Islamic University of Technology

Department of Computer Science

Database Management Systems II Lab

Course Code- CSE 4410

Prepared By:
Nazia Krim Khan Oishee
ID: 200042137

Date: January 19, 2023

Contents

1 Introduction

In our second lab of DBMS II our task was to understand tablespace, create tablespace, assign a table to a tablespace and manipulate its properties.

2 Tablespace

An Oracle database consists of one or more logical storage units. These units are called tablespaces. The database's data is collectively stored in the database's tablespaces.

Each tablespace in an Oracle database is comprised of one or more operating system files called datafiles. A database's data is collectively stored in the datafiles that constitute each tablespace of the database.

There are multiple usages of tablespace. Such as-

- Controlling the storage size allocated for the database data.
- Providing specific space quotas to different database users.
- Controlling the availability of data by using online or offline mood.
- Performing partial database recovery in case of failures.

3 Tasks

We were given total 11 tasks in the lab.

Task1: Create two tablespaces tbs1, tbs2.

Solution

```
CREATE TABLESPACE tbs1
DATAFILE 'tbs1_data.dbf' SIZE 1m,
         'tbs2_data.dbf' SIZE 1m;
CREATE TABLESPACE tbs2
DATAFILE 'tbs3_data.dbf' SIZE 1m,
         'tbs4_data.dbf' SIZE 1m;
```

Explanation

In this task, I created tablespaces Using CREATE TABLESPACE statement.A tablespace consists of one or more datafiles. We need to specify the path of the datafiles as well as their size. Here I specified the size as 1M.

Task2: Set quota for single user on both tablespaces.

Solution

```
CREATE USER iutlearner
IDENTIFIED BY test123
DEFAULT TABLESPACE tbs1;
ALTER USER iutlearner QUOTA 10M ON tbs2;
```

Explanation

We can explicitly assign a user a tablespace at the time of user creation. To assign a user more tablespaces we nees to use the ALTER statement.

Task3: Create two tables student (name, id, fk[dept]) and department (id, name) in tbs1..

Solution

```
CREATE TABLE depT(
id INT ,
name VARCHAR2 (32),
constraint pk_dept PRIMARY KEY (name)
) TABLESPACE tbs1;

CREATE TABLE studT(
id INT ,
name VARCHAR2 (32),
dept VARCHAR2(32),constraint pk_student PRIMARY KEY (id),
constraint fk_student  FOREIGN KEY(dept) references depT(name)
) TABLESPACE tbs1 ;
```

Explanation

I created two tables - student (name, id, fk[dept]) and department (id, name) using CREATE TABLE statement. By default when we create any new table in Oracle, it is placed to the User tablespace. To assign a table in the user-defined tablespace, I added the name of the tablespace at the end of the CREATE TABLE statement.

Task4: Create another table course (code, name, credit, fk[offer_by]) in tbs2.

Solution

```
CREATE TABLE courses(
code INT ,credit number ,offer_by VARCHAR2 (32),
name VARCHAR2 (32),
constraint pk_course PRIMARY KEY (code),
constraint fk_course  FOREIGN KEY(offer_by) references depT(name)
) TABLESPACE tbs2;
```

Explanation

At first I created the courses table and then to assign the table in the tbs2 tablespace, I added the name of the tablespace at the end of the CREATE TABLE statement.

Task5: Insert large amount of data in student table and course table.

Solution

```
insert into depT values(1,'CSE');

DECLARE
i NUMBER (2);
BEGIN
FOR i IN 10 .. 20 LOOP
insert into studT(id,name,dept) values (i,'Nazia','CSE');
END LOOP ;
END ;
```

```
/


DECLARE
i NUMBER (2);
BEGIN
FOR i IN 10 .. 20 LOOP
insert into courses (code,credit,offer_by,name)VALUES(i,2,'CSE','DBMS2');
END LOOP ;
END ;
/
```

Explanation

As we had to insert large amount of data into the tables, I used for loops from PL/SQL for the task.

Task6: Check free space of the tablespaces.

Solution

```
SELECT tablespace_name,file_id,bytes /1024/1024 MB
FROM dba_free_space
WHERE tablespace_name ='TBS1';
SELECT tablespace_name , file_id,bytes /1024/1024 MB
FROM dba_free_space
WHERE tablespace_name ='TBS2';
```

Explanation

To check free space of the tablespaces I used the select statement. The data is fetched from the dba_free_space.

Task7: Extend tbs1 by adding extra datafiles

Solution

```
ALTER TABLESPACE tbs1
ADD DATAFILE 'tbs3_data . dbf' SIZE 1m;
```

Explanation

If the tablespaces of the database are completely occupied then no further data can be added into the tablespace. We extend tablespace by using ALTER TABLESPACE statement. To extend a tablespace is by adding a new datafile we use the ADD statement.

Task8: Extend tbs2 by resizing datafiles.

Solution

```
ALTER DATABASE
DATAFILE 'tbs3_data.dbf' RESIZE 15m;
```

Explanation

To extend a tablespace is by a resizing the data file we use the RESIZE clause.

Task9: Check the size of the tablespaces.

Solution

```
SELECT tablespace_name , bytes /1024/1024 MB
FROM dba_data_files
WHERE tablespace_name ='TBS1';
SELECT tablespace_name , bytes /1024/1024 MB
FROM dba_data_files
WHERE tablespace_name ='TBS2';
```

Explanation

Once a tablespace is created, all information about it is stored in the dba_data_files view. We can fetch the size of the tablespace from dba_data_files.

Task10: Delete table space tbs1 including the datafiles.

Solution

```
DROP TABLESPACE tbs1
INCLUDING CONTENTS AND DATAFILES
CASCADE CONSTRAINTS;
```

Explanation

To delete a tablespace from the database, we use DROP TABLESPACE statement. INCLUDING CONTENTS is necessary here as there are tables created in the tbs1. To delete table space tbs1 including the datafiles, I used AND DATAFILES clause.

Task11: Delete table space tbs2 excluding the datafiles.

Solution

```
DROP TABLESPACE tbs2
INCLUDING CONTENTS KEEP DATAFILES
CASCADE CONSTRAINTS;
```

Explanation

To delete table space tbs2 excluding the datafiles, I used KEEP DATAFILES clause.

4 Additional Tasks

Task12: Identify tablespace of a table.

Solution

```
CREATE TABLESPACE tbs3
DATAFILE 'tbs5_data.dbf' SIZE 1m,
          'tbs6_data.dbf' SIZE 1m;
         ALTER USER iutlearner QUOTA 10M ON tbs3;

CREATE TABLE dt(
id INT ,
```

```
name VARCHAR2 (32),
constraint pk_dept PRIMARY KEY (name)
) TABLESPACE tbs3;
insert into dt values(1,'CSE');

select tablespace_name, owner
from all_tables where table_name='DT';
```

Explanation

I created a tablespace tbs3 as I deleted the first two tablespaces. Then I used the SELECT statement to find the tablespace's name from all_tables using tablespace_name.

Task13: Identify all tables under a tablespace.

Solution

```
select table_name, owner
from all_tables where tablespace_name='TBS3';
```

Explanation

I used the SELECT statement to find the table's name from all_tables using table_name.

5 Problems I faced

Tablespace was a new topic for me. But due to the effective learning material provided by our mentor, I could understand the concepts and syntax quite easily. But it took me a bit of a time to figure out the syntax for the additional tasks. Another difficulty I faced was in inserting large amount of data in the tables. To do this easily I later used PL/SQL according to the instructions.