**Question 1**: Consider the following table for a call center:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| custID | custName | empID | empName | callDate | callTime | issueStatus |
| 10001 | Barbara | 001 | Candace | Jan-7 | 1:00 PM | Will Call Cack |
| 10002 | Daniel | 001 | Candace | Jan-7 | 1:30 PM | Issue Resolved |
| 10003 | Erin | 002 | Fabian | Jan-7 | 1:00 PM | Sent to Team |
| 10001 | Barbara | 001 | Candace | Jan-7 | 2:00 PM | Sent to Team |
| 10004 | Daniel | 002 | Fabian | Jan-7 | 1:45 PM | Issue Resolved |
| 10001 | Barbara | 002 | Fabian | Jan-8 | 11:00 AM | Issue Resolved |

Part a: Is the table in 1NF? If not, normalize it to 1NF.

Part b: Identify the primary key.

Part c: Is your answer to part a in 2NF? If not, normalize it to 2NF.

Part d: Is your answer to part c in 3NF? If not, normalize it to 3NF.

Part e: Identify one anomaly fixed by normalization.

**Question 2**: Consider the following table for a widget manufacturer (color is dependent on ID):

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| factoryID | factoryAddr | date | widgetID | widgetColor | numProduced |
| 1 | 100 Main St | Apr-3  Apr-4 | 001  001 | Green  Green | 597  608 |
| 2 | 200 Main St | Apr-3  Apr-4 | 001  002 | Green  Blue | 833  773 |
| 3 | 5 Factory Rd | Apr-3  Apr-4 | 002  001 | Blue  Green | 604  777 |

Part a: Is the table in 1NF? If not, normalize it to 1NF.

Part b: Identify the primary key.

Part c: Is your answer to part a in 2NF? If not, normalize it to 2NF.

Part d: Is your answer to part c in 3NF? If not, normalize it to 3NF.

Part e: Identify one anomaly fixed by normalization. It must be a different type (modification, insertion, or deletion) that you used in question 1.

**Question 3**: Draw an ER-model and write the schema for the following scenario:

A chess club has asked you to create a database for them to keep track of their information. Each member of the club has a member ID, name, and rank. Each game takes place between two members. Each game has a game ID, date, time, and result. The club occasionally holds tournaments. Each tournament has a name uniquely identifying that tournament. Each tournament consists of at least sixteen games, although not every game is part of a tournament. One member wins each tournament.

**Bonus Question**: Consider the ER-model for the scenario below. The ER-model contains either a fan or a chasm trap. Identify the type of trap and create a new ER-model with the trap fixed.

You are making a database to track staffing and appointments at a set of doctors’ offices. Each practice has doctors and staff. Each patient belongs to one practice but can see multiple doctors at that practice.

