Database systems

# Overall description

There are two classes of user - DBA and normal. Within the DBA class there are three levels - System, Sys and Internal. Each has different powers but the differences do not matter to us in this first session. System and Sys are not available and we will use the *Internal DBA*. Similarly, different users can be granted different functionality e.g. whether they can create tables or only interrogate them. Rather than giving every different user his own list of capabilities it is often useful to classify them into groups. In Oracle this is done by means of roles. Two roles will be used - one which can create tables and the other which cannot. There are initially no users defined other than the DBA user *internal*.

The owners of tables can grant rights to other users so some users may be able to update tables whereas others can merely read them. These rights are allowed using the grant option by the owner of the resource to be shared.

This first practical is intended to illustrate the procedures necessary to:

1. create users and give them representative varieties of roles;
2. create tables and allocate different rights to these tables for different users.

##### **Work to do**

#### Log on as System

1. Try logging into Oracle by using the SQL PLUS using **System** Account

**Start -> Recently Added (start menu) -> Oracle Database 11g Express Edition -> Run SQL Command Line**

#### DBA

2. Create the first user as follows.

**create user alex identified by alex**

**default tablespace users**

**temporary tablespace temp**

**quota unlimited on users;**

This creates a user called '*alex*' with password *'alex'* (short and simple so you'll be able to remember it later!). Now try to login as alex.

#### Alex

3. Try to log on again into Oracle by using the SQL PLUS with following credentials

**Username:** alex

**Pasword:** alex

With a bit of luck it won't work. This is because the user, although it exists, hasn't been given any access rights to the database. Now again login back to System account to grant permissions to alex.

DBA

4. Give *alex* some access rights. Rather than giving every individual user their own access rights it is convenient to provide groups of access rights called **'roles'**.

Still working as DBA create a role called ***'student'*** as follows.

**Step1:** create role student;

**Step2:** grant alter session, create session, create database link, create table to student;

**Step3:** Allocate these privileges to *alex* by typing below command

grant student to alex;

#### Alex

5. Try to log on as **alex** now

**username** alex

**Pasword** alex

then start an sqlplus session as normal. If you still can't get in, go back to the DBA workstation, type

**drop user alex cascade;**

and repeat step 4.

6. Create and populate the database. Now you can get in you should check that there are no tables available (select \* from tab). Naturally there won't be any there because the database was completely empty (apart from the DBA tables) when you took it over. So now you need to create some tables. Create at least one table namely **course** with two columns **course\_id** and **course\_name.**

**Create table course (**

**course\_id char(10),**

**course\_name varchar(50));**

When you have created some tables in your database. This is to be a centralised database and everyone is going to share it (as in a normal organisation) rather than each user creating and working on their own database (as you have previously done as students). So let's create some more users to share this database with. Go back to the DBA window.

#### DBA

7. Create two more users as follows:

**create user bee identified by bee;**

**create user chris identified by chris;**

Going back to the rights we gave to alex, what should *alex* be able to do that *bee* and *chris* cannot?

8. Give these users fewer rights than *alex* by creating a different role for them:

**create role drone;**

**grant**

**alter session,**

**create session,**

**create database link**

**to drone;**

Now allocate this role to the new users i.e.

**grant drone to bee, chris;**

#### Bee and Chris

9. Back on the users' workstation start new sessions for *bee* and *chris* (you need a new window for each). From *bee* try access the *course* table:

**select \* from alex.course;**

With a bit of luck this shouldn't work, because these two new users don't yet have any access rights to the tables. This has to be set up by the table's owner so you need to go back to *alex*'s workstation to do it.

#### Alex

10. Give the other users some privileges on the 'course' table. As *alex* (the table owner) allocate the following privileges to the other users:

**grant alter, delete, insert, select, update on course to bee;**

**grant select on course to chris;**

This should allow *bee* to look at and to modify the contents of the data in table 'course', but not to modify the structure in any way. *Chris*, on the other hand should not be able to do anything except look at the data contents.

#### Bee and Chris

16. Try the following out both as *bee* and as *chris*, and see which work: (write their output in given space below each query)

**select \* from course;**

Output: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**select \* from alex.course;**

Output: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**update alex.course**

**set course\_name = 'INTRO TO SQL'**

**where course\_name = 'SQL';**

Output: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**create index ind\_course\_name**

**on alex.course (course\_name);**

Output: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Practice Questions:**

1. **Create two roles:**
   1. Teachers
   2. Students

create role Teachers;

Queries:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Queries: create role Students;

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1. **Create Following accounts** 
   1. **Teachers** 
      1. **UserName**: Zia

**Password**: 123

* + 1. **UserName**: Arshad

**Password**: 1234

* + 1. **UserName**: Sara

**Password**: 12345

* 1. **Students**
     1. **Username**: Fahad

**Password**: 1234

* + 1. **Username**: Nida

**Password**: 12345

* + 1. **Username**: Ali

**Password**: 123456

* + 1. **Username**: Khan

**Password**: 1234567

**Teachers Accounts:**

Queries: **create user Zia identified by 123**

**default tablespace users**

**temporary tablespace temp**

**quota unlimited on users;**

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Queries: **create user Arshad identified by 1234**

**default tablespace users**

**temporary tablespace temp**

**quota unlimited on users;**

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Queries: **create user Sara identified by 12345**

**default tablespace users**

**temporary tablespace temp**

**quota unlimited on users;**

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**Students Accounts:**

Queries: **create user Fahad identified by 1234**

**default tablespace users**

**temporary tablespace temp**

**quota unlimited on users;**

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Queries: **create user Nida identified by 12345**

**default tablespace users**

**temporary tablespace temp**

**quota unlimited on users;**

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Queries: **create user Ali identified by 123456**

**default tablespace users**

**temporary tablespace temp**

**quota unlimited on users;**

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Queries: **create user Khan identified by 1234567**

**default tablespace users**

**temporary tablespace temp**

**quota unlimited on users;**

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1. **Grant below mentioned permissions to roles** 
   1. **Teachers** 
      1. grant alter session
      2. create session
      3. create database link
      4. create table
      5. create sequence
      6. create synonym
      7. create view
   2. **Students**
      1. grant alter session
      2. create session
      3. create database link

**Granting Permission to Teachers Role**

Queries: grant alter session, create session, create database link, create table to Teachers;

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**Granting Permission to Students Role**

Queries: grant alter session, create session, create database link, create table to Students;

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1. **Assigning Roles to Users**
2. Assign **Teachers** role to following users
   * 1. Zia
     2. Arshad
     3. Sara
3. Assign **Students** role to following users
   * 1. Fahad
     2. Nida
     3. Ali
     4. Khan

**Assigning Teachers Roles users**

Queries: create role Zia;

create role Arshad;

create role Sara;

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**Assigning Students Role to Users**

Queries: create role Fahad;

create role Nida;

create role Ali;

create role Khan;

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1. Login into User **“Zia”** Account and Create following **Results** table.

Table Name: **Results**

|  |  |  |  |
| --- | --- | --- | --- |
| **Result\_id** | **CourseName** | **Student\_role\_number** | **Marks** |
| 1 | JAVA | 1 | 50 |
| 2 | DATABASE | 1 | 60 |
| 3 | CPP | 2 | 70 |
| 4 | BASIC ELECTRONICS | 2 | 80 |

1. Login into User “**Fahad**” Account.

Try to view results of all students by executing query.

**“select \* from result”**

Output: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Now go back to “**Zia**” Account and grant permissions to “**Fahad and Nida”** so that they view all records from **results** table.

Query: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Also Assign “**select, insert, update** and **delete”** permissions on “**Results** **table”** to teachers “**Arshad and Sara**”

Query: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Now Login into “**Sara”** account and try to insert a row in Results table.

Query: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Now Login into “**Arshad”** account and try to delete a record having **result\_id of “3”** Results table.

Query: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Delete user account of “**Khan**” also revoke all his permissions.

Query: **drop user Khan cascade;**

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