Unit 8: Normalization, and a lack Thereof

**Corey Crooks**

**Purdue University Global**

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**Ted Witt**

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1. **Explain the importance of normalization: provide a summary of the steps necessary for each 1NF, 2NF, 3NF and importance. A minimum of 120 words is expected.**

When working with large quantities of data, optimizations are paramount. Such optimizations can end up saving a company hundreds if not thousands of dollars on storage and computing costs by eliminating excess data (DePaul University, n.d.). More importantly, however, eliminating data redundancies could decrease the likelihood of logical errors, and database anomalies. This is why data normalization is a paramount practice to today’s database landscape. To normalize datasets, there are countless steps; however, only three Normal Forms are commonly required. To normalize data for the First Normal Form, ensure each attribute stores only one value (atomic values). The Second Normal Form details ensuring that each table has a unique primary key, as well as removing unnecessary dependances related to those keys. The third normal form additionally eliminates unnecessary dependencies by targeting transitive dependencies.

1. **Explain denormalization and explain the main reasons for it. A minimum of 60 words is expected.**

Denormalization works backwards through the above process to re-introduce redundancy. This practice aims to increase user-level performance at the cost of storage on the service’s servers (Monge, n.d.). In the high-performance era of today, utilizing certain optimizations is crucial. Even more crucial is the ability to choose how certain optimizations will effect certain use-cases. Understanding this relationship will give developers the insight needed to make changes to their databases such as denormalization to be able to tune algorithms for optimal performance, and better stability.

# **References**

DePaul University. (n.d.). *Relational Database Normalization Process*. Retrieved from DePaul Cybersecurity: Normalization: https://condor.depaul.edu/gandrus/240IT/accesspages/normalization3.htm

Monge, A. (n.d.). *Appendix: Traditional Normalization*. Retrieved from California State University Long Beach: https://web.csulb.edu/colleges/coe/cecs/dbdesign/dbdesign.php?page=normalize.php