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|  | **Database Management Systems**  **BSCS-4**  **Department of Computer Science**  **Bahria University, Lahore Campus** |

**Quiz: 4**

Date: Week 15, 2 January 2024

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Roll No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Evaluation of CLO** | **Question Number** | **Marks** | **Obtained Marks** |
| **CLO: analysis user requirements to design a database for the given scenario.** |  |  |  |
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| **Total Marks** | | **10** |  |

**Question 1:**

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| --- | --- | --- |
| ProjectID | EmployeeName | EmployeeSalary |
| 100a | Adnan | 65000 |
| 100a | Salman | 5100 |
| 100b | Salman | 51000 |
| 200a | Adnan | 64000 |
| 200b | Adnan | 64000 |
| 200c | Amir | 28000 |
| 200c | Salman | 51000 |
| 200d | Amir | 28000 |

PROJECT (ProjectID, EmployeeName, EmployeeSalary)

where ProjectID is the name of a work project

EmployeeName is the name of an employee who works on that project

EmployeeSalary is the salary of the employee whose name is EmployeeName

Assuming that all of the functional dependencies and constraints are apparent in data, which of the following statements is true?

1. ProjectID > EmployeeName

FALSE: employee can work on multiple projects, so the employee's name is not uniquely determined by the ProjectID alone

1. ProjectID > EmployeeSalary

FALSE: EmployeeSalary is dependent on both ProjectID and EmployeeName, not just ProjectID

1. (ProjectID, EmployeeName) > EmployeeSalary

TRUE: ProjectID and EmployeeName together uniquely determines the EmployeeSalary

1. EmployeeName > EmployeeSalary

FALSE: EmployeeSalary is not solely dependent on EmployeeName; it also depends on ProjectID

1. EmployeeSalary > ProjectID

FALSE: ProjectID is not dependent on EmployeeSalary

1. EmployeeSalary > (ProjectID, EmployeeName)

FALSE: EmployeeSalary is dependent on both ProjectID and EmployeeName, not the other way around

**Answer these questions:**

1. What is the key of PROJECT?

ProjectID and EmployeeName (Composite Key)

1. Are all non-key attributes (if any) dependent on the whole key?

Yes, all non-key attributes (like EmployeeSalary) are dependent on the whole key (ProjectID, EmployeeName).

1. In what normal form is PROJECT?

PROJECT is in the First Normal Form (1NF).

1. Describe two modification anomalies from which PROJECT suffers.

Insertion Anomaly: It is not possible to add an Employee until Employee is assigned to a Project. Likewise, you cannot add a Project until and Employee is assigned to the Project.

Update Anomaly: If you want to change Salman’s Salary you need to change three rows of data in order to change one Employee's salary.

Deletion Anomaly: If Amir did not work on Project 200C and worked in Project 200D only, deletion of ProjectC would delete the fact that Amir’s salary was 28000.

1. Is ProjectID a determinant?

YES: ProjectID is a determinant.

1. Is EmployeeName a determinant?

YES: EmployeeName > EmployeeSalary

1. Is (ProjectiD, EmployeeName) a determinant?

YES: (ProjectID, EmployeeName) is a determinant

1. Is EmployeeSalary a determinant?

No: In this case, it appears that it can be a determinate because no two people have same salary. Using logic however, one can assume that there is no business rule in a firm that says two people cannot have the same salary.

1. Does this relation contain a partial dependency? If so, what is it?

YES, the relation does contain a partial dependency. The key is ProjectID+EmployeeName but

EmployeeName > EmployeeSalary.

1. Redesign this relation to eliminate the modification anomalies.

PROJECT (ProjectID, EmployeeName)

EMPLOYEE (EmployeeName, EmployeeSalary)