

Practice Questions #4

Q1. Given the following table:

Student_ID	Student_Name	Course_ID	Course_Name	Instructor_Name	Instructor_Phone
101	Alice	CS101	Database	Dr. Smith	123-456-7890
102	Bob	CS102	AI	Dr. Johnson	987-654-3210
103	Charlie	CS101	Database	Dr. Smith	123-456-7890
104	David	CS103	Cloud	Dr. Lee	555-123-4567

a. Explain how **insert**, **update**, and **delete** anomalies could occur in such a table. Provide one example of each anomaly.

b. Convert this table to:

- **1NF** (First Normal Form)
- **2NF** (Second Normal Form)
- **3NF** (Third Normal Form)
- **BCNF** (Boyce-Codd Normal Form)

Show the updated table(s) at each normalization step.

Q2. Given the following table:

Order_ID	Customer_Name	Product_ID	Product_Names	Total_Amount	Salesperson_Name
201	John Smith	P1, P2	Laptop, Mouse	1200	Alice
202	Mary Johnson	P3	Monitor	300	Bob
203	Tom Clark	P2, P3, P4	Mouse, Monitor, Cable	450	Alice
204	Sara Lee	P1, P4	Laptop, Keyboard	700	Charlie
205	David Green	P5	Cable	150	Bob

a. Explain how **insert**, **update**, and **delete** anomalies could occur in such a table. Provide one example of each anomaly.

b. Convert this table to:

- **1NF** (First Normal Form)
- **2NF** (Second Normal Form)
- **3NF** (Third Normal Form)
- **BCNF** (Boyce-Codd Normal Form)

Show the updated table(s) at each normalization step.

Q3. Given the following table:

Service_ID	Customer_Name	Vehicle_Model	Issues_Reported	Technician_Name	Service_Date	Cost
401	James Watson	Toyota Corolla	Oil Change, Brake Issue	Mike	2024-07-01	200
402	Linda Taylor	Honda Civic	Engine Noise	Sarah	2024-07-03	300
403	James Watson	Toyota Corolla	Tire Replacement	Mike	2024-07-10	150
404	Kevin Brooks	Ford Focus	Battery, AC Repair	Sarah	2024-07-12	400
405	Emily Rogers	Nissan Altima	Brake Issue	Mike	2024-07-15	180

a. Explain how **insert**, **update**, and **delete** anomalies could occur in this table. Provide one example of each.

b. Convert this table to:

- **1NF** (First Normal Form)
- **2NF** (Second Normal Form)
- **3NF** (Third Normal Form)
- **BCNF** (Boyce-Codd Normal Form)

Show the updated table(s) at each normalization step.