

6/10/25

## Task:8 Normalizing database using functional dependence upto BCNF

Aim: To Normalize database using functional dependent 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  $\rightarrow$  Patient-Name, Doctor-ID, Room-NO,  
Treatment, Bill-Amount

Doctor-ID  $\rightarrow$  Doctor-Name, Department

Room-NO  $\rightarrow$  Department.

Step 2: Convert to 1NF

1. Eliminate repeating groups or array

2. Create 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 if key 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 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 rules to transform the schema.
5. Verify the resulting schema a. meets BCNF criteria.

Griffith tool steps:

1. Create a new project in Griffith.
2. Define the relational schema and fns.
3. Run the "Dependency Graph" tool.
4. Analyze the graph for normalization issues.
5. Apply transformation using the "Normalix" 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	
EX No	8
PERFORMANCE (10)	✓
RESULT AND ANALYSIS (10)	5
VIVA VOCE (5)	5
RECORD (5)	
TOTAL (20)	15
SIGN WITH DATE	6/10/25

Results Thus the Normalized database.  
using functional dependences upto.  
BCNF executed successfully.