

To determine whether the given relation is in BCNF (Boyce-Codd Normal Form), we need to check if it satisfies the following condition:

For every non-trivial functional dependency ($X \rightarrow Y$) in the relation, X must be a superkey.

Functional dependencies:

emp_name, team_name \rightarrow leader_name

leader_name \rightarrow team_name

The candidate key for this relation is (emp_name, team_name), which consists of both attributes. Now let's check if each functional dependency satisfies the BCNF condition:

emp_name, team_name \rightarrow leader_name:

Both emp_name and team_name are part of the candidate key.

Therefore, this functional dependency satisfies the BCNF condition.

leader_name \rightarrow team_name:

leader_name is not a superkey since it is not part of the candidate key.

Hence, this functional dependency violates the BCNF condition.

Since the relation has a functional dependency (leader_name \rightarrow team_name) that violates BCNF, we need to decompose the relation into smaller tables to achieve BCNF.

emp_name	team_name
John	Amex
Michal	Fox
Trawinski	Leopards
Smith	Leopards

leader_name	team_name
John	Amex
Patrick	Fox
Klaudia	Amex
Klaudia	Leopards
Christian	Leopards

In the new decomposition, each table satisfies the BCNF condition:

Team_Employees:

The primary key is (emp_name, team_name).

There are no non-trivial functional dependencies, so it also satisfies BCNF.

Team_Leaders:

The primary key is leader_name.

There are no non-trivial functional dependencies, so it automatically satisfies BCNF.