

A.create table

```
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)

```
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)

```
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)	YES		NULL	

7 rows in set (0.00 sec)

```
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)

```
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)

1.What the difference between type “char” and type “varchar”?

ans: “char” 是固定長度， “varchar”則可能是任意長度

2.Type “boolean” would be stored as which type in MySQL?

ans: 使用 tinyint 型態(只有1 byte)

3.How many bytes it should take for “tinyint”, “smallint”, “mediumint”, “int”? (e.g. 8 bytes for “bigint”) And what’s the range they can express?

ans:

(1)

“tinyint”: 1byte

“smallint”: 2 bytes

“mediumint”: 3 bytes

“int”: 4 bytes

(2)

“tinyint”: -128~127

“smallint”: -32768~32767

“mediumint”: -8388608~8388607

“int”: -2147483648~2147483647

4.What do you think about this table schema? If you can change this table architecture, how would you modify it and why?

ans:

我認為已經是很完整的架構了，但是如果可以再增加幾個foreign key，對於日後新增或刪除資料會更安全，ex: banturn 和 champion_id，另外，participant 和 stat 重複部分很少，合併的話不會造成很多問題

C.Query Tasks

1.

```
mysql> select count(champion_name) cnt
      -> from champ;
+-----+
| cnt |
+-----+
| 138 |
+-----+
1 row in set (0.01 sec)
```

2.

```
mysql> select count(distinct substring_index(version, '.',2)) cnt
      -> from match_info;
+-----+
| cnt |
+-----+
| 74 |
+-----+
1 row in set (0.07 sec)
```

3.

```
mysql> select C.champion_name, count(P.champion_id) cnt
-> from champ C, participant P
-> where C.champion_id=P.champion_id and P.position like 'JUN%'
-> group by P.champion_id
-> order by count(P.champion_id) desc
-> limit 3;
+-----+-----+
| champion_name | cnt   |
+-----+-----+
| Lee Sin      | 56598 |
| Master Yi    | 23385 |
| Graves       | 19767 |
+-----+-----+
3 rows in set (1.00 sec)
```

4.

```
mysql> select match_id, sec_to_time(duration) 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 rows in set (0.12 sec)
```

5.

```
ERROR 1146 (42S02): Table 'hw1.participant' doesn't exist
mysql> select (case when c.win=5 then 'win' else 'lose' end) as win_lose,
-> count(c.summary) as cnt
-> from (
-> select A.match_id, sum(B.win) win, sum(B.longesttimespentliving) summary
-> from participant A, stat B
-> where A.player_id=B.player_id
-> group by A.match_id, floor(A.player/6)
-> having sum(B.longesttimespentliving)>=6000
-> ) as c
-> group by c.win;
+-----+-----+
| win_lose | cnt   |
+-----+-----+
| lose     | 338   |
| win      | 807   |
+-----+-----+
2 rows in set (17.90 sec)
```

6.

```
mysql> select lpad(f.champion_name,15,' ') as champion_name,e.position from(select max(d.cnt) maxcount,d.position from(select count(B.player_id) cnt,B.position from match_info A,participant B,champ C where A.match_id=B.match_id and (A.duration between 2400 and 3000) and B.champion_id=C.champion_id group by B.position, B.champion_id) as d group by d.position) as e,(select count(B.player_id) cnt,C.champion_name,B.position from match_info A,participant B,champ C where A.match_id=B.match_id and (A.duration between 2400 and 3000) and B.champion_id=C.champion_id group by B.position,B.champion_id) as f where e.maxcount=f.cnt and e.position=f.position and (f.position like '%AR%' or f.position like '%UP%' or f.position like '%NG%' or f.position like 'MI%' or f.position like 'TO%');
```

champion_name	position
Caitlyn	DUO_CARRY
Thresh	DUO_SUPPORT
Lee Sin	JUNGLE
Ahri	MID
Riven	TOP

5 rows in set (16.81 sec)

7.

```
mysql> select maxkda kda,lpad(f.champion_name,20,' ') champion_name,lpad(e.position,20,' ') position from(select lpad(max(b.kda),20,' ') maxkda, b.position from(select (a.sumkills+a.sumassists)/a.sumdeaths kda,a.position from(select sum(S.kills) sumkills,sum(S.assists) sumassists,sum(S.deaths) sumdeaths,P.position,P.champion_id from participant P,stat S where P.player_id=S.player_id group by P.position, P.champion_id having sum(S.deaths)!=0) as a) as b group by b.position) as d,(select lpad((c.sumkills+c.sumassists)/c.sumdeaths,20,' ') kda,c.position,c.champion_id from(select sum(S.kills) sumkills,sum(S.assists) sumassists,sum(S.deaths) sumdeaths,P.position,P.champion_id from participant P,stat S where P.player_id=S.player_id group by P.position,P.champion_id having sum(S.deaths)!=0) as c) as e,champ f where d.maxkda=e.kda and e.position=d.position and e.champion_id=f.champion_id and (e.position like '%AR%' or e.position like '%UP%' or e.position like '%UN%' or e.position like 'TO%' or e.position like 'MI%');
```

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

5 rows in set (32.47 sec)

8.

```
mysql> select champion_name
-> from champ
-> where champion_id not in(
->     select B.champion_id
->     from match_info M, teamban B
->     where M.match_id=B.match_id and substring_index(M.version, '.',2)=7.7
-> ) order by champion_name;
+-----+
| champion_name |
+-----+
| Kayn          |
| Ornn          |
| Rakan         |
| RekSai        |
| Sion          |
| Xayah         |
+-----+
6 rows in set (0.11 sec)
```

9.

```
select g.version, g.win_res win_cnt, g.lose_res lose_cnt, g.win_res/(g.win_res+g.lose_res) win_ratio from(
select substring_index(M.version, '.',2) version, sum(f.win_res) as win_res, sum(f.lose_res) as lose_res
from(
    select if(e.win=1,1,0) as win_res, if(e.win=0,1,0) as lose_res, e.match_id
    from(
        select a.match_id, S.win
        from(
            select match_id, player_id, player
            from participant
            where champion_id in(
                select champion_id
                from champ
                where champion_name like 'LEE SIN'
            )
        ) as a, (
            select match_id, player_id, player
            from participant
            where champion_id in(
                select champion_id
                from champ
                where champion_name like 'TEEMO'
            )
        ) as b, stat S
        where a.match_id=b.match_id and S.player_id=a.player_id and floor(a.player/6)=floor(b.player/6)
    ) as e
) as f, match_info M
where f.match_id=M.match_id
group by substring_index(M.version, '.',2)
```



```
mysql> source /home/potatofarm/Desktop/hw1/9.sql;
```

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.

```
select d.champion_name as self_champ_name,d.win_ratio,d.self_kda,d.self_avg_gold
,if(d.battle_record>=100,'Renekton','null') as enemy_champ_name,d.enemy_kda,d.enemy_avg_gold,d.battle_reco
from(
  select c.champion_name,c.win_res/(c.win_res+c.lose_res) as win_ratio
  ,(c.kills+c.assists)/c.deaths as self_kda,c.goldearned/c.battle_record as self_avg_gold
  ,(c.e_kills+c.e_assists)/c.e_deaths as enemy_kda, c.e_goldearned/c.battle_record as enemy_avg_gold
  ,c.battle_record
  from(
    select b.champion_name,sum(b.win_res) win_res,sum(b.lose_res) lose_res
    ,sum(b.kills) kills,sum(b.assists) assists,sum(b.deaths) deaths,sum(b.goldearned) goldearned
    ,count(b.match_id) record
    ,sum(b.e_kills) as e_kills, sum(b.e_assists) as e_assists, sum(b.e_deaths) as e_deaths
    ,sum(b.e_goldearned) as e_goldearned
    ,count(b.match_id) as battle_record
    from(
      select a.match_id,C.champion_name,if(S.win=1,1,0) as win_res,if(S.win=0,1,0) as lose_res
      ,S.kills,S.deaths,S.assists,S.goldearned
      ,a.champion_name as e_champion_name,a.kills as e_kills,a.deaths as e_deaths
      , a.assists as e_assists, a.goldearned as e_goldearned
      from(
        select P.match_id, P.player, C.champion_name, S.kills, S.deaths, S.assists, S.goldearned
        from participant P, champ C, stat S
        where P.champion_id=C.champion_id
        and P.position like 'T0%' and C.champion_name like 'RENEKTON' and P.player_id=S.player_id
      )as a, stat S, participant P, champ C
      where S.player_id=P.player_id and floor(P.player/6)<>floor(a.player/6)
      and a.match_id=P.match_id and C.champion_id=P.champion_id and P.position like 'T0%'
    ) as b
    group by b.champion_name
  ) as c
  where c.battle_record>=100
) as d
order by d.win_ratio desc
limit 5;
```

```
Database changed
mysql> source /home/potatofarm/Desktop/hw1/10.sql;
+-----+-----+-----+-----+-----+-----+
| self_champ_name | win_ratio | self_kda | self_avg_gold | enemy_champ_name | en
emy_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      |               |                  |
+-----+-----+-----+-----+-----+-----+
5 rows in set (7.50 sec)
```


12.

哪一隻英雄最容易打出pentakill?

```
select c.champion_name, c.pentakills_ratio
from(
  select b.champion_name,b.pentakills/b.cnt pentakills_ratio
  from(
    select a.champion_name,sum(a.pentakills) pentakills,count(match_id) cnt
    from(
      select C.champion_name,S.pentakills, P.match_id
      from participant P, stat S, champ C
      where P.player_id=S.player_id and C.champion_id=P.champion_id
    ) as a
    group by a.champion_name
  ) as b
) as c
order by pentakills_ratio desc
limit 5;
```

champion_name	pentakills_ratio	
abc Filter...	abc Filter...	
Master Yi	0.0167	
Jinx	0.0082	
Twitch	0.0082	
Vayne	0.0080	
Katarina	0.0079	

ans: master yi~