SUBQUERIES

EXAMPLE

- Let's consider a scenario with four tables: **Students**, **Subjects**, **Courses**, and **Sections**.

- **Students** table contains information about students such as their ID and name.

- **Subjects** table contains information about subjects such as subject ID and subject name.

- **Courses** table contains information about courses such as course ID, course name, and subject ID.

- **Sections** table contains information about sections such as section ID, course ID, and maximum capacity.

EXAMPLE SCHEMA FOR THE TABLES:

```sql
CREATE TABLE Students (
    StudentID INT PRIMARY KEY,
    StudentName VARCHAR(50)
);

CREATE TABLE Subjects (
    SubjectID INT PRIMARY KEY,
    SubjectName VARCHAR(50)
);

CREATE TABLE Courses (
    CourseID INT PRIMARY KEY,
    CourseName VARCHAR(50),
    SubjectID INT,
    FOREIGN KEY (SubjectID) REFERENCES Subjects(SubjectID)
);

CREATE TABLE Sections (
    SectionID INT PRIMARY KEY,
    CourseID INT,
    MaxCapacity INT,
    FOREIGN KEY (CourseID) REFERENCES Courses(CourseID)
);
```

```sql
INSERT INTO Students (StudentID, StudentName) VALUES
(1, 'NOEL'),
(2, 'ARIANNE'),
(3, 'KLAY');

INSERT INTO Subjects (SubjectID, SubjectName) VALUES
(1, 'Math'),
(2, 'Science'),
(3, 'History');

INSERT INTO Courses (CourseID, CourseName, SubjectID) VALUES
(101, 'Algebra', 1),
(102, 'Biology', 2),
(103, 'World History', 3);

INSERT INTO Sections (SectionID, CourseID, MaxCapacity) VALUES
(1, 101, 30),
(2, 101, 25),
(3, 102, 35),
(4, 102, 40),
(5, 103, 20);
```

PROBLEM:

- Find the names of students who are enrolled in courses with more than the average maximum capacity of all sections for those courses.

```sql
SELECT DISTINCT s.StudentName
FROM Students AS s
INNER JOIN Sections AS sec ON sec.SectionID IN (
    SELECT SectionID
    FROM Sections
    WHERE CourseID IN (
        SELECT CourseID
        FROM Courses
        WHERE SubjectID = (
            SELECT SubjectID
            FROM Subjects
            WHERE SubjectName = 'Math'
        )
    )
)
WHERE sec.MaxCapacity > (
    SELECT AVG(MaxCapacity)
    FROM Sections
    WHERE CourseID IN (
        SELECT CourseID
        FROM Courses
        WHERE SubjectID = (
            SELECT SubjectID
            FROM Subjects
            WHERE SubjectName = 'Math'
        )
    )
)
```

EXPLANATION:

In this query:

- The innermost subquery (SELECT SubjectID FROM Subjects WHERE SubjectName = 'Math') finds the SubjectID for the specified subject (you can change the subject name as needed).

- The next subquery (SELECT CourseID FROM Courses WHERE SubjectID = (...)) finds all course IDs related to that subject.

- The outermost subquery (SELECT SectionID FROM Sections WHERE CourseID IN (...)) finds all section IDs related to those courses.

- Finally, the main query uses this information to filter out students who are enrolled in courses with sections having more than the average maximum capacity.

PROBLEM:

- Find the subjects with the highest average maximum capacity among all their sections.

```sql
SELECT s.SubjectName, AVG(sec.MaxCapacity) AS AvgMaxCapacity
FROM Subjects AS s
INNER JOIN Courses AS c ON c.SubjectID = s.SubjectID
INNER JOIN Sections AS sec ON sec.CourseID = c.CourseID
GROUP BY s.SubjectID, s.SubjectName
HAVING AVG(sec.MaxCapacity) = (
    SELECT MAX(avg_max_capacity)
    FROM (
        SELECT AVG(MaxCapacity) AS avg_max_capacity
        FROM Sections
        GROUP BY CourseID
    ) AS avg_capacity_per_course
)
```

THE END.