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Info330

Assignment 06

Relational Database Design

# Introduction

In this paper, I will be going over the process of designing relational database and creating databases with the instructional help of Randal Root, our professor. And I will focus on the steps of thinking and creating a relational database. I will answer this question with my observation and experience with dealing databases. I hope this will help future programmer who are interested in relational database design.

# Design process

Nowadays, relational database is mainly used as storing data information which is pretty useful for sorting, filtering, summarizing, formatting and visualizing information. To design a relational database, based on the data given, we have to do a basic analysis to find what we want, transform it into something that makes sense and present it as output. After that, an entity relational diagrams should be created to connect each related table, based the connection we analyzed. The relations between each table such as one to one and one to many are essential factors during the process of database design. Figure 1.

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Figure 1: ERD

## Constraint

After creating an ERD diagram, what we need to do is to create a metadata sheet which contains all of the tables with constraints description of columns. For example, each table should have one primary key and if we want to reference that table, a foreign key is required. Although there is no strict requirement for number of constraints in each table, each attribute of columns should be taken into consideration. The constraints as the rules set for every table are used to check the data type input. For example, the unique constraint is to ensure no duplicate values in the table. Figure 2.

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Figure 2: Check Constraints

## Creating databases

After the design process of relational database, we need to implement each table in sql server. The first step will be creating the database and make sure you are in the correct branch. Then, the tables should be created according to the ERD. Make sure every table should contain one primary key. Figure 3.

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Figure 3: Creating table

Then the constraints will be added on to alter the table. The constraints are including with:

* Not Null - make sure the column cannot have a null value
* Unique - Ensures that no duplicates value in the column
* Primary Key - A combination of a NOT NULL and UNIQUE. Uniquely identifies each row in a table
* Foreign Key- Uniquely identifies a row in another table
* Check - Ensures that all values in a column satisfies a specific condition
* Default - Sets a default value for a column when no value is specified
* Index- Used to create and retrieve data from the database very quickly

## Creating basic views

The next step is to create views to hide out implement details from our clients. The basic view is substantial to our database creating because our tables manage the most significant data and using basic views are the best way to protect our data. The basic views could be SELECT, UPDATE, INSERT, DELETE by public. Figure 4.

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Figure 4: Views

# Stored Procedures

Once we created the database, we can use stored procedure to easily insert, select, update, delete data which is pretty handy to use. In the database design, stored procedures are pre-compiled and once compiled, they could be reused many times. Stored procedures can print or select data while views and functions can only use select. Passing the parameters into stored procedure and it will return the values based on the parameters. Figure 5.

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Figure 5: Stored Procedures with Transactions

# Permission

Last, we can set permission to ensure who can visit these data and prohibit people to change our tables data. With deny and grant permission, the authorization of database could ensure the safety. Figure 6.

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Figure 6: Permissions

# Summary

Database design involves with ERD design and metadata for better visualization and consistency. The constraints of each tables should be focused on columns limits and requirement. After designing, we need to set up the database and filled with tables. We can use stored procedures to easily insert, update, select, delete data. At last, we can use permission for better authorization and protecting our data.