

decisions in less and less time, the delay from when the users conceived of a new way to create information from the data to when the DP specialist could create the programs to generate that information was a source of great frustration.

The following examples explain the main functions of files system and relations between file components and other files:

## Basic File Terminology

TERM	DEFINITION
Data	"Raw" facts, such as a telephone number, a birth date, a customer name, and a year-to-date (YTD) sales value. Data have little meaning unless they have been organized in some logical manner.
Field	A character or group of characters (alphabetic or numeric) that has a specific meaning. A field is used to define and store data.
Record	A logically connected set of one or more fields that describes a person, place, or thing. For example, the fields that constitute a record for a customer might consist of the customer's name, address, phone number, date of birth, credit limit, and unpaid balance.
File	A collection of related records. For example, a file might contain data about the students currently enrolled at Gigantic University.

## Contents of the AGENT file

A_NAME	A_PHONE	A_ADDRESS	ZIP	HIRED	YTD_PAY	YTD_FIT	YTD_FICA	YTD_SLS	DEP
Alex B. Alby	713-228-1249	123 Toll, Nash, TN	37119	01-Nov-2000	26566.24	6641.56	2125.30	132737.75	3
Leah F. Hahn	615-652-1244	334 Main, Fox, KY	25246	23-May-1986	32213.76	8053.44	2577.10	136967.35	0
John T. Okon	615-123-5589	452 Elm, New, TN	36155	15-Jun-2005	23198.29	5799.57	1855.86	127093.45	2

A\_NAME = Agent name

A\_PHONE = Agent phone

A\_ADDRESS = Agent address

ZIP = Agent zip code

HIRED = Agent date of hire

YTD\_PAY = Year-to-date pay

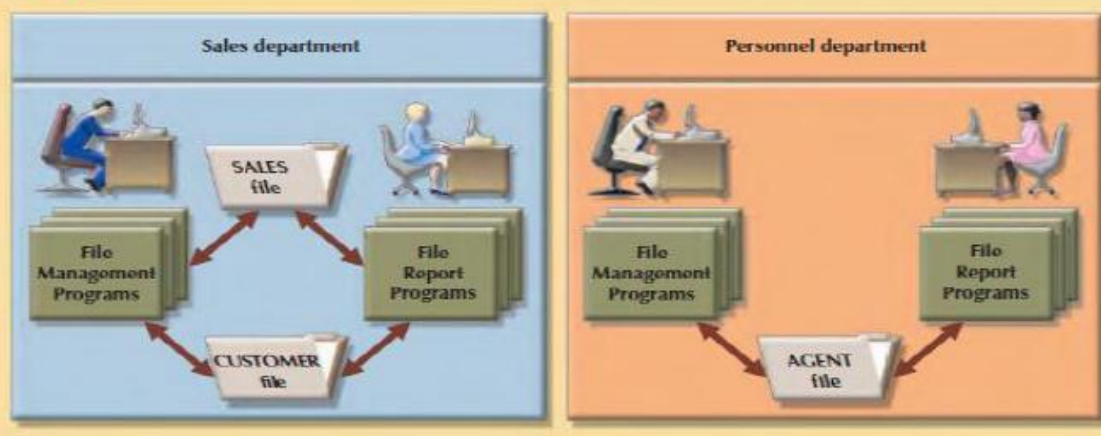
YTD\_FIT = Year-to-date federal income tax paid

YTD\_FICA = Year-to-date Social Security taxes paid

YTD\_SLS = Year-to-date sales

DEP = Number of dependents

## A simple file system





### 1.6 Components of DBMS

A database management system (DBMS) consists of several components. Each component plays very important role in the database management system environment. The major components of database management system are:

- Software
- Hardware
- Data
- Procedures
- Database Access Language

#### Software

It is the set of programs used to handle the database and to control and manage the overall computerized database DBMS software itself, is the most important software component in the overall system.

*Application programs* developed in programming languages such as C++, Visual Basic that are used to access database in database management system. Each program contains statements that request the DBMS to perform operation on database. The operations may include retrieving, updating, deleting data etc.

#### Hardware

Hardware consists of a set of physical electronic devices such as computers (together with associated I/O devices like disk drives), storage devices, I/O channels, electromechanical devices that make interface between computers and the real world systems etc., and so on.

#### Data

In DBMS, databases are defined, constructed and then data is stored, updated and retrieved to and from the databases. The database contains both the actual (or operational) data and the metadata (data about data or description about data).

#### Procedures

Procedures refer to the instructions and rules that help to design the database and to use the DBMS.

- ✓ Procedure to install the new DBMS.
- ✓ To log on to the DBMS.
- ✓ To use the DBMS or application program.
- ✓ To make backup copies of database.
- ✓ To change the structure of database.
- ✓ To generate the reports of data retrieved from database.

#### Database Access Language

The database access language is used to access the data to and from the database. The users use the database access language to enter new data, change the existing data in database and to retrieve required data from databases. The most popular database access language is SQL (Structured Query Language). Relational databases are required to have a database query language.



## Users

The users are the people who manage the databases and perform different operations on the databases in the database system. There are three kinds of people who play different roles in database system

- ✓ **Application Programmers:** The persons write application programs in programming languages (such as Visual Basic, Java, or C++)
- ✓ **Database Administrators:** A person who is responsible for managing the overall database management system is called database administrator or simply DBA.
- ✓ **End-Users:** The people who interact with database management system to perform different operations on database such as retrieving, updating, inserting, deleting data etc.

## Review Questions



1. Define each of the following terms:  
a. data    b. field    c. record    d. file
2. What is a DBMS, and what are its functions?
3. Explain the difference between data and information.
4. What is the role of a DBMS, and what are its advantages? What are its disadvantages?
5. List and describe the different types of databases.
6. What are the main components of a database system?
7. What are metadata?
8. Explain why database design is important.
- 9.

PROJ_NUM	PROJ_NAME	EMP_NUM	EMP_NAME	JOB_CODE	JOB_CHG_HOUR	PROJ_HOURS	EMP_PHONE
1	Hurricane	101	John D. Newson	EE	85.00	13.3	653-234-3245
1	Hurricane	105	David F. Schwart	CT	60.00	16.2	653-234-1123
1	Hurricane	110	Anne R. Ramoras	CT	60.00	14.3	615-233-6568
2	Coast	101	John D. Newson	EE	85.00	19.0	653-234-3254
2	Coast	108	Jane H. Sottemeir	EE	85.00	17.5	905-554-7812
3	Satellite	110	Anne R. Ramoras	CT	62.00	11.6	615-233-6568
3	Satellite	105	David F. Schwart	CT	26.00	23.4	653-234-1123
3	Satellite	123	Mary D. Chen	EE	85.00	19.1	615-233-6432
3	Satellite	112	Allecia R. Smith	EE	85.00	20.7	615-878-6679

1. How many records does the file contain? How many fields are there per record?
2. What problem would you encounter if you wanted to produce a listing by city? How would you solve this problem by altering the file structure?
3. If you wanted to produce a listing of the file contents by last name, area code, city, state, or zip code, how would you alter the file structure?

