Tutorial: Normalisation

1. Consider $R = \{A, B, C, D, E\}$ with $\Sigma = \{\{A\} \to \{A, B, C\}, \{A, B\} \to \{A\}, \{B, C\} \to \{A, D\}, \{B\} \to \{A, B\}, \{C\} \to \{D\}\}$
   (a) Decompose R with Σ into a BCNF decomposition using the decomposition algorithm from the lecture.
   (b) Is the results lossless?
   (c) Is the results dependency preserving?
   (d) Is the results in BCNF?
   (e) Synthesise R with Σ into a 3NF decomposition using the synthesis algorithm from the lecture.
   (f) Is the results lossless?
   (g) Is the results dependency preserving?
   (h) Is the results in BCNF?
2. Create Your Own Example
   (a) Invent a random R and Σ.
   (b) Decompose R with Σ into 2NF?
   (c) Decompose R with Σ into 3NF?
   (d) Decompose R with Σ into BCNF?
   (e) Synthesise R with Σ into 3NF?

References

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[3] R. Ramakrishnan and J. Gehrke. *Database Management Systems*. McGraw-Hill, 2002.