Homework SQL Query

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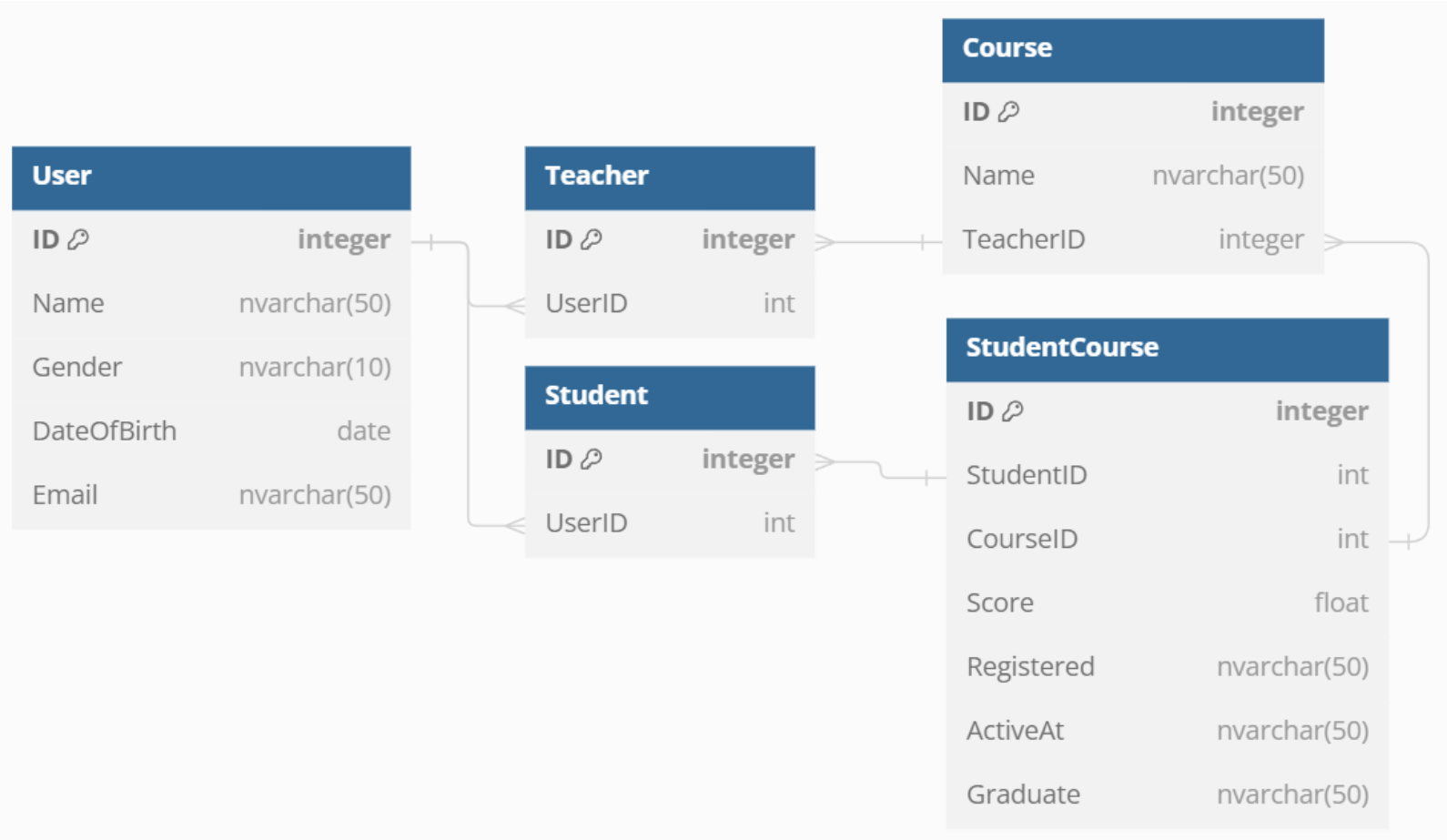
General database



Link database: https://dbdiagram.io/d/Homework-SQL-Query-66325f0b5b24a634d0424c0d

General database

User

ID	Name	Gender	DateOfBirth	Email
1	John Smith	Male	1/1/2000	john@example.com
2	Jane Doe	Female	2/3/2001	jane@example.com
3	Michael Johnson	Male	5/15/1999	michael@example.com
4	Emily Williams	Female	8/27/1998	emily@example.com
5	Daniel Brown	Male	3/10/2002	daniel@example.com
6	Sophia Taylor	Female	7/22/2003	sophia@example.com
7	James Wilson	Male	11/14/1997	james@example.com
8	Olivia Davis	Female	9/2/1999	olivia@example.com
9	Alexander Martinez	Male	4/18/2000	alexander@example.com
10	Isabella Anderson	Female	6/5/2001	isabella@example.com

Student

ID	UserID
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

Teacher

ID	UserID
1	6
2	7
3	8
4	9
5	10

Course

ID	CourseName	TeacherID
1	OOP	1
2	Database	2
3	Web Development	3
4	Algorithms	4
5	OOP	5
6	OOP	2
7	Operating Systems	1
8	UI/UX	2
9	Network Security	1
10	Software Engineering	3
11	HTML/CSS	2
12	Data Structures	4

StudentCourse

ID	StudentID	CourseID	Score	Registered	Graduate	ActiveAt
1	1	1	4.5	1/1/2022	6/30/2022	6/30/2022
2	2	1	8	2/3/2022	7/31/2022	7/31/2022
3	3	2	9	3/5/2022	8/31/2022	3/5/2022
4	4	2	6.2	4/7/2022	9/30/2022	4/7/2022
5	5	3	7.8	5/9/2022	NULL	10/31/2022
6	6	3	5.3	6/11/2022	NULL	11/30/2022
7	7	4	9.6	7/13/2022	NULL	12/31/2022
8	8	4	4.9	8/15/2022	1/31/2023	8/15/2022
9	9	5	8.2	9/17/2022	NULL	2/28/2023
10	10	5	6.5	10/19/2022	3/31/2023	10/19/2022
11	1	6	5.6	11/21/2022	NULL	11/21/2022
12	2	6	7.2	12/23/2022	5/31/2023	5/31/2023
13	3	7	8.8	1/25/2023	6/30/2023	11/21/2022
14	4	7	6.9	2/27/2023	7/31/2023	7/31/2023
15	5	8	4.4	3/29/2023	NULL	8/31/2023
16	6	8	9.3	4/30/2023	9/30/2023	4/30/2023
17	7	9	5.7	6/1/2023	10/31/2023	10/31/2023
18	8	9	7.1	7/3/2023	11/30/2023	7/3/2023
19	9	10	8.6	8/5/2023	12/31/2023	12/31/2023
20	10	11	6.7	9/6/2023	1/31/2024	9/6/2023
21	1	11	4.8	10/8/2023	2/29/2024	2/29/2024
22	2	12	9.1	11/10/2023	NULL	3/31/2024
23	3	12	7.4	12/12/2023	4/30/2024	4/30/2024
24	4	1	6.3	1/14/2024	5/31/2024	1/14/2024
25	5	2	8.9	2/15/2024	NULL	6/30/2024
26	6	3	5.2	3/17/2024	7/31/2024	7/31/2024
27	7	4	6.6	4/18/2024	8/31/2024	4/18/2024
28	8	5	7.7	5/20/2024	NULL	9/30/2024
29	9	6	4.7	6/22/2024	10/31/2024	10/31/2024
30	10	7	9.4	7/24/2024	11/30/2024	6/22/2024

Danh sách khóa học có tổng số sinh viên giỏi khá cao nhất

```sql
SELECT c.CourseName AS CourseName,
       SUM(CASE
               WHEN sc.Score >= 8 THEN 1
               ELSE 0
           END)
        +
        SUM(CASE
                WHEN (sc.Score >= 6.5
                    AND sc.Score < 8) THEN 1
                ELSE 0
            END) AS TotalExcellentGood
FROM StudentCourse sc
JOIN Course c ON sc.CourseID = c.ID
GROUP BY c.CourseName
ORDER BY TotalExcellentGood DESC;
```

	CourseName	TotalExcellentGood
1	OOP	5
2	Operating Systems	3
3	Algorithms	2
4	Data Structures	2
5	Database	2
6	HTML/CSS	1
7	Network Security	1
8	Software Engineering	1
9	UI/UX	1
10	Web Development	1

Thống kê khóa học có bao nhiêu sinh viên giỏi, khá, yếu

```sql
SELECT c.CourseName AS CourseName,
       SUM(CASE
               WHEN sc.Score >= 8
               THEN 1 ELSE 0
           END) AS Excellence,
       SUM(CASE
               WHEN (sc.Score >= 6.5
                     AND sc.Score < 8)
               THEN 1 ELSE 0
           END) AS Good,
       SUM(CASE
               WHEN Score < 6.5
               THEN 1 ELSE 0
           END) AS Weak
FROM StudentCourse sc
JOIN Course c ON sc.CourseID = c.ID
GROUP BY CourseName
ORDER BY CourseName;
```

	CourseName	Excellence	Good	Weak
1	Algorithms	1	1	1
2	Data Structures	1	1	0
3	Database	2	0	1
4	HTML/CSS	0	1	1
5	Network Security	0	1	1
6	OOP	2	3	4
7	Operating Systems	2	1	0
8	Software Engineering	1	0	0
9	UI/UX	1	0	1
10	Web Development	0	1	2

Danh sách khóa học có giáo viên phụ trách là nữ dạy môn OOP có tổng điểm trung bình cao nhất

```sql
SELECT c.CourseName AS CourseName,
       u.Name AS 'Name Teacher',
       AVG(sc.Score) AS AverageScore
FROM Course c
JOIN Teacher t ON c.TeacherID = t.ID
JOIN [User] u ON t.UserID = u.ID
JOIN StudentCourse sc ON c.ID = sc.CourseID
WHERE u.Gender = 'Female'
  AND c.CourseName = 'OOP'
GROUP BY c.CourseName,
         u.Name
ORDER BY AverageScore DESC;
```

	CourseName	Name Teacher	AverageScore
1	OOP	Isabella Anderson	7.46666666666667
2	OOP	Sophia Taylor	6.26666666666667

Danh sách giáo viên chưa bao giờ dạy môn OOP

Cách 1: Dùng `WHERE NOT EXISTS`

```sql
SELECT t.ID,
       u.Name AS TeacherName,
       u.Gender
FROM Teacher t
JOIN [User] u ON t.UserID = u.ID
WHERE NOT EXISTS
    (SELECT 1
     FROM Course c
     WHERE c.TeacherID = t.ID
           AND c.CourseName = 'OOP' );
```

Cách 2: Dùng `LEFT JOIN`

```sql
SELECT t.ID as TeacherID,
       u.Name AS TeacherName,
       u.Gender
FROM Teacher t
JOIN [User] u ON t.UserID = u.ID
LEFT JOIN Course c ON c.TeacherID = t.ID
          AND c.CourseName = 'OOP'
WHERE c.ID IS NULL;
```

	TeacherID	TeacherName	Gender
1	3	Olivia Davis	Female
2	4	Alexander Martinez	Male

Thống kê tổng số sinh viên đăng ký theo tháng

```
SELECT YEAR(sc.Registered) AS YEAR,
       MONTH(sc.Registered) AS MONTH,
       COUNT(DISTINCT sc.StudentID) AS TotalStudents
FROM StudentCourse sc
GROUP BY YEAR(sc.Registered),
         MONTH(sc.Registered)
ORDER BY YEAR, MONTH;
```

	YEAR	MONTH	TotalStudents
1	2022	1	1
2	2022	2	1
3	2022	3	1
4	2022	4	1
5	2022	5	1
6	2022	6	1
7	2022	7	1
8	2022	8	1
9	2022	9	1
10	2022	10	1
11	2022	11	1
12	2022	12	1
13	2023	1	1
14	2023	2	1
15	2023	3	1
16	2023	4	1
17	2023	6	1
18	2023	7	1
19	2023	8	1
20	2023	9	1
21	2023	10	1
22	2023	11	1
23	2023	12	1
24	2024	1	1
25	2024	2	1
26	2024	3	1
27	2024	4	1
28	2024	5	1
29	2024	6	1
30	2024	7	1

Thống kê tổng số sinh viên đăng ký theo tuần

```sql
SELECT YEAR(sc.Registered) AS YEAR,
       DATEPART(WEEK, sc.Registered) AS WEEK,
       COUNT(DISTINCT sc.StudentID) AS TotalStudents
FROM StudentCourse sc
GROUP BY YEAR(sc.Registered),
         DATEPART(WEEK, sc.Registered)
ORDER BY YEAR, WEEK;
```

	YEAR	WEEK	TotalStudents
1	2022	1	1
2	2022	6	1
3	2022	10	1
4	2022	15	1
5	2022	20	1
6	2022	24	1
7	2022	29	1
8	2022	34	1
9	2022	38	1
10	2022	43	1
11	2022	48	1
12	2022	52	1
13	2023	4	1
14	2023	9	1
15	2023	13	1
16	2023	18	1
17	2023	22	1
18	2023	27	1
19	2023	31	1
20	2023	36	1
21	2023	41	1
22	2023	45	1
23	2023	50	1
24	2024	3	1
25	2024	7	1
26	2024	12	1
27	2024	16	1
28	2024	21	1
29	2024	25	1
30	2024	30	1

Thống kê tổng số sinh viên đăng ký theo năm

```sql
SELECT YEAR(sc.Registered) AS YEAR,
       COUNT(DISTINCT sc.StudentID)
       AS TotalStudents
FROM StudentCourse sc
GROUP BY YEAR(sc.Registered)
ORDER BY YEAR;
```

	YEAR	TotalStudents
1	2022	10
2	2023	10
3	2024	7

Danh sách sinh viên đậu loại giỏi, trung bình, rớt theo từng tháng

```sql
SELECT YEAR(sc.Graduate) AS YEAR,
       MONTH(sc.Graduate) AS MONTH,
       u.Name AS StudentName,
       (CASE
           WHEN sc.Score >= 8.5 THEN 'Excellence'
           WHEN (sc.Score >= 6.5 AND sc.Score < 8) THEN 'Good'
           WHEN (sc.Score >= 0 AND sc.Score < 6.5) THEN 'week'
           ELSE 'Not graduated'
       END) AS RESULT
FROM StudentCourse sc
JOIN Student s ON sc.StudentID = s.ID
JOIN [User] u ON u.ID = s.UserID
WHERE sc.Graduate IS NOT NULL
GROUP BY MONTH(sc.Graduate),
         YEAR(sc.Graduate),
         u.Name,
         sc.Score
ORDER BY MONTH, YEAR, StudentName;
```

	YEAR	MONTH	StudentName	RESULT
1	2023	1	Olivia Davis	week
2	2024	1	Isabella Anderson	Good
3	2024	2	John Smith	week
4	2023	3	Isabella Anderson	Good
5	2024	4	Michael Johnson	Good
6	2023	5	Jane Doe	Good
7	2024	5	Emily Williams	week
8	2022	6	John Smith	week
9	2023	6	Michael Johnson	Excellence
10	2022	7	Jane Doe	Not graduated
11	2023	7	Emily Williams	Good
12	2024	7	Sophia Taylor	week
13	2022	8	Michael Johnson	Excellence
14	2024	8	James Wilson	Good
15	2022	9	Emily Williams	week
16	2023	9	Sophia Taylor	Excellence
17	2023	10	James Wilson	week
18	2024	10	Alexander Marti...	week
19	2023	11	Olivia Davis	Good
20	2024	11	Isabella Anderson	Excellence
21	2023	12	Alexander Marti...	Excellence

Danh sách month active students

```sql
SELECT
    MONTH(sc.ActiveAt) AS Month,
    COUNT(DISTINCT s.ID) AS ActiveStudent
FROM
    StudentCourse sc
JOIN
    Student s ON sc.StudentID = s.ID
WHERE
    sc.ActiveAt IS NOT NULL
GROUP BY
    MONTH(sc.ActiveAt)
ORDER BY
    Month;
```

	Month	ActiveStudent
1	1	1
2	2	2
3	3	2
4	4	4
5	5	1
6	6	3
7	7	4
8	8	2
9	9	2
10	10	4
11	11	3
12	12	2


Thanks for watching