Database Systems

Laboratory Worksheet 6
Year 3 – SE Batch

Prerequisites:

1. Consider the schema of the following two relational tables:

EMP (Employee Table)

COL NAME	TYPE		SIZE	NULL	DESCRIPTION
EMPNO	CHAR	6		no	Employee number, unique
FIRSTNAME	VARCHAR	12		no	First name
MIDINIT	CHAR	1		no	Middle initial
LASTNAME	VARCHAR	15		no	Last name
WORKDEPT	CHAR	3			Employee's dept number
PHONENO	CHAR	9			Employee's telephone number
HIREDATE	DATE				Date hired
JOB	CHAR	15			Job held by employee
EDLEVEL	NUMBER	2			No. of years of formal educ.
SEX	CHAR	1			M=male, F=female
BIRTHDATE	DATE				Date of birth
SALARY	NUMBER	(8,2)			Annual salary
BONUS	NUMBER	(8,2)			Annual bonus
COMM	NUMBER	(8,2)			Annual commission

DEPT (Department Table)

COL NAME	TYPE	SIZE	NULL	DESCRIPTION
DEPTNO	CHAR	3	no	Department number, unique
DEPTNAME	VARCHAR	36	no	Department name
MGRNO	CHAR	6		Dept manager's employee no.
ADMRDEPT	CHAR	3	no	ID of administrative dept

(a) Create tables (named as EMP and DEPT) with appropriate primary key and referential constraints.

(b) insert the sample data (script available in the courseweb.sliit.lk) into the EMP and DEPT relational tables.

The exercises in this practical are meant to explore the effect of indexes on the query plans generated by Oracle.

1. Create a PLAN_TABLE in your database by executing the script file utlxplan (available in coursweb.sliit.lk).

2. Execute the following statement:

```
explain plan for
select e.lastname, d.mgrno
from emp e, dept d
where d.admrdept='A00' and e.workdept=d.deptno;
```

3. To view the plan table output, use the script file utlxpls (also available in the courseweb.sliit.lk). Note the access paths used in the plan.

4. Now create an index named XWORKDEPT on workdept of EMP table. Run the explain plan for the above query again. Note if the plan has changed.

5. Next, create an index on admrdept of DEPT table. Name the index as XADMRDEPT. Again, check if the plan for the query changes.

6. Modify the query by adding the condition, e.job='DESIGNER' to the where clause. Check the plan. Next create an index on job in EMP table and then check the plan again. Can you describe the execution strategy of this plan?

7. Find the plan for the following query:
```
select avg(e.salary)
from emp e
where e.edlevel>10 and e.salary between 30000 and 70000;
```
Create an index on edlevel and salary. Check the plan again. What is the change in strategy?

8. To know what indexes exist on a table, you can query the view named USER_INDEXES. For example, to find the names of indexes on EMP, use:
```
Select index_name
From user_indexes
Where table_name = 'EMP';
```

User_indexes has many attributes. Use describe command to find its attributes if you need more information on indexes.

9. Refer to the slides for Lecture and check the plans for more of the queries (after suitable modifications to match your table schema) with and without indexes. You will be able to see how Oracle handles some of the queries, such as queries suitable for index-only plans. Remember that EXPALIN PLAN does not give you reasons for the choices made by the optimizer. So, do not be hasty in your conclusions about the Oracle optimizer.