

A.

Champ

```
mysql> describe champ;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| champion_name  | varchar(15)   | NO   |     | NULL    |       |
| champion_id    | int(11)       | NO   | PRI | NULL    |       |
+-----+-----+-----+-----+-----+-----+
2 rows in set (0.00 sec)
```

Match\_info:

```
mysql> describe match_info;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| match_id       | int(11)       | NO   | PRI | NULL    |       |
| duration       | int(11)       | YES  |     | NULL    |       |
| version        | varchar(15)   | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
3 rows in set (0.00 sec)
```

Participant:

```
mysql> describe participant;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| player_id      | int(11)       | NO   | PRI | NULL    |       |
| match_id       | int(11)       | NO   | MUL | NULL    |       |
| player         | tinyint(4)    | YES  |     | NULL    |       |
| champion_id    | int(11)       | NO   |     | NULL    |       |
| ss1            | varchar(15)   | YES  |     | NULL    |       |
| ss2            | varchar(15)   | YES  |     | NULL    |       |
| position       | varchar(13)   | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

Stat:

```
mysql> describe stat;
```

Field	Type	Null	Key	Default	Extra
player_id	int(11)	NO	PRI	NULL	
win	tinyint(1)	YES		NULL	
item1	smallint(6)	YES		NULL	
item2	smallint(6)	YES		NULL	
item3	smallint(6)	YES		NULL	
item4	smallint(6)	YES		NULL	
item5	smallint(6)	YES		NULL	
item6	smallint(6)	YES		NULL	
kills	tinyint(4)	YES		NULL	
deaths	tinyint(4)	YES		NULL	
assists	tinyint(4)	YES		NULL	
longesttimespentliving	smallint(6)	YES		NULL	
doublekills	tinyint(4)	YES		NULL	
triplekills	tinyint(4)	YES		NULL	
quadrakills	tinyint(4)	YES		NULL	
pentakills	tinyint(4)	YES		NULL	
legendarykills	tinyint(4)	YES		NULL	
goldearned	mediumint(9)	YES		NULL	
firstblood	tinyint(1)	YES		NULL	

19 rows in set (0.00 sec)

Teamban:

```
mysql> describe teamban;
```

Field	Type	Null	Key	Default	Extra
match_id	int(11)	NO	PRI	NULL	
team	char(1)	NO		NULL	
champion_id	int(11)	NO		NULL	
banturn	tinyint(4)	NO	PRI	NULL	

4 rows in set (0.00 sec)

1. Varchar 是可變長度，Char 是固定長度。
2. 在 mysql 裡面會用 BIT 來存，1=TRUE，0=FALSE。
3. 1 byte for “tinyint” from -128 to 127  
2 bytes for “smallint” from -32768 to 32767  
3 bytes for “mediumint” from -8388608 to 8388607  
4 bytes for “int” from -2147483648 to 2147483647
4. 我覺得可以把 stat 裡面的 kill 跟 item 獨立出來成兩個 table，還有把 teamban 裡面的 banturn 改成 banturn\_1, banturn\_2, banturn\_3, banturn\_4, banturn\_5, banturn\_6 這樣資料就不會太多  
然後裡面儲存的就是 ban 的就是 champion\_id;

B.

C.

1.

```
mysql> select count(distinct champion_id) cnt from champ;
+-----+
| cnt |
+-----+
| 138 |
+-----+
```

2.

```
mysql> select count(distinct substring(version, 1, 4)) cnt
-> from match_info;
+-----+
| cnt |
+-----+
| 74 |
+-----+
```

3.

```
mysql> select champion_name, times cnt
-> from champ , (
->     select champion_id, count(champion_id) times
->     from participant
->     where position='JUNGLE'
->     group by champion_id
->     order by times desc
->     limit 3
-> ) as top3
-> where champ.champion_id=top3.champion_id;
+-----+-----+
| champion_name | cnt |
+-----+-----+
| Lee Sin      | 56598 |
| Master Yi    | 23385 |
| Graves       | 19767 |
+-----+-----+
```

4.

```
mysql> select match_id, sec_to_time(duration) as time
-> from match_info
-> order by duration desc
-> limit 5;
```

match_id	time
146486	01:23:11
69303	01:20:14
581	01:16:59
70361	01:15:06
176628	01:13:34

5.

```
mysql> select REPLACE(REPLACE(win, 0, 'lose'), 1, 'win') as win_lose, count(avgt) as cnt
-> from
-> (
->   select win, sum(longesttimespentliving)/5 as avgt
->   from participant P, stat S
->   where P.player_id=S.player_id
->   group by match_id, win
-> )as ww
-> where avgt>=1200
-> group by win;
```

win_lose	cnt
lose	338
win	807

6.

```
mysql> SELECT position, champion_name
-> FROM champ p, (
->   select c.champion_id, m.position
->   FROM (
->     SELECT max(cnt) as maxcnt, position
->     FROM (
->       select champion_id, count(champion_id) as cnt, position
->       from participant
->       where match_id in (
->         select match_id
->         from match_info
->         where duration BETWEEN 2400 AND 3000
->       )
->       and position != 'DUO'
->       and position != 'NONE'
->       and position != 'SOLO'
->       group by position, champion_id
->       order by position, cnt desc
->     )as c
->     group by position
->   )as m, (
->     select champion_id, count(champion_id) as cnt, position
->     from participant
->     where match_id in (
->       select match_id
->       from match_info
->       where duration BETWEEN 2400 AND 3000
->     )
->     and position != 'DUO'
->     and position != 'NONE'
->     and position != 'SOLO'
->     group by position, champion_id
->     order by position, cnt desc
->   )as c
->   where m.maxcnt=c.cnt and m.position=c.position
-> ) as f
-> where p.champion_id=f.champion_id;
```

```
+-----+-----+
| position | champion_name |
+-----+-----+
| DUO_CARRY | Caitlyn      |
| DUO_SUPPORT | Thresh      |
| JUNGLE    | Lee Sin     |
| MID       | Ahri        |
| TOP       | Riven       |
+-----+-----+
```

7.

```
mysql> select position, champion_name, kda
-> from champ P,
-> (
-> (select champion_id, ((sum(kills)+sum(assists))/sum(deaths)) as kda, position
-> from(
-> select champion_id, position, kills, assists, deaths
-> from(
-> select player_id, champion_id, position
-> from participant
-> ) P,
-> (
-> select player_id, kills, assists, deaths
-> from stat
-> ) S
-> where P.player_id=S.player_id and position='DUO_CARRY'
-> ) as T
-> group by champion_id
-> having sum(deaths)!= 0
-> order by kda desc
-> limit 1)
-> UNION
-> (select champion_id, ((sum(kills)+sum(assists))/sum(deaths)) as kda, position
-> from
-> (
-> select champion_id, position, kills, assists, deaths
-> from(
-> select player_id, champion_id, position
-> from participant
-> ) P,
-> (
-> select player_id, kills, assists, deaths
-> from stat
-> ) S
-> where P.player_id=S.player_id and position='DUO_CARRY'
-> )
-> as T
->
-> group by champion_id
-> having sum(deaths)!= 0
-> order by kda desc
-> limit 1)
-> UNION
-> (select champion_id, ((sum(kills)+sum(assists))/sum(deaths)) as kda, position
-> from(
-> select champion_id, position, kills, assists, deaths
```

```

-> from(
->     select player_id, champion_id, position
->     from participant
->     ) P,
->     (
->         select player_id, kills, assists, deaths
->         from stat
->         ) S
-> where P.player_id=S.player_id and position='DUO_SUPPORT'
->     ) as T
->
-> group by champion_id
-> having sum(deaths)!= 0
-> order by kda desc
->     limit 1)
-> UNION
-> (select champion_id,((sum(kills)+sum(assists))/sum(deaths)) as kda, position
-> from
-> (
->     select champion_id, position, kills, assists, deaths
-> from(
->     select player_id, champion_id, position
->     from participant
->     ) P,
->     (
->         select player_id, kills, assists, deaths
->         from stat
->         ) S
-> where P.player_id=S.player_id and position='JUNGLE'
->     )
-> as T
->
->     group by champion_id
->     having sum(deaths)!= 0
->     order by kda desc
->     limit 1)
-> UNION
-> (select champion_id, ((sum(kills)+sum(assists))/sum(deaths)) as kda, position
-> from(
->     select champion_id, position, kills, assists, deaths
-> from(
->     select player_id, champion_id, position
->     from participant
->     ) P,
->     (

```

```

->         select player_id, kills, assists, deaths
->         from stat
->         ) S
->     where P.player_id=S.player_id and position='MID'
->         ) as T
->
-> group by champion_id
-> having sum(deaths)!= 0
-> order by kda desc
->     limit 1)
->     UNION
->     (select champion_id,((sum(kills)+sum(assists))/sum(deaths)) as kda, position
->     from
->     (
->         select champion_id, position, kills, assists, deaths
->     from(
->         select player_id, champion_id, position
->         from participant
->         ) P,
->         (
->             select player_id, kills, assists, deaths
->         from stat
->         ) S
->     where P.player_id=S.player_id and position='TOP'
->         )
->     as T
->
->     group by champion_id
->     having sum(deaths)!= 0
->     order by kda desc
->     limit 1)
-> ) F
-> where P.champion_id=F.champion_id;

```

position	champion_name	kda
DUO_CARRY	Shaco	19.0000
DUO_SUPPORT	Janna	3.8330
JUNGLE	Ivern	3.8764
MID	Ivern	3.7015
TOP	Sona	3.1538



8.

```
mysql> select champion_name
-> from champ
-> where champion_id not in(
->     select champion_id
-> from teamban
-> where match_id in(
->     select match_id
-> from match_info
-> where version like '7.7%'
-> )
-> )
-> order by champion_name asc;
```

```
+-----+
| champion_name |
+-----+
| Kayn          |
| Ornn          |
| Rakan         |
| RekSai        |
| Sion          |
| Xayah         |
+-----+
```

9.

```
mysql> select version, win_cnt, (all_cnt-win_cnt) as lose_cnt, (win_cnt/(all_cnt)) as win_ratio
-> FROM
-> (
-> select version, sum(win) as win_cnt, count(win) as all_cnt
-> FROM
-> (
-> select match_id, SUBSTRING_index(version, '.', 2) as version
-> from match_info
-> )as match_info,
-> (
-> select L.match_id, L.win
-> from
-> (select match_id, L_player_id, win
-> FROM stat,
-> (
-> select player_id as L_player_id, match_id
-> from participant
-> where champion_id=64
-> ) L
-> where stat.player_id=L_player_id
-> ) as L,
-> (select match_id, T_player_id, win
-> FROM stat,
-> (
-> select player_id as T_player_id, match_id
-> from participant
-> where champion_id=17
-> ) T
-> where stat.player_id=T_player_id
-> ) as T
-> where L.match_id=T.match_id AND L.win=T.win
-> ) as match_win
-> where match_win.match_id=match_info.match_id
-> group by version
-> ) as F;
```

version	win_cnt	lose_cnt	win_ratio
4.10	2	1	0.6667
4.12	0	1	0.0000
4.15	1	1	0.5000
4.17	0	1	0.0000
4.18	0	1	0.0000
4.19	0	1	0.0000
4.21	1	1	0.5000
4.9	1	0	1.0000
5.1	1	2	0.3333
5.12	1	0	1.0000
5.13	0	1	0.0000
5.15	0	1	0.0000
5.19	1	0	1.0000
5.20	2	0	1.0000
5.21	0	2	0.0000
5.24	1	1	0.5000
5.5	1	0	1.0000
5.6	0	1	0.0000
5.7	1	0	1.0000
6.1	0	1	0.0000
6.13	1	0	1.0000
6.14	1	0	1.0000
6.18	1	1	0.5000
6.19	1	0	1.0000
6.2	1	1	0.5000
6.20	3	2	0.6000
6.21	0	2	0.0000
6.22	2	1	0.6667
6.23	3	2	0.6000
6.24	4	3	0.5714
6.5	1	0	1.0000
6.6	0	1	0.0000
6.8	1	0	1.0000
6.9	1	1	0.5000
7.10	282	304	0.4812
7.2	2	1	0.6667
7.3	0	1	0.0000
7.4	1	1	0.5000
7.5	2	2	0.5000
7.6	2	5	0.2857
7.7	32	29	0.5246
7.8	210	237	0.4698
7.9	527	464	0.5318

10.

```
mysql> SELECT self_champ_name, win_ratio, self_kda, self_avg_gold,
->   champion_name as enemy_champ_name, enemy_kda, enemy_avg_gold, battle_record
-> FROM champ,
->   (
->   select champion_name as self_champ_name,
->     (s_win/battle_record) as win_ratio,
->     n_kda as self_kda,
->     (self_s_gold/battle_record) as self_avg_gold,
->     R_champion_id, R_kda as enemy_kda,
->     (e_s_gold/battle_record) as enemy_avg_gold, battle_record
->   FROM champ,
->   (
->   select n_champion_id, sum(N.win) as s_win,
->     ((sum(N.kills)+sum(N.assists))/sum(N.deaths)) as n_kda,
->     sum(N.goldearned) as self_s_gold, R_champion_id,
->     ((sum(R.kills)+sum(R.assists))/sum(R.deaths)) as R_kda,
->     sum(R.goldearned) as e_s_gold, count(n_champion_id) as battle_record
->   from
->   (
->   select match_id, win, champion_id as n_champion_id, kills, deaths, assists, goldearned
->     from stat,
->     (
->   select match_id, player_id, champion_id
->     from participant
->     where match_id in(
->   select match_id
->     from participant
->     where champion_id=58 AND position='TOP'
->   ) and position='TOP'
->   ) as participant
->   where stat.player_id=participant.player_id and champion_id!=58
->   ) as N,
->   (
->   select match_id, win, champion_id as R_champion_id, kills, deaths, assists, goldearned
->     from stat,
->     (
->   select match_id, player_id, champion_id
->     from participant
->     where match_id in(
->   select match_id
->     from participant
->     where champion_id=58 AND position='TOP'
->   ) and position='TOP'
->   ) as participant
->   where stat.player_id=participant.player_id and champion_id=58
```

```
-> ) as R
->   where N.match_id=R.match_id and N.win!=R.win
->   group by n_champion_id
->   having count(n_champion_id)>100
-> ) as F
->   where champion_id=n_champion_id
-> ) as F
->   where champion_id=R_champion_id
-> order by win_ratio desc
-> limit 5;
```

self_champ_name	win_ratio	self_kda	self_avg_gold	enemy_champ_name	enemy_kda	enemy_avg_gold	battle_record
Teemo	0.5756	1.9377	12429.4756	Renekton	1.8590	11838.0422	450
Pantheon	0.5433	2.3578	11710.6325	Renekton	1.6877	11377.3648	381
Nautilus	0.5399	2.5245	10610.6304	Renekton	2.0992	12158.3877	276
Jax	0.5336	1.8333	11920.0637	Renekton	1.9874	11737.3632	581
Jarvan IV	0.5333	2.5204	10889.9185	Renekton	1.9347	11220.7037	135

11.

```
mysql> select *
-> from
->     (select count(win) as win
->     FROM
->     (
-> SELECT stat.player_id, win
->     FROM stat,
->     (
-> select player_id, ss1, ss2
->     from participant
->     where position='TOP'
->     and ((ss1='Flash'and ss2='Ignite')or(ss1='Ignite'and ss2='Flash'))
-> ) as ss
->     where stat.player_id=ss.player_id
-> )as F_I
->     where win=1) as w,
->     (select count(win) as lose
->     FROM
->     (
-> SELECT stat.player_id, win
->     FROM stat,
->     (
-> select player_id, ss1, ss2
->     from participant
->     where position='TOP'
->     and ((ss1='Flash'and ss2='Ignite')or(ss1='Ignite'and ss2='Flash'))
-> ) as ss
->     where stat.player_id=ss.player_id
-> )as F_I
->     where win=0) as l;
+-----+-----+
| win   | lose  |
+-----+-----+
| 22163 | 20459 |
+-----+-----+
```

```
mysql> select *
-> FROM
-> (select count(win) as win
-> FROM
-> (
-> SELECT stat.player_id, win
-> FROM stat,
-> (
-> select player_id, ss1, ss2
-> from participant
-> where position='TOP'
-> and ((ss1='Flash'and ss2='Teleport')or(ss1='Teleport'and ss2='Flash'))
-> ) as ss
-> where stat.player_id=ss.player_id
-> )as F_I
-> where win=1) as w,
-> (select count(win) as lose
-> FROM
-> (
-> SELECT stat.player_id, win
-> FROM stat,
-> (
-> select player_id, ss1, ss2
-> from participant
-> where position='TOP'
-> and ((ss1='Flash'and ss2='Teleport')or(ss1='Teleport'and ss2='Flash'))
-> ) as ss
-> where stat.player_id=ss.player_id
-> )as F_I
-> where win=0) as l;
+-----+-----+
| win    | lose    |
+-----+-----+
| 145202 | 145308 |
+-----+-----+
```

我先找出了用閃現加點燃的 player\_id from participant, 之後再用這些 player\_id 在 stat 裡面找出它們是輸

```
+-----+-----+
| win    | lose    |
+-----+-----+
| 22163  | 20459   |
+-----+-----+
```

還是贏，最後在 count 出輸跟贏的數量，結果是

```
+-----+-----+
| win    | lose    |
+-----+-----+
| 145202 | 145308 |
+-----+-----+
```

送，結果是，雖然說可以明顯看出閃現加點燃的勝率一定是比較高的，但是閃現加點燃的樣本實在是太少了，所以無法直接斷定說閃現加點燃的一定是比較好的，獲勝機會比較大，而且閃現加傳送說輸也沒有輸多少打了快 29 萬場，結果勝敗差也只差了 106，也沒有說多不好的選擇。

但就現階段資料的確是可以做出選擇(閃現加點燃)會比較容易獲勝，因為打出來的結果是閃現加點燃的確是比較容易贏，獲勝機會是比較大的

## 12.

第 12 題，我有做兩個

第一個我是做得到首殺的隊伍會不會比較容易拿到勝利，可以從數據裡面看到那到首殺後又拿到最終勝利的有 10 萬多相較於最後戰敗的 7 萬多，足足多了 3 萬多，所以我可以斷定說拿到首殺後，可以說這隊伍是比較容易拿到最後勝利的

```
mysql> select *
-> FROM
-> (
-> select count(win) as win
->   from stat
->   where firstblood=1 and win=1
-> ) as w,
-> (
-> select count(win) as lose
->   from stat
->   where firstblood=1 and win=0
-> ) as l;
+-----+-----+
| win   | lose  |
+-----+-----+
| 107388 | 73159 |
+-----+-----+
```

第二個我是做關於人頭數與最後勝利有沒有關係，和金錢哪個對於勝利比較有直接關係，最後我也有得到結果，我做出來的結果是數出輸的隊伍的總擊殺跟隊伍的金錢是大於贏的隊伍的。

第一個結果是金錢，第二個總擊殺，可以看出基本上經濟的領先就可以說是會拿下隊伍的勝利，雖然說兩者的數字都很小相對於總數 18 萬，但可以看出只有 4000 多場的場數是最後經濟是輸的結果最後卻是勝利，所以比起擊殺數，經濟的領先才是對隊伍最有利的勝利方式。

```

mysql> select count(*)
-> from
-> (
-> select w.match_id, w.win as win, w.s_kills as w_kills, w.s_gold as w_gold,
->        l.win as lose, l.s_kills as l_kills, l.s_gold as l_gold
->        FROM
->        (
-> select match_id, win, sum(kills) as s_kills, sum(goldearned) as s_gold
->        FROM
->        (
-> select match_id, stat.player_id, win, kills, goldearned
->        from stat, participant
->        where stat.player_id=participant.player_id
-> ) as stat
->        where win=1
->        group by match_id
-> ) as w,
-> (
-> select match_id, win, sum(kills) as s_kills, sum(goldearned) as s_gold
->        FROM
->        (
-> select match_id, stat.player_id, win, kills, goldearned
->        from stat, participant
->        where stat.player_id=participant.player_id
-> ) as stat
->        where win=0
->        group by match_id
-> ) as l
->        where w.match_id=l.match_id
-> ) as F
-> where l_gold>w_gold;
+-----+
| count(*) |
+-----+
|      4646 |
+-----+

```



```

mysql> select count(*)
-> from
-> (
-> select w.match_id, w.win as win, w.s_kills as w_kills, w.s_gold as w_gold,
->        l.win as lose, l.s_kills as l_kills, l.s_gold as l_gold
->        FROM
->        (
-> select match_id, win, sum(kills) as s_kills, sum(goldearned) as s_gold
->        FROM
->        (
-> select match_id, stat.player_id, win, kills, goldearned
->        from stat, participant
->        where stat.player_id=participant.player_id
-> ) as stat
->        where win=1
->        group by match_id
-> ) as w,
-> (
-> select match_id, win, sum(kills) as s_kills, sum(goldearned) as s_gold
->        FROM
->        (
-> select match_id, stat.player_id, win, kills, goldearned
->        from stat, participant
->        where stat.player_id=participant.player_id
-> ) as stat
->        where win=0
->        group by match_id
-> ) as l
->        where w.match_id=l.match_id
-> ) as F
-> where l_kills>w_kills;
+-----+
| count(*) |
+-----+
|    11430 |
+-----+

```