Database Systems

B.Sc. (Hons) in IT

Laboratory Worksheet 07

IT22313720

Practical 7- EXPLAIN PLAN

```
SQL> @F:\Y3S2\y3s1\DS\Lab\labsheets\IT3020_Prac07_supportfiles\utlxplan

Table created.
```

```
SQL> @F:\Y3S2\y3s1\DS\Lab\labsheets\IT3020_Prac07_supportfiles\SampleDB
```

```
SQL> ALTER SESSION SET OPTIMIZER_MODE = ALL_ROWS;

Session altered.

SQL> ALTER SESSION SET "_optimizer_cost_model" = CPU;

Session altered.
```

These commands configure the Oracle optimizer to use **CPU-based cost model** and optimize for **total throughput (ALL_ROWS)** instead of response time. This is crucial for understanding how query plans are costed in Oracle.

```
SQL> EXPLAIN PLAN FOR
  2  SELECT c.clno, c.name
  3  FROM client c, purch p
  4  WHERE c.clno = p.clno AND p.qty > 1000;

Explained.
```

This statement doesn't execute the query. Instead, it tells Oracle to generate and store the execution plan in the PLAN_TABLE. This plan shows how Oracle would retrieve the data

```
SQL> @F:\Y3S2\y3s1\DS\Lab\labsheets\IT3020_Prac07_supportfiles\utlxpls

Plan Table
--------------------------------------------------------------------------------
| Operation and options            |  Object  | cost     | cpu_cost | io_cost  |
--------------------------------------------------------------------------------
| SELECT STATEMENT                 |          | 5        |7121096   | 4        |
|  HASH JOIN                       |          | 5        |7121096   | 4        |
|   TABLE ACCESS FULL              |CLIENT    | 2        |7461      | 2        |
|   TABLE ACCESS FULL              |PURCH     | 2        |9721      | 2        |
--------------------------------------------------------------------------------

7 rows selected.
```

```
SQL> CREATE INDEX purch_index ON purch(qty, clno);

Index created.

SQL> CREATE INDEX client_index ON client(clno, name);

Index created.
```

These statements create unclustered B+ tree indexes, which help Oracle locate rows more efficiently based on the indexed columns. The goal is to improve query performance.

```
SQL> EXPLAIN PLAN FOR
  2  SELECT c.clno, c.name
  3  FROM client c, purch p
  4  WHERE c.clno = p.clno AND p.qty > 1000;

Explained.

SQL>  @F:\Y3S2\y3s1\DS\Lab\labsheets\IT3020_Prac07_supportfiles\utlxpls

Plan Table
--------------------------------------------------------------------------------
| Operation and options            |  Object  | cost     | cpu_cost | io_cost  |
--------------------------------------------------------------------------------
| SELECT STATEMENT                 |          | 3        |7118756   | 2        |
|  HASH JOIN                       |          | 3        |7118756   | 2        |
|   INDEX FULL SCAN                |CLIENT_IN | 1        |7521      | 1        |
|   INDEX RANGE SCAN               |PURCH_IND | 1        |7321      | 1        |
--------------------------------------------------------------------------------

7 rows selected.
```

After creating the unclustered B+ tree indexes on purch(qty, clno) and client(clno, name), the execution plan shows a more optimized access path. Full table scans are replaced by index range scans, and the cost values are significantly reduced. This proves that the indexes improved the performance of the query by reducing the data retrieval effort.

Additional Notes:

```
SQL> select index_name
  2  from user_indexes
  3  where table_name = 'CLIENT';

INDEX_NAME
------------------------------
SYS_C0011175
CLIENT_INDEX

SQL> select DBMS_METADATA.GET_DDL('INDEX',u.index_name)
  2  from user_indexes u
  3  where table_name = 'CLIENT';

DBMS_METADATA.GET_DDL('INDEX',U.INDEX_NAME)
--------------------------------------------------------------------------------

  CREATE UNIQUE INDEX "SYSTEM"."SYS_C0011175" ON "SYSTEM"."CLIENT" ("CLNO")


  CREATE INDEX "SYSTEM"."CLIENT_INDEX" ON "SYSTEM"."CLIENT" ("CLNO", "NAME")
```