

Date: - 30/9/25

Task - 8: Normalizing Databases using Functional dependencies upto BCNF

Step - 1 :- Define the initial relational schema and functional dependencies.

StudentSlot (Student-ID, Student-Name, Email, Dept-ID, Dept-Name, Course-ID, Course-Name, Credits, Slot-ID, Slot-Type, Date, Venue)

1. $\text{Student-ID} \rightarrow \text{Student-Name, Email, Dept-ID}$
2. $\text{Dept-ID} \rightarrow \text{Dept-Name}$
3. $\text{Course-ID} \rightarrow \text{Course-Name, Credits, Course-Type}$
4. $\text{Slot-ID} \rightarrow \text{Slot-Type, Date, Venue}$
5. ~~$\text{Course} \rightarrow \text{Student-ID}$~~ $\text{Student-ID, Slot-ID} \rightarrow \text{Course-ID}$

Step - 2 :- Convert the relation to 1NF

- * Identify and eliminate any repeating groups or arrays in the studentSlot relation
- * Create separate tables if repeating groups exist

Step 3:- Convert to 2NF

- * Ensure that each non-key attribute depends on the whole primary key.
- * Move non-key attributes to separate relations if they depend on only part of the primary key

Proposed Decomposition

1. Student (Student-ID, Student-Name, Email, Dept-ID)
2. Department (Dept-ID, Dept-Name)
3. Course (Course-ID, Course-Name, Credits)
4. Slot (Slot-ID, Slot-Type, Date, Venue)
5. Student-slot-Course (Student-ID, Slot-ID, course-ID).

Step-4 - convert to 3NF

- * Remove transitive dependencies where a non-key attribute depends on another non-key attribute.
→ There is no transitive dependencies.

Step-5: convert to BCNF

- * Ensure every determinant is a candidate key.
- * Check for overlapping candidate keys.
- * Decompose relations to eliminate redundancy.

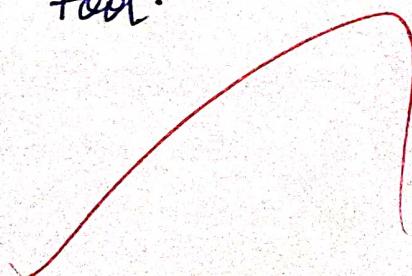
→ No decomposition needed.

Use Griffith Tool

1. Input relational 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.
2. Define the relational schema and FD's.
3. Run the "Dependency Graph" tool.
4. Analyze the graph for normalization issues.
5. Apply transformations using the "normalize" tool.
6. Verify BCNF compliance using the "BCNF check" tool.



Normalized Schema

1. Student (Student-ID, Student-Name, Email)
2. Department (Dept-ID, Dept-Name)
3. Course (Course-ID, Course-Name, Credits)
4. Slot (Slot-ID, slot-Type, Date, Venue)
5. Student-slot-course (Student-ID, slot-ID, course-ID).

Result: Thus performing normalizing database using functional dependencies has been executed & implemented successfully.

VELTECH	
DATA BASE	2
DATA STRUCTURE (5)	5
DIGITAL SIGNAL ANALYSIS (5)	5
ELECTRO VOICE (5)	4
RECORD (5)	16
TOTAL (20)	50
SIGN WITH DATE	12/10