

Report For Assignment 4

Group B1

*Li Mengqi,
Wang Shiyuan,
Liu Chenxu,
Wang Runyi*

1. Requirement Queries

1. Which are the given and family names of the G2 mid laner?

Aim: Get both given name and family name from players table whose team name is G2 and whose role is mid laner.

Query:

```
SELECT given_name,family_name
FROM players
WHERE role='MID'
AND t_name='G2';
```

Output:

given_name	family_name
Rasmus	Borregaard Winther

2. How many teams take part in League of Legends World Championship 2020?

Aim: Get team numbers from LoL_World_Championship table.

Query:

```
SELECT team_num
FROM LoL_World_Championship
WHERE champ_year=2020;
```

Output:

team_num
24

3. Which team does player Knight work for at present?

Aim: Get team name of player Knight in players table.

Query:

```
SELECT t_name
FROM players
WHERE pid='Knight';
```

Output:

```
t_name
-----
TES
```

4. What is the band of computers used for League of Legends World Championship 2020?

Aim: Get sponsor company from sponsors table whose sponsor year is 2020 and whose major product is computers.

Query:

```
SELECT spon_company
FROM sponsors
WHERE major='computers'
AND champ_year=2020;
```

Output:

```
spon_company
-----
ALIENWARE
```

5. Which team did player JackeyLove ever work for?

Aim: We just create the database based ON the present. Therefore, in that case, we can just only get the present working club of the players. So, the query is similar to query 3:

Query:

```
SELECT t_name
FROM players
WHERE pid='JackeyLove';
```

Output:

```
t_name
-----
IG
```

6. For which players does Coach Clearlove tutor now?

Aim: One coach usually tutors more than one player, one coach works for one club, and players are in clubs. So this requires us to get the player id by knowing that if one coach works for one club and there are players work for the same club, then the coach tutor the players.

Query:

```
SELECT players.pid FROM players
LEFT JOIN coaches
ON players.t_name=coaches.t_name
WHERE coaches.name='Clearlove';
```

Output:

```
pid
-----
Aodi
Scout
Meiko
Hope
Jiejie
```

7. How many teams in region League of Legends Pro League take part in League of Legends World Championship 2020?

Aim: Get the number of teams whose region is LPL.

Query:

```
SELECT count(t_name) as teams_num
FROM teams
WHERE Abbr='LPL';
```

Output:

```

teams_num
-----
          5

```

8. Who is the Coach of team RNG?

Aim: Get the both head coach and assistant coach of team RNG.

Query:

```

SELECT name
FROM coaches
WHERE t_name='RNG';

```

Output:

```

          name
-----
        Mata
        Mlxg

```

9. How many leagues take part in League of Legends World Championship 2020?

Aim: Remove duplicate leagues and count the number of independent leagues

Query:

```

SELECT count(Abbr) AS number
FROM
(
    SELECT Abbr
    FROM teams
    GROUP BY Abbr
    HAVING COUNT(DISTINCT Abbr) >= 1
)AS temp
;

```

Output:

```

        number
-----

```

10. How old is player Caps in team G2 in 2020?

Aim: Get the birth year of the player Caps from table players and do a math to calculate the age of Caps.

Query:

```
SELECT (2020-b_year+1) AS age
FROM
(
    SELECT year AS b_year FROM players
    WHERE players.pid='Caps'
    AND players.t_name='G2'
)AS temp;
```

Output:

```
age
-----
22
```

2. New Queries Over the Database

1.

Sort the year of the competition and the number of prizes in descending order of the prize money.

Because the bonus reflects to a certain extent the influence of the game in a certain year.

```
SELECT champ_year, award
FROM LoL_World_Championship
ORDER BY award DESC;
```

output:

```
champ_year | award
-----+-----
2018 | 6.45
2016 | 5.07
```

2017		4.94697
2020		2.225
2019		2.225
2014		2.13
2015		2.13
2013		2.05
2012		2

2.

Which league has NIKE sponsored?

Sponsor's sponsorship of league is very helpful to the development of a league.

```
SELECT leagues.Abbbr FROM leagues
LEFT JOIN sponsors
ON leagues.champ_year=sponsors.champ_year
WHERE sponsors.spon_company='NIKE';
```

output:

```
abbr
-----
LPL
```

3.

Who is the MID laner tutored by Zhan Ma?

Zhan Ma is a famous coach, and MID laner is very important to the game.

```
SELECT tutor.pid FROM tutor
LEFT JOIN coaches
ON coaches.cid=tutor.cid
LEFT JOIN players
ON tutor.pid=players.pid
WHERE coaches.name='Zhan Ma'
AND players.role='MID';
```

output:

```
pid
-----
```

Doinb

4.

What is the average age of all players?

The age of the player has a big relationship with the performance, it is very important.

```
SELECT ROUND(2020-AVG(year))
AS average_year
FROM players;
```

output:

```
average_year
-----
          21
```

5.

From 2014 to 2020, the number of times the LoL World Championship was held in China.

China is the country with the most LoL users, and the venue of the finals is of great concern in China.

```
SELECT COUNT(area) AS china_time
FROM LoL_World_Championship
WHERE area='CN'
AND champ_year>=2014
AND champ_year<=2020;
```

output:

```
china_time
-----
          2
```

6.

Count the number of players in each country.

The number of national players reflects the importance the country attaches to the game.


```
SELECT nationality, COUNT(*)
FROM players
GROUP BY nationality;
```

output:

nationality	count
DK	1
KR	5
CN	9

7.

Who is the oldest manager and what club he manages.

The age of the manager is related to whether he can continue to manage the club, it is very important.

```
SELECT name, company, age
FROM managers
WHERE age=
(
    SELECT MAX(age)
    FROM managers
);
```

output:

name	company	age
Guan Ming	EDG club	40

8.

Find all years with higher bonuses than the previous year.

The increase in bonuses to a certain extent represents an increase in influence.

```
SELECT L1.champ_year as year, L1.award
FROM LoL_World_Championship L1
JOIN LoL_World_Championship L2
```

```
on (L1.champ_year-L2.champ_year)=1
WHERE L1.award>L2.award;
```

output:

year	award
2013	2.05
2014	2.13
2016	5.07
2018	6.45

9.

Find players who belong to the same team.

It's important to be able to see at a glance who is a mutual ally.

```
SELECT DISTINCT p1.pid, p1.t_name
FROM players p1,
players p2
WHERE p1.t_name=p2.t_name
ORDER BY p1.t_name;
```

output:

pid	t_name
Aodi	EDG
Hope	EDG
Jiejie	EDG
Meiko	EDG
Scout	EDG
Crisp	FPX
Doinb	FPX
Lwx	FPX
Caps	G2
JackeyLove	IG
Ning	IG
Rookie	IG
TheShy	IG
Faker	SKT
Knight	TES

10.

Find sponsor companies with the same major product but different sponsors.

Sponsor's major product has a certain impact on publicity.

```
SELECT DISTINCT s1.spon_company, s1.major
FROM sponsors s1, sponsors s2
WHERE s1.major = s2.major
AND s1.spon_company != s2.spon_company;
```

output:

spon_company	major
KFC	food
SPITE	food

11.

What are the names of the coaches who cannot find players?

It's important to know who are doing nothing.

```
SELECT c.name
FROM coaches AS c
WHERE NOT EXISTS (SELECT *
                  FROM players AS p
                  WHERE c.t_name = p.t_name);
```

output:

name
Mata
Mlxg

12.

Count the number of managers in each country.

The number of managers reflects the importance the country attaches to the game.

```
SELECT nationality, COUNT(*)
FROM managers
GROUP BY nationality;
```

output:

nationality	count
KR	1
DE	1
CN	4

13.

Who is the mid laner under Lee Kyung-sik's management?

Lee Kyung-sik is a well-known manager, and the mid laner is very important to the game.

```
SELECT players.pid
FROM managers
LEFT JOIN players
ON managers.t_name=players.t_name
WHERE managers.name='Lee Kyung-sik'
AND players.role='MID';
```

output:

pid
Faker

14.

Who is the head coach of Faker's team?

Faker is the most famous person in LoL, the head coach of his team is very important.

```
SELECT coaches.name
FROM coaches
LEFT JOIN players
ON coaches.t_name=players.t_name
WHERE players.pid='Faker'
```

```
AND coaches.role='1';
```

output:

name

Kim Jeong-gyun

15.

What is the nationality of the assistant coach of Meiko's team?

Meiko is a very powerful SUP in China, the nationality of the assistant coach affects the realization of communication.

```
SELECT coaches.name, coaches.nationality
FROM coaches
LEFT JOIN players
ON coaches.t_name=players.t_name
WHERE players.pid='Meiko'
AND coaches.role='0';
```

output:

name	nationality
-----+-----	
Liu Yun-song	CN

16.

Where is the city of Crisp's team?

The location of the city determines the training environment and other factors, which are very important.

```
SELECT teams.t_name, teams.city
FROM teams
LEFT JOIN players
ON teams.t_name=players.t_name
WHERE players.pid='Crisp';
```

output:

t_name	city
--------	------

```
-----+-----
FPX    | Shanghai
```

17.

In 2020, the major product is the sports sponsor company sponsored by those teams?

In 2020, due to the economic downturn caused by covid-19, the development of sports is not good. Which teams he sponsored is very important.

```
SELECT sponsor.spon_company, sponsor.t_name
FROM sponsor
LEFT JOIN sponsors
ON sponsor.spon_company=sponsors.spon_company
WHERE sponsors.major='sports';
```

output:

```
    spon_company    | t_name
-----+-----
NIKE                | IG
NIKE                | C9
```

18.

What is the full name of the league to which C9 belongs?

C9 is a very strong team in North America, and his full league name is very important.

```
SELECT leagues.Abbbr, leagues.league_name
FROM leagues
LEFT JOIN teams
ON leagues.Abbbr = teams.Abbbr
WHERE teams.t_name='C9';
```

output:

```
abbr | league_name
-----+-----
LCS  | League of Legends Championship Series
```

19.

What is the central city of the league where the G2 team is located?

A central city in the league is very important to the development of its team.

```
SELECT leagues.Abbbr, leagues.main_location
FROM leagues
LEFT JOIN teams
ON leagues.Abbbr = teams.Abbbr
WHERE teams.t_name='G2';
```

output:

```
abbr |    main_location
-----+-----
LEC  | Berlin
```

20.

Which league does player Rasmus Borregaard Winther's team belong to?

Rasmus is a very good player, the league where his team is located should also be very strong.

```
SELECT teams.t_name, teams.Abbbr
FROM teams
LEFT JOIN players
ON teams.t_name = players.t_name
WHERE players.given_name='Rasmus'
AND players.family_name='Borregaard Winther';
```

output:

```
t_name | abbr
-----+-----
G2     | LEC
```

21.

What is the main language of the SKT team?

The main language of a team and communication between players are very important.

```
SELECT leagues.Abbbr, main_language
FROM leagues
LEFT JOIN teams
ON teams.Abbbr=leagues.Abbbr
WHERE teams.t_name='SKT';
```

output:

abbr	main_language
LCK	Korean

22.

What language does player Faker speak?

Faker is the core of team SKT, what is his language is very important to team.

```
SELECT players.pid, main_language
FROM leagues
LEFT JOIN teams
ON teams.Abbbr=leagues.Abbbr
LEFT JOIN players
ON teams.t_name=players.t_name
WHERE players.pid='Faker';
```

output:

pid	main_language
Faker	Korean

23.

What language does manager Oliver speak?

Oliver is a very interesting manager, his language is very important to the team.

```
SELECT managers.name, main_language
FROM leagues
LEFT JOIN teams
```



```

ON teams.Abbbr=leagues.Abbbr
LEFT JOIN managers
ON managers.t_name=teams.t_name
WHERE managers.name='Oliver';

```

output:

name	main_language
Oliver	English

24.

Who is the sponsor of the year with the highest bonus?

Sponsor's reputation in years with high bonuses is generally important.

```

SELECT sponsors.champ_year, sponsors.spon_company
FROM sponsors
LEFT JOIN LoL_World_Championship
ON LoL_World_Championship.champ_year=sponsors.champ_year
WHERE LoL_World_Championship.award=
(
    SELECT MAX(award)
    FROM LoL_World_Championship
);

```

output:

champ_year	spon_company
2018	SPITE

25.

What is the sponsor of the team SKT?

The SKT team is very famous, and the sponsor is very important.

```

SELECT sponsor.t_name, sponsor.spon_company
FROM sponsor
LEFT JOIN teams
ON sponsor.t_name=teams.t_name
WHERE teams.t_name='SKT';

```

output:

t_name		spon_company
SKT		BENZ
SKT		KFC

26.

Who are the players that the nationality is Chinese and the role is ADC?

Chinese ADC players are generally very good, these data are very important.

```
SELECT p.pid
FROM players p
WHERE p.nationality='CN'
AND p.role='ADC';
```

output:

pid
Lwx
JackeyLove
Hope

27.

What is the assistant coach of player Doinb?

Doinb is a very good MID player in LPL, and his assistant coach is very important.

```
SELECT coaches.name, coaches.nationality
FROM coaches
LEFT JOIN players
ON players.t_name=coaches.t_name
WHERE players.pid='Doinb';
```

output:

name		nationality
------	--	-------------

Zhan Ma | KR
Chen Guan-ting | CN

28.

Find all years with more teams than the previous year.

The increase in the number of teams represents an increase in the influence of LOL to a certain extent.

```
SELECT L1.champ_year as year, L1.team_num
FROM LoL_World_Championship L1
JOIN LoL_World_Championship L2
ON (L1.champ_year-L2.champ_year)=1
WHERE L1.team_num>L2.team_num;
```

output:

year	team_num
2013	14
2014	16
2017	24

29.

Who is the sponsor of player Song Eui-jin's team?

Song Eui-jin is a very powerful mid laner, and his team sponsor will benefit a lot from this.

```
SELECT sponsor.spon_company
FROM sponsor
LEFT JOIN players
ON sponsor.t_name=players.t_name
WHERE players.given_name='Eui-jin'
AND family_name='Song';
```

output:

spon_company
NIKE
BENZ

30.

Where is the main location of the league where the SSG is located?

SSG is a relatively strong team in Korea, and his location is very important.

```
SELECT teams.t_name, leagues.main_location
FROM leagues
LEFT JOIN teams
ON leagues.Abbbr = teams.Abbbr
WHERE teams.t_name='SSG';
```

output:

```
  t_name |   main_location
-----+-----
   SSG   |   Seoul
```

31.

What are the names of the coaches who are not coaching anyone?

It's important to know who are doing nothing due to insert errors.

```
SELECT c.name
FROM coaches AS c
WHERE NOT EXISTS (SELECT *
                  FROM tutor AS t
                  WHERE c.cid = t.cid);
```

output:

```
      name
-----
Clearlove
Liu Yun-song
Mata
Mlxg
```

32.

What the player whose tutor is Chen Guan-ting and whose role is SUP is?

SUP is an important position in the game, Chen Guan-ting is very famous,

so this player is also important.

```
SELECT pid
FROM players
LEFT JOIN coaches
ON players.t_name=coaches.t_name
WHERE players.role='SUP'
AND coaches.name='Chen Guan-ting';
```

output:

```
      pid
-----
Crisp
```

3. Queries in Relational Algebra

1.

From Requirement Queries 6:

Query:

```
SELECT players.pid FROM players
LEFT JOIN coaches
ON players.t_name=coaches.t_name
WHERE coaches.name='Clearlove';
```

Relational Algebra:

$$\pi_{\text{players.pid}} \sigma_{\text{coaches.name} = \text{'Clearlove'}} (\text{players} \bowtie \text{players.t_name} = \text{coaches.t_name} \text{coaches})$$

2.

From Requirement Queries 10:

Query:

```
SELECT (2020-b_year+1) AS age
FROM
(
    SELECT year AS b_year FROM players
    WHERE players.pid='Caps'
    AND players.t_name='G2'
)AS temp;
```

Relational Algebra:

$\pi_{(2020 - b_year + 1) \rightarrow age} \rho_{temp} (\rho_{b_year \leftarrow year} \pi_{year} \sigma_{players.pid = 'Caps' \text{ and } players.t_name = 'G2'} players)$

3.

From New Queries Over the Database 5:

Query:

```
SELECT COUNT(area) AS china_time
FROM LoL_World_Championship
WHERE area='CN'
AND champ_year >= 2014
AND champ_year <= 2020;
```

Relational Algebra:

$\pi_{china_time} \gamma_{COUNT(area) \rightarrow china_time} \sigma_{area = 'CN' \text{ and } champ_year \geq 2014 \text{ and } champ_year \leq 2020} LoL_World_Championship$

4.

From New Queries Over the Database 9:

Query:

```
SELECT DISTINCT p1.pid, p1.t_name
FROM players p1,
players p2
WHERE p1.t_name = p2.t_name
ORDER BY p1.t_name;
```

Relational Algebra:

$\tau_{p1.t_name \text{ asc}} \pi_{p1.pid, p1.t_name} \sigma_{p1.t_name = p2.t_name} (\rho_{p1} players \times \rho_{p2} players)$

5.

From New Queries Over the Database 14:

Query:

```
SELECT coaches.name
FROM coaches
```

```

LEFT JOIN players
ON coaches.t_name=players.t_name
WHERE players.pid='Faker'
AND coaches.role='1';

```

Relational Algebra:

$$\pi_{\text{coaches.name}} \sigma_{\text{players.pid} = \text{'Faker'} \text{ and } \text{coaches.role} = \text{'1'}} (\text{coaches} \bowtie_{\text{coaches.t_name} = \text{players.t_name}} \text{players})$$

6.

From New Queries Over the Database 28:

Query:

```

SELECT L1.champ_year as year, L1.team_num
FROM LoL_World_Championship L1
JOIN LoL_World_Championship L2
ON (L1.champ_year-L2.champ_year)=1
WHERE L1.team_num>L2.team_num;

```

Relational Algebra:

$$\rho_{\text{year} \leftarrow \text{L1.champ_year}} \pi_{\text{L1.champ_year}, \text{L1.team_num}} \sigma_{\text{L1.team_num} > \text{L2.team_num}} (\rho_{\text{L1}} \text{LoL_World_Championship} \bowtie_{(\text{L1.champ_year} - \text{L2.champ_year}) = 1} \rho_{\text{L2}} \text{LoL_World_Championship})$$