

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, December 2024
BCA, Semester III, 2024-25

Roll No.....

CS1116: Database Management and Applications

Time: 2 hours Max. Marks: 30

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Mention all the assumptions for your answers clearly.

Q.1	Consider a hospital “Holy Child”. There are several doctors who work at the hospital. Patients visit a specific doctor by taking an appointment. All records of doctors, patients and appointments are stored in a MySQL DBMS. Write a python program that performs the following in the MySQL DBMS (Assume your own user and password for the connection). 1. Write a function called setup. In this function: a. Create a relation Patient (<u>id</u>, name, address, date_of_birth) b. Create a relation visit (<u>patient_id</u>, <u>doctor_id</u>, time). Patient_id refers to id from patient and Doctor_id refers to emp_id from doctor. c. Insert two tuples in the patient relation. 2. Write a function called appointment that takes patient’s id, doctor’s id and date time as input. Your function should a. Check if the slot is available. If not available, print “not available” message b. If the slot is available, update the database and print a message saying that the appointment is successful. 3. Write a function called analytics a. Print the patient with the highest number of visits b. Print the total number of patients per doctor c. Print the total number of doctors a patient has visited d. How many patients have visited more than two doctors	3 (LO4, 6) 3 (LO4, 6) 4 (LO4, 6)
-----	---	---

Q.2.1	A. What are the Armstrong's Axioms. Express them in terms of functional dependencies. B. Determine if the two sets of functional dependencies, P and Q given below are equivalent or not. Show each step. P = {A->C, AC->D, E->AD, E->H} Q = {A-> CD, E-> AH}	3+ 2 (LO5)																																																									
Q.2.2	Consider the following relation: <table><tr><th colspan="9">ClientRental</th></tr><tr><th>clientNo</th><th>cName</th><th>propertyNo</th><th>pAddress</th><th>rentStart</th><th>rentFinish</th><th>rent</th><th>ownerNo</th><th>oName</th></tr><tr><td rowspan="2">CR76</td><td rowspan="2">John Kay</td><td>PG4</td><td>6 Lawrence St, Glasgow</td><td>1-Jul-03</td><td>31-Aug-04</td><td>350</td><td>CO40</td><td>Tina Murphy</td></tr><tr><td>PG16</td><td>5 Novar Dr, Glasgow</td><td>1-Sep-04</td><td>1-Sep-05</td><td>450</td><td>CO93</td><td>Tony Shaw</td></tr><tr><td rowspan="3">CR56</td><td rowspan="3">Aline Stewart</td><td>PG4</td><td>6 Lawrence St, Glasgow</td><td>1-Sep-02</td><td>10-June-03</td><td>350</td><td>CO40</td><td>Tina Murphy</td></tr><tr><td>PG36</td><td>2 Manor Rd, Glasgow</td><td>10-Oct-03</td><td>1-Dec-04</td><td>375</td><td>CO93</td><td>Tony Shaw</td></tr><tr><td>PG16</td><td>5 Novar Dr, Glasgow</td><td>1-Nov-05</td><td>10-Aug-06</td><td>450</td><td>CO93</td><td>Tony Shaw</td></tr></table> And the following functional dependencies: fd1 clientNo, propertyNo → rentStart, rentFinish fd2 clientNo → cName fd3 propertyNo → pAddress, rent, ownerNo, oName fd4 ownerNo → oName fd5 clientNo, rentStart → propertyNo, pAddress, rentFinish, rent, ownerNo, oName fd6 propertyNo, rentStart → clientNo, cName, rentFinish 1. Draw the functional dependency diagram 2. Normalize the relation into its 3NF decomposition	ClientRental									clientNo	cName	propertyNo	pAddress	rentStart	rentFinish	rent	ownerNo	oName	CR76	John Kay	PG4	6 Lawrence St, Glasgow	1-Jul-03	31-Aug-04	350	CO40	Tina Murphy	PG16	5 Novar Dr, Glasgow	1-Sep-04	1-Sep-05	450	CO93	Tony Shaw	CR56	Aline Stewart	PG4	6 Lawrence St, Glasgow	1-Sep-02	10-June-03	350	CO40	Tina Murphy	PG36	2 Manor Rd, Glasgow	10-Oct-03	1-Dec-04	375	CO93	Tony Shaw	PG16	5 Novar Dr, Glasgow	1-Nov-05	10-Aug-06	450	CO93	Tony Shaw	5 (LO5)
ClientRental																																																											
clientNo	cName	propertyNo	pAddress	rentStart	rentFinish	rent	ownerNo	oName																																																			
CR76	John Kay	PG4	6 Lawrence St, Glasgow	1-Jul-03	31-Aug-04	350	CO40	Tina Murphy																																																			
		PG16	5 Novar Dr, Glasgow	1-Sep-04	1-Sep-05	450	CO93	Tony Shaw																																																			
CR56	Aline Stewart	PG4	6 Lawrence St, Glasgow	1-Sep-02	10-June-03	350	CO40	Tina Murphy																																																			
		PG36	2 Manor Rd, Glasgow	10-Oct-03	1-Dec-04	375	CO93	Tony Shaw																																																			
		PG16	5 Novar Dr, Glasgow	1-Nov-05	10-Aug-06	450	CO93	Tony Shaw																																																			
Q.2.3	Consider the following table. <table><tr><th>staffNo</th><th>dentistName</th><th>patNo</th><th>patName</th><th>surgeryNo</th></tr><tr><td>S1011</td><td>Tony Smith</td><td>P100</td><td>Gillian White</td><td>S15</td></tr><tr><td>S1011</td><td>Tony Smith</td><td>P105</td><td>Jill Bell</td><td>S15</td></tr><tr><td>S1024</td><td>Helen Pearson</td><td>P108</td><td>Ian MacKay</td><td>S10</td></tr></table> Assume key of the relation is staffNo, patNo, surgeryNo. 1. Write a tuple to create an Insert Anomaly. 2. Write a tuple to create a Delete Anomaly.	staffNo	dentistName	patNo	patName	surgeryNo	S1011	Tony Smith	P100	Gillian White	S15	S1011	Tony Smith	P105	Jill Bell	S15	S1024	Helen Pearson	P108	Ian MacKay	S10	2 (LO5)																																					
staffNo	dentistName	patNo	patName	surgeryNo																																																							
S1011	Tony Smith	P100	Gillian White	S15																																																							
S1011	Tony Smith	P105	Jill Bell	S15																																																							
S1024	Helen Pearson	P108	Ian MacKay	S10																																																							

Q.3	Consider the following relation. Customer (<u>customer_id</u>, name, city, state, region, phone, email) Room (Room_no, type, tariff) Reservation (<u>customer_id</u>, Room_no, Date) Write Relational Algebra queries for the following: 1. Display all the rooms of “Deluxe” and “Superior” type 2. Display the dates and room numbers when customer with id 123 made a reservation 3. Display the customers who belong to the West region but NOT from Gujarat state.	1.5+1 +1.5 (LO5)
Q.4	Answer the following questions: 1. Define BCNF Normal Form. 2. Selection of Relational Algebra is equivalent to _____ of SQL and Projection of Relational Algebra is equivalent to _____ of SQL 3. Attribute closure identifies the _____ key of a relation 4. Arrange the following in the order of execution in a database engine? Select , Having, Join, Group by, Distinct, order by	1* 4 =4 (LO3)

