



Course Number and Name: CSE 4308 Database Management Systems Lab	
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Lab 5: Views and Roles

Overview:

This lab required us to use our knowledge of writing queries to create views with specific information and creating roles that can be limited to the data they access. Both roles and views hide data and restrict access to it. All the basics of view and roles were given in the lab manual and any additional help required was taken from internet resources.

On the next pages, I have mentioned the following :

- the problem statement,
- the problem analysis,
- problems faced (if any) during solution of the tasks, and
- the queries and their results on the SQL command line.

Task 1

Problem Statement:

Create a view named Advisor_Selection that shows the ID, name and department name of instructors.

Analysis of the problem:

Advisor_Selection is created by selecting the required attributes stated in the problem statement from the instructor table.

Any problems faced and how it was solved:

There were no problems faced since the query was straightforward and simple.

Results:

```
SQL> create or replace view Advisor_Selection as
  2     select ID, name, dept_name
  3     from instructor;

View created.
```

Task 2

Problem Statement:

Create another view named Student_Count using Advisor_Selection and advisor to show the name of the instructor and the number students assigned under them.

Analysis of the problem:

View creation is same as in Task 1. Student count is calculated from advisor table by first grouping i_id (id of the instructor) and then using 'count' function on the s_id (student id) attribute. Name of instructor is then selected from Advisor_Selection table.

Any problems faced and how it was solved:

Since Advisor_Selection contained information about all instructors, instructors who were not advisors also showed up in results where s_id was shown to be blank. This was solved using an additional condition that checked that the ID in Advisor_Selection was present in advisor i.e. only those instructors that were advisors were selected. Another way of solving this could have been using a check statement.

Results:

```
SQL> create or replace view Student_Count as
  2   select name, (select count(s_id)
  3                   from advisor
  4                   group by i_id
  5                   having i_id = Advisor_Selection.ID) as st_count
  6   from Advisor_Selection
  7   where Advisor_Selection.ID in (select i_id
  8                                   from advisor);

View created.
```

Task 3(a)

Problem Statement:

(Create role) Students should be able to view information regarding advisors and courses.

Analysis of the problem:

Students should be able to see the information from the view Advisor_Selection and the table course which would require select permission.

Any problems faced and how it was solved:

There were no problems faced since the query was straightforward and simple.

Results:

```
SQL> drop role student;
Role dropped.

SQL> create role student;
Role created.

SQL> grant select on S200042133.Advisor_Selection to student;
Grant succeeded.

SQL> grant select on S200042133.course to student;
Grant succeeded.
```

Task 3(b)

Problem Statement:

(Create role) Course teachers should be able to view information about the students and courses.

Analysis of the problem:

Course Teachers should be able to see the information from the tables student and course which would require select permission on these tables.

Any problems faced and how it was solved:

There were no problems faced since the query was straightforward and simple.

Results:

```
SQL> drop role Course_Teacher;
Role dropped.
SQL> create role Course_Teacher;
Role created.
SQL> grant select on S200042133.student to Course_Teacher;
Grant succeeded.
SQL> grant select on S200042133.course to Course_Teacher;
Grant succeeded.
```

Task 3(c)

Problem Statement:

(Create role) Head of the Departments should have all the privileges that a course teacher has. Additionally, s/he should be able to add new instructors.

Analysis of the problem:

The role Head of Department should be granted the role of course teacher that already exists and an additional permission of select and insert on instructor table.

Any problems faced and how it was solved:

There were no problems faced since the query was straightforward and simple.

Results:

```
SQL> drop role HeadOfDepartment;
Role dropped.
SQL> create role HeadOfDepartment;
Role created.
SQL> grant Course_Teacher to HeadOfDepartment;
Grant succeeded.
SQL> grant insert, select on S200042133.instructor to HeadOfDepartment;
Grant succeeded.
```

Task 3(d)

Problem Statement:

(Create role) Administrator should be able to see information about department and instructors. They should also be able to update the department budget.

Analysis of the problem:

Administrator would require select on the tables department and instructors and update on the specific attribute budget in the department table.

Any problems faced and how it was solved:

There were no problems faced since the query was straightforward and simple.

Results:

```
SQL> drop role Administrator;
Role dropped.
SQL> create role Administrator;
Role created.
SQL> grant select on S200042133.department to Administrator;
Grant succeeded.
SQL> grant select on S200042133.instructor to Administrator;
Grant succeeded.
SQL> grant update(budget) on S200042133.department to Administrator;
Grant succeeded.
```


Task 4

Problem Statement:

Create users under these roles and write relevant SQL queries to demonstrate that the imposed access control works.

Analysis of the problem:

Different users are created and the roles previously created are granted to the users. Different tests are done to check if the restrictions work as expected.

Any problems faced and how it was solved:

After creating a user and granting the particular role, the user still could not login. This was solved by granting 'resource' and 'create session' privileges to those users.

After testing a particular user, attempting to create another user and grant him roles failed since the database current user was the previously tested user. Each time logging in as S200042133 solved the problem but since it was a tedious solution, all the user creation and granting of roles was done beforehand and testing was done altogether at the end.

Results:

(create user for student)

```
SQL> drop user student1;
User dropped.

SQL> create user student1 identified by 1234;
User created.

SQL> grant student to student1;
Grant succeeded.

SQL> grant create session, resource to student1;
Grant succeeded.
```

(creating user for course teacher)

```
SQL> drop user Course_Teacher1;
User dropped.

SQL> create user Course_Teacher1 identified by 1234;
User created.

SQL> grant Course_Teacher to Course_Teacher1;
Grant succeeded.

SQL> grant create session, resource to Course_Teacher1;
Grant succeeded.
```

(creating user for Head of Department)

```
SQL> drop user HeadOfDepartment1;
User dropped.

SQL> create user HeadOfDepartment1 identified by 1234;
User created.

SQL> grant HeadOfDepartment to HeadOfDepartment1;
Grant succeeded.

SQL> grant create session, resource to HeadOfDepartment1;
Grant succeeded.
```

(creating user for Administrator)

```
SQL> drop user Administrator1;
User dropped.

SQL> create user Administrator1 identified by 1234;
User created.

SQL> grant Administrator to Administrator1;
Grant succeeded.

SQL> grant create session, resource to Administrator1;
Grant succeeded.
```

(Test for Student)

```
SQL> conn student1/1234;
Connected.
SQL>
SQL> select * from S200042133.course;
```

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
BIO-101	Intro. to Biology 4	Biology
BIO-301	Genetics 4	Biology
BIO-399	Computational Biology 3	Biology

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
CS-101	Intro. to Computer Science 4	Comp. Sci.
CS-190	Game Design 4	Comp. Sci.
CS-315	Robotics 3	Comp. Sci.

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
CS-319	Image Processing 3	Comp. Sci.
CS-347	Database System Concepts 3	Comp. Sci.
EE-181	Intro. to Digital Systems 3	Elec. Eng.

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
FIN-201	Investment Banking 3	Finance
HIS-351	World History 3	History
MU-199	Music Video Production 3	Music

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
PHY-101	Physical Principles 4	Physics

13 rows selected.

```
SQL> select * from S200042133.Advisor_Selection;
```

ID	NAME	DEPT_NAME
10101	Srinivasan	Comp. Sci.
12121	Wu	Finance
15151	Mozart	Music
22222	Einstein	Physics
32343	El Said	History
33456	Gold	Physics
45565	Katz	Comp. Sci.
58583	Califieri	History
76543	Singh	Finance
76766	Crick	Biology
83821	Brandt	Comp. Sci.

ID	NAME	DEPT_NAME
98345	Kim	Elec. Eng.

```
12 rows selected.
```

```
SQL>
```

```
SQL> alter table S200042133.course rename to courses;
```

```
alter table S200042133.course rename to courses
```

```
*
```

```
ERROR at line 1:
```

```
ORA-01031: insufficient privileges
```

```
SQL> select * from S200042133.instructor;
```

```
select * from S200042133.instructor
```

```
*
```

```
ERROR at line 1:
```

```
ORA-00942: table or view does not exist
```

(Test for Course Teacher)

```
SQL> conn Course_Teacher1/1234;
Connected.
SQL>
SQL> select * from S200042133.course;
```

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
BIO-101	Intro. to Biology 4	Biology
BIO-301	Genetics 4	Biology
BIO-399	Computational Biology 3	Biology

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
CS-101	Intro. to Computer Science 4	Comp. Sci.
CS-190	Game Design 4	Comp. Sci.
CS-315	Robotics 3	Comp. Sci.

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
CS-319	Image Processing 3	Comp. Sci.
CS-347	Database System Concepts 3	Comp. Sci.
EE-181	Intro. to Digital Systems 3	Elec. Eng.

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
FIN-201	Investment Banking 3	Finance
HIS-351	World History 3	History
MU-199	Music Video Production 3	Music

COURSE_I	TITLE	DEPT_NAME
	CREDITS	
PHY-101	Physical Principles 4	Physics

13 rows selected.

```
SQL> select * from S200042133.student;
```

ID	NAME	DEPT_NAME	TOT_CRED
00128	Zhang	Comp. Sci.	102
12345	Shankar	Comp. Sci.	32
19991	Brandt	History	80
23121	Chavez	Finance	110
44553	Peltier	Physics	56
45678	Levy	Physics	46
54321	Williams	Comp. Sci.	54
55739	Sanchez	Music	38
70557	Snow	Physics	0
76543	Brown	Comp. Sci.	58
76653	Aoi	Elec. Eng.	60

ID	NAME	DEPT_NAME	TOT_CRED
98765	Bourikas	Elec. Eng.	98
98988	Tanaka	Biology	120

13 rows selected.

```
SQL>
SQL> alter table S200042133.course rename to courses;
alter table S200042133.course rename to courses
*
ERROR at line 1:
ORA-01031: insufficient privileges
```

(Test for Head of Department)

```
SQL> conn HeadOfDepartment1/1234;
Connected.
SQL>
SQL> select * from S200042133.student;
```

ID	NAME	DEPT_NAME	TOT_CRED
00128	Zhang	Comp. Sci.	102
12345	Shankar	Comp. Sci.	32
19991	Brandt	History	80
23121	Chavez	Finance	110
44553	Peltier	Physics	56
45678	Levy	Physics	46
54321	Williams	Comp. Sci.	54
55739	Sanchez	Music	38
70557	Snow	Physics	0
76543	Brown	Comp. Sci.	58
76653	Aoi	Elec. Eng.	60

ID	NAME	DEPT_NAME	TOT_CRED
98765	Bourikas	Elec. Eng.	98
98988	Tanaka	Biology	120

13 rows selected.

```

SQL> select * from S200042133.course;

COURSE_I TITLE                                DEPT_NAME
-----
CREDITS
-----
BIO-101  Intro. to Biology                      Biology
         4
BIO-301  Genetics                              Biology
         4
BIO-399  Computational Biology                  Biology
         3

COURSE_I TITLE                                DEPT_NAME
-----
CREDITS
-----
CS-101   Intro. to Computer Science              Comp. Sci.
         4
CS-190   Game Design                            Comp. Sci.
         4
CS-315   Robotics                             Comp. Sci.
         3

COURSE_I TITLE                                DEPT_NAME
-----
CREDITS
-----
CS-319   Image Processing                      Comp. Sci.
         3
CS-347   Database System Concepts              Comp. Sci.
         3

EE-181   Intro. to Digital Systems              Elec. Eng.
         3

COURSE_I TITLE                                DEPT_NAME
-----
CREDITS
-----
FIN-201  Investment Banking                     Finance
         3
HIS-351  World History                         History
         3
MU-199   Music Video Production                Music
         3

COURSE_I TITLE                                DEPT_NAME
-----
CREDITS
-----
PHY-101  Physical Principles                    Physics
         4

13 rows selected.

SQL> insert into S200042133.instructor values('33445', 'Sangwoo', 'Physics', 50000);

1 row created.

SQL>
SQL> insert into S200042133.student values('98875', 'Park', 'Biology', 56);
insert into S200042133.student values('98875', 'Park', 'Biology', 56)
*
ERROR at line 1:
ORA-01031: insufficient privileges

```


(Test for Administrator)

```
SQL> conn Administrator1/1234;
Connected.
SQL>
SQL> select * from S200042133.department;

DEPT_NAME          BUILDING          BUDGET
-----
Biology            Watson            90000
Comp. Sci.         Taylor            100000
Elec. Eng.         Taylor            85000
Finance            Painter           120000
History            Painter           50000
Music              Packard           80000
Physics            Watson            70000

7 rows selected.

SQL> select * from S200042133.instructor;

ID      NAME          DEPT_NAME          SALARY
-----
10101 Srinivasan      Comp. Sci.          65000
12121 Wu           Finance            90000
15151 Mozart       Music              40000
22222 Einstein     Physics            95000
32343 El Said      History            60000
33456 Gold         Physics            87000
45565 Katz          Comp. Sci.          75000
58583 Califieri    History            62000
76543 Singh        Finance            80000
76766 Crick        Biology            72000
83821 Brandt       Comp. Sci.          92000

ID      NAME          DEPT_NAME          SALARY
-----
98345 Kim          Elec. Eng.          80000
33445 Sangwoo      Physics             50000

13 rows selected.

SQL> update S200042133.department set budget = 400
      2      where dept_name = 'Biology';

1 row updated.

SQL> update S200042133.department set budget = 90000
      2      where dept_name = 'Biology';

1 row updated.

SQL>
SQL> insert into S200042133.department values('Psychology', 'Watson', 12400);
insert into S200042133.department values('Psychology', 'Watson', 12400)
      *
ERROR at line 1:
ORA-01031: insufficient privileges
```