

《数据库概论》实验一：用SQL进行数据操作实验报告

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实验环境

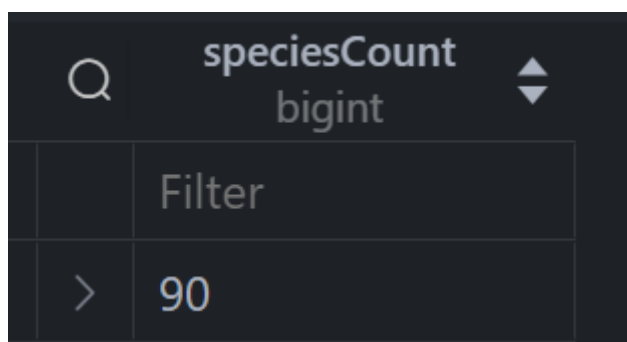
操作系统为Windows 11，软件版本为mysql-community-8.0.26.0

实验过程

1.使用模式匹配即可表达出符合要求的 description

SQL语句：

```
1 SELECT COUNT(*) AS speciesCount FROM species
2 WHERE description LIKE "%this%";
```

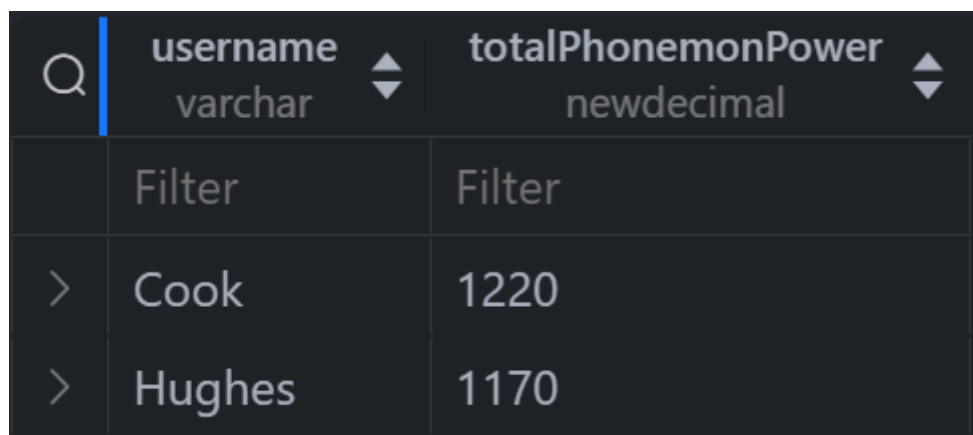


	speciesCount
	bigint
	Filter
>	90

2.将 player 和 phonemon 两个表进行自然连接，筛选出username是 Cook 或 Hughes 的元组，然后按照 username 分组即可计算出总能量

SQL语句：

```
1 SELECT p1.username AS username, SUM(ph.power) AS totalPhonemonPower
2 FROM player p1, phonemon ph
3 WHERE p1.id = ph.player AND p1.username in ('Cook', 'Hughes')
4 GROUP BY p1.username;
```



	username	totalPhonemonPower
	varchar	newdecimal
	Filter	Filter
>	Cook	1220
>	Hughes	1170

3.将team和player表自然连接，连接后按照team.id分组，运用 COUNT(*) 计算即可

SQL语句：

```
1 SELECT team.title, COUNT(*) AS numberOfPlayers
2 FROM team, player
3 WHERE team.id = player.team
4 GROUP BY team.id
5 ORDER BY numberOfPlayers DESC
```

title varchar	numberOfPlayers bigint
Filter	Filter
Mystic	8
Valor	6
Instinct	5

4.将 species 和 type 表格自然连接，然后进行筛选即可

SQL语句：

```
1 SELECT sp.id AS idSpecies, sp.title
2 FROM species sp, type t
3 WHERE (sp.type1 = t.id AND t.title = 'Grass') OR (sp.type2 = t.id AND t.title = 'Grass')
```

idSpecies tinyint	title varchar
Filter	Filter
1	Bulbasaur
2	Ivysaur
3	Venusaur
43	Oddish
44	Gloom
45	Vileplume
69	Bellsprout
70	Weepinbell
71	Victreebel
102	Exeggcute
103	Exeggutor
114	Tangela

5.即找不在买过食物的玩家列表里的玩家，使用 `NOT IN` 结构即可

SQL语句：

```

1  SELECT p1.id AS idPlayer, p1.username AS username
2  FROM player p1
3  WHERE p1.id NOT IN (
4      SELECT DISTINCT pur.player
5      FROM purchase pur
6      WHERE pur.item IN (
7          SELECT item.id
8          FROM item
9          WHERE type = 'F'
10     )
11 )

```

idPlayer int	username varchar
Filter	Filter
4	Reid
7	Hughes
8	Bruce
10	Lyons
11	Emily
12	Darthy
15	Huma

6.将player、purchase和item自然连接即可，根据level进行分组，并使用SUM函数计算金额总和

SQL语句：

```
1 SELECT level, SUM(purchase.quantity * (item.price)) AS  
   totalAmountSpentByAllPlayersAtLevel  
2 FROM purchase, item, player  
3 WHERE purchase.item = item.id AND player.id = purchase.player  
4 GROUP BY player.level  
5 ORDER BY totalAmountSpentByAllPlayersAtLevel DESC
```

level tinyint	totalAmountSpentByAll newdecimal
Filter	Filter
2	130.68
12	95.45
6	62.37
5	52.98
3	51.75
1	39.58
4	33.74
8	29.48
11	26.97
7	24.26
10	17.22
9	9.99

7.首先把purchase和item表格自然连接，然后按照item.id分组，计算每组有几个purchase条目，然后把等于最大的筛选出来

SQL语句：

```

1  SELECT item.id AS item, title AS title, COUNT(purchase.id) AS
   numTimesPurchased
2  FROM item, purchase
3  WHERE purchase.item = item.id
4  GROUP BY item.id
5  HAVING COUNT(purchase.id) = (
6      SELECT MAX(itemCount)
7      FROM (
8          SELECT COUNT(p.id) AS itemCount
9          FROM purchase p
10         GROUP BY p.item
11     ) AS PurchaseCounts
12 )

```

item tinyint	title varchar	numTimesPurchased bigint
Filter	Filter	Filter
1	Phoneball	10

8.把purchase、player、item表格自然连接起来，然后按照player.id分组，找到组内 `DISTINCT item.id` 的总数等于食物种类数的

SQL语句：

```

1 SELECT pl.id AS playerId, username, COUNT(DISTINCT it.id) AS
   numberDistinctFoodItemsPurchased
2 FROM player pl, purchase pu, item it
3 WHERE pl.id = pu.player AND it.type = 'F' AND it.id = pu.item
4 GROUP BY pl.id
5 HAVING numberDistinctFoodItemsPurchased = (
6     SELECT COUNT(item2.id)
7     FROM item item2
8     WHERE item2.type = 'F'
9 );

```

playerID int	username varchar	numberDistinctFoodIter bigint
Filter	Filter	Filter
20	Zihan	6

9.将两个phonemon表格自然连接，为确保配对不重复，使用`ph1.id < ph2.id`来进行去重。选择欧式距离等于最小距离的即可

SQL语句：

```

1 SELECT COUNT(*) AS numberOfPhonemonPairs, distanceX
2 FROM (
3     SELECT ROUND(SQRT(POW(ph1.latitude - ph2.latitude, 2) +
4     POW(ph1.longitude - ph2.longitude, 2))*100, 2) AS distanceX
5     FROM phonemon ph1, phonemon ph2
6     WHERE ph1.id > ph2.id
7 ) AS distances
8 WHERE distanceX = (
9     SELECT MIN(ROUND(SQRT(POW(ph1.latitude - ph2.latitude, 2) +
10     POW(ph1.longitude - ph2.longitude, 2))*100, 2))
11     FROM phonemon ph1, phonemon ph2
12     WHERE ph1.id > ph2.id
13 );

```

numberOfPhonemonPai bigint	distanceX double
Filter	Filter
98	0.19

10.将player、phonemon、type和species表格自然连接，按照 player.id 和 type.id 分组，从中选出 DISTINCT species.id 数量等于相应type总species数量的组即可

SQL语句：

```

1 SELECT player.username AS username, type.title AS typeTitle
2 FROM player, phonemon, type, species
3 WHERE player.id = phonemon.player AND phonemon.species = species.id AND
   (species.type1 = type.id OR species.type2 = type.id)
4 GROUP BY player.id, type.id
5 HAVING COUNT(DISTINCT species.id) = ALL(
6     SELECT COUNT(*)
7     FROM species, type
8     WHERE (species.type1 = type.id OR species.type2 = type.id) AND type.title
   = typeTitle
9 )

```

username varchar	typeTitle varchar
Filter	Filter
Lyons	Bug
Lyons	Fairy

实验中遇到的困难及解决办法

1. 在写第10题的时候，总是输出不了结果。经检查发现，在HAVING子句里面，忘记限制了COUNT的部分只能是 type.title 等于分组的 title。
2. “可获取的食物”这一说法及其完整题干确实有点表意不清，即使说明之后也有点让人捉摸不透，希望以后手册的表述可以更加语义明确一点~