

Complete SQL Database Setup and Queries

1. Table Creation

```
CREATE TABLE Professors (  
    PROFID INT PRIMARY KEY,  
    Name VARCHAR(50),  
    Age INT,  
    `Rank` VARCHAR(20),  
    ResearchSpecialty VARCHAR(50)  
);
```

```
CREATE TABLE Projects (  
    ProjectNumber INT PRIMARY KEY,  
    SponsorName VARCHAR(50),  
    StartDate DATE,  
    EndDate DATE,  
    Budget DECIMAL(10, 2),  
    PrincipallInvestigatorID INT,  
    FOREIGN KEY (PrincipallInvestigatorID) REFERENCES Professors(PROFID)  
);
```

```
CREATE TABLE GraduateStudents (  
    USN INT PRIMARY KEY,  
    Name VARCHAR(50),  
    Age INT,  
    DegreeProgram VARCHAR(20),  
    SupervisorID INT,
```

```
FOREIGN KEY (SupervisorID) REFERENCES Professors(PROFID)
);

CREATE TABLE ProjectProfessors (
    ProjectNumber INT,
    PROFID INT,
    FOREIGN KEY (ProjectNumber) REFERENCES Projects(ProjectNumber),
    FOREIGN KEY (PROFID) REFERENCES Professors(PROFID)
);

CREATE TABLE ProjectStudents (
    ProjectNumber INT,
    USN INT,
    FOREIGN KEY (ProjectNumber) REFERENCES Projects(ProjectNumber),
    FOREIGN KEY (USN) REFERENCES GraduateStudents(USN)
);
```

2. Data Insertion

```
INSERT INTO Professors (PROFID, Name, Age, Rank, ResearchSpecialty) VALUES
(1, 'Prof. A', 50, 'Professor', 'AI'),
(2, 'Prof. B', 45, 'Associate Professor', 'Data Science'),
(3, 'Prof. C', 40, 'Assistant Professor', 'Machine Learning'),
(4, 'Prof. D', 38, 'Lecturer', 'Quantum Computing');

INSERT INTO Projects (ProjectNumber, SponsorName, StartDate, EndDate, Budget,
PrincipallInvestigatorID) VALUES
(101, 'UGC', '2006-01-01', '2010-12-31', 500000, 1),
(102, 'AICTE', '2008-03-15', '2012-05-10', 50, 2),
(103, 'UGC', '2009-06-01', '2011-10-31', 500000, 3),
```

```
(104, 'NSF', '2007-02-01', '2009-12-31', 300000, 4);
```

```
INSERT INTO GraduateStudents (USN, Name, Age, DegreeProgram, SupervisorID) VALUES
```

```
(201, 'Student X', 25, 'MCA', 1),
```

```
(202, 'Student Y', 27, 'ME', 2),
```

```
(203, 'Student Z', 26, 'MPhil', 3),
```

```
(204, 'Student W', 24, 'PhD', 4);
```

```
INSERT INTO ProjectProfessors (ProjectNumber, PROFID) VALUES
```

```
(101, 1),
```

```
(102, 2),
```

```
(103, 3),
```

```
(104, 4),
```

```
(101, 2),
```

```
(102, 1),
```

```
(103, 1),
```

```
(104, 1);
```

```
INSERT INTO ProjectStudents (ProjectNumber, USN) VALUES
```

```
(101, 201),
```

```
(102, 202),
```

```
(103, 203),
```

```
(104, 204),
```

```
(101, 204),
```

```
(102, 203),
```

```
(103, 202),
```

```
(104, 201);
```

3. SQL Queries

a) Retrieve the names of all professors who do not have an ongoing project of more than 100000.

```
SELECT Name FROM Professors WHERE PROFID NOT IN (SELECT PrincipallInvestigatorID  
FROM Projects WHERE Budget > 100000);
```

b) Retrieve the names of all graduate students along with their professors under whom they work and project sponsor.

```
SELECT gs.Name AS StudentName, p.Name AS ProfessorName, pr.SponsorName FROM  
GraduateStudents gs JOIN Professors p ON gs.SupervisorID = p.PROFID JOIN ProjectStudents ps  
ON gs.USN = ps.USN JOIN Projects pr ON ps.ProjectNumber = pr.ProjectNumber;
```

c) List the professors and the sum of the budget of their projects started after 2005 but ended in 2010.

```
SELECT p.Name, SUM(pr.Budget) AS TotalBudget FROM Professors p JOIN Projects pr ON  
p.PROFID = pr.PrincipallInvestigatorID WHERE pr.StartDate > '2005-01-01' AND pr.EndDate <  
'2010-12-31' GROUP BY p.Name;
```

d) List the names of professors who have a total worth of projects greater than the average budget of projects sanctioned.

```
WITH AvgBudget AS (SELECT AVG(Budget) AS AvgProjectBudget FROM Projects) SELECT  
p.Name FROM Professors p JOIN Projects pr ON p.PROFID = pr.PrincipallInvestigatorID GROUP  
BY p.Name HAVING SUM(pr.Budget) > (SELECT AvgProjectBudget FROM AvgBudget);
```

e) List the professors who work on all the projects.

```
SELECT p.Name FROM Professors p JOIN ProjectProfessors pp ON p.PROFID = pp.PROFID  
GROUP BY p.PROFID, p.Name HAVING COUNT(DISTINCT pp.ProjectNumber) = (SELECT  
COUNT(*) FROM Projects);
```