EXERCISE 4: SQL SELECT QUERIES & AGGREGATE FUNCTIONS

Faculty Name: Dr. Balasundaram A
Slot: L43+L44
Class Number: CH2021221000708
Date: 29/08/2021

DBMS LAB ASSIGNMENT 4 MEHER SHRISHTI NIGAM 20BRS1193

SYNTAX OF ORACLE SELECT AND AGGREGATE FUNCTIONS

1. Create the following tables with suitable constraints:
    a. STUDENT (REG_NO, NAME, GENDER, AGE, DID,SEMESTER). Make REG_NO as the primary key and DID as foreign key to DEPARTMENT table. NAME cannot be null.
    b. DEPARTMENT (DEPT_ID, DEPT_NAME, STUDENT_CNT). Make DEPT_ID as the primary key and DEPT_NAME cannot be null.

```
SQL> CREATE TABLE DEPARTMENT_20BRS1193 (DEPT_ID INT PRIMARY KEY, DEPT_NAME VARCHAR2(10) NOT NULL, STUDENT_CNT INT);

Table created.

SQL> CREATE TABLE STUDENT_20BRS1193 (REG_NO INT NOT NULL PRIMARY KEY, NAME VARCHAR2(30) NOT NULL, GENDER VARCHAR2(10),
AGE INT , DID INT NOT NULL, SEMESTER INT, CONSTRAINT FK_G FOREIGN KEY (DID) REFERENCES DEPARTMENT_20BRS1193(DEPT_ID));

Table created.

SQL> CREATE TABLE COURSES_20BRS1193 (COURSE_ID INT PRIMARY KEY, COURSE_NAME VARCHAR2(50) NOT NULL, DID INT NOT NULL, ST
UDENT_CNT INT, CONSTRAINT FKG2 FOREIGN KEY (DID) REFERENCES DEPARTMENT_20BRS1193(DEPT_ID));

Table created.
```

2. Insert suitable records into the STUDENT & DEPARTMENT tables.

Also created courses table.

```
SQL> INSERT ALL
  2  INTO DEPARTMENT_20BRS1193 VALUES (101, 'CSE', 4)
  3  INTO DEPARTMENT_20BRS1193 VALUES (102, 'ECE', 3)
  4  INTO DEPARTMENT_20BRS1193 VALUES (103, 'EEE', 3)
  5  SELECT * FROM DUAL;

3 rows created.

SQL>
SQL>
SQL> INSERT ALL
  2  INTO STUDENT_20BRS1193 VALUES (1001, 'Khushi Dutta', 'Female', 18, 101, 1)
  3  INTO STUDENT_20BRS1193 VALUES (1002, 'Mayuram Das', 'Male', 18, 102, 2)
  4  INTO STUDENT_20BRS1193 VALUES (1003, 'Aakash Deshpande', 'Male', 19, 103, 3)
  5  INTO STUDENT_20BRS1193 VALUES (1004, 'Rudra Chad', 'Male', 19, 101, 4)
  6  INTO STUDENT_20BRS1193 VALUES (1005, 'Sumati Balay', 'Female', 20, 101, 5)
  7  INTO STUDENT_20BRS1193 VALUES (1006, 'Nilima Deol', 'Female', 20, 102, 6)
  8  INTO STUDENT_20BRS1193 VALUES (1007, 'Akansha DAlia', 'Female', 21, 102, 7)
  9  INTO STUDENT_20BRS1193 VALUES (1008, 'Pran Bhalla', 'Male', 21, 103, 8)
 10  INTO STUDENT_20BRS1193 VALUES (1009, 'Anisha Nanda', 'Female', 20, 101, 5)
 11  INTO STUDENT_20BRS1193 VALUES (1010, 'Harsh Nigam', 'Male', 20, 103, 6)
 12  SELECT * FROM DUAL;

10 rows created.
```

```
SQL>
SQL> INSERT ALL
  2  INTO COURSES_20BRS1193 VALUES (1210, 'Operating Systems', 101, 4)
  3  INTO COURSES_20BRS1193 VALUES (1310, 'Web Development', 101, 3)
  4  INTO COURSES_20BRS1193 VALUES (1410, 'Software Engineering', 101, 4)
  5  INTO COURSES_20BRS1193 VALUES (2210, 'Signal Processing', 102, 3)
  6  INTO COURSES_20BRS1193 VALUES (2310, 'VLSI Design', 102, 2)
  7  INTO COURSES_20BRS1193 VALUES (3210, 'Dynamics of Electric Machines', 103, 2)
  8  INTO COURSES_20BRS1193 VALUES (3310, 'Semiconductor Controlled Drives', 103, 3)
  9  INTO COURSES_20BRS1193 VALUES (3410, 'Electric Traction Systems', 103, 1)
 10  SELECT * FROM DUAL;

8 rows created.
```

3. Retrieve all the details of department table.

SELECT * FROM DEPARTMENT_20BRS1193;

```
SQL> SELECT * FROM DEPARTMENT_20BRS1193;

   DEPT_ID DEPT_NAME  STUDENT_CNT
---------- ---------- -----------
       101 CSE                  4
       102 ECE                  3
       103 EEE                  3
```

4. Fetch the names of all departments that exists in your college.

SELECT DEPT_NAME FROM DEPARTMENT_20BRS1193;

```
SQL> SELECT DEPT_NAME FROM DEPARTMENT_20BRS1193;

DEPT_NAME
----------
CSE
ECE
EEE
```

5. Fetch the department id and department name of all departments.

SELECT DEPT_ID, DEPT_NAME FROM DEPARTMENT_20BRS1193;

```
SQL> SELECT DEPT_ID, DEPT_NAME FROM DEPARTMENT_20BRS1193;

   DEPT_ID DEPT_NAME
---------- ----------
       101 CSE
       102 ECE
       103 EEE
```

6. Retrieve the registration number and names of students belonging to CSE department.

SELECT DEPT_ID FROM DEPARTMENT_20BRS1193 WHERE DEPT_NAME = 'CSE';
SELECT REG_NO, NAME FROM STUDENT_20BRS1193 WHERE DID = 101;

```
SQL> SELECT DEPT_ID FROM DEPARTMENT_20BRS1193 WHERE DEPT_NAME = 'CSE';

   DEPT_ID
----------
       101
```

```
SQL> SELECT REG_NO, NAME FROM STUDENT_20BRS1193 WHERE DID = 101;

    REG_NO NAME
---------- ------------------------------
      1001 Khushi Dutta
      1004 Rudra Chad
      1005 Sumati Balay
      1009 Anisha Nanda
```

Here, first we find the Dept ID of the CSE Branch from the department table.

7. Retrieve the registration number and names of female students belonging to CSE department.

SELECT REG_NO, NAME FROM STUDENT_20BRS1193 WHERE DID = 101 AND GENDER = 'Female';

```
SQL> SELECT REG_NO, NAME FROM STUDENT_20BRS1193 WHERE DID = 101 AND GENDER = 'Female';

    REG_NO NAME
---------- ------------------------------
      1001 Khushi Dutta
      1005 Sumati Balay
      1009 Anisha Nanda
```

8. Find the number of male students belonging to CSE department.

SELECT COUNT(*) FROM STUDENT_20BRS1193 WHERE GENDER = 'Male' AND DID = 101;

```
SQL> SELECT COUNT(*) FROM STUDENT_20BRS1193 WHERE GENDER = 'Male' AND DID = 101;

  COUNT(*)
----------
         1
```

9. Retrieve the registration number and names of students whose age is > 19.

SELECT REG_NO, NAME FROM STUDENT_20BRS1193 WHERE AGE > 19;

```
SQL> SELECT REG_NO, NAME FROM STUDENT_20BRS1193 WHERE AGE > 19;

    REG_NO NAME
---------- ------------------------------
      1005 Sumati Balay
      1006 Nilima Deol
      1007 Akansha DAlia
      1008 Pran Bhalla
      1009 Anisha Nanda
      1010 Harsh Nigam

6 rows selected.
```

10. List the names of students whose names start with letter ‘A’.

SELECT NAME FROM STUDENT_20BRS1193 WHERE NAME LIKE 'A%';

```
SQL> SELECT NAME FROM STUDENT_20BRS1193 WHERE NAME LIKE 'A%';

NAME
------------------------------
Aakash Deshpande
Akansha DAlia
Anisha Nanda
```

11. List the names of students whose names end with letter ‘a’.

SELECT NAME FROM STUDENT_20BRS1193 WHERE NAME LIKE '%a';

```
SQL> SELECT NAME FROM STUDENT_20BRS1193 WHERE NAME LIKE '%a';

NAME
------------------------------
Khushi Dutta
Akansha DAlia
Pran Bhalla
Anisha Nanda
```

12. List the names of students whose names contain the letter ‘m’.

SELECT NAME FROM STUDENT_20BRS1193 WHERE NAME LIKE '%m%';

```
SQL> SELECT NAME FROM STUDENT_20BRS1193 WHERE NAME LIKE '%m%';

NAME
------------------------------
Mayuram Das
Sumati Balay
Nilima Deol
Harsh Nigam
```

13. List the names of students whose names contain the letter ‘m’ but not at the start or at the end of their names.

SELECT NAME FROM STUDENT_20BRS1193 WHERE NAME LIKE ('%m%') AND NAME NOT LIKE ('M%') AND NAME NOT LIKE ('%m');

```
SQL> SELECT NAME FROM STUDENT_20BRS1193 WHERE NAME LIKE ('%m%') AND NAME NOT LIKE ('M%') AND NAME NOT LIKE ('%m');

NAME
----------------------------
Sumati Balay
Nilima Deol
```

14. List the registration numbers and names of students belonging to ECE & EEE departments.

SELECT DEPT_NAME, DEPT_ID FROM DEPARTMENT_20BRS1193 WHERE DEPT_NAME IN ('EEE', 'ECE');

SELECT REG_NO, NAME FROM STUDENT_20BRS1193 WHERE DID IN (102, 103);

```
SQL> SELECT DEPT_NAME, DEPT_ID FROM DEPARTMENT_20BRS1193 WHERE DEPT_NAME IN ('EEE', 'ECE');

DEPT_NAME     DEPT_ID
---------- ----------
ECE               102
EEE               103
```

```
SQL> SELECT REG_NO, NAME FROM STUDENT_20BRS1193 WHERE DID IN (102, 103);

    REG_NO NAME
---------- ------------------------------
      1002 Mayuram Das
      1003 Aakash Deshpande
      1006 Nilima Deol
      1007 Akansha DAlia
      1008 Pran Bhalla
      1010 Harsh Nigam

6 rows selected.
```

Here, we first find the DID of ECE and EEE in department table and use to find the students in student table.

15. What is the maximum count of students in a department?

SELECT MAX(STUDENT_CNT) FROM DEPARTMENT_20BRS1193;

```
SQL> SELECT MAX(STUDENT_CNT) FROM DEPARTMENT_20BRS1193;

MAX(STUDENT_CNT)
----------------
               4
```

16. What is the minimum count of students in a department?

SELECT MIN(STUDENT_CNT) FROM DEPARTMENT_20BRS1193;

```
SQL> SELECT MIN(STUDENT_CNT) FROM DEPARTMENT_20BRS1193;

MIN(STUDENT_CNT)
----------------
               3
```

17. What is the average student count per department in your college?

SELECT AVG(STUDENT_CNT) FROM DEPARTMENT_20BRS1193;

```
SQL> SELECT AVG(STUDENT_CNT) FROM DEPARTMENT_20BRS1193;

AVG(STUDENT_CNT)
----------------
      3.33333333
```

18. List the students who study 3rd year in your college using Between.

SELECT * FROM STUDENT_20BRS1193 WHERE SEMESTER BETWEEN 5 AND 6;

```
SQL> SELECT * FROM STUDENT_20BRS1193 WHERE SEMESTER BETWEEN 5 AND 6;

    REG_NO NAME                           GENDER            AGE        DID
---------- ------------------------------ ---------- ---------- ----------
  SEMESTER
----------
      1005 Sumati Balay                   Female             20        101
         5

      1006 Nilima Deol                    Female             20        102
         6

      1009 Anisha Nanda                   Female             20        101
         5


    REG_NO NAME                           GENDER            AGE        DID
---------- ------------------------------ ---------- ---------- ----------
  SEMESTER
----------
      1010 Harsh Nigam                    Male               20        103
         6
```

19. List the different departments which have students.

SELECT * FROM DEPARTMENT_20BRS1193 WHERE STUDENT_CNT > 0;

```
SQL> SELECT * FROM DEPARTMENT_20BRS1193 WHERE STUDENT_CNT > 0;

   DEPT_ID DEPT_NAME  STUDENT_CNT
---------- ---------- -----------
       101 CSE                  4
       102 ECE                  3
       103 EEE                  3
```

20. Display the count of students enrolled in CSE department;

Two ways to do this,

SELECT DEPT_NAME, STUDENT_CNT FROM DEPARTMENT_20BRS1193 WHERE DEPT_NAME = 'CSE';

SELECT DID, COUNT(*) FROM STUDENT_20BRS1193 WHERE DID = 101 GROUP BY DID;

```
SQL> SELECT DEPT_NAME, STUDENT_CNT FROM DEPARTMENT_20BRS1193 WHERE DEPT_NAME = 'CSE';

DEPT_NAME  STUDENT_CNT
---------- -----------
CSE                  4

SQL> SELECT DID, COUNT(*) FROM STUDENT_20BRS1193 WHERE DID = 101 GROUP BY DID;

       DID   COUNT(*)
---------- ----------
       101          4
```

21. Display the contents of courses table in ascending order of Students count.

SELECT * FROM COURSES_20BRS1193 ORDER BY STUDENT_CNT;

```
SQL> SELECT * FROM COURSES_20BRS1193 ORDER BY STUDENT_CNT;

 COURSE_ID COURSE_NAME                                              DID
---------- -------------------------------------------------- ----------
STUDENT_CNT
-----------
      3410 Electric Traction Systems                                103
         1

      3210 Dynamics of Electric Machines                            103
         2

      2310 VLSI Design                                              102
         2


 COURSE_ID COURSE_NAME                                              DID
---------- -------------------------------------------------- ----------
STUDENT_CNT
-----------
      1310 Web Development                                          101
         3

      2210 Signal Processing                                        102
         3

      3310 Semiconductor Controlled Drives                          103
         3


 COURSE_ID COURSE_NAME                                              DID
---------- -------------------------------------------------- ----------
STUDENT_CNT
-----------
      1210 Operating Systems                                        101
         4

      1410 Software Engineering                                     101
         4


8 rows selected.
```

Ascending by default

22. Display the contents of courses table in descending order of Students count.

SELECT * FROM COURSES_20BRS1193 ORDER BY STUDENT_CNT DESC;

```
SQL> SELECT * FROM COURSES_20BRS1193 ORDER BY STUDENT_CNT DESC;

 COURSE_ID COURSE_NAME                                              DID
---------- -------------------------------------------------- ----------
STUDENT_CNT
-----------
      1410 Software Engineering                                     101
         4

      1210 Operating Systems                                        101
         4

      1310 Web Development                                          101
         3


 COURSE_ID COURSE_NAME                                              DID
---------- -------------------------------------------------- ----------
STUDENT_CNT
-----------
      2210 Signal Processing                                        102
         3

      3310 Semiconductor Controlled Drives                          103
         3

      3210 Dynamics of Electric Machines                            103
         2


 COURSE_ID COURSE_NAME                                              DID
---------- -------------------------------------------------- ----------
STUDENT_CNT
-----------
      2310 VLSI Design                                              102
         2

      3410 Electric Traction Systems                                103
         1


8 rows selected.
```

23. Determine the average student count across courses run by each department.

SELECT DID, AVG(STUDENT_CNT) FROM COURSES_20BRS1193 GROUP BY DID;

```
SQL> SELECT DID, AVG(STUDENT_CNT) FROM COURSES_20BRS1193 GROUP BY DID;

       DID AVG(STUDENT_CNT)
---------- ----------------
       101       3.66666667
       103                2
       102              2.5
```