



# Daffodil International University

## Department of Computer Science and Engineering

Faculty of Science and Information Technology (FSIT)

Midterm Examination, Semester: Fall-2019

Course Code: CSE311

Course Title: Database Management Systems

Section: ALL

Course Teacher: ALL

Time: 90 minutes

Answer all questions

Total Marks: 25

**Q1:** Assume you have the following application that models soccer teams, the games they play, and the players in each team. In the design, you want to capture the following:

- You have a set of teams, each team has an ID (unique identifier), name, main stadium, and to which city this team belongs.
- Each team has many players, and each player belongs to one team. Each player has a number (unique identifier), name, DoB, start year, and shirt number that he uses.
- Teams play matches, in each match there is a host team and a guest team. The match takes place in the stadium of the host team.
- For each match we need to keep track of the following:
  - The date on which the game is played.
  - The final result of the match.
  - The players participated in the match. For each player, how many goals he scored, whether or not he took yellow card, and whether or not he took red card.
  - During the match, one player may substitute another player. We want to capture this substitution and the time at which it took place.
- Each match has exactly three referees. For each referee we have an ID (unique identifier), name, DoB, years of experience. One referee is the main referee and the other two are assistant referee.

- i) Construct an E-R diagram for the above scenario. Document all assumptions that you make about the mapping constraints. Make sure cardinalities and primary keys are clear. 7.5
- ii) Construct appropriate tables for the above E-R diagram. 5

**Q2:** Consider the following relational schema for library schema. 5

Books (DocId, Title, Publisher, Year),	Students (StId, StName, Major, Age)
Authors (AName, Address),	borrows (DocId, StId, Date)
has-written( DocId, AName),	describes (DocId, Keyword)

Write the following queries using **Relational Algebra**:

- a. List all books published by McGraw-Hill before 1990.



- b. List the name of those authors who are living in Davis.
- c. List the name of students who are older than 30 and who are not studying CS.
- d. List all students with the books they have borrowed.
- e. List all information about students whose major is CS.

**Q3:** The following relations keep track of airline flight information:

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Flights (flno: integer, from: string, to: string,  
distance: integer, departs: time, arrives: time, price: integer)  
Aircraft (aid: integer, aname: string, cruising\_range: integer)  
Certified (eid: integer, aid: integer)  
Employees (eid: integer, ename: string, salary: integer)

Write the following queries using SQL.

1. Find the names of aircraft such that all pilots certified to operate them earn more than 80,000.
2. For each pilot who is certified for more than three aircraft, and the *eid* and the maximum cruising range of the aircraft that he (or she) is certified for.
3. Find the names of pilots whose salary is less than the price of the cheapest route from Dhaka to Chittagong.
4. Find the names of pilots certified for some Boeing aircraft.
5. Find the *aids* of all aircraft that can be used on routes from Dhaka to Khulna.

**Q4:** Shortly explain ACID properties of Transaction using suitable example.

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