

## Q3 What Are the Components of a Database Application System?

A database, all by itself, is not very useful. The tables in Figure 5-6 have all of the data the professor wants, but the format is unwieldy. The professor wants to see the data in a form like that in Figure 5-2 and also as a formatted report. Pure database data are correct, but in raw form they are not pertinent or useful.

Figure 5-8 shows the components of a **database application system**. Such applications make database data more accessible and useful. Users employ a database application that consists of forms (like that in Figure 5-2), formatted reports, queries, and application programs. Each of these, in turn, calls on the database management system (DBMS) to process the database tables. We will first describe DBMSs and then discuss database application components.

### What Is a Database Management System?

A **database management system (DBMS)** is a program used to create, process, and administer a database. As with operating systems, almost no organization develops its own DBMS. Instead, companies license DBMS products from vendors such as IBM, Microsoft, Oracle, and others. Popular DBMS products are **DB2** from IBM, **Access and SQL Server** from Microsoft, and **Oracle Database** from the Oracle Corporation. Another popular DBMS is **MySQL**, an open source DBMS product that is license-free for most applications.<sup>1</sup> Other DBMS products are available, but these five process the great bulk of databases today.

Note that a DBMS and a database are two different things. For some reason, the trade press and even some books confuse the two. A DBMS is a software program; a database is a collection of tables, relationships, and metadata. The two are very different concepts.

### Creating the Database and Its Structures

Database developers use the DBMS to create tables, relationships, and other structures in the database. The form in Figure 5-7 can be used to define a new table or to modify an existing one. To create a new table, the developer just fills the new table's metadata into the form.

To modify an existing table—say, to add a new column—the developer opens the metadata form for that table and adds a new row of metadata. For example, in Figure 5-9 the developer has added a new column called *Response?*. This new column has the data type *Yes/No*, which means that the column can contain only one value—*Yes* or *No*. The professor will use this column to indicate whether he has responded to the student's email. A column can be removed by deleting its row in this table, though doing so will lose any existing data.

### Processing the Database

The second function of the DBMS is to process the database. Such processing can be quite complex, but, fundamentally, the DBMS provides applications for four processing

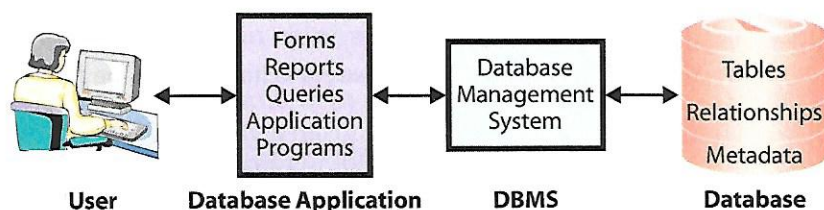


Figure 5-8  
Components of a Database Application System

<sup>1</sup>MySQL was supported by the MySQL company. In 2008, that company was acquired by Sun Microsystems, which was, in turn, acquired by Oracle later that year. Because MySQL is open source, Oracle does not own the source code, however.