CS 4750: Database Systems (Fall 2020)

POTD 1: FD and F+

Due Thursday 10-September-2020, 11:00am *(Submit to Collab)*

Name(s) and ComputingID(s): *Geoff Hicks, gdh5j hm*

Purpose: Be familiar with functional dependencies and practice computing F+

You may make a copy of a worksheet and complete this activity, or type your answers in any text editor.

You may work alone or with another student in this course.

1. Consider the following relation and functional dependencies, compute the closure of F (F+)
   ```
   R(A, B, C, D, E)
   FDs = { A -> B, AB -> D, B -> BDE, C -> D, D -> D }
   ```
   Compute F+ (show your steps)

$A \to B$ | $A \to AB$ | $A \to ABDE$
$AB \to D$ | $AB \to ABD$ | $AB \to ABDE$
$B \to BDE$ | $B \to BDE$ | $B \to BDE$
$C \to D$ | $C \to CD$ | $C \to CD$
$D \to D$ | $D \to D$ | $D \to D$

F+ = { $A \to ABDE$, $AB \to ABDE$, $B \to BDE$, $C \to CD$, $D \to D$ }

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2. Consider the following relation and functional dependencies, compute the closure of F (F+)
   ```
   R(A, B, C, D, E)
   FDs = { A -> C, C -> DE, D -> B, A -> D }
   ```
   Compute F+

$A \to C$ | $A \to AC$ | $A \to ACDE$
$C \to DE$ | $C \to CDE$ | $C \to CDE$
$D \to B$ | $D \to DE$ | $D \to DE$
$A \to D$ | $A \to AD$ | $A \to AD$

F+ = { $A \to ACDE$, $C \to CDE$, $D \to DE$, $A \to AD$ }

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3. Consider the following relation and functional dependencies, compute the closure of F (F+)
   ```
   R(A, B, C, D, E)
   FDs = { B -> DE, C -> A, A -> BC, D -> E }
   ```
   Compute F+

$$B \rightarrow DE \quad \Big| \quad B \rightarrow BDE \quad \Big| \quad B \rightarrow BDE$$
$$C \rightarrow A \quad \Big| \quad C \rightarrow AC \quad \Big| \quad C \rightarrow ABCDE$$
$$A \rightarrow BC \quad \Big| \quad A \rightarrow ABC \quad \Big| \quad A \rightarrow ABCDE$$
$$D \rightarrow E \quad \Big| \quad D \rightarrow DE \quad \Big| \quad D \rightarrow DE$$

$$F+ = \{ B \rightarrow BDE, C \rightarrow ABCDE, A \rightarrow ABCDE, D \rightarrow DE \quad \}$$

Grading rubric

[Total: 10 points]: Done (or provide evidence of your attempt, full or reasonable effort)
   - (5 points) — Providing evidence of your attempt, minimal effort

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Submission

   - [optional] Take a selfie (or picture) of your team and submit it with your POTD
   - Submit your POTD to Collab (under Assignments/POTD1). If you have multiple files, no need to zip them.
   - Each team submit only **one** copy
   - When submitting your POTD to Collab, make a note in a submission textarea (or text box), ***clearly specifying all team members' computingIDs and names.*** This will help us record your team's grades efficiently.