SVKM's NMIMS
MUKESH PATEL SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING / SCHOOL OF TECHNOLOGY MANAGEMENT & ENGINEERING

Academic Year: 2022-23

Programme: B.Tech / MBA Tech (All Stream)/ B. Tech (Artificial Intelligence) Year: II/III Semester: III/V

Subject: Database Management Systems

Date: 28 November 2022

Marks: 100
Time: 10.00 am - 1.00 pm
Durations: 3 (Hrs)
No. of Pages: 05

Final Examination

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover of the Answer Book, which is provided for their use.

1) Question No. 1 is compulsory.
2) Out of remaining questions, attempt any 4 questions.
3) **In all 5 questions to be attempted.**
4) All questions carry equal marks.
5) **Answer to each new question to be started on a fresh page.**
6) **Figures in brackets on the right hand side indicate full marks.**
7) **Assume Suitable data if necessary.**

Q1		Answer briefly:	[20]
CO -2; BL- 2	a.	Explain the terms primary key, candidate key, and foreign key. Give an example for each.	[5]
CO-1; BL-2	b.	Why is the use of a database management system recommended? Justify by listing some of its major advantages and applications	[5]
CO-3; BL-3	c.	Functional dependencies for relation schema R = (X, Y, Z, U, V) are given below: $X \rightarrow YZ$, $ZU \rightarrow V$, $Y \rightarrow U$, $V \rightarrow X$ Find the closure of attributes X^+, ZU^+, Y^+, V^+ and also identify prime and non-prime attributes.	[5]
CO-4; BL-2	d.	Discuss transaction and its properties.	[5]
Q2			[20]
CO-1; BL-5	a.	Suppose the following requirements for a simple database for the National Hockey League (NHL) are given: The NHL has many teams, each team has a name, a city, a coach, a captain, and a set of players, each player belongs to only one team, each player has a name, a position (such as left wing or goalie), a skill level, and a set of injury records, a team captain is also a player, a game is played between two teams (referred to as host_team and	[10]

		guest_team) and has a date (such as May 11th, 1999) and a score (e.g. 4). i. Design an Entity Relation for above problem statement. ii. Map the ER diagram into relational schema indicating primary keys and foreign keys.	
CO-3; BL-4	b.	What is the use of normalization? Define 3NF with example. Given set of functional dependencies of a relation R(ABCDE) are as follows: AB → C, B → D, D → E i. Identify the candidate keys ii. Identify the current Normal form of the Relation iii. Decompose the relation and normalize it to 3NF	[10]
Q3			[20]
CO-1; BL-3	a.	i. Explain specialization and generalization with examples. ii. What do you mean by integrity constraints? Explain the two constraints, check constraints and referential integrity constraint constraints in SQL with an example for each.	[10]
CO-1; BL-4	b.	Consider the set of relations and write the SQL queries: EMP (Emp_no, Dept_no, Emp_name, Job, Salary, Address) DEPT (Dept_no, Dept_name, Location) Formulate the SQL queries for the following i. To display all the information of employees including their department. [2] ii. Find the name of the employees whose job profile location is the same as their address. [2] iii. Find the details of the employee who is taking the second highest salary using subqueries/nested queries. [3] iv. Find the employee name and salary whose salary is greater than average salary of the employee. [3]	[10]
Q4			[20]
CO-2; BL-3	a.	Why is a weak entity set called weak? How is the weak entity set represented in the ER model? Give an example. Justify whether there will always be total participation for the weak entity set.	[10]
CO-3; BL-3	b.	i. Discuss BCNF normal form in relational database design with an example. ii. Given the following relation R and the set of functional dependencies F that hold on R, find all candidate keys for R.	[10]

		R (X, Y, Z, U, V, W) F = {XY → Z, XZ → Y, XU → V, YZ → X, V → W}	
Q5			[20]
CO-4; BL-4	a.	What is view serializability and conflict serializability? Check whether the schedules given below is conflict serializable or not? Provide justification S : R2(A); W2(A); R3(C); W2(B); W3(A); W3(C); R1(A); R1(B); W1(A); W1(B)	[10]
CO-3; BL-4	b.	Consider the relations given below. Actor (actorId, name, nationality, age) Director (directorId, name, nationality) Film (filmId, title, year, directorId*) PerformsIn (actorId*, filmId*, character) Write the relational algebra expression for the following i. Retrieve details of all actors above the age of 45. ii. Retrieve all distinct film titles. iii. Retrieve all distinct titles of films that were released before 2000. iv. Retrieve the details of all films released in 2012 and directed by a non-American director, along with the details of the corresponding director. v. Retrieve all distinct titles of films directed by a British director	[10]
Q6			[20]
CO-3; BL-4	a.	Consider a database with the following schema: Person (name, age, gender) — name is a key Frequents (name, pizzeria) — (name, pizzeria) is a key Eats (name, pizza) — (name, pizza) is a key Serves (pizzeria, pizza, price) — (pizzeria, pizza) is a key Eats contains information about what type of pizza each person (customer) eats (dikes) • Name is always the customer's name • Frequents record information about pizzerias that each customer frequents (visits)	[10]

		• Serves contains information about all possible pizza types for each pizzeria **pizzeria** is a restaurant focusing on pizza Write relational algebraic expression for the following i. Find all pizzerias frequented by at least one person under the age of 18 [2] ii. List the name of the persons who eats tomato pizza [2] iii. Find the names of all females who eat both mushroom and pepperoni pizza. [3] iv. Find all pizza types which are not eaten by anyone. [3]	
CO-4; BL-3	b.	Differentiate between the characteristics of NoSQL and relational database management system.	[10]
Q7			[20]
CO-3; BL-3	a.	i. Justify the statement "Decomposition of relation in normalization reduces the redundancy." ii. Discuss fully functional dependency with an example.	[10]
CO-3; BL-3	b	i. Discuss the use of outer join and also explain different types of outer join. ii. The instance of the Salesman and order relation is given: Salesman	[10]

salesman_id	name	city	commission
5001	James Hoog	New York	0.15
5002	Nail Knite	Paris	0.13
5005	Pit Alex	London	0.11
5006	Mc Lyon	Paris	0.14
5007	Paul Adam	Rome	0.13
5003	Lauson Hen	San Jose	0.12

Order

ord_no	purch_amt	ord_date	customer_id	salesman_id
70001	150.5	2012-10-05	3005	5002
70009	270.65	2012-09-10	3001	5005
70002	65.26	2012-10-05	3002	5001
70004	110.5	2012-08-17	3009	5003
70007	948.5	2012-09-10	3005	5002
70005	2400.6	2012-07-27	3007	5001
70008	5760	2012-09-10	3002	5001
70010	1983.43	2012-10-10	3004	5006
70003	2480.4	2012-10-10	3009	5003
70012	250.45	2012-06-27	3008	5002
70011	75.29	2012-08-17	3003	5007
70013	3045.6	2012-04-25	3002	5001

Formulate the SQL queries for the following

i. Find the details of those salespeople who come from the 'Paris' City or 'Rome' City.

ii. Find the details of those salespeople who live in cities other than Paris and Rome.

iii. Select orders between 500 and 4000 (begin and end values are included) Exclude orders amount 948.50 and 1983.43.

X