Date → 30/9/25 Task-8 : Normalizing databases using functional dependencies upto BCNF

Step 1 :- Define the initial Relational Schema and functional Dependencies

- Player (Player_ID, Name, Team, Position, Coach_ID)

* Player_ID → Name, Team, Position, Coach_ID.
* Team → Coach_ID
* Coach_ID → Name

Step 2 :- Convert the Relation to 1NF

* Identify and eliminate any repeating groups or arrays in the player 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 depends on only part of the primary key.

→ Proposed decomposition:

* Team (Team_ID, Coach_ID, Team_Name)
* Player (Player_ID, Name, Team_ID, position)

Step 4 :- Convert to 3NF

* Remove transitive dependencies where a non-key attribute depends on another non-key attribute.
* Create a separate Coach table.

→ Proposed decomposition :-

* Coach (Coach_ID, Name)
* Update Team (Team_ID

Step 5 :- Convert to BCNF

* Ensure every determinant is a candidate key.
* Check for overlapping candidate keys.
* Decompose relations to eliminate redundancy.
  - No further decomposition needed.

Using Griffith Tool

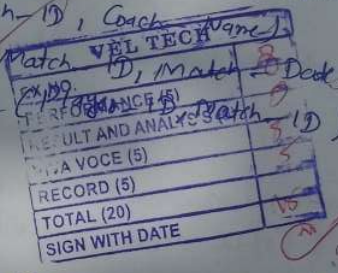
* Input relational schema and functional dependencies
* Griffith tool generates a dependency graph.
* Analyze the graph to identify normalization issues.
* Apply normalization rules to transform the schema.
* Verify the resulting schema meets BCNF criteria.

Griffith Tool steps

* Create a new project in Griffith.
* Define the relational schema and FDs
* Run the 'Dependency Graph' tool.
* Analyze the graph for normalization issues.
* Verify BCNF compliance using the "BCNF Check" tool.

Normalized Schema

* Player (Player_ID, Player_Name, Team_ID, Position)
* Team (Team_ID, Coach_ID, Team_Name)
* Coach (Coach_ID, Coach_Name)
* Match (Match_ID, Match_Date)
* Performance (Player_ID, Match_ID).



RESULT :- Thus, Normalization of database using functional dependencies upto BCNF on sports database management System is implemented successfully.