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Applied Database II

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Assignment 15B

COP4709 Database Items Learned

Table of Contents

I. Introduction

SQL is a language that I had minimal experience with prior to taking Applied Database II. My first experience with SQL was using MySQL last year for a Java assignment. In that assignment, I created a simple database and used Java to connect to that database and manipulate its tables. I did not use SQL again until I enrolled in Applied Database I last fall, where I spent the first half of the course learning about the relational model and the second half of the course creating a database in Oracle SQL. Though I had trivial experience with MySQL and Oracle SQL prior to attending this course, I had never used Microsoft SQL Server until starting Applied Database II. I currently have some experience with three database management systems: MySQL, Oracle SQL, and SQL Server, but most of my overall experience with databases has been in SQL Server over the course of this semester.

II. Objectives

The major reasons I had for taking this course were to develop an understanding of SQL beyond the most basic queries and tasks, to learn how to apply the knowledge I have previously gathered in a way that may be beneficial to me in future professional endeavors, to learn how to approach SQL as a programmer, to develop and hone the thought process required for working with more advanced databases, to gain some experience in database management and dynamic SQL, and to fulfill the requirements of my program of study. Most of all, I wanted to gain a better understanding of how SQL is applied in the real world.

III. Learning

The assignment-based approach in this class allowed for a very hands-on learning experience, with new concepts, features, and techniques introduced in each assignment. Being new to SQL Server, I was quickly able to learn how to use SQL Server Management Studio and begin working on the assignments. From there, I took my established knowledge of basic SQL fundamentals and built upon it through the practice of data analysis and manipulation. I learned new ways of thinking about SQL and the programming practices involved in furthering my understanding beyond simple syntax and structure. I learned about multiple programmable elements, including how to write and incorporate stored procedures for the encapsulation of database tasks and queries. I also learned how to draft and utilize stored functions, including both table valued functions and Scalar functions.

I delved into creating and managing transactions and learned how to do so in accordance with the ACID ruleset. I continued to develop a knowledgebase regarding programmability as I learned how to properly implement cursors into a stored procedure to retrieve individual rows. Another simple yet powerful tool I learned how to use is the pivot table, which I used by creating a standard pivot table as well as a dynamic pivot table. I also developed a greater understanding of how to search through a database, by learning about indexing and creating a full text index. Perhaps the most important skill I was able to hone is reporting. Even with all other tasks completed, being able to compile all my findings into a report was an integral part of realizing success in COP4709. Additionally, I learned how to analyze and optimize queries for maximum efficiency, and I learned about the uses of SQL in cybersecurity, such as SQL Injection Attacks and how to harden an SQL server. The last major item I learned about was MongoDB and the NoSQL structure, which is an alternative to using the traditional relational model.

IV. Challenges

I faced multiple challenging assignments in COP4709. Some were more time-consuming than others in terms of the effort involved, while others required more critical thinking and problem-solving abilities. The most difficult assignments were Assignment 3, due to my inexperience and lack of understanding when attempting to start the assignment, Assignment 6, due to the difficulty I experienced in getting all the stored procedures and cursors to work together when using a traditional approach, and Assignment 9, due to the difficulties I was experiencing with formatting pivot table results.

V. Conclusion

In conclusion, Applied Database II was a deeply engaging and highly involved learning experience in which I was able to take the basics I learned in Applied Database I and not only improve upon them, but also learn a multitude of new concepts that combined the structured knowledge of relational database design with the critical thinking and problem-solving practices of programming. It was a challenging, pleasant, and enjoyable experience that provided me with the tools and information required to further my skillset and support my academic and professional growth.