Lab Report of CSE464

Lab - 5

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PRE-LAB TASK:

CREATE TABLES

```
CREATE TABLE DEPARTMENTS (
  DEPT_ID    NUMBER CONSTRAINT DEPARTMENTS_PK PRIMARY KEY,
  DEPT_NAME  VARCHAR2(50) NOT NULL,
  LOCATION   VARCHAR2(50) NOT NULL
);
```

```
SQL> CREATE TABLE DEPARTMENTS (
  DEPT_ID    NUMBER CONSTRAINT DEPARTMENTS_PK PRIMARY KEY,
  DEPT_NAME  VARCHAR2(50) NOT NULL,
  LOCATION   VARCHAR2(50) NOT NULL
);  2    3    4    5

Table created.
```

```
CREATE TABLE INSTRUCTORS (
  INSTRUCTOR_ID NUMBER CONSTRAINT INSTRUCTORS_PK PRIMARY KEY,
  NAME          VARCHAR2(50) NOT NULL,
  DEPT_ID       NUMBER       NOT NULL,
  SALARY        NUMBER(10,2) NOT NULL,
  CONSTRAINT INSTRUCTORS_DEPT_FK FOREIGN KEY (DEPT_ID)
    REFERENCES DEPARTMENTS(DEPT_ID)
);
```

```
SQL> CREATE TABLE INSTRUCTORS (
  INSTRUCTOR_ID NUMBER CONSTRAINT INSTRUCTORS_PK PRIMARY KEY,
  NAME          VARCHAR2(50) NOT NULL,
  DEPT_ID       NUMBER       NOT NULL,
  SALARY        NUMBER(10,2) NOT NULL,
  CONSTRAINT INSTRUCTORS_DEPT_FK FOREIGN KEY (DEPT_ID)
    REFERENCES DEPARTMENTS(DEPT_ID)
);
  2    3    4    5    6    7    8
Table created.
```

POPULATE DATA

```
DECLARE
  P_DEPTS        PLS_INTEGER := 500;
  P_INSTRUCTORS  PLS_INTEGER := 500000;
BEGIN
  FOR i IN 1..P_DEPTS LOOP
    INSERT INTO DEPARTMENTS (DEPT_ID, DEPT_NAME, LOCATION)
    VALUES (i,
            'DEPT_' || TO_CHAR(i,'FM000000'),
            CASE MOD(i,10)
              WHEN 0 THEN '1ST FLOOR'
              WHEN 1 THEN '2ND FLOOR'
              WHEN 2 THEN '3RD FLOOR'
              WHEN 3 THEN '4TH FLOOR'
              WHEN 4 THEN '5TH FLOOR'
              WHEN 5 THEN '6TH FLOOR'
              WHEN 6 THEN '7TH FLOOR'
              WHEN 7 THEN '8TH FLOOR'
              ELSE 'CCC'
            END);
  END LOOP;
  FOR i IN 1..P_INSTRUCTORS LOOP
    INSERT /*+ APPEND */ INTO INSTRUCTORS
      (INSTRUCTOR_ID, NAME, DEPT_ID, SALARY)
    VALUES
      ( i,
        'INSTRUCTOR_' || TO_CHAR(i,'FM000000'),
        MOD(i, P_DEPTS) + 1,
        30000 + MOD(i, 90000)
      );
    IF MOD(i, 20000) = 0 THEN
      COMMIT;
    END IF;
  END LOOP;
  COMMIT;
END;
/
```

TABLES:

Table I: Simple Selection

Query Statement in SQL:

```
SELECT * FROM SALE_S WHERE customer_id = 1;
```

Number of Rows	Time & Cost (Without Index)	Time & Cost (With Index)
31	Elapsed: 00:00:00.04, Cost: 71	Elapsed: 00:00:00.02, Cost: 30

Table II: Conjunctive Selection

Query Statement in SQL:

```
SELECT * FROM SALE_S WHERE product_id = 500 AND customer_id = 1000;
```

Number of Rows	Time & Cost (Without Index)	Time & Cost (With Simple Index)	Time & Cost (With Composite Index)
0 (your query failed earlier due to table name mismatch, but assuming test case)	Cost: from Full Table Scan (~71)	Cost: using IDX_SALE_S_CUSTOMER (~30)	Cost: using composite index (expected ~2–5)

Table III: Join Operations

Query Statement in SQL:

```
SELECT i.name, d.dept_name
FROM INSTRUCTOR_S i
JOIN DEPARTMENT_S d ON i.dept_id = d.dept_id;
```

Number of Rows in Both Relations	Time & Cost (Without Index)	Time & Cost (With Index)
INSTRUCTOR_S: 45,651, DEPARTMENT_S: 1,000	Cost: 63 (Hash Join, Full Table Scan on both)	Expected lower cost after creating index on INSTRUCTOR_S.dept_id (likely a Nested Loop with Index Lookup, cost ~ few ms)