

DATABASE HW1

A. Create Tables

```
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 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)
```

```
mysql> 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 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)
```

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

A: 兩者最大差異為 varchar 保存可變長度的字串, 僅給予其一個最大空間, 系統會根據實際上資料儲存的數據量分配合適的儲存空間, 相較於固定長度可以減少佔用空間 ; char 則是採用固定的儲存方式, 即使資料保存時沒有使用到最大長度, 系統也會分配給那麼多的儲存空間

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

A: 使用 tinyint

3. How many bytes it should take for “tinyint”, “smallint”, “mediumint”, “int”?

A: tinyint: 1 BYTE , From 0 To 255

smallint: 2 BYTE, From -32768 To 32767

mediumint 3 BYTE, From -8388608 To 8388607

int 4 BYTE, From -2147483648 To 2147483647

4. What do you think about this table schema? If you can change this table

architecture, how would you modify it and why?

A:

1. 召喚師技能(ss1,ss2)放在 Participant 中顯的很奇怪, 放在 Stat 中應該比較合理一些

2.Participant 中如果要區別玩家為不同隊伍,可以使用 0 與 1 就好沒必要使用 1 至 5 以及 6 至 10 區分

C. Query Tasks

1.

```
mysql> SELECT COUNT(DISTINCT champ.champion_name) as cnt
-> FROM champ ;
+-----+
| cnt |
+-----+
| 138 |
+-----+
1 row in set (0.00 sec)
```

2.

```
mysql> SELECT COUNT(DISTINCT SUBSTRING_INDEX(m.version, '.', 2)) as cnt
-> FROM match_info as m;
+-----+
| cnt |
+-----+
| 74 |
+-----+
1 row in set (0.06 sec)
```

3.

```
mysql> SELECT c.champion_name as champion_name, COUNT(p.champion_id) as cnt
-> FROM champ as c, participant as p
-> WHERE p.champion_id=c.champion_id AND p.position='JUNGLE'
-> GROUP BY champion_name
-> ORDER BY cnt DESC
-> LIMIT 3;
+-----+-----+
| champion_name | cnt |
+-----+-----+
| Lee Sin      | 56598 |
| Master Yi    | 23385 |
| Graves       | 19767 |
+-----+-----+
3 rows in set (0.58 sec)
```

4.

```
mysql> SELECT m.match_id as match_id,SEC_TO_TIME(m.duration) as time
-> FROM match_info as m
-> ORDER BY m.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 (0.03 sec)

5.

```
mysql> SELECT if (temp.win=0,'lose','win') as win_lose
->           ,count(temp.win) as cnt
-> FROM(
-> SELECT p.match_id as tempmatch
->           ,SUM(s.longesttimespentliving) as summ
->           ,s.win as win
-> FROM participant as p,stat as s
-> WHERE p.player_id=s.player_id AND p.player>5
-> GROUP BY p.match_id,s.win
-> UNION
-> SELECT p.match_id as tempmatch
->           ,SUM(s.longesttimespentliving) as summ,s.win as win
-> FROM participant as p,stat as s
-> WHERE p.player_id=s.player_id AND p.player<=5
-> GROUP BY p.match_id,s.win) as temp
-> WHERE temp.summ>=6000
-> GROUP BY temp.win
-> ;
```

win_lose	cnt
lose	338
win	807

2 rows in set (19.27 sec)

6.

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

5 rows in set (10.74 sec)

```
mysql> SELECT temp4.position as position,c.champion_name as champion_name
-> FROM
-> champ as c,
-> (SELECT temp2.position as position,MAX(cnt) as cnt
-> FROM
-> (SELECT temp.position as position,temp.champion_id as champion_id,COUNT(temp.champion_id) as cnt
-> FROM
-> (SELECT p.position as position,p.champion_id as champion_id
-> FROM match_info as m,participant as p
-> WHERE m.match_id=p.match_id AND m.duration BETWEEN 2400 AND 3000 AND (p.position='DUO_CARRY' OR p.position='DUO_SUPPORT'
OR p.position='JUNGLE' OR p.position='MID' OR p.position='TOP')) as temp
-> GROUP BY temp.position,temp.champion_id) as temp2
-> GROUP BY temp2.position) as temp3,
-> (SELECT temp.position as position,temp.champion_id as champion_id,COUNT(temp.champion_id) as cnt
-> FROM
-> (SELECT p.position as position,p.champion_id as champion_id
-> FROM match_info as m,participant as p
-> WHERE m.match_id=p.match_id AND m.duration BETWEEN 2400 AND 3000 AND (p.position='DUO_CARRY' OR p.position='DUO_SUPPORT'
OR p.position='JUNGLE' OR p.position='MID' OR p.position='TOP')) as temp
-> GROUP BY temp.position,temp.champion_id) temp4
-> WHERE temp3.cnt=temp4.cnt AND c.champion_id=temp4.champion_id
-> ORDER BY temp4.position ASC;
+-----+-----+
| position | champion_name |
+-----+-----+
| DUO_CARRY | Caitlyn       |
| DUO_SUPPORT | Thresh        |
| JUNGLE     | Lee Sin       |
| MID        | Ahri          |
| TOP        | Riven         |
+-----+-----+
5 rows in set (10.74 sec)
```

```
mysql> SELECT temp4.position as position,c.champion_name as champion_name
-> FROM
-> champ as c,
-> (SELECT temp2.position as position,MAX(cnt) as cnt
-> FROM
-> (SELECT temp.position as position,temp.champion_id as champion_id,COUNT(temp.champion_id) as cnt
-> FROM
-> (SELECT p.position as position,p.champion_id as champion_id
-> FROM match_info as m,participant as p
-> WHERE m.match_id=p.match_id AND m.duration BETWEEN 2400 AND 3000 AND (p.position='DUO_CARRY' OR p.position='DUO_SUPPORT'
OR p.position='JUNGLE' OR p.position='MID' OR p.position='TOP')) as temp
-> GROUP BY temp.position,temp.champion_id) as temp2
-> GROUP BY temp2.position) as temp3,
-> (SELECT temp.position as position,temp.champion_id as champion_id,COUNT(temp.champion_id) as cnt
-> FROM
-> (SELECT p.position as position,p.champion_id as champion_id
-> FROM match_info as m,participant as p
-> WHERE m.match_id=p.match_id AND m.duration BETWEEN 2400 AND 3000 AND (p.position='DUO_CARRY' OR p.position='DUO_SUPPORT'
OR p.position='JUNGLE' OR p.position='MID' OR p.position='TOP')) as temp
-> GROUP BY temp.position,temp.champion_id) temp4
-> WHERE temp3.cnt=temp4.cnt AND c.champion_id=temp4.champion_id
-> ORDER BY temp4.position ASC;
```


7.

```
mysql> SELECT temp5.position as position,c.champion_name as champion_name,temp6.kda as kda
-> FROM champ as c,
-> (SELECT temp2.position as position,MAX(temp2.kda) as maxkda
-> FROM(
-> SELECT temp.position,temp.champion_id as champion_id,temp.ka/temp.death as kda,temp.ka as ka,temp.death as death
-> FROM(
-> SELECT p.position,p.champion_id,(SUM(s.kills)+SUM(s.assists)) as ka,SUM(s.deaths) as death
-> FROM participant as p,stat as s
-> WHERE s.player_id=p.player_id AND (p.position='DUO_CARRY' OR p.position='DUO_SUPPORT' OR p.position='JUNGLE' OR p.position='MID' OR p.position='TOP'))
-> GROUP BY p.position,p.champion_id
-> )as temp
-> WHERE temp.death!=0) as temp2
-> GROUP BY temp2.position) as temp5,
-> (SELECT temp.position,temp.champion_id as champion_id,temp.ka/temp.death as kda
-> FROM(
-> SELECT p.position,p.champion_id,(SUM(s.kills)+SUM(s.assists)) as ka,SUM(s.deaths) as death
-> FROM participant as p,stat as s
-> WHERE s.player_id=p.player_id AND (p.position='DUO_CARRY' OR p.position='DUO_SUPPORT' OR p.position='JUNGLE' OR p.position='MID' OR p.position='TOP'))
-> GROUP BY p.position,p.champion_id
-> )as temp
-> WHERE temp.death!=0) as temp6
-> WHERE temp5.maxkda LIKE temp6.kda AND c.champion_id=temp6.champion_id
-> ORDER BY temp5.position ASC;
```

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

5 rows in set (29.22 sec)

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

```
mysql> SELECT temp5.position as position,c.champion_name as champion_name,temp6.kda as kda
-> FROM champ as c,
-> (SELECT temp2.position as position,MAX(temp2.kda) as maxkda
-> FROM(
-> SELECT temp.position,temp.champion_id as champion_id,temp.ka/temp.death as kda,temp.ka as ka,temp.death as death
-> FROM(
-> SELECT p.position,p.champion_id,(SUM(s.kills)+SUM(s.assists)) as ka,SUM(s.deaths) as death
-> FROM participant as p,stat as s
-> WHERE s.player_id=p.player_id AND (p.position='DUO_CARRY' OR p.position='DUO_SUPPORT' OR p.position='JUNGLE' OR p.position='MID' OR p.position='TOP'))
-> GROUP BY p.position,p.champion_id
-> )as temp
-> WHERE temp.death!=0) as temp2
-> GROUP BY temp2.position) as temp5,
-> (SELECT temp.position,temp.champion_id as champion_id,temp.ka/temp.death as kda
-> FROM(
-> SELECT p.position,p.champion_id,(SUM(s.kills)+SUM(s.assists)) as ka,SUM(s.deaths) as death
-> FROM participant as p,stat as s
-> WHERE s.player_id=p.player_id AND (p.position='DUO_CARRY' OR p.position='DUO_SUPPORT' OR p.position='JUNGLE' OR p.position='MID' OR p.position='TOP'))
-> GROUP BY p.position,p.champion_id
-> )as temp
-> WHERE temp.death!=0) as temp6
-> WHERE temp5.maxkda LIKE temp6.kda AND c.champion_id=temp6.champion_id
-> ORDER BY temp5.position ASC;
```


8.

```
mysql> SELECT c.champion_name
-> FROM champ as c
-> WHERE c.champion_id
-> NOT IN(
-> SELECT b.champion_id
-> FROM teamban as b,match_info as m
-> WHERE m.match_id=b.match_id AND SUBSTRING_INDEX(m.version, '.',2)=7.7
-> )
-> ORDER BY c.champion_name ASC;
+-----+
| champion_name |
+-----+
| Kayn          |
| Ornn          |
| Rakan         |
| RekSai        |
| Sion          |
| Xayah         |
+-----+
6 rows in set (0.08 sec)
```

9.

```

mysql> SELECT SUBSTRING_INDEX(m.version, '.', 2) as version, SUM(s.win=1) as win_cnt, SUM(s.win=0) as lose_cnt, sum(s.win=1)/(SUM(s.win=1)+SUM(s.win=0)) as win_ratio
-> FROM stat as s,
-> match_info as m,
-> (SELECT p.match_id, temp.player_id
-> FROM participant as p,
-> (SELECT p.match_id, p.player, p.player_id
-> FROM participant as p
-> WHERE p.champion_id=64) as temp
-> WHERE p.champion_id=17 AND temp.match_id=p.match_id AND ((temp.player<=5 AND p.player<=5)OR(temp.player>5 AND p.player>5))) as temp2
-> WHERE s.player_id=temp2.player_id AND m.match_id=temp2.match_id
-> GROUP BY SUBSTRING_INDEX(m.version, '.', 2)
-> ORDER BY SUBSTRING_INDEX(m.version, '.', 2) ASC;

```

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

43 rows in set (3.49 sec)

10.

self_champion_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

5 rows in set (8.47 sec)

```
mysql> SELECT c.champion_name as self_champion_name,SUM(tmp1.win2=1)/(SUM(tmp1.win2=1)+SUM(tmp1.win2=0)) as win_ratio,(SUM(tmp1.assist
s2)+SUM(tmp1.kill2))/SUM(tmp1.deaths2) as self_kda,SUM(tmp1.goldearned2)/COUNT(*) as self_avg_gold,'Renekton' as enemy_champ_name,(SUM
(s.kills)+SUM(s.assists))/SUM(s.deaths) as enemy_kda
-> ,SUM(s.goldearned)/COUNT(*) as enemy_avg_gold,COUNT(*) as battle_record
-> FROM participant as p,stat as s,champ as c,
-> (SELECT p.player as player,p.match_id as match_id,p.player_id as player_id,p.champion_id as champion_id,s.player_id as player2_
id,s.win as win2,s.goldearned as goldearned2,s.kills as kill2,s.assists as assists2,s.deaths as deaths2
-> FROM participant as p,stat as s
-> WHERE p.champion_id!=58 AND p.position='TOP' AND s.player_id=p.player_id
-> ) as tmp1
-> WHERE p.champion_id=58 AND p.match_id=tmp1.match_id AND ((p.player>5 AND tmp1.player<=5) or (p.player<=5 AND tmp1.player>5)) AN
D s.player_id=p.player_id AND p.position='TOP' AND c.champion_id=tmp1.champion_id
-> GROUP BY p.champion_id,tmp1.champion_id
-> HAVING battle_record>100 AND SUM(s.deaths)!=0 AND SUM(tmp1.deaths2)!=0
-> ORDER BY win_ratio DESC
-> limit 5;
```

11.

算出兩者的勝率並且比較後發現帶點燃的勝率比帶傳送的勝率高

```
mysql> SOURCE 11.sql
+-----+-----+
| ss1_ss2          | win_ratio |
+-----+-----+
| Flash and Ignite  | 0.5200    |
| Flash and Teleport| 0.4998    |
+-----+-----+
2 rows in set (5.35 sec)
```

```
SELECT 'Flash and Ignite' as ss1_ss2,SUM(s.win=1)/COUNT(*) as win_ratio
FROM participant as p,stat as s
WHERE p.player_id=s.player_id AND ((p.ss1='Flash' AND p.ss2='Ignite') OR (p.ss1='Ignite' AND p.ss2='Flash')) AND p.position='TOP'
UNION
SELECT 'Flash and Teleport' as ss1_ss2,SUM(s.win=1)/COUNT(*) as win_ratio
FROM participant as p,stat as s
WHERE p.player_id=s.player_id AND ((p.ss1='Flash' AND p.ss2='Teleport') OR (p.ss1='Teleport' AND p.ss2='Flash')) AND p.position='TOP';
```

12.

說明： 利用 **Teamban** 找出前十名最常被 **BAN** 的英雄以及兩隊最常首 **Ban** 的英雄

可以清楚看到 **Yasuo** 這個英雄很明顯的最常被先被 **Ban** 掉,如果先 **Ban** 的隊伍沒有先 **ban Yasuo** (可能想選 **Yasuo** 這個英雄),另一隊最有可能也是先 **Ban** 掉 **Yasuo**(防止對方選此英雄)

```
SELECT c.champion_name as champion_name,tmp1.cnt as cnt
FROM champ as c,
(SELECT t.champion_id as champion_id,COUNT(t.champion_id) as cnt
FROM teamban as t
GROUP by t.champion_id
) as tmp1
WHERE c.champion_id=tmp1.champion_id
ORDER BY tmp1.cnt DESC
LIMIT 10;
```

```
SELECT c.champion_name as champion_name,tmp1.cnt as cnt
FROM champ as c,
(SELECT t.champion_id as champion_id,COUNT(t.champion_id) as cnt
FROM teamban as t
WHERE t.banturn=1
GROUP by t.champion_id
) as tmp1
WHERE c.champion_id=tmp1.champion_id
ORDER BY tmp1.cnt DESC
LIMIT 10;
```

```
SELECT c.champion_name as champion_name,tmp1.cnt as cnt
FROM champ as c,
(SELECT t.champion_id as champion_id,COUNT(t.champion_id) as cnt
FROM teamban as t
WHERE t.banturn=2
GROUP by t.champion_id
) as tmp1
WHERE c.champion_id=tmp1.champion_id
ORDER BY tmp1.cnt DESC
LIMIT 10;
```

```
mysql> mysql> SOURCE 12.sc
```

champion_name	cnt
Yasuo	97269
Fizz	81325
Xayah	77178
Lulu	75329
Darius	57733
Sejuani	46891
Zed	41337
Katarina	39713
Fiora	36035
Ivern	30342

```
10 rows in set (0.32 sec)
```

champion_name	cnt
Yasuo	19366
Fizz	15721
Lulu	14663
Xayah	14040
Darius	10703
Sejuani	7813
Katarina	6083
Zed	6033
Fiora	5686
Ivern	5559

```
10 rows in set (0.17 sec)
```

champion_name	cnt
Yasuo	18150
Fizz	14854
Lulu	14482
Xayah	13654
Darius	9846
Sejuani	7939
Zed	6431
Katarina	6347
Fiora	5929
Ivern	5587

```
10 rows in set (0.18 sec)
```