**实验报告3：SQL实践**

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| **课程名称**：数据库系统实践 | **年级**：2018级 | **上机实践成绩**： |
| **指导教师**：赵慧 | **姓名**：陈俊潼 |  |
| **上机实践名称**：SQL实践 | **学号**：10185101210 | **上机实践日期**：2020.4.16 |
| **上机实践编号**：3 | **组号**：第12小组 | **上机实践时间**：10:00-11:30 |

**一、目的**

* 掌握SQL的数据定义和数据操纵的功能
* 掌握数据库中的完整性约束的基本概念和使用方法

**二、内容与设计思想**

以University为例，建立数据库及相关表，输入数据，完成查询、 定义和使用View。

同时基于University数据库及相关表，输入数据，完成查询工作，学会定义和使用View。

**三、使用环境**

macOS 10.15.3(SSH)

Ubuntu 18.0.4(服务器环境)

MySQL 8.0.14

**四、实验过程**

1. **Create Database**

这一部分和实验1的要求相同，故省略重复的过程。

1. **Populate Relations:**

这一部分同样和实验2相同，直接利用实验2中插入的数据。

1. **Retriving Data:**

* List all information stored in the table course;

 SELECT \* FROM course;

 List the dept\_name and buildings of all departments;

 SELECT dept\_name, building FROM department;

 List the instructor's name appears in the table instructor;

 SELECT name FROM instructor;

 List the instructor's name whose salary is more than 90000 and dept\_name is 'Comp Sci' ;

 SELECT name FROM instructor WHERE dept\_name = 'Comp. Sci.' AND salary > 90000;

 List the instructor's all information after we gave a 10% raise to each instructor;

 SELECT \*, salary\*1.1 as raised\_salary FROM instructor;

 Show the different dept\_name in the table instructor;

 SELECT DISTINCT dept\_name FROM instructor;

 List the course's title ,dept\_name,and credits which prerep\_id is 'CS-101';

 SELECT title, dept\_name, credits FROM course NATURAL JOIN prereq WHERE prereq\_id='CS-101';

 Find the titles of courses in the Comp Sci department the have 3 credits;

 SELECT title FROM course WHERE credits=3;

 List the course\_id which prereq\_id is 'CS-101';

 SELECT course\_id FROM course NATURAL JOIN prereq WHERE prereq\_id='CS-101';

 Find all courses that were offered at least twice in 2010(not unique);

 SELECT course\_id FROM (SELECT course\_id, COUNT(course\_id) AS c FROM section WHERE `year`=2010 GROUP BY course\_id) AS T WHERE c > 1;

 Find the instructor names and the courses they taught for all instructors in the Biology department who have taught some course;

 SELECT `name`, course\_id FROM instructor NATURAL JOIN teaches WHERE dept\_name='Biology';

 List all courses taught in Fall 2009;

 SELECT \* FROM course NATURAL JOIN section WHERE semester='Fall' AND `year`=2009;

 Find the set of all courses taught either in Fall 2010 or in Spring 2009,or both we write.

 SELECT \* FROM course NATURAL JOIN section WHERE (semester='Fall' AND `year`=2010) OR (semester='Spring' AND `year`=2009);

 Find all courses taught in the Fall 2009 but not in the Spring 2010;

 SELECT \* FROM section WHERE (semester='Fall' AND `year`=2009) AND course\_id NOT IN (SELECT course\_id FROM section WHERE (semester='Spring' AND `year`=2010));

 Find the average salary of instructors in the Comp Sci department;

 SELECT avg(salary) FROM instructor WHERE dept\_name='Comp. Sci.'

 Find the total number of instructors who teach a course in the Spring 2010 semester;

 SELECT count(\*) FROM instructor NATURAL JOIN teaches WHERE `year`=2010 AND semester='Spring';

 Find the number of tuples in the course relation;

 SELECT count(\*) FROM course;

 Find the average salary in each department;

 SELECT dept\_name, FORMAT(AVG(salary),2) AS avg\_salary FROM instructor GROUP BY dept\_name;

 Find the average salary of instructors in those departments where the average salary is more than 42000;

 SELECT dept\_name, AVG(salary) AS avg\_salary FROM instructor GROUP BY dept\_name HAVING AVG(salary) > 42000;

 Find the names of all instructors whose salary is greater than at least one instructor in the Com Sic department.

 SELECT \* FROM instructor WHERE salary> (SELECT min(salary) FROM instructor WHERE dept\_name='Comp. Sci.');

1. **Modification of DB**

* Delete all the instroctors with a salary more than 90000;

 DELETE FROM instructor WHERE salary>90000;

* Adjust the budget of the Comp Sci to 120000;

 UPDATE department SET budget=120000 WHERE dept\_name='Comp. Sci.';

* Salary are increased by 10 percent only the instructors with salary of less than 70000 (not including 70000),and others increased by 5 percent;

 UPDATE instructor SET salary=1.1\*salary WHERE salary<70000;  
 UPDATE instructor SET salary=1.05\*salary WHERE salary>=70000;

1. **View Operation**

* Create a view named instructor\_info with lists the ID,name,and building-name of each instructor.

 CREATE VIEW instructor\_info AS (SELECT ID, `name`, building FROM instructor NATURAL JOIN department);

* Find all the instructors whose building name is 'Taylor' by the view you created above.

 SELECT name FROM instructor\_info WHERE building='Taylor';

* Try to find the ‘View update policy’ in SQL Server:2

SQLServer views are not cached, so everytime the user request a view the query is executed.

**Exercise 2**

**A screenshot of a computer

Description automatically generated**

取消合并单元格，使用 Navicat 的 Import Wizard 导入数据库：

* 

首先创建两个 View 整合数据：

CREATE view giveout AS (SELECT \*, '2020-02-14' as date FROM giveout214 UNION SELECT \*,'2020-02-13' as date FROM giveout213);  
CREATE view donation AS (SELECT \*, '2020-02-14' as date FROM donation214 UNION SELECT \*,'2020-02-13' as date FROM donation213);

1.查找蔡甸区卫生健康局接受的捐赠情况

SELECT \* FROM (SELECT \* FROM giveout214 UNION SELECT \* FROM giveout213) AS T WHERE T.target='蔡甸区卫生健康局';



2.查找浏阳市华盛山庄的捐赠情况

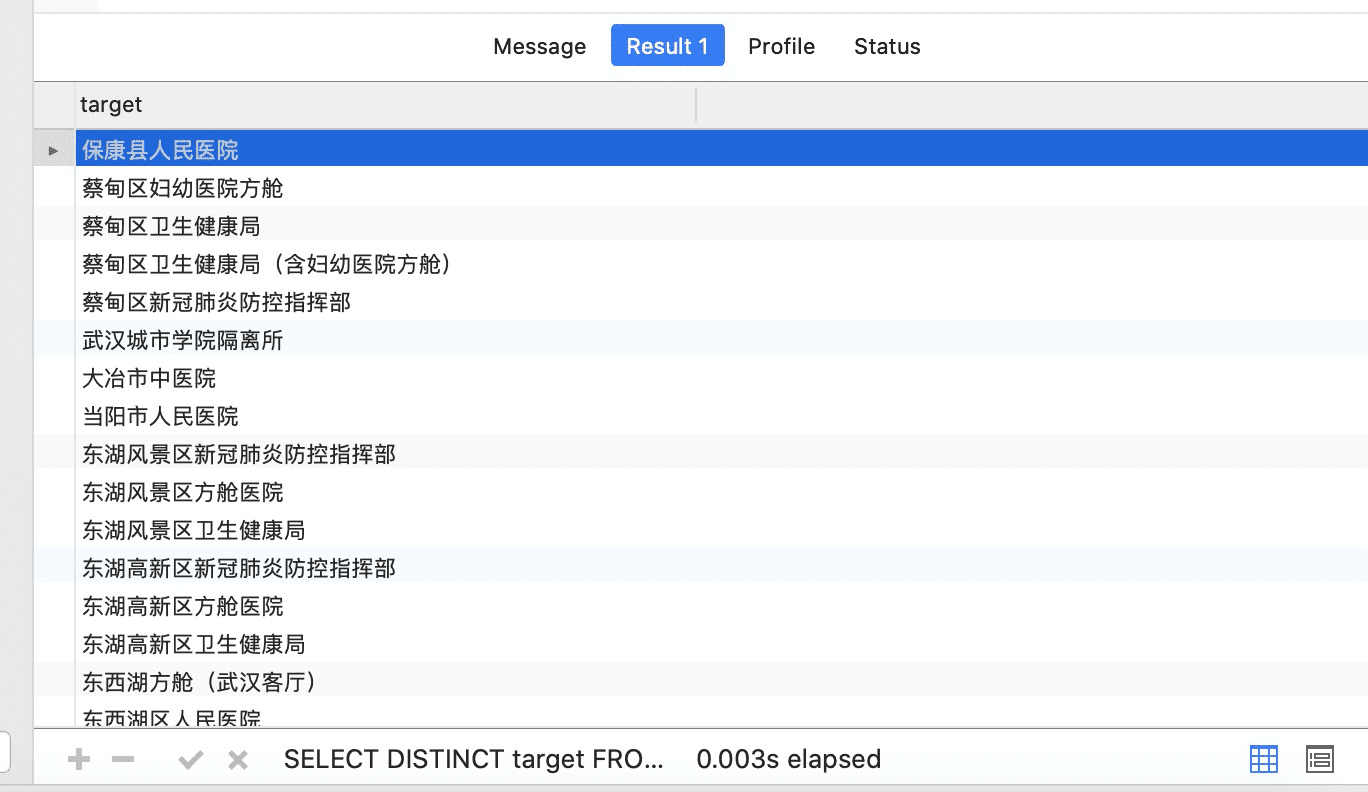
SELECT \* FROM donation WHERE provider='浏阳市华盛山庄';



3.查找2.13到2.14医用口罩捐赠给了哪些单位

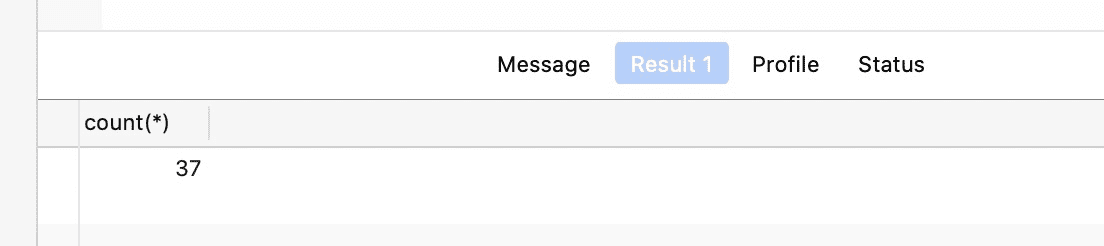
SELECT DISTINCT target FROM giveout;

（结果过长有省略）



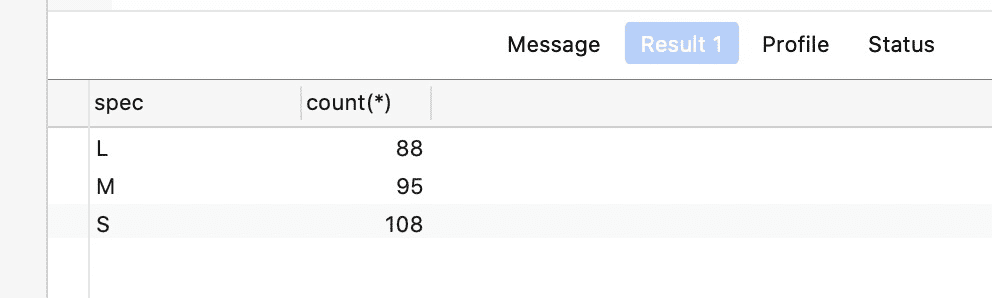
4.查询2.13到2.14社会捐赠的医用口罩的数目

SELECT count(\*) FROM donation WHERE asset LIKE "%口罩%";



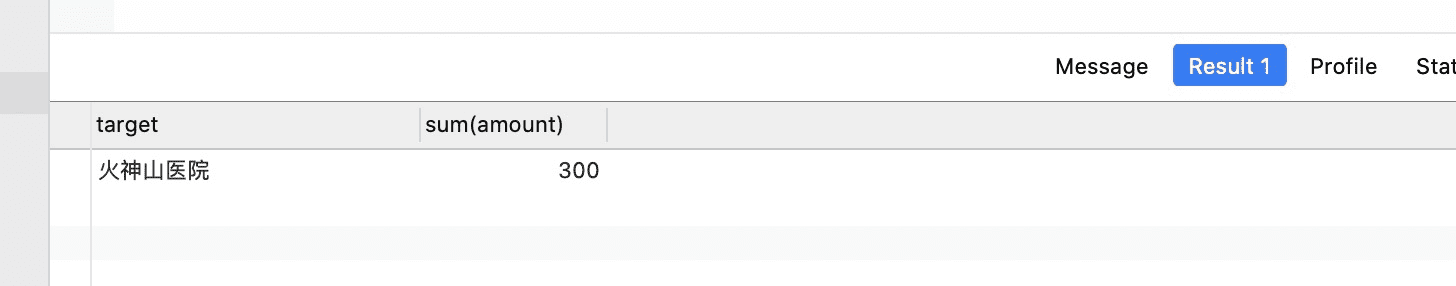
5.查询2.13到2.14发放的一次性手套大、中、小号各多少只

SELECT 'L' AS spec, count(\*) FROM giveout WHERE asset LIKE "%手套%" AND (spec LIKE '%大号%' OR spec LIKE '%L%') UNION  
SELECT 'M' AS spec, count(\*) FROM giveout WHERE asset LIKE "%手套%" AND (spec LIKE '%中号%' OR spec LIKE '%M%') UNION  
SELECT 'S' AS spec, count(\*) FROM giveout WHERE asset LIKE "%手套%" AND (spec LIKE '%小号%' OR spec LIKE '%S%');SELECT 'L' AS spec, count(\*) FROM giveout WHERE asset LIKE "%手套%" AND (spec LIKE '%大号%' OR spec LIKE '%L%') UNION  
SELECT 'M' AS spec, count(\*) FROM giveout WHERE asset LIKE "%手套%" AND (spec LIKE '%中号%' OR spec LIKE '%M%') UNION  
SELECT 'S' AS spec, count(\*) FROM giveout WHERE asset LIKE "%手套%" AND (spec LIKE '%小号%' OR spec LIKE '%S%');



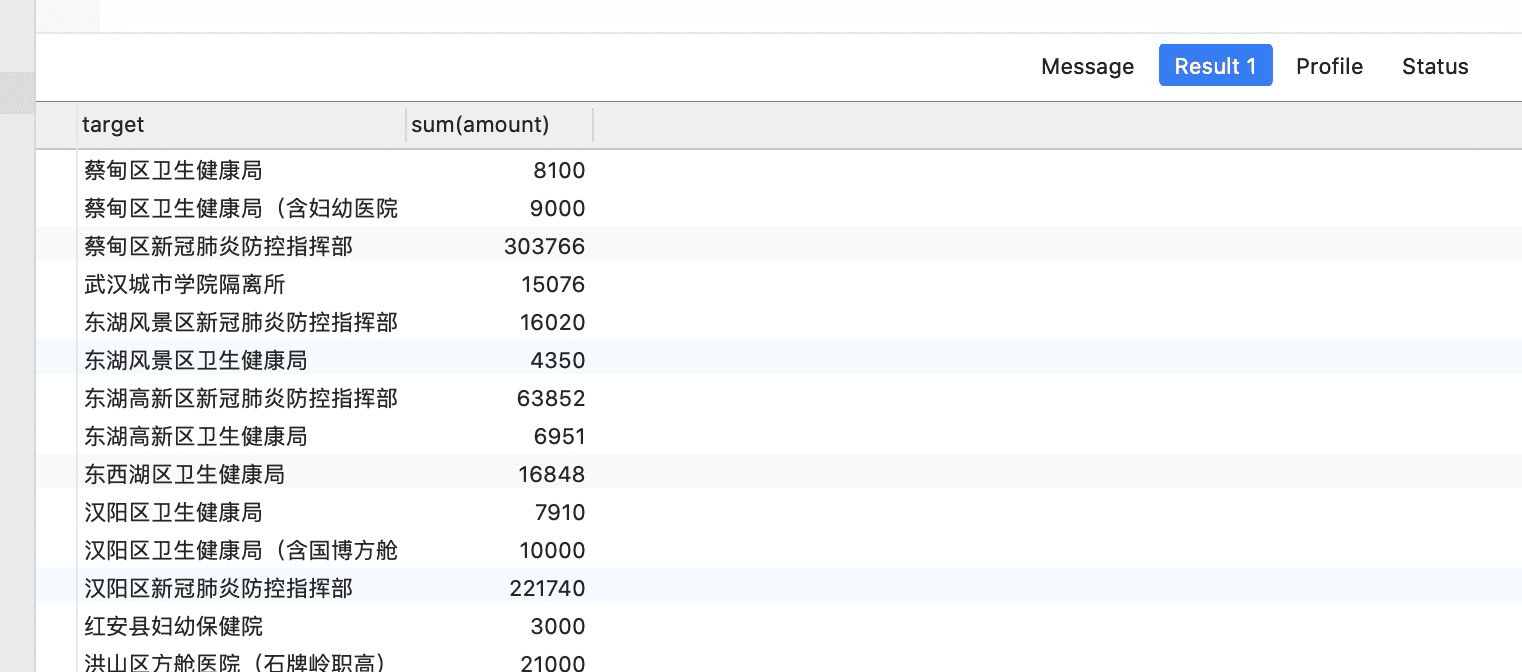
6.查询2.14接受了医用N95口罩捐赠的单位有哪几家，各获得多少只

SELECT target, sum(amount) FROM giveout214 WHERE asset LIKE '%N95%' GROUP BY target;



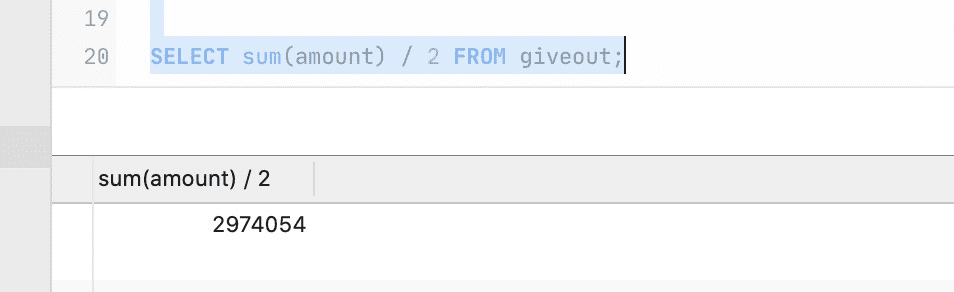
7.查找获得物资数量超过2000计量单位的单位有哪几家

SELECT target, sum(amount) FROM giveout GROUP BY target HAVING sum(amount) > 2000;



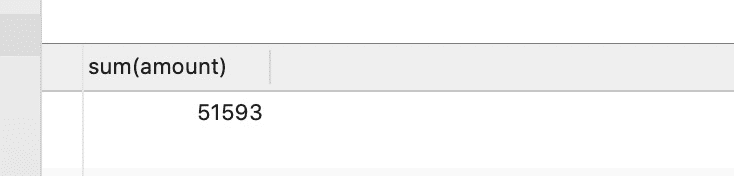
8.统计2.13到2.14两天平均每天发放了多少数量口罩

SELECT sum(amount) / 2 FROM giveout;



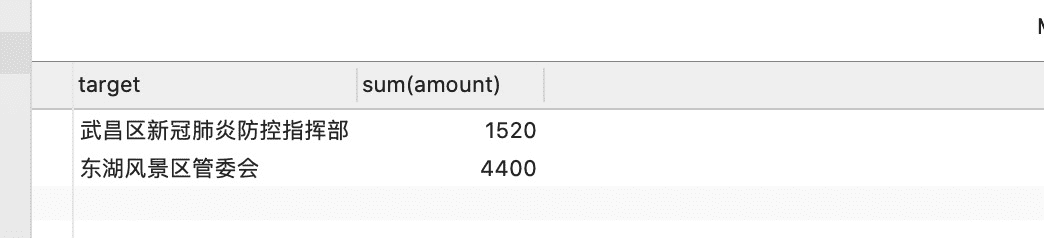
9.统计2.13到2.14一共发放的防护服的数量

SELECT sum(amount) FROM giveout WHERE asset LIKE '%防护服%';



10.查询获得物资感冒清热颗粒的单位有哪几家，数量分别是多少

SELECT target, sum(amount) FROM giveout WHERE asset LIKE '%感冒清热颗粒%' GROUP BY target;



**五、总结**

经过本次实验，我对DBMS数据结构定义和数据实体建立的过程都有了更深刻的理解。此外，通过操作Table Plus、Navicat等数据库可视化管理软件，我能更熟练地操作数据库，方便地实现需要的功能。

在实践数据库操作中，我对关系型数据库的常用操作又了更深的理解，能够更自如地应对不同的查找需求。

**六、附录**

*无*