Justin Tran

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INFO 330 Databases and Data Modeling

Assignment 01

Database Design

Introduction

This document goes over introductory concepts of databases and database design. This is simply a brief overview. Topics discussed include what a database is, comparisons between different types of databases, and some key concepts/processes that should always be considered when designing a database. Much of the information in the answers comes from Professor Root and his videos provided.

Short responses to questions

1. A database is a way to store, organize, and retrieve data. They can be physical (paper databases) or digital (database systems). Almost everyone uses databases in some form to store data and use that data in their lives. For me, a database that I use daily is Canvas. It stores my classes, grades, assignments, and files I upload. I can access this database to see relevant data (my grades, upcoming assignments, messages, etc.) and upload more files to the database.
2. A relational database is more useful in today’s digital world. Relational databases are more equipped to handle large amounts of data. They are also better when someone wants to look inside the database and uses queries to find data. Paper databases can also contain a large amount of data, but it is less intuitive compared to relational databases. Relational databases are also more secure, they can be password protected and have infinite backups and previous copies as fail safes. Paper systems often lack security and can have no backups, leading to a potential loss of data.
3. Normalization reduces the redundancy of the data in the database and improves the integrity of data (less errors, more organized data). Following normalization rules makes the process of designing databases simpler and the final database cleaner and easier to understand. Normalization is a standard process that should be used when designing databases, so following the process will make it easier for others to work with.
4. “The Key, The Whole Key, and Nothing but They Key” is a way of describing the first, second, and third normal forms, in that every table needs a primary key, to be dependent on that whole key, and depend on nothing but the primary key.
5. Associative entities are a term that refers to bridge tables that connect tables that can have many to many relationships. An example of this is a student and teacher relationship. A student can have many different teachers for different classes, while a teacher might be teaching different classes with many different students. An associative entity might take the students by ID (studentID) and group them into classes (classID) and put them under a teacher (teacherID).

Summary

As can be seen, a database is useful in many different ways. It can also become complicated and confusing, so understanding the fundamentals of databases and database design is important in succeeding when it comes to interacting with databases. The topics above are merely surface level concepts in the field, but they are important to understand.