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REG NO: 22MCA0223

1. Implement the following object diagram and test the implementation in a PL/SQL block.

TYPE AND TABLE CREATION

```
CREATE OR REPLACE TYPE EMPLOYEE_TYPE AS
    OBJECT (
        ID NUMBER,
        NAME VARCHAR(50),
        ADDRESS VARCHAR(100),
        HIRE_DATE DATE,
        MEMBER FUNCTION GETEXPERIENCE RETURN NUMBER,
        MEMBER FUNCTION GETID RETURN NUMBER,
        MEMBER PROCEDURE DISPLAYEMPDETAIL,
        STATIC FUNCTION GETEMP(EMPID NUMBER) RETURN EMPLOYEE_TYPE,
        STATIC PROCEDURE INSERT_EMPLOYEE(EMPID NUMBER, EMPNAME VARCHAR,
EMPADDRESS VARCHAR, EMPHIRE_DATE DATE),
        STATIC PROCEDURE DELETE_EMPLOYEE(EMPID NUMBER)
    );
```

```
/

CREATE TABLE EMPLOYEE OF EMPLOYEE_TYPE;

CREATE OR REPLACE TYPE BODY EMPLOYEE_TYPE AS
    MEMBER FUNCTION GETEXPERIENCE RETURN NUMBER IS
    BEGIN
        RETURN TRUNC(MONTHS_BETWEEN(SYSDATE, SELF.HIRE_DATE)/12);
    END GETEXPERIENCE;
    MEMBER FUNCTION GETID RETURN NUMBER IS
    BEGIN
        RETURN SELF.ID;
    END GETID;
    MEMBER PROCEDURE DISPLAYEMPDETAIL IS
    BEGIN
        DBMS_OUTPUT.PUT_LINE('ID: '
            || SELF.ID);
        DBMS_OUTPUT.PUT_LINE('Name: '
            || SELF.NAME);
        DBMS_OUTPUT.PUT_LINE('Address: '
            || SELF.ADDRESS);
        DBMS_OUTPUT.PUT_LINE('Hire date: '
            || TO_CHAR(SELF.HIRE_DATE, 'DD-MON-YYYY'));
    END DISPLAYEMPDETAIL;
    STATIC FUNCTION GETEMP(
        EMPID NUMBER
    ) RETURN EMPLOYEE_TYPE AS
        EMP EMPLOYEE_TYPE;
    BEGIN
        SELECT
            EMPLOYEE_TYPE(ID,
            NAME,
```

```
            ADDRESS,
            HIRE_DATE) INTO EMP
        FROM
            EMPLOYEE
        WHERE
            ID = EMPID;
        RETURN EMP;
    END GETEMP;
    STATIC PROCEDURE INSERT_EMPLOYEE(
        EMPID NUMBER,
        EMPNAME VARCHAR,
        EMPADDRESS VARCHAR,
        EMPHIRE_DATE DATE
    ) IS
    BEGIN
        INSERT INTO EMPLOYEE VALUES (
            EMPID,
            EMPNAME,
            EMPADDRESS,
            EMPHIRE_DATE
        );
    END INSERT_EMPLOYEE;
    STATIC PROCEDURE DELETE_EMPLOYEE(
        EMPID NUMBER
    ) IS
    BEGIN
        DELETE FROM EMPLOYEE
        WHERE
            ID = EMPID;
    END DELETE_EMPLOYEE;
END;
/
```

INSERTION

```
INSERT INTO EMPLOYEE VALUES(
    2201,
    'E1',
    'A1',
    '18-MAR-10'
);

INSERT INTO EMPLOYEE VALUES(
    2202,
    'E2',
    'A2',
    '04-FEB-14'
);

INSERT INTO EMPLOYEE VALUES(
    2203,
    'E3',
    'A3',
    '10-JUN-12'
);

INSERT INTO EMPLOYEE VALUES(
    2204,
    'E4',
    'A4',
    '12-JUL-21'
);
```

PROCEDURE DEMONSTRATION

```
SELECT
    *
FROM
    EMPLOYEE;

EXEC EMPLOYEE_TYPE.INSERT_EMPLOYEE(2205, 'E5', 'A5', '17-SEP-09');

SELECT
    *
FROM
    EMPLOYEE;

DECLARE
    EMP EMPLOYEE_TYPE;
BEGIN
    EMP := EMPLOYEE_TYPE.GETEMP(2202);
    EMP.DISPLAYEMPDETAIL;
    DBMS_OUTPUT.PUT_LINE('EXPERIENCE(YEARS) : '
        || EMP.GETEXPERIENCE);
END;
/

SELECT
    *
FROM
    EMPLOYEE;

EXEC EMPLOYEE_TYPE.DELETE_EMPLOYEE(2201);
```

```
SELECT
    *
FROM
    EMPLOYEE;
```

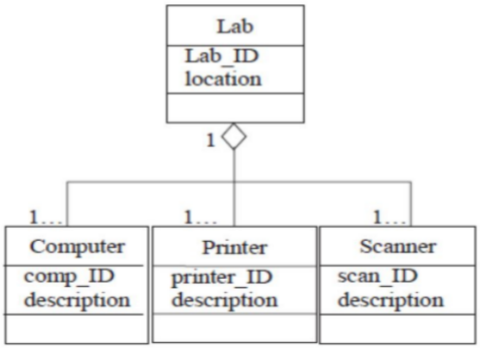
OUTPUT

```
Type created.

Table created.

Type body created.

0 rows deleted.

1 row created.

1 row created.

1 row created.

1 row created.
```

```
   ID NAME                 ADDRESS              HIRE_DATE
----- -------------------- -------------------- --------------------
 2201 E1                   A1                   18-MAR-10
 2202 E2                   A2                   04-FEB-14
 2203 E3                   A3                   10-JUN-12
 2204 E4                   A4                   12-JUL-21


PL/SQL procedure successfully completed.


   ID NAME                 ADDRESS              HIRE_DATE
----- -------------------- -------------------- --------------------
 2201 E1                   A1                   18-MAR-10
 2202 E2                   A2                   04-FEB-14
 2203 E3                   A3                   10-JUN-12
 2204 E4                   A4                   12-JUL-21
 2205 E5                   A5                   17-SEP-09

ID: 2202
Name: E2
Address: A2
Hire date: 04-FEB-2014
EXPERIENCE(YEARS) : 8

PL/SQL procedure successfully completed.
```

```
   ID NAME                 ADDRESS              HIRE_DATE
----- -------------------- -------------------- --------------------
 2201 E1                   A1                   18-MAR-10
 2202 E2                   A2                   04-FEB-14
 2203 E3                   A3                   10-JUN-12
 2204 E4                   A4                   12-JUL-21
 2205 E5                   A5                   17-SEP-09


PL/SQL procedure successfully completed.


   ID NAME                 ADDRESS              HIRE_DATE
----- -------------------- -------------------- --------------------
 2202 E2                   A2                   04-FEB-14
 2203 E3                   A3                   10-JUN-12
 2204 E4                   A4                   12-JUL-21
 2205 E5                   A5                   17-SEP-09
```

2. Implement the following object oriented diagram relating to assets in a computer laboratory. Execute insert statements for entering data into the tables so created.



TYPE AND TABLE CREATION

```
CREATE TYPE COMPUTER_TYPE AS
    OBJECT (
        COMP_ID INT,
        DESCRIPTION VARCHAR(20)
    );
/

CREATE TYPE PRINTER_TYPE AS
    OBJECT (
        PRINTER_ID INT,
        DESCRIPTION VARCHAR(20)
    );
/

CREATE TYPE SCANNER_TYPE AS
    OBJECT (
        SCANNER_ID INT,
        DESCRIPTION VARCHAR(20)
    );
/

CREATE TYPE LAB_TYPE AS
    OBJECT (
```

```
        LAB_ID INT,
        LOCATION VARCHAR(20),
        COMP_REF REF COMPUTER_TYPE,
        PRINT_REF REF PRINTER_TYPE,
        SCAN_REF REF SCANNER_TYPE
    );
/

CREATE TABLE LAB OF LAB_TYPE;

CREATE TABLE COMPUTER OF COMPUTER_TYPE;

CREATE TABLE PRINTER OF PRINTER_TYPE;

CREATE TABLE SCANNER OF SCANNER_TYPE;
```

INSERTION

```
INSERT INTO COMPUTER VALUES(
    COMPUTER_TYPE(1, 'C1')
);

INSERT INTO COMPUTER VALUES(
    COMPUTER_TYPE(2, 'C2')
);

INSERT INTO COMPUTER VALUES(
    COMPUTER_TYPE(3, 'C3')
);

INSERT INTO COMPUTER VALUES(
    COMPUTER_TYPE(4, 'C4')
);
```

```
INSERT INTO COMPUTER VALUES(
    COMPUTER_TYPE(5, 'C5')
);

INSERT INTO PRINTER VALUES(
    PRINTER_TYPE(1, 'P1')
);

INSERT INTO PRINTER VALUES(
    PRINTER_TYPE(2, 'P2')
);

INSERT INTO PRINTER VALUES(
    PRINTER_TYPE(3, 'P3')
);

INSERT INTO PRINTER VALUES(
    PRINTER_TYPE(4, 'P4')
);

INSERT INTO PRINTER VALUES(
    PRINTER_TYPE(5, 'P5')
);

INSERT INTO SCANNER VALUES(
    SCANNER_TYPE(1, 'S1')
);

INSERT INTO SCANNER VALUES(
    SCANNER_TYPE(2, 'S2')
);
```

```
INSERT INTO SCANNER VALUES(
    SCANNER_TYPE(3, 'S3')
);

INSERT INTO SCANNER VALUES(
    SCANNER_TYPE(4, 'S4')
);

INSERT INTO SCANNER VALUES(
    SCANNER_TYPE(5, 'S5')
);

INSERT INTO LAB
    SELECT
        LAB_TYPE(1,
        'L',
        REF(C),
        REF(P),
        REF(S))
    FROM
        COMPUTER C,
        PRINTER  P,
        SCANNER  S
    WHERE
        COMP_ID = 1
        AND SCANNER_ID = 1
        AND PRINTER_ID = 1;

INSERT INTO LAB
    SELECT
        LAB_TYPE(2,
```

```
        'L2',
        REF(C),
        REF(P),
        REF(S))
    FROM
        COMPUTER C,
        PRINTER  P,
        SCANNER  S
    WHERE
        COMP_ID = 2
        AND SCANNER_ID = 2
        AND PRINTER_ID = 2;

INSERT INTO LAB
    SELECT
        LAB_TYPE(3,
        'L3',
        REF(C),
        REF(P),
        REF(S))
    FROM
        COMPUTER C,
        PRINTER  P,
        SCANNER  S
    WHERE
        COMP_ID = 3
        AND SCANNER_ID = 3
        AND PRINTER_ID = 3;

INSERT INTO LAB
    SELECT
        LAB_TYPE(4,
```

```
        'L4',
        REF(C),
        REF(P),
        REF(S))
    FROM
        COMPUTER C,
        PRINTER  P,
        SCANNER  S
    WHERE
        COMP_ID = 4
        AND SCANNER_ID = 4
        AND PRINTER_ID = 4;

INSERT INTO LAB
    SELECT
        LAB_TYPE(5,
        'L5',
        REF(C),
        REF(P),
        REF(S))
    FROM
        COMPUTER C,
        PRINTER  P,
        SCANNER  S
    WHERE
        COMP_ID = 5
        AND SCANNER_ID = 5
        AND PRINTER_ID = 5;
```

SHOW TABLES

```
SELECT
    *
FROM
    COMPUTER;
SELECT
    *
FROM
    PRINTER;
SELECT
    *
FROM
    SCANNER;
SELECT
    *
FROM
    LAB;
```

OUTPUT

```
Type created.

Type created.

Type created.

Type created.

Table created.

Table created.

Table created.

Table created.

1 row created.
```

```
COMP_ID DESCRIPTION
------- --------------------
      1 C1
      2 C2
      3 C3
      4 C4
      5 C5

PRINTER_ID DESCRIPTION
---------- --------------------
         1 P1
         2 P2
         3 P3
         4 P4
         5 P5

SCANNER_ID DESCRIPTION
---------- --------------------
         1 S1
         2 S2
         3 S3
         4 S4
         5 S5
```

LAB_ID	LOCATION	COMP_REF	PRINT_REF	SCAN_REF
1	L	0000220208900012AF99 004147AA9163428FFEF3 361140682883D44B9E92 5083A9709063FC	00002202087BD0A97A40 724D11849CBAB1FF85CD 9C7F06341FC1A5421DB7 8AAF9D5CE3C21F	00002202082030EB6C64 2C4AC5B4ACE1DAB75A6D 790FF7E00B53C149CF80 6927F7151C531D
2	L2	0000220208BA1DD343BB C14B3CB34245CDDA2BD9 B01140682883D44B9E92 5083A9709063FC	0000220208F27D5BCF52 CA44E6A097A2487E3586 567F06341FC1A5421DB7 8AAF9D5CE3C21F	0000220208CAE280B9C3 D54A4982CD75A7E2901B D90FF7E00B53C149CF80 6927F7151C531D
3	L3	00002202081F3D5776FC	0000220208DBB97037C1	00002202083DC3FEE64B

LAB_ID	LOCATION	COMP_REF	PRINT_REF	SCAN_REF
		0745DBB0373EBB9B8066 1D1140682883D44B9E92 5083A9709063FC	E141F1A86033BDBF8D9D 687F06341FC1A5421DB7 8AAF9D5CE3C21F	2E4BFEAE141B98226A10 9B0FF7E00B53C149CF80 6927F7151C531D
4	L4	000022020872680CF9EC 7C4490A0264F988ACB9A 4B1140682883D44B9E92 5083A9709063FC	0000220208050D995568 8641C392452A7540991E 8A7F06341FC1A5421DB7 8AAF9D5CE3C21F	000022020808F3E6C11A 01411EB3E7B914F0ADAC A90FF7E00B53C149CF80 6927F7151C531D
5	L5	0000220208EA1BF8D40A 3D49438A55DFC42D4C3E	00002202085CA1D1FA5B 4B494585EA58DA1D304F	00002202083425F3C038 824E3AAAB6C1F9639421

LAB_ID	LOCATION	COMP_REF	PRINT_REF	SCAN_REF
		381140682883D44B9E92 5083A9709063FC	147F06341FC1A5421DB7 8AAF9D5CE3C21F	FF0FF7E00B53C149CF80 6927F7151C531D

3. Implement the following object oriented diagram relating to assets in a computer laboratory. Execute insert statements for entering data into the tables so created.

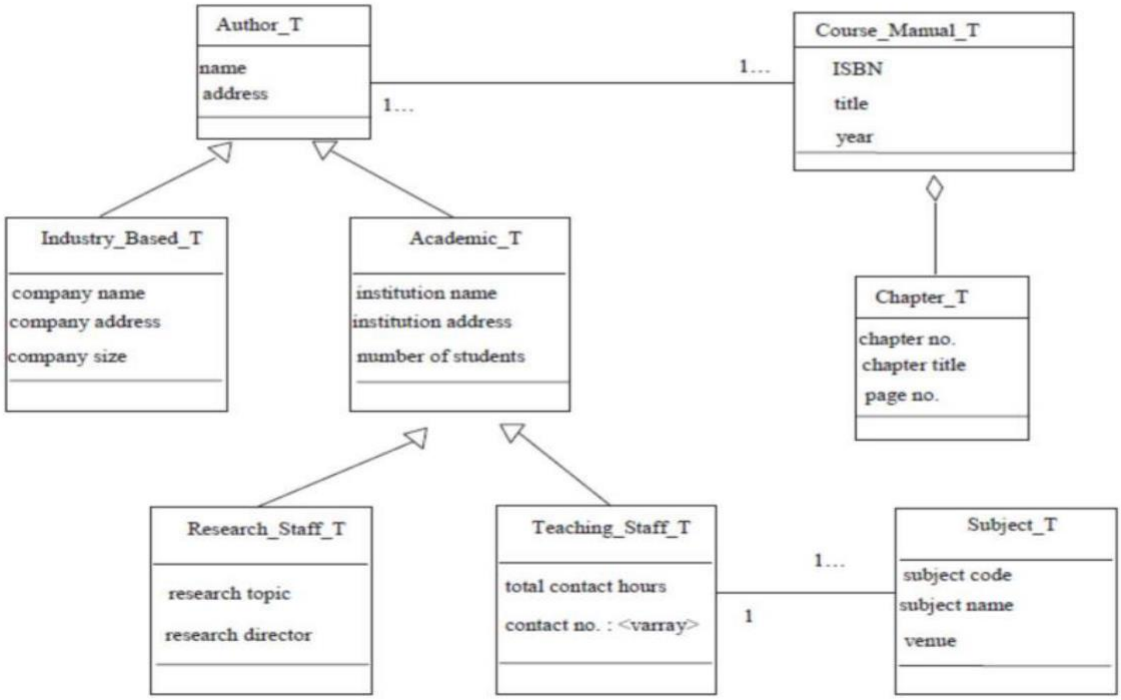


TABLE AND TYPE CREATION

```
CREATE OR REPLACE TYPE AUTHOR_T AS
    OBJECT(
        NAME VARCHAR(20),
        ADDRESS VARCHAR(20)
    )NOT FINAL;
/

CREATE OR REPLACE TYPE INDUSTRY_T UNDER AUTHOR_T(
    C_NAME VARCHAR(20),
    C_ADDR VARCHAR(20),
    C_SIZE INT
);
/
```

```
CREATE OR REPLACE TYPE ACADEMIC_T UNDER AUTHOR_T(
    I_NAME VARCHAR(20),
    I_ADDR VARCHAR(20),
    I_SIZE INT
)NOT FINAL;
/

CREATE OR REPLACE TYPE RESEARCH_T UNDER ACADEMIC_T(
    R_TOPIC VARCHAR(20),
    R_DIRECTOR VARCHAR(20)
);
/

CREATE OR REPLACE TYPE TEACHING_T UNDER ACADEMIC_T(
    C_HOURS INT,
    C_NO NUMBER
);
/

CREATE OR REPLACE TYPE CHAPTER_T AS
    OBJECT(
        C_NO INT,
        C_TITLE VARCHAR(20),
        PG_NO INT
    );
/

CREATE OR REPLACE TYPE COURSE_MANUAL_T AS
    OBJECT(
        ISBN NUMBER,
        TITLE VARCHAR(20),
        YEAR INT,
```

```
        CHAP_REF REF CHAPTER_T
    );
/

CREATE OR REPLACE TYPE SUBJECT_T AS
    OBJECT(
        S_CODE INT,
        S_NAME VARCHAR(20),
        VENUE VARCHAR(20),
        TEACHING_REF REF TEACHING_T
    );
/

CREATE OR REPLACE TYPE AUTH_COUR_T AS
    OBJECT(
        AUTHOR_REF REF AUTHOR_T,
        COURSE_REF REF COURSE_MANUAL_T
    );
/

CREATE TABLE AUTHOR OF AUTHOR_T;

CREATE TABLE INDUSTRY OF INDUSTRY_T;

CREATE TABLE ACADEMIC OF ACADEMIC_T;

CREATE TABLE RESEARCH OF RESEARCH_T;

CREATE TABLE TEACHING OF TEACHING_T;

CREATE TABLE CHAPTER OF CHAPTER_T;
```

```
CREATE TABLE COURSE_MANUAL OF COURSE_MANUAL_T;

CREATE TABLE SUBJECT OF SUBJECT_T;

CREATE TABLE AUTH_COUR OF AUTH_COUR_T;
```

INSERTION

```
INSERT INTO AUTHOR VALUES(
    AUTHOR_T('AR1', 'AD1')
);

INSERT INTO AUTHOR VALUES(
    AUTHOR_T('AR2', 'AD2')
);

INSERT INTO AUTHOR VALUES(
    AUTHOR_T('AR3', 'AD3')
);

INSERT INTO AUTHOR VALUES(
    AUTHOR_T('AR4', 'AD4')
);

INSERT INTO AUTHOR VALUES(
    AUTHOR_T('AR5', 'AD5')
);

INSERT INTO AUTHOR VALUES(
    AUTHOR_T('AR6', 'AD6')
);

INSERT INTO AUTHOR VALUES(
```

```
    AUTHOR_T('AR7', 'AD8')
);

INSERT INTO AUTHOR VALUES(
    AUTHOR_T('AR8', 'AD8')
);

INSERT INTO INDUSTRY
    SELECT
        AUTHOR.NAME,
        AUTHOR.ADDRESS,
        'GOOGLE',
        AUTHOR.ADDRESS,
        10
    FROM
        AUTHOR
    WHERE
        AUTHOR.NAME = 'AR1';

INSERT INTO INDUSTRY
    SELECT
        AUTHOR.NAME,
        AUTHOR.ADDRESS,
        'MICROSOFT',
        AUTHOR.ADDRESS,
        11
    FROM
        AUTHOR
    WHERE
        AUTHOR.NAME = 'AR2';

INSERT INTO INDUSTRY
```

```
    SELECT
        AUTHOR.NAME,
        AUTHOR.ADDRESS,
        'AMAZON',
        AUTHOR.ADDRESS,
        87
    FROM
        AUTHOR
    WHERE
        AUTHOR.NAME = 'AR3';

INSERT INTO INDUSTRY
    SELECT
        AUTHOR.NAME,
        AUTHOR.ADDRESS,
        'NETFLIX',
        AUTHOR.ADDRESS,
        90
    FROM
        AUTHOR
    WHERE
        AUTHOR.NAME = 'AR3';

INSERT INTO ACADEMIC
    SELECT
        AUTHOR.NAME,
        AUTHOR.ADDRESS,
        'VIT',
        'VELLORE',
        70
    FROM
        AUTHOR
```

```
    WHERE
        AUTHOR.NAME = 'AR4';

INSERT INTO ACADEMIC
    SELECT
        AUTHOR.NAME,
        AUTHOR.ADDRESS,
        'MIT',
        'PUNE',
        15
    FROM
        AUTHOR
    WHERE
        AUTHOR.NAME = 'AR5';

INSERT INTO ACADEMIC
    SELECT
        AUTHOR.NAME,
        AUTHOR.ADDRESS,
        'KJS',
        'MUMBAI',
        34
    FROM
        AUTHOR
    WHERE
        AUTHOR.NAME = 'AR6';

INSERT INTO ACADEMIC
    SELECT
        AUTHOR.NAME,
        AUTHOR.ADDRESS,
        'VIT',
```

```
        'VELLORE',
        67
    FROM
        AUTHOR
    WHERE
        AUTHOR.NAME = 'AR7';
INSERT INTO TEACHING
    SELECT
        A.NAME,
        A.ADDRESS,
        A.I_NAME,
        A.I_ADDR,
        A.I_SIZE,
        8,
        9234125462
    FROM
        ACADEMIC A
    WHERE
        A.NAME = 'AR8';

INSERT INTO TEACHING
    SELECT
        A.NAME,
        A.ADDRESS,
        A.I_NAME,
        A.I_ADDR,
        A.I_SIZE,
        6,
        9435127865
    FROM
        ACADEMIC A
    WHERE
```

```
        A.NAME = 'AR2';

INSERT INTO TEACHING
    SELECT
        A.NAME,
        A.ADDRESS,
        A.I_NAME,
        A.I_ADDR,
        A.I_SIZE,
        2,
        7089654423
    FROM
        ACADEMIC A
    WHERE
        A.NAME = 'AR3';

INSERT INTO TEACHING
    SELECT
        A.NAME,
        A.ADDRESS,
        A.I_NAME,
        A.I_ADDR,
        A.I_SIZE,
        5,
        6998745237
    FROM
        ACADEMIC A
    WHERE
        A.NAME = 'AR4';
INSERT INTO CHAPTER VALUES(
    CHAPTER_T(1, 'SEARCHING', 134)
);
```

```
INSERT INTO CHAPTER VALUES(
    CHAPTER_T(2, 'SORTING', 143)
);

INSERT INTO CHAPTER VALUES(
    CHAPTER_T(3, 'GRAPHS', 267)
);

INSERT INTO CHAPTER VALUES(
    CHAPTER_T(4, 'TREES', 200)
);
INSERT INTO COURSE_MANUAL
    SELECT
        COURSE_MANUAL_T(1111,
        'DSA',
        2018,
        REF(C))
    FROM
        CHAPTER C
    WHERE
        C_NO = 1;

INSERT INTO COURSE_MANUAL
    SELECT
        COURSE_MANUAL_T(2222,
        'DBMS',
        2015,
        REF(C))
    FROM
        CHAPTER C
    WHERE
```

```
        C_NO = 2;

INSERT INTO COURSE_MANUAL
    SELECT
        COURSE_MANUAL_T(3333,
        'DCN',
        1999,
        REF(C))
    FROM
        CHAPTER C
    WHERE
        C_NO = 3;

INSERT INTO COURSE_MANUAL
    SELECT
        COURSE_MANUAL_T(4444,
        'DSA',
        2016,
        REF(C))
    FROM
        CHAPTER C
    WHERE
        C_NO = 4;
INSERT INTO SUBJECT
    SELECT
        SUBJECT_T(1111,
        'OOSE',
        'SJT 103',
        REF(T))
    FROM
        TEACHING T
    WHERE
```

```
        T.NAME = 'AR2';

INSERT INTO SUBJECT
    SELECT
        SUBJECT_T(2222,
        'CC',
        'SJT 103',
        REF(T))
    FROM
        TEACHING T
    WHERE
        T.NAME = 'AR3';

INSERT INTO SUBJECT
    SELECT
        SUBJECT_T(3333,
        'OS',
        'SVM 211',
        REF(T))
    FROM
        TEACHING T
    WHERE
        T.NAME = 'AR4';

INSERT INTO SUBJECT
    SELECT
        SUBJECT_T(4444,
        'ASM',
        'PRP 103',
        REF(T))
    FROM
        TEACHING T
```

```
    WHERE
        T.NAME = 'AR8';
INSERT INTO AUTH_COUR
    SELECT
        AUTH_COUR_T(REF(A),
        REF(C))
    FROM
        AUTHOR        A,
        COURSE_MANUAL C
    WHERE
        A.NAME = 'AR1'
        AND C.ISBN = 1111;

INSERT INTO AUTH_COUR
    SELECT
        AUTH_COUR_T(REF(A),
        REF(C))
    FROM
        AUTHOR        A,
        COURSE_MANUAL C
    WHERE
        A.NAME = 'AR5'
        AND C.ISBN = 2222;

INSERT INTO AUTH_COUR
    SELECT
        AUTH_COUR_T(REF(A),
        REF(C))
    FROM
        AUTHOR        A,
        COURSE_MANUAL C
    WHERE
```

```
        A.NAME = 'AR6'
        AND C.ISBN = 3333;

INSERT INTO AUTH_COUR
    SELECT
        AUTH_COUR_T(REF(A),
        REF(C))
    FROM
        AUTHOR        A,
        COURSE_MANUAL C
    WHERE
        A.NAME = 'AR3'
        AND C.ISBN = 4444;
```

DISPLAY TABLES

```
SELECT
    *
FROM
    AUTHOR;

SELECT
    *
FROM
    INDUSTRY;

SELECT
    *
FROM
    ACADEMIC;

SELECT
    *
```

```
FROM
    TEACHING;

SELECT
    *
FROM
    CHAPTER;

SELECT
    *
FROM
    COURSE_MANUAL;

SELECT
    *
FROM
    SUBJECT;

SELECT
    *
FROM
    AUTH_COUR;
```

OUTPUT

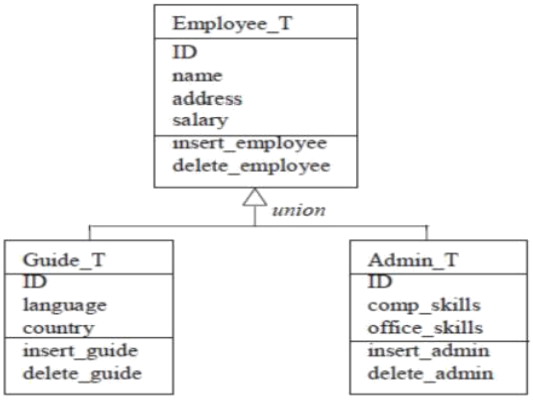
```
NAME                 ADDRESS
-------------------- --------------------
AR1                  AD1
AR2                  AD2
AR3                  AD3
AR4                  AD4
AR5                  AD5
AR6                  AD6
AR7                  AD8
AR8                  AD8

NAME                 ADDRESS              C_NAME               C_ADDR                 C_SIZE
-------------------- -------------------- -------------------- -------------------- ----------
AR1                  AD1                  GOOGLE               AD1                        10
AR2                  AD2                  MICROSOFT            AD2                        11
AR3                  AD3                  AMAZON               AD3                        87
AR3                  AD3                  NETFLIX              AD3                        90

NAME                 ADDRESS              I_NAME               I_ADDR                 I_SIZE
-------------------- -------------------- -------------------- -------------------- ----------
AR4                  AD4                  VIT                  VELLORE                    70
AR5                  AD5                  MIT                  PUNE                       15
AR6                  AD6                  KJS                  MUMBAI                     34
AR7                  AD8                  VIT                  VELLORE                    67
```

```
NAME                 ADDRESS              I_NAME               I_ADDR                 I_SIZE    C_HOURS       C_NO
-------------------- -------------------- -------------------- -------------------- ---------- ---------- ----------
AR4                  AD4                  VIT                  VELLORE                    70          5 6998745237

      C_NO C_TITLE                  PG_NO
---------- -------------------- ----------
         1 SEARCHING                   134
         2 SORTING                     143
         3 GRAPHS                      267
         4 TREES                       200

      ISBN TITLE                    YEAR CHAP_REF
---------- -------------------- ---------- --------------------
      1111 DSA                      2018 0000220208AFA6E710BA
                                         F6429080814A10661214
                                         500BB6A0F126954F0DAD
                                         6281DAE615AE77

      2222 DBMS                     2015 00002202087C932C00EF
                                         AC4E5FBC5A8FEC09125A
                                         6C0BB6A0F126954F0DAD
                                         6281DAE615AE77

      3333 DCN                      1999 00002202081573ECA353
```

```
      ISBN TITLE                     YEAR CHAP_REF
---------- -------------------- ---------- --------------------
                                          6149D19F1A4AA61F5AE6
                                          EC0BB6A0F126954F0DAD
                                          6281DAE615AE77

      4444 DSA                       2016 0000220208A765CCE973
                                          6C46809ACDB16BADD5F8
                                          E00BB6A0F126954F0DAD
                                          6281DAE615AE77


    S_CODE S_NAME               VENUE                TEACHING_REF
---------- -------------------- -------------------- --------------------
      3333 OS                   SVM 211              00002202089BC4AD7AA2
                                                     4E42F8B12F2A4954FCA4
                                                     9254FA4DBA20DA4CB3AF
                                                     C934C28A0B4020


AUTHOR_REF           COURSE_REF
-------------------- --------------------
000022020838313 88F37 00002202083A878C0710
0C4E41BDE844D2EFF058 67493EB0E25F9E031674
1896218FC1A7464EE984 22A0DBB920FABF4F6F81
E48B03E1979E90       BC0F86F3EF384A
```

```
0000220208020C7A8A5F 00002202087013BD9538
A84D3383723F7956D983 A94F22A31BFA2866AEA7
D096218FC1A7464EE984 FAA0DBB920FABF4F6F81
E48B03E1979E90       BC0F86F3EF384A

0000220208FBBA978992 0000220208F92609FFE3

AUTHOR_REF           COURSE_REF
-------------------- --------------------
CE49ACAA8D8A688B0FC3 0E413793B39D8C0472E5
F896218FC1A7464EE984 3DA0DBB920FABF4F6F81
E48B03E1979E90       BC0F86F3EF384A

000022020896366802D8 0000220208DBE8BA3107
FA42E4ACDC02745FB58C 3B4937A10C24D4AC0810
F596218FC1A7464EE984 59A0DBB920FABF4F6F81
E48B03E1979E90       BC0F86F3EF384A
```

4. Giant Travel is a well-known travel agency that operates guided tours. With offices around the world, they maintain accurate and detailed employee data. The employee data are kept in an object Employee_T and can be divided into two child objects: Guide_T and Admin_T. An employee can be categorized as a guide or an administration staff, but he or she can also be both. This is important because in the peak season, an administration worker might be needed to guide the tours and vice versa. The objects and the attributes are shown below.



Implement the following object oriented diagram relating to assets in a computer laboratory. Execute insert statements for entering data into the tables so created.

```
CREATE OR REPLACE TYPE EMPLOYEE_T AS
    OBJECT(
        ID NUMBER,
        NAME VARCHAR(20),
        ADDRESS VARCHAR(20),
        SALARY NUMBER,
        STATIC PROCEDURE INSERT_EMPLOYEE(EID NUMBER, ENAME VARCHAR,
EADDRESS VARCHAR, SALARY NUMBER),
        STATIC PROCEDURE DELETE_EMPLOYEE(EID NUMBER)
    )NOT FINAL;
/

CREATE TABLE EMPLOYEE2 OF EMPLOYEE_T;

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'DESCRIBE EMPLOYEE2');
END;
```

```
/

DESC EMPLOYEE2;

CREATE OR REPLACE TYPE BODY EMPLOYEE_T AS
    STATIC PROCEDURE INSERT_EMPLOYEE(
        EID NUMBER,
        ENAME VARCHAR,
        EADDRESS VARCHAR,
        SALARY NUMBER
    ) IS
    BEGIN
        INSERT INTO EMPLOYEE2 VALUES (
            EID,
            ENAME,
            EADDRESS,
            SALARY
        );
    END INSERT_EMPLOYEE;
    STATIC PROCEDURE DELETE_EMPLOYEE(
        EID NUMBER
    ) IS
    BEGIN
        DELETE FROM EMPLOYEE2
        WHERE
            ID = EID;
    END DELETE_EMPLOYEE;
END;
/

--LANGUAGE
-- CREATE OR REPLACE TYPE LANGUAGE_T AS OBJECT(
```

```
-- LANGUAGE VARCHAR(20)
-- );
-- /
CREATE TYPE LANGUAGE_VARRAY_TYPE AS
    VARRAY(
        3
    ) OF VARCHAR(
        20
    );
/

--COUNTRY
-- CREATE OR REPLACE TYPE COUNTRY_T AS OBJECT(
-- COUNTRY VARCHAR(20)
-- );
-- /
CREATE TYPE COUNTRY_VARRAY_TYPE AS
    VARRAY(
        3
    ) OF VARCHAR(
        20
    );
/

--GUIDE
CREATE OR REPLACE TYPE GUIDE_T UNDER EMPLOYEE_T(
    LANGUAGES LANGUAGE_VARRAY_TYPE,
    COUNTRIES COUNTRY_VARRAY_TYPE,
    STATIC PROCEDURE INSERT_GUIDE(GID NUMBER, LANGUAGES
LANGUAGE_VARRAY_TYPE, COUNTRIES COUNTRY_VARRAY_TYPE),
    STATIC PROCEDURE DELETE_GUIDE(GID NUMBER)
);
```

```
/

CREATE TABLE GUIDE OF GUIDE_T;

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'DESCRIBE GUIDE');
END;
/

DESC GUIDE;

CREATE OR REPLACE TYPE BODY GUIDE_T AS
    STATIC PROCEDURE INSERT_GUIDE(
        GID NUMBER,
        LANGUAGES LANGUAGE_VARRAY_TYPE,
        COUNTRIES COUNTRY_VARRAY_TYPE
    ) IS
    BEGIN
        INSERT INTO GUIDE
            SELECT
                GID,
                EMPLOYEE2.NAME,
                EMPLOYEE2.ADDRESS,
                EMPLOYEE2.SALARY,
                LANGUAGES,
                COUNTRIES
            FROM
                EMPLOYEE2
            WHERE
                EMPLOYEE2.ID = GID;
    END INSERT_GUIDE;
```

```
    STATIC PROCEDURE DELETE_GUIDE(
        GID NUMBER
    ) IS
    BEGIN
        DELETE FROM GUIDE
        WHERE
            ID = GID;
    END DELETE_GUIDE;
END;
/

--COMPUTER SKILLS
-- CREATE OR REPLACE TYPE COMPSKILLS_T AS OBJECT(
-- COMPSKILL VARCHAR(20)
-- );
-- /
CREATE TYPE COMPSKILLS_VARRAY_TYPE AS
    VARRAY(
        3
    ) OF VARCHAR(
        20
    );
/

--OFFICE SKILLS
-- CREATE OR REPLACE TYPE OFFICESKILLS_T AS OBJECT(
-- OFFICESKILL VARCHAR(20)
-- );
-- /
CREATE TYPE OFFICESKILLS_VARRAY_TYPE AS
    VARRAY(
        3
```

```
    ) OF VARCHAR(
        20
    );
/

--ADMIN
CREATE OR REPLACE TYPE ADMIN_T UNDER EMPLOYEE_T(
    COMPSKILLS COMPSKILLS_VARRAY_TYPE,
    OFFICESKILLS OFFICESKILLS_VARRAY_TYPE,
    STATIC PROCEDURE INSERT_ADMIN(AID NUMBER, COMPSKILLS
COMPSKILLS_VARRAY_TYPE, OFFICESKILLS OFFICESKILLS_VARRAY_TYPE),
    STATIC PROCEDURE DELETE_ADMIN(AID NUMBER)
);
/

CREATE TABLE ADMIN OF ADMIN_T;

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'DESCRIBE ADMIN');
END;
/

DESC ADMIN;

CREATE OR REPLACE TYPE BODY ADMIN_T AS
    STATIC PROCEDURE INSERT_ADMIN(
        AID NUMBER,
        COMPSKILLS COMPSKILLS_VARRAY_TYPE,
        OFFICESKILLS OFFICESKILLS_VARRAY_TYPE
    ) IS
    BEGIN
```

```
        INSERT INTO ADMIN(
            ID,
            NAME,
            ADDRESS,
            SALARY
        )
            SELECT
                AID,
                EMPLOYEE2.NAME,
                EMPLOYEE2.ADDRESS,
                EMPLOYEE2.SALARY
            FROM
                EMPLOYEE2
            WHERE
                EMPLOYEE2.ID = AID;
        INSERT INTO ADMIN(
            COMPSKILLS,
            OFFICESKILLS
        ) VALUES (
            COMPSKILLS,
            OFFICESKILLS
        );
    END INSERT_ADMIN;
    STATIC PROCEDURE DELETE_ADMIN(
        AID NUMBER
    ) IS
    BEGIN
        DELETE FROM ADMIN
        WHERE
            ID = AID;
    END DELETE_ADMIN;
END;
```

```
/

--INSERTING VALUES
SET LINESIZE 1000

SET FEEDBACK OFF

--Employee
DELETE FROM EMPLOYEE2;

EXEC EMPLOYEE_T.INSERT_EMPLOYEE(1, 'VIRAT KOHLI', 'DELHI', 20000000);

EXEC EMPLOYEE_T.INSERT_EMPLOYEE(2, 'ROHIT SHARMA', 'MUMBAI', 2000000);

EXEC EMPLOYEE_T.INSERT_EMPLOYEE(3, 'SURYA YADAV', 'MUMBAI', 1500000);

EXEC EMPLOYEE_T.INSERT_EMPLOYEE(4, 'ISHAN KISHAN', 'JHARKHAND', 1000000);

EXEC EMPLOYEE_T.INSERT_EMPLOYEE(5, 'PAT CUMMINGS', 'CANBERRA', 900000);

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'EMPLOYEE2');
END;
/

SELECT
    *
FROM
    EMPLOYEE2;

--Guide
```

```
DELETE FROM GUIDE;


EXEC GUIDE_T.INSERT_GUIDE(1, LANGUAGE_VARRAY_TYPE('Hindi', 'English',
'Marathi'),


COUNTRY_VARRAY_TYPE('India', 'USA', 'UK'));


EXEC GUIDE_T.INSERT_GUIDE(2, LANGUAGE_VARRAY_TYPE('Hindi', 'English',
'Bengali'),


COUNTRY_VARRAY_TYPE('India', 'Germany', 'Peru'));


EXEC GUIDE_T.INSERT_GUIDE(3, LANGUAGE_VARRAY_TYPE('Tamil', 'English',
'Telugu'),


COUNTRY_VARRAY_TYPE('Canada', 'France', 'Brazil'));


BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'GUIDE');
END;
/


SELECT
    *
FROM
    GUIDE;


--Admin
DELETE FROM ADMIN;


EXEC
```

```
ADMIN_T.INSERT_ADMIN(4, COMPSKILLS_VARRAY_TYPE('Presentations',
'Spreadsheets', 'Photo


EDITING'), officeskills_varray_type('TIME
MGMT','LEADERSHIP','COMMUNICATIONS'));


EXEC ADMIN_T.INSERT_ADMIN(5, COMPSKILLS_VARRAY_TYPE('Video


EDITING','PRESENTATIONS','DATABASE MGMT'),


OFFICESKILLS_VARRAY_TYPE('Schedulilng', 'Communications', 'Time Mgmt'));


BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'ADMIN');
END;
/


SELECT
    *
FROM
    ADMIN;


--DELETING ADMIN
BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE('============================');
    DBMS_OUTPUT.PUT_LINE('DELETING... ID - 1');
    DBMS_OUTPUT.PUT_LINE('============================');
END;
/
```

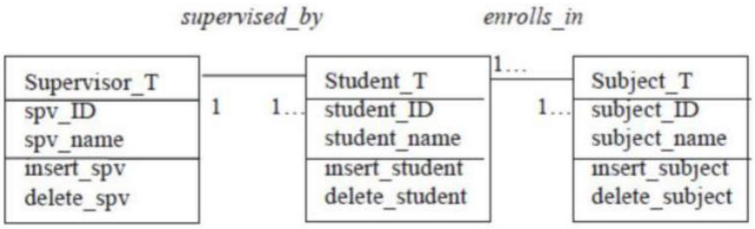
```
EXEC ADMIN_T.DELETE_ADMIN(2);

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'ADMIN');
END;
/

SELECT
    *
FROM
    ADMIN;

--DELETING GUIDE
BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE('============================');
    DBMS_OUTPUT.PUT_LINE('DELETING... ID - 2 AND ID - 3');
    DBMS_OUTPUT.PUT_LINE('============================');
END;
/

EXEC GUIDE_T.DELETE_GUIDE(2);

EXEC GUIDE_T.DELETE_GUIDE(3);

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'GUIDE');
END;
/
```

```
SELECT
    *
FROM
    GUIDE;

--DELETING EMPLOYEE
BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE('============================');
    DBMS_OUTPUT.PUT_LINE('DELETING... ID - 2 AND ID - 3');
    DBMS_OUTPUT.PUT_LINE('============================');
END;
/

EXEC EMPLOYEE_T.DELETE_EMPLOYEE(2);

EXEC EMPLOYEE_T.DELETE_EMPLOYEE(3);

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'EMPLOYEE2');
END;
/

SELECT
    *
FROM
    EMPLOYEE2;
```

```
EMPLOYEE2

 ID NAME              ADDRESS             SALARY
--- ----------------- --------------- ----------
  1 VIRAT KOHLI       DELHI             20000000
  2 ROHIT SHARMA      MUMBAI             2000000
  3 SURYA YADAV       MUMBAI             1500000
  4 ISHAN KISHAN      JHARKHAND          1000000
  5 PAT CUMMINGS      CANBERRA            900000

GUIDE

 ID NAME              ADDRESS             SALARY LANGUAGES                      COUNTRIES
--- ----------------- --------------- ---------- ---------------------------- ----------------------------
  1 VIRAT KOHLI       DELHI             20000000 LANGUAGE_VARRAY_TYPE('Hindi',  COUNTRY_VARRAY_TYPE('India', '
                                                 'English', 'Marathi')         USA', 'UK')

  2 ROHIT SHARMA      MUMBAI             2000000 LANGUAGE_VARRAY_TYPE('Hindi',  COUNTRY_VARRAY_TYPE('India', '
                                                 'English', 'Bengali')         Germany', 'Peru')

  3 SURYA YADAV       MUMBAI             1500000 LANGUAGE_VARRAY_TYPE('Tamil',  COUNTRY_VARRAY_TYPE('Canada',
                                                 'English', 'Telugu')          'France', 'Brazil')

ADMIN

 ID NAME              ADDRESS             SALARY COMPSKILLS                    OFFICESKILLS
--- ----------------- --------------- ---------- ---------------------------- ----------------------------
  4 ISHAN KISHAN      JHARKHAND          1000000
                                                 COMPSKILLS_VARRAY_TYPE('Presen OFFICESKILLS_VARRAY_TYPE('Time
                                                 tations', 'Spreadsheets', 'Pho  Mgmt', 'Leadership', 'Communi
                                                 to Editing')                  cations')

  5 PAT CUMMINGS      CANBERRA            900000
                                                 COMPSKILLS_VARRAY_TYPE('Video  OFFICESKILLS_VARRAY_TYPE('Sche
                                                 Editing', 'Presentations', 'Da dulilng', 'Communications', 'T
                                                 tabase Mgmt')                 ime Mgmt')



============================
DELETING... ID - 1
============================

ADMIN

 ID NAME              ADDRESS             SALARY COMPSKILLS                    OFFICESKILLS
--- ----------------- --------------- ---------- ---------------------------- ----------------------------
  4 ISHAN KISHAN      JHARKHAND          1000000
                                                 COMPSKILLS_VARRAY_TYPE('Presen OFFICESKILLS_VARRAY_TYPE('Time
                                                 tations', 'Spreadsheets', 'Pho  Mgmt', 'Leadership', 'Communi
ADMIN

 ID NAME              ADDRESS             SALARY COMPSKILLS                    OFFICESKILLS
--- ----------------- --------------- ---------- ---------------------------- ----------------------------
  4 ISHAN KISHAN      JHARKHAND          1000000
                                                 COMPSKILLS_VARRAY_TYPE('Presen OFFICESKILLS_VARRAY_TYPE('Time
                                                 tations', 'Spreadsheets', 'Pho  Mgmt', 'Leadership', 'Communi
                                                 to Editing')                  cations')

  5 PAT CUMMINGS      CANBERRA            900000
                                                 COMPSKILLS_VARRAY_TYPE('Video  OFFICESKILLS_VARRAY_TYPE('Sche
                                                 Editing', 'Presentations', 'Da dulilng', 'Communications', 'T
                                                 tabase Mgmt')                 ime Mgmt')



============================
DELETING... ID - 2 AND ID - 3
============================

GUIDE

 ID NAME              ADDRESS             SALARY LANGUAGES                      COUNTRIES
--- ----------------- --------------- ---------- ---------------------------- ----------------------------
  1 VIRAT KOHLI       DELHI             20000000 LANGUAGE_VARRAY_TYPE('Hindi',  COUNTRY_VARRAY_TYPE('India', '
                                                 'English', 'Marathi')         USA', 'UK')
```

```
============================
DELETING... ID - 2 AND ID - 3
============================

GUIDE

 ID NAME            ADDRESS            SALARY LANGUAGES                    COUNTRIES
--- --------------- -------------- ---------- ---------------------------- ----------------------------
  1 VIRAT KOHLI     DELHI            20000000 LANGUAGE_VARRAY_TYPE('Hindi',  COUNTRY_VARRAY_TYPE('India', '
                                              'English', 'Marathi')         USA', 'UK')



============================
DELETING... ID - 2 AND ID - 3
============================

EMPLOYEE2

 ID NAME            ADDRESS            SALARY
--- --------------- -------------- ----------
  1 VIRAT KOHLI     DELHI            20000000
  4 ISHAN KISHAN    JHARKHAND         1000000
  5 PAT CUMMINGS    CANBERRA           900000
SQL>
```

5. The following figure shows the relationship among objects Supervisor_T, Student_T, and Subject_T in a university. A student can take many subjects, and a subject can be taken by many students. For every subject a student takes, there is a mark given. In another relationship, a student can be supervised by only one supervisor, but a supervisor can supervise many students. Assume that objects have been created and the tables from these objects are shown.



Implement the following object oriented diagram relating to assets in a computer laboratory. Execute insert statement for entering data into the tables so created.

```
--SUPERVISOR
CREATE OR REPLACE TYPE SUPERVISOR_T AS
    OBJECT(
        SPV_ID NUMBER,
        SPV_NAME VARCHAR(20),
        STATIC PROCEDURE INSERT_SPV(SID NUMBER, NAME VARCHAR),
        STATIC PROCEDURE DELETE_SPV(SID NUMBER)
    );
/

CREATE TABLE SUPERVISOR OF SUPERVISOR_T;

CREATE OR REPLACE TYPE BODY SUPERVISOR_T AS
    STATIC PROCEDURE INSERT_SPV(
        SID NUMBER,
        NAME VARCHAR
    ) IS
    BEGIN
        INSERT INTO SUPERVISOR VALUES (
            SID,
            NAME
```

```
        );
    END INSERT_SPV;
    STATIC PROCEDURE DELETE_SPV(
        SID NUMBER
    ) IS
    BEGIN
        DELETE FROM SUPERVISOR
        WHERE
            SPV_ID = SID;
    END DELETE_SPV;
END;
/

--STUDENT
CREATE OR REPLACE TYPE STUDENT_T AS
    OBJECT(
        STUDENT_ID NUMBER,
        STUDENT_NAME VARCHAR(20),
        SPV_REF REF SUPERVISOR_T,
        STATIC PROCEDURE INSERT_STUDENT(SID NUMBER, SNAME VARCHAR, SPD
NUMBER),
        STATIC PROCEDURE DELETE_STUDENT(SID NUMBER)
    );
/

CREATE TABLE STUDENT2 OF STUDENT_T;

CREATE OR REPLACE TYPE BODY STUDENT_T AS
    STATIC PROCEDURE INSERT_STUDENT(
        SID NUMBER,
        SNAME VARCHAR,
        SPD NUMBER
```

```
    ) IS
    BEGIN
        INSERT INTO STUDENT2
            SELECT
                SID,
                SNAME,
                REF(S)
            FROM
                SUPERVISOR S
            WHERE
                S.SPV_ID = SPD;
    END INSERT_STUDENT;
    STATIC PROCEDURE DELETE_STUDENT(
        SID NUMBER
    ) IS
    BEGIN
        DELETE FROM STUDENT2
        WHERE
            STUDENT_ID = SID;
    END DELETE_STUDENT;
END;
/

--SUBJECT
CREATE OR REPLACE TYPE SUBJECT_T2 AS
    OBJECT(
        SUBJECT_ID NUMBER,
        SUBJECT_NAME VARCHAR(20),
        STATIC PROCEDURE INSERT_SUBJECT(SID NUMBER, SNAME VARCHAR),
        STATIC PROCEDURE DELETE_SUBJECT(SID NUMBER)
    );
/
```

```
CREATE TABLE SUBJECT2 OF SUBJECT_T2;

CREATE OR REPLACE TYPE BODY SUBJECT_T2 AS
    STATIC PROCEDURE INSERT_SUBJECT(
        SID NUMBER,
        SNAME VARCHAR
    ) IS
    BEGIN
        INSERT INTO SUBJECT2 VALUES(
            SID,
            SNAME
        );
    END INSERT_SUBJECT;
    STATIC PROCEDURE DELETE_SUBJECT(
        SID NUMBER
    ) IS
    BEGIN
        DELETE FROM SUBJECT2
        WHERE
            SUBJECT_ID = SID;
    END DELETE_SUBJECT;
END;
/

--STUD_SUB
CREATE OR REPLACE TYPE STUD_SUB_T AS
    OBJECT(
        ID NUMBER,
        STUD_REF REF STUDENT_T,
        SUB_REF REF SUBJECT_T2,
        MARKS NUMBER,
```

```
        STATIC PROCEDURE INSERT_STUD_SUB(SID NUMBER, STR NUMBER, SBR
NUMBER, MARKS NUMBER),
        STATIC PROCEDURE DELETE_STUD_SUB(ID NUMBER)
    );
/

CREATE TABLE STUD_SUB OF STUD_SUB_T (
    ID PRIMARY KEY
);

CREATE OR REPLACE TYPE BODY STUD_SUB_T AS
    STATIC PROCEDURE INSERT_STUD_SUB(
        SID NUMBER,
        STR NUMBER,
        SBR NUMBER,
        MARKS NUMBER
    ) IS
    BEGIN
        INSERT INTO STUD_SUB
            SELECT
                SID,
                REF(STD),
                REF(SBD),
                MARKS
            FROM
                STUDENT2 STD,
                SUBJECT2 SBD
            WHERE
                STD.STUDENT_ID = STR
                AND SBD.SUBJECT_ID = SBR;
    END INSERT_STUD_SUB;
    STATIC PROCEDURE DELETE_STUD_SUB(
```

```
        ID NUMBER
    ) IS
    BEGIN
        DELETE FROM STUD_SUB
        WHERE
            ID = ID;
    END DELETE_STUD_SUB;
END;
/

--INSERTING VALUES
SET FEEDBACK OFF;

--SUPERVISOR
DELETE FROM SUPERVISOR;

EXEC SUPERVISOR_T.INSERT_SPV(1, 'SHANTANU N');

EXEC SUPERVISOR_T.INSERT_SPV(2, 'NAGRAJAN T');

EXEC SUPERVISOR_T.INSERT_SPV(3, 'SHARAD K');

EXEC SUPERVISOR_T.INSERT_SPV(4, 'BIJU L');

EXEC SUPERVISOR_T.INSERT_SPV(5, 'SAMRAT T');

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'SUPERVISOR');
END;
/
```

```
SELECT
    *
FROM
    SUPERVISOR;

--STUDENT
DELETE FROM STUDENT2;

EXEC STUDENT_T.INSERT_STUDENT(1, 'BHOOSHAN B', 1);

EXEC STUDENT_T.INSERT_STUDENT(2, 'KARTIK I', 1);

EXEC STUDENT_T.INSERT_STUDENT(3, 'ABHISHEK K', 3);

EXEC STUDENT_T.INSERT_STUDENT(4, 'PARTH K', 2);

EXEC STUDENT_T.INSERT_STUDENT(5, 'AMIT E', 5);

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'STUDENT2');
END;
/

SELECT
    *
FROM
    STUDENT2;

--SUBJECT
DELETE FROM SUBJECT2;
```

```
EXEC SUBJECT_T2.INSERT_SUBJECT(1, 'DSA');

EXEC SUBJECT_T2.INSERT_SUBJECT(2, 'DBMS');

EXEC SUBJECT_T2.INSERT_SUBJECT(3, 'OOSE');

EXEC SUBJECT_T2.INSERT_SUBJECT(4, 'STS');

EXEC SUBJECT_T2.INSERT_SUBJECT(5, 'ASM');

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'SUBJECT2');
END;
/

SELECT
    *
FROM
    SUBJECT2;

--STUD_SUB
DELETE FROM STUD_SUB;

EXEC STUD_SUB_T.INSERT_STUD_SUB(1, 3, 4, 49);

EXEC STUD_SUB_T.INSERT_STUD_SUB(2, 2, 5, 38);

EXEC STUD_SUB_T.INSERT_STUD_SUB(3, 4, 2, 48);

EXEC STUD_SUB_T.INSERT_STUD_SUB(4, 3, 5, 40);
```

```
EXEC STUD_SUB_T.INSERT_STUD_SUB(5, 4, 3, 29);

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'STUD_SUB');
END;
/

SELECT
    *
FROM
    STUD_SUB;

--DELETING STUD_SUB TO EXECUTE DELETE OPERATIONS IN
--DEPENDENT TABLES
DROP TABLE STUD_SUB;

--DELETING SUBJECT
BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE('============================');
    DBMS_OUTPUT.PUT_LINE('DELETING... ID - 2 AND ID - 3');
    DBMS_OUTPUT.PUT_LINE('============================');
END;
/

EXEC SUBJECT_T2.DELETE_SUBJECT(2);

EXEC SUBJECT_T2.DELETE_SUBJECT(3);

BEGIN
```

```
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'SUBJECT2');
END;
/

SELECT
    *
FROM
    SUBJECT2;

--DELETING STUDENT
BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE('============================');
    DBMS_OUTPUT.PUT_LINE('DELETING... ID - 4 AND ID - 5');
    DBMS_OUTPUT.PUT_LINE('============================');
END;
/

EXEC STUDENT_T.DELETE_STUDENT(4);

EXEC STUDENT_T.DELETE_STUDENT(5);

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'STUDENT2');
END;
/

SELECT
    *
```

```
FROM
    STUDENT2;

--DELETING SUPERVISOR
BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE(CHR(9));
    DBMS_OUTPUT.PUT_LINE('============================');
    DBMS_OUTPUT.PUT_LINE('DELETING... ID - 1 AND ID - 5');
    DBMS_OUTPUT.PUT_LINE('============================');
END;
/

EXEC SUPERVISOR_T.DELETE_SPV(2);

EXEC SUPERVISOR_T.DELETE_SPV(3);

BEGIN
    DBMS_OUTPUT.PUT_LINE(CHR(10)
        ||'SUPERVISOR');
END;
/

SELECT
    *
FROM
    SUPERVISOR;
```

OUTPUT

```
SUPERVISOR

SPV_ID SPV_NAME
------ --------------------
     1 SHANTANU N
     2 NAGRAJAN T
     3 SHARAD K
     4 BIJU L
     5 SAMRAT T

STUDENT2

STUDENT_ID STUDENT_NAME         SPV_REF
---------- -------------------- --------------------
         1 BHOOSHAN B           00002202085EE8D3B96F
                                A840A08072F0D7E7DF05
                                830078823F849548CFB5
                                7D079B4718838F

         2 KARTIK I             00002202085EE8D3B96F
                                A840A08072F0D7E7DF05
                                830078823F849548CFB5
                                7D079B4718838F

         3 ABHISHEK K           0000220208AC922D279D
```

```
STUDENT_ID STUDENT_NAME          SPV_REF
---------- --------------------- --------------------
                                 1F489680693652333DBA7
                                 EB0078823F849548CFB5
                                 7D079B4718838F

         4 PARTH K               0000220208679969FEED
                                 1E4175B8117F0EA34B69
                                 F30078823F849548CFB5
                                 7D079B4718838F

         5 AMIT E                0000220208F8C903441B
                                 E341E4BD54F62B756F10

STUDENT_ID STUDENT_NAME          SPV_REF
---------- --------------------- --------------------
                                 5B0078823F849548CFB5
                                 7D079B4718838F
```

SUBJECT2

SUBJECT_ID	SUBJECT_NAME
1	DSA
2	DBMS
3	OOSE
4	STS
5	ASM

STUD_SUB

ID	STUD_REF	SUB_REF	MARKS
1	00002202080287DF92CD444A85B5C07340DC26C7B5D5C20DDE0D3349C8ACCD9E5263DD3255	00002202088A7D452E507A414AAB39D63ECEF43F2CFAC1B5380CFD412A8CA24A5A044A120C	49
2	0000220208AE8355F756D84377B43C7C0710EEE827D5C20DDE0D3349C8ACCD9E5263DD3255	00002202081B1AD95462EB4F3BB5092982FF477E87FAC1B5380CFD412A8CA24A5A044A120C	38
3	000022020823526D5D55	00002202084F81212141	48

```
 ID STUD_REF                 SUB_REF                 MARKS
--- ---------------------- ---------------------- -----
    C147CFB43BF5027A94B3 FF4E0D806908DA70AD40
    68D5C20DDE0D3349C8AC 91FAC1B5380CFD412A8C
    CD9E5263DD3255       A24A5A044A120C

  4 00002202080287DF92CD 00002202081B1AD95462    40
    444A85B5C07340DC26C7 EB4F3BB5092982FF477E
    B5D5C20DDE0D3349C8AC 87FAC1B5380CFD412A8C
    CD9E5263DD3255       A24A5A044A120C

  5 000022020823526D5D55 0000220208CE2036483E    29
    C147CFB43BF5027A94B3 FF4A2385DC5445B665C1

 ID STUD_REF                 SUB_REF                 MARKS
--- ---------------------- ---------------------- -----
    68D5C20DDE0D3349C8AC D3FAC1B5380CFD412A8C
    CD9E5263DD3255       A24A5A044A120C
```

```
============================
DELETING... ID - 2 AND ID - 3
============================

SUBJECT2

SUBJECT_ID SUBJECT_NAME
---------- --------------------
         1 DSA
         4 STS
         5 ASM


============================
DELETING... ID - 4 AND ID - 5
============================

STUDENT2

STUDENT_ID STUDENT_NAME         SPV_REF
---------- -------------------- --------------------
         1 BHOOSHAN B           00002202085EE8D3B96F
                                A840A08072F0D7E7DF05
                                830078823F849548CFB5
                                7D079B4718838F
```

```
         2 KARTIK I             00002202085EE8D3B96F
                                A840A08072F0D7E7DF05
                                830078823F849548CFB5
                                7D079B4718838F

         3 ABHISHEK K           0000220208AC922D279D

STUDENT_ID STUDENT_NAME         SPV_REF
---------- -------------------- --------------------
                                1F48968069365233DBA7
                                EB0078823F849548CFB5
                                7D079B4718838F



============================
DELETING... ID - 1 AND ID - 5
============================

SUPERVISOR
```

```
SUPERVISOR

SPV_ID SPV_NAME
------ --------------------
     1 SHANTANU N
     4 BIJU L
     5 SAMRAT T
```