Task 8 : Normalizing Database Using Functional Dependence upto BCNF.

Aim : To normalize database using functional dependence upto BCNF

Hospital database:

1. Identify hospital attribute :

   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 dependence (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. Generate separate 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 attribute, to separate tables it key depends only part of the primary key .

- Create Doctor Table : Doctor (Doctor - ID) , Data - 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 dependence.

2. Move non-key attribute to separate table if they depend on another non-key attribute,

   - Create Room table: Room (Room-No, Department).

   - Update Doctor table: Doctor (Doctor-ID, Doctor-Name).

step 5: Convert to BCNF

1. Ensure every department is a candidate key.

2. check for overlapping candidate key.

3. Decompose relation to eliminate redundancy no further decomposition needed.

Using criteria tool:

1. Input relation schema and functional dependencies.

2. Griffith tool generator as dependency graph.

3. Analyze the graph to identify normalization issues.

4. Apply normalization rule to transform the schema.

5. Verify the resulting scheme a meets BCNF criteria

Griffith tool steps:

1. Create a new project in criffth.

2. Define the relational schema and fun.

3. Run the "dependency graph" tool.

4. Analyze transformation using the "Normalix" tool.

5. Apply transformation using the Normatrix "BCNF check" 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 normalized database using functional dependence upto BCNF executed successfully.