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**EXPERIMENT NO. 02**

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**AIM :** To establish a multi-relation database and execute SQL queries involving insertions, deletions and updating on it.

**PROBLEM STATEMENT:**

*Establish an environment for executing the queries based on the logical schemata and the database structuring for the* ***SalesCo*** *database given below.*

**CUSTOMER** (C_CODE, LNAME, FNAME, C_AREA, C_PHONE, BALANCE)

**INVOICE** (INV_NUM, C_CODE, INV_DATE)

**LINE** (INV_NUM, L_NUM, P_CODE, L_UNITS, L_PRICE)

**PRODUCT** (P_CODE, DESCRIPT, P_DATE, QTY, P_MIN, P_PRICE, P_DISC, V_CODE)

**VENDOR** (V_CODE, V_NAME, V_CONTACT, V_AREA, V_PHONE, V_STATE, V_ORDER)

********** **QUERY-02** **********

For each table of SalesCo database, list all the enforced constraints. (Use USER_CONSTRAINTS view).

**********

```
SELECT TABLE_NAME, CONSTRAINT_NAME, CONSTRAINT_TYPE,DELETE_RULE
   FROM USER_CONSTRAINTS
     WHERE TABLE_NAME IN('CUSTOMER','INVOICE','VENDOR','PRODUCT','LINE');
```

| TABLE_NAME | CONSTRAINT_NAME | CONSTRAINT_TYPE | DELETE_RULE |
|---|---|---|---|
| INVOICE | INVOICE_CUSTOMER_FK_C_CODE | R | NO ACTION |
| LINE | LINE_INVOICE_FK_INV_NUM | R | NO ACTION |
| LINE | LINE_PRODUCT_FK_P_CODE | R | NO ACTION |
| PRODUCT | PRODUCT_VENDOR_FK_V_CODE | R | NO ACTION |
| CUSTOMER | SYS_C008387 | C | |
| CUSTOMER | SYS_C008388 | C | |
| CUSTOMER | SYS_C008389 | C | |
| CUSTOMER | SYS_C008390 | C | |
| CUSTOMER | SYS_C008391 | C | |
| CUSTOMER | SYS_C008392 | C | |
| CUSTOMER | CUSTOMER_CK_C_CODE | C | |
| CUSTOMER | CUSTOMER_CK_C_AREA | C | |
| INVOICE | SYS_C008396 | C | |
| INVOICE | SYS_C008397 | C | |
| INVOICE | SYS_C008398 | C | |
| INVOICE | INVOICE_CK_INV_NUM | C | |
| VENDOR | SYS_C008402 | C | |
| VENDOR | SYS_C008403 | C | |
| VENDOR | SYS_C008404 | C | |
| VENDOR | SYS_C008405 | C | |
| VENDOR | SYS_C008406 | C | |
| VENDOR | SYS_C008407 | C | |
| VENDOR | SYS_C008408 | C | |

```
VENDOR          VENDOR_CK_V_CODE            C
VENDOR          VENDOR_CK_V_AREA            C
VENDOR          VENDOR_CK_V_STATE           C
PRODUCT         SYS_C008413                 C
PRODUCT         SYS_C008414                 C
PRODUCT         SYS_C008415                 C
PRODUCT         SYS_C008416                 C
PRODUCT         SYS_C008417                 C
PRODUCT         SYS_C008418                 C
PRODUCT         SYS_C008419                 C
PRODUCT         PRODUCT_CK_P_MIN            C
LINE            SYS_C008423                 C
LINE            SYS_C008424                 C
LINE            SYS_C008425                 C
LINE            SYS_C008426                 C
LINE            SYS_C008427                 C
LINE            LINE_CK_L_NUM               C
LINE            LINE_CK_L_UNITS             C
LINE            LINE_CK_L_PRICE             C
CUSTOMER        CUSTOMER_PK_C_CODE          P
INVOICE         INVOICE_PK_INV_NUM          P
VENDOR          VENDOR_PK_V_CODE            P
PRODUCT         PRODUCT_PK_P_CODE           P
LINE            LINE_PK_INV_NUM_L_NUM       P

47 rows selected.
```

********** **QUERY-03** **********

Write SQL code to insert a LINE record - 1009, 1, HW15X, 20, 17.50. What are the problems encountered? Assume that the 60 units of the product “HiVeld Hammer" were supplied by "Indian Masters” located in “KY' at unit price of 17.50 on January 10, 2020. Minimum stock quantity was anticipated to be 15. The line was billed to “You" located in area 904 with phone 3562098 and a balance of 500.00 on June 22, 2020. The supplier with ID 24992 has a contact named “Your Sibling" with phone 2863322. Write appropriate SELECT statements to showcase the effects of the query.

**********

```
INSERT INTO LINE
   VALUES (-1009,1,'HW15X',20,15.50);
INSERT INTO LINE
*
ERROR at line 1:
ORA-02291: integrity constraint (CS5A27.LINE_PRODUCT_FK_P_CODE) violated -
parent key not found
```

```
INSERT INTO CUSTOMER
   VALUES (10020, 'GUPTA', 'DIKSHA', 904, 3562098,500.0);

1 row created.
```

```
INSERT INTO VENDOR
   VALUES (24992, 'INDIAN MASTERS', 'DEEPIKA GUPTA', 615,2863322,'KY','N');

1 row created.
```

```
INSERT INTO INVOICE
   VALUES (1019, 10020, '22-JUN-20');

1 row created.
```

```
INSERT INTO PRODUCT
   VALUES ('HW15X', 'Hiveld Hammer', '10-JAN-20', 60, 15,17.50, 0, 24992);

1 row created.
```

```
INSERT INTO LINE VALUES (1019, 1, 'HW15X', 20, 17.50);

1 row created.
```

```
SELECT C_CODE , FNAME , LNAME
 FROM CUSTOMER
   WHERE C_CODE = 10020;

    C_CODE FNAME      LNAME
---------- ---------- ----------
     10020 DIKSHA     GUPTA


SELECT  INV_NUM , C_CODE ,  INV_DATE
  FROM INVOICE
   WHERE INV_NUM = 1019;

   INV_NUM     C_CODE INV_DATE
---------- ---------- ---------
      1019      10020 22-JUN-20


SELECT INV_NUM , L_NUM , P_CODE ,L_UNITS , L_PRICE
  FROM LINE
    WHERE INV_NUM = 1019;

   INV_NUM      L_NUM P_COD    L_UNITS    L_PRICE
---------- ---------- ----- ---------- ----------
      1019          1 HW15X         20       17.5


SELECT P_CODE,DESCRIPT,QTY
   FROM PRODUCT
     WHERE P_CODE = 'HW15X';

P_COD DESCRIPT                             QTY
----- ------------------------------ ----------
HW15X Hiveld Hammer                        60


SELECT V_CODE,V_NAME,V_CONTACT
  FROM VENDOR
    WHERE V_CODE = 24992;

    V_CODE V_NAME                        V_CONTACT
---------- ------------------------------ --------------------
     24992 INDIAN MASTERS                 DEEPIKA GUPTA
```

********** **QUERY-04** **********

Write SQL code that will list P_CODE, DESCRIPT, V_CODE for all products that are some kind of hammers or screws.

**********

```
SELECT P_CODE , DESCRIPT , V_CODE
  FROM PRODUCT
    WHERE LOWER(DESCRIPT) LIKE '%hammer'
      OR LOWER(DESCRIPT) LIKE '%screw';
```

| P_COD | DESCRIPT | V_CODE |
|---|---|---|
| CH10X | Claw Hammer | 21225 |
| SH100 | Sledge Hammer | |
| MC001 | Metal Screw | 21225 |
| WC025 | 2.5in wide Screw | 21231 |
| HW15X | Hiveld Hammer | 24992 |

********** **QUERY-05** **********

Write the SQL code that will list all products which were added to inventory during 2020.

**********

```
SELECT P_CODE , DESCRIPT , P_DATE,QTY,P_MIN,P_PRICE
  FROM PRODUCT
    WHERE P_DATE >= '01-JAN-2020'
      AND P_DATE <= '31-DEC-2020';
```

| P_CODE | DESCRIPT | P_DATE | QTY | P_MIN | P_PRICE |
|---|---|---|---|---|---|
| CL025 | Hrd. Spring 1/4in | 15-JAN-20 | 15 | 8 | 39.95 |
| CL050 | Hrd. Spring 1/2in | 15-JAN-20 | 23 | 5 | 43.99 |
| CD00X | Cordless Drill | 20-JAN-20 | 12 | 5 | 38.95 |
| CH10X | Claw Hammer | 20-JAN-20 | 23 | 10 | 9.95 |
| SH100 | Sledge Hammer | 02-JAN-20 | 8 | 5 | 14.4 |
| HC100 | Hicut Chain Saw | 07-FEB-20 | 11 | 5 | 256.99 |
| PP101 | PVC Pipe | 20-FEB-20 | 188 | 75 | 5.87 |
| MC001 | Metal Screw | 01-MAR-20 | 172 | 75 | 6.99 |
| WC025 | 2.5in wide Screw | 24-FEB-20 | 237 | 100 | 8.45 |
| SM48X | Steel Malting Mesh | 17-JAN-20 | 18 | 5 | 119.95 |
| HW15X | Hiveld Hammer | 10-JAN-20 | 60 | 15 | 17.5 |

********** **QUERY-06**********
Write SQL code that will list all invoices billed to customers Elena Johnson. Your query must account for combining the FNAME and LNAME attributes while creating and testing the predicate
**********

```
SELECT C.C_CODE , INV_NUM , FNAME||' '||LNAME NAME
  FROM INVOICE I JOIN CUSTOMER C ON C.C_CODE = I.C_CODE
    AND UPPER(FNAME||' '||LNAME) = 'ELENA JOHNSON';

    C_CODE    INV_NUM NAME
---------- ---------- --------------------
     10011       1002 Elena Johnson
     10011       1005 Elena Johnson
     10011       1008 Elena Johnson
```

********** **QUERY-07** **********
Write SQL code that will add following records to PRODUCT Table.
AB111, Power Drill, Today, 15, 5, 125, 0.1, 24992
PP102, PVC Pipe, Tomorrow, 50, 12, 15.25, 0.02, 24992
**********

```
INSERT INTO PRODUCT
   VALUES('AB111','POWER DRILL',SYSDATE,15,5,125,0.1,24992);
1 row created.

INSERT INTO PRODUCT
   VALUES('PP102','PVC PIPE',SYSDATE+2,50,12,15.25,0.02,24992);
1 row created.

SELECT P_CODE,DESCRIPT,P_DATE,QTY,P_MIN,P_PRICE
  FROM PRODUCT WHERE P_CODE = 'AB111' OR P_CODE = 'PP102';

P_CODE     DESCRIPT           P_DATE       QTY   P_MIN    P_PRICE
---------- ------------------ --------- ------ ------- ----------
AB111      POWER DRILL        18-SEP-22     15       5        125
PP102      PVC PIPE           20-SEP-22     50      12      15.25
```

********** **QUERY-08** **********

Write SQL code that will remove the vendor 23119. Explain the problem(s) encountered (if any). Now, if the policy decision has been to allow such removals from vendor list by removing the depending relation tuples; modify the constraints in PRODUCT table. On modifying the constraints, remove the said vendor and check the changes in database. Revert to the database state as before executing this query.

**********

```
SELECT V_CODE , V_NAME
  FROM VENDOR
    WHERE V_CODE = 23119;

    V_CODE V_NAME
---------- ------------------------------
     23119 Blackman Sisters
```

```
SELECT P_CODE , DESCRIPT , V_CODE
   FROM PRODUCT
     WHERE V_CODE = 23119;

P_CODE     DESCRIPT                V_CODE
---------- -------------------- ----------
CL025      Hrd. Spring 1/4in         23119
CL050      Hrd. Spring 1/2in         23119
```

```
DELETE FROM VENDOR
   WHERE V_CODE = 23119;

 DELETE FROM VENDOR
*
ERROR at line 1:
ORA-02292: integrity constraint (CS5A27.PRODUCT_VENDOR_FK_V_CODE)
violated - child record found
```

```
SELECT TABLE_NAME , CONSTRAINT_NAME , CONSTRAINT_TYPE , DELETE_RULE
  FROM USER_CONSTRAINTS
    WHERE TABLE_NAME = 'PRODUCT' AND CONSTRAINT_TYPE = 'R';

TABLE_NAME     CONSTRAINT_NAME              CONSTRAINT_T DELETE_RULE
-------------- ---------------------------- ------------ --------------
PRODUCT        PRODUCT_VENDOR_FK_V_CODE     R            NO ACTION


ALTER TABLE PRODUCT
   DROP CONSTRAINT PRODUCT_VENDOR_FK_V_CODE;

Table altered.


SELECT TABLE_NAME , CONSTRAINT_NAME , CONSTRAINT_TYPE , DELETE_RULE
  FROM USER_CONSTRAINTS
    WHERE TABLE_NAME = 'PRODUCT' AND CONSTRAINT_TYPE = 'R';

no rows selected


ALTER TABLE PRODUCT
  ADD CONSTRAINT PRODUCT_VENDOR_FK_V_CODE FOREIGN KEY(V_CODE)
    REFERENCES VENDOR(V_CODE) ON DELETE CASCADE ;

Table altered.


SELECT TABLE_NAME , CONSTRAINT_NAME , CONSTRAINT_TYPE , DELETE_RULE
  FROM USER_CONSTRAINTS
    WHERE TABLE_NAME = 'PRODUCT' AND CONSTRAINT_TYPE = 'R';

TABLE_NAME     CONSTRAINT_NAME      CONSTRAINT_TYPE DELETE_RULE
-------------- -------------------- --------------- --------------
PRODUCT        PRODUCT_VENDOR_FK_V_ R               CASCADE
               CODE
```

```
DELETE FROM VENDOR
   WHERE V_CODE = 23119;

1 row deleted.


SELECT V_CODE , V_NAME
   FROM VENDOR
     WHERE V_CODE = 23119;

 no rows selected


ROLLBACK;

Rollback complete.


COMMIT;

Commit complete.


SELECT V_CODE , V_NAME
  FROM VENDOR
    WHERE V_CODE = 23119;

 V_CODE    V_NAME
---------- --------------------
 23119     Blackman Sisters
```

********** **QUERY-09**********

Write SQL code that lists all products that were supplied by vendors belonging to the state 'KY' arranged in increasing sequence of vendor code. The output should include vendor code, vendor's name, product code, product description, vendor contact, and inventory purchase date.

**********

```
SELECT V_CODE, V_NAME, PRODUCT.P_CODE, PRODUCT.DESCRIPT,V_PHONE,
 PRODUCT.P_DATE
  FROM PRODUCT
    JOIN VENDOR USING(V_CODE)
      WHERE V_STATE = 'KY'
        ORDER BY V_CODE ASC;
```

| V_CODE | V_NAME | P_CODE | DESCRIPT | V_PHONE | P_DATE |
|---|---|---|---|---|---|
| 21344 | Gomez Sons | SB725 | 7.25in Saw Blade | 2986363 | 13-DEC-19 |
| 21344 | Gomez Sons | SB900 | 9.00 in Saw Blade | 2986363 | 13-NOV-19 |
| 21344 | Gomez Sons | RF100 | Rat Tail File | 2986363 | 15-DEC-19 |
| 24992 | INDIAN MASTERS | HW15X | HIVELD HAMMER | 2863322 | 10-JAN-20 |
| 24992 | INDIAN MASTERS | AB111 | POWER DRILL | 2863322 | 18-SEP-22 |
| 24992 | INDIAN MASTERS | PP102 | PVC PIPE | 2863322 | 20-SEP-22 |

********** **QUERY-12** **********

Write SQL code that will modify Query-11, to include the subtotals for each of the line with invoice numbers. [You are required compute a derived column SUBTOTAL as L_UNITS * L_PRICE].

**********

```
SELECT INV_NUM,C_CODE,INV_DATE,LINE.L_UNITS, LINE.L_PRICE,
  LINE.L_UNITS*LINE.L_PRICE AS SUBTOTAL
    FROM INVOICE
      JOIN LINE USING (INV_NUM)
        ORDER BY INV_NUM ASC,C_CODE DESC;
```

| INV_NUM | C_CODE | INV_DATE | L_UNITS | L_PRICE | SUBTOTAL |
|---|---|---|---|---|---|
| 1001 | 10014 | 16-JAN-20 | 1 | 14.99 | 14.99 |
| 1001 | 10014 | 16-JAN-20 | 1 | 9.95 | 9.95 |
| 1002 | 10011 | 16-JAN-20 | 2 | 4.99 | 9.98 |
| 1003 | 10012 | 16-JAN-20 | 1 | 38.95 | 38.95 |
| 1003 | 10012 | 16-JAN-20 | 1 | 39.95 | 39.95 |
| 1003 | 10012 | 16-JAN-20 | 5 | 14.99 | 74.95 |
| 1004 | 10018 | 17-JAN-20 | 3 | 4.99 | 14.97 |
| 1004 | 10018 | 17-JAN-20 | 2 | 9.95 | 19.9 |
| 1005 | 10011 | 17-JAN-20 | 12 | 5.87 | 70.44 |
| 1006 | 10014 | 17-JAN-20 | 3 | 6.99 | 20.97 |
| 1006 | 10014 | 17-JAN-20 | 1 | 256.99 | 256.99 |
| 1006 | 10014 | 17-JAN-20 | 1 | 9.95 | 9.95 |
| 1006 | 10014 | 17-JAN-20 | 1 | 109.92 | 109.92 |
| 1007 | 10015 | 17-JAN-20 | 2 | 14.99 | 29.98 |
| 1007 | 10015 | 17-JAN-20 | 1 | 4.99 | 4.99 |
| 1008 | 10011 | 17-JAN-20 | 1 | 9.95 | 9.95 |
| 1008 | 10011 | 17-JAN-20 | 3 | 119.95 | 359.85 |
| 1008 | 10011 | 17-JAN-20 | 5 | 5.87 | 29.35 |
| 1019 | 10020 | 22-JUN-20 | 20 | 17.5 | 350 |

********** **QUERY-10** **********

Write SQL code that will list details of customers who purchased the products CDOOX or PP101. The output must include customer name (combination of FName & LName), product code and date of purchase.

**********

```
SELECT CUSTOMER.FNAME||' '||CUSTOMER.LNAME AS CUST_NAME,P_CODE,P_DATE
  FROM LINE
   JOIN INVOICE USING(INV_NUM)
     JOIN CUSTOMER USING(C_CODE)
       JOIN PRODUCT USING(P_CODE)
         WHERE P_CODE = 'CD00X'
           OR P_CODE = 'PP101'
             ORDER BY P_CODE;
```

| CUST_NAME | P_CODE | P_DATE |
|---|---|---|
| Kathy Smith | CD00X | 20-JAN-20 |
| Kathy Smith | CD00X | 20-JAN-20 |
| Elena Johnson | PP101 | 20-FEB-20 |
| Elena Johnson | PP101 | 20-FEB-20 |

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**INFERENCES OF THE EXPERIMENT**

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Hence , we have successfully establish a multi-relation database and execute SQL queries involving insertions, deletions and updating on it.