Question Paper

Exam Date & Time: 04-Dec-2023 (02:30 PM - 05:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

FIFTH SEMESTER B.TECH. DEGREE EXAMINATIONS - NOVEMBER / DECEMBER 2023
SUBJECT: ICT 3157 - DATABASE SYSTEMS

Marks: 50 **Duration: 180 mins.**

Answer all the questions.

1A) Write a query by using CRUD operation method in ecommerce site (5)

- To Create an item phone and TV in the site.
- Client should READ inventory by browsing through the product catalog.
- UPDATEs the inventory temporarily to reflect the reduced number of items available, When client places an order, the backend system.
- To DELETE an item TV If the user purchases TV from the shopping cart, by using Delete operation.

1B) Analyse strict 2 phase locking with an example. (3)

1C) Illustrate advantages and disadvantages of time stamp protocol. (2)

2A) Consider the following schema for Order Database: (5)
SALESMAN(**Salesman_id**, Name, City, Commission)
CUSTOMER(**Customer_id**, Cust_Name, City, Grade, Salesman_id)
ORDERS(**Ord_No**, Purchase_Amt, Ord_Date, Customer_id, Salesman_id)
Write SQL queries to
1) Count the customers with grades above "Bangalore" average.
2) Find the name and numbers of all salesman who had more than one customer.
3) List all the salesman and indicate those who have and don't have customers in their cities.
4) Create a view that finds the salesman who has the customer with the highest order of a day.
5) Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted

2B) Demonstrate Declaring, Defining and Invoking a simple PL/SQL function which will compute and return the maximum of two values (3)

2C) Write SQL Queries for using below table Worker with attributes WORKER_ID, FIRST_NAME,LAST_NAME, SALARY,JOINING_DATE, DEPARTMENT (2)

1) Write an SQL query that fetches the unique values of DEPARTMENT from the Worker table and prints its length.
2) Write an SQL query to print all Worker details from the Worker table order by FIRST_NAME Ascending.

3A) Consider R(A,B,C,D,E) having the following functional dependencies (5)
Fd1: ABCD->E
FD2: E->D
FD3: AC->D
FD4: A->B
Identify the current highest normal form seen in these functional dependencies. Convert these to the highest normal forms possible. Examine whether the normalized schema is dependency

preserving and lossless join

3B)	Consider a relation R(P,Q,R,S,V) having to set of functional dependencies as follows: Set1: P->Q, PQ->R, S->PRV Set2: P->QR, D->AE Examine whether these sets are equivalent.	(3)
3C)	In what type of applications or systems do you think a two-tier architecture would be more suitable, and conversely, in what scenarios would a three-tier architecture be a better choice? Consider factors such as scalability, complexity, user access methods, and security.	(2)
4A)	Assume we have the following application that models soccer teams, the games they play, and the players in each team. In the design, we want to capture the following: • We 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: o The date on which the game is played o The final result of the match o 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. o 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. Design an ER diagram to capture the above requirements. Make sure cardinalities and primary keys are clear. Further convert the ER diagram to appropriate schemas.	(5)
4B)	Consider a relation R(A,B,C,D,E,F,G,H,I,J) having Functional dependencies {AB → C, A → DE, B → F, F → GH, D → IJ}. Identify the prime and non prime attributes.	(3)
4C)	With a suitable example demonstrate the different Deadlock handling strategies, and also mention their drawbacks.	(2)
5A)	Identify all the drawbacks of Lock based protocol and demonstrate with an example a solution for each of the drawbacks.	(5)
5B)	Consider a scenario where an e-commerce platform has product information represented by a file, and a separate file for tracking inventory. Consider a situation where a product price is increased. Identify various challenges seen by maintaining files to maintain product information.	(3)
5C)	Develop a usecase in flight management system and with the help of a neat diagram relate the requirements to a database system environment.	(2)

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