Islamic University of Technology (IUT)

CSE 4308: Database Management Systems Lab

Lab Report # 5

Submitted to:

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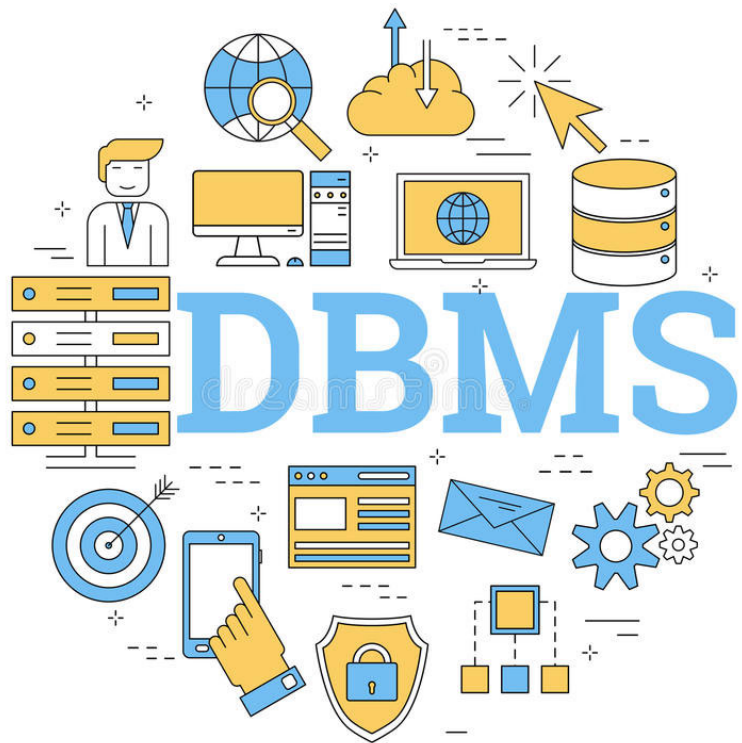Lecturer, CSE.

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Introduction

In our fifth database management systems lab, the goal of this lab was to learn about views, roles and users and how they can be used to implements various security features in Oracle.

Method

The first two tasks of the lab were to take the tables and input values from two files and create two views. One was a simple view. The other was a more complex view. The advantage of a simple view is that you can modify information in the original table from which it was derived by modifying the view. The code for creating the simple view, Task 1 :

```
create or replace view Advisor_Selection as
select i_ID,name,dept_name
from instructor;
```

The code for creating the complex view, Task 2:

```
create or replace view Student_Count as
select name,count(s_ID) as student_count
from Advisor_Selection natural join advisor
group by name;
```

This is a complex view because we used an aggregate function count, and joined two tables. Since this is a complex view, we can't modify any table from the Student_Count view.

Task 3 asked us to create several different roles which granted different privileges for those roles. As instructed, I created 4 different roles: students, course_teacher, dept_head and administrator.

For students, I granted the role select on advisor and course table.

```
create role students;
grant select on dbms_200042118.advisor to students;
grant select on dbms_200042118.course to students;
```

For course_teacher, I granted the role select on student and course.

```
create role course_teacher;
grant select on dbms_200042118.student to course_teacher;
grant select on dbms_200042118.course to course_teacher;
```

For dept_head, I granted all the privileges of a course_teacher and then I granted it select and insert on instructors.

```
create role dept_head;
grant course_teacher to dept_head;
grant select on dbms_200042118.instructor to dept_head;
grant insert on dbms_200042118.instructor to dept_head;
```

For administrator, I granted the role select on department and instructor table. Then I granted the role update on ONLY the budget column of the department table and no other attributes.

```
create role administrator;
grant select on dbms_200042118.department to administrator;
grant select on dbms_200042118.instructor to administrator;
grant update (budget) on dbms_200042118.department to administrator;
```

For Task 4, I at first created all the users required for the four separate users and granted them create session privileges.

```
create user nazz identified by naz4532;
grant students to nazz;
grant create session to nazz;

create user bakht identified by bakht4532;
grant course_teacher to bakht;
grant create session to bakht;

create user armk identified by armk4532;
grant dept_head to armk;
grant create session to armk;

create user sian identified by sian4532;
grant administrator to sian;
grant create session to sian;
```

Then I connected to the first user and checked which permission it had or if it didn't have. From the testing, I could see that the user nazz could only select from course and advisor tables. It couldn't update or insert values into any other tables.

```
conn nazz/naz4532
select * from dbms_200042118.course;
select * from dbms_200042118.advisor;
select * from dbms_200042118.instructor; -->doesn't show<--
select * from dbms_200042118.department; -->doesn't show<--
select * from dbms_200042118.student; --> doesn't show<--
insert into dbms_200042118.instructor values ('45311', 'Sian', 'Comp. Sci.',
'42000');-->trying to insert also doesn't work<--
Update dbms_200042118.department
Set budget = 69000000
where dept_name = 'Biology';
select * from dbms_200042118.department; -->trying to update doesn't work<--
```

Then I connected to the second user and checked which permission it had or if it didn't have. From testing, I could see that, the user bakht could only access the course and student tables. It couldn't update or insert values in any other tables.

```
conn bakht/bakht4532
select * from dbms_200042118.course;
select * from dbms_200042118.student;
select * from dbms_200042118.instructor; -->doesn't show<--
select * from dbms_200042118.department; -->doesn't show<--
select * from dbms_200042119.advisor; -->doesn't show<--
insert into dbms_200042118.instructor values ('45311', 'Sian', 'Comp. Sci.',
'42000');-->trying to insert also doesn't work<--
Update dbms_200042118.department
Set budget = 69000000
where dept_name = 'Biology';
select * from dbms_200042118.department; -->trying to update doesn't work<--
```

Then I connected to the third user and checked which permission it had or if it didn't have. From testing, I could see that the armk user could access the course and student tables. It could additionally access the instructor table. It could insert new values into the instructor table. But it can't insert in any other tables and it can't update values in any tables.

```
conn armk/armk4532
select * from dbms_200042118.course;
select * from dbms_200042118.student;
select * from dbms_200042118.instructor; -->shows<--
select * from dbms_200042118.department; -->doesn't show<--
insert into dbms_200042118.instructor values ('45311', 'Sian', 'Comp. Sci.',
'42000');-->can add new instructor<--
insert into dbms_200042118.student values ('696969','Mamun', 'History', '420'); -
->can not add new students though<--
Update dbms_200042118.department
Set budget = 69000000
where dept_name = 'Biology';
select * from dbms_200042118.department; -->trying to update doesn't work<--
```

Then I connected to the fourth user and checked which permission it had or if it didn't have. From testing, I could see that, sian user could access only the department and instructor tables. It could update only the budget attribute in department table. It couldn't update any other attributes nor could it insert any value in any tables.

```
conn sian/sian4532
select * from dbms_200042118.department;
select * from dbms_200042118.instructor;
Update dbms_200042118.department
Set budget = 6942000
where dept_name = 'Biology';-->can update the department budget since it has that
permission
insert into dbms_200042118.instructor values ('45311', 'Sian', 'Comp. Sci.',
'42000'); -->trying to insert also doesn't work<--
select * from dbms_200042118.department; -->can update the department budget<--
Update dbms_200042118.department
Set dept_name = 'Bio'
where dept_name = 'Biology';
select * from dbms_200042118.department; -->doesn't work because no access to
update dept_name, so can't update anything else in department<--
```

Code

```sql
-->Tasks Start Here <--
alter table instructor rename column ID to i_ID;
@F:\DBMS_LAB\DBMS_Lab_5\DDL+drop.sql
@F:\DBMS_LAB\DBMS_Lab_5\smallRelationsInsertFile.sql


-->Task 1<--
create or replace view Advisor_Selection as
select i_ID,name,dept_name
from instructor;

-->Task 2<--
create or replace view Student_Count as
select name,count(s_ID) as student_count
from Advisor_Selection natural join advisor
group by name;

-->Task 3<--
create role students;
grant select on dbms_200042118.advisor to students;
grant select on dbms_200042118.course to students;

create role course_teacher;
grant select on dbms_200042118.student to course_teacher;
grant select on dbms_200042118.course to course_teacher;

create role dept_head;
grant course_teacher to dept_head;
grant select on dbms_200042118.instructor to dept_head;
grant insert on dbms_200042118.instructor to dept_head;

create role administrator;
grant select on dbms_200042118.department to administrator;
grant select on dbms_200042118.instructor to administrator;
grant update (budget) on dbms_200042118.department to administrator;

-->Task 4<--
create user nazz identified by naz4532;
grant students to nazz;
grant create session to nazz;

create user bakht identified by bakht4532;
```

```sql
grant course_teacher to bakht;
grant create session to bakht;

create user armk identified by armk4532;
grant dept_head to armk;
grant create session to armk;

create user sian identified by sian4532;
grant administrator to sian;
grant create session to sian;


conn nazz/naz4532
select * from dbms_200042118.course;
select * from dbms_200042118.advisor;
select * from dbms_200042118.instructor; -->doesn't show<--
select * from dbms_200042118.department; -->doesn't show<--
select * from dbms_200042118.student; --> doesn't show<--
insert into dbms_200042118.instructor values ('45311', 'Sian', 'Comp. Sci.',
'42000');-->trying to insert also doesn't work<--
Update dbms_200042118.department
Set budget = 69000000
where dept_name = 'Biology';
select * from dbms_200042118.department; -->trying to update doesn't work<--

conn bakht/bakht4532
select * from dbms_200042118.course;
select * from dbms_200042118.student;
select * from dbms_200042118.instructor; -->doesn't show<--
select * from dbms_200042118.department; -->doesn't show<--
select * from dbms_200042119.advisor; -->doesn't show<--
insert into dbms_200042118.instructor values ('45311', 'Sian', 'Comp. Sci.',
'42000');-->trying to insert also doesn't work<--
Update dbms_200042118.department
Set budget = 69000000
where dept_name = 'Biology';
select * from dbms_200042118.department; -->trying to update doesn't work<--

conn armk/armk4532
select * from dbms_200042118.course;
select * from dbms_200042118.student;
select * from dbms_200042118.instructor; -->shows<--
select * from dbms_200042118.department; -->doesn't show<--
insert into dbms_200042118.instructor values ('45311', 'Sian', 'Comp. Sci.',
'42000');-->can add new instructor<--
```

```
insert into dbms_200042118.student values ('696969','Mamun', 'History', '420'); -
->can not add new students though<--
Update dbms_200042118.department
Set budget = 69000000
where dept_name = 'Biology';
select * from dbms_200042118.department; -->trying to update doesn't work<--

conn sian/sian4532
-->works<--
select * from dbms_200042118.department;
-->works<--
select * from dbms_200042118.instructor;
--> can update budget<--
Update dbms_200042118.department
Set budget = 6942000
where dept_name = 'Biology';
insert into dbms_200042118.instructor values ('45311', 'Sian', 'Comp. Sci.',
'42000');-->trying to insert also doesn't work<--
select * from dbms_200042118.department; -->can update the department budget<--

Update dbms_200042118.department
Set dept_name = 'Bio'
where dept_name = 'Biology';
select * from dbms_200042118.department; -->doesn't work because no access to
update dept_name, so can't update anything else in department<--
```

Problems

During the lab, due to time constraints, I only checked for the privileges I granted all the users. I added the extra privilege checks later on (while writing this report). Other than that, this lab was fairly simple, though quite time consuming as it took quite a while to figure out how I should check for the privileges.

Conclusion

In conclusion, views, roles and users are a very important part in building abstraction in Oracle which helps implement various security features. Learning more about them is crucial in managing databases where a huge number of people can access the database.