**DBMS LAB MANUAL**

**Database Lab**

***Session 11***

**Course:** Database Systems **Semester:** Fall 2013

**Instructor:** Shoaib Raza

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* **Maintain discipline during the lab.**
* **Listen and follow the instructions as they are given.**
* **Just raise hand if you have any problem.**

**MAIN OBJECTIVES:**

**After completing this lab, you should be able to** **do the following:**

* **Create and maintain indexes**
* **Create, maintain, and use sequences**

**INDEXES:**

**An Oracle Server index is a schema object that can speed up the retrieval of rows by using a pointer. Indexes can be created explicitly or automatically.**

**An index provides direct and fast access to rows in a table. Its purpose is to reduce the necessity of disk I/O by using an indexed path to locate data quickly. The index is used andmaintained automatically by the Oracle Server. Once an index is created, no direct activity isrequired by the user.**

**Indexes are logically and physically independent of the table they index. Therefore, they can**

**be created or dropped at any time and have no effect on the base tables or other indexes.**

**Types of indexes:**

1. **B-TREE INDEX**

**The following are the types of b-tree indexes:-**

* **Unique Index: The Oracle server automatically creates this index when a column in a table is defined to be a PRIMARY KEY or UNIQUE key contraint.**
* **NonUnique Index: Users can create nonunique indexes on columns to speed up access time to the rows. For example, we can create a FOREIGN KEY column index for a join in a query to improve retrieval speed.**
* **Function-based index: The function-based index can be created on columns with expressions. For example, creating an index on the SUBSTR (EMPNO, 1, 2) can speed up the queries using the SUBSTR (EMPNO, 1, 2) in the WHERE clause.**

**Syntax:**

**CREATE INDEX *index* ON *table* (*column*[, *column*]...);**

* **To create an index on ENAME column in the EMP table.**

**SQL> CREATE INDEX emp\_ename\_idx ON emp(ename);**

* **To create an index on first 5 characters of JOB column in the EMP table.**

**SQL>CREATE INDEX emp\_job5\_idx ON emp(SUBSTR(JOB, 1, 5));**

1. **BITMAP INDEX**

**A bitmap index does not repeatedly store the index column values. Each value is treated as a key, and for the corresponding ROWIDs a bit is set. Bitmap indexes are suitable for columns with low cardinality, such as the GENDER column in the EMP table, where the possible values are M or F. The cardinality is the number of distinct column values in a column. In the EMP table column, the cardinality of the SEX column is 2.**

**EXAMPLE:**

**To create a bitmap index, we must specify the keyword BITMAP immediately after CREATE. Bitmap indexes cannot be unique. For example:**

**CREATE BITMAP INDEX IND\_PROJ\_STAT**

**ON PROJECT (STATUS);**

**Confirming Indexes**

**We can confirm the existence of indexes from the USER\_INDEXES data dictionary view. It contains the name of the index and its uniqueness.**

**SQL> SELECT INDEX\_NAME, TABLE\_NAME, TABLE\_OWNER, UNIQUENESS FROM USER\_INDEXES;**

**Removing an Index**

**It is not possible to modify an index. To change it, we must drop it first and then re-create it.**

**Remove an index definition from the data dictionary by issuing the DROP INDEX statement.**

**To drop an index, one must be the owner of the index or have the DROP ANY INDEX privilege.**

**DROP INDEX *index*;**

**For example, remove the EMP\_ENAME\_IDX index from the data dictionary.**

**DROP INDEX emp\_ename\_idx;**

**SEQUENCES:**

**Sequence generator can be used to automatically generate sequence numbers for rows in tables. A sequence is a database object created by a user and can be shared by multiple users. A typical usage for sequences is to create a primary key value, which must be unique for each row. The sequence is generated and incremented (or decremented) by an internal Oracle routine. Sequence numbers are stored and generated independently of tables.**

**Therefore, the same sequence can be used for multiple tables.**

**CREATING SEQUENCES**

**Following is the syntax of SQL statement to create sequences:-**

**CREATE SEQUENCE sequence**

**[INCREMENT BY n]**

**[START WITH n];**

**For example, creating a sequence named DEPT\_DEPTNO to be used for the primary key of the DEPT table.**

**EXAMPLE:**

**SQL> CREATE SEQUENCE dept\_deptno**

**INCREMENT BY 1**

**START WITH 50;**

**NEXTVAL and CURRVAL Pseudocolumns**

**The NEXTVAL pseudocolumn is used to extract successive sequence numbers from a specified sequence. We must qualify NEXTVAL with the sequence name. When we reference *sequence*. NEXTVAL, a new sequence number is generated and the current sequence number is placed in CURRVAL. NEXTVAL returns the next available sequence value. It returns a unique value every time it is referenced, even for different users. CURRVAL obtains the current sequence value. NEXTVAL must be issued for that sequence before CURRVAL contains a value.**

**EXAMPLE:**

**Insert a new department named MARKETING in San Diego**

**SQL > INSERT INTO dept (deptno, dname, loc) VALUES (dept\_deptno.NEXTVAL, ‘MARKETING’, ‘SAN DIEGO’);**

**In order to view the current value for the DEPT\_DEPTNO sequence**

**SELECT dept\_deptno.CURRVAL FORM dual;**

**REMOVING A SEQUENCE**

**A sequence can be removed by using the DROP SEQUENCE statement. Once removed, the sequence can no longer be referenced.**

**SQL> DROP SEQUENCE dept\_deptno;**

**EXERCISE:**

1. **Display the indexes and uniqueness that exist in the data dictionary for the EMP table.**
2. **Create a nonunique index on the foreign key column (DEPTNO) in the EMP table.**
3. **Create a sequence to be used with the primary key column of the DEPT table. The sequence should start at 200 and have a maximum value of 1000. Have your sequence increment by ten numbers. Name the sequence DEPTNO\_SEQ.**
4. **Write a query in a script to display the following information about your sequences: sequence name, maximum value, increment size, and last number.**
5. **Insert two rows into the DEPT table. Be sure to use the sequence that you created for the DEPTNO column. Add two departments named Education and Administration. Confirm your additions.**

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**ATTENDENCE DATABASE LAB**

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Std No: \_\_\_\_\_\_\_\_\_ Section:\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_