**深 圳 大 学 实 验 报 告**

**课程名称：­ 数据库系统**

**实验项目名称： SQL的多表连接查询以及视图**

**学院： 计算机与软件学院**

**专业： 计算机科学与技术**

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**实验时间： 2021.10.09至2021.11.07**

**实验报告提交时间： 2021.11.04**

**教务处制**

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| 实验目的：   1. 掌握postgresql的服务管理、命令行服务管理，熟悉集群服务配置管理方式； 2. 熟悉并掌握数据库查询与数据库视图的基础原理； 3. 掌握利用SQL语句进行多表连接查询、建立并操纵视图的方法。   实验要求：  1、练习postgresql服务管理配置；  2、练习典型的多表连接查询SQL语句、聚合函数；  3、练习视图的创建查询、插入、更新、删除等操作 |
| 实验环境：  软件：liunx系统，centos  **（根据自己实验环境填写）** |
| 实验内容   1. 在服务器端练习postgresql的系统配置、用户环境配置、集群服务配置：   1. 实现服务的自启动，将“源码包/contrib/start-scripts”目录下的脚本重命名为linux1后放到/etc/init.d目录下，并使用sudo chkconfig --add linux1指令添加服务自启动（图1-1-1）。对操作系统进行配置如图1-1-2所示，对Linux资源限制调整如图1-1-3所示，对系统防火墙配置如图1-1-4所示。    图1-1-1    图1-1-2    图1-1-3    图1-1-4  2. 配置环境变量（图1-1-5），测试pg\_ctl（图1-1-6），成功。    图1-1-5  图1-1-6  3.pg\_hba.conf配置（图1-1-7），postgresresql.conf配置与重新启动pg\_ctl（图1-1-8），进入postgres后输入show all （图1-1-9）以及select语句（图1-1-10）查看当前所有配置。    图1-1-7                    图1-1-8    图1-1-9    图1-1-10   1. 在实验一的基础上完成EX2-EX7的SQL练习题   **Ex2**  1.Find the name and salary of employees in Luton.  语句：  select emp2017303010.ENAME,emp2017303010.SAL from emp2017303010 inner join dep2017303010 on emp2017303010.DEPTNO = dep2017303010.DEPTNO where dep2017303010.loc='LUTON';  结果（图2-2-1）：    图2-2-1  4.List all departments that do not have any employees.  \* use join and no subquery  语句：  select dep2017303010.deptno,dep2017303010.dname,dep2017303010.loc from emp2017303010 right join dep2017303010 on emp2017303010.DEPTNO =dep2017303010.DEPTNO where empno is null;  结果（图2-2-4）：    图2-2-4  5.For each employee whose salary exceeds his manager's salary, list the employee's name and salary and the manager's name and salary.  语句:  select e.ename,e.sal,m.ename,m.sal from emp2017303010 e,emp2017303010 m where e.mgr=m.empno and e.sal>m.sal;  结果（图2-2-5）：    6.List the employees who have BLAKE as their manager.  语句：  select \* from emp2017303010 e where e.mgr=(select empno from emp2017303010 where ename= 'BLAKE');  结果（图2-2-6）：    图2-2-6  **Ex3**  2.Compute the average annual income (income is salary plus commission) for all salesmen  语句：  select AVG(e.sal+e.comm) from emp2017303010 e where job='SALESMAN';  结果（图2-3-2）：    图2-3-2  3.Find the number of characters in the longest department name  语句：  select max(length(dname)) from dep2017303010;  结果（图2-3-3）：    图2-3-3  5.Count the number of people in department 30 who receive a salary and the number of people who receive a commission (single statement).  语句：  Select \* from (select count(\*) as both\_comm\_man from (select e.empno from emp2017303010 e where e.deptno = 30 and e.comm is not null)temp1) tempa, (select count(\*) as salary\_man from (select e.empno from emp2017303010 e where e.sal is not null and e.deptno = 30)temp2)tempb;  结果（图2-3-5）：    图2-3-5  8.Compute the daily and hourly salary for employees in department 30, round to the nearest penny. Assume there are 22 working days in a month and 8 working hours in a day.(Use function round())  语句：  select \*,round((sal)/22) as Daily\_salary,round(((sal)/(22\*8))) as Hour\_salary from emp2017303010 e where deptno=30;  结果（图2-3-8）    图2-3-8  **Ex4**  1.Select the name, job, and date of hire of the employees in department (Format the HIREDATE column to MM/DD/YY)  语句：  select ename,job,to\_char(hiredate,'MM/DD/YY') from emp2017303010;  结果（图2-4-1）：    图2-4-1  2.Then format the HIREDATE column into DoW (day of the week), Day (day of the month), MONTH (name of the month) and YYYY(year)  语句：  Select ename,job,to\_char(hiredate,'DoW,Day,MONTH,YYYY') from emp2017303010;  结果（图2-4-2）：    图2-4-2  3.Which employees were hired in April?  语句：  select \*,to\_char(hiredate,'MONTH') as hire\_month from emp2017303010 where to\_char(hiredate,'MONTH') like 'APRIL%';  结果（图2-4-3）：    图2-4-3  5.Are there any employees who have worked more than 30 years for the company?  语句：  select \* from emp2017303010 where date\_part('year',now())-date\_part('year',hiredate)>30;  结果（图2-4-5）：    图2-4-5  6.Show the weekday of the first day of the month in which each employee was hired. (plus their names)  语句：  select ename,hiredate,extract(DOW FROM cast ( to\_date ( to\_char ( date\_trunc ( 'month' , hiredate ) , 'YYYY/MM/DD' ) , 'YYYY/MM/DD' ) as TIMESTAMP)) as First\_weekday from emp2017303010;  结果（图2-4-6）：    图2-4-6  7.Show details of employee hiredates and the date of their first payday.  (Paydays occur on the last Friday of each month) (plus their names)  \*此题为附加题  语句：  1、find\_firstsalday函数  Create or replace function find\_firstsalday(d1 date) returns  Date as $$  DECLARE  D2 date;  D3 timestamp;  Begin  D3= date\_trunc('month',d1 + interval '1 MONTH - 1 DAY');  D2 = to\_date(to\_char(D3,'YYYY/MM/DD'),'YYYY/MM/DD');  while extract(DOW FROM cast(D2 as TIMESTAMP)) <> 5 loop  D2 = D2 - 1 'day';  end loop;  return D2 ;  end ;  $$ LANGUAGE plpgsql;  2、select语句  select e.empno,e.ename,e.job,e.mgr,e.hiredate,e.sal,e.comm,e.deptno,d.dname,d.loc,find\_firstsalday(hiredate) as First\_salday from emp2017303010 e inner join dep2017303010 d on e.deptno = d.deptno;  结果（图2-4-8、图2-4-9）：    图2-4-8    图2-4-9  **Ex5**  2. Divide all employees into groups by department and by job within department. Count the employees in each group and compute each group's average annual salary.  语句：  select d.dname,e.job,count(ename),round(AVG(sal),2) from emp2017303010 e inner join dep2017303010 d on e.deptno = d.deptno group by d.dname,e.job;  结果（图2-5-2）：    图2-5-2  5.Find all departments with an average commission greater than 25% of average salary.  语句：  select d.deptno,d.dname,round(AVG(e.comm),2) as comm\_avg,round(AVG(e.sal),2) as sal\_avg from emp2017303010 e inner join dep2017303010 d on e.deptno = d.deptno group by d.deptno,d.dname having AVG(e.comm)>AVG(e.sal)\*0.25;  结果（图2-5-5）：    图2-5-5  6.Find each department's average annual salary for all its employees except the managers and the president.  语句：  select e.deptno,round(AVG(e.sal),2),count(\*) as sal\_avg from emp2017303010 e where job <> 'MANAGER' and job <> 'PRESIDENT' group by e.deptno;  结果（图2-5-6）：    图2-5-6  **Ex6**  1.List the name and job of employees who have the same job as Jones.  语句：  select ename,job from emp2017303010 where job = (select job from emp2017303010 where ename = 'JONES') and ename <> 'JONES';  结果（图2-6-1）：    图2-6-1  3.List the name, job, and department of employees who have the same job as Jones or a salary greater than or equal to Ford.  语句：  select e.ename,d.dname,e.job,e.sal from emp2017303010 e inner join dep2017303010 d on e.deptno = d.deptno where e.job = (select job from emp2017303010 where ename = 'JONES') or e.sal >= (select sal from emp2017303010 where ename = 'FORD') and e.ename <> 'FORD' and e.ename <> 'JONES';  结果（图2-6-3）：    图2-6-3  4.Find all employees in department 10 that have a job that is the same as anyone in the Sales department  语句：  select \* from emp2017303010 where deptno=10 and job = (select job from dep2017303010 where dname = 'SALES');;  结果（图2-6-4）：    图2-6-4  7.Find all the employees that earn more than JONES, using temporary labels to abbreviate table names.  语句：  select \* from emp2017303010 e where e.sal>(select e.sal from emp2017303010 e where e.ename = 'JONES');  结果（图2-6-7）：    图2-6-7  **Ex7**  1.Create a new table called loans with columns named LNO NUMERIC (3), EMPNO NUMERIC (4), TYPE CHAR(1), AMNT NUMERIC (8,2)  \*Don’t forget to create constraints  语句：  create table loans (LNO NUMERIC(3),EMPNO NUMERIC(4),TYPE CHAR(1),AMNT NUMERIC(8,2));  alter table loans add primary key (lno);  结果（图2-7-1）：    图2-7-1  2.Insert the following data  LNO EMPNO TYPE AMNT  23 7499 M 20000.00  42 7499 C 2000.00  65 7844 M 3564.00  语句：  INSERT INTO loans (lno,empno,type,amnt) VALUES (23, 7499, 'M', 20000.00),(42, 7499, 'C', 2000.00),(65, 7844, 'M', 3564.00);  结果（图2-7-2）：    图2-7-3  4.The Loans table must be altered to include another column OUTST NUMERIC(8,2)  语句：  alter table loans add outst NUMERIC (8,2);  结果（图2-7-4）：    图2-7-4  5.Add 10% interest to all M type loans  语句：  update loans set amnt = amnt\*1.1 where type = 'M';  结果（图2-7-5）：    图2-7-5  6.Remove all loans less than £3000.00  语句：  delete from loans where amnt < 3000;  结果（图2-7-6）：    图2-7-6  7.Change the name of loans table to accounts  语句：  alter table loans rename to accounts;  结果（图2-7-7）：    图2-7-7  8.Change the name of column LNO to LOANNO  语句：  alter table accounts rename LNO to LOANNO;  结果（图2-7-8）：    图2-7-8  9.Create a view for use by personnel in department 30 showing employee name, number, job and hiredate  语句：  create view view2017303010 as select ename,empno,job,hiredate from emp2017303010 where deptno=30;  结果（图2-7-9）：    图2-7-9  10.Use the view to show employees in department 30 having jobs which are not salesman  语句：  select \* from view2017303010 where job <> 'SALESMAN';  结果（图2-7-10）：    图2-7-10 |
| 实验结论或体会：  实验结论：  实验收获：  1、在bash界面启动pg\_ctl时，仍然报错（图5-1），根据网上查阅的[资料](https://www.cnblogs.com/hello-wei/p/10150883.html)未解决问题，猜测可能是自己的路径没写对（图5-2、图5-3、图5-4），修改后如图5-5所示，但是仍然报错，后来向老师提问才明白，我是用的yum安装postgres而不是用的源码安装，因此并不存在pg\_ctl，因为yum安装已经自带了，所以启动不了，用户权限不够。    图5-1  图5-2    图5-3    图5-4    图5-5  **（给出实验结论，介绍实验过程中遇到的困难，总结实验收获！）** | |

深圳大学学生实验报告用纸

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| 指导教师批阅意见：  成绩评定：  指导教师签字：  年 月 日 |
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注：1、报告内的项目或内容设置，可根据实际情况加以调整和补充。

2、教师批改学生实验报告时间应在学生提交实验报告时间后10日内。