Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Examination, Fall-2023

Course Code: CSE311 Course Title: Database Management System

Level: 3 Term: 1 Batch: 60

Time: 2 Hours **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1. a) Discover Normalization for the following table up to Third Normal Form. Be certain to indicate necessary constraints. **[10] CO4**

SSN	Contract_No	Weekly_ Hourse	Staff_ Name	Restaurant_ No	Restaurant_ Address
ZA75632, SQ54782	N8005	20, 23	Alex, Stuart	R81	London
MX68931, TR78925	N8006	21, 24	Marry, George	R84	Manchester
FH18237, HJ78925	N8007	22, 25	David, Michel	R87	Birmingham
KL61481	N8008	23	Chapel	R88	London

2. a) Consider the following relational schema representing a university database: **[5*2] CO2**

Student (StudentID, Name, Age, Department)
Course (CourseID, Title, Credits)
Enrollment (StudentID, CourseID, Semester, Grade)
Department (DepartmentID, DepartmentName, HeadOfDepartment)
Professor (ProfessorID, Name, DepartmentID)

Now, write the SQL query and relational algebra expression for every following question -

i. Retrieve the names of students who have enrolled in the "Database Management System" course.
ii. Find the total number of credits taken by each student.
iii. Find the average age of students in the "Computer Science" department.
iv. List the names of professors who are also heads of departments.
v. Display the names and grades of students who have taken the "Data Structures" course in descending order of grades.

b) Write the following queries in SQL (use subquery only): **[2*2]**

i. List the names of professors who teach courses in the "Computer Science" department.
ii. Retrieve the names of students who have enrolled in more than two courses.

3.	a)	In a student information database, design a stored procedure that calculates the average grade for a given student based on their individual subject grades. Specify the parameters for the stored procedure and give a brief example of how it would work.	[3]	CO3
	b)	In your employee database, you have a table named Salaries that stores the salary information for each employee. Due to a company-wide salary adjustment, you want to increase all employees' salaries by 10%. Create a trigger that, whenever a salary update is attempted, automatically calculates and updates the salary by applying a 10% increase and explain how it would work.	[3]	
4.	a)	In a company's database system, there is a database containing employee information. The database administrators have designed multiple views for different departments within the company. The HR department has access to a view that displays employee names, contact details, and job titles. The IT department has a separate view showing employee names, system access levels, and hardware allocation. Additionally, the physical level consists of various data files stored on different servers, while the logical level defines the relationships between different tables such as employees, departments, and projects. Identify the levels of data abstraction (view, physical, and logical) in the given scenario of the company's database system and explain their roles or functionalities within the database structure.	[3]	CO3
	b)	Explain the significance of ACID properties in ensuring database transaction reliability and consistency. Provide examples illustrating each of the ACID properties in a database system.	[4]	
	c)	BEGIN TRANSACTION; CREATE TABLE Employees (ID INT PRIMARY KEY, Name VARCHAR (50), Salary DECIMAL (10, 2)); INSERT INTO Employees (ID, Name, Salary) VALUES (1, 'John', 50000.00); INSERT INTO Employees (ID, Name, Salary) VALUES (2, 'Emma', 60000.00); INSERT INTO Employees (ID, Name, Salary) VALUES (3, 'Alex', 55000.00); SAVEPOINT sp1; UPDATE Employees SET Salary = 52000.00 WHERE ID = 2; SAVEPOINT sp2; INSERT INTO Employees (ID, Name, Salary) VALUES (4, 'Sophia', 52000.00); INSERT INTO Employees (ID, Name, Salary) VALUES (5, 'Michael', 58000.00); SAVEPOINT sp3; UPDATE Employees SET Salary = 57000.00 WHERE ID = 3; ROLLBACK TO sp2; SAVEPOINT sp4; UPDATE Employees SET Salary = 54000.00 WHERE ID = 1; ROLLBACK TO sp1; SAVEPOINT sp5; INSERT INTO Employees (ID, Name, Salary) VALUES (6, 'Olivia', 59000.00); INSERT INTO Employees (ID, Name, Salary) VALUES (7, 'William', 63000.00); ROLLBACK TO sp4; COMMIT; Based on the provided SQL transactions, what will be the final state of the 'Employees' table after executing the entire script? Provide the contents of the 'Employees' table at the end of the transactions, considering the effects of COMMIT, ROLLBACK, and SAVEPOINT commands.	[3]	

Daffodil International University

Faculty of Science & Information Technology

Final Examination, Spring 2023

Course Code: CSE311 Course Title: Database Management System

Level: 3 Term: 1

Time: 2:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1. Consider the following schemas: **CO2**

Course (id, name, course_code)
Student (id, name, email, phone)
Enrolment (id, course_id, student_id, enrollment_date, enrollment_status)

a) Write an SQL query to list all of the students id, name and email in ascending order of ID who are enrolled in course with code "CSE311" **[2]**

b) Write an SQL query find the name and ID of the students who enrolled in "Database Management System" course after 15 March 2023. **[1]**

c) Write an SQL query to find the total number of students in each course with course name. **[2.5]**

d) Write an SQL query to find course names that have more than 15 student enrolment. **[3]**

2. Consider the following tables: **CO2**

Ticket No.	Travel Date	Travel Time	Seat No.	Passenger ID	Bus No.
T301	03-06-2023	10:30 AM	D3	163-15-54215	S_11
T301	03-06-2023	10:30 AM	D4	163-15-54215	S_11
T302	03-06-2023	10:30 AM	A1	183-15-2458	S_02
T302	03-06-2023	10:30 AM	A2	183-15-2458	S_02
T302	03-06-2023	10:30 AM	A3	183-15-2458	S_02
T304	05-06-2023	7:00 AM	D2	123-15-8546	S_12
T305	07-06-2023	7:00 AM	C2	131-15-3167	S_12

Passenger ID	Passenger Name	Passenger Contact
163-15-54215	Maruf Ahmed	0175224668
183-15-2458	Jahangir Khan	0185245687
123-15-8546	Rocin Shetty	0154687453
131-15-3167	Bristy Zaham	0154687453

Bus No.	Bus Name	Staff	Route Name
S_11	Surjomukhi 11	Johir	Dhanmondi
S_12	Surjomukhi 12	Alamin	Uttara
S_02	Surjomukhi 2	Alamin	Mirpur

a) Write an SQL query to find the seat numbers of Student bearing ID 183-15-2458 travelling on 03-06-2023 at 10:30 AM. **[1]**

b) Find the contact information of the passenger who bought Ticket Number T302. **[2]**

c) List the names of all students who have travelled to Uttara Between 03-06-2023 to 09-06-2023. **[3]**

d) Find the name of the staff who assisted the passenger with ticket no T302. **[2]**

3. Discover Normalization for the following table up to Third Normal Form. Be certain to indicate necessary constraints. **[10] CO4**

Order Number	Order Date	Customer ID	Customer Name	Customer Address	Product ID	Product Name	Quant ity	Price
001	2022-01-01	C001	John Smith	123 Main St	P001, P002	MacBook, Laser Printer	2, 1	1000, 500
002	2022-01-05	C002	Jane Doe	456 Oak Ave	P004	Asus Zenbook	1	1200
003	2022-01-10	C003	Bob Johnson	789 Maple St	P003, P005	Samsung Z-Fold, Realme Bud 3	3, 1	3000, 300

4. How do triggers work in a database management system, and what are some practical use cases for implementing triggers? **[4.5] CO3**

5. Create appropriate examples to demonstrate the use of rollback and commit within a database transaction? **[4.5] CO3**

6. How do ACID properties guarantee the reliability and consistency of transactions in a database system? **[4.5] CO3**

Daffodil International University

Faculty of Science & Information Technology

Final Examination, Fall 2022

Course Code: CSE311, Course Title: Database Management System

Time: 2:00 Hrs **Marks: 40**

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1. Consider the following schemas: **[1.5*5 =7.5]** **CO2**

StaffInfo(StaffID, StaffFname, StaffLname, Department, Project, Address, DOB, Gender)
StaffPosition(StaffID, StaffPosition, DateOfJoining, Salary)
StaffContact(StaffID, Email, PhoneNo)

Solve the following queries using SQL:

a) Select all staffs with a staff first name that ends with "k" and are at least 4 characters in length.

b) Select 4th highest salary of the staff.

c) Select 3 percent salary increase to the staff whose salary is less than average.

d) Select staff position and staff salary whose first name is Mamun

e) Select department name and address of the staff whose phone number is 083216832

2. Consider the following tables: **[3*3 =9]** **CO2**

Table 1: Customer

C_Id	C_Name	C_Contact	C_Email
1	Adam	8189326331	adam@gmail.com
2	Saimond	8187344367	saimond@gmail.com
3	Helen	8151678434	helen@gmail.com
4	Gary	8176621166	gary@gmail.com

Table 2: Shopping_Details

I_Id	I_Name	I_Quantity	C_Id
1	Biscuit	3	1
2	Chips	5	3
3	Chocolate	10	3
4	Drinks	2	Null

Give the following queries using SQL with Joining and show the output. Use C_Id, C_Name, C_Email, I_Id, I_Name, I_Quantity columns in your output.

a) Identify a SQL statement to select all items and any customer buys this.

b) Identify a SQL statement to select all customers with items they buy.

c) Identify a SQL statement to select all customers and any item they buy.

3. Discover Normalization for the following table up to Third Normal Form. Be certain to indicate necessary constraints. **[10]** **CO4**

St_ID	Co_ID	St_Name	Co_Name	Grade	Teacher	T_Phone
501	CE201, CE405	Jamal	AI, Java	A, B	Mr. X, Mrs. Y	02432773, 02548924
502	CE201	Sabina	AI	A	Mr. X	02432773,
503	CE201	Osman	AI	B	Mr. X	02432773,
504	CE405, CE201	Sanjida	Java, AI	A, B	Mrs. Y, Mr. X	02548924, 02432773,

4. Outline different states of a transaction. **[4]** **CO3**

5. Construct the code of Before Insert Trigger with example. **[5.5]** **CO3**

6. Construct the code of procedure with OUT parameter using example. **[4]** **CO3**

Daffodil International University

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Final Examination, Spring 2022
Course Code: CSE311 (Day), Course Title: Database Management System
Level: 3 Term: 1 Section: All
Instructor: ALL

Time: 2 Hours **Full Marks: 40**

Q1. Consider the following schemas. **[1.5*5 =7.5]** **[CO2]**

EmployeeInfo(EmpID, EmpFname, EmpLname, Department, Project, Address, DOB, Gender)
EmployeePosition(EmpID, EmpPosition, DateOfJoining, Salary)

Write the following queries using SQL:

a) Select all the records ordered by EmpLname in descending order and Department in the ascending order.
b) Select the details of all employees excluding the employees with first names 'Asif' and 'Tania'.
c) Select the total number of employees for each department sorted by descending order.
d) Select the department name that gives highest salary.
e) Select the employee position of the employee whose first name is 'Yousuf'.

Q2. Consider the following schemas. **[3*3 = 9]** **[CO2]**

Table 1: Students

S_ID	S_Name	S_DOB	S_Fee	S_Gender	A_ID
101	Alex	2002-04-23	55000	Male	2
102	David	2001-11-05	60000	Male	4
103	Abraham	2000-02-17	65000	Male	2
104	Marry	2001-12-30	70000	Female	1
105	Stuart	2001-12-19	64000	Male	4
106	Carol	2000-06-27	62000	Female	1

Table 2: Advisors

A_ID	A_Name	A_Room_No	A_Contact	A_Email
1	Rupart	503	0142378	Rupart.edu@gmail.com
2	Simpson	402	0144521	Simpson.edu@gmail.com
3	Donald	518	0149856	Donald.edu@gmail.com
4	John	410	0145691	John.edu@gmail.com

Give the following queries using SQL with Joining and show the output. Use S_ID, S_Name, S_DOB, A_ID, A_Name, A_Room_No columns in your output.

a) Identify a SQL statement to select all advisors and any students they might have to advise.
b) Identify a SQL statement to select all students with advisors.
c) Identify a SQL statement to select all students and any advisors they might have.

Q3. Discover Normalization for the following table up to Third Normal Form. Be certain to indicate necessary constraints. **[10]**

Salesperson Number	Salesperson Name	Sales Area	Customer Number	Customer Name	Warehouse Number	Warehouse Location	Sales Amount
3462	Waters	West	18765	Delta Systems	4	Fargo	13540
			18830	A. Levy and Sons	3	Bismarck	10600
			19242	Ranier Company	3	Bismarck	9700
3593	Dryne	East	18841	R. W. Flood Inc.	2	Superior	11560
			18899	Seward Systems	2	Superior	2590
			19565	Stodola's Inc.	1	Plymouth	8800

Q4. Patient (ID, Name, DateOfBirth, Age, Gender, PlaceOfBirth, Nationality, ContactNo) **[4]**

Construct a Stored Procedure with parameter that selects patient whose age is 60 and gender is Male from the above Patient table.

Q5. Illustrate about ACID properties in DBMS. **[4]**

Q6. Construct the code for After Insert trigger with example. **[5.5]**

Daffodil International University

Department of Computer Science and Engineering
Faculty of Science & Information Technology
Final Exam, summer 2021 @ DIU Blended Learning Center
Course Code: CSE311 (Day), Course Title: Database Management System
Level: 3 Term: 1 Section: All
Instructor: RUH Modality: Open Book Exam
Date: Saturday 28 August, 2021 Time: 01:30pm-05:0pm
Two and half hours (3:30), Marks: 40

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1. Consider the following relational schema and write expression in SQL **OR** in Relational Algebra. [7.5]

Employee(SSN, Fname, Lname, Gender, Address, Sex, Relationship, Salary, Designation, Super-SSN, Dno)
Department(Dname, Dnumber, Dlocation,Mgr-ssn, Mgr-start-date)
Project(Pname, Pnumber, Plocation,Budget, Dnum)
Works-on(Essn, Pno, Hours)

a) Write SQL to increase the salary of employees by 2000 who is getting less then 70000tk.
b) Write SQL to find the total number of employee from distinct place in descending order.
c) Write SQL to rearrange Project table according to the descending order of Budget of the project.
d) Write SQL to display all the department number where Number of employee is less than 10.
e) Write SQL to display the project Number having largest hour.

2. Write expression in SQL for each of the queries using sub query or joining [12.5]

a) Write SQL to display the department's name that gives the second highest salary on average.
b) Write SQL to display the first name, ssn and department name for all Female supervisor.
c) Write SQL to display the employee's name that spent maximum hour in a project.
d) Write SQL to display the lowest paying supervisor's all project details.
e) Write SQL to display the name of all employees and department name who work under Arman Khan and ProductX project.

3. Suppose, you want to withdraw 5000tk money from your DBBL account. You go to DBBL bank booth and enter your card, password and amount of money for withdrawing. After some moment you can see a message "Withdraw successfully done" but you do not get money. You shock and check the account details. In account details, it shown 5000tk is debited from your account few moments ago. You do not understand anything. You go to DBBL bank branch to solve the problem. [2+2]

a) What happened in above case in DBMS aspect? In which state system failure occurs?
b) What is the way to prevent these types of unwanted situation? Explain with example.

4. Normalize the following table up to Third Normal Form. Be certain to indicate necessary constraints.
[State any assumptions you make about the data shown in this table] [8]

Studio	Director	Movies	Budget	Release year	Release date	StudioCity	CityTemp
Walt Disney	Mark Andrews	Brave	18.5 Cr.	2012	10-06-2012	California	18
Warner Bros	Chris Joseph Columbus	Harry Potter	120 Cr.	2001	04-11-2001	London	13
DCEU	Zack Snyder	Batman Vs superman	70 Cr	2016	19-03-2016	Gotham	20
		Suicide Quad	80 Cr.	2021	28-07-2021		
Marvel	Kevin Feige	The Avengers	100 Cr.	2012	03-08-2012	New York	15
		Captain America	150 Cr.	2011	19-07-2011		

Candidate key {Studio, Movies}

5. Perform normalization for following table (1NF,2NF,3NF) [8]

ID	Reg Num	Total marks	Dept	Country	Zip code	City	Mobile	Advisor Id	Name	Rank	Salary
1	1201	600	CSE	bd	12	Mirpor Cantt	012254	71001	Mr. A	Lecturer	50000
2	1202	890	GED	india	45	Dhulipara	134565 487576	71002	Mr. B	Assistant	65000
3	1203	455	CSE	usa	34	Texax	340858	71003	Mr. C	Associate	60000
4	1204	566	PHY	pakistan	46	Agrabad	345666 847566	71004	Mr. D	Assistant	65000
5	1205	900	PHY	canada	38	Alberta	923820	71501	Mr. E	Lecturer	50000
6	1206	100	ACC	Somalia	87	Gold Coast	012254	71006	Mr. F	Assistant	65000

Good Luck ☺