*** **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,OWNER
FROM USER_CONSTRAINTS
WHERE TABLE_NAME IN('CUSTOMER','INVOICE','VENDOR','PRODUCT','LINE');
```

```
TABLE_NAME CONSTRAINT_NAME             C OWNER
---------- --------------------------- - -----
CUSTOMER   SYS_C0011365                C CS540
CUSTOMER   SYS_C0011366                C CS540
CUSTOMER   SYS_C0011367                C CS540
CUSTOMER   SYS_C0011368                C CS540
```

```
CUSTOMER   SYS_C0011369                C CS540

CUSTOMER   SYS_C0011370                C CS540

CUSTOMER   CUSTOMER_CK_C_CODE          C CS540

CUSTOMER   CUSTOMER_CK_C_AREA          C CS540

CUSTOMER   CUSTOMER_PK_C_CODE          P CS540

INVOICE    SYS_C0011374                C CS540

INVOICE    SYS_C0011375                C CS540

INVOICE    SYS_C0011376                C CS540

INVOICE    INVOICE_CK_INV_NUM          C CS540

INVOICE    INVOICE_PK_INV_NUM          P CS540

INVOICE    INVOICE_CUSTOMER_FK_C_CODE  R CS540

LINE       SYS_C0011405                C CS540

LINE       LINE_CK_L_NUM               C CS540

LINE       LINE_CK_L_UNITS             C CS540

LINE       LINE_CK_L_PRICE             C CS540

LINE       LINE_PK_INV_NUM_L_NUM       P CS540

LINE       LINE_INVOICE_FK_INV_NUM     R CS540

LINE       LINE_PRODUCT_FK_P_CODE      R CS540


TABLE_NAME CONSTRAINT_NAME             C OWNER

---------- ---------------------------- - -----

LINE       SYS_C0011401                C CS540

LINE       SYS_C0011402                C CS540

LINE       SYS_C0011403                C CS540

LINE       SYS_C0011404                C CS540

PRODUCT    SYS_C0011391                C CS540
```

```
PRODUCT    SYS_C0011392               C CS540

PRODUCT    SYS_C0011393               C CS540

PRODUCT    SYS_C0011394               C CS540

PRODUCT    SYS_C0011395               C CS540

PRODUCT    SYS_C0011396               C CS540

PRODUCT    SYS_C0011397               C CS540

PRODUCT    PRODUCT_CK_P_MIN           C CS540

PRODUCT    PRODUCT_PK_P_CODE          P CS540

VENDOR     SYS_C0011380               C CS540

VENDOR     SYS_C0011381               C CS540

VENDOR     SYS_C0011382               C CS540

VENDOR     SYS_C0011383               C CS540

VENDOR     SYS_C0011384               C CS540

VENDOR     SYS_C0011385               C CS540

VENDOR     SYS_C0011386               C CS540

VENDOR     VENDOR_CK_V_CODE           C CS540

VENDOR     VENDOR_CK_V_AREA           C CS540


TABLE_NAME CONSTRAINT_NAME            C OWNER

---------- -------------------------- - -----

VENDOR     VENDOR_CK_V_STATE          C CS540

VENDOR     VENDOR_PK_V_CODE           P CS540


47 rows selected.
```

****

QUERY 03: Write SQL code to insert a LINE record - 1009, 1, HW15X, 20, 15.50. What are the problems encountered? Assume that the 60 units of the product "Hi Veld Hammer" were supplied by "Indian Masters" located in "KY' at unit price of 15.50 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 (CS540.LINE_PRODUCT_FK_P_CODE) violated -
parent key not found
```

PROBLEM ENCOUNTERED:

The above error came because the table LINE has a foreign key constraint on table INVOICE. Also other tables of SalesCo database were also inter-related.

```
INSERT INTO VENDOR
VALUES(24992,'INDIAN MASTERS','GAURAV',501,2863322,'KY','N');

1 row created.
```

```
INSERT INTO PRODUCT
VALUES('HW15X','HiVeld Hammer','10-JAN-2020',60,15,15.50,0,24992);

1 row created.

INSERT INTO CUSTOMER
VALUES(10020,'PALIWAL','ATHARVA',904,3562098,500);

1 row created.

INSERT INTO INVOICE
VALUES(1009,10020,'22-JAN-2020');

1 row created.

INSERT INTO LINE
VALUES(1009,1,'HW15X',20,15.50);

1 row created.

SELECT * FROM CUSTOMER WHERE C_CODE=10020;

   C_CODE LNAME      FNAME          C_AREA    C_PHONE    BALANCE
--------- ---------- ---------- ---------- ---------- ----------
    10020 PALIWAL    ATHARVA           904    3562098        500
```

SELECT * FROM INVOICE WHERE INV_NUM=1009;

```
   INV_NUM     C_CODE INV_DATE
---------- ---------- ---------
      1009      10020 22-JAN-20
```

SELECT * FROM VENDOR WHERE V_CODE=24992;

```
    V_CODE V_NAME          V_CONTACT                V_AREA    V_PHONE V_ V
---------- --------------- ------------------- ---------- ---------- -- -
     24992 INDIAN MASTERS  GAURAV                      501    2863322 KY N
```

SELECT * FROM PRODUCT WHERE P_CODE='HW15X' AND V_CODE=24992;

```
P_COD DESCRIPT        P_DATE           QTY      P_MIN    P_PRICE     P_DISC    V_CODE
----- --------------- --------- ---------- ---------- ---------- ---------- ---------
HW15X HiVeld Hammer   10-JAN-20         60         15       15.5          0     24992
```

SELECT * FROM LINE WHERE P_CODE='HW15X';

```
   INV_NUM      L_NUM P_COD    L_UNITS    L_PRICE
---------- ---------- ----- ---------- ----------
      1009          1 HW15X         20       15.5
```

****

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 UPPER(DESCRIPT) LIKE '%HAMMER%' OR UPPER(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

5 rows selected.
```

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QUERY 05: Write the SQL code that will list all products which were added to inventory during 2020.

****

```
SELECT P_CODE,DESCRIPT,P_DATE FROM PRODUCT
WHERE P_DATE>='01-JAN-2020';
```

```
P_COD DESCRIPT                      P_DATE
----- ------------------------------ ---------
CL025 Hrd. Spring 1/4in             15-JAN-20
CL050 Hrd. Spring 1/2in             15-JAN-20
CD00X Cordless Drill                20-JAN-20
CH10X Claw Hammer                   20-JAN-20
SH100 Sledge Hammer                 02-JAN-20
HC100 Hicut Chain Saw               07-FEB-20
PP101 PVC Pipe                      20-FEB-20
MC001 Metal Screw                   01-MAR-20
WC025 2.5in wide Screw              24-FEB-20
SM48X Steel Malting Mesh            17-JAN-20
HW15X HiVeld Hammer                 10-JAN-20

11 rows selected.
```

****

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 INV_NUM,INVOICE.C_CODE,INV_DATE FROM INVOICE,CUSTOMER
WHERE CUSTOMER.C_CODE=INVOICE.C_CODE AND UPPER(LNAME)='JOHNSON' AND
UPPER(FNAME)='ELENA';
```

```
   INV_NUM     C_CODE INV_DATE
---------- ---------- ---------
      1002      10011 16-JAN-20
      1005      10011 17-JAN-20
      1008      10011 17-JAN-20

3 rows selected.
```

****

QUERY 07: Write SQL code that will add following records to PRODUCT Table.

ABIII, 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+1,50,12,15.25,0.02,24992);

1 row created.

P_COD DESCRIPT      P_DATE           QTY      P_MIN    P_PRICE     P_DISC     V_CODE
----- -----------   --------- ---------- ---------- ---------- ----------  ---------
AB111 POWER DRILL   16-AUG-20         15          5        125         .1      24992

PP102 PVC PIPE      17-AUG-20         50         12      15.25        .02      24992
```

****

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.

****

```
DELETE FROM VENDOR
WHERE V_CODE=23119;
DELETE FROM VENDOR
*
ERROR at line 1:
ORA-02292: integrity constraint (CS540.PRODUCT_VENDOR_FK_V_CODE) violated -
child record found
```

PROBLEM ENCOUNTERED:

This error is because of foreign key constraints on child table,
giving problem in deleting tuple of parent table.
To remove this error, the foreign key constraint needs to be taken out

```
ALTER TABLE PRODUCT
DROP CONSTRAINT PRODUCT_VENDOR_FK_V_CODE;
```

Table altered.

```
SELECT TABLE_NAME,CONSTRAINT_NAME,CONSTRAINT_TYPE,OWNER
FROM USER_CONSTRAINTS
WHERE TABLE_NAME IN('CUSTOMER') AND CONSTRAINT_TYPE='R';

no rows selected

SELECT * FROM VENDOR
WHERE V_CODE=23119;


    V_CODE V_NAME           V_CONTACT                V_AREA    V_PHONE V_ V
---------- ---------------- -------------------- ---------- ---------- -- -
     23119 Blackman Sisters Svetlana Han               901    3562429 GA Y

DELETE FROM VENDOR
WHERE V_CODE=23119;

1 row deleted.

SELECT * FROM VENDOR
WHERE V_CODE=23119;

no rows selected
```

INSERT INTO VENDOR

VALUES(23119,'Blackman Sisters','Svetlana Han',901,3562429,'GA','Y');

```
    V_CODE V_NAME           V_CONTACT                V_AREA    V_PHONE V_ V
---------- ---------------- -------------------- ---------- ---------- -- -
     23119 Blackman Sisters Svetlana Han                901    3562429 GA Y
```

ALTER TABLE PRODUCT

ADD CONSTRAINT PRODUCT_VENDOR_FK_V_CODE FOREIGN KEY(V_CODE) REFERENCES VENDOR(V_CODE);

Table altered.

SELECT * FROM VENDOR

WHERE V_CODE=23119;

```
    V_CODE V_NAME           V_CONTACT                V_AREA    V_PHONE V_ V
---------- ---------------- -------------------- ---------- ---------- -- -
     23119 Blackman Sisters Svetlana Han                901    3562429 GA Y
```

****

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 VENDOR.V_CODE,V_NAME,P_CODE,DESCRIPT,V_CONTACT,P_DATE FROM VENDOR,PRODUCT
WHERE UPPER(V_STATE)='KY' AND VENDOR.V_CODE=PRODUCT.V_CODE
ORDER BY VENDOR.V_CODE;
```

V_CODE	V_NAME	P_COD	DESCRIPT	V_CONT	P_DATE
21344	Gomez Sons	SB900	9.00 in Saw Blade	Mark Welder	13-NOV-19
21344	Gomez Sons	SB725	7.25in Saw Blade	Mark Welder	13-DEC-19
21344	Gomez Sons	RF100	Rat Tail File	Mark Welder	15-DEC-19
24992	INDIAN MASTERS	AB111	Power Drill	GAURAV	14-AUG-20
24992	INDIAN MASTERS	PP102	PVC Pipe	GAURAV	15-AUG-20
24992	INDIAN MASTERS	HW15X	HiVeld Hammer	GAURAV	10-JAN-20

6 rows selected.

****

QUERY 10: Write SQL code that will list details of customers who purchased the products CDOOX or P P101. The output must include customer name (combination of FName & LName), product code and date of purchase.

****

```
SELECT DISTINCT FNAME||' '||LNAME "CUST_NAME",P_CODE,INV_DATE FROM
CUSTOMER,INVOICE,LINE
WHERE CUSTOMER.C_CODE=INVOICE.C_CODE AND INVOICE.INV_NUM=LINE.INV_NUM AND
(P_CODE='CD00X' OR P_CODE='PP101')
```

```
CUST_NAME             P_COD INV_DATE
--------------------- ----- ---------
Kathy Smith           CD00X 16-JAN-20
Elena Johnson         PP101 17-JAN-20
```

****

QUERY 11: Write SQL code that for each customer lists invoices in decreasing order. You must but keep ascending sequence for customers in the output. The output should show customer code,invoice number, line units and line price.

****

```
SELECT CUSTOMER.C_CODE,INVOICE.INV_NUM,L_UNITS,L_PRICE FROM CUSTOMER,INVOICE,LINE
WHERE CUSTOMER.C_CODE=INVOICE.C_CODE AND INVOICE.INV_NUM=LINE.INV_NUM
ORDER BY INV_NUM DESC;
```

C_CODE	INV_NUM	L_UNITS	L_PRICE
10020	1009	20	15.5
10011	1008	5	5.87
10011	1008	3	119.95
10011	1008	1	9.95
10015	1007	1	4.99
10015	1007	2	14.99
10014	1006	3	6.99
10014	1006	1	109.92
10014	1006	1	9.95

10014	1006	1	256.99
10011	1005	12	5.87
10018	1004	2	9.95
10018	1004	3	4.99
10012	1003	1	39.95
10012	1003	1	38.95
10012	1003	5	14.99
10011	1002	2	4.99
10014	1001	1	9.95
10014	1001	1	14.99

19 rows selected.

****

QUERY 12: Write SQL code that will modify Query-Il, to include the subtotals for each of the line with invoice numbers. [You are required compute a derived column SUBTOTAL as L_UNITS * LPRICE].

****

```
SELECT CUSTOMER.C_CODE,INVOICE.INV_NUM,L_UNITS,L_PRICE,LINE.L_UNITS*LINE.L_PRICE AS
SUBTOTAL FROM CUSTOMER,INVOICE,LINE

WHERE CUSTOMER.C_CODE=INVOICE.C_CODE AND INVOICE.INV_NUM=LINE.INV_NUM

ORDER BY INV_NUM DESC;
```

C_CODE	INV_NUM	L_UNITS	L_PRICE	SUBTOTAL
10020	1009	20	15.5	310

10011	1008	5	5.87	29.35
10011	1008	3	119.95	359.85
10011	1008	1	9.95	9.95
10015	1007	1	4.99	4.99
10015	1007	2	14.99	29.98
10014	1006	3	6.99	20.97
10014	1006	1	109.92	109.92
10014	1006	1	9.95	9.95
10014	1006	1	256.99	256.99
10011	1005	12	5.87	70.44
10018	1004	2	9.95	19.9
10018	1004	3	4.99	14.97
10012	1003	1	39.95	39.95
10012	1003	1	38.95	38.95
10012	1003	5	14.99	74.95
10011	1002	2	4.99	9.98
10014	1001	1	9.95	9.95
10014	1001	1	14.99	14.99

19 rows selected.

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VIVA VOICE

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QUESTION 1: Bring out differences among super key, candidate key and primary key.

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Super Key - A super key is a group of single or multiple keys which identifies rows in a table.

Primary Key - is a column or group of columns in a table that uniquely identify every row in that table.

Candidate Key - is a set of attributes that uniquely identify tuples in a table.

****

QUESTION 2: Differentiate between primary key constraint and unique constraint.

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1.Primary key will not accept NULL values whereas Unique key can accept one NULL value.

2.A table can have only primary key whereas there can be multiple unique key on a table.

3.A Clustered index automatically created when a primary key is defined whereas Unique key generates the non-clustered index.

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3. How DROP TABLE differs from TRUNCATE?

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1. DROP :

DROP is a DDL(Data Definition Language) command and is used to remove table definition and indexes, data, constraints, triggers etc for that table.

Performance-wise the DROP command is quick to perform but slower than TRUNCATE because it gives rise to complications.

Unlike DELETE we can't rollback the data after using the DROP command. In the DROP command, table space is freed from memory because it permanently delete table as well as all its contents.

Syntax of DROP command –

```
DROP TABLE table_name;
```

2. TRUNCATE :

TRUNCATE is a DDL(Data Definition Language) command. It is used to delete all the tuples from the table. Like the DROP command, the TRUNCATE command also does not contain a WHERE clause.The TRUNCATE command is faster than both the DROP and the DELETE command. Like the DROP command we also can't rollback the data after using the this command.

Syntax of TRUNCATE command –

```
TRUNCATE TABLE table_name;
```

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QUESTION 4: How does DEFAULT differ from CHECK constraint?

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The CHECK constraint in SQL is basically used to put a value limit on the values that can be put in a column. A DEFAULT constraint, on the other hand, is used to assign default values to the columns.

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INFERENCES:

Studied and learnt about:

- Establishing an environment for executing the queries based on the logical schemata and the database structuring.
- Differences among super key, candidate key and primary key.