STUDENT DATABASE MANAGEMENT SYSTEM

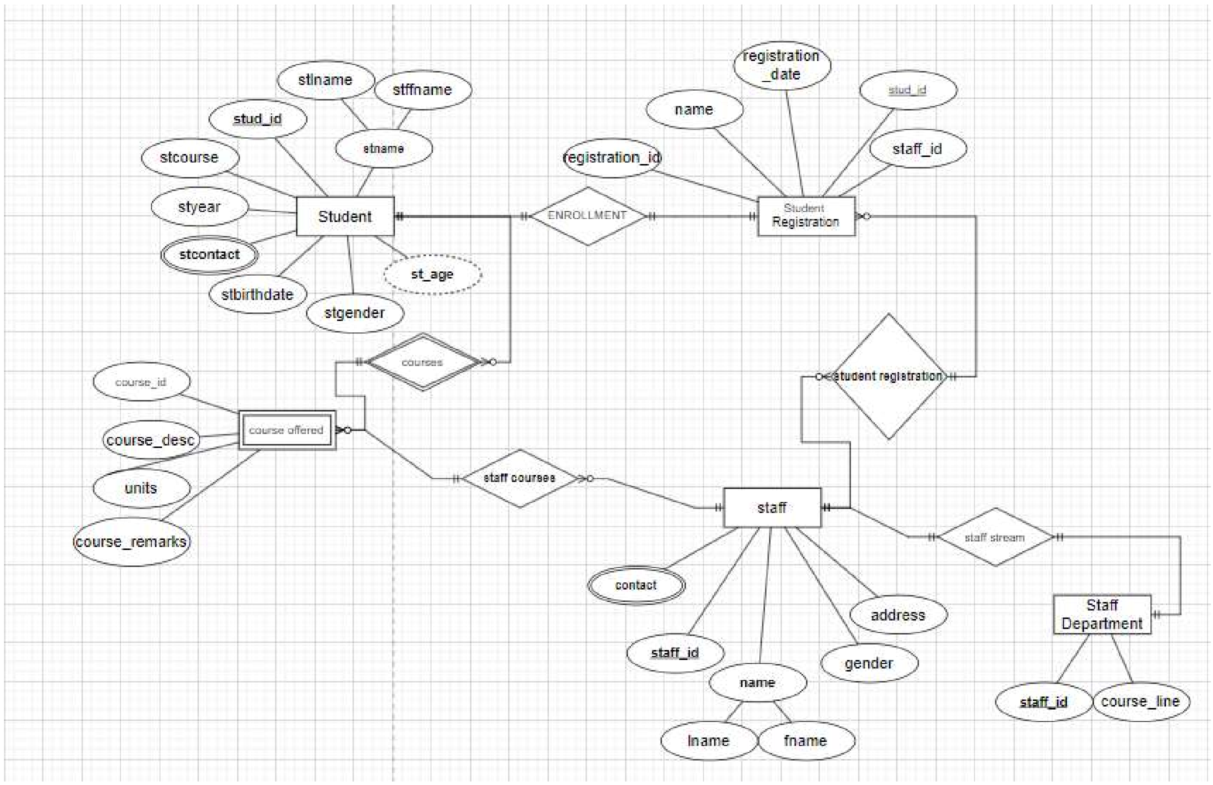
ABSTRACT

The Student Database Management System is an data base design to efficiently manage student information and streamline administrative processes within educational institutions. This abstract provides an overview of the key functionalities and benefits of implementing an SDMS.
The SDMS serves as a centralized repository for storing and organizing a wide range of student-related data, including personal information, staff records, staff department, student registration , courses offered to the students and course line of the staff. By digitizing these records, the Student Database Management System eliminates the need for manual paperwork, reducing administrative burden, minimizing errors, and improving data accuracy.

INTRODUCTION

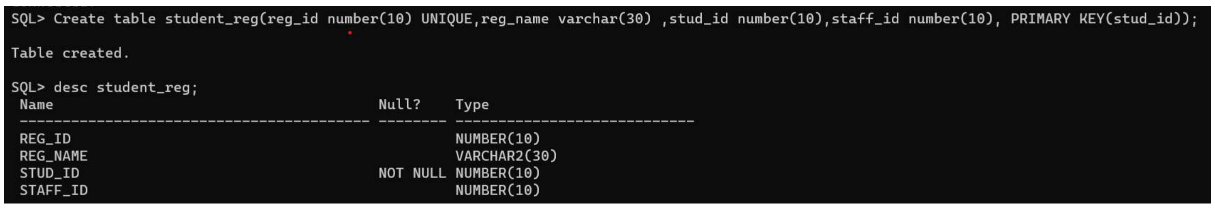
The system offers a user-friendly interface accessible to administrators, teachers, and authorized staff members, providing them with secure and role-based access to relevant student information. It enables swift retrieval of records, allowing administrators to quickly generate reports, monitor student progress, and make data-driven decisions to enhance academic performance and student success.
Moreover, the SDMS automates routine administrative tasks, such as student enrollment, class scheduling, grading, and fee management. Through integrated communication features, the system facilitates seamless communication between teachers, students, and parents, ensuring timely updates, notifications, and feedback.
Security is a top priority in the SDMS, with robust data encryption and access control measures in place to safeguard sensitive student information. Regular backups and disaster recovery mechanisms are employed to prevent data loss and ensure system reliability.
Implementing an SDMS offers numerous benefits, including increased operational efficiency, enhanced data accuracy, improved decision-making capabilities, streamlined administrative processes, and enhanced communication between stakeholders. Educational institutions can leverage these advantages to optimize resource allocation, promote transparency, and foster an environment conducive to student growth and achievement.

ER DIAGRAM:


stlname
stffname
stud_id
stname
stcourse
styear
Student
stcontact
stbirthdate
stgender
st_age
ENROLLMENT
registration_date
name
stud_id
staff_id
registration_id
Student Registration
courses
course_id
course_desc
units
course_remarks
course offered
staff courses
student registration
staff
staff stream
contact
staff_id
name
lname
fname
address
gender
Staff Department
staff_id
course_line

INFORMATION ABOUT ENTITIES:

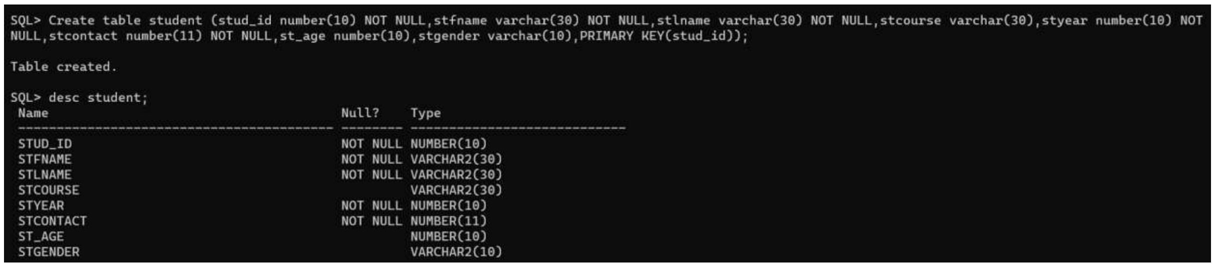
1. **student_reg:**



```
SQL> Create table student_reg(reg_id number(10) UNIQUE,reg_name varchar(30) ,stud_id number(10),staff_id number(10), PRIMARY KEY(stud_id));

Table created.

SQL> desc student_reg;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 REG_ID                                             NUMBER(10)
 REG_NAME                                           VARCHAR2(30)
 STUD_ID                                   NOT NULL NUMBER(10)
 STAFF_ID                                           NUMBER(10)
```

Student registration is an activity performed by the staff in order to enroll or registration of students into the course. The stud_id is the primary key and the table consists of reg_id ,reg_name,stud_id and the staff_id.

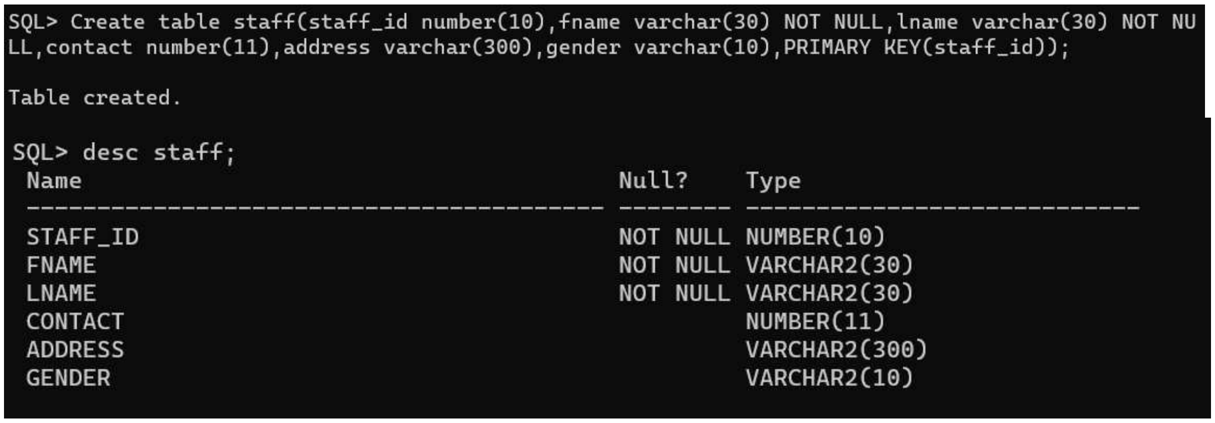
2. **student:**



```
SQL> Create table student (stud_id number(10) NOT NULL,stfname varchar(30) NOT NULL,stlname varchar(30) NOT NULL,stcourse varchar(30),styear number(10) NOT
NULL,stcontact number(11) NOT NULL,st_age number(10),stgender varchar(10),PRIMARY KEY(stud_id));

Table created.

SQL> desc student;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 STUD_ID                                   NOT NULL NUMBER(10)
 STFNAME                                   NOT NULL VARCHAR2(30)
 STLNAME                                   NOT NULL VARCHAR2(30)
 STCOURSE                                           VARCHAR2(30)
 STYEAR                                    NOT NULL NUMBER(10)
 STCONTACT                                 NOT NULL NUMBER(11)
 ST_AGE                                             NUMBER(10)
 STGENDER                                           VARCHAR2(10)
```

The student is an person consists of all the details. The stud_id is the primary key to access the students easily with their unique identification .the above desc function describes the all the attributes of the student.

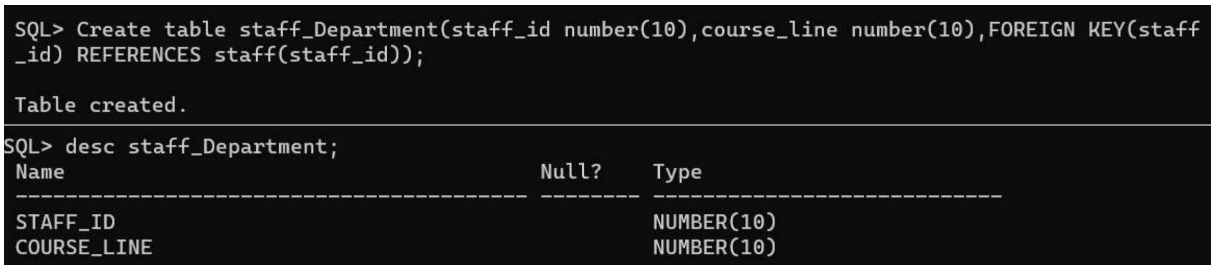
3. **staff:**



```
SQL> Create table staff(staff_id number(10),fname varchar(30) NOT NULL,lname varchar(30) NOT NU
LL,contact number(11),address varchar(300),gender varchar(10),PRIMARY KEY(staff_id));

Table created.

SQL> desc staff;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 STAFF_ID                                  NOT NULL NUMBER(10)
 FNAME                                     NOT NULL VARCHAR2(30)
 LNAME                                     NOT NULL VARCHAR2(30)
 CONTACT                                            NUMBER(11)
 ADDRESS                                            VARCHAR2(300)
 GENDER                                             VARCHAR2(10)
```

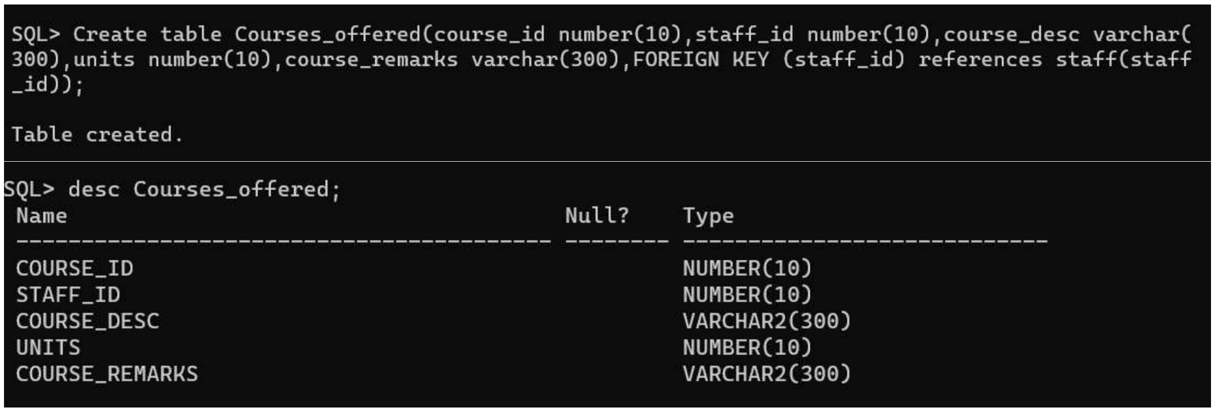
The staff is the faculty or a teacher one who manages the courses and as well as the student registrations. staff_id is the primary key of the table staff.

4. **staff_Department:**



```
SQL> Create table staff_Department(staff_id number(10),course_line number(10),FOREIGN KEY(staff
_id) REFERENCES staff(staff_id));

Table created.

SQL> desc staff_Department;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 STAFF_ID                                           NUMBER(10)
 COURSE_LINE                                        NUMBER(10)
```

5. Courses_offered:



```
SQL> Create table Courses_offered(course_id number(10),staff_id number(10),course_desc varchar(
300),units number(10),course_remarks varchar(300),FOREIGN KEY (staff_id) references staff(staff
_id));

Table created.

SQL> desc Courses_offered;
 Name                                      Null?    Type
 ----------------------------------------- -------- ----------------------------
 COURSE_ID                                          NUMBER(10)
 STAFF_ID                                           NUMBER(10)
 COURSE_DESC                                        VARCHAR2(300)
 UNITS                                              NUMBER(10)
 COURSE_REMARKS                                     VARCHAR2(300)
```

Courses_offered is the list of courses offered to the student and handling subjects to the staff. The above courses_offered is an weak entity referred to the staff table with the staff_id attribute.

RELEATION SHIP BETWEEN ENTITIES:

Staff and student_registration:
Relationship: student registration
Type of relation: one to many
Explanation: staff has to do the student enrollement or registration for the students in order to access the courses.

Staff and staff_department:
Relationship: staff stream
Type of relation: one to one
Explanation: one lecturer or a faculty are assigned to one department to handle the courses

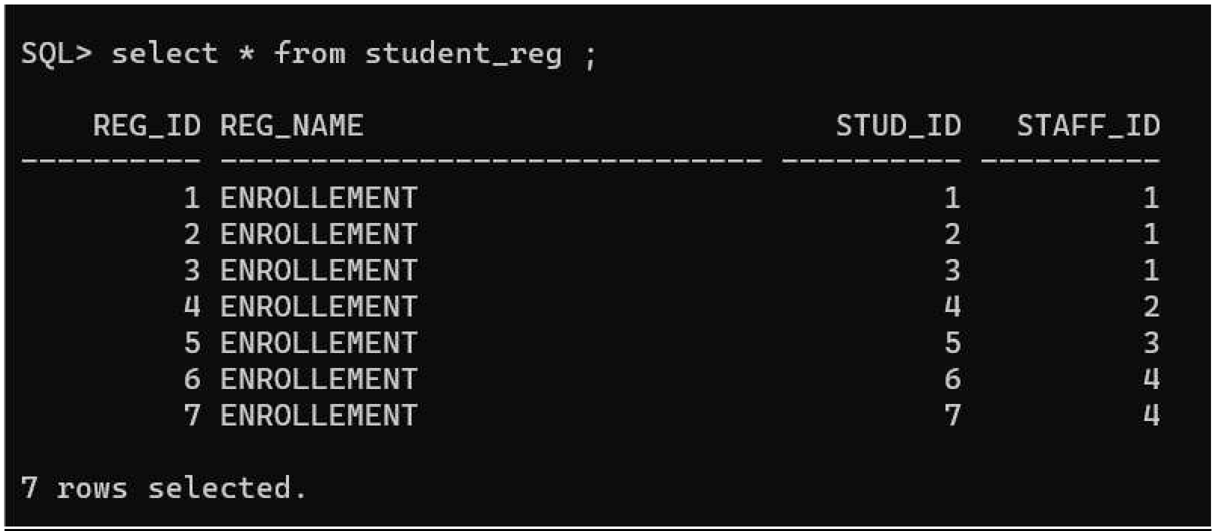
Staff and courses offered:
Relationship: courses offered
Type of releation: one to many
Explanation: staff can handle multiple courses offering to students.

Student registration and student:
Relationship: enrolloment
Type of relation: one to one
Explanation: one student can be enrolled once for the registration of course with the stud_id

Student and courses offered:
Relationship: courses
Type of relation: one to many
Explanation: one student can access multiple courses

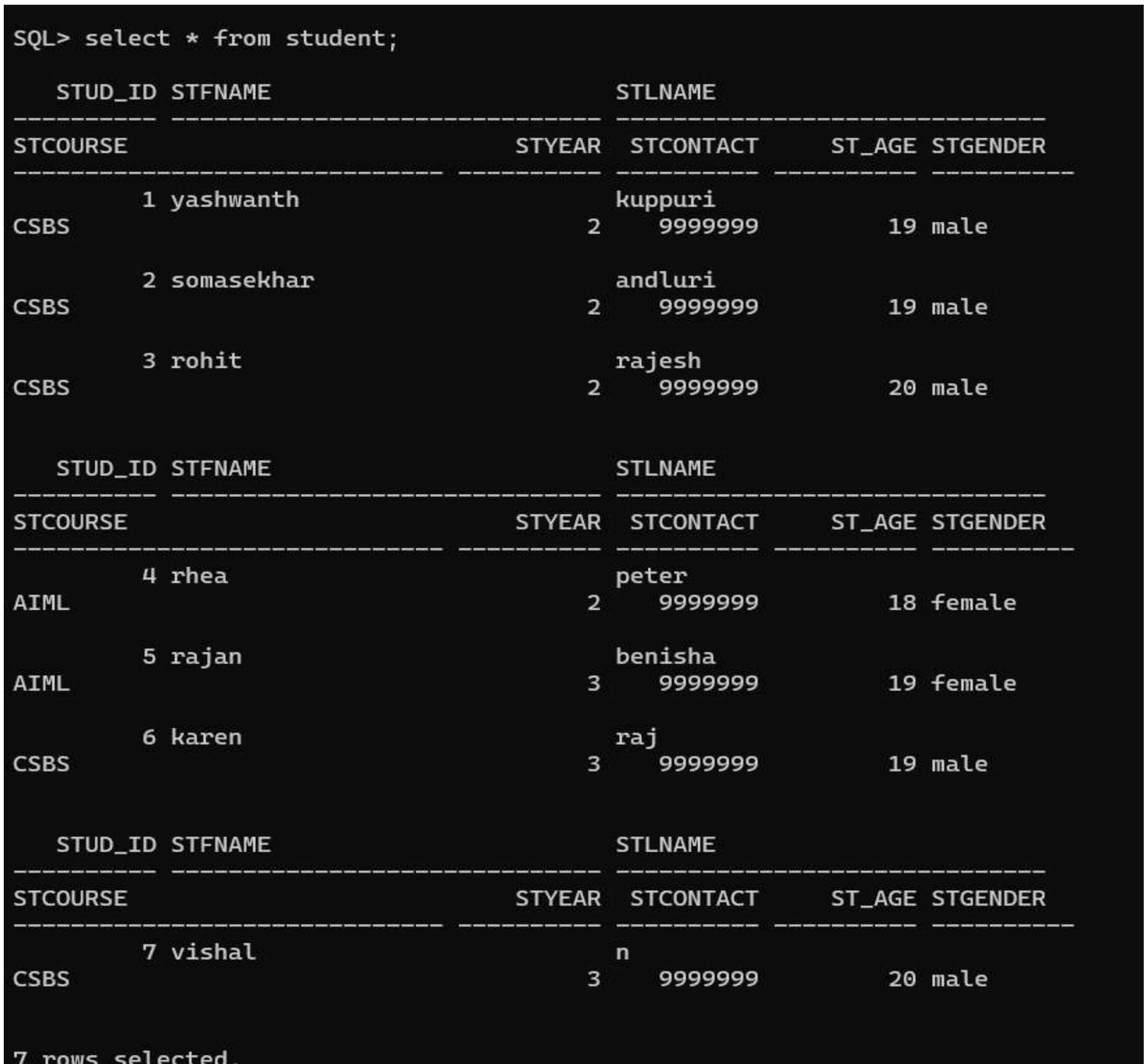
AFTER INSERTING TABLE INTO THE VALUES

1. **student_reg:**



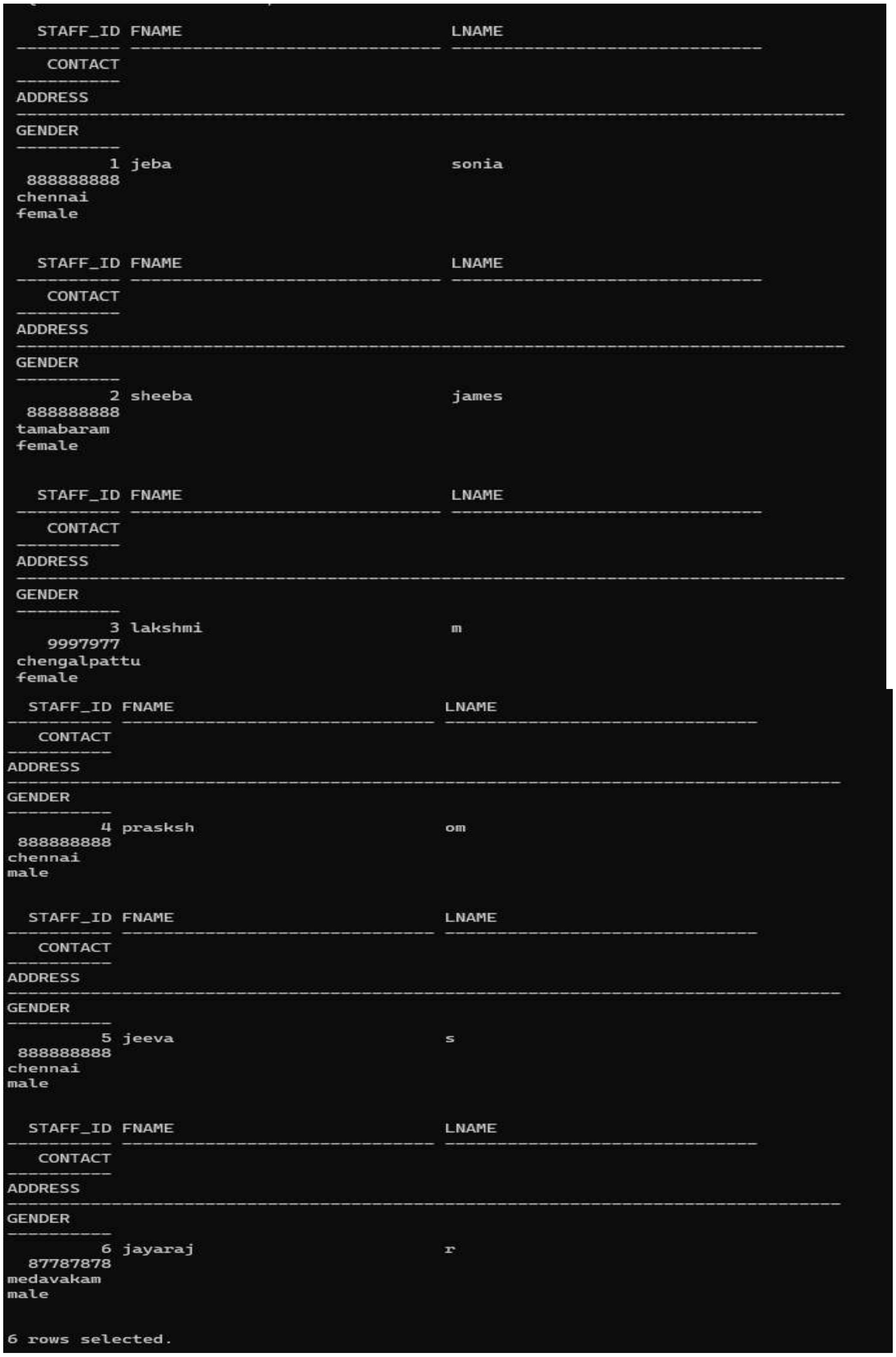
```
SQL> select * from student_reg ;

    REG_ID REG_NAME                          STUD_ID   STAFF_ID
---------- ------------------------------ ---------- ----------
         1 ENROLLEMENT                             1          1
         2 ENROLLEMENT                             2          1
         3 ENROLLEMENT                             3          1
         4 ENROLLEMENT                             4          2
         5 ENROLLEMENT                             5          3
         6 ENROLLEMENT                             6          4
         7 ENROLLEMENT                             7          4

7 rows selected.
```

2. **student**



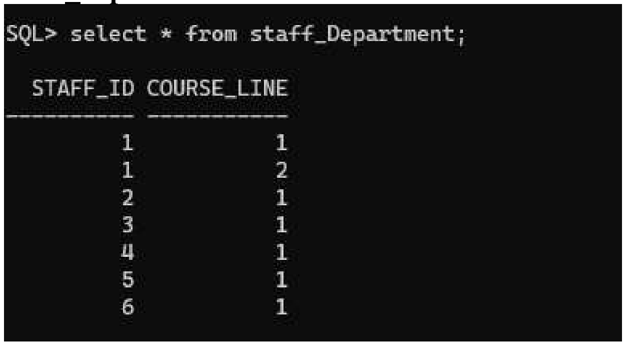
```
SQL> select * from student;

   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
STCOURSE                           STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         1 yashwanth                      kuppuri
CSBS                                    2    9999999         19 male

         2 somasekhar                     andluri
CSBS                                    2    9999999         19 male

         3 rohit                          rajesh
CSBS                                    2    9999999         20 male


   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
STCOURSE                           STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         4 rhea                           peter
AIML                                    2    9999999         18 female

         5 rajan                          benisha
AIML                                    3    9999999         19 female

         6 karen                          raj
CSBS                                    3    9999999         19 male


   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
STCOURSE                           STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         7 vishal                         n
CSBS                                    3    9999999         20 male

7 rows selected.
```

3. **staff**



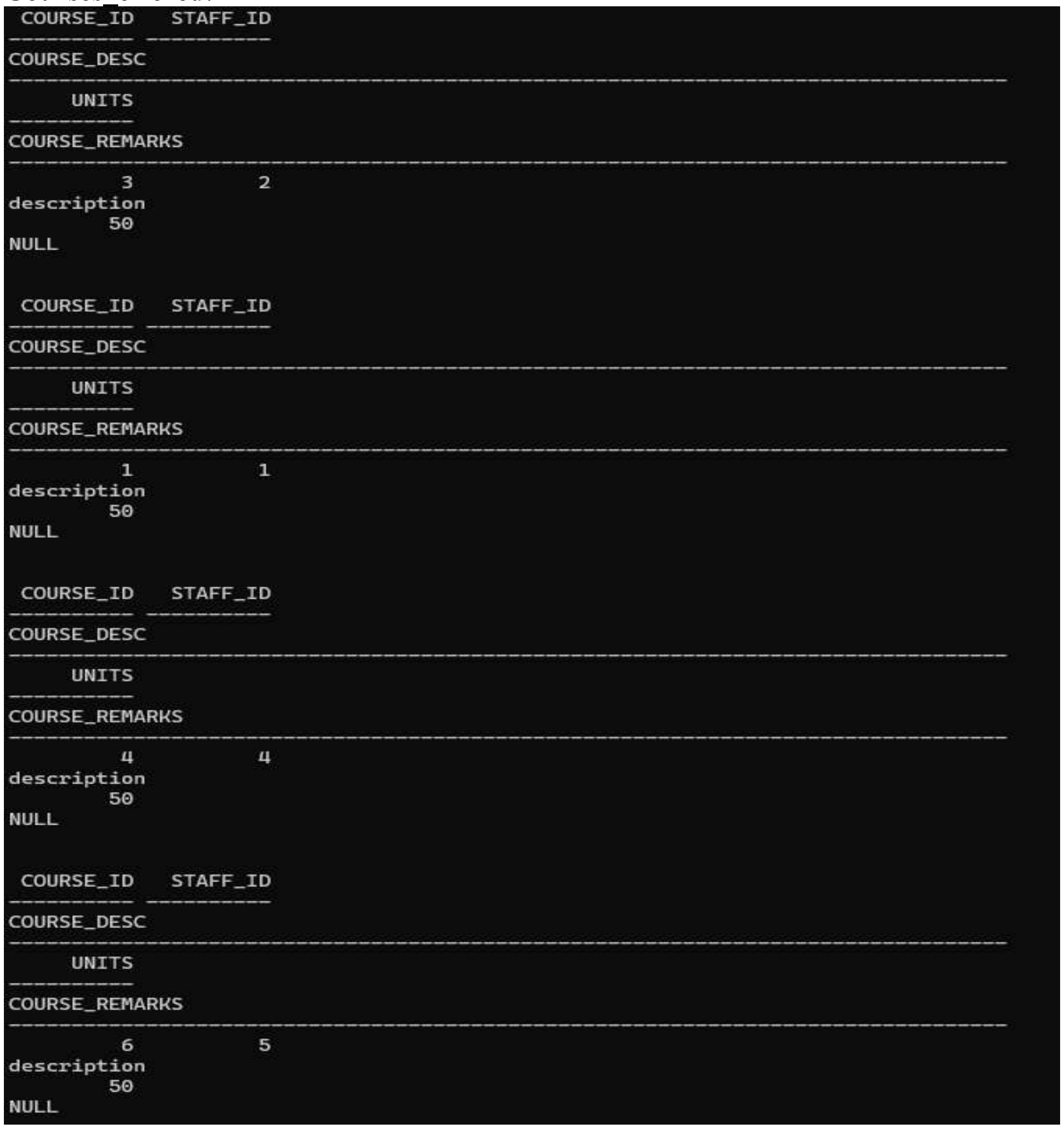
```
  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         1 jeba                           sonia
 888888888
chennai
female

  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         2 sheeba                         james
 888888888
tamabaram
female

  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         3 lakshmi                        m
   9997977
chengalpattu
female
  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         4 prasksh                        om
 888888888
chennai
male

  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         5 jeeva                          s
 888888888
chennai
male

  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         6 jayaraj                        r
  87787878
medavakam
male

6 rows selected.
```

Staff_department:

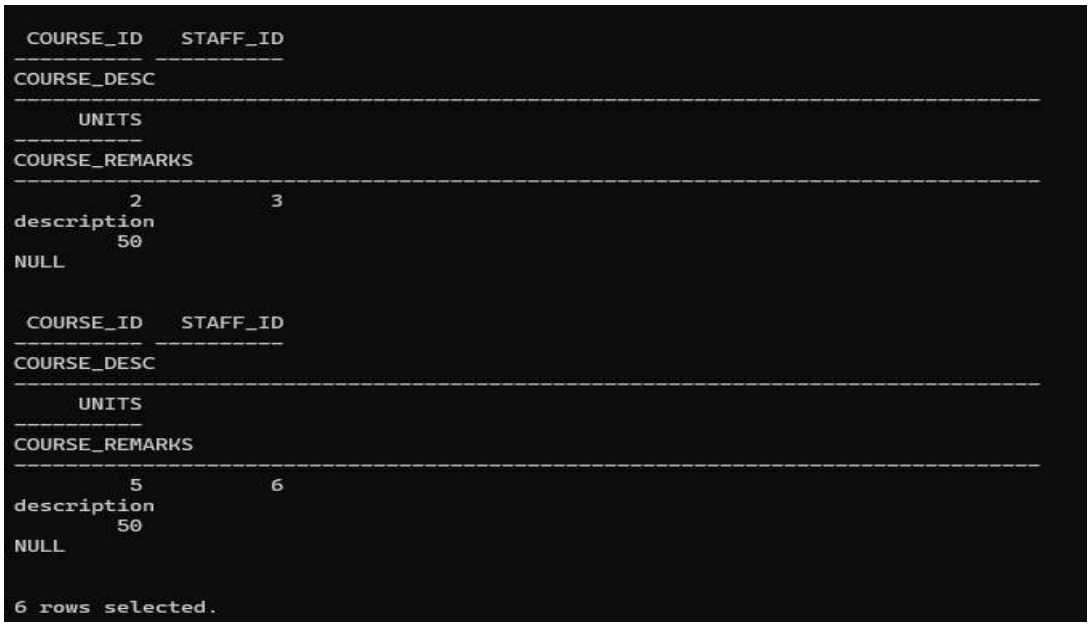


```
SQL> select * from staff_Department;

  STAFF_ID COURSE_LINE
---------- -----------
         1           1
         1           2
         2           1
         3           1
         4           1
         5           1
         6           1
```

Courses_offered:



```
 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         3          2
description
        50
NULL

 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         1          1
description
        50
NULL

 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         4          4
description
        50
NULL

 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         6          5
description
        50
NULL
```

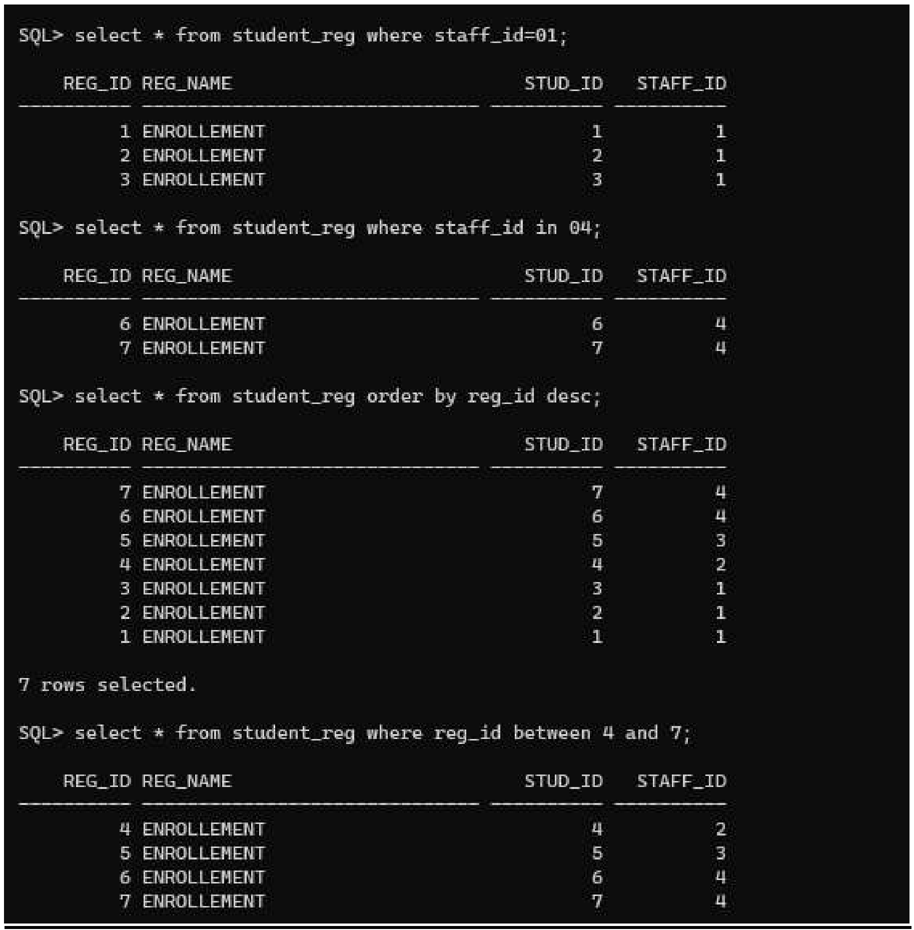


```
 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         2          3
description
        50
NULL


 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         5          6
description
        50
NULL


6 rows selected.
```

-

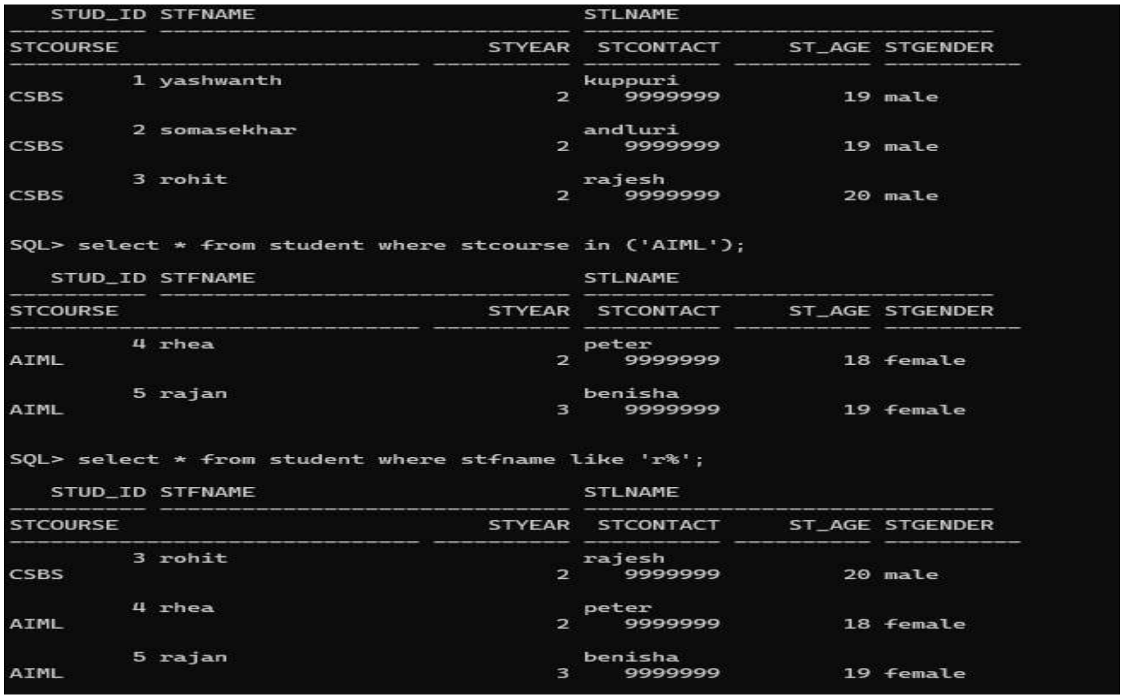
RELEATIONAL, ARTHIMETIC AND LOGICLAL OPERATIONS :

1. **student_reg:**

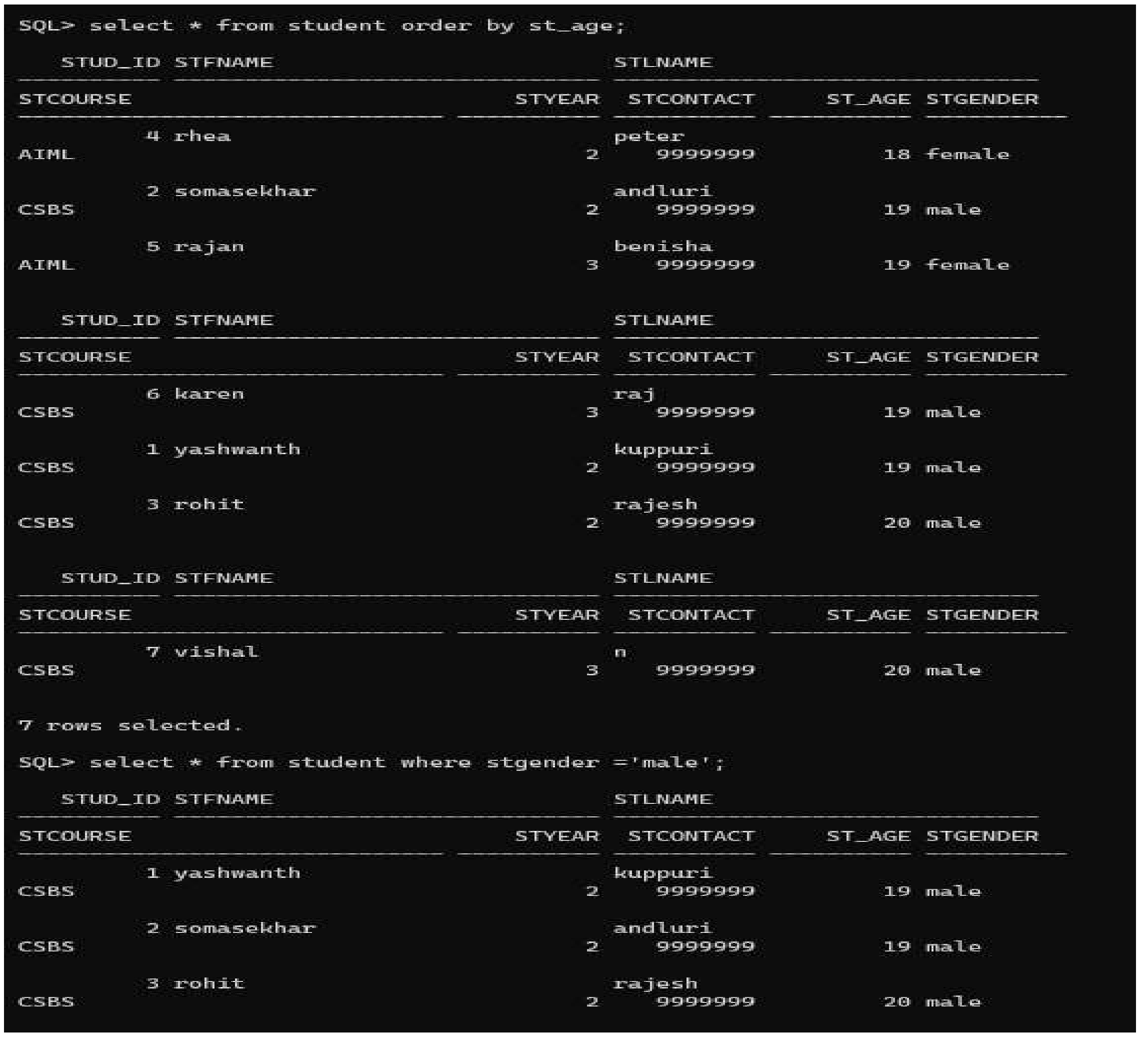


```
SQL> select * from student_reg where staff_id=01;

    REG_ID REG_NAME                          STUD_ID   STAFF_ID
---------- ------------------------------ ---------- ----------
         1 ENROLLEMENT                             1          1
         2 ENROLLEMENT                             2          1
         3 ENROLLEMENT                             3          1

SQL> select * from student_reg where staff_id in 04;

    REG_ID REG_NAME                          STUD_ID   STAFF_ID
---------- ------------------------------ ---------- ----------
         6 ENROLLEMENT                             6          4
         7 ENROLLEMENT                             7          4

SQL> select * from student_reg order by reg_id desc;

    REG_ID REG_NAME                          STUD_ID   STAFF_ID
---------- ------------------------------ ---------- ----------
         7 ENROLLEMENT                             7          4
         6 ENROLLEMENT                             6          4
         5 ENROLLEMENT                             5          3
         4 ENROLLEMENT                             4          2
         3 ENROLLEMENT                             3          1
         2 ENROLLEMENT                             2          1
         1 ENROLLEMENT                             1          1

7 rows selected.

SQL> select * from student_reg where reg_id between 4 and 7;

    REG_ID REG_NAME                          STUD_ID   STAFF_ID
---------- ------------------------------ ---------- ----------
         4 ENROLLEMENT                             4          2
         5 ENROLLEMENT                             5          3
         6 ENROLLEMENT                             6          4
         7 ENROLLEMENT                             7          4
```

2. **STUDENT:**

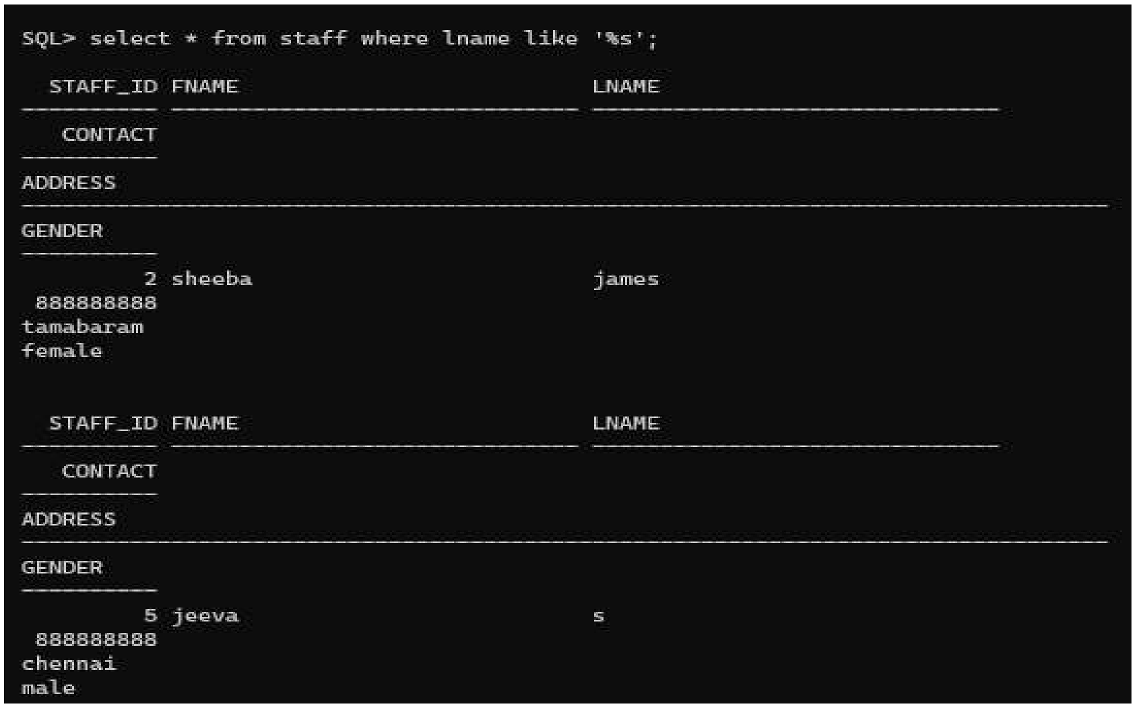


```
   STUD_ID STFNAME                                  STLNAME
---------- ---------------------------------------- ------------------------------
STCOURSE                              STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         1 yashwanth                                kuppuri
CSBS                                       2    9999999         19 male

         2 somasekhar                               andluri
CSBS                                       2    9999999         19 male

         3 rohit                                    rajesh
CSBS                                       2    9999999         20 male

SQL> select * from student where stcourse in ('AIML');

   STUD_ID STFNAME                                  STLNAME
---------- ---------------------------------------- ------------------------------
STCOURSE                              STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         4 rhea                                     peter
AIML                                       2    9999999         18 female

         5 rajan                                    benisha
AIML                                       3    9999999         19 female

SQL> select * from student where stfname like 'r%';

   STUD_ID STFNAME                                  STLNAME
---------- ---------------------------------------- ------------------------------
STCOURSE                              STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         3 rohit                                    rajesh
CSBS                                       2    9999999         20 male

         4 rhea                                     peter
AIML                                       2    9999999         18 female

         5 rajan                                    benisha
AIML                                       3    9999999         19 female
```

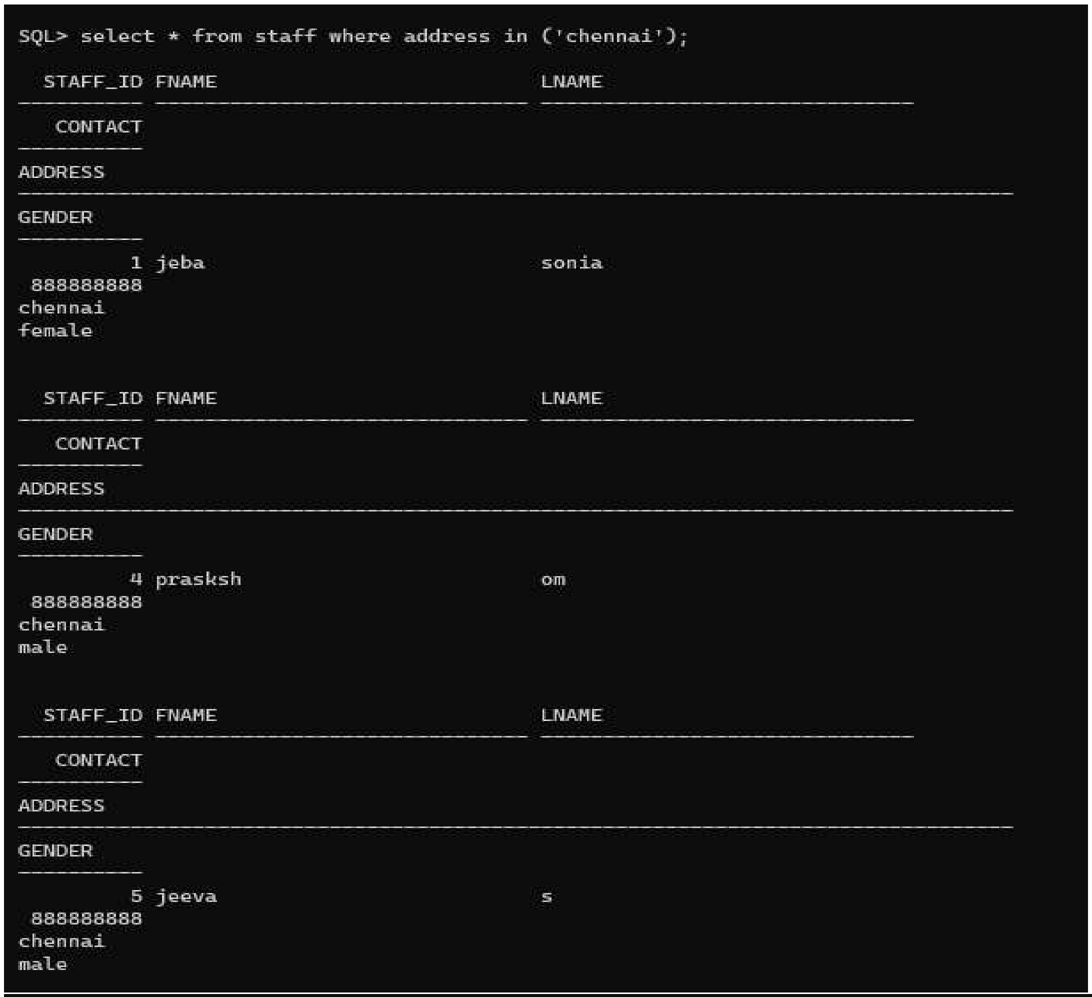


```
SQL> select * from student order by st_age;

   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
STCOURSE                       STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         4 rhea                           peter
AIML                                    2    9999999         18 female

         2 somasekhar                     andluri
CSBS                                    2    9999999         19 male

         5 rajan                          benisha
AIML                                    3    9999999         19 female

   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
STCOURSE                       STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         6 karen                          raj
CSBS                                    3    9999999         19 male

         1 yashwanth                      kuppuri
CSBS                                    2    9999999         19 male

         3 rohit                          rajesh
CSBS                                    2    9999999         20 male

   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
STCOURSE                       STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         7 vishal                         n
CSBS                                    3    9999999         20 male

7 rows selected.

SQL> select * from student where stgender ='male';

   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
STCOURSE                       STYEAR  STCONTACT     ST_AGE STGENDER
------------------------------ ---------- ---------- ---------- ----------
         1 yashwanth                      kuppuri
CSBS                                    2    9999999         19 male

         2 somasekhar                     andluri
CSBS                                    2    9999999         19 male

         3 rohit                          rajesh
CSBS                                    2    9999999         20 male
```

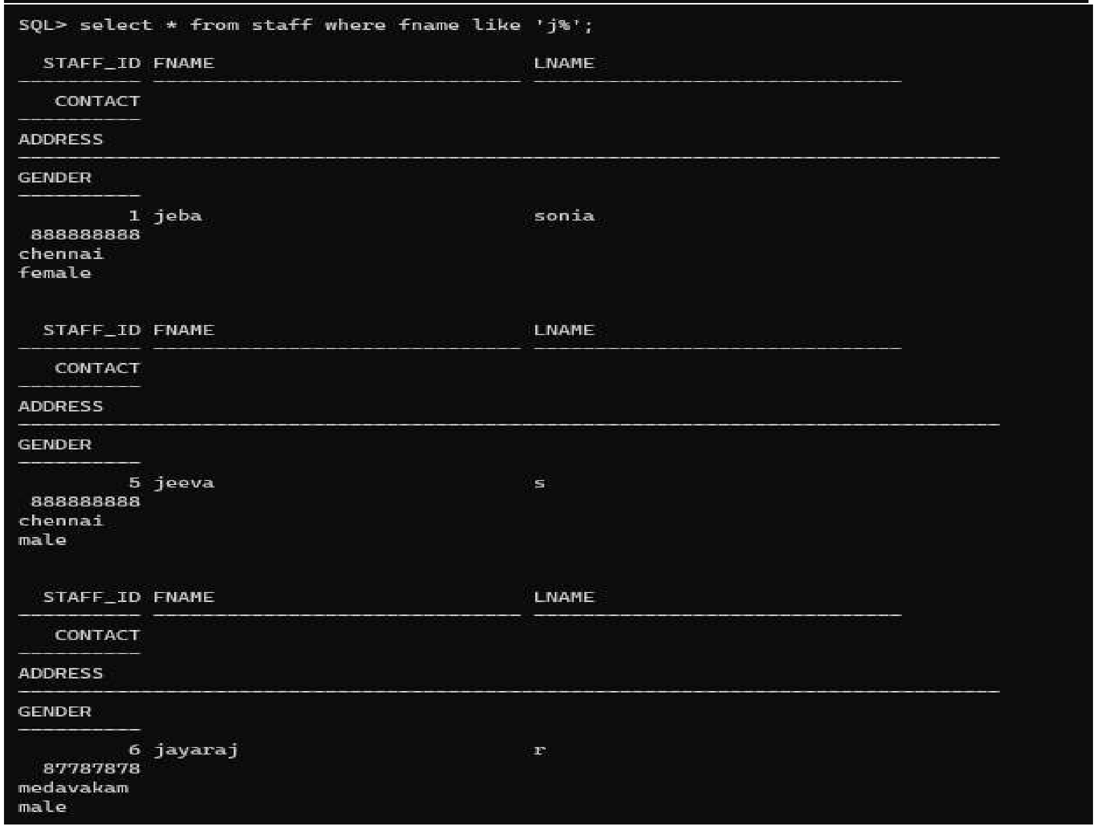
3. **STAFF:**



```
SQL> select * from staff where lname like '%s';

  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         2 sheeba                         james
 888888888
tamabaram
female


  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         5 jeeva                          s
 888888888
chennai
male
```

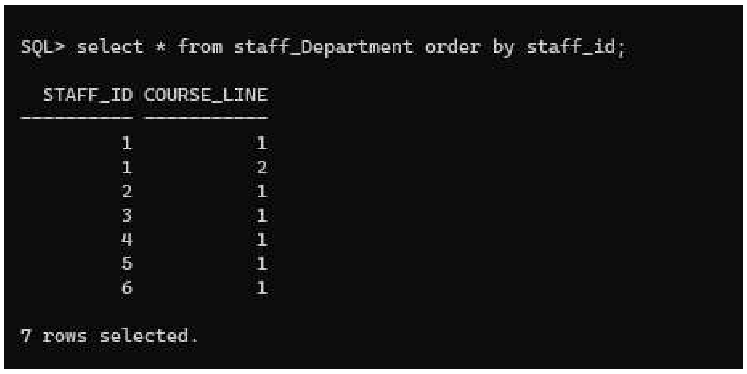


```
SQL> select * from staff where address in ('chennai');

  STAFF_ID FNAME                              LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         1 jeba                               sonia
 888888888
chennai
female


  STAFF_ID FNAME                              LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         4 prasksh                            om
 888888888
chennai
male


  STAFF_ID FNAME                              LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         5 jeeva                              s
 888888888
chennai
male
```



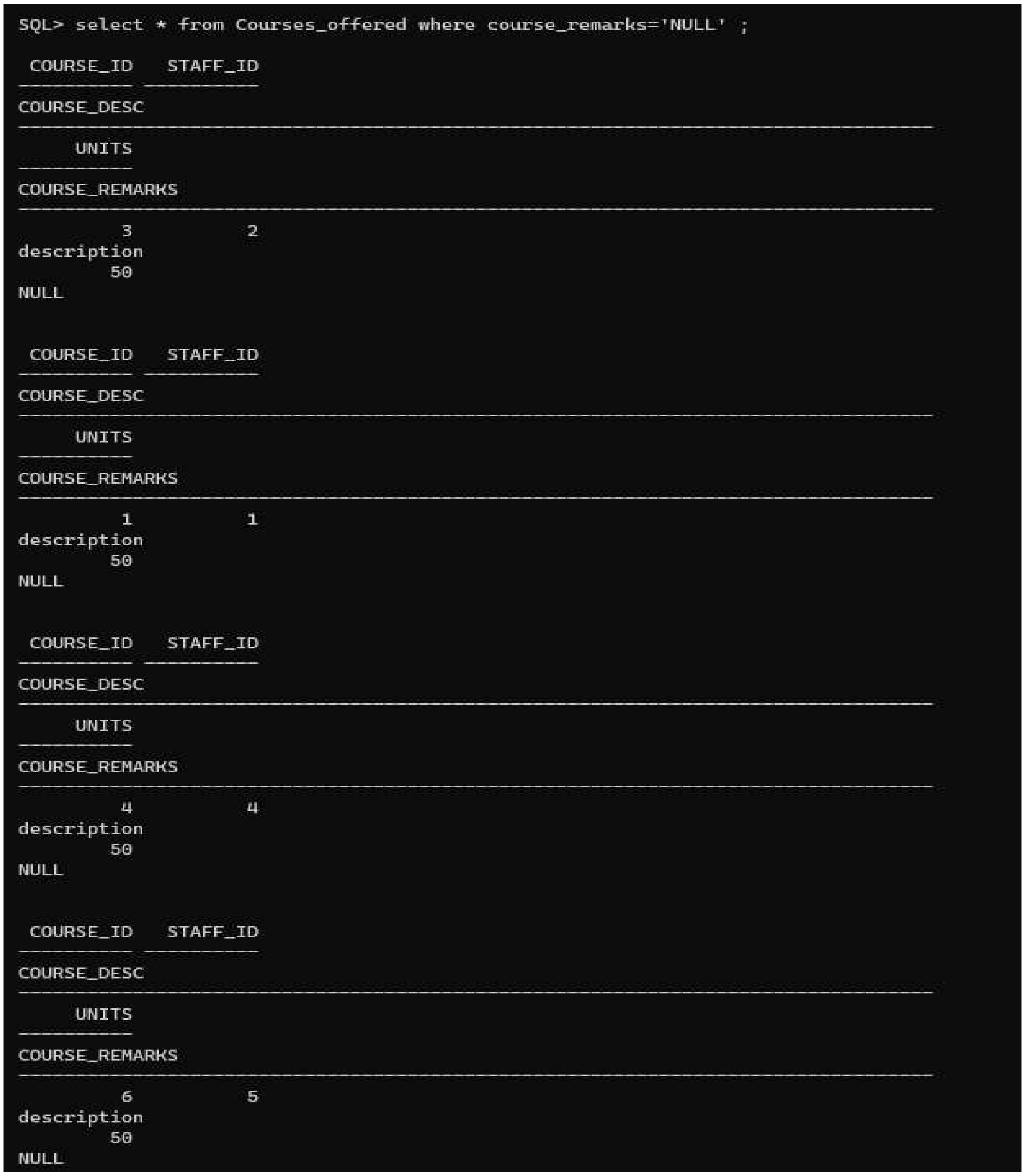
```
SQL> select * from staff where fname like 'j%';

  STAFF_ID FNAME                              LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         1 jeba                               sonia
 888888888
chennai
female


  STAFF_ID FNAME                              LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         5 jeeva                              s
 888888888
chennai
male


  STAFF_ID FNAME                              LNAME
---------- ------------------------------ ------------------------------
   CONTACT
----------
ADDRESS
--------------------------------------------------------------------------------
GENDER
----------
         6 jayaraj                            r
  87787878
medavakam
male
```

4. **Staff_Department:**



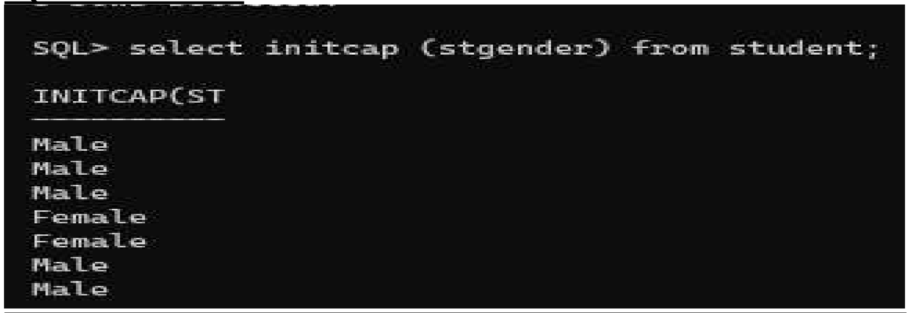
```
SQL> select * from staff_Department order by staff_id;

  STAFF_ID COURSE_LINE
---------- -----------
         1           1
         1           2
         2           1
         3           1
         4           1
         5           1
         6           1

7 rows selected.
```

5. **Courses_offered:**

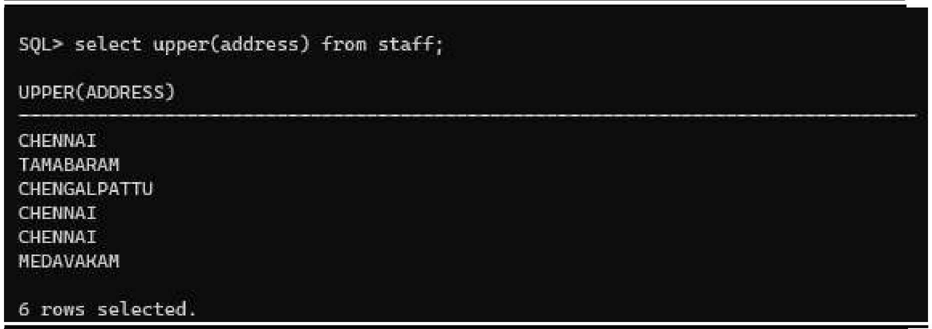


```
SQL> select * from Courses_offered where course_remarks='NULL' ;

 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         3          2
description
        50
NULL


 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         1          1
description
        50
NULL


 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         4          4
description
        50
NULL


 COURSE_ID   STAFF_ID
---------- ----------
COURSE_DESC
--------------------------------------------------------------------------------
     UNITS
----------
COURSE_REMARKS
--------------------------------------------------------------------------------
         6          5
description
        50
NULL
```

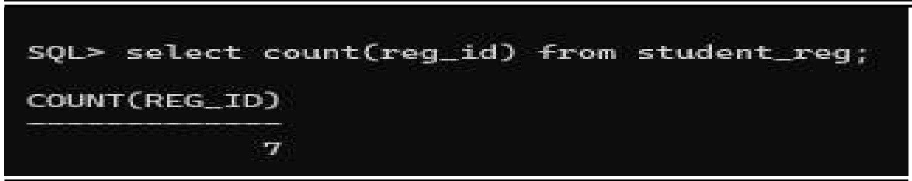
SQL FUNCTIONS



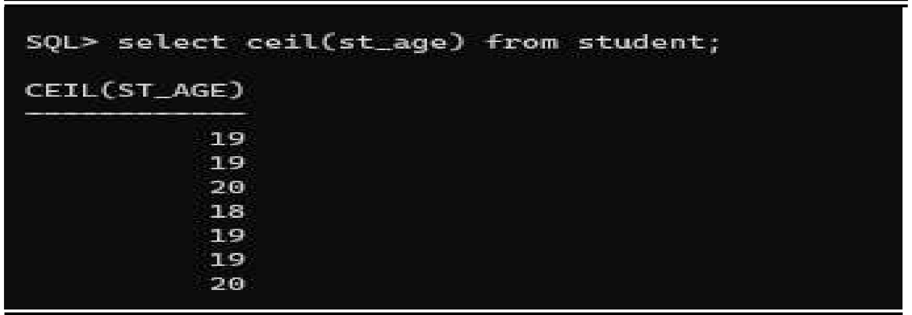
```
SQL> select initcap (stgender) from student;

INITCAP(ST
----------
Male
Male
Male
Female
Female
Male
Male
```



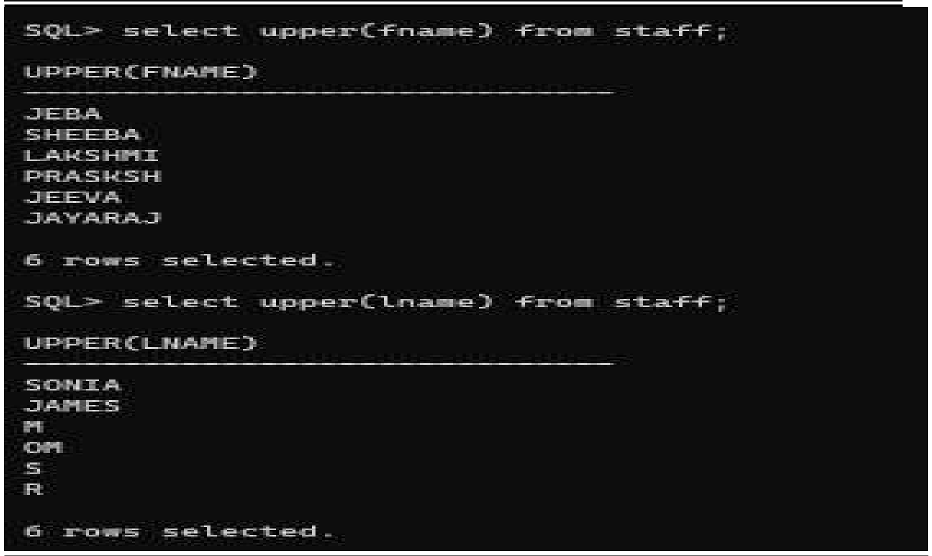
```
SQL> select upper(address) from staff;

UPPER(ADDRESS)
--------------------------------------------------------------------------------
CHENNAI
TAMABARAM
CHENGALPATTU
CHENNAI
CHENNAI
MEDAVAKAM

6 rows selected.
```



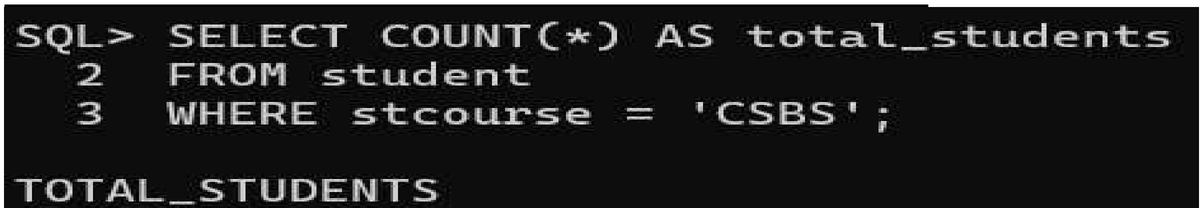
```
SQL> select count(reg_id) from student_reg;

COUNT(REG_ID)
-------------
            7
```



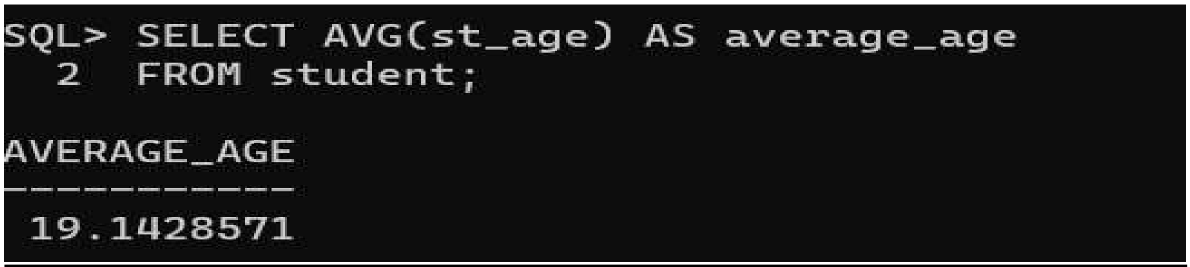
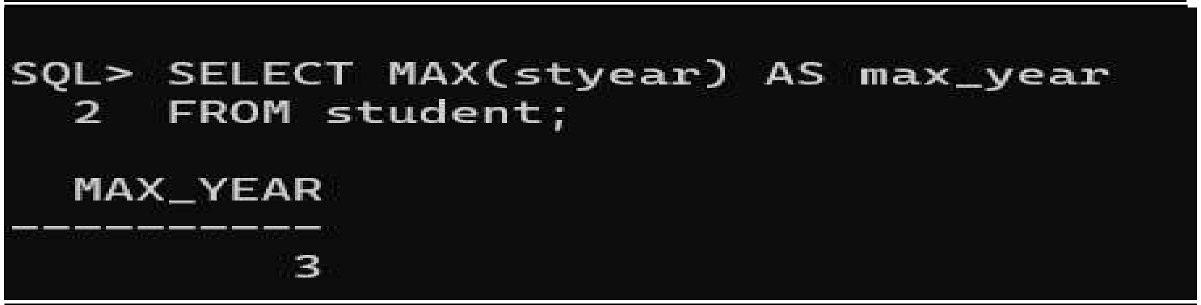
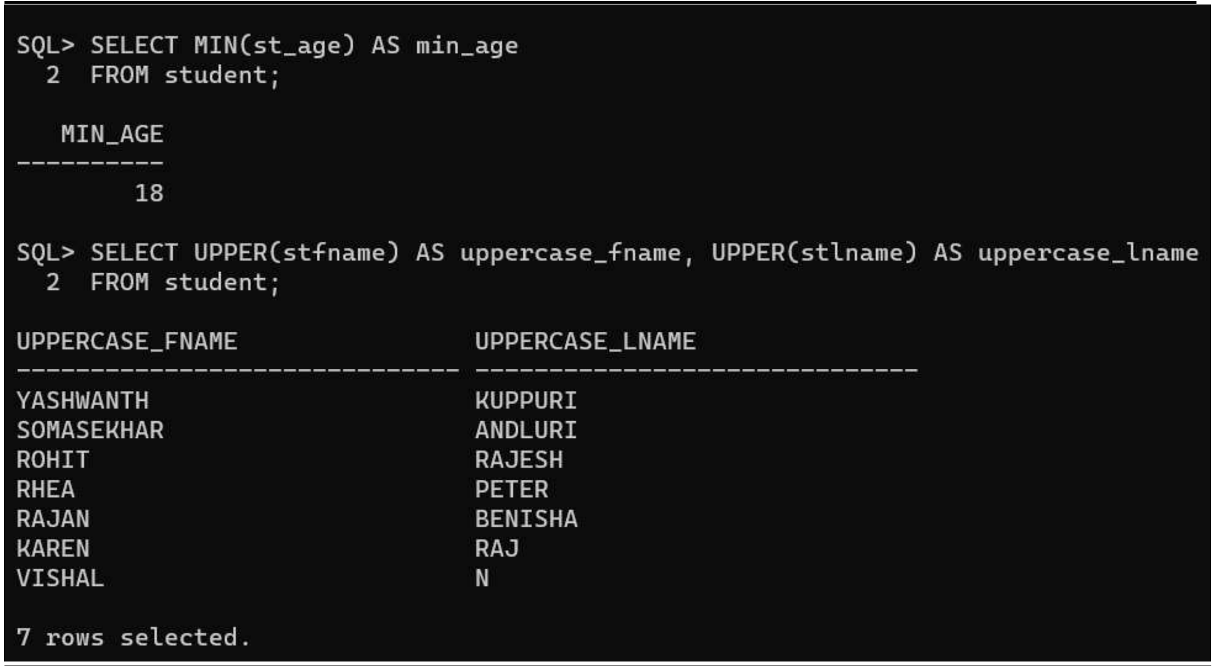
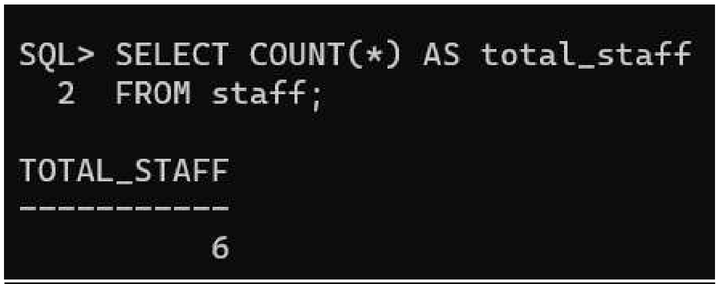
```
SQL> select ceil(st_age) from student;

CEIL(ST_AGE)
------------
          19
          19
          20
          18
          19
          19
          20
```



```
SQL> select upper(fname) from staff;

UPPER(FNAME)
------------------------------
JEBA
SHEEBA
LAKSHMI
PRASKSH
JEEVA
JAYARAJ

6 rows selected.

SQL> select upper(lname) from staff;

UPPER(LNAME)
------------------------------
SONIA
JAMES
M
OM
S
R

6 rows selected.
```

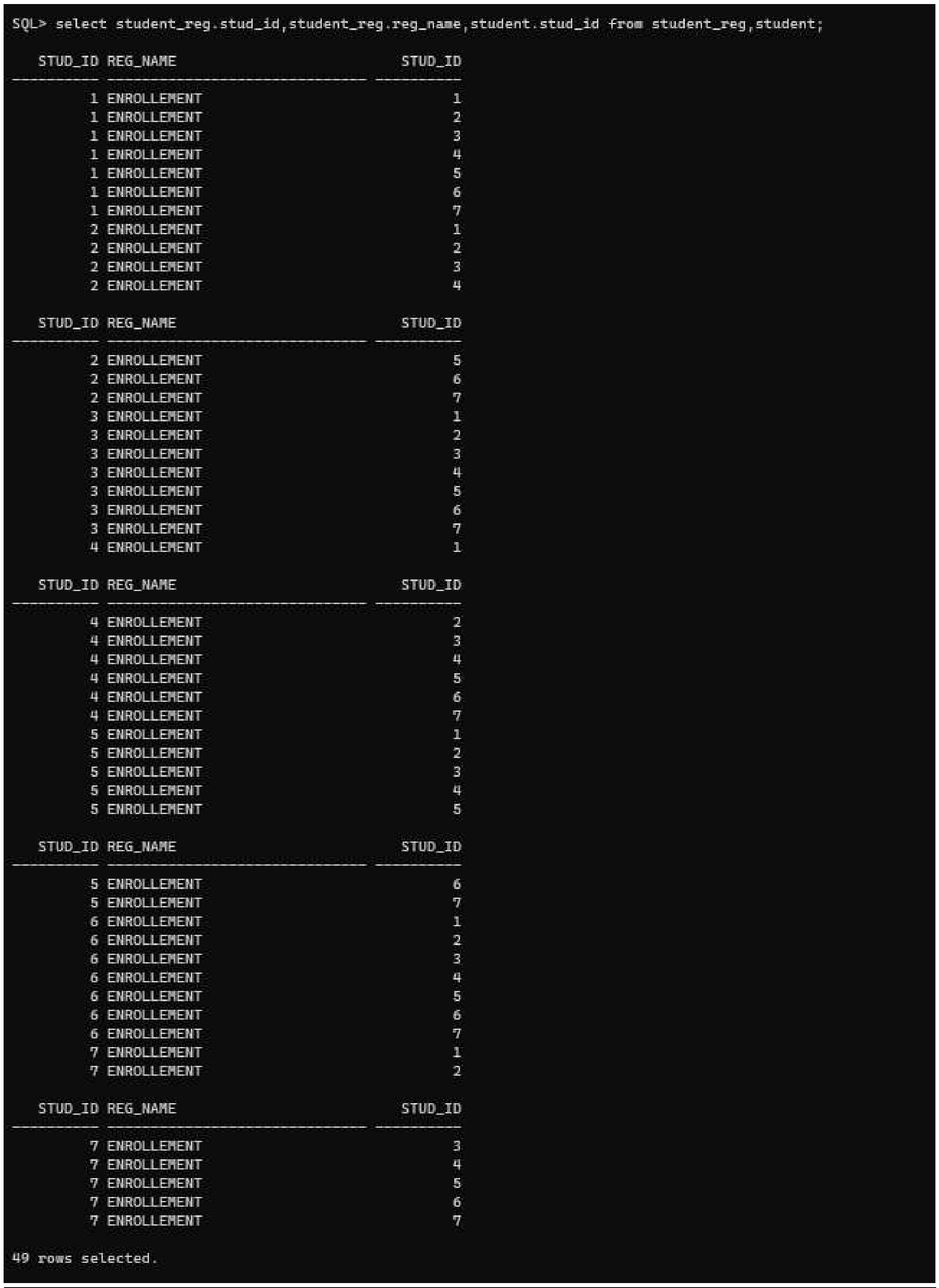


```
SQL> SELECT COUNT(*) AS total_students
  2  FROM student
  3  WHERE stcourse = 'CSBS';

TOTAL_STUDENTS
```


```
SQL> SELECT AVG(st_age) AS average_age
  2  FROM student;

AVERAGE_AGE
-----------
 19.1428571
```

```
SQL> SELECT MAX(styear) AS max_year
  2  FROM student;

  MAX_YEAR
----------
         3
```

```
SQL> SELECT MIN(st_age) AS min_age
  2  FROM student;

   MIN_AGE
----------
        18

SQL> SELECT UPPER(stfname) AS uppercase_fname, UPPER(stlname) AS uppercase_lname
  2  FROM student;

UPPERCASE_FNAME                UPPERCASE_LNAME
------------------------------ ------------------------------
YASHWANTH                      KUPPURI
SOMASEKHAR                     ANDLURI
ROHIT                          RAJESH
RHEA                           PETER
RAJAN                          BENISHA
KAREN                          RAJ
VISHAL                         N

7 rows selected.
```

```
SQL> SELECT COUNT(*) AS total_staff
  2  FROM staff;

TOTAL_STAFF
-----------
          6
```

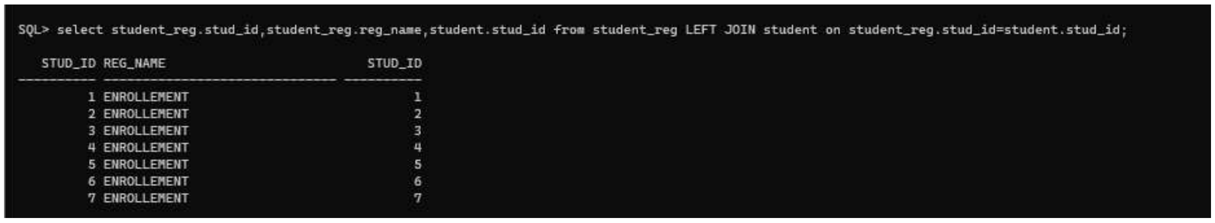
JOINING TABLES

1. **Crossjoin:**

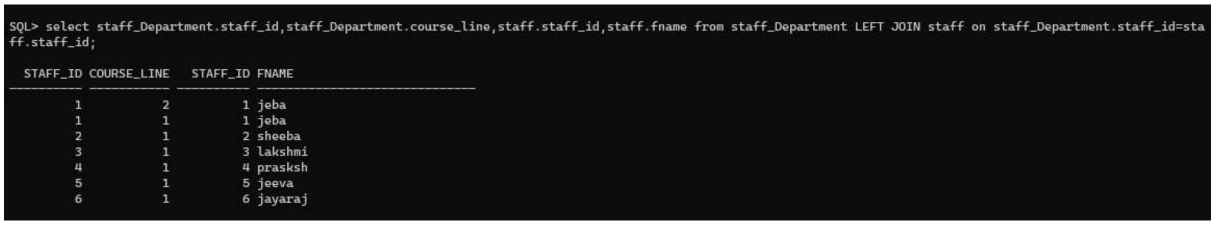


```
SQL> select student_reg.stud_id,student_reg.reg_name,student.stud_id from student_reg,student;

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
         1 ENROLLEMENT                             1
         1 ENROLLEMENT                             2
         1 ENROLLEMENT                             3
         1 ENROLLEMENT                             4
         1 ENROLLEMENT                             5
         1 ENROLLEMENT                             6
         1 ENROLLEMENT                             7
         2 ENROLLEMENT                             1
         2 ENROLLEMENT                             2
         2 ENROLLEMENT                             3
         2 ENROLLEMENT                             4

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
         2 ENROLLEMENT                             5
         2 ENROLLEMENT                             6
         2 ENROLLEMENT                             7
         3 ENROLLEMENT                             1
         3 ENROLLEMENT                             2
         3 ENROLLEMENT                             3
         3 ENROLLEMENT                             4
         3 ENROLLEMENT                             5
         3 ENROLLEMENT                             6
         3 ENROLLEMENT                             7
         4 ENROLLEMENT                             1

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
         4 ENROLLEMENT                             2
         4 ENROLLEMENT                             3
         4 ENROLLEMENT                             4
         4 ENROLLEMENT                             5
         4 ENROLLEMENT                             6
         4 ENROLLEMENT                             7
         5 ENROLLEMENT                             1
         5 ENROLLEMENT                             2
         5 ENROLLEMENT                             3
         5 ENROLLEMENT                             4
         5 ENROLLEMENT                             5

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
         5 ENROLLEMENT                             6
         5 ENROLLEMENT                             7
         6 ENROLLEMENT                             1
         6 ENROLLEMENT                             2
         6 ENROLLEMENT                             3
         6 ENROLLEMENT                             4
         6 ENROLLEMENT                             5
         6 ENROLLEMENT                             6
         6 ENROLLEMENT                             7
         7 ENROLLEMENT                             1
         7 ENROLLEMENT                             2

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
         7 ENROLLEMENT                             3
         7 ENROLLEMENT                             4
         7 ENROLLEMENT                             5
         7 ENROLLEMENT                             6
         7 ENROLLEMENT                             7

49 rows selected.
```

2. **Left join:**

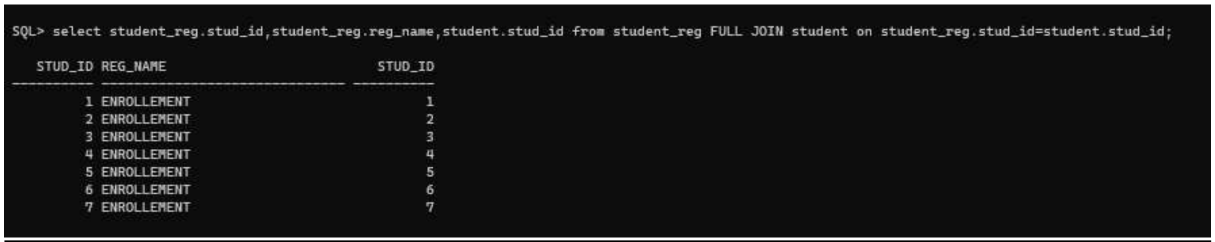


```
SQL> select student_reg.stud_id,student_reg.reg_name,student.stud_id from student_reg LEFT JOIN student on student_reg.stud_id=student.stud_id;

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
         1 ENROLLEMENT                             1
         2 ENROLLEMENT                             2
         3 ENROLLEMENT                             3
         4 ENROLLEMENT                             4
         5 ENROLLEMENT                             5
         6 ENROLLEMENT                             6
         7 ENROLLEMENT                             7
```

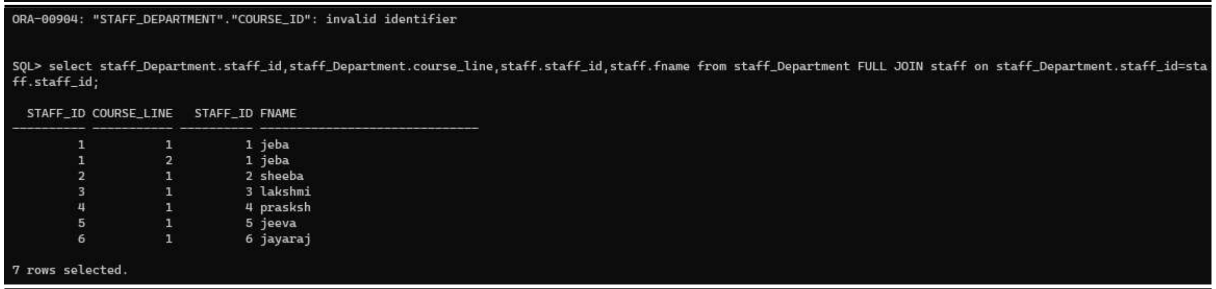


```
SQL> select staff_Department.staff_id,staff_Department.course_line,staff.staff_id,staff.fname from staff_Department LEFT JOIN staff on staff_Department.staff_id=sta
ff.staff_id;

  STAFF_ID COURSE_LINE   STAFF_ID FNAME
---------- ----------- ---------- ------------------------------
         1           2          1 jeba
         1           1          1 jeba
         2           1          2 sheeba
         3           1          3 lakshmi
         4           1          4 prasksh
         5           1          5 jeeva
         6           1          6 jayaraj
```

3. **Full join:**

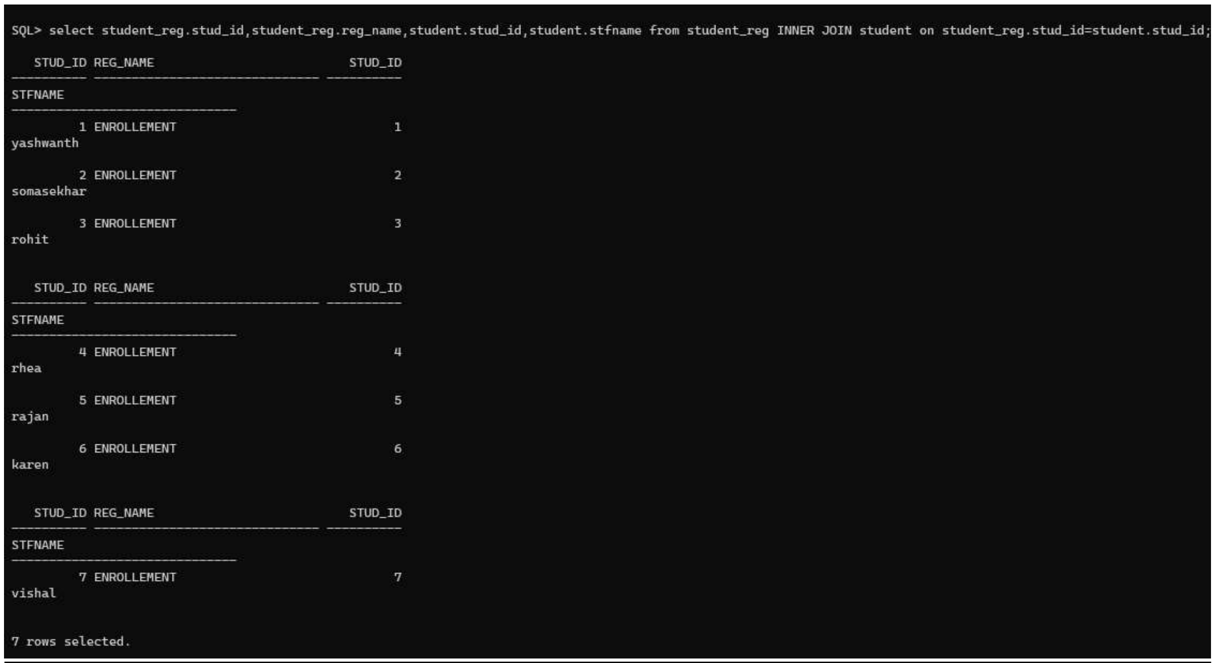


```
SQL> select student_reg.stud_id,student_reg.reg_name,student.stud_id from student_reg FULL JOIN student on student_reg.stud_id=student.stud_id;

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
         1 ENROLLEMENT                             1
         2 ENROLLEMENT                             2
         3 ENROLLEMENT                             3
         4 ENROLLEMENT                             4
         5 ENROLLEMENT                             5
         6 ENROLLEMENT                             6
         7 ENROLLEMENT                             7
```

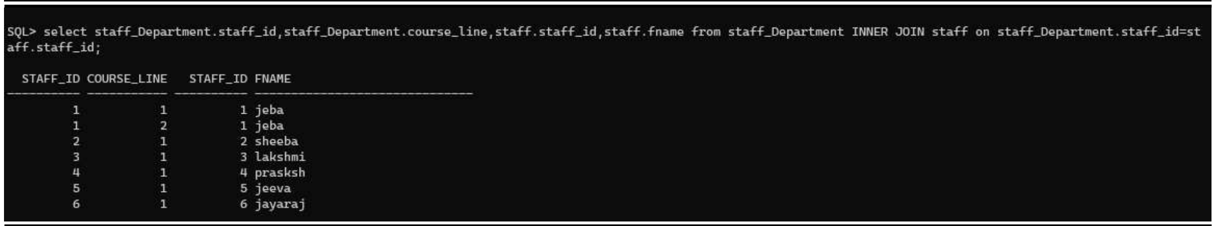


```
ORA-00904: "STAFF_DEPARTMENT"."COURSE_ID": invalid identifier


SQL> select staff_Department.staff_id,staff_Department.course_line,staff.staff_id,staff.fname from staff_Department FULL JOIN staff on staff_Department.staff_id=sta
ff.staff_id;

  STAFF_ID COURSE_LINE   STAFF_ID FNAME
---------- ----------- ---------- ------------------------------
         1           1          1 jeba
         1           2          1 jeba
         2           1          2 sheeba
         3           1          3 lakshmi
         4           1          4 prasksh
         5           1          5 jeeva
         6           1          6 jayaraj

7 rows selected.
```

4. **Inner join:**

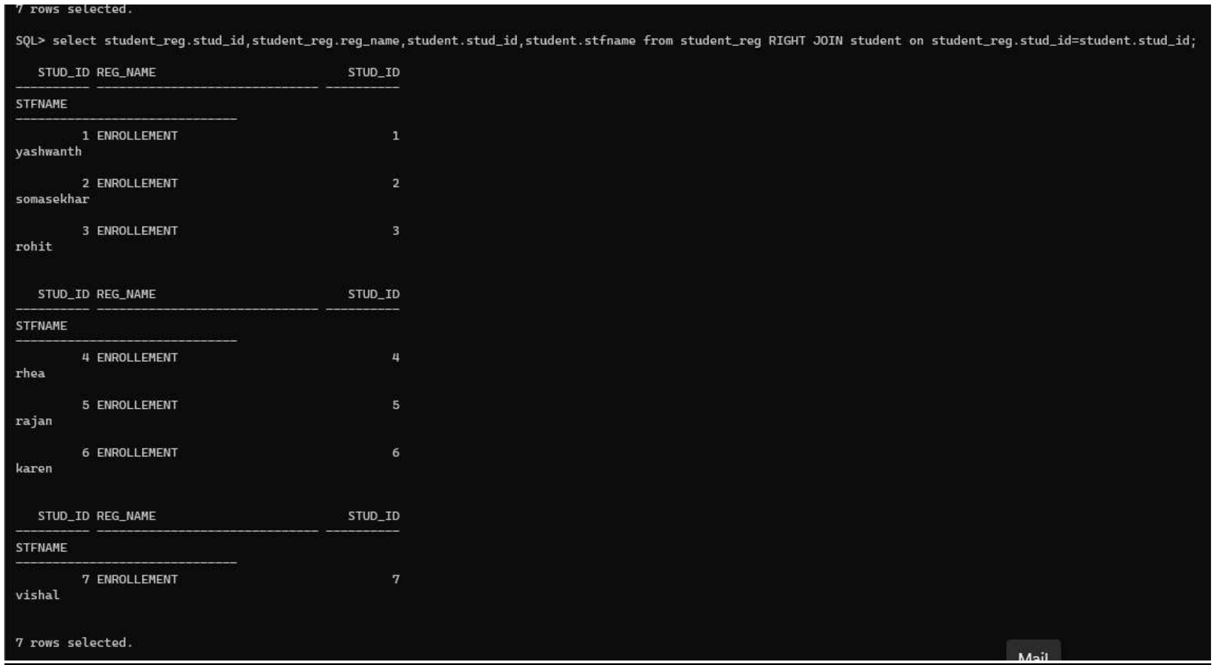


```
SQL> select student_reg.stud_id,student_reg.reg_name,student.stud_id,student.stfname from student_reg INNER JOIN student on student_reg.stud_id=student.stud_id;

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
STFNAME
------------------------------
         1 ENROLLEMENT                             1
yashwanth

         2 ENROLLEMENT                             2
somasekhar

         3 ENROLLEMENT                             3
rohit

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
STFNAME
------------------------------
         4 ENROLLEMENT                             4
rhea

         5 ENROLLEMENT                             5
rajan

         6 ENROLLEMENT                             6
karen

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
STFNAME
------------------------------
         7 ENROLLEMENT                             7
vishal


7 rows selected.
```

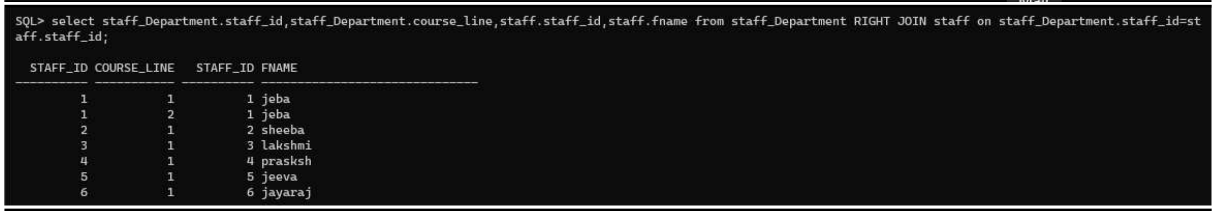


```
SQL> select staff_Department.staff_id,staff_Department.course_line,staff.staff_id,staff.fname from staff_Department INNER JOIN staff on staff_Department.staff_id=st
aff.staff_id;

  STAFF_ID COURSE_LINE   STAFF_ID FNAME
---------- ----------- ---------- ------------------------------
         1           1          1 jeba
         1           2          1 jeba
         2           1          2 sheeba
         3           1          3 lakshmi
         4           1          4 prasksh
         5           1          5 jeeva
         6           1          6 jayaraj
```

5. **<u>Right join:</u>**



```
7 rows selected.

SQL> select student_reg.stud_id,student_reg.reg_name,student.stud_id,student.stfname from student_reg RIGHT JOIN student on student_reg.stud_id=student.stud_id;

   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
STFNAME
------------------------------
         1 ENROLLEMENT                             1
yashwanth

         2 ENROLLEMENT                             2
somasekhar

         3 ENROLLEMENT                             3
rohit


   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
STFNAME
------------------------------
         4 ENROLLEMENT                             4
rhea

         5 ENROLLEMENT                             5
rajan

         6 ENROLLEMENT                             6
karen


   STUD_ID REG_NAME                          STUD_ID
---------- ------------------------------ ----------
STFNAME
------------------------------
         7 ENROLLEMENT                             7
vishal


7 rows selected.
```

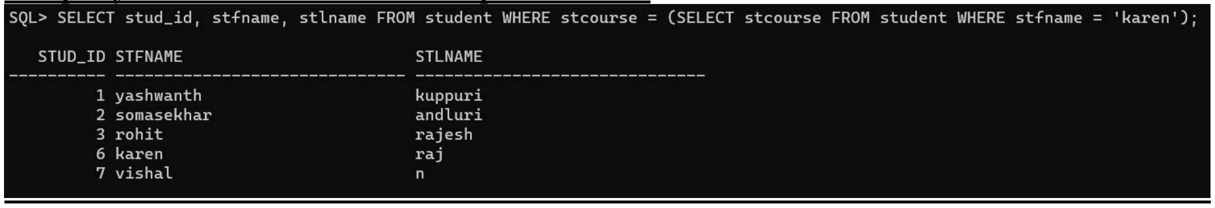


```
SQL> select staff_Department.staff_id,staff_Department.course_line,staff.staff_id,staff.fname from staff_Department RIGHT JOIN staff on staff_Department.staff_id=st
aff.staff_id;

  STAFF_ID COURSE_LINE   STAFF_ID FNAME
---------- ----------- ---------- ------------------------------
         1           1          1 jeba
         1           2          1 jeba
         2           1          2 sheeba
         3           1          3 lakshmi
         4           1          4 prasksh
         5           1          5 jeeva
         6           1          6 jayaraj
```

SUBQUERIES

STUDENT TABLE:

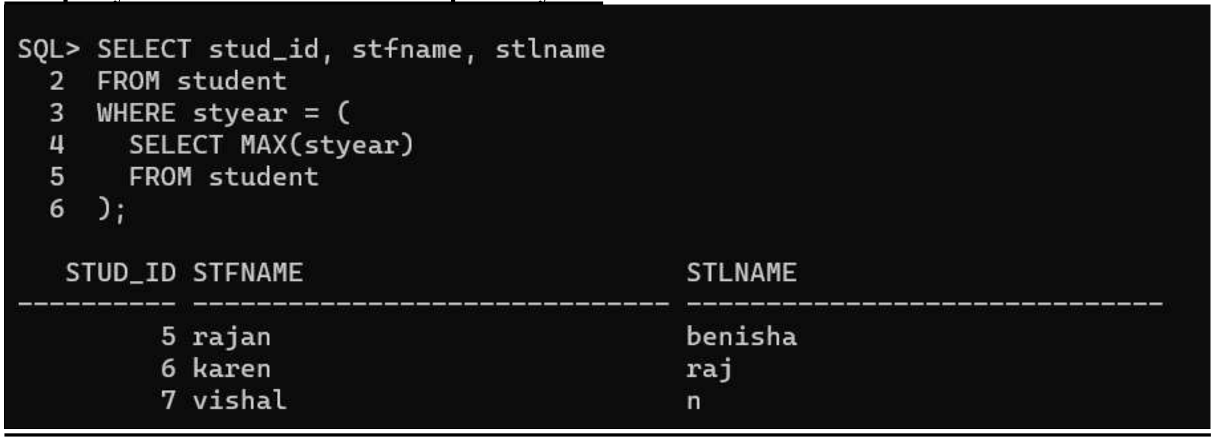
Subquery to retrieve students with a specific course



```
SQL> SELECT stud_id, stfname, stlname FROM student WHERE stcourse = (SELECT stcourse FROM student WHERE stfname = 'karen');

   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
         1 yashwanth                      kuppuri
         2 somasekhar                     andluri
         3 rohit                          rajesh
         6 karen                          raj
         7 vishal                         n
```

This subquery retrieves the course of a specific student ('karen' in this example) and then finds all students who are enrolled in the same course.

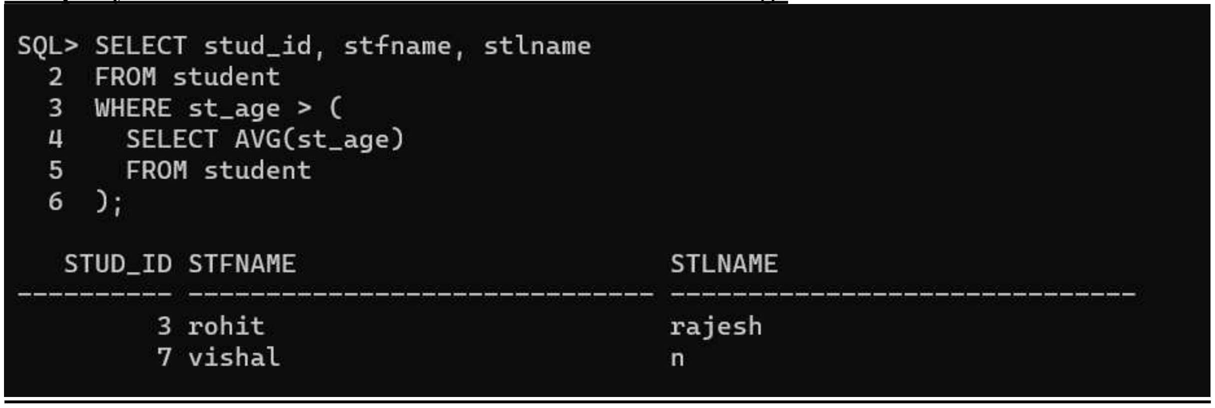
Subquery to retrieve students in a specific year:



```
SQL> SELECT stud_id, stfname, stlname
  2  FROM student
  3  WHERE styear = (
  4    SELECT MAX(styear)
  5    FROM student
  6  );

   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
         5 rajan                          benisha
         6 karen                          raj
         7 vishal                         n
```

This subquery retrieves the maximum value of the "styear" column from the "student" table, and then finds all students who are in that year.

Subquery to retrieve students who are older than a certain age

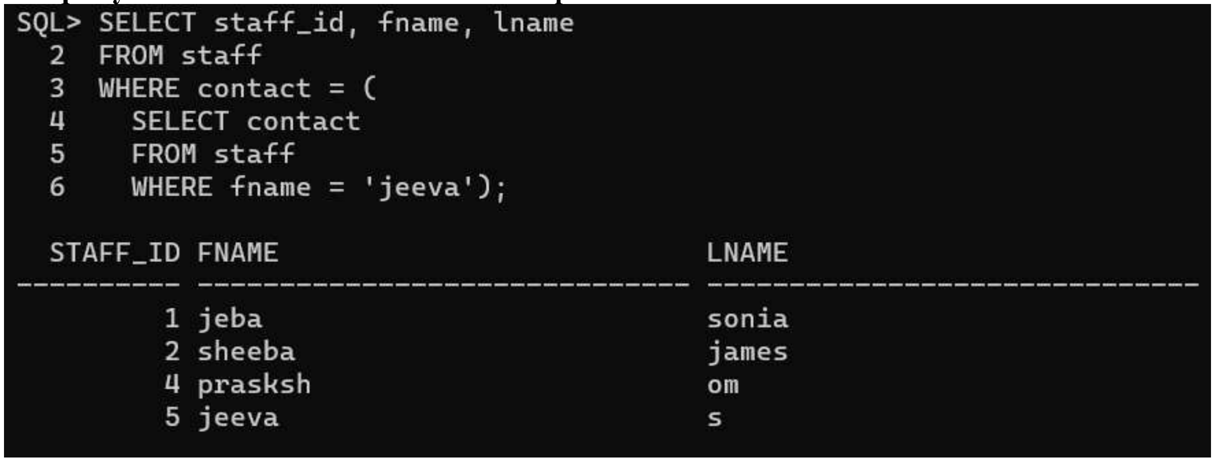


```
SQL> SELECT stud_id, stfname, stlname
  2  FROM student
  3  WHERE st_age > (
  4    SELECT AVG(st_age)
  5    FROM student
  6  );

   STUD_ID STFNAME                        STLNAME
---------- ------------------------------ ------------------------------
         3 rohit                          rajesh
         7 vishal                         n
```

This subquery calculates the average value of the "st_age" column from the "student" table, and then finds all students whose age is greater than the average.

STAFF:

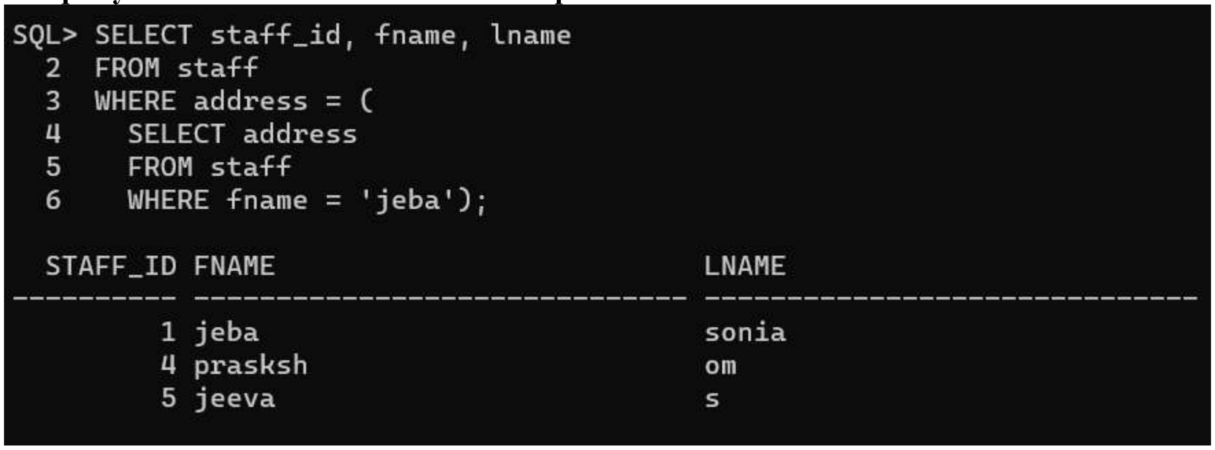
Subquery to retrieve staff members with a specific contact number



```
SQL> SELECT staff_id, fname, lname
     FROM staff
     WHERE contact = (
       SELECT contact
       FROM staff
       WHERE fname = 'jeeva');

  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
         1 jeba                           sonia
         2 sheeba                         james
         4 prasksh                        om
         5 jeeva                          s
```

This subquery retrieves the contact number of a specific staff member ('jeeva' in this example) and then finds all staff members who have the same contact number.

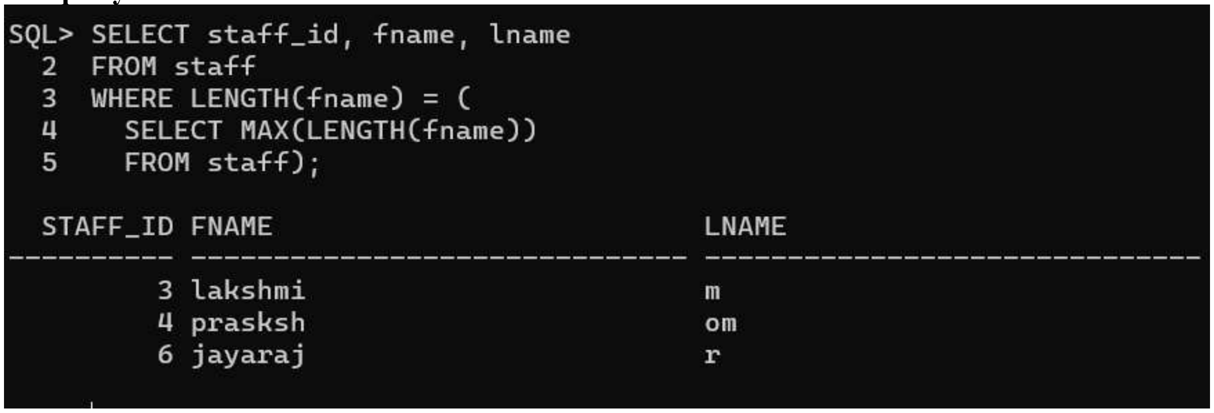
Subquery to retrieve staff members with a specific address



```
SQL> SELECT staff_id, fname, lname
     FROM staff
     WHERE address = (
       SELECT address
       FROM staff
       WHERE fname = 'jeba');

  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
         1 jeba                           sonia
         4 prasksh                        om
         5 jeeva                          s
```

This subquery retrieves the address of a specific staff member ('jeba' in this example) and then finds all staff members who have the same address.

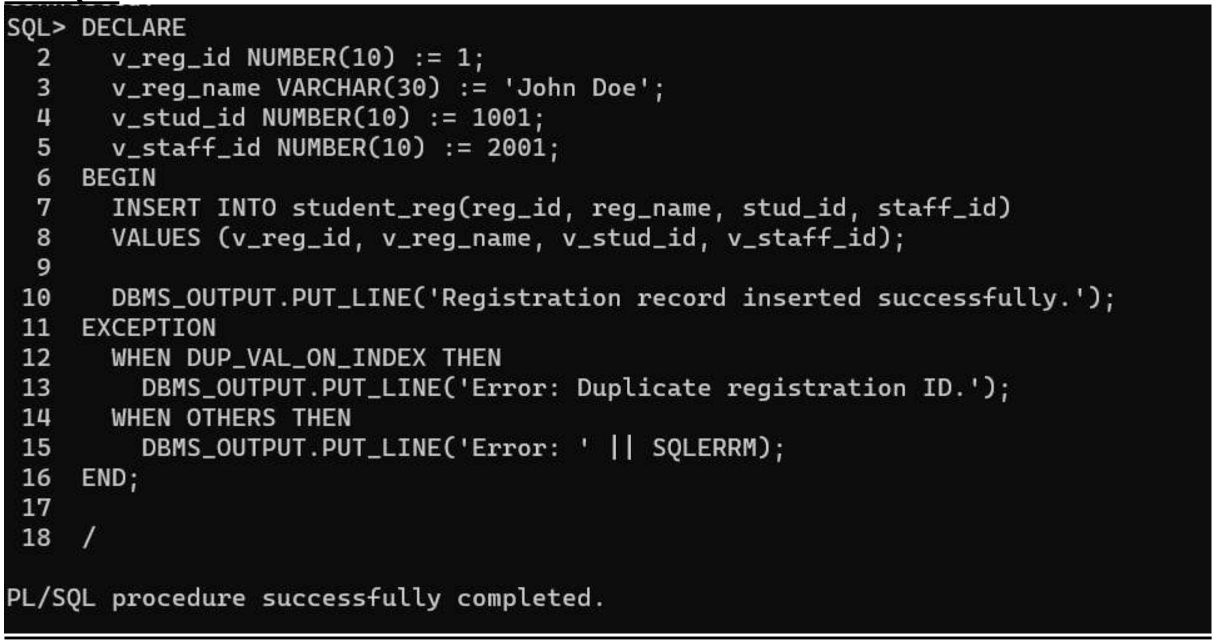
Subquery to retrieve staff members based on the number of characters in their first name



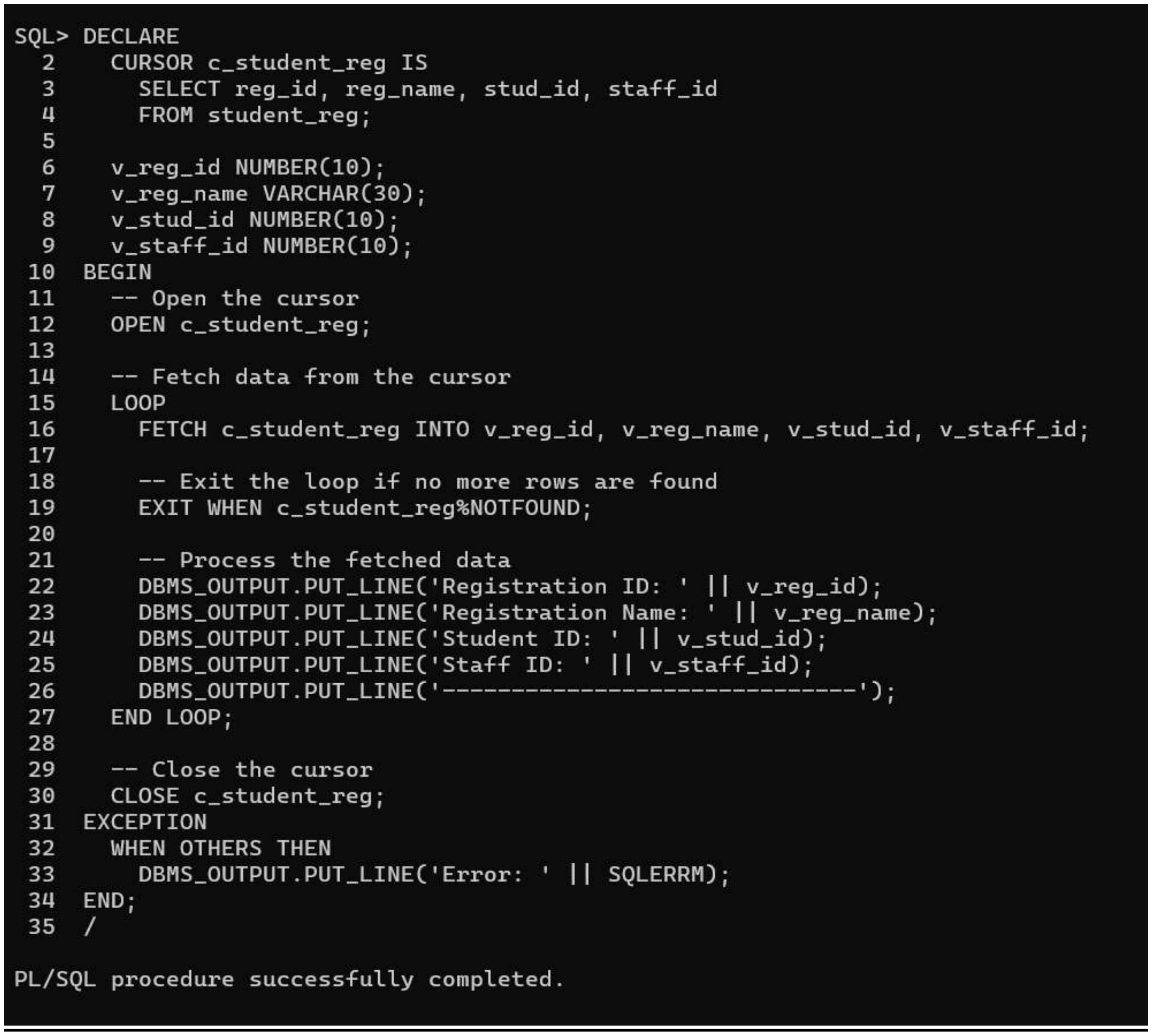
```
SQL> SELECT staff_id, fname, lname
     FROM staff
     WHERE LENGTH(fname) = (
       SELECT MAX(LENGTH(fname))
       FROM staff);

  STAFF_ID FNAME                          LNAME
---------- ------------------------------ ------------------------------
         3 lakshmi                        m
         4 prasksh                        om
         6 jayaraj                        r
```

This subquery retrieves the maximum number of characters in the first name from the "staff" table and then finds all staff members whose first name has the same length.

PL/SQL:

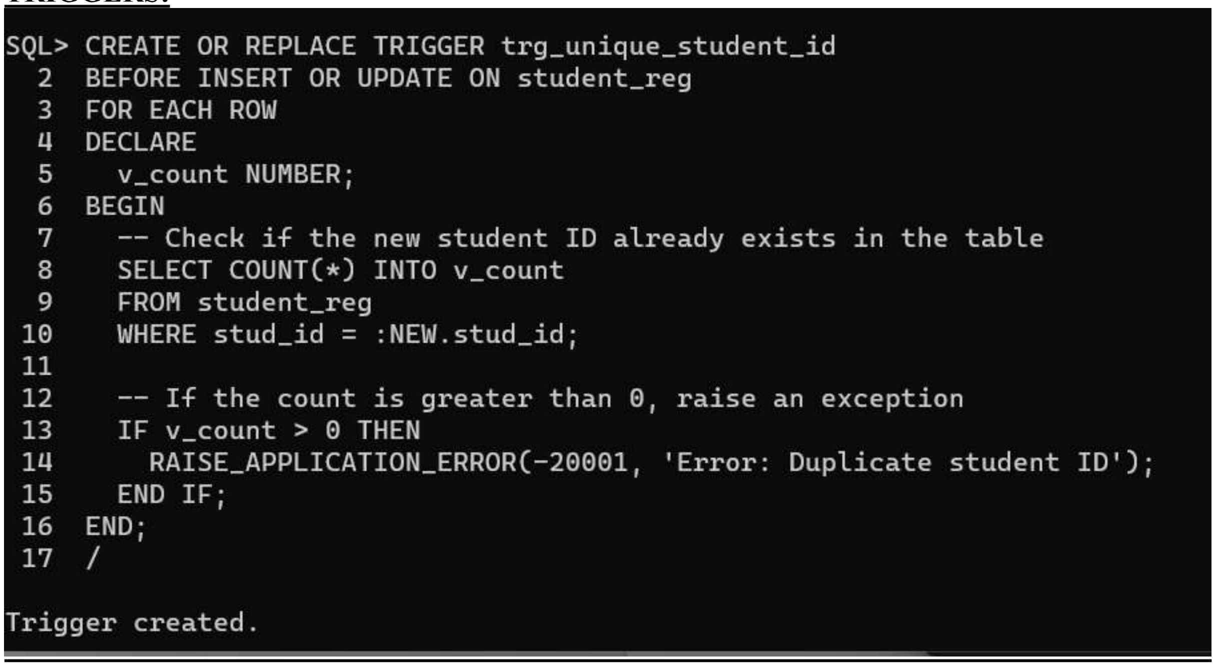


```
SQL> DECLARE
       v_reg_id NUMBER(10) := 1;
       v_reg_name VARCHAR(30) := 'John Doe';
       v_stud_id NUMBER(10) := 1001;
       v_staff_id NUMBER(10) := 2001;
     BEGIN
       INSERT INTO student_reg(reg_id, reg_name, stud_id, staff_id)
       VALUES (v_reg_id, v_reg_name, v_stud_id, v_staff_id);

       DBMS_OUTPUT.PUT_LINE('Registration record inserted successfully.');
     EXCEPTION
       WHEN DUP_VAL_ON_INDEX THEN
         DBMS_OUTPUT.PUT_LINE('Error: Duplicate registration ID.');
       WHEN OTHERS THEN
         DBMS_OUTPUT.PUT_LINE('Error: ' || SQLERRM);
     END;

     /

PL/SQL procedure successfully completed.
```



```
SQL> DECLARE
       CURSOR c_student_reg IS
         SELECT reg_id, reg_name, stud_id, staff_id
         FROM student_reg;

       v_reg_id NUMBER(10);
       v_reg_name VARCHAR(30);
       v_stud_id NUMBER(10);
       v_staff_id NUMBER(10);
     BEGIN
       -- Open the cursor
       OPEN c_student_reg;

       -- Fetch data from the cursor
       LOOP
         FETCH c_student_reg INTO v_reg_id, v_reg_name, v_stud_id, v_staff_id;

         -- Exit the loop if no more rows are found
         EXIT WHEN c_student_reg%NOTFOUND;

         -- Process the fetched data
         DBMS_OUTPUT.PUT_LINE('Registration ID: ' || v_reg_id);
         DBMS_OUTPUT.PUT_LINE('Registration Name: ' || v_reg_name);
         DBMS_OUTPUT.PUT_LINE('Student ID: ' || v_stud_id);
         DBMS_OUTPUT.PUT_LINE('Staff ID: ' || v_staff_id);
         DBMS_OUTPUT.PUT_LINE('------------------------------');
       END LOOP;

       -- Close the cursor
       CLOSE c_student_reg;
     EXCEPTION
       WHEN OTHERS THEN
         DBMS_OUTPUT.PUT_LINE('Error: ' || SQLERRM);
     END;
     /

PL/SQL procedure successfully completed.
```

TRIGGERS:



```
SQL> CREATE OR REPLACE TRIGGER trg_unique_student_id
  BEFORE INSERT OR UPDATE ON student_reg
  FOR EACH ROW
  DECLARE
    v_count NUMBER;
  BEGIN
    -- Check if the new student ID already exists in the table
    SELECT COUNT(*) INTO v_count
    FROM student_reg
    WHERE stud_id = :NEW.stud_id;

    -- If the count is greater than 0, raise an exception
    IF v_count > 0 THEN
      RAISE_APPLICATION_ERROR(-20001, 'Error: Duplicate student ID');
    END IF;
  END;
  /

Trigger created.
```