

Course code: CSE 301
Course name: Databases
Type of Exam: Closed book / Practice on Computer

Exam code: 01
Duration: 90'
Maximum mark: 100

Instructions:

- *Non-programming calculator: Yes ☒ / No ☐*
- *This paper consists of 2 sections. This paper carries 100 marks:*
Section 1 (40 marks) includes 3 essay questions.
Section 2 (60 marks) includes 2 practices on computers.

Section 1: Essay questions: The student answers right below the question.

Given a course management database schema below:

Departments (DepartmentID, DepartmentName, Faculty)

Description: This table contains information about the various departments in the university, including their unique identifier (DepartmentID), name (DepartmentName), and the faculty to which each department belongs (Faculty).

Courses (CourseID, CourseName, Credit, DepartmentID)

Description: Each course must have a unique identifier (CourseID), a name (CourseName), the number of credits (Credit), and the department offering the course. Each department can offer multiple courses.

Lecturers (LecturerID, LecturerName, Email, Phone, DateOfBirth, Address)

Description: This table contains information about the lecturers at the university, including their unique identifier (LecturerID), name (LecturerName), email address (Email), phone number (Phone), date of birth (DateOfBirth), and address (Address).

Students (StudentID, StudentName, DateOfBirth, Class, Faculty, Address, Phone)

Description: Description: Contains details about the students enrolled in the university, including their unique identifier (StudentID), name (StudentName), date of birth (DateOfBirth), class or year (Class), faculty (Faculty), address (Address), and phone number (Phone).

Student_Course (StudentID, CourseID, Grade, Result, Semester, AcademicYear, LecturerID)

Description: Contains information about the courses taken by students, their grades, and the semester in which the course was taken. Each course can be taken by multiple students, each student can enroll in multiple courses, and each lecturer can teach multiple courses. Grades of students are from 0 to 10, academic year is present is 2 consecutive years separated by a sign such as '2023-2024', each year has 3 semesters.

Question 1 (10 marks) Find primary key and foreign key of sales management database schema

Name table	Primary Key	Foreign Key
Departments		

[illegible]

Section 2: Practice on Computer

Question 1 (20 marks) Given the database schema managing a supply company described as follows:

A trading company specializes in selling electronic goods. The company offers a variety of products and ships goods through different shipping units. The company manages detailed information about suppliers, including supplier codes and supplier names. Each supplier has a unique identifier for easy management and information retrieval while providing a diverse range of electronic products.

The products that the company deals with have their own identifiers, names, units of measurement, and prices. A supplier can supply multiple different products, but each product is supplied by only one supplier. During the supply process, information about orders, including order codes, order dates, and product quantities, is stored to help the company track the ordering and receiving process from the suppliers.

The shipping units are responsible for transporting the goods. Each shipping unit has a unique identifier and a distinct name for easy management. A product can be shipped by multiple different shipping units, and a shipping unit can transport multiple products. Information about deliveries, including invoice numbers, delivery dates, and quantities of products delivered, is stored to track the delivery process.

Requirements: Using draw.io to design an ER - Diagram and Identify Entities with attributes and the relationships between entities in the above schema management. (Export image from draw.io then insert on file)

Question 2 (40 marks) Practice on My SQL Workbench

Create a database `course_management` have the database schema in question 1 of section 1 from the file `database_final_exam.sql` provided. Then do requirement below:

1. Creating Constraint for the tables in Database (10 marks)

- Implement a constraint to ensure that the **Grade** field only accepts values between 0 and 10.
- Implement a constraint to ensure that the **Semester** field only accepts values between 1 and 3.

2. Writing SQL query (30 marks)

- Update the results in the `Result_Course` table such that any grade below 5 is marked as 'Fail' and any grade 5 or above is marked as 'Pass'.
- Count the number of students who failed in each course and display only the courses where more than one student has failed.
- Find the names of lecturers and the average grade that students received in the courses they taught.
- Find the course names and the highest and lowest grades that students achieved in each course during the first semester of the 2023-2024 academic year.
- Find the names of students who have achieved grades greater than or equal to 5.0 in all their courses.

- f) Find the list of students (StudentName, StudentID) who are eligible for a scholarship in the first semester of the 2023-2024 academic year. Eligibility criteria include a minimum average grade of 8.0 and no failed courses. List the top 5 students based on their average grade.
- g) Create a stored procedure to update the grade of a student in a specific course.

----- *End* -----

Lecturer's signature

Trần Văn Tài