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Assignment 02- Common Database Options

Introduction

Converting an analog database into an electronic database is a good first step in modern data management although it is also imperative that the database be properly designed to ensure up-to-date, accurate information access. Numerous tools are used and steps taken when deciding what data is included, how it is organized, and what relationships should be portrayed in each database. A few examples of options used to plan and organize databases include constraints, abstraction layers, ERD, and Meta-Data worksheets.

Constraints and Design

A good, simple database design should follow several principles. First, data should not be redundant, or redundancy should be limited as much as possible. Data within the database should also be correct, complete, and consistent. To reduce redundancy, information should be organized and divided into subject-based tables using the rules of data normalization.

A number of different constraints can also be used to enforce the integrity of data within the database. Tables can be altered during or after creation to define rules for the values permitted in each column. SQL supports the following classes of constraints; primary key, foreign key, unique, check, and nullability.

When used properly, constraints ensure data will remain consistent, usable, and trustworthy. Each column within a table should display a different field and a primary key (column or set of columns) should always be used to create unique identification for each row. Once data is organized and arranged into tables, meaningful relationships between different tables within the database can be defined and clarified using foreign keys.

Abstraction Layers, ERD, and Meta-Data

In order to simplify and increase ease of use for individuals not necessarily familiar or comfortable with database management, many software models use abstraction levels. The creation of these levels/layers can bridge the gap between the logical level and a higher, more removed, business-oriented level. These layers serve to hide unnecessary complexity and simplify information access.

Entity relationship diagrams (ERD) are another tool used to increase accessibility and ease of design for organizing databases. They provide a visual "starting point" to help map the data/information stored in a database and display the relationships between tables through lines connecting foreign and primary keys.

One additional tool used to increase efficiency and ease of use when working with databases are meta-data worksheets. These spreadsheets offer context to the data stored within the database and can help to describe and explain the way the data is being stored and

organized. An example may include a meta-data spreadsheet that lists the constraints used for each column within a table (or several tables) within a database.

Summary

With modern information being stored in more abstract, digital forms, tools developed for the purpose of ensuring information integrity and consistency have become integral. Ways to increase ease of data access and use are also essential when working with databases. Database organization, constraints, abstraction, and meta-data are all tools used to help gain a deeper understanding of data and its management. Use of these tools, among many others, can only help to optimize the processes in which databases are used to make informed decisions about the world around us.