

Chapter 1

Introduction to Databases Transparencies

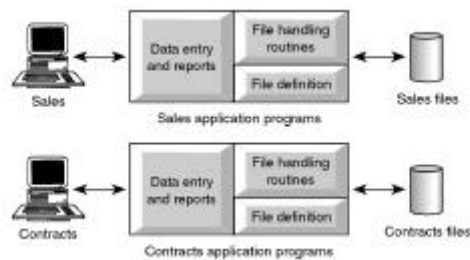
Chapter 1 Objectives

- ◆ **Some common uses of database systems.**
- ◆ **The meaning of the term database.**
- ◆ **The meaning of the term Database Management System (DBMS).**
- ◆ **The typical functions of a DBMS.**

Chapter 1 Objectives

- ◆ The major components of the DBMS environment.
- ◆ The advantages and disadvantages of DBMSs

File-based Processing



Sales Files

Property_for_Rent(Property Number, Street, Area, City, Post Code, Property Type, Number of Rooms, Monthly Rent, Owner Number)

Owner(Owner Number, First Name, Last Name, Address, Telephone Number)

Rentee(Rentee Number, First Name, Last Name, Address, Telephone Number, Preferred Type, Maximum Rent)

Contracts Files

Lease(Lease Number, Property Number, Rentee Number, Monthly Rent, Payment Method, Deposit, Paid, Rent Start Date, Rent Finish Date, Duration)

Property_for_Rent(Property Number, Street, Area, City, Post Code, Monthly Rent)

Rentee(Rentee Number, First Name, Last Name, Address, Telephone Number)

Limitations of File-based Approach

- ◆ **Separation and isolation of data**
 - Each program maintains its own set of data. Users of one program may be unaware of potentially useful data held by other programs.
- ◆ **Duplication of data**
 - Same data is held by different programs. Wasted space and potentially different values and/or different formats for the same item.

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Limitations of File-based Approach

- ◆ **Data dependence**
 - File structure is defined in the program code.
- ◆ **Incompatible file formats**
 - Programs are written in different languages, and so cannot easily access each others files.

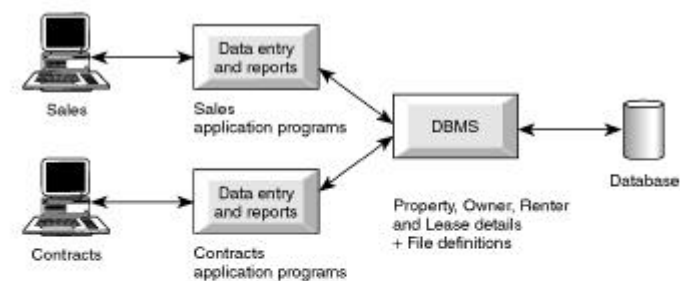
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Limitations of File-based Approach

- ◆ **Fixed Queries/Proliferation of application programs**
 - **Programs are written to satisfy particular functions. Any new requirement needs a new program.**

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Database Management System (DBMS)



Property for Rent(Property Number, Street, Area, City, Post Code, Property Type, Number of Rooms, Monthly Rent, Owner Number)

Owner(Owner Number, First Name, Last Name, Address, Telephone Number)

Renter(Renter Number, First Name, Last Name, Address, Telephone Number), Preferred Type, Maximum Rent)

Lease(Lease Number, Property Number, Renter Number, Payment Method, Deposit, Paid, Rent Start Date, Rent Finish Date)

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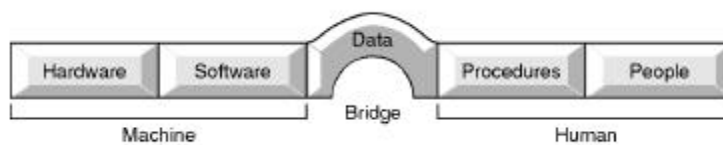
Database Approach

- ◆ **Data definition language (DDL).**
 - **Permits specification of data types, structures and any data constraints. All specifications are stored in the database.**

- ◆ **Data manipulation language (DML).**
 - **General enquiry facility (query language) of the data.**

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Components of DBMS Environment



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Components of DBMS Environment

- ◆ **Hardware**
 - Can range from a PC to a network of computers.
- ◆ **Software**
 - DBMS, operating system, network software (if necessary) and also the application programs.
- ◆ **Data**
 - Used by the organization and a description of this data called the schema.

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Components of DBMS Environment

- ◆ **Procedures**
 - Instructions and rules that should be applied to the design and use of the database and DBMS.
- ◆ **People**

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Roles in the Database Environment

- ◆ **Data Administrator (DA)**
- ◆ **Database Administrator (DBA)**
- ◆ **Database Designers (Logical and Physical)**
- ◆ **Application Programmers**
- ◆ **End Users (native and sophisticated)**

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Advantages of DBMS

- ◆ **Control of data redundancy.**
- ◆ **Data consistency**
- ◆ **More information from the same amount of data.**
- ◆ **Sharing of data.**
- ◆ **Improved data integrity.**
- ◆ **Improved security.**
- ◆ **Enforcement of standards.**
- ◆ **Economy of scale.**

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Advantages of DBMS

- ◆ **Balanced conflicting requirements**
- ◆ **Improved data accessibility and responsiveness**
- ◆ **Increased productivity**
- ◆ **Improved maintenance through data independence**
- ◆ **Increased concurrency**
- ◆ **Improved backup and recovery services**

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Disadvantages of DBMS

- ◆ **Complexity**
- ◆ **Size**
- ◆ **Cost of DBMS**
- ◆ **Additional hardware costs**
- ◆ **Cost of conversion**
- ◆ **Performance**
- ◆ **Higher impact of a failure**

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