

D. Consider the schema for College Database:

STUDENT (USN, SName, Address, Phone, Gender)

SEMSEC (SSID, Sem, Sec)

CLASS (USN, SSID)

SUBJECT (Subcode, Title, Sem, Credits)

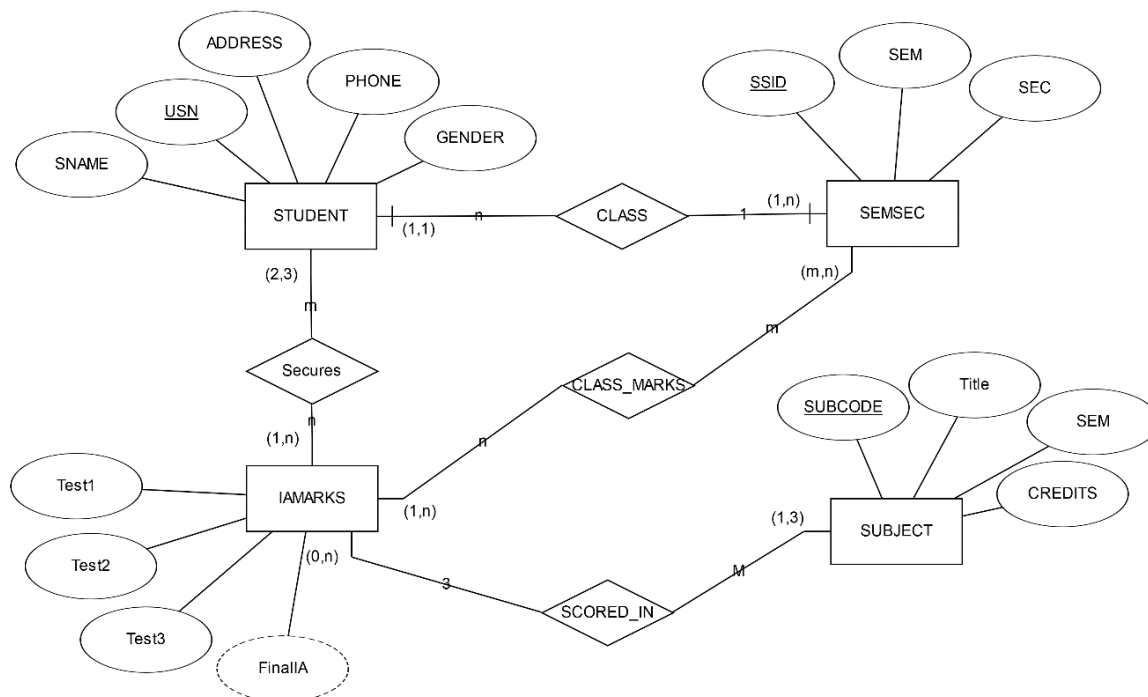
IAMARKS (USN, Subcode, SSID, Test1, Test2, Test3, FinalIA)

Write SQL queries to

1. List all the student details studying in fourth semester 'C' section.
2. Compute the total number of male and female students in each semester and in each section.
3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.
4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.
5. Categorize students based on the following criterion:
If FinalIA = 17 to 20 then CAT = 'Outstanding'
If FinalIA = 12 to 16 then CAT = 'Average'
If FinalIA < 12 then CAT = 'Weak'
Give these details only for 8th semester A, B, and C section students.

Solution:

Entity - Relationship Diagram



Schema Diagram

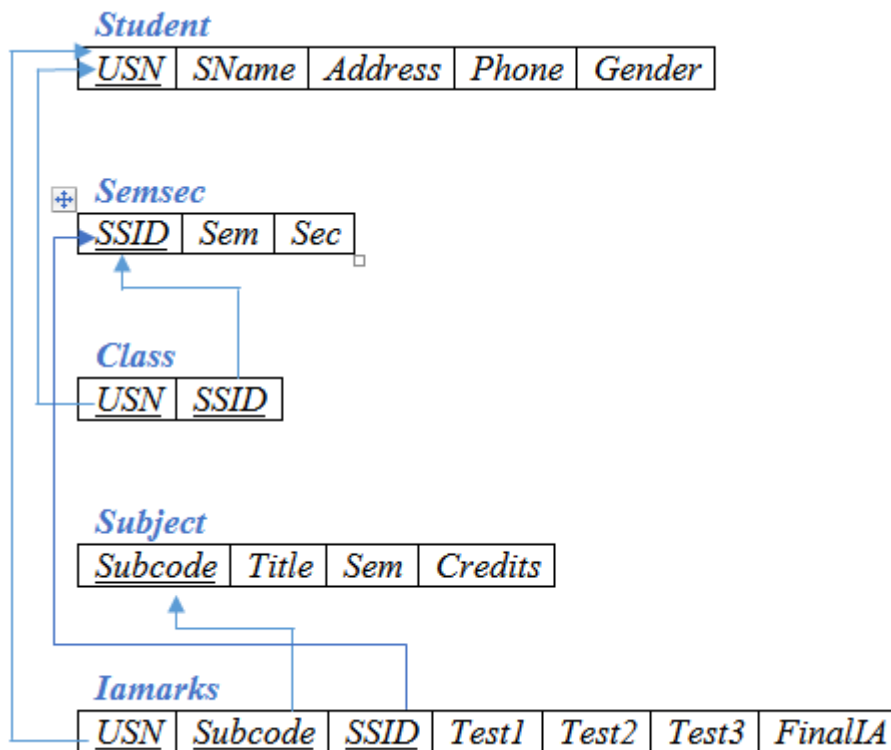


Table Creation

```
CREATE TABLE STUDENT (  
  USN VARCHAR (10) PRIMARY KEY,  
  SNAME VARCHAR (25),  
  ADDRESS VARCHAR (25),  
  PHONE NUMBER (10),  
  GENDER CHAR (1));
```

```
CREATE TABLE SEMSEC (  
  SSID VARCHAR (5) PRIMARY KEY,  
  SEM NUMBER (2),  
  SEC CHAR (1));
```

```
CREATE TABLE CLASS (  
  USN VARCHAR (10),  
  SSID VARCHAR (5),  
  PRIMARY KEY (USN, SSID),  
  FOREIGN KEY (USN) REFERENCES STUDENT (USN),  
  FOREIGN KEY (SSID) REFERENCES SEMSEC (SSID));
```

```
CREATE TABLE SUBJECT (  
SUBCODE VARCHAR (8),  
TITLE VARCHAR (20),  
SEM NUMBER (2), CREDITS  
NUMBER (2), PRIMARY KEY  
(SUBCODE));
```

```
CREATE TABLE IAMARKS (  
USN VARCHAR (10),  
SUBCODE VARCHAR (8),  
SSID VARCHAR (5),  
TEST1 NUMBER (2),  
TEST2 NUMBER (2),  
TEST3 NUMBER (2),  
FINALIA NUMBER (2),  
PRIMARY KEY (USN, SUBCODE, SSID),  
FOREIGN KEY (USN) REFERENCES STUDENT (USN),  
FOREIGN KEY (SUBCODE) REFERENCES SUBJECT (SUBCODE),  
FOREIGN KEY (SSID) REFERENCES SEMSEC (SSID));
```

Table Descriptions

DESC STUDENT;

Name

USN
SNAME
ADDRESS
PHONE
GENDER

DESC SEMSEC;

SQL> DESC SEMSEC;

Name

SSID
SEM
SEC

DESC CLASS;

SQL> DESC CLASS;

Name

USN

SSID

DESC SUBJECT;

SQL> DESC SUBJECT1;

Name

SUBCODE

TITLE

SEM

CREDITS

DESC IAMARKS;

SQL> DESC IAMARKS;

Name

USN

SUBCODE

SSID

TEST1

TEST2

TEST3

FINALIA

Insertion of values to tables

INSERT INTO STUDENT VALUES ('1RN13CS020','AKSHAY','BELAGAVI',
8877881122,'M');

INSERT INTO STUDENT VALUES ('1RN13CS062','SANDHYA','BENGALURU',
7722829912,'F');

INSERT INTO STUDENT VALUES ('1RN13CS091','TEESHA','BENGALURU',
7712312312,'F');

INSERT INTO STUDENT VALUES ('1RN13CS066','SUPRIYA','MANGALURU',
8877881122,'F');

INSERT INTO STUDENT VALUES ('1RN14CS010','ABHAY','BENGALURU',
9900211201,'M');

INSERT INTO STUDENT VALUES ('1RN14CS032','BHASKAR','BENGALURU',
9923211099,'M');

INSERT INTO STUDENT VALUES ('1RN14CS025','ASMI','BENGALURU', 7894737377,'F');

INSERT INTO STUDENT VALUES ('1RN15CS011','AJAY','TUMKUR', 9845091341,'M');

INSERT INTO STUDENT VALUES ('1RN15CS029','CHITRA','DAVANGERE',
7696772121,'F');
INSERT INTO STUDENT VALUES ('1RN15CS045','JEEVA','BELLARY', 9944850121,'M');
INSERT INTO STUDENT VALUES ('1RN15CS091','SANTOSH','MANGALURU',
8812332201,'M');
INSERT INTO STUDENT VALUES ('1RN16CS045','ISMAIL','KALBURGI',
9900232201,'M');
INSERT INTO STUDENT VALUES ('1RN16CS088','SAMEERA','SHIMOGA',
9905542212,'F');
INSERT INTO STUDENT VALUES ('1RN16CS122','VINAYAKA','CHIKAMAGALUR',
8800880011,'M');

INSERT INTO SEMSEC VALUES ('CSE8A', 8,'A');
INSERT INTO SEMSEC VALUES ('CSE8B', 8,'B');
INSERT INTO SEMSEC VALUES ('CSE8C', 8,'C');

INSERT INTO SEMSEC VALUES ('CSE7A', 7,'A');
INSERT INTO SEMSEC VALUES ('CSE7B', 7,'B');
INSERT INTO SEMSEC VALUES ('CSE7C', 7,'C');

INSERT INTO SEMSEC VALUES ('CSE6A', 6,'A');
INSERT INTO SEMSEC VALUES ('CSE6B', 6,'B');
INSERT INTO SEMSEC VALUES ('CSE6C', 6,'C');

INSERT INTO SEMSEC VALUES ('CSE5A', 5,'A');
INSERT INTO SEMSEC VALUES ('CSE5B', 5,'B');
INSERT INTO SEMSEC VALUES ('CSE5C', 5,'C');

INSERT INTO SEMSEC VALUES ('CSE4A', 4,'A');
INSERT INTO SEMSEC VALUES ('CSE4B', 4,'B');
INSERT INTO SEMSEC VALUES ('CSE4C', 4,'C');

INSERT INTO SEMSEC VALUES ('CSE3A', 3,'A');
INSERT INTO SEMSEC VALUES ('CSE3B', 3,'B');
INSERT INTO SEMSEC VALUES ('CSE3C', 3,'C');

INSERT INTO SEMSEC VALUES ('CSE2A', 2,'A');
INSERT INTO SEMSEC VALUES ('CSE2B', 2,'B');
INSERT INTO SEMSEC VALUES ('CSE2C', 2,'C');
INSERT INTO SEMSEC VALUES ('CSE1A', 1,'A');

INSERT INTO SEMSEC VALUES ('CSE1B', 1, 'B');
INSERT INTO SEMSEC VALUES ('CSE1C', 1, 'C');

INSERT INTO CLASS VALUES ('1RN13CS020', 'CSE8A');
INSERT INTO CLASS VALUES ('1RN13CS062', 'CSE8A');
INSERT INTO CLASS VALUES ('1RN13CS066', 'CSE8B');
INSERT INTO CLASS VALUES ('1RN13CS091', 'CSE8C');

INSERT INTO CLASS VALUES ('1RN14CS010', 'CSE7A');
INSERT INTO CLASS VALUES ('1RN14CS025', 'CSE7A');
INSERT INTO CLASS VALUES ('1RN14CS032', 'CSE7A');

INSERT INTO CLASS VALUES ('1RN15CS011', 'CSE4A');
INSERT INTO CLASS VALUES ('1RN15CS029', 'CSE4A');
INSERT INTO CLASS VALUES ('1RN15CS045', 'CSE4B');
INSERT INTO CLASS VALUES ('1RN15CS091', 'CSE4C');

INSERT INTO CLASS VALUES ('1RN16CS045', 'CSE3A');
INSERT INTO CLASS VALUES ('1RN16CS088', 'CSE3B');
INSERT INTO CLASS VALUES ('1RN16CS122', 'CSE3C');

INSERT INTO SUBJECT VALUES ('10CS81', 'ACA', 8, 4);
INSERT INTO SUBJECT VALUES ('10CS82', 'SSM', 8, 4);
INSERT INTO SUBJECT VALUES ('10CS83', 'NM', 8, 4);
INSERT INTO SUBJECT VALUES ('10CS84', 'CC', 8, 4);
INSERT INTO SUBJECT VALUES ('10CS85', 'PW', 8, 4);

INSERT INTO SUBJECT VALUES ('10CS71', 'OOAD', 7, 4);
INSERT INTO SUBJECT VALUES ('10CS72', 'ECS', 7, 4);
INSERT INTO SUBJECT VALUES ('10CS73', 'PTW', 7, 4);
INSERT INTO SUBJECT VALUES ('10CS74', 'DWD', 7, 4);
INSERT INTO SUBJECT VALUES ('10CS75', 'JAVA', 7, 4);
INSERT INTO SUBJECT VALUES ('10CS76', 'SAN', 7, 4);

INSERT INTO SUBJECT VALUES ('15CS51', 'ME', 5, 4);
INSERT INTO SUBJECT VALUES ('15CS52', 'CN', 5, 4);
INSERT INTO SUBJECT VALUES ('15CS53', 'DBMS', 5, 4);
INSERT INTO SUBJECT VALUES ('15CS54', 'ATC', 5, 4);
INSERT INTO SUBJECT VALUES ('15CS55', 'JAVA', 5, 3);
INSERT INTO SUBJECT VALUES ('15CS56', 'AI', 5, 3);

```

INSERT INTO SUBJECT VALUES ('15CS41','M4', 4, 4);
INSERT INTO SUBJECT VALUES ('15CS42','SE', 4, 4);
INSERT INTO SUBJECT VALUES ('15CS43','DAA', 4, 4);
INSERT INTO SUBJECT VALUES ('15CS44','MPMC', 4, 4);
INSERT INTO SUBJECT VALUES ('15CS45','OOC', 4, 3);
INSERT INTO SUBJECT VALUES ('15CS46','DC', 4, 3);

```

```

INSERT INTO SUBJECT VALUES ('15CS31','M3', 3, 4);
INSERT INTO SUBJECT VALUES ('15CS32','ADE', 3, 4);
INSERT INTO SUBJECT VALUES ('15CS33','DSA', 3, 4);
INSERT INTO SUBJECT VALUES ('15CS34','CO', 3, 4);
INSERT INTO SUBJECT VALUES ('15CS35','USP', 3, 3);
INSERT INTO SUBJECT VALUES ('15CS36','DMS', 3, 3);

```

```

INSERT INTO IAMARKS (USN, SUBCODE, SSID, TEST1, TEST2, TEST3) VALUES
('1RN13CS091','10CS81','CSE8C', 15, 16, 18);
INSERT INTO IAMARKS (USN, SUBCODE, SSID, TEST1, TEST2, TEST3) VALUES
('1RN13CS091','10CS82','CSE8C', 12, 19, 14);
INSERT INTO IAMARKS (USN, SUBCODE, SSID, TEST1, TEST2, TEST3) VALUES
('1RN13CS091','10CS83','CSE8C', 19, 15, 20);
INSERT INTO IAMARKS (USN, SUBCODE, SSID, TEST1, TEST2, TEST3) VALUES
('1RN13CS091','10CS84','CSE8C', 20, 16, 19);
INSERT INTO IAMARKS (USN, SUBCODE, SSID, TEST1, TEST2, TEST3) VALUES
('1RN13CS091','10CS85','CSE8C', 15, 15, 12);

```

```

SELECT * FROM STUDENT;

```

```

SQL> SELECT * FROM STUDENT1;

```

USN	SNAME	ADDRESS	PHONE	G
1RN13CS020	AKSHAY	BELAGAVI	8877881122	M
1RN13CS062	SANDHYA	BENGALURU	7722829912	F
1RN13CS091	TEESHA	BENGALURU	7712312312	F
1RN13CS066	SUPRIYA	MANGALURU	8877881122	F
1RN14CS010	ABHAY	BENGALURU	9900211201	M
1RN14CS032	BHASKAR	BENGALURU	9923211099	M
1RN15CS011	AJAY	TUMKUR	9845091341	M
1RN15CS029	CHITRA	DAVANGERE	7696772121	F
1RN15CS045	JEEVA	BELLARY	9944850121	M
1RN15CS091	SANTOSH	MANGALURU	8812332201	M
1RN16CS045	ISMAIL	KALBURGI	9900232201	F
1RN16CS088	SAMEERA	SHIMOGA	9905542212	F
1RN16CS122	VINAYAKA	CHIKAMAGALUR	8800880011	M
1RN14CS025	ASMI	BENGALURU	7894737377	F

```
SELECT * FROM SEMSEC;
```

```
SQL> SELECT * FROM SEMSEC;
```

SSID	SEM S
CSE8A	8 A
CSE8B	8 B
CSE8C	8 C
CSE7A	7 A
CSE7B	7 B
CSE7C	7 C
CSE6A	6 A
CSE6B	6 B
CSE6C	6 C
CSE5A	5 A
CSE5B	5 B
CSE5C	5 C
CSE4A	4 A
CSE4B	4 B
CSE4C	4 C
CSE3A	3 A
CSE3B	3 B
CSE3C	3 C
CSE2A	2 A
CSE2C	2 C
CSE2B	2 B
CSE1A	1 A
CSE1B	1 B
CSE1C	1 C

```
SELECT * FROM CLASS;
```

```
SQL> SELECT * FROM CLASS;
```

USN	SSID
1RN13CS020	CSE8A
1RN13CS062	CSE8A
1RN13CS066	CSE8B
1RN13CS091	CSE8C
1RN14CS010	CSE7A
1RN14CS025	CSE7A
1RN14CS032	CSE7A
1RN15CS011	CSE4A
1RN15CS029	CSE4A
1RN15CS045	CSE4B
1RN15CS091	CSE4C
1RN16CS045	CSE3A
1RN16CS088	CSE3B
1RN16CS122	CSE3C

```
14 rows selected.
```


SELECT * FROM SUBJECT;

SUBCODE	TITLE	SEM	CREDITS
10CS81	ACA	8	4
10CS82	SSM	8	4
10CS83	NM	8	4
10CS84	CC	8	4
10CS85	PW	8	4
10CS71	OOD	7	4
10CS72	ECS	7	4
10CS73	PTW	7	4
10CS74	DWDM	7	4
10CS75	JAVA	7	4
10CS76	SAN	7	4
15CS51	ME	5	4
15CS52	CN	5	4
15CS53	DBMS	5	4
15CS54	ATC	5	4
15CS55	JAVA	5	3
15CS56	AI	5	3
15CS41	M4	4	4
15CS42	SE	4	4
15CS43	DAA	4	4
15CS44	MPMC	4	4
15CS45	OOC	4	3
15CS46	DC	4	3
15CS31	M3	3	4
15CS32	ADE	3	4
15CS33	DSA	3	4
15CS34	CO	3	4
15CS35	USP	3	3
15CS36	DMS	3	3

SELECT * FROM IAMARKS;

SQL> SELECT * FROM IAMARKS;

USN	SUBCODE	SSID	TEST1	TEST2	TEST3	FINALIA
1RN13CS091	10CS81	CSE8C	15	16	18	
1RN13CS091	10CS82	CSE8C	12	19	14	
1RN13CS091	10CS83	CSE8C	19	15	20	
1RN13CS091	10CS84	CSE8C	20	16	19	
1RN13CS091	10CS85	CSE8C	15	15	12	

Queries:

1. List all the student details studying in fourth semester 'C' section.

```
SELECT S.*, SS.SEM, SS.SEC
FROM STUDENT S, SEMSEC SS, CLASS C
WHERE S.USN = C.USN AND
SS.SSID = C.SSID AND
SS.SEM = 4 AND
```

SS.SEC='C';

USN	SNAME	ADDRESS	PHONE G	SEM S
1RN15CS091	SANTOSH	MANGALURU	8812332201 M	4 C

2. Compute the total number of male and female students in each semester and in each section.

```

SELECT SS.SEM, SS.SEC, S.GENDER, COUNT (S.GENDER) AS COUNT
FROM STUDENT S, SEMSEC SS, CLASS C
WHERE S.USN = C.USN AND
SS.SSID = C.SSID
GROUP BY SS.SEM, SS.SEC, S.GENDER
ORDER BY SEM;

```

SEM	S	G	COUNT
3	A	M	1
3	B	F	1
3	C	M	1
4	A	F	1
4	A	M	1
4	B	M	1
4	C	M	1
7	A	F	1
7	A	M	2
8	A	F	1
8	A	M	1
8	B	F	1
8	C	F	1

3. Create a view of Test1 marks of student USN '1BI15CS101' in all subjects.

```

CREATE VIEW STU_TEST1_MARKS_VIEW
AS
SELECT TEST1, SUBCODE
FROM IAMARKS
WHERE USN = '1RN13CS091';

```

TEST1	SUBCODE
15	10CS81
12	10CS82
19	10CS83
20	10CS84
15	10CS85

4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students.

```
CREATE OR REPLACE PROCEDURE AVGMARKS
IS
    CURSOR C_IAMARKS IS
    SELECT GREATEST(TEST1,TEST2) AS A, GREATEST(TEST1,TEST3) AS B,
    GREATEST(TEST3,TEST2) AS C
    FROM IAMARKS
    WHERE FINALIA IS NULL
    FOR UPDATE;

    C_A NUMBER;
    C_B NUMBER;
    C_C NUMBER;
    C_SM NUMBER;
    C_AV NUMBER;

BEGIN
    OPEN C_IAMARKS;
    LOOP
        FETCH C_IAMARKS INTO C_A, C_B, C_C;
        EXIT WHEN C_IAMARKS%NOTFOUND;
        --DBMS_OUTPUT.PUT_LINE(C_A || ' ' || C_B || ' ' || C_C);
        IF (C_A != C_B) THEN
            C_SM:=C_A+C_B;
        ELSE
            C_SM:=C_A+C_C;
        END IF;

        C_AV:=C_SM/2;
        --DBMS_OUTPUT.PUT_LINE('SUM = '||C_SM);
        --DBMS_OUTPUT.PUT_LINE('AVERAGE = '||C_AV);
        UPDATE IAMARKS SET FINALIA=C_AV WHERE CURRENT OF C_IAMARKS;

    END LOOP;
    CLOSE C_IAMARKS;
END;
```

Note: Before execution of PL/SQL procedure, IAMARKS table contents are:

SELECT * FROM IAMARKS;

SQL> SELECT * FROM IAMARKS;

USN	SUBCODE	SSID	TEST1	TEST2	TEST3	FINALIA
1RN13CS091	10CS81	CSE8C	15	16	18	
1RN13CS091	10CS82	CSE8C	12	19	14	
1RN13CS091	10CS83	CSE8C	19	15	20	
1RN13CS091	10CS84	CSE8C	20	16	19	
1RN13CS091	10CS85	CSE8C	15	15	12	

Below SQL code is to invoke the PL/SQL stored procedure from the command line:

```
BEGIN
AVGMARKS;
END;
```

SQL> select * from IAMARKS;

USN	SUBCODE	SSID	TEST1	TEST2	TEST3	FINALIA
1RN13CS091	10CS81	CSE8C	15	16	18	17
1RN13CS091	10CS82	CSE8C	12	19	14	17
1RN13CS091	10CS83	CSE8C	19	15	20	20
1RN13CS091	10CS84	CSE8C	20	16	19	20
1RN13CS091	10CS85	CSE8C	15	15	12	15

5. Categorize students based on the following criterion:

If FinalIA = 17 to 20 then CAT = 'Outstanding'

If FinalIA = 12 to 16 then CAT = 'Average'

If FinalIA < 12 then CAT = 'Weak'

Give these details only for 8th semester A, B, and C section students.

```
SELECT S.USN,S.SNAME,S.ADDRESS,S.PHONE,S.GENDER,
(CASE
  WHEN IA.FINALIA BETWEEN 17 AND 20 THEN 'OUTSTANDING'
  WHEN IA.FINALIA BETWEEN 12 AND 16 THEN 'AVERAGE'
  ELSE 'WEAK'
END) AS CAT
FROM STUDENT S, SEMSEC SS, IAMARKS IA, SUBJECT SUB
WHERE S.USN = IA.USN AND
SS.SSID = IA.SSID AND
SUB.SUBCODE = IA.SUBCODE AND
SUB.SEM = 8;
```

USN	SNAME	ADDRESS	PHONE	G	CAT
1RN13CS091	TEESHA	BENGALURU	7712312312	F	OutStanding
1RN13CS091	TEESHA	BENGALURU	7712312312	F	OutStanding
1RN13CS091	TEESHA	BENGALURU	7712312312	F	OutStanding
1RN13CS091	TEESHA	BENGALURU	7712312312	F	OutStanding
1RN13CS091	TEESHA	BENGALURU	7712312312	F	Average

