



BIL3203 – DATABASE MANAGEMENT



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What is “Database”?



- is a *base* that *data* are kept.
- A database is a collection of information that is organized so that it can easily be accessed, managed, and updated.
- A collection of regular and related data cleared from mistakes and redundancies, and stored to serve some applications.

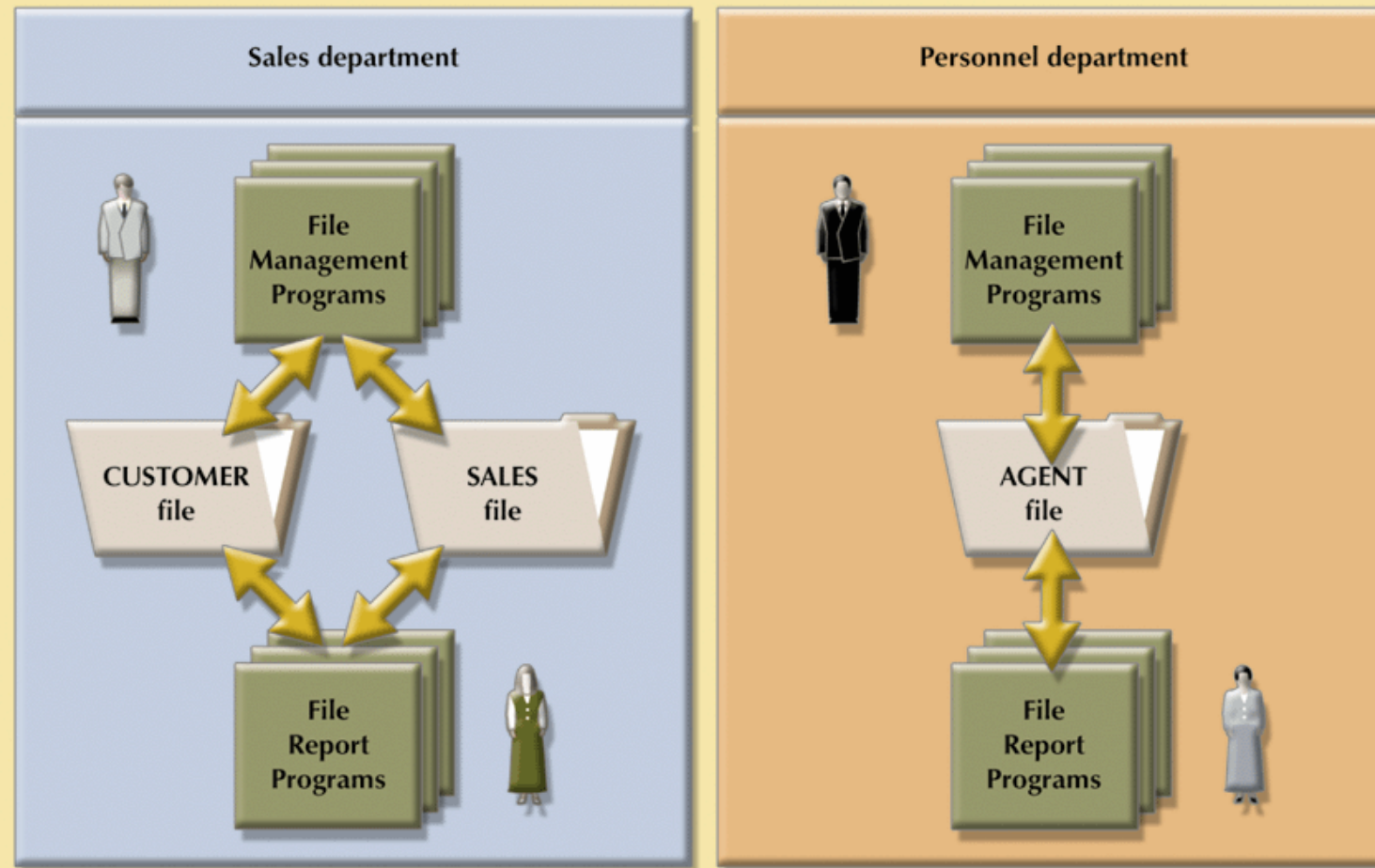


Before Databases...

- Traditional System (Data Processing System)
 - Each application suite had independent master files.
 - No Integrity, No Security, No Reliability
 - Duplication of data could lead to inconsistencies.
 - Data had to be manipulated for every single application.
 - Hard to manage data structures.
 - No standards

Data Processing System

FIGURE 1.5 A simple file system





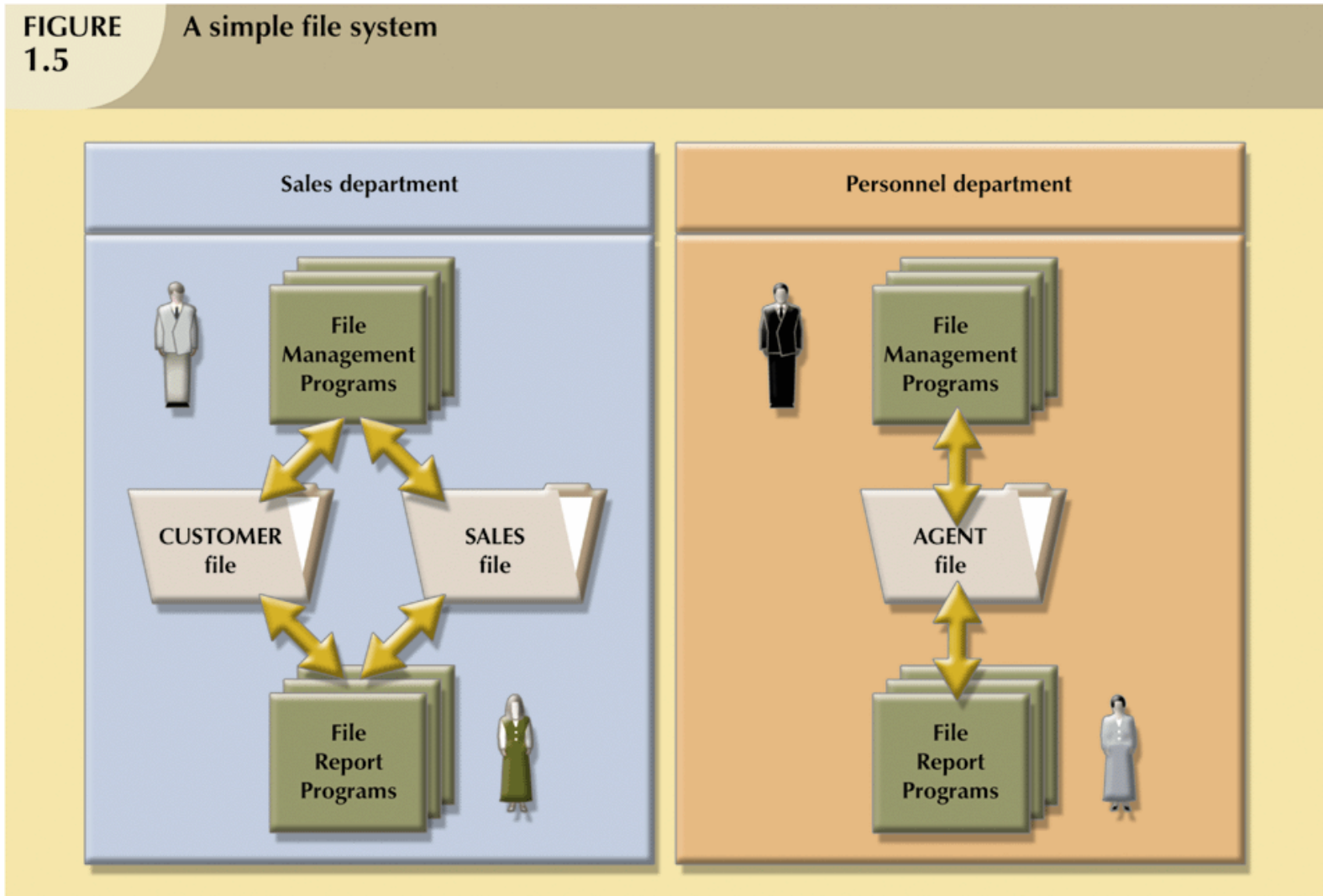
Disadvantages of File System

- Uncontrolled Redundancy,
- Restricted Data Sharing,
- Security,
- Inconsistency,
- Inflexibility,
- Difficulty in manage and manipulation,
- Programmer need and dependancy,
- Difficulty in maintenance and update,
- Lack of standards.

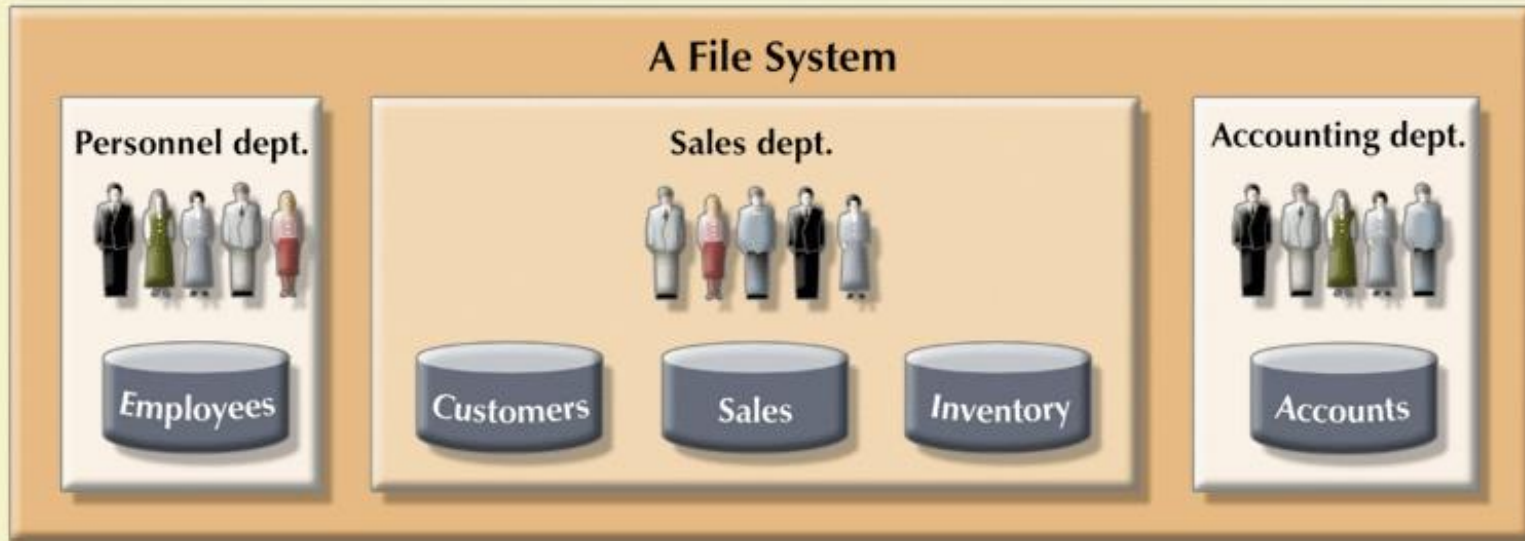
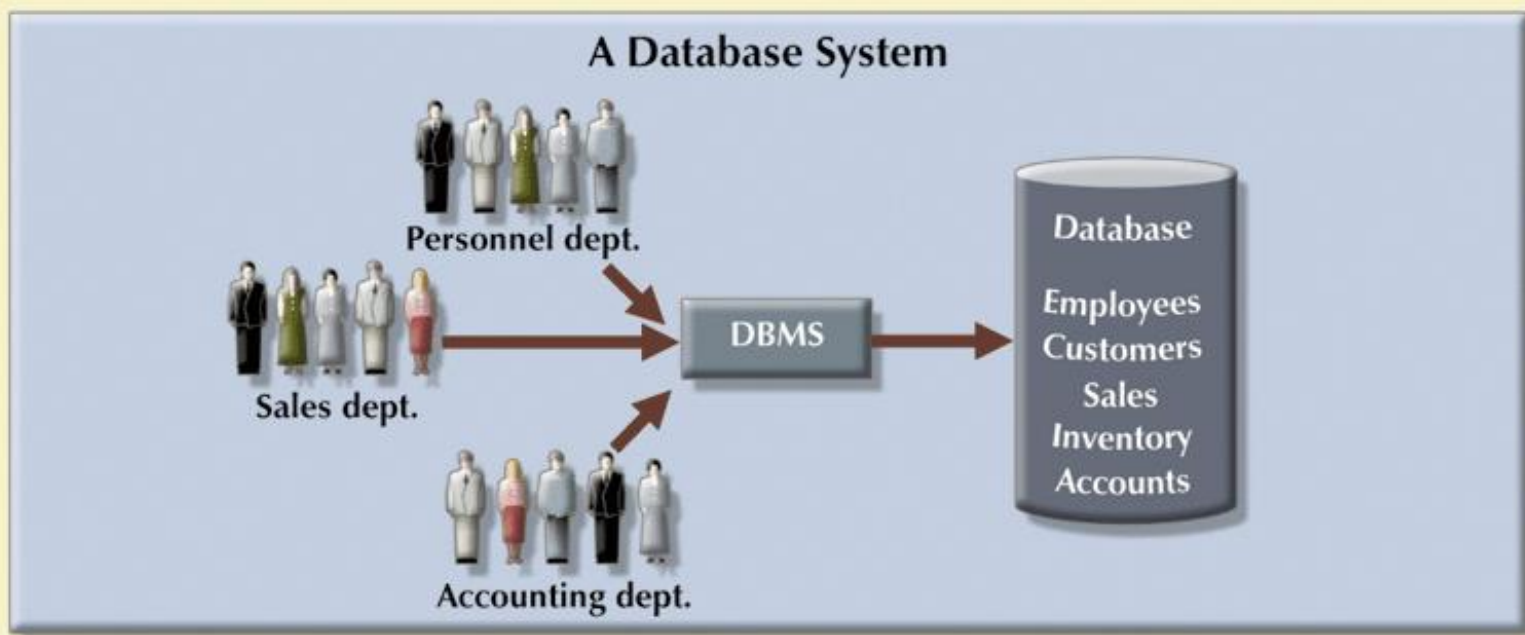
Data Processing System



FIGURE 1.5 A simple file system



Database Approach





Why to use Database?

- Data Independency,
- Application Development,
- Data Integrity and Security,
- Uniform Data Administration,
- Data Sharing, Concurrent Access,
- Backup and Recovery.

Characteristics of Database Approach



- Data definition in databases (meta-data),
- Data abstraction (between program and the data),
- Multiple views for multiple users,
- Data sharing and multi user environment.

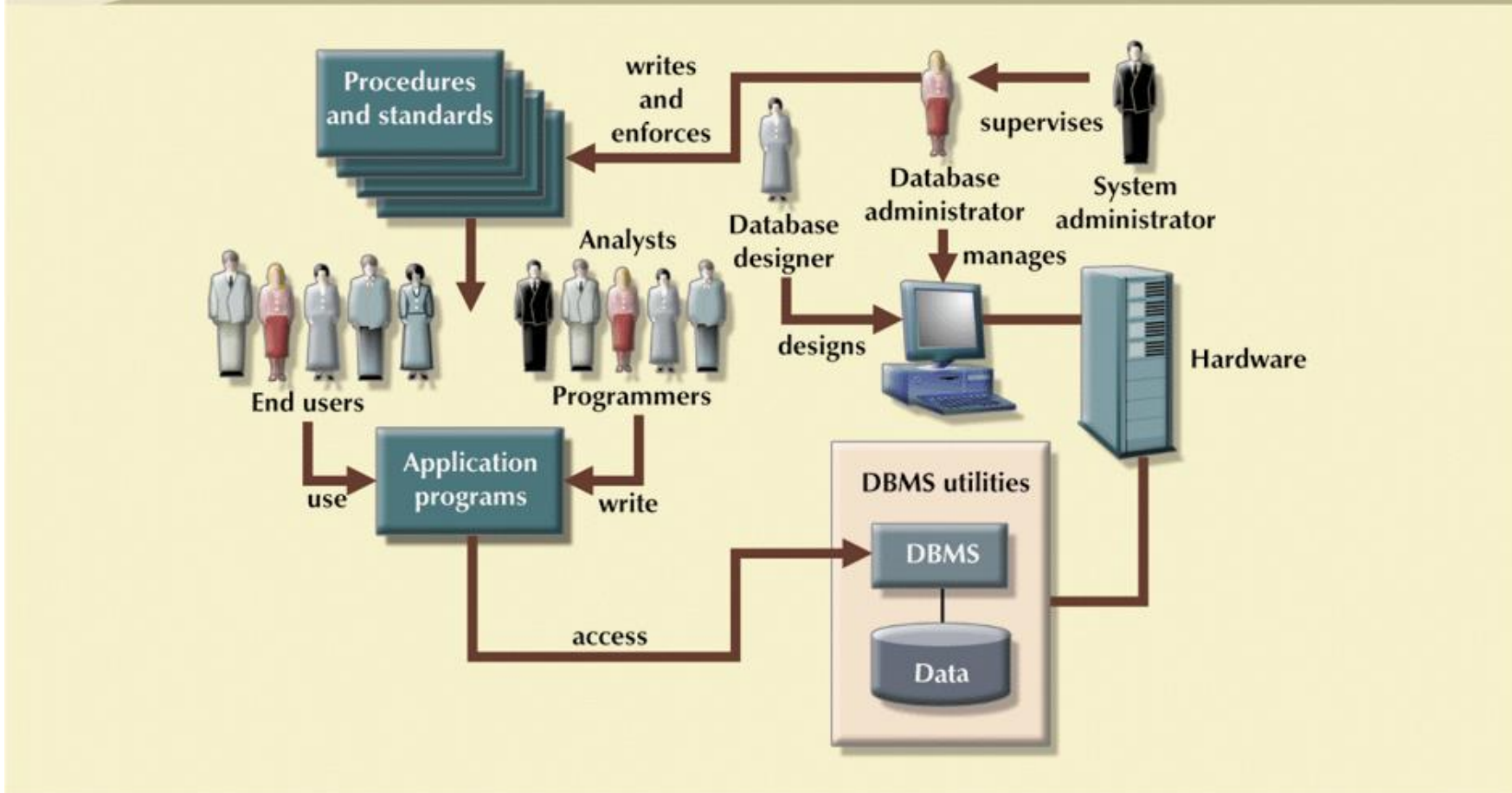
Database Users



- Database Designer,
- Database Administrator,
- End Users,
- System analysts,
- Programmers.

Database Environment

FIGURE 1.7 The database system environment



Database Management System (DBMS)

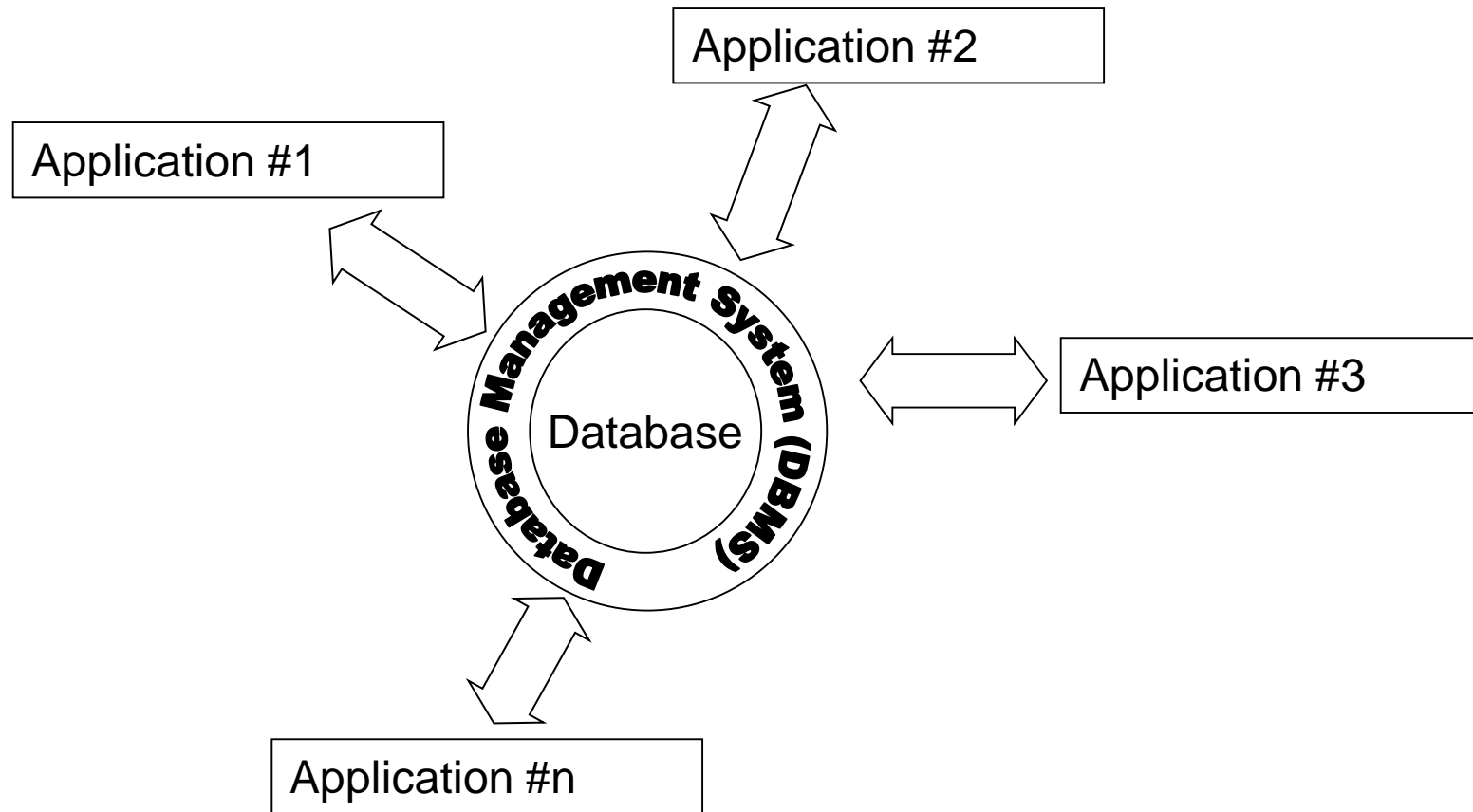


is a collection of software which

- describes the data structure,
- collects the related data,
- operates on the data,
- provides consistency,
- prevents misuse,
- defines the users and their authorizations,
- allows concurrent access and usage of data.



Database Management System (DBMS)



Database Administrator



- A database administrator (DBA) directs or performs all activities related to maintaining a successful database environment. Responsibilities include:
 - designing,
 - implementing,
 - maintaining the database system;
 - establishing policies and procedures,
 - security,
 - maintenance, and use of the database management system;
 - and training employees in database management and use.

Database Administrator



- A database administrator (DBA) is a person who is responsible for the environmental aspects of a database. In general, these include:
 - **Recoverability** - Creating and testing Backups
 - **Integrity** - Verifying or helping to verify data integrity
 - **Security** - Defining and/or implementing access controls to the data
 - **Availability** - Ensuring maximum uptime
 - **Performance** - Ensuring maximum performance given budgetary constraints
 - **Development and testing support** - Helping programmers and engineers to efficiently utilize the database.

Database Administrator



- designing,
 - implementing,
 - maintaining the database system;
 - establishing policies and procedures,
 - security,
 - maintenance, and use of the DBMS;
 - training employees in database management and use.
- Recoverability
 - Integrity
 - Security
 - Availability
 - Performance
 - Development and testing support

Database Administrator



- There are different kinds of DBA depending on the responsibility that he owns.
- **Administrative DBA** – This DBA is mainly concerned with installing, and maintaining DBMS servers. His prime tasks are installing, backups, recovery, security, replications, memory management, configurations and tuning. He is mainly responsible for all administrative tasks of a database.
- **Development DBA** – He is responsible for creating queries and procedure for the requirement. Basically his task is similar to any database developer.
- **Database Architect** – Database architect is responsible for creating and maintaining the users, roles, access rights, tables, views, constraints and indexes. He is mainly responsible for designing the structure of the database depending on the requirement. These structures will be used by developers and development DBA to code.
- **Data Warehouse DBA** –DBA should be able to maintain the data and procedures from various sources in the datawarehouse. These sources can be files, COBOL, or any other programs. Here data and programs will be from different sources. A good DBA should be able to keep the performance and function levels from these sources at same pace to make the datawarehouse to work.
- **Application DBA** –He acts like a bridge between the application program and the database. He makes sure all the application program is optimized to interact with the database. He ensures all the activities from installing, upgrading, and patching, maintaining, backup, recovery to executing the records works without any issues.
- **OLAP DBA** – He is responsible for installing and maintaining the database in OLAP systems. He maintains only OLAP databases.



Database Approach – Risks

- New and Expert Personnel
- Operations on Shared Data
- Organizational Conflicts
- Backup and Recovery