CS150A Quiz09

FD Properties

I'd like some properties for my functional dependencies please.

2. **1) Select all the FD's that follow from Armstrong's Axioms** *
   Hint: there's at least one
   Check all that apply.

   - [ ] if X → Y and Z → W, then XZ → YW
   - [ ] if X → Y and WY → Z, then WX → Z
   - [ ] if X → YZ, then X → Y and X → Z
   - [ ] if XZ → YZ, then X → Y
   - [ ] if X → Y and W → Y, then X → W

FD Example

We have a relation R(A, B, C, D, E). We are told that the set of functional dependencies is F = {E → BC, A → B, C → D, AD → 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.

We will be grading with a script so *please submit your answers in alphabetical order* and without any whitespace.

3. **2) A+:** *

4. **3) B+:** *

5. **4) C+:** *

6. **5) D+:** *

7. **6) E+:** *

8. **7) Select the attribute set(s) that are keys for relation R** *
   Hint: there's at least one
   Check all that apply.
   - [ ] E
   - [ ] ABC
   - [ ] BCD
   - [ ] ACE
   - [ ] ABCDE

9. **8) The attribute closure of (AD)+ is equivalent to the attribute closure of (AC)+.** *
   By equivalent we mean the intersection is equivalent to the union of both closure sets.
   Mark only one oval.
   - ◯ True
   - ◯ False

10. **9) Is relation R already in Boyce-Codd Normal Form (BCNF)?** *
    Mark only one oval.
    - ◯ Yes
    - ◯ No

Normalization

BCNF stands for Boyce-Codd Normal Form. For this question, assume the decomposition is performed using the algorithm described in lecture.

11. **10) Decomposing a relation in BCNF will always guarantee a dependency preserving decomposition.** *
    Mark only one oval.
    - ◯ True
    - ◯ False

12. **11) Decomposing a relation in BCNF will always guarantee a lossless decomposition.** *
Mark only one oval.

- True
- False

13. **12) 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}. Is this decomposition lossless?**
Note: the decomposition might not follow the BCNF algorithm discussed in class.
Mark only one oval.

- Yes
- No