CHANDIGARH UNIVERSITY

Discover. Learn. Empower.

INSTITUTE : UIE
DEPARTMENT : APEX INSTITUTE OF TECHNOLOGY(CSE) -AIML

Bachelor of Engineering (Computer Science & Engineering)

Advanced Database Management System

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DISCOVER . LEARN . EMPOWER

Synonym and Views

Course Objectives

CO Number	Course Objective	Level
CO1	Develop understanding the advancement in SQL	Apply

Course Outcome

CO Number	Course Outcome	Level
CO2	Create views of data and Implement transaction control using locks.	Apply

LECTURE OUTCOMES

- Student will learn about the advances in SQL like Locks.
- Student will learn about Shared and Exclusive locks

INDEX – INTRODUCTION

Introduction

- When a SELECT statement is fired to search for a record, the Oracle engine must **first locate the table** on the hard disk
- It looks for **the first location of a table's records** on current storage media
- Then it **performs a sequential search** to locate records that match USER DEFINED where clause

About Records Storage

- Records in the table are stored in the order **in which they are keyed.**

Thus, indexing a table is an access strategy, way to sort and search records in the table. Indexes are essential to improve the performance

INDEX DEFINITION

An index is an ordered list of the contents of a column, (or group of columns) of a table.

STRUCTURE OF INDEX TABLE:

- Indexing involves forming a 2D matrix completely independent of the table on which the index is created
- This 2D will have a single column, which will hold sorted data
- Another column called the address field which identifies the location of the record (rowid)
- When data is inserted in a table, Oracle engine automatically inserts the data value in the index. And, for every such new value, a unique ROWID is inserted
- Index column can be ordered in ASC/DESC

ROWID

- If the SELECT statement has a where clause bound to a table column that is indexed, then index is scanned sequentially to match criteria rather than table data
- As soon as there is no match in index table, then further table is not looked up

ROWID:

- ROWID is pseudo column, which doesn't appear in any command, neither it takes space in the table. But each row address can be retrieved with SQL query using ROWID as column name

```
SELECT ROWID, last_name FROM employees WHERE department_id = 20;
```

ROWID EXAMPLE

SQL Plus

```
SQL> select * from dept;

    DEPTNO DNAME          LOC
---------- -------------- -------------
        10 ACCOUNTING     NEW YORK
        20 RESEARCH       DALLAS
        30 SALES          CHICAGO
        40 OPERATIONS     BOSTON

SQL> select dname , rowid , rownum from dept;

DNAME          ROWID                  ROWNUM
-------------- ------------------ ----------
ACCOUNTING     AAAQ+hAAEAAAAAOAAA           1
RESEARCH       AAAQ+hAAEAAAAAOAAB           2
SALES          AAAQ+hAAEAAAAAOAAC           3
OPERATIONS     AAAQ+hAAEAAAAAOAAD           4

SQL> select * from dept where rowid=(select min())
```

ROWID

- The values of ROWID cannot be set or deleted using INSERT or UPDATE statements
- ROWIDS can be referenced like other tables in SELECT o WHERE clause but cannot be stored
- Each key in an index is associated with a ROWID that points to rows address for fast access

Example: ROWID Format BBBBBBB.RRRR.FFFF(database→ table_names/files-→phy. Blocks→ records): OS

where, **FFFF**: gives unique number of each data file (file is divided into blocks, blocks starts from 0)

BBBBBBBB: It gives block number in which records are stored (each block may store 1/more records, starts from 0)

RRRR: It gives record number

Each time a record is inserted in table, Oracle locates free space in data blocks in the data file. It then inserts record in table and update an entry in index.

INDEX EXAMPLE

Oracle allows creation of two types of indexes:

- Index that allows duplicate values (Duplicate index)
- Index that deny duplicate values (Unique index)

Creation of index:

- Simple index (on single column)
- Composite index (more than one column)

Eg1. CREATE INDEX <index-name> ON <tb_name> (col_name);

Eg2. CREATE INDEX <index-name> ON <tb_name> (<col1>, <col2>)

- For UNIQUE index, CREATE **UNIQUE** INDEX <index-name> ON <tb_name> (<col_name>);

MULTIPLE INDEXES

- Multiple indexes can be created on each table, the query engine prepares a query-plan to decide on index that must be used to retrieve data faster as given in WHERE or OREDER BY Clause.

Index for Data extraction:

1. A SELECT with WHERE clause
2. A SELECT with ORDER BY clause

No index for data extraction

1. A SELECT without search criteria
2. A SELECT with where clause on column where no index is created
3. A SELECT with order-by clause on column where no index is created

DRAWBACKS OF INDEXES

Each time a record is inserted:

1. Free space is located in the blocks of data files
2. Insert/ update a record in index table
3. Index entries are then sorted in prescribed order

This will slow down performance, if too many indexes are created.

Therefore, only frequent used columns must be used for data retrieval.

HOME WORK

- What is Index?
- Describe drawbacks of indexes?.

REFERENCES

Text Book:

1.Sql/ Pl/SQL, Bayross,Ivan

Reference Book:

1.An Introduction to Database Systems, C. J. Date

THANK YOU

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