CHAPTER III
DATABASE CONCEPTS

3.1 BASIC CONCEPTS

A database is defined as a collection of interrelated data that are systematically organized without unnecessary redudancy to facilitate easy acess, retrieval and modification. The purpose of the database is to store all of the data in one location, so that redundant data storage is eliminated. A database is composed of data, fileds, records and then files. Figure 3.1 shows the basic structure of a database. A database is a collection of files, a file is a collection of recoeds, a record is a collection of fields and a field is a collection of many data.
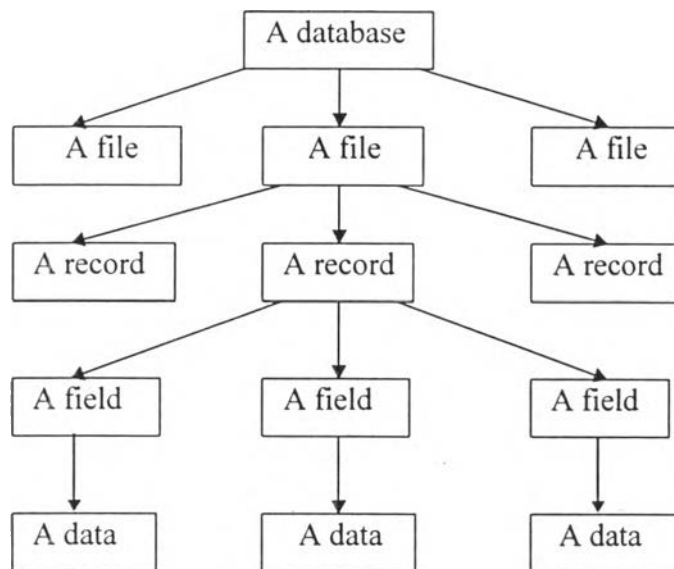

Figure 3.1   Basic structure of a database

3.2 DATABASE MANAGEMENT SYSTEM (DBMS)

A database management system (DBMS) consists of the databases and programs for accessing data. The primary goal of DBMS is to provide an environment that is convenient and efficient to use in retriving and storing data. One of main reason for having DBMS is that DBMS is used for transfering data between the database to other programs. A well-designed DBMS will provide users to communicate easily with the database. Figure 3.2 shows DBMS concept.
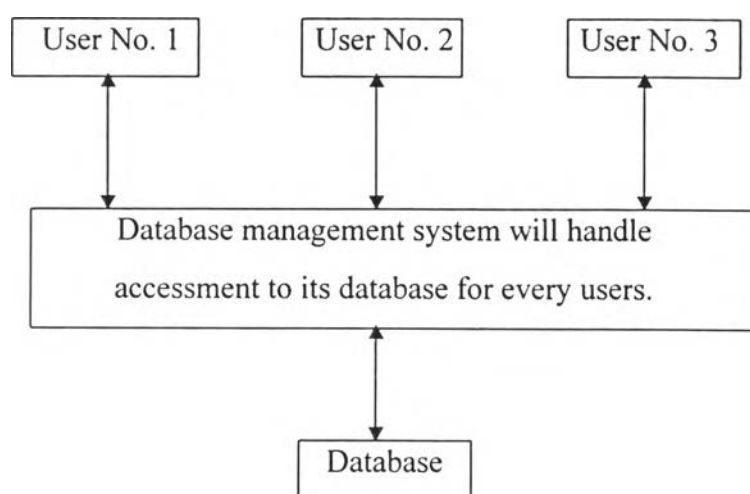

Figure 3.2 Database management system (DBMS) concept

3.3 DATABASE MODELS

Three models of database widely accepted are the relational, network and hierarchical models. The relational model has gained favor over the other two in recent years (Korth and Silberschatz, 1991). The network and hierarchical models are usually used in a large number of older database.

3.3.1 Relational model

The relational model represents data and relationships between data by a collection of tables which have columns and rows. Figure 3.3 is a sample relational database of bank customers and accounts.

Name	Street	City	Number
Lowery	Maple	Queens	900
Shiver	North	Bronx	556
Shiver	North	Bronx	647
Hodges	Sidehill	Brooklyn	801
Hodges	Sidehill	Brooklyn	647

Number	Balance
900	55
556	100,000
647	105,366
801	10,533

Figure 3.3 A sample relational database(Korth and Silberschatz, 1991)

3.3.2 Network model

The net work model uses record to collect data whose relationships among the data are represented by links, which can be viewed as pointers. Figure 3.4 shows a sample network model

Lowery   Maple   Queens   900   55

Shiver   North   Bronx   556   100,000

Hodges   Sidehill   Brooklyn   647   105,366

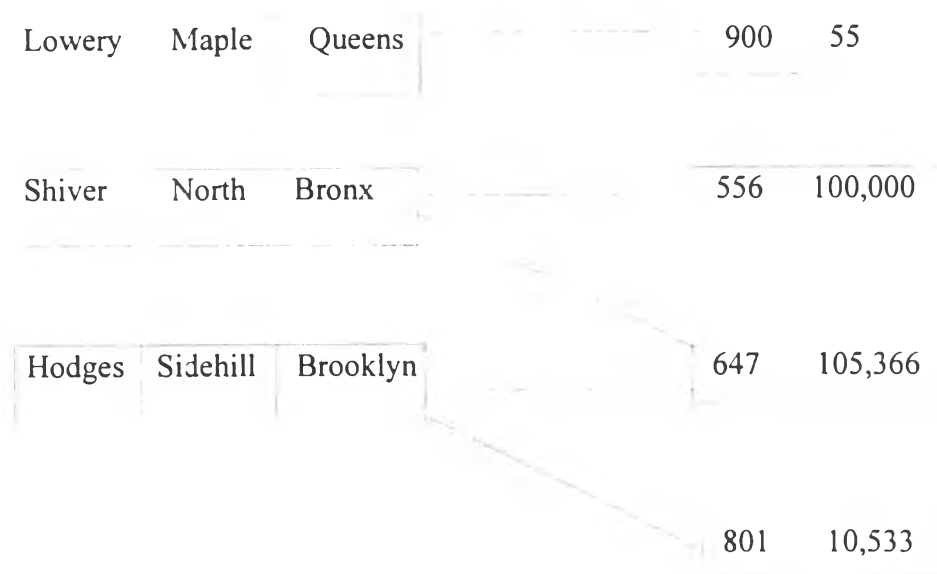   801   10,533

Figure 3.4 A sample network database(Korth and Silberschatz, 1991)

3.3.3 Hierarchical model

The hierarchical model is similar to the network model. Data and relationships among data are represented by records and links, respectively. The difference between network model and hierarchical model is the records in hierarchical model are organized as collection of trees rather than arbitray graphs. Figure 3.5   presents a sample hierarchical database.
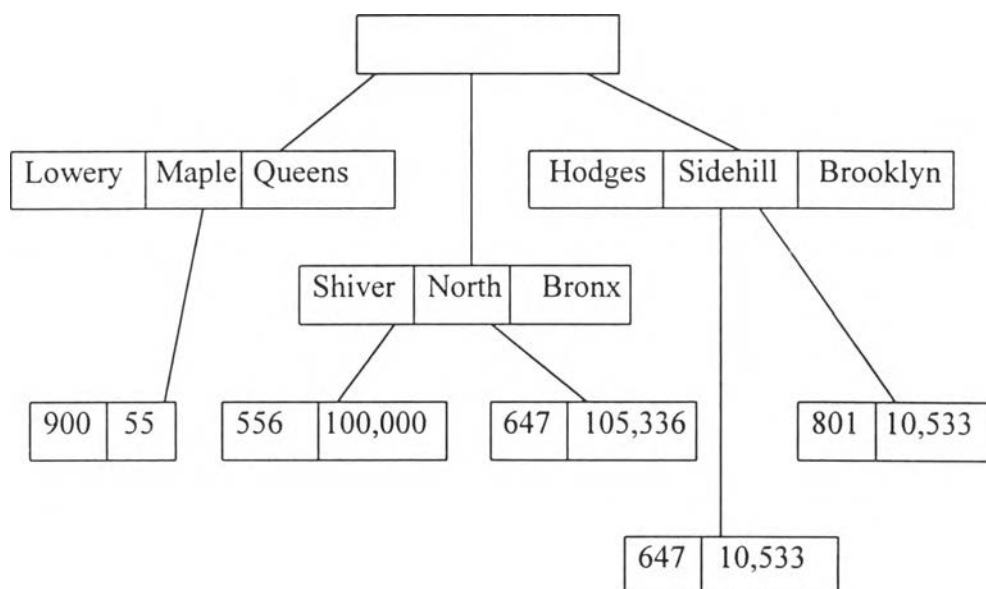
Figure 3.5 A sample hierarchical database(Korth and Silberschatz, 1991)

3.3.4 Differences between the models

The relational model differs from the network and hierarchical models in a point that it does not use pointers or links. The relational model relates records by the values they contain. This freedom from the use of pointers allows a formal mathematical foundation to be defined. The relational model is better than the network and hierarchical models as follows:

- The relational model is easy to understand and data structure is not complicated.

- Problems in the relational database can be found easily by user.

- Data store in the relational database is physical therefore user is not necessary to know data structure.