



Faculty of Engineering, Architecture and Science
Department of Electrical and Computer Engineering

Course Number	848
Course Title	Fundamentals of Data Engineering
Semester/Year	W2023

Instructor	Dr. Faezeh Ensan
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Lab No.	4
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Lab Title	Manipulating Data
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Submission Date	March 10th, 2023
Due Date	March 12th, 2023

Student Name	Student ID	Signature*
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**By signing above you attest that you have contributed to this written lab report and confirm that all work you have contributed to this lab report is your own work.*

Player Table:

```
CREATE TABLE player (
  playerID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
  name VARCHAR(255),
  role VARCHAR(25),
  gamesPlayed INTEGER,
  avgKDA DOUBLE,
  avgCSR DOUBLE
);

INSERT INTO player VALUES (1, 'Jerry', 'Top', 35, 2.7, 8.4);
INSERT INTO player VALUES (2, 'Barry', 'Jungle', 42, 3.5, 7.8);
INSERT INTO player VALUES (3, 'Mike', 'Mid', 38, 4.1, 9.2);
INSERT INTO player VALUES (4, 'Tyson', 'ADC', 29, 3.8, 8.6);
INSERT INTO player VALUES (5, 'Nicolas', 'Support', 33, 2.9, 9.1);
INSERT INTO player VALUES (6, 'Rachel', 'Top', 41, 3.3, 8.8);
INSERT INTO player VALUES (7, 'Chris', 'Jungle', 37, 2.8, 7.5);
INSERT INTO player VALUES (8, 'Jennifer', 'Mid', 28, 3.9, 9.5);
INSERT INTO player VALUES (9, 'Tate', 'ADC', 31, 4.2, 8.9);
INSERT INTO player VALUES (10, 'Jessica', 'Support', 30, 2.5, 9.3);
```

```
sqlite> .dump
PRAGMA foreign_keys=OFF;
BEGIN TRANSACTION;
CREATE TABLE player (
  playerID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
  name VARCHAR(255),
  role VARCHAR(25),
  gamesPlayed INTEGER,
  avgKDA DOUBLE,
  avgCSR DOUBLE
);
INSERT INTO player VALUES(1,'Jerry','Top',35,2.7000000000000001776,8.4000000000000003552);
INSERT INTO player VALUES(2,'Barry','Jungle',42,3.5,7.7999999999999998223);
INSERT INTO player VALUES(3,'Mike','Mid',38,4.0999999999999996447,9.1999999999999992894);
INSERT INTO player VALUES(4,'Tyson','ADC',29,3.7999999999999998223,8.5999999999999996447);
INSERT INTO player VALUES(5,'Nicolas','Support',33,2.899999999999999111,9.0999999999999996447);
INSERT INTO player VALUES(6,'Rachel','Top',41,3.2999999999999998223,8.8000000000000007105);
INSERT INTO player VALUES(7,'Chris','Jungle',37,2.7999999999999998223,7.5);
INSERT INTO player VALUES(8,'Jennifer','Mid',28,3.899999999999999111,9.5);
INSERT INTO player VALUES(9,'Tate','ADC',31,4.2000000000000001776,8.9000000000000003552);
INSERT INTO player VALUES(10,'Jessica','Support',30,2.5,9.3000000000000007105);
```

Champion Table:

```
CREATE TABLE champion (
  championID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
  name VARCHAR(255),
  skin VARCHAR(255),
```

```

winrate DOUBLE,
banrate DOUBLE,
pickrate DOUBLE,
lossrate DOUBLE
);

INSERT INTO champion VALUES (1, 'Ashe', 'Classic', 0.52, 0.08, 0.15, 0.35);
INSERT INTO champion VALUES (2, 'Akali', 'KDA', 0.48, 0.23, 0.20, 0.27);
INSERT INTO champion VALUES (3, 'Caitlyn', 'Pulsefire', 0.49, 0.07, 0.18, 0.32);
INSERT INTO champion VALUES (4, 'Darius', 'God-King', 0.51, 0.14, 0.12, 0.37);
INSERT INTO champion VALUES (5, 'Ezreal', 'Arcade', 0.54, 0.10, 0.25, 0.30);
INSERT INTO champion VALUES (6, 'Flora', 'Royal Guard', 0.47, 0.12, 0.11, 0.39);
INSERT INTO champion VALUES (7, 'Garen', 'Steel Legion', 0.55, 0.18, 0.16, 0.29);
INSERT INTO champion VALUES (8, 'Jinx', 'Firecracker', 0.50, 0.11, 0.20, 0.30);
INSERT INTO champion VALUES (9, 'Katarina', 'Battle Academia', 0.46, 0.22, 0.17,
0.35);
INSERT INTO champion VALUES (10, 'Lee Sin', 'Dragon Fist', 0.53, 0.09, 0.22, 0.28);

```

```

CREATE TABLE champion (
championID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
name VARCHAR(255),
skin VARCHAR(255),
winrate DOUBLE,
banrate DOUBLE,
pickrate DOUBLE,
lossrate DOUBLE
);
INSERT INTO champion VALUES(1,'Ashe','Classic',0.5200000000000001776,0.0800000000000001665,0.149999999999999444,0.349999999999997779);
INSERT INTO champion VALUES(2,'Akali','KDA',0.479999999999998223,0.2300000000000000999,0.200000000000000111,0.2700000000000001776);
INSERT INTO champion VALUES(3,'Caitlyn','Pulsefire',0.489999999999999111,0.0700000000000006661,0.179999999999999333,0.320000000000000666);
INSERT INTO champion VALUES(4,'Darius','God-King',0.510000000000000888,0.1400000000000001332,0.119999999999999555,0.369999999999999555);
INSERT INTO champion VALUES(5,'Ezreal','Arcade',0.5400000000000003552,0.100000000000000555,0.25,0.299999999999999889);
INSERT INTO champion VALUES(6,'Flora','Royal Guard',0.469999999999997335,0.119999999999999555,0.110000000000000055,0.3900000000000001332);
INSERT INTO champion VALUES(7,'Garen','Steel Legion',0.550000000000000444,0.179999999999999333,0.160000000000000333,0.2899999999999998001);
INSERT INTO champion VALUES(8,'Jinx','Firecracker',0.5,0.110000000000000055,0.200000000000000111,0.299999999999999889);
INSERT INTO champion VALUES(9,'Katarina','Battle Academia',0.4600000000000001998,0.220000000000000111,0.1700000000000001221,0.349999999999997779);
INSERT INTO champion VALUES(10,'Lee Sin','Dragon Fist',0.5300000000000002664,0.089999999999999669,0.220000000000000111,0.2800000000000002664);

```

Game Table:

```

CREATE TABLE game (
gameID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
teamsInvolved VARCHAR(255),
duration DOUBLE,
totalKills INTEGER,
totalDeaths INTEGER);

INSERT INTO game VALUES (1, 'Ace and TSM', 3.24, 23, 32);
INSERT INTO game VALUES (2, 'Immortals and GenG', 5.23, 83, 92);
INSERT INTO game VALUES (3, 'Akafr and Ace', 1.84, 4, 43);
INSERT INTO game VALUES (4, 'Clutch and Clouds', 7.21, 7, 12);
INSERT INTO game VALUES (5, 'Clouds and Never', 5.43, 57, 7);
INSERT INTO game VALUES (6, 'Fathomable and Never', 1.73, 93, 82);

```

```

INSERT INTO game VALUES (7, 'Akafr and Clutch', 7.21, 43, 91);
INSERT INTO game VALUES (8, 'Invictus and Immortals', 6.43, 63, 17);
INSERT INTO game VALUES (9, 'Never and Clutch', 1.65, 33, 82);
INSERT INTO game VALUES (10, 'TSM and Clouds', 4.32, 27, 13);

```

```

CREATE TABLE game (
  gameID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
  teamsInvolved VARCHAR(255),
  duration DOUBLE,
  totalKills INTEGER,
  totalDeaths INTEGER);
INSERT INTO game VALUES(1,'Ace and TSM',3.2400000000000002131,23,32);
INSERT INTO game VALUES(2,'Immortals and GenG',5.2300000000000004263,83,92);
INSERT INTO game VALUES(3,'Akafr and Ace',1.8400000000000000799,4,43);
INSERT INTO game VALUES(4,'Clutch and Clouds',7.209999999999999644,7,12);
INSERT INTO game VALUES(5,'Clouds and Never',5.4299999999999997157,57,7);
INSERT INTO game VALUES(6,'Fathomable and Never',1.729999999999999822,93,82);
INSERT INTO game VALUES(7,'Akafr and Clutch',7.209999999999999644,43,91);
INSERT INTO game VALUES(8,'Invictus and Immortals',6.4299999999999997157,63,17);
INSERT INTO game VALUES(9,'Never and Clutch',1.649999999999999111,33,82);
INSERT INTO game VALUES(10,'TSM and Clouds',4.3200000000000002842,27,13);

```

Team Table:

```

CREATE TABLE team (
  teamID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
  name VARCHAR(255) NOT NULL,
  region VARCHAR(255) NOT NULL,
  gamesPlayed INTEGER,
  winrate DOUBLE,
  lossrate DOUBLE,
  avgGameDuration DOUBLE,
  avgDragonsSlaughtered INTEGER);

INSERT INTO team VALUES (1, 'Ace', 'NA', 421, 50.77, 49.22, 2.45, 2);
INSERT INTO team VALUES (2, 'TSM', 'KR', 213, 48.98, 51.01, 4.45, 3);
INSERT INTO team VALUES (3, 'Immortals', 'EU', 483, 50.77, 49.22, 3.53, 4);
INSERT INTO team VALUES (4, 'GenG', 'RU', 123, 61.00, 39.00, 5.09, 5);
INSERT INTO team VALUES (5, 'Invictus', 'TR', 832, 75.55, 24.44, 3.45, 3);
INSERT INTO team VALUES (6, 'Akafr', 'NA', 165, 67.77, 32.22, 3.43, 4);
INSERT INTO team VALUES (7, 'Fathomable', "NA", 547, 55.00, 45.00, 1.92, 2);
INSERT INTO team VALUES (8, 'Never', "TR", 90, 45.12, 54.87, 4.78, 2);
INSERT INTO team VALUES (9, 'Clutch', 'RU', 571, 55.71, 44.28, 2.94, 4);
INSERT INTO team VALUES (10, 'Clouds', 'KR', 145, 60.00, 40.00, 2.15, 5);

```

```

CREATE TABLE team (
  teamID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
  name VARCHAR(255) NOT NULL,
  region VARCHAR(255) NOT NULL,
  gamesPlayed INTEGER,
  winrate DOUBLE,
  lossrate DOUBLE,
  avgGameDuration DOUBLE,
  avgDragonsSlaughtered INTEGER);
INSERT INTO team VALUES(1,'Ace','NA',421,50.770000000000003125,49.219999999999998864,2.450000000000001776,2);
INSERT INTO team VALUES(2,'TSM','KR',213,48.979999999999996873,51.009999999999998008,4.450000000000001776,3);
INSERT INTO team VALUES(3,'Immortals','EU',483,50.770000000000003125,49.219999999999998864,3.529999999999998046,4);
INSERT INTO team VALUES(4,'GenG','RU',123,61.0,39.0,5.089999999999998578,5);
INSERT INTO team VALUES(5,'Invictus','TR',832,75.54999999999997157,24.440000000000001278,3.450000000000001776,3);
INSERT INTO team VALUES(6,'Akafr','NA',165,67.76999999999999602,32.219999999999998862,3.430000000000001598,4);
INSERT INTO team VALUES(7,'Fathomable','NA',547,55.0,45.0,1.919999999999999289,2);
INSERT INTO team VALUES(8,'Never','TR',90,45.119999999999997443,54.869999999999997442,4.780000000000002486,2);
INSERT INTO team VALUES(9,'Clutch','RU',571,55.71000000000000851,44.280000000000001138,2.939999999999999467,4);
INSERT INTO team VALUES(10,'Clouds','KR',145,60.0,40.0,2.149999999999999111,5);

```

Maker Table:

```

CREATE TABLE maker (
makerID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
name VARCHAR(255)
);

INSERT INTO maker VALUES (1, 'Ichigo Kurosaki');
INSERT INTO maker VALUES (2, 'Retsu Unohana');
INSERT INTO maker VALUES (3, 'Lebron Games');
INSERT INTO maker VALUES (4, 'Daryl Bills');
INSERT INTO maker VALUES (5, 'Mike Tyson');
INSERT INTO maker VALUES (6, 'Naruto Uzumaki');
INSERT INTO maker VALUES (7, 'Jerry Springer');
INSERT INTO maker VALUES (8, 'Guts Thorfinn');
INSERT INTO maker VALUES (9, 'Creed Aventus');
INSERT INTO maker VALUES (10, 'Obito Uchiha');

```

```

CREATE TABLE maker (
makerID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
name VARCHAR(255)
);
INSERT INTO maker VALUES(1,'Ichigo Kurosaki');
INSERT INTO maker VALUES(2,'Retsu Unohana');
INSERT INTO maker VALUES(3,'Lebron Games');
INSERT INTO maker VALUES(4,'Daryl Bills');
INSERT INTO maker VALUES(5,'Mike Tyson');
INSERT INTO maker VALUES(6,'Naruto Uzumaki');
INSERT INTO maker VALUES(7,'Jerry Springer');
INSERT INTO maker VALUES(8,'Guts Thorfinn');
INSERT INTO maker VALUES(9,'Creed Aventus');
INSERT INTO maker VALUES(10,'Obito Uchiha');
DELETE FROM maker WHERE makerID=1;

```

Contest Table:

```

CREATE TABLE contest (
contestID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
name VARCHAR(255),
region VARCHAR(255),
numberOfGames INTEGER,
purse INTEGER
);

INSERT INTO contest VALUES (1, 'SoulSociety', 'NA', 40,500000);
INSERT INTO contest VALUES (2, 'LeafVillage', 'KR', 31,100000);
INSERT INTO contest VALUES (3, 'CloudVillage', 'EU', 84,1000000);
INSERT INTO contest VALUES (4, 'Vinland', 'RU', 93,5000000);
INSERT INTO contest VALUES (5, 'Stella', 'TR', 103,10000000);
INSERT INTO contest VALUES (6, 'Eden', 'NA', 23,500000);
INSERT INTO contest VALUES (7, 'Ragnarok', 'NA', 18,25000);
INSERT INTO contest VALUES (8, 'GoldenTime', 'TR', 91,5000000);
INSERT INTO contest VALUES (9, 'Jujutsu', 'RU', 34,50000);
INSERT INTO contest VALUES (10, 'Pain', 'KR', 76,500000);

```

```

CREATE TABLE contest (
  contestID INTEGER PRIMARY KEY AUTOINCREMENT NOT NULL,
  name VARCHAR(255),
  region VARCHAR(255),
  numberOfGames INTEGER,
  purse INTEGER
);
INSERT INTO contest VALUES(1,'SoulSociety','NA',40,500000);
INSERT INTO contest VALUES(2,'LeafVillage','KR',31,100000);
INSERT INTO contest VALUES(3,'CloudVillage','EU',84,1000000);
INSERT INTO contest VALUES(4,'Vinland','RU',93,5000000);
INSERT INTO contest VALUES(5,'Stella','TR',103,10000000);
INSERT INTO contest VALUES(6,'Eden','NA',23,500000);
INSERT INTO contest VALUES(7,'Ragnarok','NA',18,25000);
INSERT INTO contest VALUES(8,'GoldenTime','TR',91,5000000);
INSERT INTO contest VALUES(9,'Jujutsu','RU',34,50000);
INSERT INTO contest VALUES(10,'Pain','KR',76,500000);

```

```

DELETE FROM sqlite_sequence;
INSERT INTO sqlite_sequence VALUES('player',10);
INSERT INTO sqlite_sequence VALUES('champion',10);
INSERT INTO sqlite_sequence VALUES('maker',10);
INSERT INTO sqlite_sequence VALUES('team',10);
INSERT INTO sqlite_sequence VALUES('contest',10);
INSERT INTO sqlite_sequence VALUES('game',10);
COMMIT;

```

Queries:

1. Which players have a Kill-Death-Ratio higher than 2?

```

SELECT * FROM player
WHERE avgKDA > 2

```

```
sqlite> SELECT * FROM player
[WHERE avgKDA > 2;
1|Jerry|Top|35|2.7|8.4
2|Barry|Jungle|42|3.5|7.8
3|Mike|Mid|38|4.1|9.2
4|Tyson|ADC|29|3.8|8.6
5|Nicolas|Support|33|2.9|9.1
6|Rachel|Top|41|3.3|8.8
7|Chris|Jungle|37|2.8|7.5
8|Jennifer|Mid|28|3.9|9.5
9|Tate|ADC|31|4.2|8.9
10|Jessica|Support|30|2.5|9.3
```

2. What is the max number of games played by a player?

```
SELECT MAX(gamesPlayed) FROM player
```

```
[sqlite> SELECT MAX(gamesPlayed) FROM player;
42
```

3. What is the lowest average game duration for the teams?

```
SELECT MIN(avgGameDuration) FROM team
```

```
sqlite> SELECT MIN(avgGameDuration) FROM team;
1.92
```

4. Which players have a Creep-Score-Ratio higher than 5?

```
SELECT * FROM player
WHERE avgCSR > 5
```



```
sqlite> SELECT * FROM player
WHERE avgCSR > 5;
1|Jerry|Top|35|2.7|8.4
2|Barry|Jungle|42|3.5|7.8
3|Mike|Mid|38|4.1|9.2
4|Tyson|ADC|29|3.8|8.6
5|Nicolas|Support|33|2.9|9.1
6|Rachel|Top|41|3.3|8.8
7|Chris|Jungle|37|2.8|7.5
8|Jennifer|Mid|28|3.9|9.5
9|Tate|ADC|31|4.2|8.9
10|Jessica|Support|30|2.5|9.3
```

5. What is the max pickrate that a champion has?

```
SELECT name FROM champion
WHERE MAX(pickrate) AS MaxPickRate
```

```
sqlite> SELECT MAX(pickrate) FROM champion;
0.25
```

6. Change the team name of Akafr to Akafrf

```
UPDATE team SET name = 'Akafrf'
WHERE name = 'Akafr'
```

```
sqlite> UPDATE team SET name = 'Akafrf'
WHERE name = 'Akafr';
```

7. Which skin has the highest win rate?

```
SELECT skin FROM champion
WHERE MAX(winrate) AS MaxWinRate
```

8. What is the minimum banrate for a champion?

```
SELECT MIN(banrate) FROM champion
```

```
[sqlite> SELECT MIN(banrate) FROM champion;
0.07
```

9. Which team has more than 2 average dragons slaughtered?

```
SELECT name FROM team
WHERE avgDragonsSlaughtered > 2
```

```
sqlite> SELECT name FROM team
WHERE avgDragonsSlaughtered > 2;
TSM
Immortals
GenG
Invictus
Akafr
Clutch
Clouds
```

10. What region has the shortest game?

```
SELECT region FROM team
WHERE MIN(avgGameDuration) AS MinAvgGameDuration
```

11. What is the highest purse a contest can offer?

```
SELECT MAX(purse) FROM contest
```

```
[sqlite> SELECT MAX(purse) FROM contest;  
10000000
```

12. Which games had more than 50 kills?

```
SELECT teamsInvolved FROM game  
WHERE totalKills > 50
```

```
sqlite> SELECT teamsInvolved FROM game  
[WHERE totalKills > 50;  
Immortals and GenG  
Clouds and Never  
Fathomable and Never  
Invictus and Immortals
```

13. How many contests were held in TR region?

```
SELECT COUNT(name) AS numberOfTRContests FROM contest  
WHERE region = 'TR'
```

```
sqlite> SELECT COUNT(name) AS numberOfTRContests FROM contest  
WHERE region = 'TR';  
2
```

14. What is the max loss rate that a team has?

```
SELECT MAX(lossrate) FROM team
```

```
[sqlite> SELECT MAX(lossrate)FROM team;  
54.87  
sqlite>
```

15. Which game had more than 30 deaths?

```
SELECT teamsInvolved FROM game  
WHERE totalDeaths > 30
```

```
sqlite> SELECT teamsInvolved FROM game  
WHERE totalDeaths > 30  
;  
Ace and TSM  
Immortals and GenG  
Akafr and Ace  
Fathomable and Never  
Akafr and Clutch  
Never and Clutch
```