LAB 2: DATABASE CREATION

GOAL: This lab assignment is related to the first two course learning outcomes (describing the architecture of a DBMS; performing the roles of a DBA including storage, user management). In particular, the assignment is aimed at the following objectives:

a) Create a new database and database instance.
b) Become familiar with the environment: learn how to start up and shutdown the database instance.
c) Concretize the Oracle DBMS architecture.

BACKGROUND: DATA DICTIONARY VIEWS

- DBAs use the data dictionary views, also known as catalog views, as a read-only reference to monitor the state of the database in real time.
- The following views show information about schema objects at different levels of privilege:
    - USER: Views focused on objects that a user owns
    - ALL: Views about objects that a user either owns or can query
    - DBA: Views for DBAs only, showing information about all objects in the database
        - Examples of DBA Views
            - General overview
                - DICTIONARY
                - DICT_COLUMNS
            - Schema objects
                - DBA_TABLES
                - DBA_INDEXES
                - DBA_TAB_COLUMNS
                - DBA_CONSTRAINTS
            - Space allocation
                - DBA_SEGMENTS
                - DBA_EXTENTS
            - Database structure
                - DBA_TABLESPACES
            - DBA_DATA_FILES
    - You will use these views to check your database structure, schema objects and space allocated to the database you create in this lab.

ACTIVITIES:

You have been provided with the following files:
a) cit487.sh – directory structure for the database
b) initcit487.ora – initialization file. Note the contents of this file.
c) credb.sql – commands to be run on the server
The lab is divided into two parts. In the first part, you will review the provided credb.sql script as per the instructions provided below. In the second part, you will run the credb.sql script to create the database, and monitor the created objects and tablespaces.

PART 1: REVIEW THE PROVIDED SCRIPT

Review the steps in a-j to understand the commands in the credb.sql script on your server:

a) Spool your output so you can check later for errors that might not otherwise be visible.
(Note: You will need to use the SPOOL command every time you log back in to SQL*Plus. After the database is shut down, you can check cit487.log to see the recorded output.)

```
SQL> spool /home/oracle/cit487.log
```

b) Connect to Oracle as user **SYS** (i.e., with rights to start up and shut down Oracle)

```
SQL> connect / as SYSDBA
(Or, from terminal: $ sqlplus / as SYSDBA)
Connected to an idle instance.
```

c) Startup the instance using the initialization parameters file in /cit487/disk1/admin/pfile (initcit487.ora) in NOMOUNT mode
(Learn more about starting up and shutting down a database here: https://docs.oracle.com/cd/F49540_01/DOC/server.815/a67772/start.htm)

```
SQL> startup pfile=/cit487/disk1/admin/pfile/initcit487.ora nomount
ORACLE instance started.
Total System Global Area  285212672 bytes
Fixed Size                  2020224 bytes
Variable Size             100666496 bytes
Database Buffers          180355072 bytes
Redo Buffers                2170880 bytes
```

d) Use the following command to create a new **cit487** database:

```
SQL>  CREATE DATABASE cit487
CONTROLFILE REUSE
DATAFILE '/cit487/disk1/oradata/system01.dbf' SIZE 50M REUSE AUTOEXTEND ON NEXT 5M
MAXSIZE 350M
SYSAUX DATAFILE '/cit487/disk1/oradata/system02.dbf' SIZE 50M REUSE AUTOEXTEND ON NEX
5M MAXSIZE 350M
LOGFILE GROUP 1 ( '/cit487/disk2/oradata/log1a.rdo', '/cit487/disk3/oradata/log1b.rdo') SIZE 5M
REUSE,
GROUP 2 ( '/cit487/disk3/oradata/log2a.rdo', '/cit487/disk4/oradata/log2b.rdo') SIZE 5M REUSE,
GROUP 3 ( '/cit487/disk4/oradata/log3a.rdo', '/cit487/disk2/oradata/log3b.rdo') SIZE 5M REUSE
UNDO TABLESPACE UNDOTBS1 DATAFILE '/cit487/disk10/oradata/undotbs1.dbf' SIZE 25M REUS
AUTOEXTEND ON
DEFAULT TEMPORARY TABLESPACE TEMP TEMPFILE '/cit487/disk6/oradata/temp01.dbf' SIZE 5
REUSE
DEFAULT TABLESPACE USERS DATAFILE '/cit487/disk8/oradata/user01.dbf' SIZE 5M REUSE
AUTOEXTEND ON NEXT 5M MAXSIZE 100M;
```

This operation takes time. Verify that your database has been created:

```
SELECT NAME FROM v$database;
```

e) Create *data dictionary views* and *synonyms* by running the script files below as shown

i) Run the **CATALOG** script file to create **V$_**, **DBA_**, **ALL_**, and **USER_** *data dictionary views*. (Includes **CATEXP** to create **EXPORT**/**IMPORT** views and **CATAUDIT** to create **AUDIT** views.)

```
SQL> @$ORACLE_HOME/rdbms/admin/catalog
```

(This operation takes time)

ii) Run the **CATPROC** script file to add the *Procedural Option* (**PL/SQL**, including the **STANDARD** package).

```
SQL> @$ORACLE_HOME/rdbms/admin/catproc
```

(This operation takes time)

f) Connect as user **SYSTEM** to build the *Product User Profile* needed by **SQL*Plus**

```
SQL> connect system/manager
Connected.
SQL> @$ORACLE_HOME/sqlplus/admin/pupbld
```

g) Shutdown instance

```
SQL> connect / as sysdba
Connected.
SQL> shutdown
Database closed.
Database dismounted.
ORACLE instance shut down.
```

h) Restart instance (Note: we can use startup without a mode)

```
SQL> connect / as sysdba
Connected to an idle instance.
SQL> startup pfile=/cit487/disk1/admin/pfile/initcit487.ora
ORACLE instance started.
Total System Global Area  285212672 bytes
Fixed Size                 2020224 bytes
Variable Size            100666496 bytes
Database Buffers         180355072 bytes
Redo Buffers               2170880 bytes
Database mounted.
Database opened.
```

i) Create a tablespace

```
SQL> CREATE TABLESPACE appl_data
DATAFILE '/cit487/disk7/oradata/appl01.dbf' SIZE 500K reuse DEFAULT STORAGE (INITIAL 50K);
Tablespace created.
```

j) Shutdown instance

```
SQL> shutdown
Database closed.
Database dismounted.
ORACLE instance shut down.
```

PART 2: CREATE THE DATABASE

1) Access your database server based on the above instructions.
   a) Browse the directories in /cit487

```
[oracle@CNIT487G00BDL ~]$ ls -R /cit487/
/cit487/:
disk1  disk10  disk2  disk3  disk4  disk5  disk6  disk7  disk8  disk9
...
```

   b) Locate and view initcit487.ora in the /cit487/disk1/admin/pfile directory

```
[oracle@CNIT487G00BDL ~]$ cat /cit487/disk1/admin/pfile/initcit487.ora
db_cache_size=180355072
…
control_files='/cit487/disk1/oradata/control01.ctl',
'/cit487/disk1/oradata/control02.ctl','/cit487/disk1/oradata/control03.ctl'
…
#sga_target=283115520
undo_management='AUTO'
undo_tablespace='UNDOTBS1'
```

   c) Start **SQLPlus**

```
[oracle@CNIT487G00BDL ~]$ sqlplus /nolog
```

   d) Execute the credb.sql script on your server. Was it successful? If not, debug and execute again until successful.

```
SQL> @credb.sql
```

2) Note the users and privileges used throughout this lab
   a) SYS
   b) SYSTEM
   c) SYSDBA

3) Note the sequence of events for startup
   a) Start the instance.
   b) Mount the database.
   c) Open the database.

DELIVERABLES:

1. Review your work with the lab instructor.

a. Show that the directory structure has been created.
b. In what sequence are the database instance started, database mounted and opened for queries?
    i. What happens when the database is mounted vs. not mounted vs. open?
    ii. What is the default state?
c. Show the sequence of activities of a database instance shutting down.
d. Where are the following physical files stored on disk: control files, datafiles, online redo log files, parameter file?
e. What happens when a database is created?
    i. What are the default tablespace? Where are they created?
    ii. How is a new tablespace created?
    iii. How can we see all tablespaces created for this database?
f. Explain the output of the following queries on dictionary views:
    i. Select COUNT(*) from DBA_TABLES;
    ii. Select COUNT(*) from DBA_TABLESPACES;
    iii. Select COUNT(*) from USER_TABLES;
g. How are the following user roles different— SYS, SYSDBA, SYSTEM?

2. Create and submit the **log file** (cit487.log) on Brightspace **.**