

2: Fundamental Concepts

What Is a Database?

A *database* is a shared collection of related data used to support the activities of a particular organization. A database can be viewed as a repository of data that is defined once and then accessed by various users as shown in Figure 2.1.

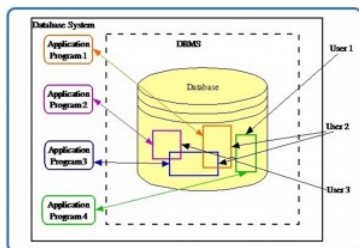


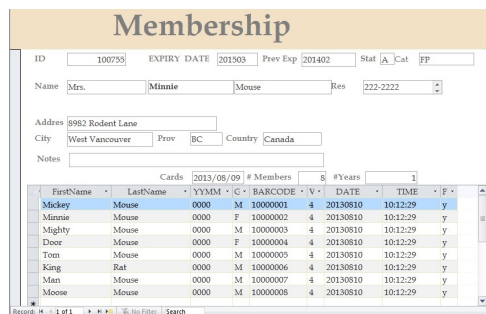
Figure 2.1. A database is a repository of data.

Database Properties

A database has the following properties:

- It is a representation of some aspect of the real world or a collection of *data elements* (facts) representing real-world information.
- A database is logical, coherent and internally consistent.
- A database is designed, built and populated with data for a specific purpose.
- Each data item is stored in a field.
- A combination of fields makes up a *table*. For example, each field in an employee table contains data about an individual employee.

A database can contain many tables. For example, a membership system may contain an address table and an individual member table as shown in Figure 2.2. Members of Science World are individuals, group homes, businesses and corporations who have an active membership to Science World. Memberships can be purchased for a one- or two-year period, and then renewed for another one- or two-year period.



First Name	Last Name	YYMM	G	BARCODE	V	DATE	TIME	F
Mickey	Mouse	0000	M	10000001	4	20130810	10:12:29	y
Minnie	Mouse	0000	F	10000002	4	20130810	10:12:29	y
Mighty	Mouse	0000	M	10000003	4	20130810	10:12:29	y
Door	Mouse	0000	F	10000004	4	20130810	10:12:29	y
Tom	Mouse	0000	M	10000005	4	20130810	10:12:29	y
King	Rat	0000	M	10000006	4	20130810	10:12:29	y
Man	Mouse	0000	M	10000007	4	20130810	10:12:29	y
Moose	Mouse	0000	M	10000008	4	20130810	10:12:29	y

Figure 2.2. Membership system at Science World by N. Eng.

In Figure 2.2, Minnie Mouse renewed the family membership with Science World. Everyone with membership ID#100755 lives at 8932 Rodent Lane. The individual members are Mickey Mouse, Minnie Mouse, Mighty Mouse, Door Mouse, Tom Mouse, King Rat, Man Mouse and Moose Mouse.

Database Management System

A *database management system (DBMS)* is a collection of programs that enables users to create and maintain databases and control all access to them. The primary goal of a DBMS is to provide an environment that is both convenient and efficient for users to retrieve and store information.

With the database approach, we can have the traditional banking system as shown in Figure 2.3. In this bank example, a DBMS is used by the Personnel Department, the Account Department and the Loan Department to access the shared corporate database.

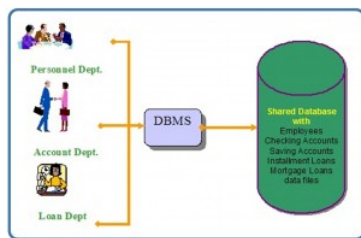


Figure 2.3. A bank database management system (DBMS).

Key Terms

data elements: facts that represent real-world information

database: a shared collection of related data used to support the activities of a particular organization

database management system (DBMS): a collection of programs that enables users to create and maintain databases and control all access to them

table: a combination of fields

Exercises

1. What is a database management system (DBMS)?
2. What are the properties of a DBMS?
3. Provide three examples of a real-world database (e.g., the library contains a database of books).

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1. Example under *Database Properties*
2. Key Terms

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1. Exercises

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