        2 |      350 |      3.35 |
| 9735 | LOTR 2     |        2 |      150 |      3.40 |
| 9736 | PALESTINE  |        1 |      288 |      2.50 |
| 9737 | AGOT       |        3 |      150 |      4.20 |
+------+------------+----------+----------+-----------+
```

Users: UID, Name, Age, Sex, Location, Birthday, ReadCount, CurrentlyReadingCount, ToReadCount

Input: create table users (uid int, name varchar(20), age int, sex char(1), location varchar(20), birthday date, readCt int, toReadCt int, currentlyReadCt int, primary key(uid));

Output: Select * from users;

This will display users table

```
mysql> select * from users;
+-----+--------+------+------+----------+------------+--------+----------+-----------------+
| uid | name   | age  | sex  | location | birthday   | readCt | toReadCt | currentlyReadCt |
+-----+--------+------+------+----------+------------+--------+----------+-----------------+
|   1 | user 1 |   21 | M    | India    | 1992-01-14 |     10 |        5 |               1 |
|   2 | user 2 |   21 | M    | USA      | 1992-02-14 |      8 |       10 |               2 |
|   3 | user 3 |   21 | M    | LONDON   | 1992-03-14 |     10 |       20 |               5 |
|   4 | user 4 |   20 | m    | jampit   | 2000-01-01 |     10 |        3 |              12 |
+-----+--------+------+------+----------+------------+--------+----------+-----------------+
```

Shelf: UID, ISBN, Rating, ShelfName, DateRead, DateAdded

Input: create table shelf(uid int, isbn varchar(255), name varchar(20), rating decimal(3,2), dateRead date, dateAdded date, primary key(uid, isbn), constraint fk2 foreign key(uid) references users(uid), constraint fk3 foreign key(isbn) references book(isbn));

Output: select * from shelf

This will display shelf table

```
mysql> select * from shelf;
+-----+------+-------------------+--------+------------+------------+
| uid | isbn | name              | rating | dateRead   | dateAdded  |
+-----+------+-------------------+--------+------------+------------+
|   1 | 9731 | read              |   5.00 | 2000-01-01 | 2000-02-02 |
|   1 | 9732 | read              |   5.00 | 2000-01-01 | 2000-01-01 |
|   1 | 9733 | read              |   5.00 | 2000-01-01 | 2000-02-02 |
|   1 | 9734 | read              |   4.00 | 2000-01-01 | 2001-01-01 |
|   1 | 9735 | to-read           |   4.00 | NULL       | 2002-02-02 |
|   1 | 9736 | read              |   5.00 | 2000-01-01 | 2000-02-02 |
|   2 | 9734 | to-read           |   2.70 | NULL       | 2000-02-02 |
|   2 | 9736 | to-read           |   2.70 | NULL       | 2000-02-02 |
|   3 | 9731 | to-read           |   4.20 | NULL       | 2000-02-02 |
|   3 | 9736 | read              |   5.00 | 1999-12-11 | 2000-01-01 |
|   4 | 9733 | currently reading |   5.00 | 2000-01-01 | 2000-02-02 |
|   4 | 9735 | currently reading |   5.00 | 2000-01-01 | 2000-02-02 |
+-----+------+-------------------+--------+------------+------------+
```

Friends: UID, FriendID

Input: create table friends(uid int, fid int, primary key(uid, fid), constraint fk4 foreign key(uid) references users(uid), constraint fk5 foreign key(fid) references users(uid));

Output: Select * from friends;

This will display friends table

```
mysql> select * from friends;
+-----+-----+
| uid | fid |
+-----+-----+
|   2 |   1 |
|   3 |   1 |
|   1 |   2 |
|   1 |   3 |
+-----+-----+
```

Author: AuthorID, Name.

```
mysql> select * from author;
+----------+---------------+
| authorId | name          |
+----------+---------------+
|        1 | Joe Sacco     |
|        2 | Talkien       |
|        3 | George Martin |
+----------+---------------+
```

Questions:

1. **User adds a new book to his shelf with a rating. Update the average rating of that book.**

Solution 1:

Input: insert into shelf values (3,9732,” read”,3.50, ‘2000-01-01’,’2000-01-01’);
In this query user will insert a new book with a rating to his shelf. Insert query with values will work here.
Output: select * from shelf;
Gives updated table with new inserted book with isbn 9732 uid 3.

```
mysql> insert into shelf values(3,9732,"read",3.50,'2000-01-01','2001-01-01');
Query OK, 1 row affected (0.04 sec)

mysql> select * from shelf;
+-----+------+-------------------+--------+------------+------------+
| uid | isbn | name              | rating | dateRead   | dateAdded  |
+-----+------+-------------------+--------+------------+------------+
|   1 | 9731 | read              |   5.00 | 2000-01-01 | 2000-02-02 |
|   1 | 9732 | read              |   5.00 | 2000-01-01 | 2000-01-01 |
|   1 | 9733 | read              |   5.00 | 2000-01-01 | 2000-02-02 |
|   1 | 9734 | read              |   4.00 | 2000-01-01 | 2001-01-01 |
|   1 | 9735 | to-read           |   4.00 | NULL       | 2002-02-02 |
|   1 | 9736 | read              |   5.00 | 2000-01-01 | 2000-02-02 |
|   2 | 9734 | to-read           |   2.70 | NULL       | 2000-02-02 |
|   2 | 9736 | to-read           |   2.70 | NULL       | 2000-02-02 |
|   3 | 9731 | to-read           |   4.20 | NULL       | 2000-02-02 |
|   3 | 9732 | read              |   3.50 | 2000-01-01 | 2001-01-01 |
|   3 | 9736 | read              |   5.00 | 1999-12-11 | 2000-01-01 |
|   4 | 9733 | currently reading |   5.00 | 2000-01-01 | 2000-02-02 |
|   4 | 9735 | currently reading |   5.00 | 2000-01-01 | 2000-02-02 |
+-----+------+-------------------+--------+------------+------------+
```

In second part of question the avg rating of book is to be updated in book table.

Input: update book set avgrating = (select avg(rating) from shelf group by isbn having isbn=9732) where isbn=9732;

I applied here nested query where first avg rating is calculated from shelf table. Then, I updated particular rating in book table with the help of update query.

Ouput: select * from book;

Updated rating column in book will be displayed. First in book column rating of 9732 was 3.47 now it's changed to 4.25.

```
mysql> select isbn, count(uid), avg(rating)
    -> from shelf
    -> group by isbn
    -> having isbn=9732;
+------+------------+-------------+
| isbn | count(uid) | avg(rating) |
+------+------------+-------------+
| 9732 |          2 |    4.250000 |
+------+------------+-------------+
```

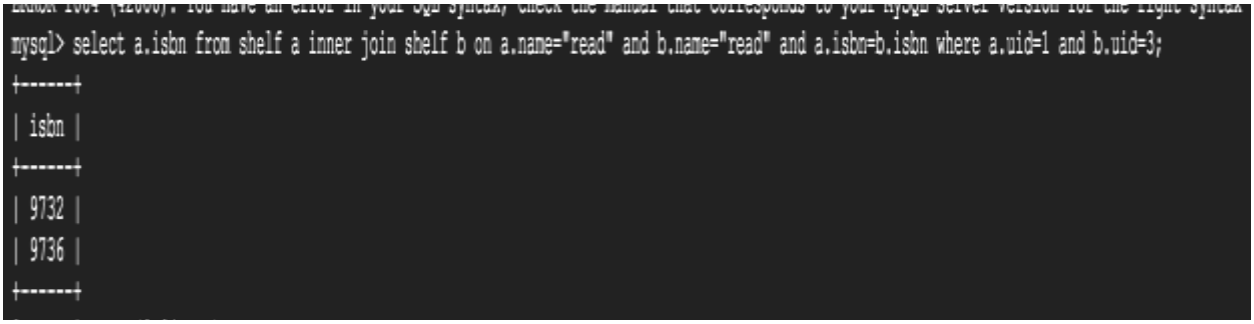
```
mysql> update book set avgrating= (select avg(rating) from shelf group by isbn having isbn=9732) where isbn=
    -> 9732;
Query OK, 1 row affected (0.04 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from book;
+------+------------+----------+----------+-----------+
| isbn | title      | authorId | numpages | avgrating |
+------+------------+----------+----------+-----------+
| 9731 | ASOS       |        3 |      150 |      4.60 |
| 9732 | ACOK       |        3 |      150 |      4.25 |
| 9733 | The Hobbit |        2 |      366 |      3.30 |
| 9734 | LOTR 1     |        2 |      350 |      3.35 |
| 9735 | LOTR 2     |        2 |      150 |      3.40 |
| 9736 | PALESTINE  |        1 |      288 |      2.50 |
| 9737 | AGOT       |        3 |      150 |      4.20 |
+------+------------+----------+----------+-----------+
```

2. Find the names of the common books that were read by any two users X and Y.

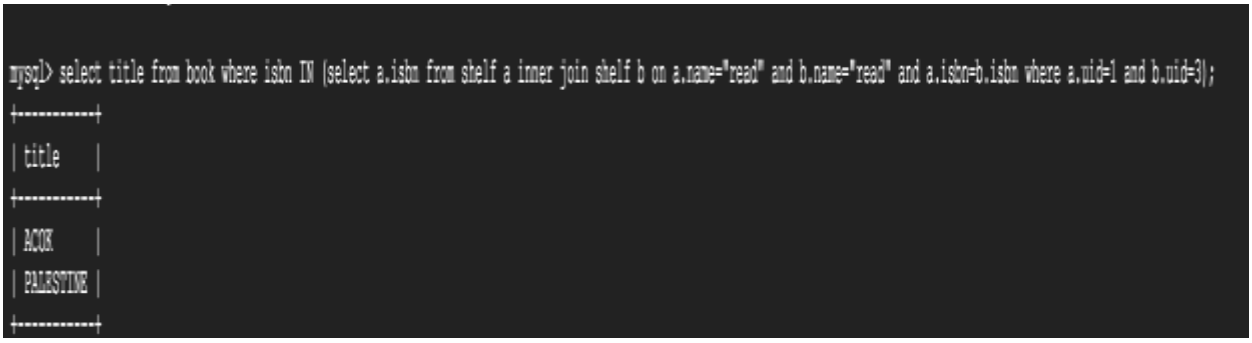
Input: select a.isbn from shelf a inner join shelf b on a.name=”read” and b.name=”read” and a.isbn=b.isbn where a.uid=1 and b.uid=3;

Output: It will display common books isbn of two users x=1 and y=3;



Input: select title from book where isbn IN(select a.isbn from shelf a inner join shelf b on a.name=”read” and b.name=”read” and a.isbn=b.isbn where a.uid=1 and b.uid=3;)
Ouput: It will display title of common books read by two users.

Explanation: Inner join will join two tables in such a way that it will display only common elements. In the above query two users x=1 and y=3 who read the common book(isbn) will be displayed.



QUESTION 2

Set 2: Github Database

User: UserID, NumRepos, Location, Email, Website, ContributionCount

Input: create table users (userId int, noOfRepos int, location varchar (50), email varchar (50), website varchar (50), contributions int, primary key(userId));

Output: list of users will be displayed

```
mysql> select * from users;
+--------+-----------+----------+---------+---------+---------------+
| userId | noOfRepos | location | email   | website | contributions |
+--------+-----------+----------+---------+---------+---------------+
|      1 |        15 | jampot   | a@x.com | a.com   |           100 |
|      2 |        10 | kampota  | b@x.com | b.com   |           200 |
|      3 |        19 | nampota  | c@x.com | c.com   |           300 |
|      4 |        21 | pampota  | d@x.com | d.com   |           400 |
|      5 |        25 | rampota  | e@x.com | e.com   |           500 |
+--------+-----------+----------+---------+---------+---------------+
```

Repository: RepoID, UserID, IssueCount, PullRequestCount, ProjectCount, Wiki (yes/no)

Input: create table repository (repoId int, userId int not null, issueCount int, pullCount int, projectsCount int, wiki boolean primary key (repoId), constraint fk1 foreign key(userId) references users(userId));

Output: list of all repository by users will be displayed

```
mysql> select * from repository;
+--------+--------+------------+-----------+---------------+------+
| repoId | userId | issueCount | pullCount | projectsCount | wiki |
+--------+--------+------------+-----------+---------------+------+
|      1 |      1 |         10 |        10 |            10 |    0 |
|      2 |      2 |         12 |        10 |            10 |    1 |
|      3 |      1 |         12 |        10 |            10 |    1 |
|      4 |      3 |         12 |        10 |            10 |    1 |
|      5 |      4 |         12 |        10 |            10 |    0 |
|      6 |      5 |         12 |        10 |            10 |    0 |
|      7 |      2 |         12 |        10 |            10 |    0 |
|      8 |      1 |         12 |        10 |            10 |    0 |
+--------+--------+------------+-----------+---------------+------+
```

Issues: IssueID, CreatorID, RaiseDate, ResolverID, ResolveDate.

Input: create table issue (issueId int, creatorId int not null, raiseDate date, resolverId int, resolveDate date, primary key (issueId), constraint fk2 foreign key(creatorId) references users(userId), constraint fk3 foreign key(resolverId) references users(userId));

Output: List of all issues will be displayed

```
mysql> select * from issue;
+---------+-----------+------------+------------+-------------+
| issueId | creatorId | raiseDate  | resolverId | resolveDate |
+---------+-----------+------------+------------+-------------+
|       1 |         1 | 2000-01-01 |          2 | 2000-02-02  |
|       2 |         2 | 2000-01-01 |          1 | 2000-02-02  |
|       3 |         1 | 2000-01-01 |          3 | 2000-02-02  |
|       4 |         3 | 2000-01-01 |          5 | 2000-02-02  |
|       5 |         4 | 2000-01-01 |          5 | 2000-02-02  |
|       6 |         3 | 2000-01-01 |          4 | 2000-02-02  |
|       7 |         5 | 2000-01-01 |          3 | 2000-02-02  |
+---------+-----------+------------+------------+-------------+
```

Codes: RepoID, CommitCount, BranchCount, ReleaseCount, ContributorCount

Input: create table codes (repoId int, commits int not null, branches int not null, releases int, contributors int, primary key(repoId), constraint fk4 foreign key(repoId) references repository(repoId));

Output: List of all codes by the users will be displayed

```
mysql> select * from codes;
+--------+---------+----------+----------+--------------+
| repoId | commits | branches | releases | contributors |
+--------+---------+----------+----------+--------------+
|      1 |       2 |        1 |        1 |            2 |
|      2 |       2 |        1 |        1 |            2 |
|      3 |       2 |        1 |        1 |            2 |
|      4 |       2 |        4 |        3 |            2 |
+--------+---------+----------+----------+--------------+
```

Branch: UserID, BranchID, RepoID

Input: create table branch (branchId int, repoId int not null, userId int not null, primary key(branchId), constraint fk5 foreign key(repoId) references repository(repoId), constraint fk6 foreign key(userId) references users(userId));

Output: List of all branches will be displayed

```
mysql> select * from branch;
+----------+--------+--------+
| branchId | repoId | userId |
+----------+--------+--------+
|        1 |      1 |      1 |
|        2 |      2 |      1 |
|        3 |      2 |      2 |
|        4 |      1 |      2 |
|        5 |      3 |      4 |
|        6 |      4 |      5 |
|        7 |      1 |      3 |
|        8 |      2 |      5 |
+----------+--------+--------+
```

Commit: CommitID, BranchID, Timestamp, NumFiles, Additions, Deletions

Input: create table commits (commitId int, branchId int not null, commitTime datetime, noOfFiles int, additions int, deletions int, primary key (commitId), constraint fk7 foreign key(branchId) references branch(branchId));

Output: commit table will be displayed

```
mysql> select * from commits;
+----------+----------+---------------------+-----------+-----------+-----------+
| commitId | branchId | commitTime          | noOfFiles | additions | deletions |
+----------+----------+---------------------+-----------+-----------+-----------+
|        1 |        1 | 2000-01-01 11:00:00 |         2 |       100 |       200 |
|        2 |        3 | 2000-01-01 11:00:00 |         2 |      1000 |      2300 |
|        3 |        4 | 2000-01-01 11:00:00 |         2 |      1000 |      2300 |
|        4 |        7 | 2000-01-01 11:00:00 |         2 |      2000 |       100 |
|        5 |        8 | 2000-01-01 11:00:00 |         2 |       200 |      1200 |
|        6 |        4 | 2000-01-01 11:00:00 |         2 |       200 |      1200 |
+----------+----------+---------------------+-----------+-----------+-----------+
```

QUESTION:

1. **Find the users who made branches of either of repositories X or Y but not of a repository Z.**

Input: select distinct(userid) from branch where (repoid=1 or repoid=2) and userid not in (select userid from branch where repoid=3);

Output: List of userid who created branch in repository x=1 and y=2 but not in z=3;

First, I created a list of all users who created a branch in either repository 1 or 2. Then a list of users created a branch in repository=3. Selected distinct userid who have created in 1 or 2 repository but not in 3. Distinct will remove repeating values in the userid column.

```
mysql> select distinct(userid) from branch where (repoid=1 or repoid=2) and userid not in(select userid from branch where repoid=3);
+--------+
| userid |
+--------+
|      1 |
|      2 |
|      5 |
+--------+
```

2. **Find the top commit with the highest lines of code reduced. (Hint: We need to find the maximized value of: number of deletions - number of additions in each commit).**

Input: select commitid, (deletions-additions) from commits where (deletions-additions)= (select (max(deletions-additions)) from commits);

Output: Display userid with maximum lines of code reduced. If there are two maximum lines of code reduced then two will be displayed.

Here, (deletions-additions) will be equal lines of code reduced. In inner query max of (deletions-additions) is calculated and displayed along with commitid to show which commit have highest lines of code reduced.

```
mysql> select commitid,(deletions-additions) from commits where (deletions-additions)=(select(max(deletions-additions)) from commits);
+----------+----------------------+
| commitid | (deletions-additions) |
+----------+----------------------+
|        2 |                 1300 |
|        3 |                 1300 |
+----------+----------------------+
```

One more example to check whether query is working perfectly.

This time commits table is updated.

Input: Here commitid 7 is added.

```
mysql> select * from commits;
+----------+----------+---------------------+-----------+-----------+-----------+
| commitId | branchId | commitTime          | noOfFiles | additions | deletions |
+----------+----------+---------------------+-----------+-----------+-----------+
|        1 |        1 | 2000-01-01 11:00:00 |         2 |       100 |       200 |
|        2 |        3 | 2000-01-01 11:00:00 |         2 |      1000 |      2300 |
|        3 |        4 | 2000-01-01 11:00:00 |         2 |      1000 |      2300 |
|        4 |        7 | 2000-01-01 11:00:00 |         2 |      2000 |      2100 |
|        5 |        8 | 2000-01-01 11:00:00 |         2 |       200 |      1200 |
|        6 |        4 | 2000-01-01 11:00:00 |         2 |       200 |      1200 |
|        7 |        4 | 2000-01-01 11:00:00 |         2 |       100 |      2000 |
+----------+----------+---------------------+-----------+-----------+-----------+
```

Output:

```
mysql> select commitid,(deletions-additions) from commits where (deletions-additions)=(select(max(deletions-additions)) from commits);
+----------+----------------------+
| commitid | (deletions-additions) |
+----------+----------------------+
|        7 |                 1900 |
+----------+----------------------+
```

Hence, query is working fine.

Bonus Question

3. List the users who solved more issues than they raised. (i.e. number of issues in which they were the resolver is greater than the number of issues where they were the creator.)

Input: Creation of issue table:

create table issue (issueId int, creatorId int not null, raiseDate date, resolverId int, resolveDate date, primary key (issueId), constraint fk2 foreign key(creatorId) references users(userId), constraint fk3 foreign key(resolverId) references users(userId));

Insert into issue values(1,1,'2000-01-01',2,'2000-02-02');
Insert into issue values(2,2,'2000-01-01',1,'2000-02-02');
Insert into issue values(3,1,'2000-01-01',3,'2000-02-02');
Insert into issue values(4,3,'2000-01-01',5,'2000-02-02');
Insert into issue values(5,4,'2000-01-01',5,'2000-02-02');
Insert into issue values(6,3,'2000-01-01',4,'2000-02-02');
Insert into issue values(7,5,'2000-01-01',3,'2000-02-02');

Select * from issue;

```
mysql> select * from issue;
+---------+-----------+------------+------------+-------------+
| issueId | creatorId | raiseDate  | resolverId | resolveDate |
+---------+-----------+------------+------------+-------------+
|       1 |         1 | 2000-01-01 |          2 | 2000-02-02  |
|       2 |         2 | 2000-01-01 |          1 | 2000-02-02  |
|       3 |         1 | 2000-01-01 |          3 | 2000-02-02  |
|       4 |         3 | 2000-01-01 |          5 | 2000-02-02  |
|       5 |         4 | 2000-01-01 |          5 | 2000-02-02  |
|       6 |         3 | 2000-01-01 |          4 | 2000-02-02  |
|       7 |         5 | 2000-01-01 |          3 | 2000-02-02  |
+---------+-----------+------------+------------+-------------+
```

User Table:

```
mysql> select * from users;
+--------+-----------+----------+---------+---------+---------------+
| userId | noOfRepos | location | email   | website | contributions |
+--------+-----------+----------+---------+---------+---------------+
|      1 |        15 | jampot   | a@x.com | a.com   |           100 |
|      2 |        10 | kampota  | b@x.com | b.com   |           200 |
|      3 |        19 | nampota  | c@x.com | c.com   |           300 |
|      4 |        21 | pampota  | d@x.com | d.com   |           400 |
|      5 |        25 | rampota  | e@x.com | e.com   |           500 |
+--------+-----------+----------+---------+---------+---------------+
```

Output: select userid from users where (select count(creatorid) from issue where users.userid=issue.creatorid group by userid)< (select count(resolverid) from issue where users.userid=issue.resolverid group by userid);

```
mysql> select userid from users where ( select count(creatorid) from issue where users.userid=issue.creatorid group by userid)< ( select count(resolverid) from issue where users.user
id=issue.resolverid group by userid);
+--------+
| userid |
+--------+
|      5 |
+--------+
```

to test query I modified issue table
Modified Table:
Insert into issue values (8,1,'2000-01-01',3,'2000-02-02');
Select * from issue;

```
mysql> select * from issue;
+---------+-----------+------------+------------+-------------+
| issueId | creatorId | raiseDate  | resolverId | resolveDate |
+---------+-----------+------------+------------+-------------+
|       1 |         1 | 2000-01-01 |          2 | 2000-02-02  |
|       2 |         2 | 2000-01-01 |          1 | 2000-02-02  |
|       3 |         1 | 2000-01-01 |          3 | 2000-02-02  |
|       4 |         3 | 2000-01-01 |          5 | 2000-02-02  |
|       5 |         4 | 2000-01-01 |          5 | 2000-02-02  |
|       6 |         3 | 2000-01-01 |          4 | 2000-02-02  |
|       7 |         5 | 2000-01-01 |          3 | 2000-02-02  |
|       8 |         1 | 2000-01-01 |          3 | 2000-02-02  |
+---------+-----------+------------+------------+-------------+
```

Executing query on the above table result will be:

```
mysql> select userid from users where ( select count(creatorid) from issue where users.userid=issue.creatorid group by userid)< ( select count(resolverid) from issue where users.user
id=issue.resolverid group by userid);
+--------+
| userid |
+--------+
|      3 |
|      5 |
+--------+
```

In this query, I just applied equijoin in both queries and compare them to give the result. Join is applied on users table and issue table. In first subquery users who raised the issues are counted and second subquery the users who resolved issues are counted. Both are compared, users with more issues resolved then created are displayed using select query.