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

**Assignment: [4]**

Date: Week 15, 03 January 2024

Name: \_AFFAN AHMAD\_\_\_\_

Roll No: \_03-134221-003\_\_\_

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| **Evaluation of CLO** | **Question Number** | **Marks** | **Obtained Marks** |
| **CLO: Analyze user requirements to design a database for the given scenarios** |  |  |  |
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|  |  |  |
| **Total Marks** | | **20** |  |

**Question 1**

A table contains sample data for parts and for vendors who supply parts. The part numbers uniquely identify parts and that vendor names uniquely identify vendors.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Part\_No | Description | Vendor\_Name | Address | Unit\_Cost |
| 1234 | Logic chip | Ejaz | Peoples colony | 10.00 |
|  |  | Naeem | Medina town | 8.00 |
| 5678 | Memory chip | Ali Raza | Peoples colony | 3.00 |
|  |  | Anjum | Raza Abad | 2.00 |
|  |  | Nasir | Saeed colony | 5.00 |

1. Convert this table to a relation (named PART SUPPLIER) in first normal form. Illustrate the relation with the sample data in the table.



1. List the functional dependencies in PART SUPPLIER and identify a candidate key.

Candidate key: {Part\_No, Vendor\_Name}

1. For the relation PART SUPPLIER, identify each of the following: an insert anomaly a delete anomaly and a modification anomaly.

Insert Anomaly: If you want to add a vendor without any parts or a part without any associated vendor, you can'tz do it in this structure.

Delete Anomaly: Deleting a row may inadvertently remove information about a part or a vendor.

Update Anomaly: Updating the Unit\_Cost for a specific part from a specific vendor requires multiple updates in this structure.

1. Draw a relational schema for PART SUPPLIER and show the functional dependencies.

PART\_SUPPLIER(Part\_No, Description, Vendor\_Name, Address, Unit\_Cost)

Functional Dependencies:

Part\_No → Description’

Part\_No → Unit\_Cost

Vendor\_Name → Address

1. In what normal form is this relation?

The purpose of Normalisation in SQL is to eliminate redundant (repetitive) data and ensure data is stored logically.

This relation is in the First Normal Form (1NF) because it eliminates repeating groups by separating them into individual rows and columns. However, it's not in higher normal forms due to the presence of certain anomalies.

**Question 2**

Examine the Patient Medication Form for Civil Hospital as follows:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Civil Hospital  Patient Medication Form | | | | | | | |
| Patient Number:9876  Full Name: Ali Ahmad Ward Number: W11  BedNumber: 87 Ward Name: Fatima | | | | | | | |
| Drug Number | Name | Description | Dosage | Method of Admin | Units per Day | Start Date | Finish Date |
| 10223  10334  10223 | Morphine  Tetracycline  Morphine | Pain Killer  Antibiotic  Pain Killer | 10mg/ml  0.5mg/ml  10mg/ml | Oral  IV  Oral | 50  10  10 | 24/03/01  24/03/01  25/04/02 | 25/04/02  17/04/01  02/05/03 |

1. Identify the functional dependencies represented by the data shown in the form in

Patient Number → Full Name, Ward Number, Bed Number, Ward Name

Drug Number → Name, Description, Dosage, Method of Admin

Drug Number, Start Date → Finish Date

Drug Number, Start Date → Units per Day

1. Describe and illustrate the process of normalizing the data shown in Figure to first (1 NF), second (2NF), third (3NF), and BCNE

Patient Medication Form Table (1NF):

| Patient Number | Full Name | Ward Number | Bed Number | Ward Name | Drug Number | Name | Description | Dosage | Method of Admin | Units per Day | Start Date | Finish Date |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 9876 | Ali Ahmad | W11 | 87 | Fatima | 10223 | Morphine | Pain Killer | 10mg/ml | Oral | 50 | 24/03/01 | 25/04/02 |
| 9876 | Ali Ahmad | W11 | 87 | Fatima | 10334 | Tetracycline | Antibiotic | 0.5mg/ml | IV | 10 | 24/03/01 | 17/04/01 |
| 9876 | Ali Ahmad | W11 | 87 | Fatima | 10223 | Morphine | Pain Killer | 10mg/ml | Oral | 10 | 25/04/02 | 02/05/03 |

Patient Table (2NF):

| Patient Number | Full Name | Ward Number | Bed Number | Ward Name |
| --- | --- | --- | --- | --- |
| 9876 | Ali Ahmad | W11 | 87 | Fatima |
|  |  |  |  |  |
|  |  |  |  |  |

Drug Table (2NF):

| Drug Number | Name | Description | Dosage | Method of Admin |
| --- | --- | --- | --- | --- |
| 10223 | Morphine | Pain Killer | 10mg/ml | Oral |
| 10334 | Tetracycline | Antibiotic | 0.5mg/ml | IV |
|  |  |  |  |  |

Patient Table (3NF):

| Patient Number | Full Name | Ward Number | Bed Number | Ward Name |
| --- | --- | --- | --- | --- |
| 9876 | Ali Ahmad | W11 | 87 | Fatima |

Drug Table (3NF):

| Drug Number | Name | Description | Dosage | Method of Admin |
| --- | --- | --- | --- | --- |
| 10223 | Morphine | Pain Killer | 10mg/ml | Oral |
| 10334 | Tetracycline | Antibiotic | 0.5mg/ml | IV |

Medication Table (3NF):

| Drug Number | Start Date | Finish Date | Units per Day |
| --- | --- | --- | --- |
| 10223 | 24/03/01 | 25/04/02 | 50 |
| 10334 | 24/03/01 | 17/04/01 | 10 |
| 10223 | 25/04/02 | 02/05/03 | 10 |

Medication Table (2NF):

| Drug Number | Start Date | Finish Date | Units per Day |
| --- | --- | --- | --- |
| 10223 | 24/03/01 | 25/04/02 | 50 |
| 10334 | 24/03/01 | 17/04/01 | 10 |
| 10223 | 25/04/02 | 02/05/03 | 10 |

1. Identify the primary, alternate, and foreign keys in your BCNF relations

Patient Table:

Primary Key: Patient Number

Drug Table:

Primary Key: Drug Number

Medication Table:

Composite Primary Key: {Drug Number, Start Date}

Foreign Key: Drug Number (references Drug Table)