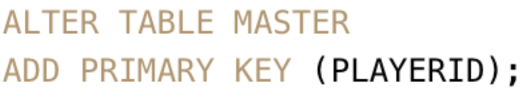
1.

1) Determine appropriate primary and foreign keys needed for the baseball database.

Master table

Primary key: PLAYERID

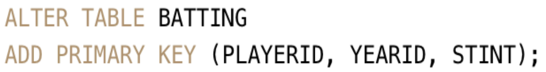


```
ALTER TABLE MASTER
ADD PRIMARY KEY (PLAYERID);
```

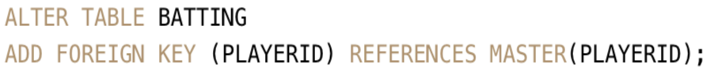
Batting table

Primary key: PLAYERID, YEARID, STINT

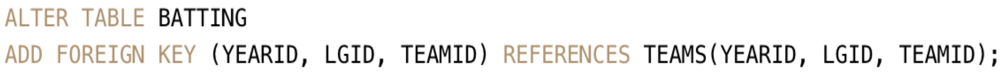
Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAM)



```
ALTER TABLE BATTING
ADD PRIMARY KEY (PLAYERID, YEARID, STINT);
```



```
ALTER TABLE BATTING
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);
```

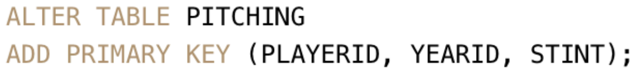


```
ALTER TABLE BATTING
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

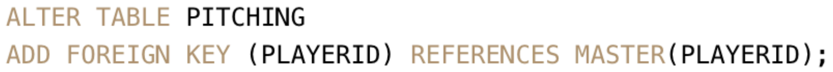
Pitching table

Primary key: PLAYERID, YEARID, STINT

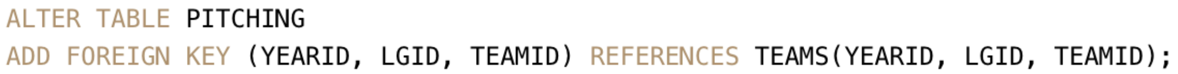
Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)



```
ALTER TABLE PITCHING
ADD PRIMARY KEY (PLAYERID, YEARID, STINT);
```



```
ALTER TABLE PITCHING
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);
```

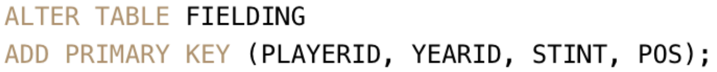


```
ALTER TABLE PITCHING
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

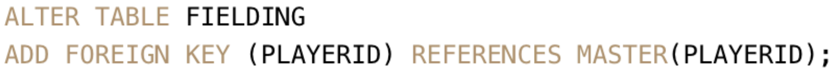
Fielding table

Primary key: PLAYERID, YEARID, STINT, POS

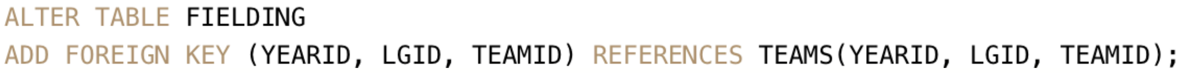
Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)



```
ALTER TABLE FIELDING
ADD PRIMARY KEY (PLAYERID, YEARID, STINT, POS);
```



```
ALTER TABLE FIELDING
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);
```



```
ALTER TABLE FIELDING
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

Ĉ

AllstarFull table

Primary key: PLAYERID, YEARID, GAMENUM

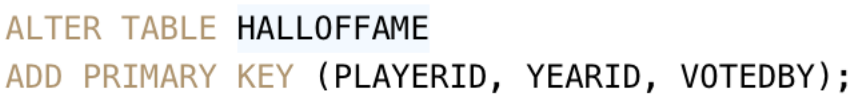
Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)

```
ALTER TABLE ALLSTARFULL
ADD PRIMARY KEY (PLAYERID, YEARID, GAMENUM);

ALTER TABLE ALLSTARFULL
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);

ALTER TABLE ALLSTARFULL
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

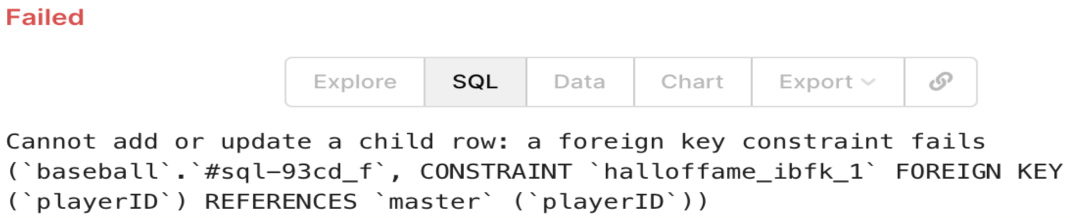
HallOfFame table

Primary key: PLAYERID, YEARID, VOTEDBY

Foreign key: PLAYERID (MASTER)

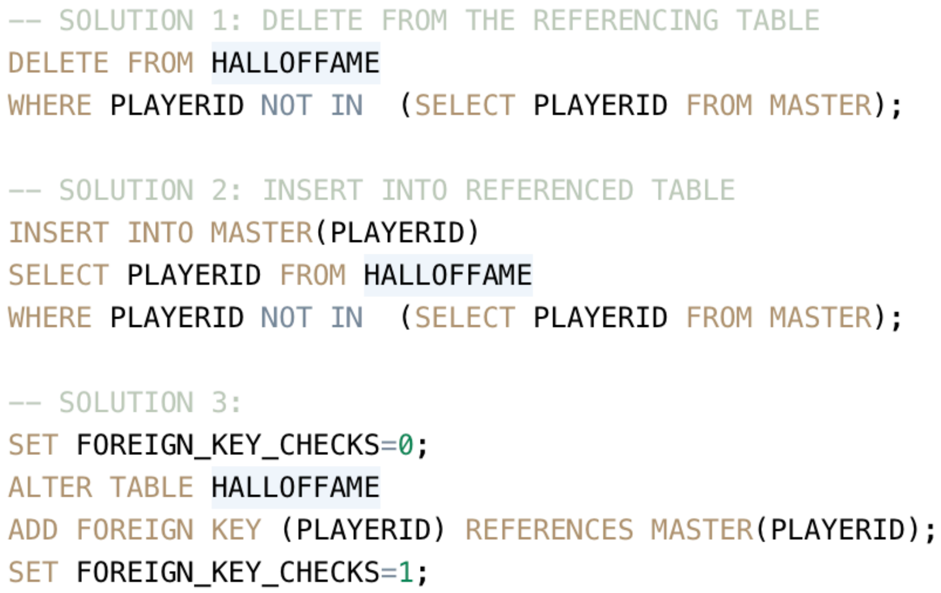


```
ALTER TABLE HALLOFFAME
ADD PRIMARY KEY (PLAYERID, YEARID, VOTEDBY);
```

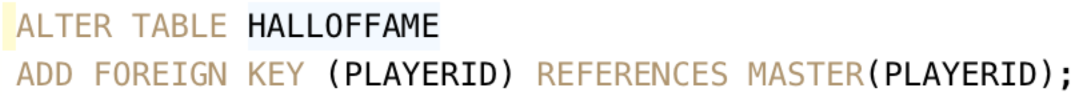


Failed

```
Cannot add or update a child row: a foreign key constraint fails
(`baseball`.`#sql-93cd_f`, CONSTRAINT `halloffame_ibfk_1` FOREIGN KEY
(`playerID`) REFERENCES `master` (`playerID`))
```



```
-- SOLUTION 1: DELETE FROM THE REFERENCING TABLE
DELETE FROM HALLOFFAME
WHERE PLAYERID NOT IN  (SELECT PLAYERID FROM MASTER);

-- SOLUTION 2: INSERT INTO REFERENCED TABLE
INSERT INTO MASTER(PLAYERID)
SELECT PLAYERID FROM HALLOFFAME
WHERE PLAYERID NOT IN  (SELECT PLAYERID FROM MASTER);

-- SOLUTION 3:
SET FOREIGN_KEY_CHECKS=0;
ALTER TABLE HALLOFFAME
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);
SET FOREIGN_KEY_CHECKS=1;
```



```
ALTER TABLE HALLOFFAME
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);
```

ổ

Managers table

Primary key: PLAYERID, YEARID, INSEASON

Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)

```
ALTER TABLE MANAGERS
ADD PRIMARY KEY (PLAYERID, YEARID, INSEASON);

ALTER TABLE MANAGERS
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);

ALTER TABLE MANAGERS
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

Teams table

Primary key: YEARID, LGID, TEAMID

Foreign key: FRANCHID(TEAMFRANCHISES)

```
ALTER TABLE TEAMS
ADD PRIMARY KEY (YEARID, LGID, TEAMID);
ALTER TABLE TEAMS
ADD FOREIGN KEY (FRANCHID) REFERENCES TEAMSFRANCHISES(FRANCHID);
```

BattingPost table

Primary key: YEARID, ROUND, PLAYERID

Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)

```
ALTER TABLE BATTINGPOST
ADD PRIMARY KEY (YEARID, ROUND, PLAYERID);

ALTER TABLE BATTINGPOST
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);

ALTER TABLE BATTINGPOST
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

PitchingPost table

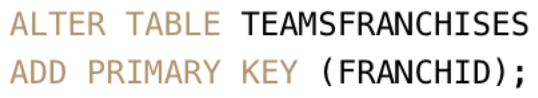
Primary key: YEARID, ROUND, PLAYERID

Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)

```
ALTER TABLE PITCHINGPOST
ADD PRIMARY KEY (YEARID, ROUND, PLAYERID);

ALTER TABLE PITCHINGPOST
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);

ALTER TABLE PITCHINGPOST
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

TeamFranchises table

Primary key: FRANCHID

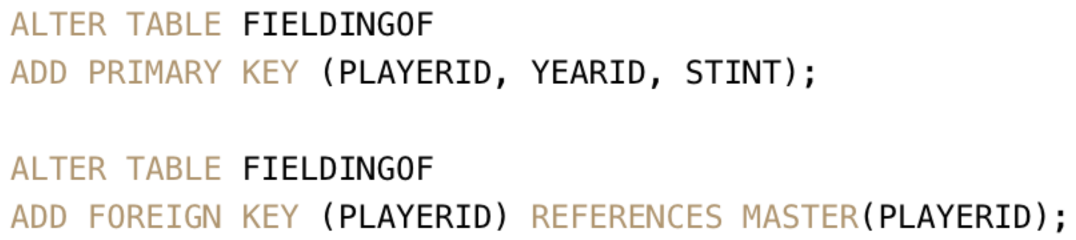


```
ALTER TABLE TEAMSFRANCHISES
ADD PRIMARY KEY (FRANCHID);
```

### FieldingOf table

Primary key: PLAYERID, YEARID, STINT

Foreign key: PLAYERID (MASTER)

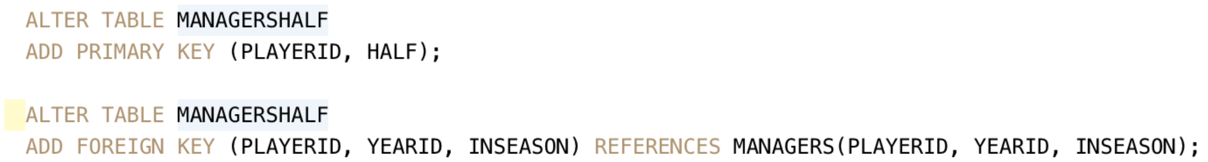


```
ALTER TABLE FIELDINGOF
ADD PRIMARY KEY (PLAYERID, YEARID, STINT);

ALTER TABLE FIELDINGOF
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);
```

### ManagersHalf table

Primary key: PLAYERID, HALF

Foreign key: PLAYERID, YEARID, INSEASON (MANAGERS)

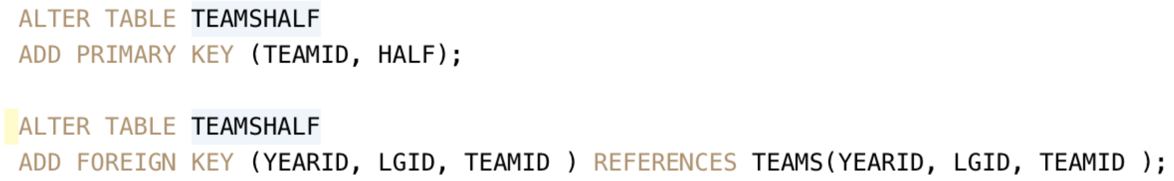


```
ALTER TABLE MANAGERSHALF
ADD PRIMARY KEY (PLAYERID, HALF);

ALTER TABLE MANAGERSHALF
ADD FOREIGN KEY (PLAYERID, YEARID, INSEASON) REFERENCES MANAGERS(PLAYERID, YEARID, INSEASON);
```

### TeamsHalf table

Primary key: TEAMID, HALF

Foreign key: YEARID, LGID, TEAMID (TEAM)

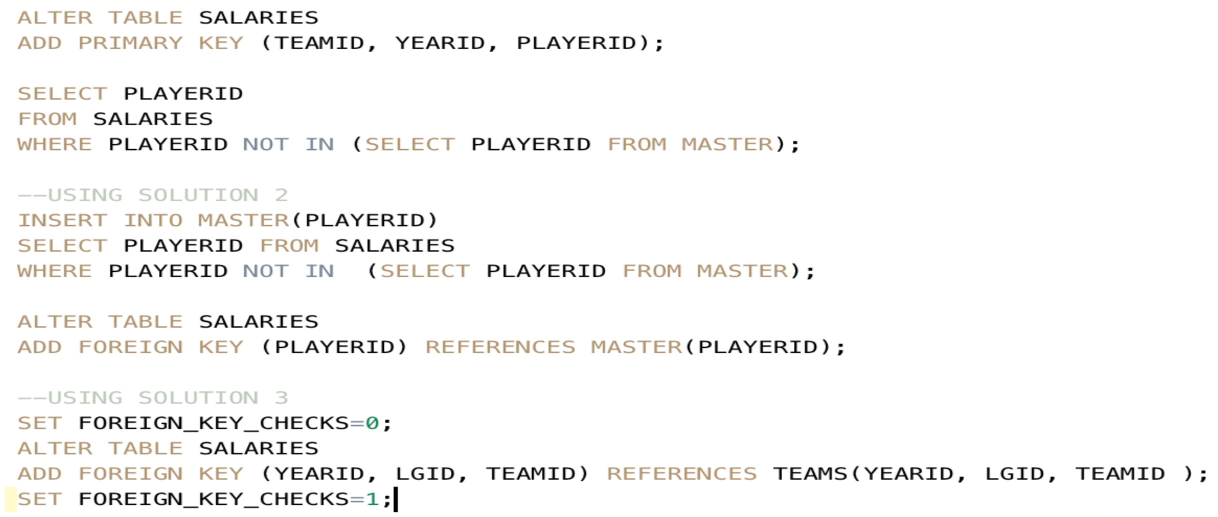


```
ALTER TABLE TEAMSHALF
ADD PRIMARY KEY (TEAMID, HALF);

ALTER TABLE TEAMSHALF
ADD FOREIGN KEY (YEARID, LGID, TEAMID ) REFERENCES TEAMS(YEARID, LGID, TEAMID );
```

### Salaries table

Primary key: TEAMID, YEARID, PLAYERID

Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)

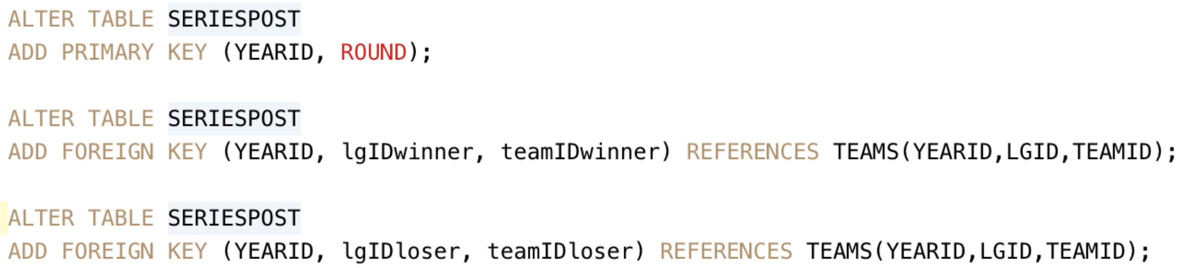


```
ALTER TABLE SALARIES
ADD PRIMARY KEY (TEAMID, YEARID, PLAYERID);

SELECT PLAYERID
FROM SALARIES
WHERE PLAYERID NOT IN (SELECT PLAYERID FROM MASTER);

--USING SOLUTION 2
INSERT INTO MASTER(PLAYERID)
SELECT PLAYERID FROM SALARIES
WHERE PLAYERID NOT IN  (SELECT PLAYERID FROM MASTER);

ALTER TABLE SALARIES
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);

--USING SOLUTION 3
SET FOREIGN_KEY_CHECKS=0;
ALTER TABLE SALARIES
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID );
SET FOREIGN_KEY_CHECKS=1;
```

### SERIESPOST table

Primary key: YEARID, ROUND

Foreign key: YEARID, teamIDwinner, lgIDwinner (TEAMS), YEARID, teamIDloser, lgIDloser (TEAMS)

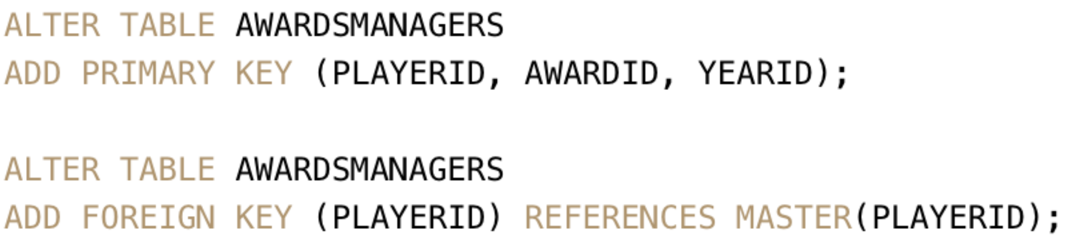


```
ALTER TABLE SERIESPOST
ADD PRIMARY KEY (YEARID, ROUND);

ALTER TABLE SERIESPOST
ADD FOREIGN KEY (YEARID, lgIDwinner, teamIDwinner) REFERENCES TEAMS(YEARID,LGID,TEAMID);

ALTER TABLE SERIESPOST
ADD FOREIGN KEY (YEARID, lgIDloser, teamIDloser) REFERENCES TEAMS(YEARID,LGID,TEAMID);
```

### AwardsManagers table

Primary key: PLAYERID, AWARDID, YEARID

Foreign key: PLAYERID (MASTER)

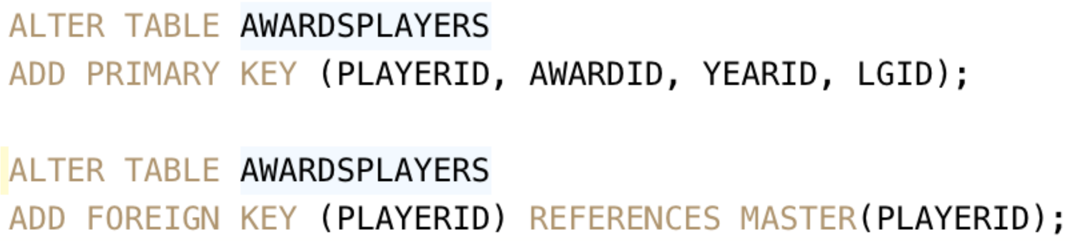


```
ALTER TABLE AWARDSMANAGERS
ADD PRIMARY KEY (PLAYERID, AWARDID, YEARID);

ALTER TABLE AWARDSMANAGERS
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);
```

### AwardsPlayer table

Primary key: PLAYERID, AWARDID, YEARID, LGID

Foreign key: PLAYERID (MASTER)

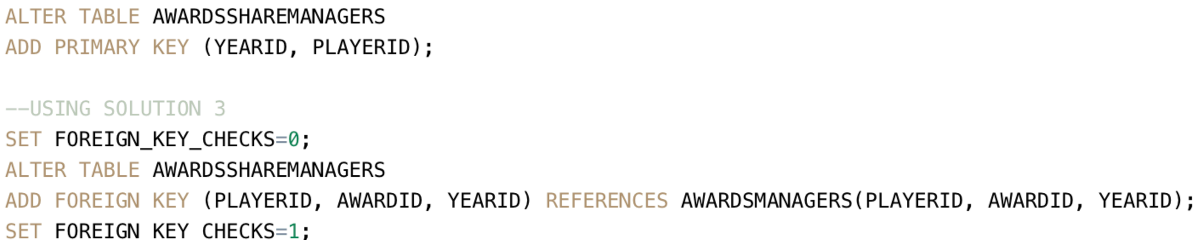


```
ALTER TABLE AWARDSPLAYERS
ADD PRIMARY KEY (PLAYERID, AWARDID, YEARID, LGID);

ALTER TABLE AWARDSPLAYERS
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);
```

### AwardsShareManagers table

Primary key: YEARID, PLAYERID

Foreign key: PLAYERID, AWARDID, YEARID (AWARDSMANAGER)

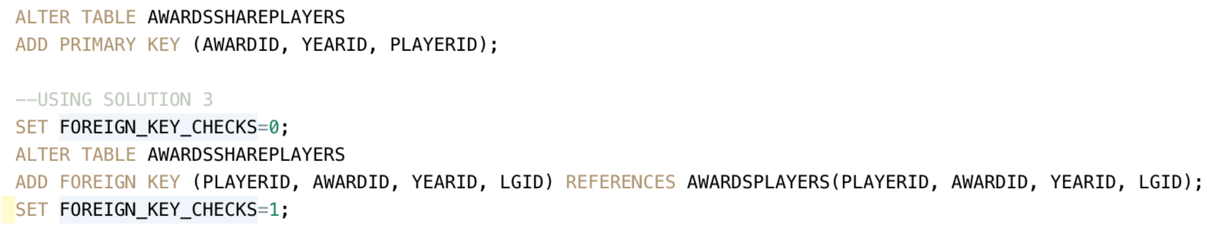


```
ALTER TABLE AWARDSSHAREMANAGERS
ADD PRIMARY KEY (YEARID, PLAYERID);

--USING SOLUTION 3
SET FOREIGN_KEY_CHECKS=0;
ALTER TABLE AWARDSSHAREMANAGERS
ADD FOREIGN KEY (PLAYERID, AWARDID, YEARID) REFERENCES AWARDSMANAGERS(PLAYERID, AWARDID, YEARID);
SET FOREIGN KEY CHECKS=1;
```

### AwardsSharePlayers table

Primary key: AWARDID, YEARID, PLAYERID

Foreign key: PLAYERID, AWARDID, YEARID, LGID (AWARDSPLAYER)

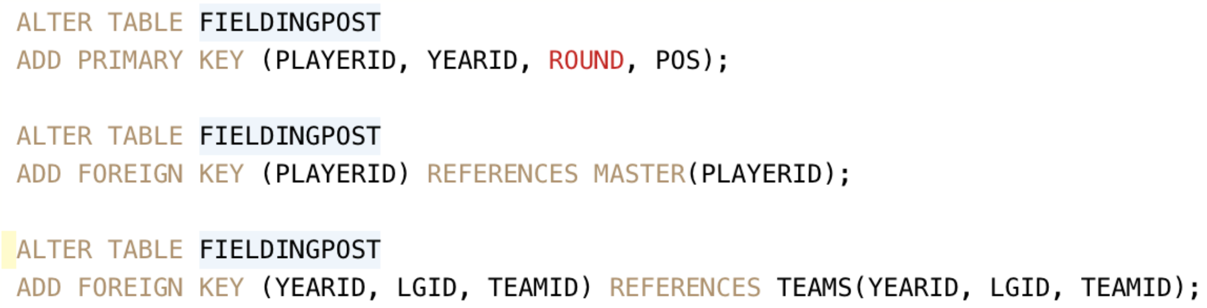


```
ALTER TABLE AWARDSSHAREPLAYERS
ADD PRIMARY KEY (AWARDID, YEARID, PLAYERID);

--USING SOLUTION 3
SET FOREIGN_KEY_CHECKS=0;
ALTER TABLE AWARDSSHAREPLAYERS
ADD FOREIGN KEY (PLAYERID, AWARDID, YEARID, LGID) REFERENCES AWARDSPLAYERS(PLAYERID, AWARDID, YEARID, LGID);
SET FOREIGN_KEY_CHECKS=1;
```

### FieldingPost table

Primary key: PLAYERID, YEARID, ROUND, POS

Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)

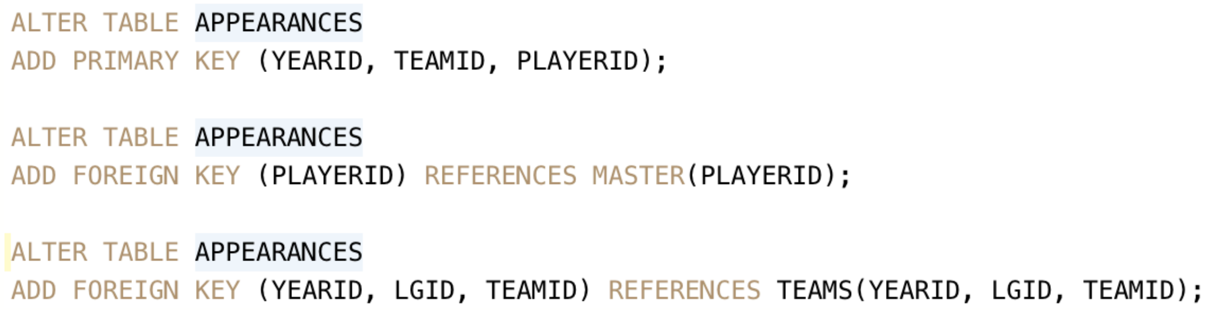


```
ALTER TABLE FIELDINGPOST
ADD PRIMARY KEY (PLAYERID, YEARID, ROUND, POS);

ALTER TABLE FIELDINGPOST
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);

ALTER TABLE FIELDINGPOST
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

### Appearances table

Primary key: YEARID, TEAMID, PLAYERID

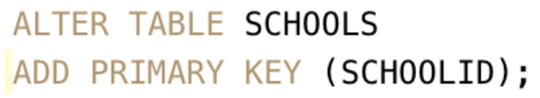
Foreign key: PLAYERID (MASTER), YEARID, LGID, TEAMID (TEAMS)



```
ALTER TABLE APPEARANCES
ADD PRIMARY KEY (YEARID, TEAMID, PLAYERID);

ALTER TABLE APPEARANCES
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);

ALTER TABLE APPEARANCES
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

### Schools table

Primary key: SCHOOLID



```
ALTER TABLE SCHOOLS
ADD PRIMARY KEY (SCHOOLID);
```

### CollegePlaying table

Primary key: PLAYERID, SCHOOLID, YEARID

Foreign key: PLAYERID (MASTER), SCHOOLID(SCHOOLS)

```
ALTER TABLE COLLEGEPLAYING
ADD PRIMARY KEY (PLAYERID, SCHOOLID, YEARID);

ALTER TABLE COLLEGEPLAYING
ADD FOREIGN KEY (PLAYERID) REFERENCES MASTER(PLAYERID);

--USING SOLUTION 2
SELECT SCHOOLID
FROM COLLEGEPLAYING
WHERE SCHOOLID NOT IN (SELECT SCHOOLID FROM SCHOOLS);

INSERT INTO SCHOOLS(SCHOOLID)
SELECT DISTINCT SCHOOLID FROM COLLEGEPLAYING
WHERE SCHOOLID NOT IN  (SELECT SCHOOLID FROM SCHOOLS);


ALTER TABLE COLLEGEPLAYING
ADD FOREIGN KEY (SCHOOLID) REFERENCES SCHOOLS(SCHOOLID);
```

FieldingOFsplit table

Primary key: PLAYERID, YEARID, STINT, POS

Foreign key: YEARID, LGID, TEAMID (TEAMS)

```
ALTER TABLE FIELDINGOFSPLIT
ADD PRIMARY KEY (PLAYERID, YEARID, STINT, POS);


ALTER TABLE FIELDINGOFSPLIT
ADD FOREIGN KEY (YEARID, LGID, TEAMID) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

Parks table

Primary key: PARK.KEY

```
ALTER TABLE PARKS
ADD PRIMARY KEY (`PARK.KEY`);
```

HomeGames table

Primary key: `YEAR.KEY`, `TEAM.KEY`, `PARK.KEY`

Foreign key: PARK.KEY(PARKS), `YEAR.KEY`, `LEAGUE.KEY`, `TEAM.KEY`(TEAMS)

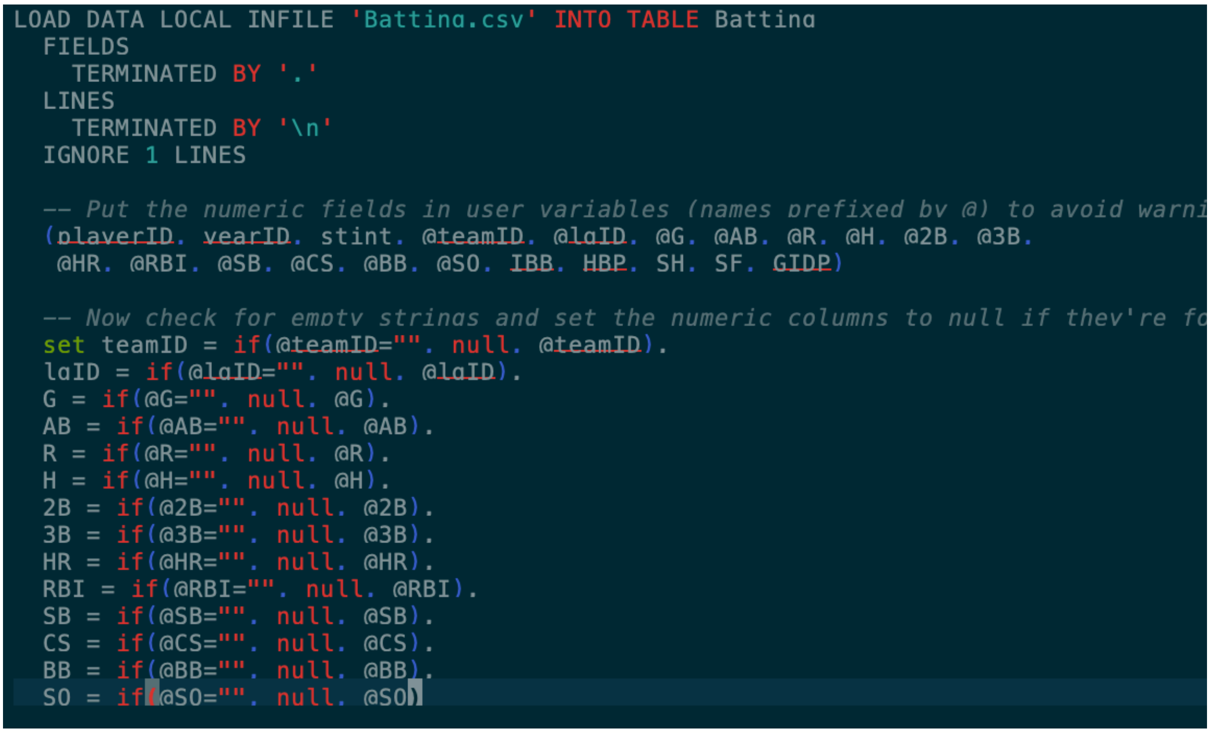
```
ALTER TABLE HOMEGAMES
ADD PRIMARY KEY (`YEAR.KEY`, `TEAM.KEY`, `PARK.KEY`);

ALTER TABLE HOMEGAMES
ADD FOREIGN KEY (`PARK.KEY`) REFERENCES PARKS(`PARK.KEY`);

ALTER TABLE HOMEGAMES
ADD FOREIGN KEY (`YEAR.KEY`, `LEAGUE.KEY`, `TEAM.KEY` ) REFERENCES TEAMS(YEARID, LGID, TEAMID);
```

2.

Where is the csv data located relative to CLI and DB server?

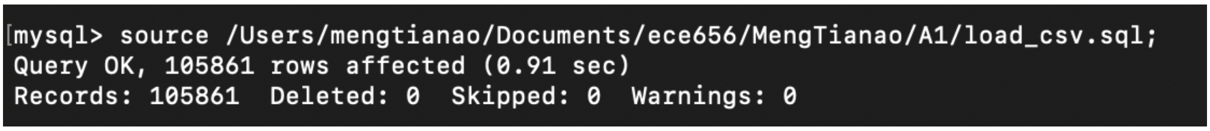
```
mysql> show global variables like "%datadir%";
datadir       | /usr/local/mysql/data/
/usr/local/bin/bash
```

we can see that CLI and DB server locate on the same computer for this question, and the csv data locate on the DB server, in the DB server data forder.



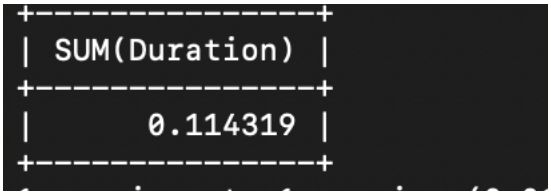
```
LOAD DATA LOCAL INFILE 'Batting.csv' INTO TABLE Batting
  FIELDS
    TERMINATED BY ','
  LINES
    TERMINATED BY '\n'
  IGNORE 1 LINES

  -- Put the numeric fields in user variables (names prefixed by @) to avoid warni
  (playerID, yearID, stint, @teamID, @lgID, @G, @AB, @R, @H, @2B, @3B,
   @HR, @RBI, @SB, @CS, @BB, @SO, IBB, HBP, SH, SF, GIDP)

  -- Now check for empty strings and set the numeric columns to null if they're fo
  set teamID = if(@teamID="", null, @teamID),
  lgID = if(@lgID="", null, @lgID),
  G = if(@G="", null, @G),
  AB = if(@AB="", null, @AB),
  R = if(@R="", null, @R),
  H = if(@H="", null, @H),
  2B = if(@2B="", null, @2B),
  3B = if(@3B="", null, @3B),
  HR = if(@HR="", null, @HR),
  RBI = if(@RBI="", null, @RBI),
  SB = if(@SB="", null, @SB),
  CS = if(@CS="", null, @CS),
  BB = if(@BB="", null, @BB),
  SO = if(@SO="", null, @SO)
```

1) Load statement



```
mysql> source /Users/mengtianao/Documents/ece656/MengTianao/A1/load_csv.sql;
Query OK, 105861 rows affected (0.91 sec)
Records: 105861  Deleted: 0  Skipped: 0  Warnings: 0
```

2) Insert statement



```
+----------------+
| SUM(Duration)  |
+----------------+
|       0.114319 |
+----------------+
```

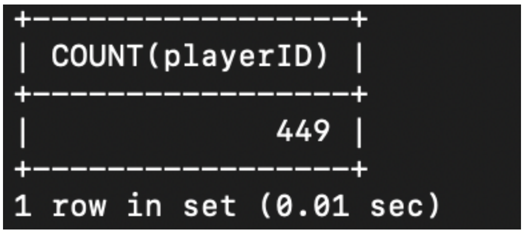
How to calculate the total runtime of multiple queries:

1. SET profiling = 1;
2. Execute the multiple queries;
3. SELECT SUM(Duration) from information_schema.profiling;

3.

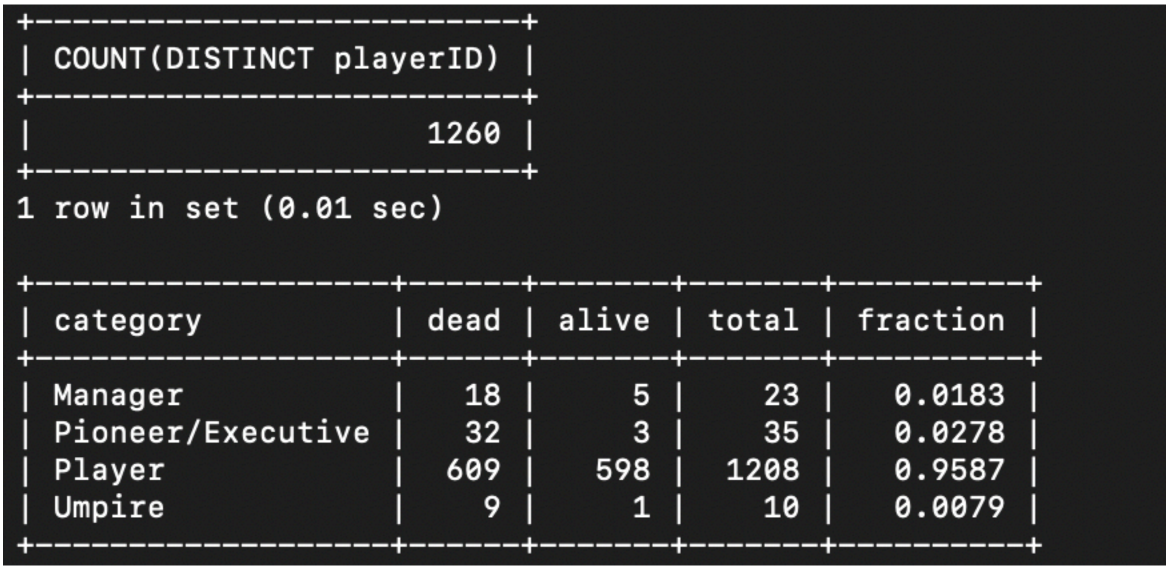
RA is shown in ECE656_A1.pdf.

1)



```
+-----------------+
| COUNT(playerID) |
+-----------------+
|             449 |
+-----------------+
1 row in set (0.01 sec)
```

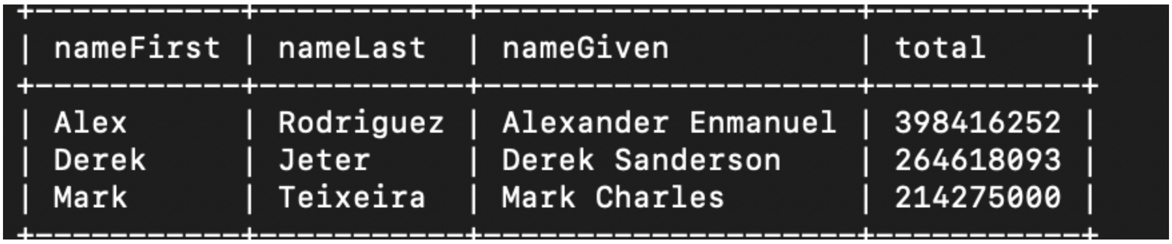
2)



```
+--------------------------+
| COUNT(DISTINCT playerID) |
+--------------------------+
|                     1260 |
+--------------------------+
1 row in set (0.01 sec)

+--------------------+------+-------+-------+----------+
| category           | dead | alive | total | fraction |
+--------------------+------+-------+-------+----------+
| Manager            |   18 |     5 |    23 |   0.0183 |
| Pioneer/Executive  |   32 |     3 |    35 |   0.0278 |
| Player             |  609 |   598 |  1208 |   0.9587 |
| Umpire             |    9 |     1 |    10 |   0.0079 |
+--------------------+------+-------+-------+----------+
```

3)

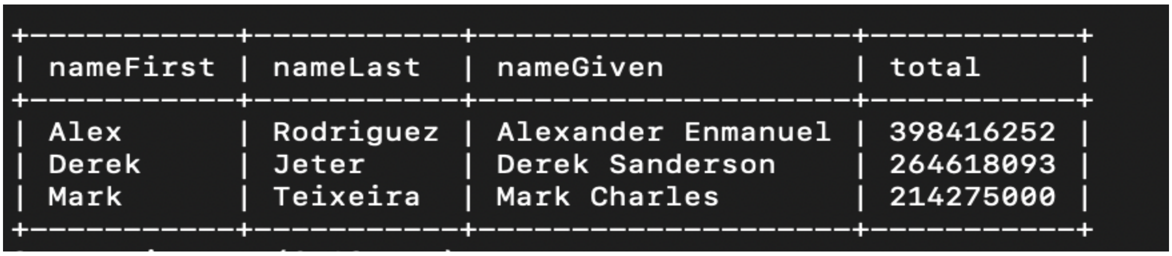
Toal



```
+-----------+-----------+---------------------+-----------+
| nameFirst | nameLast  | nameGiven           | total     |
+-----------+-----------+---------------------+-----------+
| Alex      | Rodriguez | Alexander Enmanuel  | 398416252 |
| Derek     | Jeter     | Derek Sanderson     | 264618093 |
| Mark      | Teixeira  | Mark Charles        | 214275000 |
+-----------+-----------+---------------------+-----------+
```

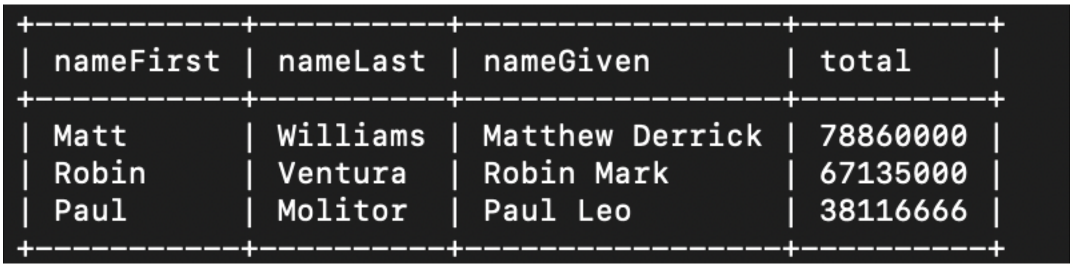
Player_only

Ċ



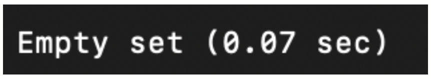
```
+-----------+-----------+--------------------+-----------+
| nameFirst | nameLast  | nameGiven          | total     |
+-----------+-----------+--------------------+-----------+
| Alex      | Rodriguez | Alexander Enmanuel | 398416252 |
| Derek     | Jeter     | Derek Sanderson    | 264618093 |
| Mark      | Teixeira  | Mark Charles       | 214275000 |
+-----------+-----------+--------------------+-----------+
```

Manager only



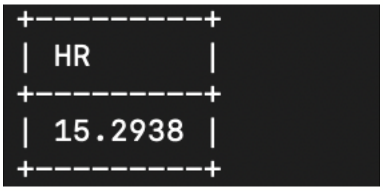
```
+-----------+----------+-----------------+----------+
| nameFirst | nameLast | nameGiven       | total    |
+-----------+----------+-----------------+----------+
| Matt      | Williams | Matthew Derrick | 78860000 |
| Robin     | Ventura  | Robin Mark      | 67135000 |
| Paul      | Molitor  | Paul Leo        | 38116666 |
+-----------+----------+-----------------+----------+
```

Other



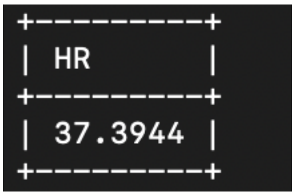
```
Empty set (0.07 sec)
```

4)



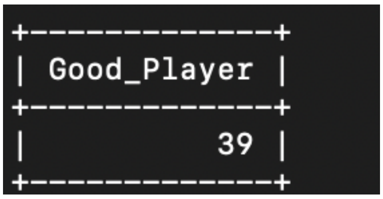
```
+---------+
| HR      |
+---------+
| 15.2938 |
+---------+
```

5)



```
+---------+
| HR      |
+---------+
| 37.3944 |
+---------+
```

6)



```
+-------------+
| Good_Player |
+-------------+
|          39 |
+-------------+
```