# Data Bases

Organizations such as hospitals, banks, retailers, and manufacturers have special information needs. Usually, data is collected and stored by many departments in these organizations, which often results in duplication of data. A hospital, for example, may keep files on patients treated in the emergency room. If a patient is then admitted, separate records may be compiled and kept for admissions, surgical procedures, X-rays, insurance, and billing purposes. The patient's name, address, personal physician, and medical history might be repeated in most or all of the records.

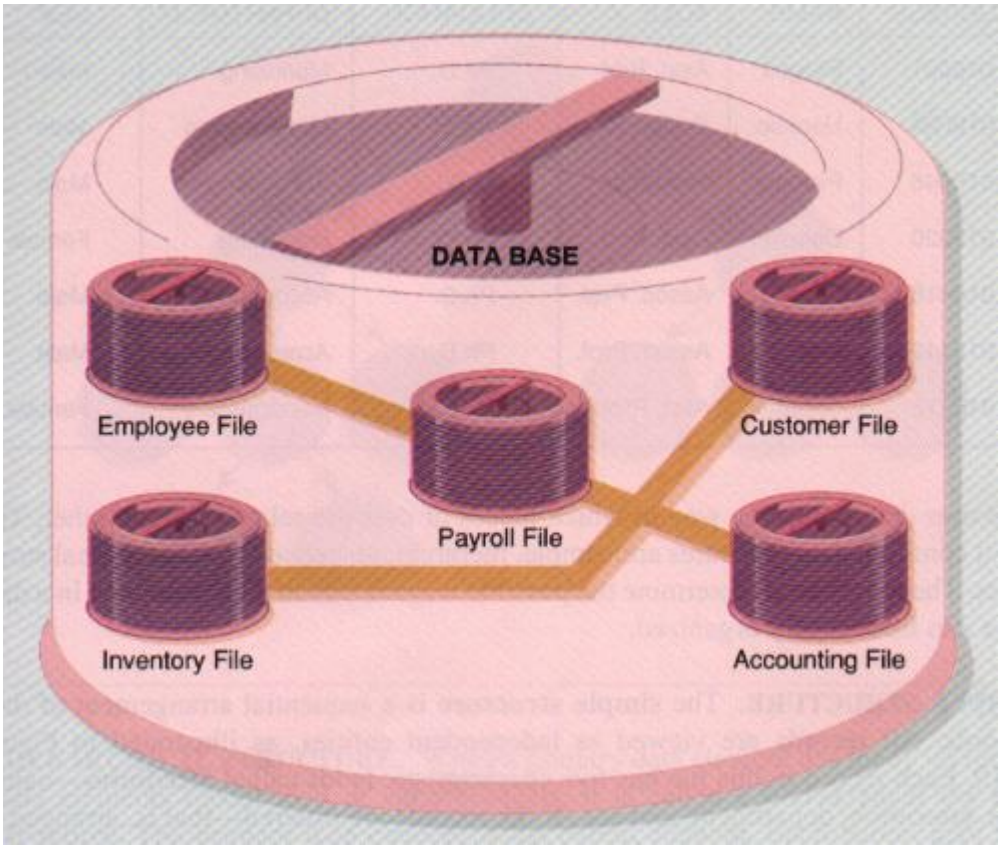
A data-base approach to file design treats all data from every department as one entity. A **data base** is a single collection of related data that can be used in many applications. Data is usually stored only once in a data base, which minimizes data duplication.

In a data base, data is stored in such a way that the same data can be accessed by many users for various reasons. Data is grouped to fit the needs of all departments in the organization rather than the needs of one particular department. Eliminating duplication of data also increases efficiency. When a piece of data is updated, the change needs to be made only once because the data files are shared by all users. Once the update is made, current information is readily available to all departments.

Consider the case of a student at a large university. The student's name, home address, and social security number are often stored in a student file by a number of offices, such as the registrar, financial aid office, housing office, and the health center. If the student's home (permanent) address is changed, all these offices will need this information. Without a data base the student would need to notify each office individually about the change of address. If the university has a data base, the information needs to be changed only once because all the offices would share the student data file.

The task of determining the design of data in a data base is the responsibility of the system analyst and the data-base analyst. The system analyst helps the users define their data-base needs. The data-base analyst is responsible for the analysis, design, and implementation of the data base. Together, they try to model the actual relationships that exist among pieces of data. The physical design of the data base is performed by the data-base administration (DBA) team. The DBA team must consider the problems of data redundancy, access time, and storage constraints in order to develop a logical design that works for the physical records and files actually stored in the data base.

The key to a successful data base is to incorporate more than one physical file into a logical file. The **physical file** is the way data is stored by the computer. The **logical file** is the combination of data needed to meet a user's needs. What one user views as a logical unit of data may include data from several physical files. For example, if a user needs an employee's identification number, address, and salary, all that information can be obtained from two files, the employee file and the payroll file (see Figure below).




**Example of a Data Base**

Data-base systems depend on direct-access storage devices (DASDs) to allow easy retrieval of data elements. The capabilities of DASDs are needed to handle the many logical relationships that exist among data elements. Combinations of data elements can be retrieved from a number of DASDs.

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