Task:8 Normalizing database using functional dependencies upto BCNF

Aim:- To normalize database using functional dependencies upto BCNF

Hospital Database:-

1. Identify hospital attributes.

Patient_ID, Patient_Name, Doctor_ID, Doctor_Name, Department, Room_NO, Treatments Bill_Amount.

2. Define relational sche:

Hospital (Patient_ID, Patient_Name, Doctor_ID, Doctor_Name, Department, ROOM_NO, Treatment, Bill_Amounts.

3. Determine functional dependencies (FDs) b/w attributes.

Patient_ID → Patient_Name, Doctor_ID, Room_No, Treatment, Bill_Amount

Doctor_ID → Doctor_Name, Department

Room_No → Department.

Step 2:- convert to INF

1. Eliminate repeating groups or carry
2. Create seperate tables for each repeating group.

Step 3:- convert to 2NF

1. Ensure each non-key attribute depend on the entire primary key-tables if they

depend only part of the primary key.

- Create Doctor table :- Doctor (Doctor-ID, Doctor-Name, Department)
- Create Patient table :- Patient (Patient-ID, Patient-Name, Doctor-ID, Room-No, Treatment, Bill-Amount)

Step 4 :- Convert to 3NF

1) Ensure there are no transitive dependencies.

2) Move non-key attribute to seperate tables if they depend on another non-key attributes.

- Create Room table :- Room (Room-No, Department)
- Update Doctor table :- Doctor (Doctor-ID, Doctor-Name)

Steps :- convert to BCNF

1. Ensure every determinal is a candidate key.
2. Check for overlapping candidate key
3. Decompose relations to eliminate redudency
4. No further decomposition needed.

Using Bafilith tool :-

1) Input relation schema and functional dependencies.

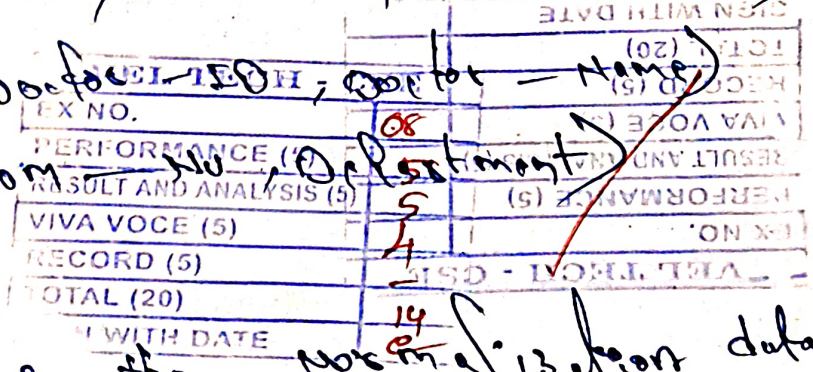
2) Workbench tool generates a dependency graph.
3) Analyse the graph to identify normalization issues.
4) Apply normalization rules to transform the schema.
5) Verify the resultant schema meets BCNF criteria.

Workbench tool steps:-

1. Create a new project in workbench
2. Define the relational schema and FDs
3. Run the "Dependency graphs" Tool.
4. Analyse the graph for normalization issues.
5. Apply transformation using tools "normalize" tool.
6. Verify BCNF compliance using the "BCNF Check" tool.

Normalized schema:-

1) Patient (Patient-ID, Patient-name, Doctor-ID, room-no, treatment, Bill-Amount)
2. Doctor (Doctor-ID, Doctor-Name)
3. Room (Room-no, Department)



Result:- Thus, the normalization database using functional dependencies upto BCNF executed successfully.