Course Introduction

Most people if asked would say that a database is something that stores data. Although that is certainly true, a database is much more than just a storage device. Storing data without an effective means of maintaining it and retrieving it isn't of much use. In order to maintain and retrieve this data, the software used is referred to as the DBMS (Database Management System). One of the more popular and robust DBMS is Oracle, which you will become very familiar with in this course. Although the purpose of this course is concentrated more on learning SQL (Structured Query Language) from a computer programmer's perspective, you will also learn some of the things that a database administrator would do, such as design considerations, creating and dropping tables, and building constraints.

Terminology

In a relational database, data is stored in tables instead of files. The table represents a particular entity, or category of information, such as students or courses or instructors. The columns in a table represent attributes or characteristics about the entity, while the rows signify an occurrence of the entity. The smallest unit of data is a character. A column is also referred to as a field, and a row is also referred to as a record.

DBMS

A good DBMS should accomplish several things, aside from data storage: security, backup and recovery, SQL support, and data integrity are some of the main ones. To better understand how data is stored in the database, an ERD (Entity Relationship Diagram) is often used. This "picture" of the database shows the entities and how they are related. Relationships may be one-to-one, one-to-many, or many-tomany. These relationships affect the overall design of the database and how the tables are eventually constructed.

Design

An important part of database design is the Normalization process. Normalization is a 3-step approach to making sure the tables are free of potential anomalies, which are design flaws that may affect the updating and retrieving of data. Each step of the approach, also referred to as first normal form, second normal form, and third normal form (1NF, 2NF, 3NF) represents an improvement over the other. After 3NF is complete, the database should be a workable model that will stand the test of time. Primary keys and foreign keys are crucial to this discussion also.

SQL

SQL (Structured Query Language) is the industry standard for interacting with the database, mainly by querying data (SELECT), updating data (INSERT, UPDATE, DELETE), or modifying structure (CREATE, ALTER, DROP). As an application programmer, it can be of great benefit for your career to master SQL. Just about any company of any size has its data stored in a database of some kind, so mastering SQL is

crucial. For the most part, SQL in any DBMS (Oracle, MySQL, SQL Server, etc.) is the same, with some minor differences based on the platform.
