Lab 2 Creating Secondary Indexes (solution)

Practices

1. Run the script **CC.sql** to create and populate the **CC** table.

   a) How many records are there in the CC tables? **2000**

```
select count(*)
from cc;
```

   b) Query the table CC to find the number of *distinct* values and the number of Null values in each column of the table.

select count(distinct cid) from cc;	select count(*) from cc where cid is null;
select count(distinct c1) from cc;	select count(*) from cc where c1 is null;
select count(distinct c2) from cc;	select count(*) from cc where c2 is null;
select count(distinct c3) from cc;	select count(*) from cc where c3 is null;
select count(distinct c4) from cc;	select count(*) from cc where c4 is null;

Column	# Distinct values	# Null Values
CID	**2000**	**0**
C1	**1785**	**0**
C2	**30**	**0**
C3	**5**	**0**
C4	**26**	**1974**

   c) View the existing indexes of the CC table. How many indexes?

Index Name (s)	Index Type (s)	Column Name (s)
1. CC_ID_PK	B-Tree	ID

2. *Checking whether the query is executed using an index or not:*

SQL Statement	Index Usage (Yes | No)	Index Name
2.1 select * from cc where cid = 1000 ;	Yes	CC_ID_PK
2.2 select * from cc where cid BETWEEN 1000 and 1005 ;	Yes	CC_ID_PK
2.3 select * from cc where cid in (1001, 1100, 1200) ;	Yes	CC_ID_PK
2.4 select * from cc where c1 = 888 ;	No	

SQL Statement	Index Usage (Yes | No)	Index Name
2.5 select * from cc where c2 =29 ;	No	
2.6 select * from cc where c2 =30 ;	No	
2.7 select * from cc where c3 = 1 ;	No	
2.8 select * from cc where c3 = 4 ;	No	
2.9 select * from cc where c4 = 'z' ;	No	
2.10 select * from cc where upper(c4) = 'Z' ;	No	
2.11 select * from cc where c4 in ('a','b','c') ;	No	
2.12 select * from cc where c4 not in ('a','b','c') ;	No	
2.13 select * from cc where c2 = 15 and c3 =3 and c4='z' ;	No	
2.14 select * from cc where c3 =3 and c4='z' ;	No	

3. Create indexes on the columns of CC table and evaluate the types of index are appropriate for the specified column?

```
create index cc_c1_idx
on cc(c1);
create index cc_c2_idx
on cc(c2);
create bitmap index cc_c3_idx
on cc(c3);
create index cc_c4_idx
on cc(c4);
create index cc_c234_idx
on cc(c2,c3,c4);
```

Column Name (s)	Index Name (s)	Index Type (s)
C1	CC_C1_IDX	B-Tree
C2	CC_C2_IDX	B-Tree
C3	CC_C3_IDX	Bitmap
C4	CC_C4_IDX	B-Tree
C2,C3,C4	CC_C234_IDX	B-Tree

View the existing indexes of the CC table. How many indexes? 6 Which index is a composite index? CC_C234_IDX

4. Checking whether the query is executed using an index or not:

SQL Statement	Index Usage	Index Name
4.1 select * from cc where cid = 1000 ;	Yes	CC_ID_PK
4.2 select * from cc where cid BETWEEN 1000 and 1005 ;	Yes	CC_ID_PK
4.3 select * from cc where cid in (1001, 1100, 1200) ;	Yes	CC_ID_PK
4.4 select * from cc where c1 = 888 ;	Yes	CC_C1_IDX
4.5 select * from cc where c2 =29 ;	No	
4.6 select * from cc where c2 =30 ;	Yes	CC_C2_IDX
4.7 select * from cc where c3 = 1 ;	Yes	CC_C3_IDX
4.8 select * from cc where c3 = 4 ;	Yes	CC_C3_IDX
4.9 select * from cc where c4 = 'z' ;	Yes	CC_C4_IDX
4.10 select * from cc where upper(c4) = 'Z' ;	No	
4.11 select * from cc where c4 in ('a','b','c') ;	Yes	CC_C4_IDX
4.12 select * from cc where c4 not in ('a','b','c') ;	No	
4.13 select * from cc where c2 = 15 and c3 =3 and c4='z' ;	Yes	CC_C4_IDX
4.14 select * from cc where c3 =3 and c4='z' ;	Yes	CC_C4_IDX

Note:

- The query optimizer (called simply the optimizer) is built-in database software that determines the most efficient method for a SQL statement to access requested data. So, the result of index usage depends on the optimizer.
- Generally, search arguments in the WHERE clause such as "IS NOT NULL", "<>", "!=", "!>", "!<", "NOT", "NOT EXISTS", "NOT IN", "NOT LIKE", and "LIKE '%500'" prevents Oracle from using an index to perform the search (however, not always).