CSCI3170 Short Assignment/Classwork #3 (Solution)

Name: Pass / Fail

Student ID:

Consider the following relation schema and functional dependency:

R(A,B,C)

F = {A 🡪 C, C🡪 A}

1. Find A+, B+, C+, AB+ and BC+

Ans:

A+=AC

B+=B

C+=AC

AB+=ABC

BC+=ABC

1. List all the candidate keys of the relation.

Ans:

AB and BC

1. Is the relation in BCNF? Briefly explain your answer.

Ans:

No.

The dependency A🡪C violates the BCNF requirement, as

* it is not a trivial relation, and
* A is not a superkey

(Note: To prove a relation not belonging to BCNF (or 3NF), you only need to point out one functional dependency that violates the requirement. You may also point out that C🡪A violates the BCNF requirement)

1. Is the relation in 3NF? Briefly explain your answer

Ans:

Yes.

The dependency A🡪C does not violate the 3NF requirement, as C is part of the candidate key BC.

Similarly, the dependency C🡪A does not violate the 3NF requirement, as A is also part of the candidate key AB.

(Note: To prove a relation belonging to 3NF (or BCNF), you need to show that every functional dependency satisfies the requirement.)