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, Treatment, Bill_Amount.

2. Define Relational schema:

Hospital(Patient_ID, Patient_Name, Doctor_ID, Doctor_Name, Department, ROOM_NO, Treatment, Bill_Amount).

3. Determine functional dependencies(FDs) between attributes:

Patient_ID → Patient_Name, Doctor_ID, ROOM_NO, Treatment, Bill_Amount

Doctor_ID → Doctor_Name, Department

ROOM_NO → Department

Step 2: Convert to 1NF

1. Eliminate repeating groups or array.
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.
2. Move non-key attributes to separate 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 dependies.
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)

Step 5: Convert to BCNF

1. Ensure every determinal is a candidate key.
2. Check for overlapping candidate key

3-decompose relations to eliminate redundancy.

4. No further decomposition needed.

Using Griffith tool:

1. Input relation schema and functional dependencies.
2. Griffith tool generates a dependency graph.
3. Analyze the graph to identify normalization issues.
4. Apply normalization rules to transform the schema.
5. Verify the resulting schema meets BCNF criteria.

Griffith tool steps:

1. Create a new project in Griffith EOS
2. Define the relational schema and
3. Run the "dependency Graph" tool.
4. Analyze the graph for normalization issues.
5. Apply transformation using the "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)

VEL TECH - CSE	
EX NO.	08
PERFORMANCE (5)	5
RESULT AND ANALYSIS (5)	5
VIVA VOCE (5)	4
RECORD (5)	
TOTAL (20)	14
SIGN WITH DATE	

6/10/25

Result:

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