

## Introduction

### Chapter 1

#### The Database

SQL is used to manipulate and retrieve data from relational-database structures. In order to properly plan for your e-commerce business enterprise, it is important for you to gain at least a basic understanding of database concepts. Familiarizing yourself with the database structure and concepts will give you a better understanding of SQL and will allow you to grasp the concepts of what it can do to streamline your business operations sooner.

At some point in your life, you have come in contact with databases. You use them every day. Whether you use the Internet, an ATM machine, or simply a computer-based card-catalog system at a library, you've at least had minimal exposure to a database.

It's important that you learn and understand the following terms:

client: A single-user computer that interfaces with the multiple-user server.

client-server database system: A system that divides processing between client computers and a database server.

database: A collection of electronically stored organized files.

server: A multiple-user computer that provides shared database connection, interfacing, and processing services.

Today the traditional database is referred to as a client/server database system because the processing is divided between client computers and a database server. This division in processing makes it possible for many users to share the information that is stored in the database. The database-system software and interfaces are spread across a network of clients and servers that communicate and cooperate to carry out system objectives.

A database management system (DBMS) is specialized computer software that is used to create, modify, and update the database; retrieve data; and generate reports. The core of any database system lies in the DBMS. Some examples include Microsoft Access, DB2, Sybase, and Microsoft Server .

#### Database Design

Data Retrieval: One of SQL's main functions is to retrieve data from the database. Because data retrieval is so vital, it is important to note that creation and population of the database contribute greatly to the success of employing SQL. Consequently, the database must be designed with the user in mind.

Database Organization: To ensure that your database is effective, you must organize it properly. When you need to retrieve information from the database, you want it to be easily available. If you don't organize it efficiently, you won't be able to retrieve your data quickly. Remember that you want your database to be useful; otherwise, it serves no purpose.

A database must also contain accurate and reliable information. Therefore, the data must have integrity. To ensure that your data is accurate and reliable, it is necessary for the information to be updated frequently.

## Chapter 2

### Relational Databases

The most widely used type of database is the relational database. Its structure consists of two or more two-dimensional tables that are related to one another. The data within the tables is stored as a value in a tabular form, and all values in the relational database are accessible through a combination of table names, primary key values, and column names.

It's important that you learn and understand the following terms:

field: Column that runs vertically within a table.

foreign key: Link records of one type with those of another type.

keys: Uniquely identify a row or record in a table.

normalization: A three-step technique used to organize data attributes in a more efficient, reliable, flexible, and maintainable structure.

primary key: A field whose value uniquely identifies every row in a table.

row: A record that represents a collection of information relating to an item in a table.

table: Structured file containing rows and columns.

### The Structure of a Table

A table is a structured file that contains rows and columns. A column is a field that represents a category of information within a table such as an address. A row is a record that represents a collection of information relating to an item in a table such as a customer's name, address, phone number, and social security number.

Individual records within the table are represented by the rows. The total number of rows in the table is equal to the total number of records in the table. Every time you add a new row, you are adding a new record to your database.

Relational databases contain many tables. For example, an airline-reservation system could have a table for customers, airlines, departure times, arrival times, and so on. In order for the database to be relational, these tables must be linked together.

### Keys

To relate two tables to one another (e.g., a table containing customer information, and a table containing order information), you have to use keys. Keys are used to uniquely identify a row or record in a table. They're similar to DNA. DNA uniquely identifies who we are, and no two people can have the same DNA. Without a unique identifier, the database cannot identify individual rows.

A primary key is a field whose value uniquely identifies every row in a table. For example, a column representing social security numbers would be unique because no two people could have the same social security number. The primary key is used to refer to a specific row. The absence of a primary key makes it difficult to update or delete specific rows.

Another type of key is the foreign key. Foreign keys are pointers to the records of a different file in database. They link records of one type with those of another type. The link requires that the foreign key in one table be linked to a corresponding primary key in another table. For example, to link a customer table to an order table, the customer table containing social security numbers as the primary key must also be a column within the order table. Yet when you place the social security column within the order table, it is considered a foreign key instead of a primary key.

## Chapter 3

### Structured Query Language

#### History

Structured Query Language (SQL) has been around for over twenty-five years. IBM developed it in 1970 from the concept of the relational-database structure. It was originally called SEQUEL (Structured English Query Language). The first commercial implementation of SQL was in 1979 by Relational Software, Inc., which today is known as the Oracle Corporation.

#### Current Implementations of SQL

SQL is now widely implemented and is accepted as the industry standard database language. Almost all major database management systems (DBMS) support SQL, and all programs written in SQL are portable among most DBMSs.

Some DBMSs use slightly different rules for writing SQL. Basically, however, code written in one DBMS can be moved into another, with a minimal amount of modification.

## SQL Defined

SQL is a nonprocedural language that is used to manipulate and retrieve data from relational DBMSs such as Microsoft Access, DB2, Sybase, and Microsoft Server 7. It is considered nonprocedural because of the way operations are carried out. Unlike procedural computer languages like C++ and Java, which are concerned with how to perform operations, SQL describes what needs to be processed. The focus is on what to retrieve, delete, or insert.

It's a high-level set-oriented language that accesses data stored in tables. Set-oriented refers to the way SQL processes data. To put it simply, SQL processes sets of data in groups rather than as individual units. You'll be able to process sets of data with a single line of code.

## Functions of SQL

There are a variety of functions that can be performed using SQL. You can modify a database's structure, change system security settings, add user permissions to databases, query a database for information, and update the contents of a database. As you can see, SQL is extremely powerful.