BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination: Midterm
Duration: 1 hr
(+ 10 mins for submission)

Semester: Fall 2023
Full Marks: 25

CSE 370: Database Systems

Answer **ALL** of the following questions.
Understanding the question is part of the exam, so **DO NOT** ask questions and answer to the best of your understanding.

Figures in the right margin indicate marks.

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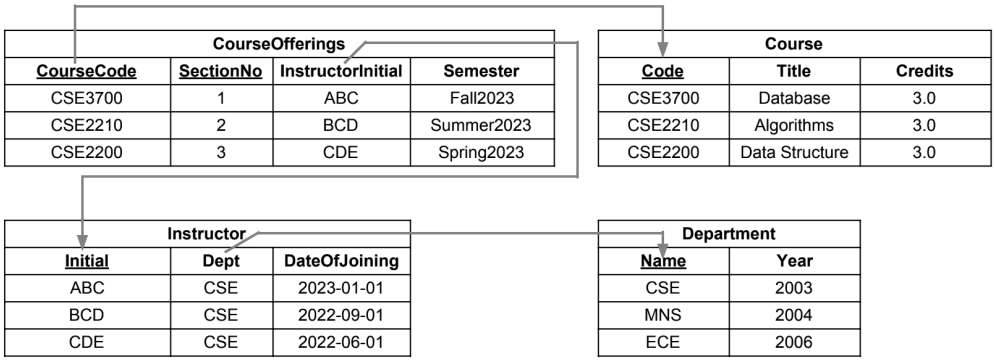
1. CO1 Consider the database state below (primary keys are underlined, foreign keys are shown using arrows): 5



CourseOfferings

CourseCode	SectionNo	InstructorInitial	Semester
CSE3700	1	ABC	Fall2023
CSE2210	2	BCD	Summer2023
CSE2200	3	CDE	Spring2023

Course

Code	Title	Credits
CSE3700	Database	3.0
CSE2210	Algorithms	3.0
CSE2200	Data Structure	3.0

Instructor

Initial	Dept	DateOfJoining
ABC	CSE	2023-01-01
BCD	CSE	2022-09-01
CDE	CSE	2022-06-01

Department

Name	Year
CSE	2003
MNS	2004
ECE	2006

If the operation below is executed, **identify** all constraints that will be violated and **explain** how you can enforce these constraints to ensure no violation occurs.

Operation : Insert the values <'CSE1110', NULL, 'ABC', 2023> in the CourseOfferings table.

2. CO2 In Pokemon World, Trainers collect magical creatures called pokemons and use them to fight battles against other Trainers to become Pokemon Masters. **Construct** an ER diagram for the Pokemon World according to the data requirements given below: 12

a. A pokemon has a unique pokemon id, a name, a type, one or more powers and the next evolution stage.

b. A pokemon trainer has a unique id, name, address (which consists of house no., street no. and city.), date of birth and rank. The age of a trainer is determined by the given date of birth, so it is not stored, but should be shown using the appropriate symbol.

c. Pokemon trainers collect pokemons throughout their journey. Every Pokemon trainer may have many pokemons but a pokemon will have only one trainer. Some pokemons may not have been collected yet.

d. Trainers participate in Leagues. Each league has a unique Id, start date, end date and league name.

e. A league has several battles on the same date. A battle has a battle number, location and date. The battle number is a serial number(1, 2, 3…) within the league and the other attributes also will not be unique.

f. Trainers fight in battles. The score of each trainer in that battle is recorded.

Do not assume any attributes/entities/relationships/multivalued/composite other than the ones mentioned above. For participation constraints/ cardinality ratios, if they are not hinted at in the question, you may assume according to your logical reasoning.

3. CO2 **Design** an EER diagram for the University Sports Club. The sports club uses a database system to keep track of its members, advisors, club departments, different sports activities and their results and other club related events. 8

You can design your EER as you wish, but it must satisfy the following constraints:

a. there should be at least one disjoint-total specialization/generalization,
b. there should be at least four regular entities (excluding the subclasses),
c. there must be at least one recursive relationship,
d. there must be at least one M:N relationship.

Show the important attributes of all the entities and any relationships required. The EER diagram should be clear and realistic, representing the database of the given scenario.