Question Paper

Exam Date & Time: 03-Jun-2023 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SIXTH SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY/JUNE 2023

PRINCIPLES OF DATABASE SYSTEMS [CSE 4304]

Ма	rks: 50	Duration	: 180 mins
An	swer all the	questions.	
Ins	tructions to C	Candidates: Answer ALL questions Missing data may be suitably assumed	
1)		With a neat diagram, illustrate three level abstraction of database system of food delivery application.	(5)
	A)		
	B)	Analyse the "Instructor" relation with attributes as ID, name, salary, dept_name, building and budget. Identify insert, update and delete anomaly in the "Instructor" relation.	(3)
	C)	Differentiate between Union and Union All.	(2)
2)		Construct an E-R diagram for Soccer teams with the following list of requirements. Identify the entities and relationships. Also mention the cardinality ratio and participation.	(5)
	A)	 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.	
		 For each match we need to keep track of the following: 	
		 The date on which the game is played. 	
		• The result of the match	
		 The players participated in the match. For each player, how many goals he scored, whether 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 one or more referees. For each referee we have an ID (unique identifier), name, DoB, years of experience. 	
	B)	Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted. Assume appropriate attributes (at least three) for each entity.	(3)
	C)	Discuss how null values affect aggregate function.	(2)
3)		Consider the relational database given below:	(5)

- account(account_number, branch_name, balance)
- loan (loan_number, branch_name, amount)
- depositor((customer_name, account_number)
- borrower(customer_name, loan_number)

Write the SQL queries for:

A)

- a. For all customers who have an account at the bank, find their names, account numbers and balance.
- b. Find all the branch names (without duplicates) which have both a loan and an account.
- c. Find branches which have atleast three customers.
- B) Write the SQL statements to create tables with primary key and foreign key constraints for the (3) relational database given below:
 - account(account_number, branch_name, balance)
 - depositor((customer_name, account_number)

Assume appropriate datatypes.

- C) Consider the relational database given below:
 - account(account_number, branch_name, balance)
 - depositor((customer_name, account_number)

Write the SQL query to find customers whose total account balance is greater than the average of the total account balance of all customers.

4)	A)	Suppose we have a relation R(A, B, C, D, E) with a set of functional dependencies $F = \{AB \rightarrow C, C \rightarrow D, D \rightarrow E, B \rightarrow E\}$, Analyse if R is in BCNF with respect to set of functional dependencies. If not in BCNF, decompose R till all relations are in BCNF.	(5)
	B)	Consider a schema R = (ABCDEF) and a set of functional dependencies F = {AB \rightarrow C, C \rightarrow D, B \rightarrow E }. Identify all the candidate keys of R.	(3)
	C)	Consider the relational database given below:	(2)
		 account(account_number, branch_name, balance) 	
		 loan (loan_number, branch_name, amount) 	
		Identify any two non-trivial functional dependencies.	
5)		Write the canonical cover for a given set of functional dependencies.	(5)
	A)	$F = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$	
	B)	Consider a schema R = (ABCDEF) and a set of functional dependencies F = {A \rightarrow B, B \rightarrow C, C \rightarrow D, D \rightarrow E, E \rightarrow F}. Identify the attribute closure of A.	(3)
	C)	Differentiate between candidate key and super key.	(2)

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(2)