LAB 1: Introduction to SQL and RDBMS

Objectives

After completing this lesson, you should be able to do the following:

- ✓ List the benefits of SQL
- ✓ Communicating with a RDBMS Using SQL

Lesson Aim

In this lesson, you gain an understanding of the relational database management system (RDBMS) and the structured query language (SQL). You are also introduced to the following:
• SQL statements those are specific to the Oracle Server

Relational Model

The principles of the relational model were first outlined by Dr. E. F. Codd in June 1970 paper called "A Relational Model of Data for Large Shared Data Banks." In this paper, Dr. Codd proposed the relational model for database systems.
The more popular models used at that time were hierarchical and network, or even simple flat file data structures. Relational database management systems (RDBMS) soon became very popular, especially for their ease of use and flexibility in structure. In addition, a number of innovative vendors, such as Oracle, supplemented the RDBMS with a suite of powerful application development and user products, providing a total solution.

Components of the Relational Model

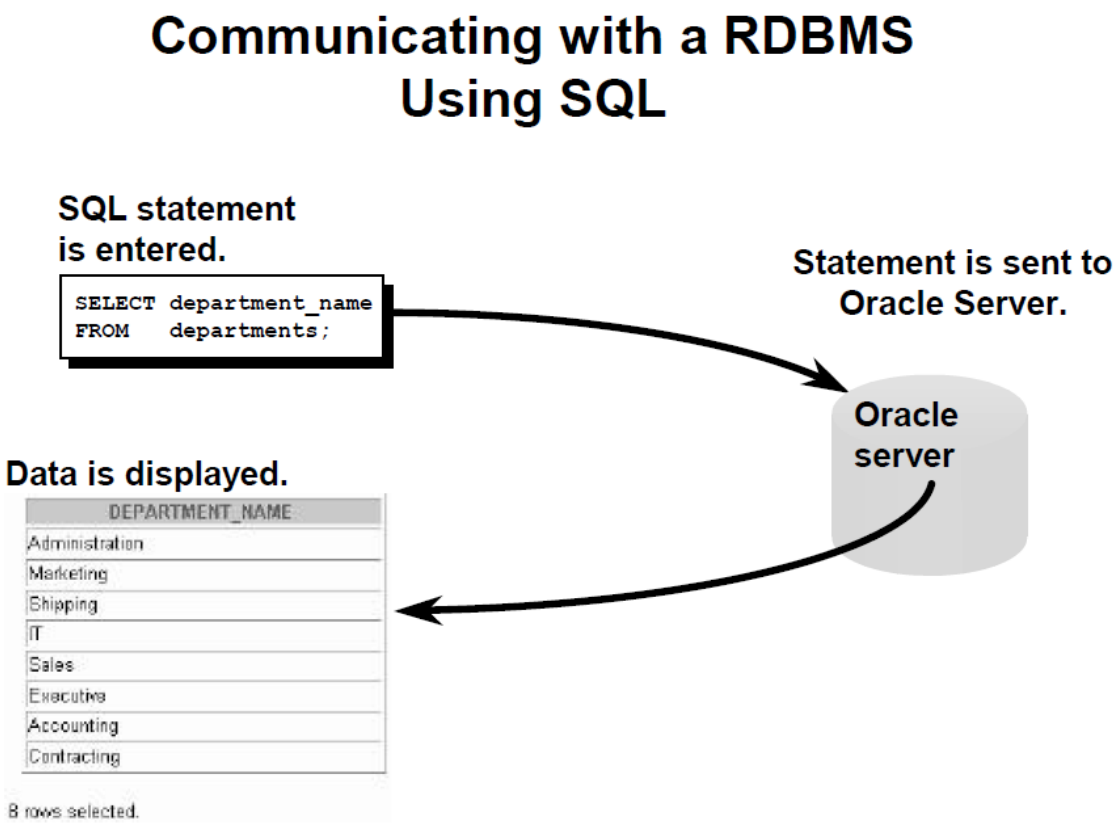
• Collections of objects or relations that store the data
• A set of operators that can act on the relations to produce other relations
• Data integrity for accuracy and consistency
For more information, see E. F. Codd*, The Relational Model for Database Management, Version 2*(Reading, Mass.: Addison-Wesley, 1990).

Definition of a Relational Database

A relational database uses relations or two-dimensional tables to store information. For example, you might want to store information about all the employees in your company. In a relational database, you create several tables to store different pieces of information about your employees, such as an employee table, a department table, and a salary table.

Properties of a Relational Database

In a relational database, you do not specify the access route to the tables, and you do not need to know how the data is arranged physically. To access the database, you execute a structured query language (SQL) statement, which is the American National Standards Institute (ANSI) standard language for operating relational databases. The language contains a large set of operators for partitioning and combining relations. The database can be modified by using SQL statements.



Structured Query Language (SQL)

Pronounced "S-Q-L" by some and "sequel" by others, SQL has become the de facto standard language for creating and querying relational databases. (Can the next standard be the sequel to SQL?) The primary purpose of this chapter is to introduce SQL, the most common language for relational systems. It has been accepted as a U.S. standard by the American National Standards Institute (ANSI) and is a Federal Information Processing Standard (FIPS). It is also an international standard recognized by the International Organization for Standardization (ISO). ANSI has accredited the International Committee for Information Technology Standards (INCITS) as a standards development organization; INCITS is working on the next version of the SQL standard to be released.

The ANSI SQL standards were first published in 1986 and updated in 1989, 1992 (SQL-92), 1999 (SQL:1999), 2003 (SQL:2003), 2006 (SQL:2006), 2008 (SQL:2008) and 2013 (SQL:2013)

The benefits of SQL:

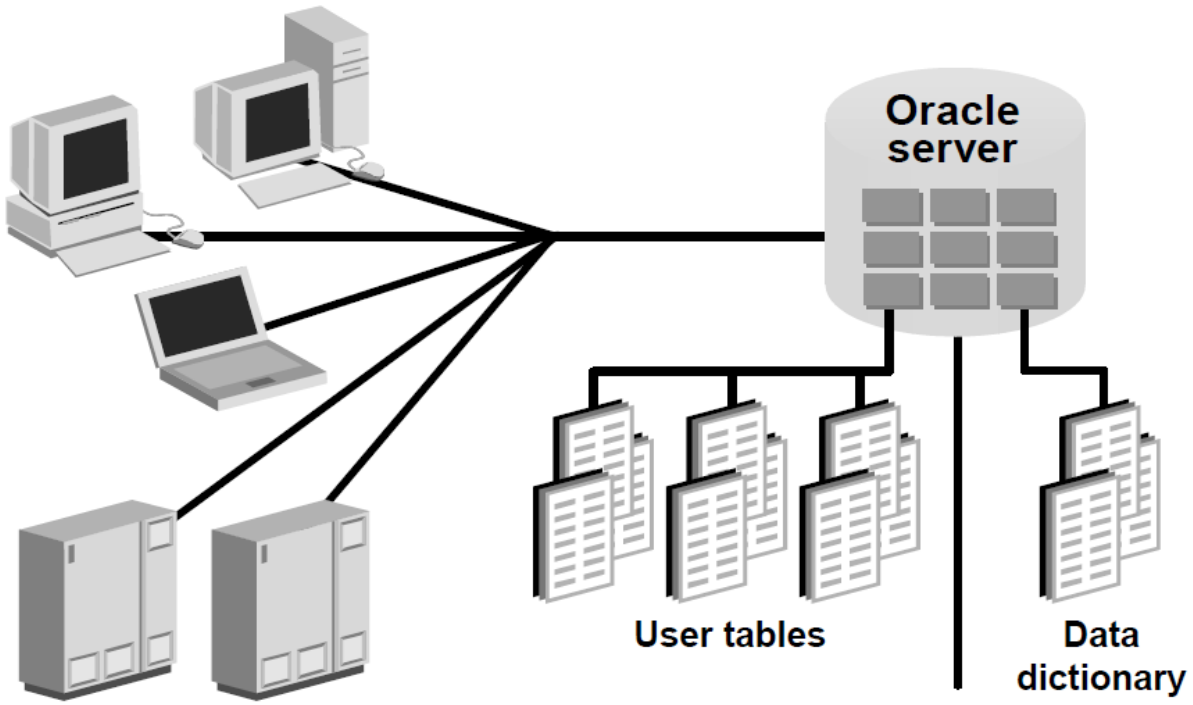
• ***Reduced training costs*** Training in an organization can concentrate on one language. A large labor pool of IS professionals trained in a common language reduces retraining for newly hired employees.

• ***Productivity*** IS professionals can learn SQL thoroughly and become proficient with it from continued use. An organization can afford to invest in tools to help IS professionals become

more productive. And because they are familiar with the language in which programs are written, programmers can more quickly maintain existing programs.
• ***Application portability*** Applications can be moved from machine to machine when each machine uses SQL. Further, it is economical for the computer software industry to develop off-the-shelf application software when there is a standard language.
• ***Application longevity*** A standard language tends to remain so for a long time; hence there will be little pressure to rewrite old applications. Rather, applications Implementation will simply be updated as the standard language is enhanced or new versions of DBMSs are introduced.
• ***Reduced dependence on a single vendor*** When a nonproprietary language is used, it is easier to use different vendors for the DBMS, training and educational services, application software, and consulting assistance; further, the market for such vendors will be more competitive, which may lower prices and improve service.
• ***Cross-system communication*** Different DBMSs and application programs can more easily communicate and cooperate in managing data and processing user programs.

Using SQL, you can communicate with the Oracle server. SQL has the following advantages:
• Efficient
• Easy to learn and use
• Functionally complete (With SQL, you can define, retrieve, and manipulate data in the tables.)

Relational Database Management System



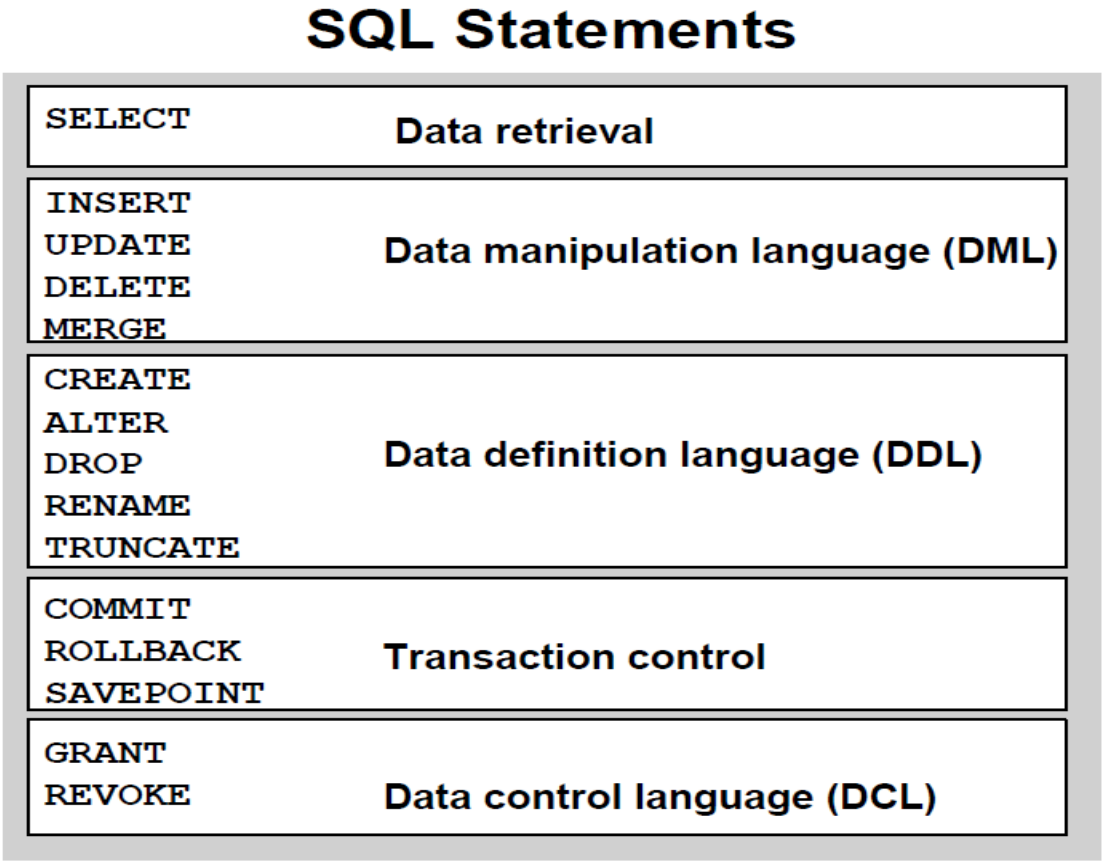
Oracle Database 11g Express Edition

Oracle Database 11*g* Express Edition (Oracle Database XE) is a free version of the world's most capable relational database. Oracle Database XE is easy to install, easy to manage, and easy to develop with. With Oracle Database XE, you use an intuitive, browser-based interface to administer the database, create tables, views, and other database objects, import, export, and view table data, run queries and SQL scripts, and generate reports.

For more information, see http://docs.oracle.com/cd/E17781_01/index.htm.

SQL Statements

Oracle SQL complies with industry-accepted standards. Oracle Corporation ensures future compliance with evolving standards by actively involving key personnel in SQL standards committees. Industry accepted committees are the American National Standards Institute (ANSI) and the International Standards Organization (ISO). Both ANSI and ISO have accepted SQL as the standard language for relational databases.



Tables Used in the Course

The following main tables are used in this course:

- EMPLOYEES table, which gives details of all the employees
- DEPARTMENTS table, which gives details of all the departments
- JOB_GRADES table, which gives details of salaries for various grades