Student Database Analysis – Documentation

1. Database Schema (Tables)

- **Students Table**

```
CREATE TABLE Students (
    student_id INT PRIMARY KEY AUTO_INCREMENT,
    name VARCHAR(100),
    age INT,
    gender VARCHAR(10)
);
INSERT INTO Students (name, age, gender) VALUES
('Rahul Sharma', 20, 'Male'),
('Priya Verma', 21, 'Female'),
('Amit Patil', 22, 'Male'),
('Neha Gupta', 20, 'Female');
```

student_id	**name**	**age**	**gender**
1	Rahul Sharma	20	Male
2	Priya Verma	21	Female
3	Amit Patil	22	Male
4	Neha Gupta	20	Female

- **Subjects Table**

```
CREATE TABLE Subjects (
    subject_id INT PRIMARY KEY AUTO_INCREMENT,
    subject_name VARCHAR(100)
);
INSERT INTO Subjects (subject_name) VALUES
('Database Systems'),
('Data Structures'),
('Mathematics');
```

subject_id	subject_name
1	Database Systems
2	Data Structures
3	Mathematics

- **Attendance Table**

```
CREATE TABLE Attendance (
    attendance_id INT PRIMARY KEY AUTO_INCREMENT,
    student_id INT,
    subject_id INT,
    attendance_percent DECIMAL(5,2),
    FOREIGN KEY (student_id) REFERENCES Students(student_id),
    FOREIGN KEY (subject_id) REFERENCES Subjects(subject_id)
);
INSERT INTO Attendance (student_id, subject_id, attendance_percent) VALUES
(1,1,85.50),
(1,2,90.00),
(2,1,78.00),
(2,3,88.00),
(3,2,70.00),
(4,1,95.00);
```

attendance_id	student_id	subject_id	attendance_percent
1	1	1	85.50
2	1	2	90.00
3	2	1	78.00
4	2	3	88.00
5	3	2	70.00
6	4	1	95.00

- **Grades Table**

```
CREATE TABLE Grades (
    grade_id INT PRIMARY KEY AUTO_INCREMENT,
    student_id INT,
    subject_id INT,
    marks DECIMAL(5,2),
    FOREIGN KEY (student_id) REFERENCES Students(student_id),
    FOREIGN KEY (subject_id) REFERENCES Subjects(subject_id)
);
INSERT INTO Grades (student_id, subject_id, marks) VALUES
(1,1,92.00),
(1,2,85.00),
(2,1,80.00),
(2,3,75.00),
(3,2,60.00),
(4,1,95.00);
```

grade_id	**student_id**	**subject_id**	**marks**
1	1	1	92.00
2	1	2	85.00
3	2	1	80.00
4	2	3	75.00
5	3	2	60.00
6	4	1	95.00

2. SQL Queries for Analysis

a) Average Marks per Subject

```
SELECT s.subject_name, AVG(g.marks) AS avg_marks
FROM Grades g
JOIN Subjects s ON g.subject_id = s.subject_id
GROUP BY s.subject_name;
```

Subject	Avg Marks
Database Systems	88.5
Data Structures	72.5
Mathematics	75.0

b) Attendance Below 80%

```
SELECT st.name, sub.subject_name, a.attendance_percent
FROM Attendance a
JOIN Students st ON a.student_id = st.student_id
JOIN Subjects sub ON a.subject_id = sub.subject_id
WHERE a.attendance_percent < 80;
```

Name	Subject	Attendance (%)
Priya Verma	Database Systems	78.0
Amit Patil	Data Structures	70.0

c) Top Performer in Each Subject

```
SELECT s.subject_name, st.name, MAX(g.marks) AS top_marks
FROM Grades g
JOIN Students st ON g.student_id = st.student_id
JOIN Subjects s ON g.subject_id = s.subject_id
GROUP BY s.subject_name;
```

Subject	Top Student	Marks
Database Systems	Neha Gupta	95
Data Structures	Rahul Sharma	85
Mathematics	Priya Verma	75

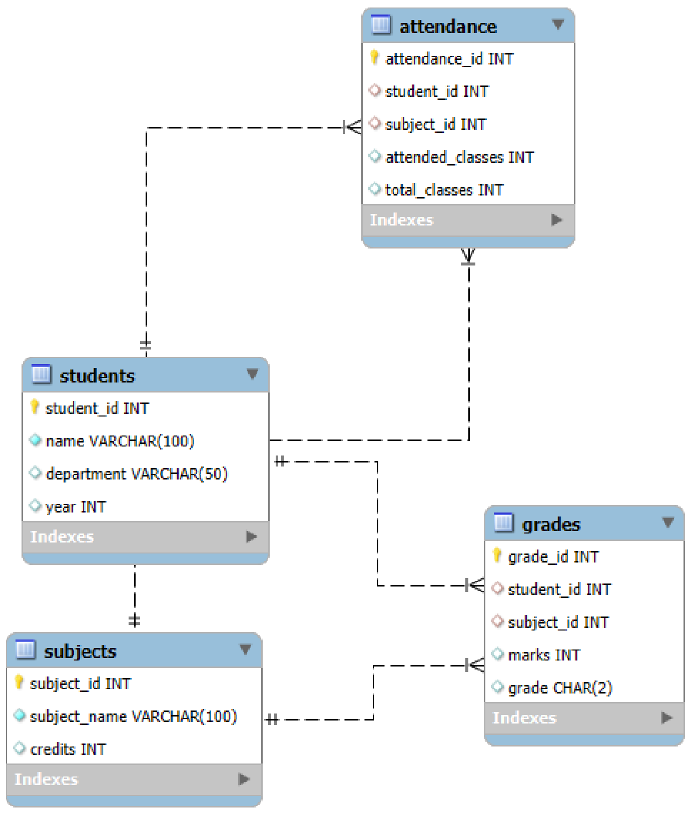
d) View for Consolidated Student Performance

```
CREATE VIEW StudentPerformance AS
SELECT st.name, sub.subject_name, g.marks, a.attendance_percent
FROM Students st
JOIN Grades g ON st.student_id = g.student_id
JOIN Subjects sub ON g.subject_id = sub.subject_id
```

JOIN Attendance a ON st.student_id = a.student_id AND sub.subject_id = a.subject_id;

Name	Subject	Marks	Attendance (%)
Rahul Sharma	Database Systems	92	85.5
Rahul Sharma	Data Structures	85	90.0
Priya Verma	Database Systems	80	78.0
Priya Verma	Mathematics	75	88.0
Amit Patil	Data Structures	60	70.0
Neha Gupta	Database Systems	95	95.0

3. ER Diagram



Explanation of the ER Diagram

1. Students Table

- **Attributes:**
  - student_id (Primary Key) → Unique ID for each student.
  - name → Student's full name.
  - department → Department name (e.g., Computer Engg).

    - year → Academic year (e.g., 1, 2, 3, 4).
- **Role:** Stores the core information of students.

2. Subjects Table

- **Attributes:**
    - subject_id (Primary Key) → Unique ID for each subject.
    - subject_name → Name of the subject (e.g., Database Systems).
    - credits → Credit weightage of the subject.
- **Role:** Stores information about the courses/subjects offered.

3. Attendance Table

- **Attributes:**
    - attendance_id (Primary Key) → Unique ID for each attendance record.
    - student_id (Foreign Key → Students) → Which student's attendance is being recorded.
    - subject_id (Foreign Key → Subjects) → For which subject the attendance belongs.
    - attended_classes → How many classes the student has attended.
    - total_classes → Total number of classes conducted.
- **Role:** Tracks how much a student has attended in each subject.

4. Grades Table

- **Attributes:**
    - grade_id (Primary Key) → Unique ID for each grade record.
    - student_id (Foreign Key → Students) → Which student got the grade.
    - subject_id (Foreign Key → Subjects) → Subject for which grade is given.
    - marks → Marks scored by the student.
    - grade → Final grade (A, B, C, etc.).
- **Role:** Stores performance/grades of students for each subject.

Relationships in ERD

1. **Students → Attendance**
    - One student can have multiple attendance records (one per subject).
    - **One-to-Many relationship.**

2. **Students → Grades**
    - One student can have multiple grades (one per subject).
    - **One-to-Many relationship.**
3. **Subjects → Attendance**
    - One subject can be attended by many students.
    - **One-to-Many relationship.**
4. **Subjects → Grades**
    - One subject can have grades of many students.
    - **One-to-Many relationship.**