Database Approach

From the time that businesses first adopted computer applications (mid-1950s) until the early 1970s, organizations managed their data in a fi le management environment. This environment evolved because organizations typically automated their functions one application at a time. Therefore, the various automated systems developed independently from one another, without any overall planning.

Each application required its own data, which were organized in a data fi le. A data fi le is a collection of logically related records. In a file management environment, each application has a specific data fi le related to it. This file contains all of the data records the application requires. Over time, organizations developed numerous applications, each with an associated, application-specific data fi le.

For example, you can relate to a situation where most of your information is stored in your university's central database, but a club to which you belong has its own fi les, the athletics department has separate fi les for student athletes, and your instructors maintain grade data on their personal computers. It is easy for your name to be misspelled in one of these databases or fi les but not in others. Similarly, if you move, then your address might be updated correctly in one database or file but not in others. Using databases eliminates many problems that arose from previous methods of storing and accessing data, such as fi le management systems. Databases are arranged so that one set of software programs—the database management system—provides all users with access to all of the data.

This system minimizes the following problems:

• Data redundancy: The same data are stored in multiple locations.

• Data isolation: Applications cannot access data associated with other applications.

• Data inconsistency: Various copies of the data do not agree.

In addition, database systems maximize the following:

• Data security: Because data are "put in one place" in databases, there is a risk of losing a lot of data at once. Therefore, databases have extremely high security measures in place to minimize mistakes and deter attacks.

• Data integrity: Data meet certain constraints; for example, there are no alphabetic characters in a Social Security number field.

• Data independence: Applications and data are independent of one another; that is, applications and data are not linked to each other, so all applications are able to access the same data

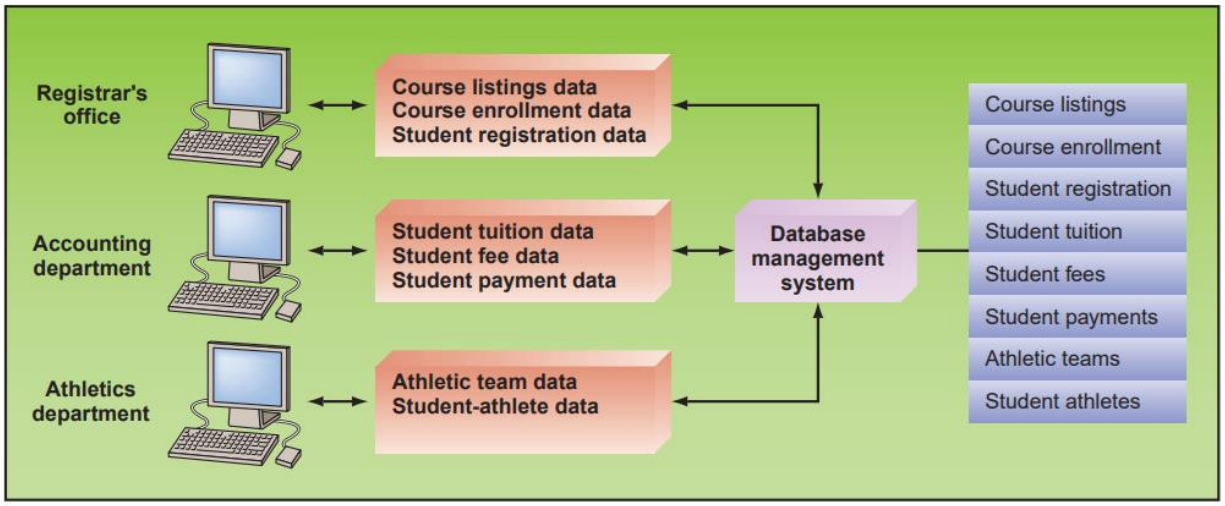

FIGURE 5.1 Database management system.

Database Management Systems

A database management system (DBMS) is a set of programs that provide users with tools to add, delete, access, modify, and analyze data stored in a single location. An organization can access the data by using query and reporting tools that are part of the DBMS or by using application programs specifically written to perform this function. DBMSs also provide the mechanisms for maintaining the integrity of stored data, managing security and user access, and recovering information if the system fails. Because databases and DBMSs are essential to all areas of business, they must be carefully managed. There are a number of different database architectures, but we focus on the relational database model because it is popular and easy to use. Other database models (e.g., the hierarchical and network models) are the responsibility of the MIS function and are not used by organizational employees. Popular examples of relational databases are Microsoft Access and Oracle