University of Toronto
CSC343, Fall 2017

Lecture Prep for Week 9

1. Suppose we have a relation on attributes A, B, C, D, E, and F, and these functional dependencies hold: $S = \{\ B \to DE, \quad BF \to C, \quad CF \to B, \quad DF \to AE\ \}$.

   (a) Compute B^+.
   (b) Compute CF^+.
   (c) Compute DF^+.
   (d) Compute BC^+.
   (e) Compute ABC^+.

   Write your closures in alphabetical order. For example, rather than $BDFA$, write $ABDF$.

2. Again, suppose we have a relation on attributes A, B, C, D, E, and F, and these functional dependencies hold: $S = \{\ B \to DE, \quad BF \to C, \quad CF \to B, \quad DF \to AE\ \}$.

   (a) Does it follow from S that $B \to A$?
   (b) Does it follow from S that $CF \to E$?
   (c) Does it follow from S that $DF \to B$?
   (d) Does it follow from S that $BD \to C$?
   (e) Does it follow from S that $BFC \to A$?

   Write "yes" or "no" for each, and show your rough work.

3. Suppose we have a relation with attributes $ABCDE$ and these functional dependencies: $S = \{\ A \to D$, $B \to A$, $C \to A$, $D \to CE.\ \}$ Project the functional dependencies onto the attribute set ABD.

   Show all your steps, and clearly label your final anwer.

4. Consider relation $R(A, B, C, D, E, F)$ with functional dependencies:

   $$S = \{\ CD \to A, \quad B \to EF, \quad A \to BC, \quad F \to D\ \}$$

   Create an instance of R that satisfies its FDs and has redundant data. Identify redundancy by circling a single value in the table that could be erased and yet we would know what its value *must* be. Thought exercise: what does it have to do with the FDs?

Submit your work in a pdf file called "prep9.pdf" on MarkUs.