Database is an organized collection of data that is maintained for muti purpose.

Software doesn’t include database

In early days:

data is stored in files and are processed by the dedicated applications

However, this approach leads to several problems such as: data incompatibility, dependent on application, cannot be used simultaneously, inconsistency, redundancy, maintenance difficulty and usability.

Disadvantages:

* Simultaneous use: 1 user per one terminal could access data. solution: file sharing
* Consistency: with file sharing, simultaneous operations often led to inconsistent data.
* Redundancy: Storing the same data in multiple files increased storage costs and maintenance efforts while also causing inconsistencies.

DBMS: Database Management System

DBMS is system software that provides essential functions for a database, including data input/output, management, and operation needed for data manipulation.

Including features: Independency of data and application, keep consistency, security, Concurrency control, Data protection, usability

Advantages:

* Versatile Object: Data and application are independent
* Avoid Redundancy and inconsistency: One fact in one place
* Grasping relations in data.
* Unification of representation, management

Database System is the combination of a database and DBMS in which database stores the actual data and DBMS is the software that manages this data

A DBMS is needed because traditional file-based systems cause redundancy, inconsistency, and poor simultaneous access. DBMS solves these by ensuring consistency, reducing redundancy, supporting multiple users, and providing secure and efficient data management.

データベースシステムとは、データベースとDBMSの組み合わせであり、データベースは実際のデータを格納し、DBMSはそのデータを管理するソフトウェアです。

DBMSが必要な理由は、従来のファイルベースのシステムでは冗長性や不整合、同時利用の制限といった問題が発生するからです。DBMSは、データの一貫性を確保し、冗長性を減らし、複数ユーザーの同時利用を可能にし、さらに安全で効率的なデータ管理を実現します。

Conclusion:

DB: is an organized collection of data being maintained to be used for multi purposes.

DB System: is the combination of DB and DBMS which DB stores the actual data while DBMS is the system software that manages the data.

In the figure on the slide, accessing each db requires different program, so the db is now dependent on the application.