Show that if a relation has no attribute that is functionally determined by all the other attributes, then the relation has no nontrivial FD’s at all.

Step 1:

A functional dependence is a restriction between two sets of attributes in a relation from a database, according to relational database theory. In other terms, a functional dependency is a restriction placed on a relationship between two qualities.

The dependent in a non-trivial functional dependency is categorically not a subset of the determinant. For example, if X Y and Y is not a subset of X, the relationship is said to be non-trivial functional.

Step 2:

There are no functional dependencies of the type B1B2...Bn1 C, where B1B2...Bn1 is n-1 of the attributes from A1A2...An and C is the final attribute from A1A2...An, if a connection with the attributes A1A2...An is given.

The set B1B2...Bn1 and any subset in this situation do not functionally determine C. Therefore, we can only establish functional relationships in which C is present on both the left and right sides. The relation has no nontrivial FDs because all of these functional dependencies would be trivial.

. Let X and Y be sets of attributes. Show that if X ⊆ Y , then X+ ⊆ Y +, where the closures are taken with respect to the same set of FD’s. ! Prove that (X+)+ = X+. !!

Answer with Explanation

Let's use the contrapositive to demonstrate this. We want to demonstrate that X must not be a subset of Y if X+ is not a subset of Y +. There must be qualities A1A2...An in X+ that are not in Y + if X+ is not a subset of Y +. We are done if any of these characteristics were initially present in X because Y does not have any of the A1A2...An. But if the closure included the A1A2...An, then we need to look into the case more thoroughly. Consider the case where C1C2...Cm A1A2...Aj, where A1A2...Aj is a subset of A1A2...An. Then, X must contain C1C2...Cm or a subset of C1C2...Cm. Because we thought that attributes A1A2...An are exclusively in X+ and not in Y +, the attributes C1C2...Cm cannot be in Y. X is not a subset of Y, therefore. We have demonstrated the contrapositive and shown that if X Y, then X+ Y +.