

6/10/21

Topic:

NORMALIZING DATABASES

USING FUNCTIONAL DEPENDENCIES

UP TO BCNF:

Aim: To normalize the Employee database up to BCNF we decompose the schema using functional dependencies to estimate Redundancy.

Initial Relation Schema:

Employee (Employee-ID, Name, Department, Job-Title, manager-ID, Hire-Date, Salary.)

Functional Dependencies:

* Employee-ID \rightarrow Name, Department, Job-Title, manager-ID, Hire-Date, Salary.

* Department \rightarrow manager-ID

* manager-ID \rightarrow Name

Step by step Normalization

1NF (First Normal Form)

- No repeating groups or arrays in schema.

- Already in 1NF

2NF (Second Normal Form)

- Remove partial dependencies.

✓ However, FD2 & FD3 suggest dependencies not on primary key.

Decompositions

- Employee (Employee-ID, Name, department-ID, Job-Title, Hire-Date, Salary)
- department (department-ID, manager-ID, Name)

3NF (3rd Normal form)

- Eliminate transitive dependencies o manager-ID Name.
(transitive via)
o Department \rightarrow manager-ID

Updated Tables:

Employee (Employee-ID, Name, department-ID, Job-Title, Hire-Date, Salary).

Department (department-ID, manager-ID)

manager (manager-ID, Name)

BCNF:

- Every determinant must be a candidate key
- All remaining FDs have determinants that are candidate keys.

* Employee-ID.

* Department-ID

* manager-ID

No decomposition is needed.

Final BNF

employee (employee - 10, name, department - 10,
job - title, hire date, salary).

department (department - 10, manager - 10);

manager (manager - 10, name)

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Result: Thus, the database was normalized to BNF by decomposing it into employee, department & manager tables based on functional dependencies.

Question: Quantify the value.
Show measurable benefits.
A value proposition
Identify the