DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING ST JOSEPH ENGINEERING COLLEGE, VAMANJOOR

Assignment -1

Course Name: Database Management System

Course Code: 22CSE43

Instructor: Rakshitha Naresh

Submission Date: 08/03/2024

Total Marks _____ /10

Scenario Selection:

Selected Scenario: 4

A college is struggling to efficiently manage student records, Including personal details, course, enrollments, attendance, and grades. Your task is to design a database that streamlines student record management, making it easier for administrators and faculty to track student progress.

Scenario Description:

The selected scenario involves a college facing challenges in efficiently managing student records, which include personal details, course enrollments, attendance, and grades. The goal is to design a database system that simplifies and streamlines the management of these records. This system would help administrators and faculty track student progress more effectively and efficiently, improving accessibility, organization, and overall management of student data.

1)Identification of Entities and Constraints

- **Entities:** Students, Degree_Program, Departments, Faculty, Course, Enrollment, Attendance, Grades, Course Schedule, Assessments

- **Primary Keys:** student_id, Program_id, Department_id, Faculty_id, Course_id, Enrollment_id, Attendance_id, Grade_id, Schedule_id, Assessment_id.

- **ForeignKey:**Degree_Program→Program_id, Departments→Department_id, Faculty→Faculty_id, Student→Student_id, Courses→Course_id.

- **Constraints:**
  NOT NULL: All primary keys, Full name, DOB, Address, Admission_Year, Program_id, Program_name, Department_name, Department_id, Email, PhoneNumber, CourseCode, CourseTitle, Semester, Year, Date, StartTime, EndTime

  UNIQUE: Fullname, Program_name, Department_name, Fullname, CourseTitle

  CHECK: Gender, Status, Degree_type, DurationYear, Designation, Credit, Score, DayOfWeek, AssessmentType, TotalMarks.

  FOREIGN KEY: As listed in the foreign keys section

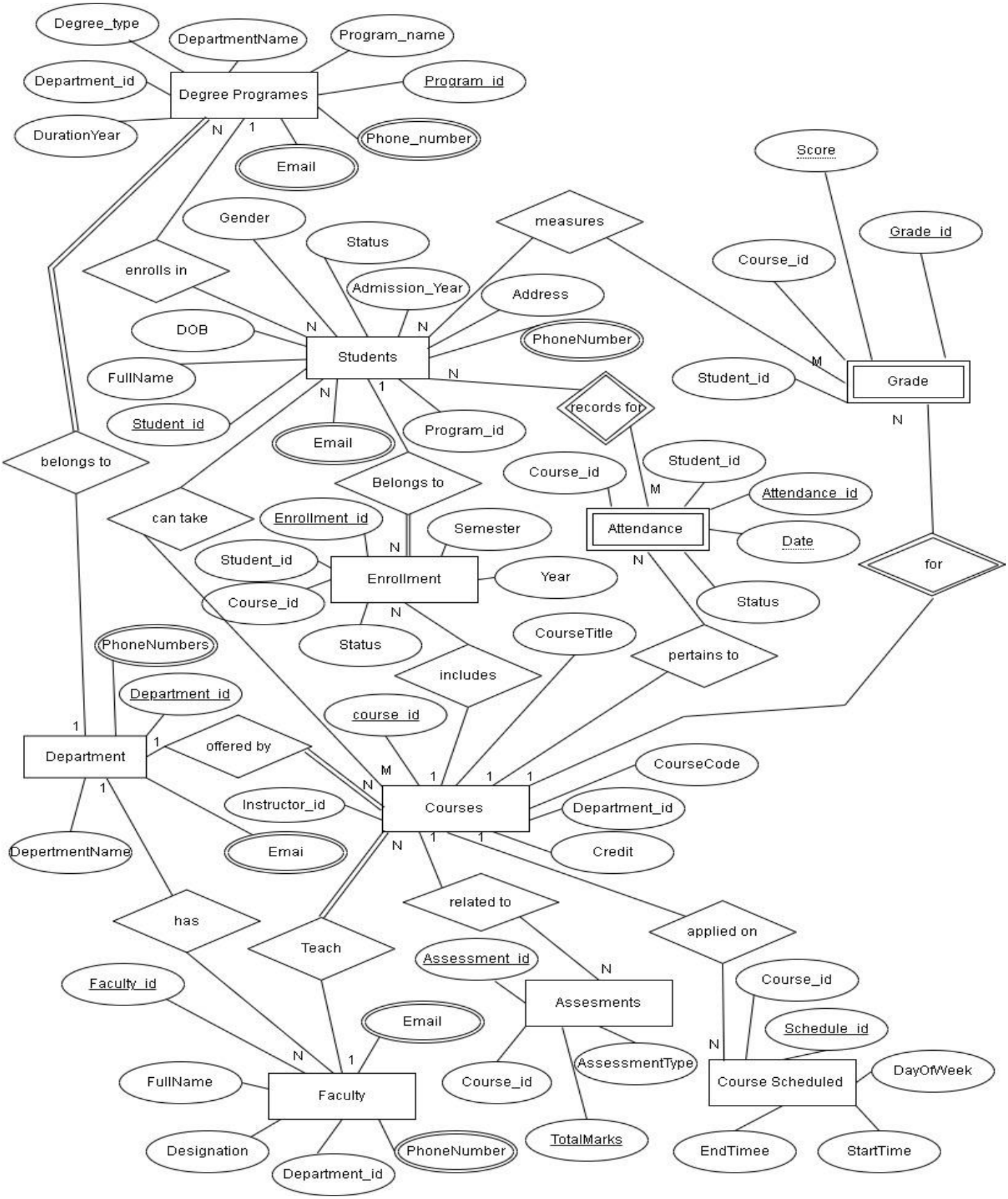
Entity name	Attributes	Primary Key	Foreign Key(s)	Constraints
1.Students	Student_id Fullname DOB Gender Email PhoneNumber Address Admission_Year Status Program_id	student_id	 Degree_program→ Program_id	PRIMARY KEY UNIQUE NOT NULL CHECK NOT NULL NOT NULL NOT NULL NOT NULL CHECK FOREIGN KEY
2.Degree_Program	Program_id Program_name Degree_type DurationYear Department_Name Email Phone Number Department_id	Program_id	 Departments→ Department_id	PRIMARY KEY UNIQUE CHECK CHECK NOT NULL NOT NULL NOT NULL FOREIGN KEY

3. Departments.	Department_id Department_name Email Phone Number	Department_id		PRIMARY KEY UNIQUE NOT NULL NOT NULL
4. Faculty	Faculty_id FullName Designation Email PhoneNumber Department_id	Faculty_id	Departments→ Department_id	PRIMARY KEY UNIQUE CHECK NOT NULL NOT NULL FOREIGN KEY
5. Course	Course_id CourseCode CourseTitle Credit Department_id Instructor_id	Course_id	Departments→ Department_id Faculty→Faculty_id	PRIMARY KEY NOT NULL UNIQUE CHECK FOREIGN KEY FOREIGN KEY
6. Enrollment	Enrollment_id Student_id Course_id Semester Year Status	Enrollment_id	Student→Student_id Courses→Course_id	PRIMARY KEY FOREIGN KEY FOREIGN KEY NOT NULL NOT NULL CHECK

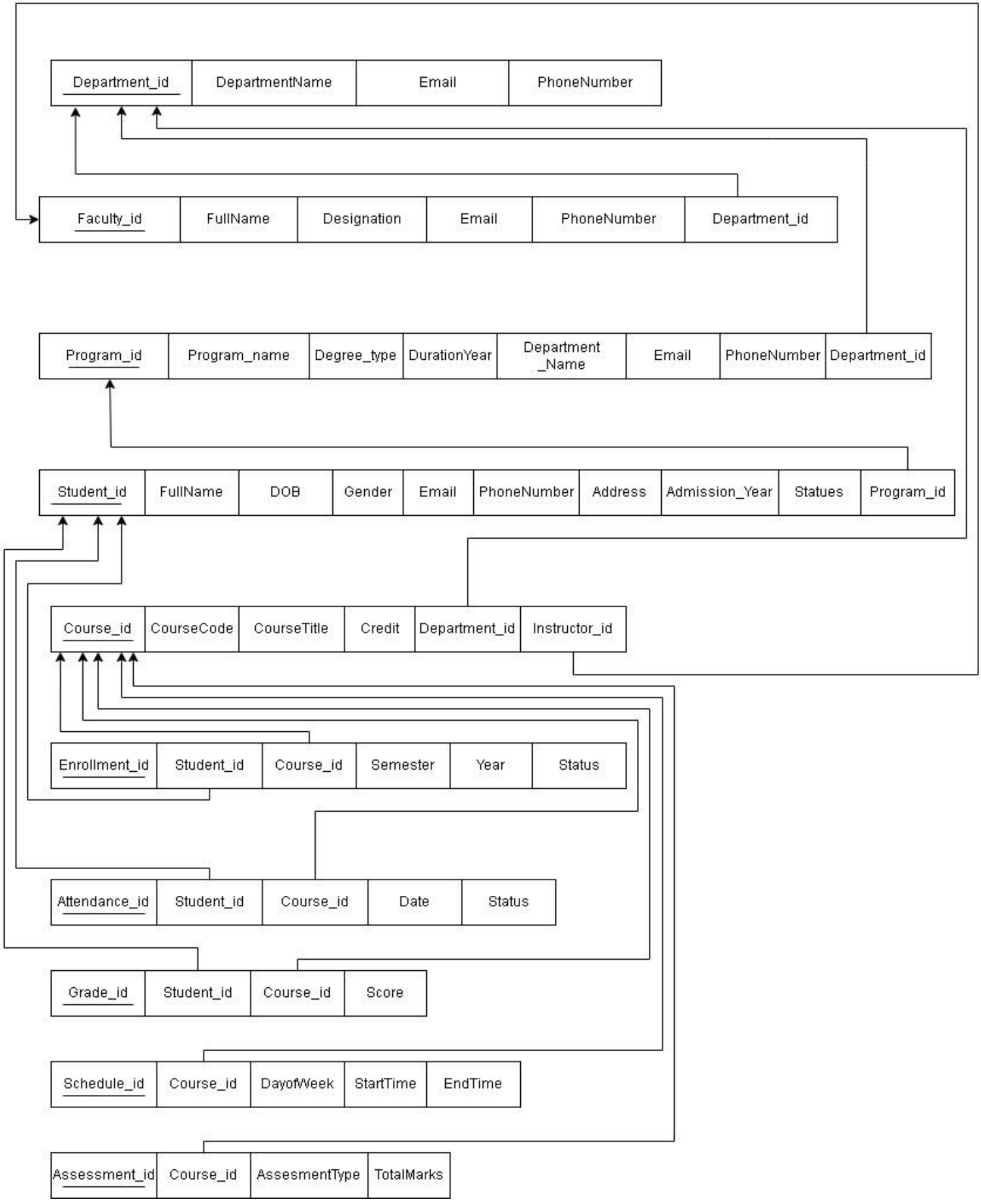
7. Attendance	Attendance_id Student_id Course_id Date Status	Attendance_id	 Student→Student_id Courses→Course_id	PRIMARY KEY FOREIGN KEY FOREIGN KEY NOT NULL CHECK
8. Grades	Grade_id Student_id Course_id Score	Grade_id	 Students→Student_id Courses→Course_id	PRIMARY KEY FOREIGN KEY FOREIGN KEY CHECK
9. Course Schedule	Schedule_id Course_id DayOfWeek StartTime EndTime	Schedule_id	 Courses→Course_id	PRIMARY KEY FOREIGN KEY CHECK NOT NULL NOT NULL
10. Assessments	Assessment_id Course_id AssessmentType TotalMarks	Assessment_id	 Courses→Course_id	PRIMARY KEY FOREIGN KEY CHECK CHECK

1. ER Diagram and Schema Diagram

ER Diagram



Schema Diagram:



2. Complex SQL Query Questions

1. **Trigger-based query**

   Write a trigger to automatically assign a letter grade to a student's record when a new score is entered for an assessment.

   Purpose: This trigger automatically assigns a grade to a student based on their score when a new entry is added to the Grades table.

2. **Joins-based query**

   Write a trigger to automatically assign a letter grade to a student's record when a new score is entered for an assessment.

   Purpose: To retrieve a list of all active students, their enrolled courses, and their grades in those courses, including students who may not have grades recorded yet.

3. **Nested query**

   Write a query to select all active students who have achieved scores greater than the average score for their respective courses.

   Purpose: To find all active students who have received grades higher than the average score for their respective courses.

4. **Any other complex query**

   Retrieve the top 5 students who have the highest average scores across all their courses, along with their full name, email, and average score.

   Purpose: This query identifies the top 5 students with the highest average scores across all their enrolled courses.

5. **Any additional query of your choice**

   Find the number of students enrolled in each course along with the course title and department name.

   Purpose: This query helps administrators analyze course popularity by displaying how many students are enrolled in each course.

Course Instructor:

Signature: