

# Module 4

## Creation and Management of Databases Using CDS/ISIS

---

### Lesson 1

## Introduction to Concepts of Database Design

# Rationale

- Keeping up with library automation technology has been a major aspect of librarians' jobs in this era. An emerging need in the area of library automation concerns interlibrary loan and other forms of resource sharing. Library automation has opened doors for users located in the most remote sites to “visit” those situated in highly populated locations.
- Libraries using technology developments have expanded the resources available to their users. In addition to simply cataloging title, author, ISBN number and annotated bibliography, they now include web sites and CD-ROMs.

# Scope

**Lesson 1 will answer the following questions:**

- Why use a DBMS?
- What is a Database Management System (DBMS)?
- What is the relationship between a card catalog and a DBMS?
- What are the components of a DBMS?

# Learning Outcomes

## By the end of the lesson you will:

- Understand the concepts of a DBMS
- Recognize the relationship between the card catalog and a DBMS
- Realize the importance of using a DBMS in a library.
- Understand the advantages of using database management systems

# Why Use Databases?

- Databases and database technology are having a major impact on the growing use of computers.
- They play a critical role in almost all areas where computers are used...
  - – e.g. banks, hospitals, libraries...

# Why Use Databases?

- Easy to manage large collection of data
- Data can be accessed concurrently by many
- Consistency in data input
- Access to some parts of data can be restricted

# Some Examples

- Company Databases: **Employees, departments, projects**
- Airline Reservation Systems: **Flights, fares, customers, reservations ..**
- Library Databases: **Authors, titles, publishers, pagination**

# What is a Database Management System (DBMS)?

- DBMSs are a key component of most applications. e.g. banking, making reservations, borrowing a book, checking your marks/schedule
- **These are called traditional database applications.** Data stored is either textual or numeric.

# Some Definitions

- **Database:** A collection of related data
- **Data:** Known facts that can be recorded and have an implicit meaning. Examples: Author's name, Title of a book
- **Database Management System (DBMS):** the software that manages the data
- **Database System:** The DBMS software together with the data itself. Sometimes, the applications are also included.

# What does a DBMS do?

- Manages very large amounts of data
- Supports efficient access to high volumes of data
- Supports concurrent access to very large amounts of data: e.g. bank and its ATM machines

# How does a DBMS Work?

**The DBMS is a general-purpose software system that facilitates the processes of:**

- **Defining.** Specifying the data types, structures, and how data should be stored;
- **Constructing.** The process of storing the data itself on some storage medium that is controlled by the DBMS and;
- **Manipulating.** Querying the database to retrieve specific data, updating the database, and generating reports from the data for various applications.

# What are the Advantages of a DBMS?

- Data Independence.
- Provides multiple user interfaces.
- Efficient Data Access.
- Data Integrity and Security.
- Controls redundancy and Uniform Data Administration.
- Concurrent Access, Recovery From Crashes.
- Reduces Application Development Time

# What are the Advantages of a DBMS?

- Utilizes sophisticated techniques to store and retrieve data efficiently
- Storage methods can be improved without changing the application program

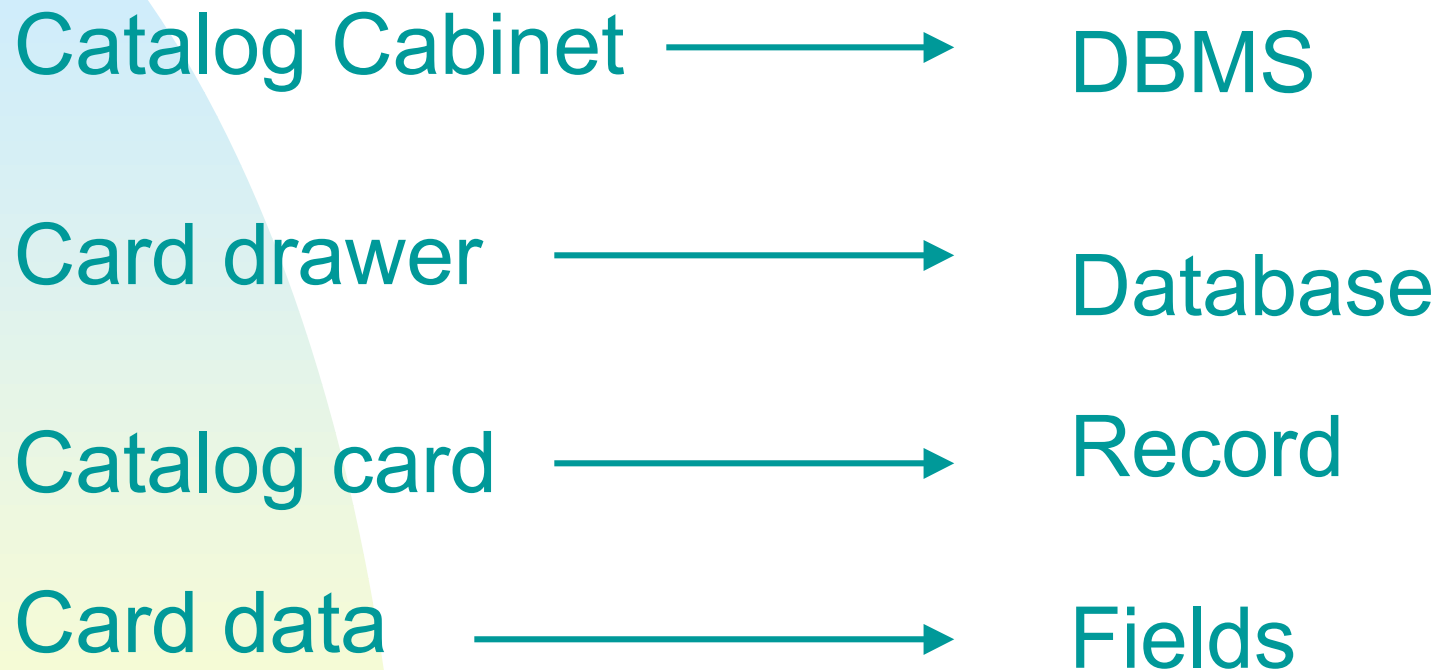
# What are the Advantages of a DBMS?

- Centralizes administration of data shared among many users
  - Data managed by professionals
- Organizes data to
  - Meet user needs
  - Minimise redundancy
- Fine tunes storage for efficient retrieval

# What are Different Types of DBMS?

- Entity Relationship Model (semantic model)
- Relational Model (DB2, Oracle, Access...)
- Hierarchical Model (IBM's IMS DBMS)
- Network Model (IDS, IDMS)
- Object-Oriented Models (ObjectStore, Versant)
- Object-Relational Model (IBM, Informix, Oracle...)
- XML

# Card Catalog versus DBMS



# At this point you should be able to:

- Understand the concepts of a DBMS
- Recognize the relationship between the card catalog and a DBMS
- Realize the importance of using a DBMS in libraries.