CSIE4105 Database Systems

Homework # 3

Due on 12/07/2023

1. (60%) Consider the following database schema.

   STUDENT(StudentNumber, Name, Class, Major)
   COURSE(CourseNumber, CourseName, CreditHour, Department)
   SECTION(SectionNumber, CourseNumber, Semester, Year, Instructor)
   GRADE_REPORT(StudentNumber, SectionNumber, Grade)
   PREREQUISITE(CourseNumber, PrerequisiteCourseNumber)

   Specify the following queries in SQL.

   (a) (5%) Change the credit hours of the course 'Object-Oriented Programming' for the 'EECS' department to 2.

   (b) (5%) Delete the record for the student whose name is 'David' and whose student number is '005'.

   (c) (5%) Retrieve the names of all courses taught by instructor 'John' in years 2022 and 2023.

   (d) (5%) For each section taught by instructor 'Eric', retrieve the course number, semester, year, and the number of students who took the section.

   (e) (5%) Retrieve the prerequisite course number and name for the course 'Database Systems' offered by the 'EECS' department.

   (f) (5%) Retrieve the name and transcript of each junior student (Class=3) majoring in 'EECS'. A transcript includes course number, course name, credit hours, semester, year, and grade for each course completed by the student.

   (g) (5%) Retrieve the names of students who have a grade greater than or equal to 80 in all of their courses.

   (h) (5%) Retrieve the names and major departments of all students who do not have a grade below 60 in any of their courses.

   (i) (5%) Retrieve the names and majors of all students who have a grade below 60 in any of their courses, order *alphabetically* by the student number.

   (j) (5%) Retrieve the names and their *average grades* for the students who have an *average grade* greater than 80.0 in year 2023.

   (k) (5%) For each department (i.e., student major), list the number of students whose *average grade* is below 60.0.

   (l) (5%) Create a view that has student ID, student name, the names of the courses took by the student, the semester and the year that the courses offered, and the grade received by the student for the courses.

2. (40%) Choose a DBMS (e.g., SQL Server, PostgreSQL or MySQL) to create and populate the tables in problem 1.

   (a) (10%) Show your SQL statements and the execution results (**screen snapshots**) for **creating the tables**. The SQL statements need to specify the **key and referential constraints** (i.e., primary key and foreign key) for each table.

   (b) (10%) **Populate the tables** so that each table contains at least **3 tuples**. Show your SQL insertion statements and the execution results (**screen snapshots**) for populating the tables.

   (c) (10%) **Perform the SQL queries in problem 1** in your DBMS. Show your

SQL statements and the execution results (**screen snapshots**). ***Note that your SQL query results MUST NOT contain no tuples.***

(d) (10%) Based on the DB in problem 1, write a **stored procedure** (can be functions or procedures) that reads student’s number and prints the average grade of the student in *letter format* according to the following rules. Show the source code and the execution results (**screen snapshots**) of your **stored procedure**.

greater than or equal to 60	-	'PASS'
less than 60	-	'FAIL'