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Daffodil International University
Department of Software Engineering
Faculty of Science & Information Technology
Final Examination, Spring 2024
Course Code: SE 223; Course Title: Database Systems
Sections & Teachers: NJ, KRA, AM

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. ***a)*** *Employee*

Employee_id	Employee_name	*Department_ID*	Department
101	Steven	*200*	HR
202	John Doe	*201*	Finance
301	Lex	*114*	Marketing
402	Alexander	*203*	Accounting
501	Bruce	*121*	IT

Salary

EMPLOYEE_ID	Salary	PHONE_NUMBER	HIRE_DATE	*Department_ID*
101	20000	5151234567	2003-06-17	*200*
202	3598	5241234567	2005-09-21	*201*
301	3000	5151258567	2001-01-13	*114*
404	79000	5151248567	2006-01-03	*203*
505	348799	515489567	2005-06-25	*121*
102	12390	578489567	2006-02-05	*123*

[Marks-10] CLO-3 *Level-3*

Develop SQL queries for the given question:

a. Retrieve the average salary for each department.
b. Find all employees who earn more than John Doe.
c. Find those employees who earn more than the average salary.
d. Count the number of employees in each department.
e. Get the details of employees who work in the "Marketing Department".
f. Find all employees who do not have a salary entry.
g. Get the employee information whose name starts with "A".
h. Find the phone numbers of those employees who were hired between 17th June 2003 and 3rd January 2006.
i. Find all employees whose salary is higher than the average salary of their department.
j. Find the employee id who gets the highest salary.

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2. Consider the following tables:

Topic: DIU library Management

DIU library management data where student's information is recorded, when a student borrowed a book, when he returned etc.

StudentID: 024222000518888888
StudentName: Sumaiya
StudentEmail: sumu23@gmail.com
StudentPhoneNo:01789955454
BorrowID: 04

DepartmentName: SWE
DepartmentNo: 35
BorrowedDate: 20-04-24
ReturnDate: 04-05-24

BookID	BookName	AuthorName	Publisher
04	To Kill a Mockingbird	Harper Lee	HarperCollins
05	1984	George Orwell	Penguin Books
06	The Great Gatsby	F. Scott Fitzgerald	Scribner

a)	**Normalize** the table from 1NF up to BCNF; examining every step of the process from those tables given in question 2 with proper explanation.	[Marks-6]	CLO-4 *Level-4*
b)	**Distinguish** between full functional dependency and partial dependency from the above tables.	[Marks-4]	
c)	**List** the normalization rules and explain why we need normalization to design databases.	[Marks-4]	
d)	**Analyze** four anomalies that may exist in the above tables.	[Marks-4]	
e)		[Marks-2]	

Student_Id	Student_name	Student_Address	Course_no	Course_title

Explain the current normalization level of the given table.

3.	*a)*	**Establish** an Entity relationship diagram based on the tables given in question 2 with appropriate attribute type, cardinality, and relationship.	[Marks-5]	CLO-2 *Level-3*
4.	*a)*	**Demonstrate** the transaction properties along with an explanation of any two properties, and **explain the** states of the transaction.	[Marks-3]	CLO-5 *Level-2*
	b)	**Define** each component of ACID properties, and how they ensure reliability, integrity, and concurrency control in database transactions.	[Marks-2]	