Quiz09 Solutions

# FD Properties

1. Select all the FD's that follow from Armstrong's Axioms \*

if X → Y and Z → W, then XZ → YW

if X → Y and WY → Z, then WX → Z

if XZ→Y, then X→Y (Incorrect)

if X→YZ, then X→Y

if X→Y and X→Z, then X→YZ

# FD Example

We have a relation R(A, B, C, D, E). We are told that the set of functional dependencies is

F = {E→BD, A→BC, C→DE, D→C}.

Find the attribute closures for each of the attributes. If the attribute closure for X was WXZ, you would fill in "WXZ" without quotes in the answer box.

2. A+: ABCDE

3. B+: B

4. C+: CDE

5. D+: CD

6. E+: BCDE

7. Select the attribute set(s) that are keys for relation R \*

* E (Incorrect)
* A
* AD
* BCE (Incorrect)
* ABCDE

8. The attribute closure of (BC)+ is equivalent to the attribute closure of (BD)+. \*

**False.**

9. Is relation R already in Boyce-Codd Normal Form (BCNF)? \*

**No. – There are some trivial FDs.**

# Normalization

Assume the decomposition is performed using the algorithm described in lecture.

10. Putting a relation in Boyce-Codd Normal Form (BCNF) will always guarantee a lossless decomposition.   
**False**

11. Putting a relation in Boyce-Codd Normal Form will always guarantee a dependency preserving decomposition.

**False**

12. Determine whether the decomposition is lossless or not.

If relation R(A, B, C, D, E) is decomposed into R(A, C, D) and R(A, B, C, E) with the set of functional dependencies F = {BC → A, C → D}. Note: the decomposition might not follow the BCNF algorithm discussed in class.

**No.**

We see that R1 R2 is AC. Since, since the FD AC ACD is not a key of either resulting relation, then the decomposition is not lossless.