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CS 3431 Database Systems
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Assignment 3

1.
 - a. Foreign Keys
 - i. Foreign Key (PT.tournamentName, PT.startingDate) References (T.tournamentName, T.startingDate)
 - ii. Foreign Key (PT.playerFullName, PT.playerBirthDate) References (P.fullName, P.birthDate)
 - iii. Foreign Key (P.association) References (A.associationName)
 - b. Foreign Keys in SQL
 - i. ALTER TABLE PlayersInTournament
ADD CONSTRAINT PlayersInTournament_tournamentName_startingDate_FK
FOREIGN KEY (tournamentName, startingDate) REFERENCES Tournament
(tournamentName, startingDate)
 - ii. ALTER TABLE PlayersInTournament
ADD CONSTRAINT
PlayersInTournament_playerFullName_playerBirthDate_FK FOREIGN KEY
(playerFullName, playerBirthDate) REFERENCES Players (fullName, birthDate)
 - iii. ALTER TABLE Players
ADD CONSTRAINT Players_association_FK FOREIGN KEY (association)
REFERENCES Association (associationName)

2.

a.

$\pi_{title, copyrightYear, totalBooks} (SF \bowtie_{SF.ISBN=S.ISBN} \sigma_{totalBooks > 100} (\gamma_{ISBN, sum(numberOfBooks) as totalBooks}(S)))$

b.

```
Select title, copyrightYear, totalBooks
From SFBooks Join
(Select ISBN, sum(numberOfBooks) as totalBooks
From Stocks
Group By title, copyrightYear
Having totalBooks > 100)
On SFBooks.ISBN = Stocks.ISBN;
```

3.

a. $\gamma_{fullName,city,count(ISBN)as numberOfBooks}(\sigma_{copyrightYear < 2015}(NF \cup SF) \bowtie A)$

b.

```
Select fullName, city, count(ISBN) as numberOfBooks
From ((select fullname, ISBN from SFBooks where copyrightDate < 2015)
UNION
(select fullname, ISBN from NFBooks where copyrightDate < 2015))
Group by fullname, city
Order by city, fullName;
```

4.

a. $\gamma_{fullName,birthDate,max(Price)as MaxPrice}(NF \bowtie (A - SF))$

b.

```
Select fullName,birthDate, max(price) as MaxPrice
From NFBooks Natural Join
((Select * from Authors)
minus
(Select * from SFBooks))
Order By MaxPrice desc;
```

Part 2

1.

a.

E	C	G
10	Mary	8
10	Mary	42
7	Dan	8
7	Dan	42

b.

```
Select A+B As E, C, X As G
From M Natural Join
(Select * from N
Where X > B);
```

2.

a.

C	D	Total
Lisa	Mary	12
Dan	Matt	9
Tom	Paul	67
Mary	Helen	12

b.

Select C, D, sum(A+M.B+X) as Total
From M Join N
On M.B = N.X
Group By C, D;

3.

a.

X	Y	B
8	Mary	61
8	Lisa	2
13	Tom	42
42	Henry	2

b.

Select R.X, R.Y, N.B
From N Join
((Select * From N Where X >5)
Minus
(Select B As X, D As Y, A As B From M Where A >B)) R
On N.X = R.X and N.Y = R.Y;