

Online Information Retrieval

Course Code: **LIS-6210**

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Database Technology: background

- Development of database technology has been closely related to the development of computer hardware and software.
 - With hardware development, it is now common to talk about 'computer generations', and similar way several 'database system generation', can be distinguished.
 - The history of database systems to data can be divided into five generation, roughly starts from the 1950s.
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Database Technology: background

➤ The first generation

- Starts in early 1950s with the major task of any computer system to process data, i.e., calculating, counting etc.
- Program data provided by primary or secondary memory.
- Secondary memory referred to punched cards or magnetic tapes.
- Thus, first file systems allowed sequential access to the records of a file



Database Technology: background

➤ The second generation

- Starts in early 1960s, performing tasks efficiently then previous version.
- Became possible to use computers in online and batch mode.
- Development of magnetic disks as fast secondary memory led to more sophisticated file systems, providing multiple access.
- Direct access file allows access to a record file directory via its address.



Database Technology: background

➤ The third generation

- Roughly coincides with the 1970s, but started in late sixties.
- Characterized by the introduction of a distinction between logical and physical information.
- Data models were used for the first time to describe physical structures from a logical point of view.
- Hierarchical or the network model are classified as 'implementation-oriented'.



Database Technology: background

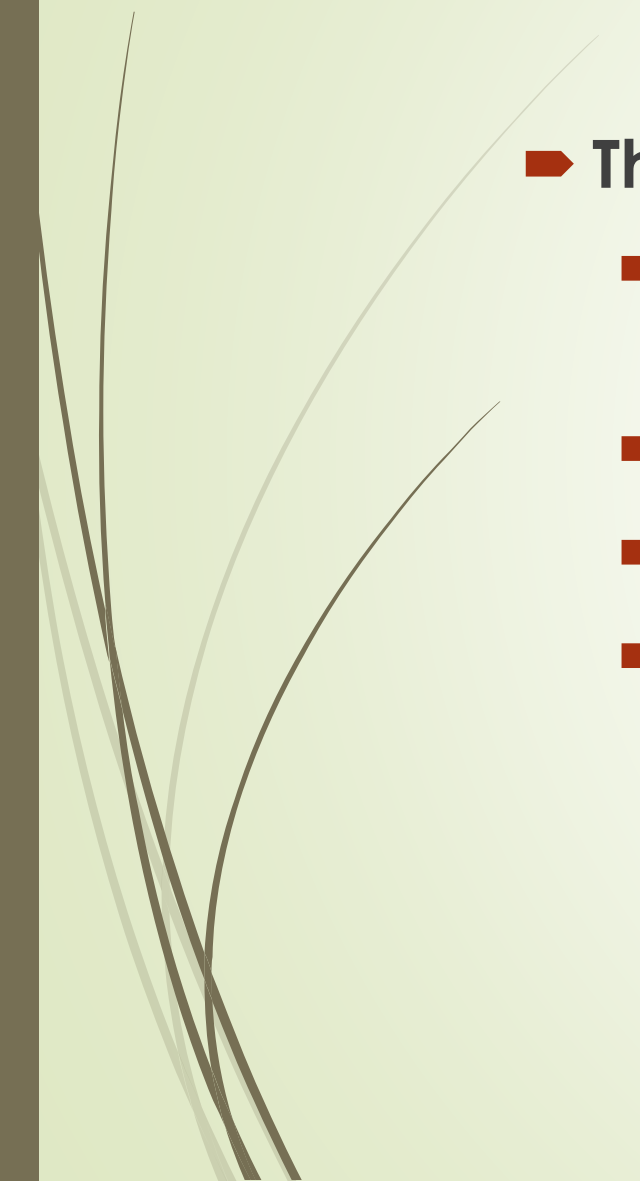
➤ The fourth generation

- Launched in marketplace in the 1980s.
- Saw systems (now DBMSs), in addition to storing data redundancy-free under centralized control.
- Made a clear distinction between a physical and a logical data model, appropriate for relational model of data.
- Provided base for powerful computer languages



Database Technology: background

➤ The fifth generation

- Third generation may be termed 'pre-relational' and fourth 'relational'.
 - The fifth generation began to emerge in the 1990s
 - This generation can be termed 'post-relational'.
 - The most significant achievements of the generation are the object-oriented database systems, multimedia systems and knowledge-based systems.
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Database Technology: current scenario

- Web-based environment, access through web-browsers.
- Significant characteristic of modern day database systems.
- As user, information searching, adding, editing and retrieval is easy now.
- User friendly, one can use even having basic knowledge of databases and networking.



Database Technology: introduction

- Database technology emerged in the late sixties as a result of a combination of various circumstances.
 - Growing demand among users for more information.
 - The demand coincided with advances in computer technology and in expertise in computer data processing.
 - The technology emerged to process and manipulate data of various kinds is termed 'database management technology.'
 - The resulting software packages are known as 'database management systems (DBMSs).'
 - DBMSs manage a computer-stored database or collection of data.
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Database Technology: the data

- 'Data' refers to a set of given facts.
- 'Information in a form that can be processed by a computer is called data.'
- Generally has been used to refer to scientific measurements and raw fact and figures.
- A list of students/employees names, a set of keywords, doctors record of their patients, figures relating to temperature, humidity, and record of products, sales of a company are the examples of data.



Database Technology: the database

- A system whose base, key concept is simply a particular way of handling data.
- A database is nothing more than a computer-based record-keeping system.
- The overall objective of a database is to record and maintain information.
- 'A collection of interrelated data stored so that it may be accessed by users with simple user-friendly dialogues'.
- 'A collection of information that can be searched as a single entity'.

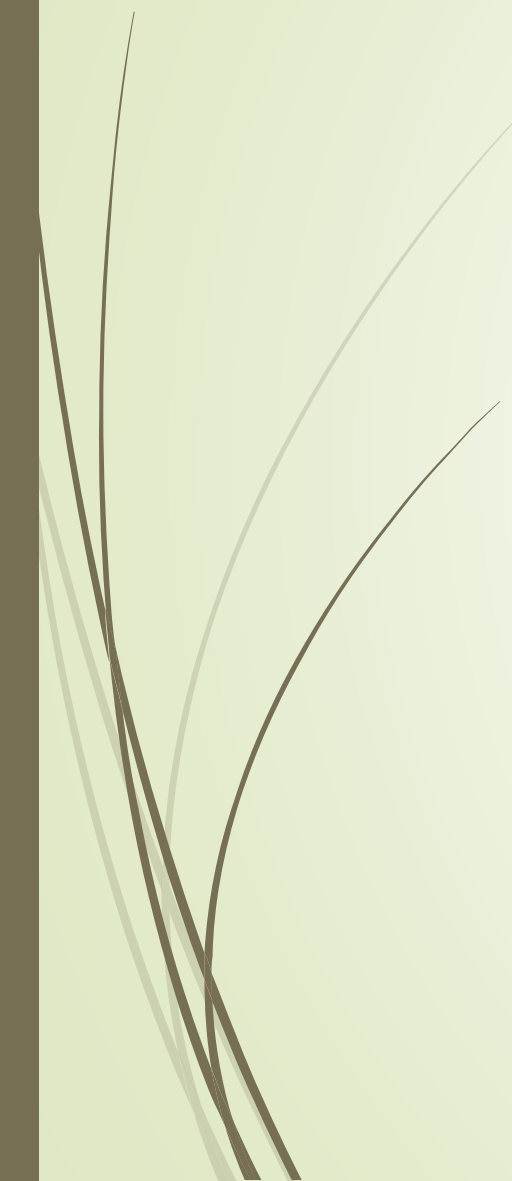


Database Technology: records & fields

- In the computer-world we usually deal with *files*, the outer boundary or a sort of data container.
- A *record* is a collection of related information.
- Each unit of information in a database is known as *record*.
- A stored record is a named collection of associated stored fields.
- Segments or elements of information, holding particular type of information within record that can be addressed separately, is called a *field*.



Database Technology: records & fields

- A record is composed of fields and subfields.
 - Different items of information in a bibliographic record may be author, title, and so forth, each of them is known as field.
 - Field may be subdivided into smaller units called subfields.
 - While designing a database each field is supposed to given a unique identifier, called *field tag*.
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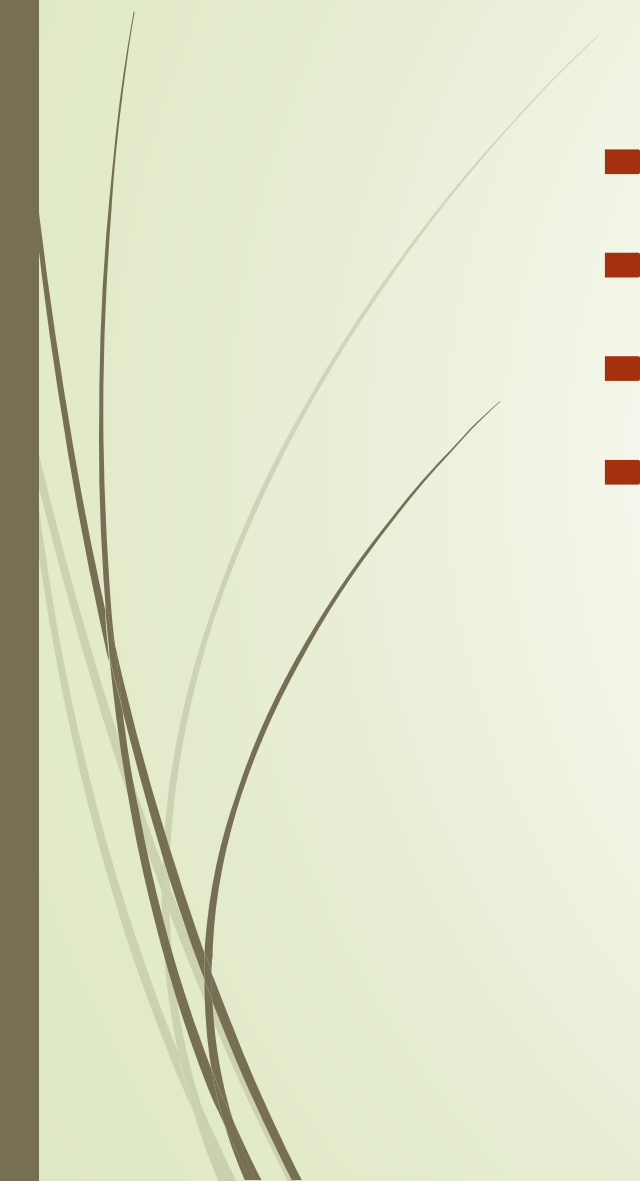


Properties of databases

- A database is designed to:
 - To avoid duplication of data; and
 - To permit retrieval of information to satisfy users need.
- Properties of a database can be summarizes as follows:
 - Integrated with provisions for different applications
 - Eliminates or reduces data duplication
 - Enhances data independence by permitting application programs to be insensitive to changes in the database.



Properties of databases

- Permits shared access
 - Permits finer granularity
 - Provides facilities for centralized control of accessing
 - Provides security control functions.
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Kinds of databases

- Two major divisions of databases are **reference databases (RD)** and **source databases (SD)**.
- RD lead the users to the source of the information: a document, person or organization.
- RD can be divided into three categories:
 - Bibliographic databases,
 - Catalogue databases, and
 - Referral databases.

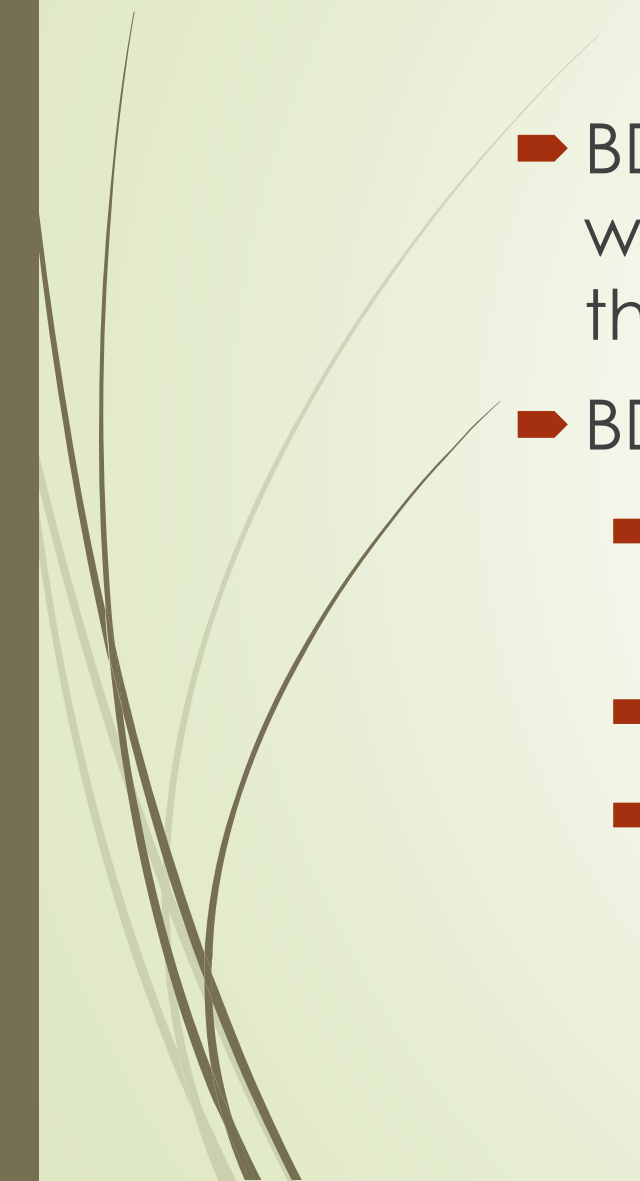


Kinds of databases

- Source databases (SD) provide the answer with no need for the user to refer elsewhere.
- SD contain the information sought for in machine-readable form, may be regarded as electronic document
- SD can be grouped according to their contents;
 - Numeric databases
 - Full-text databases
 - Text-numeric databases, and
 - Multimedia databases.

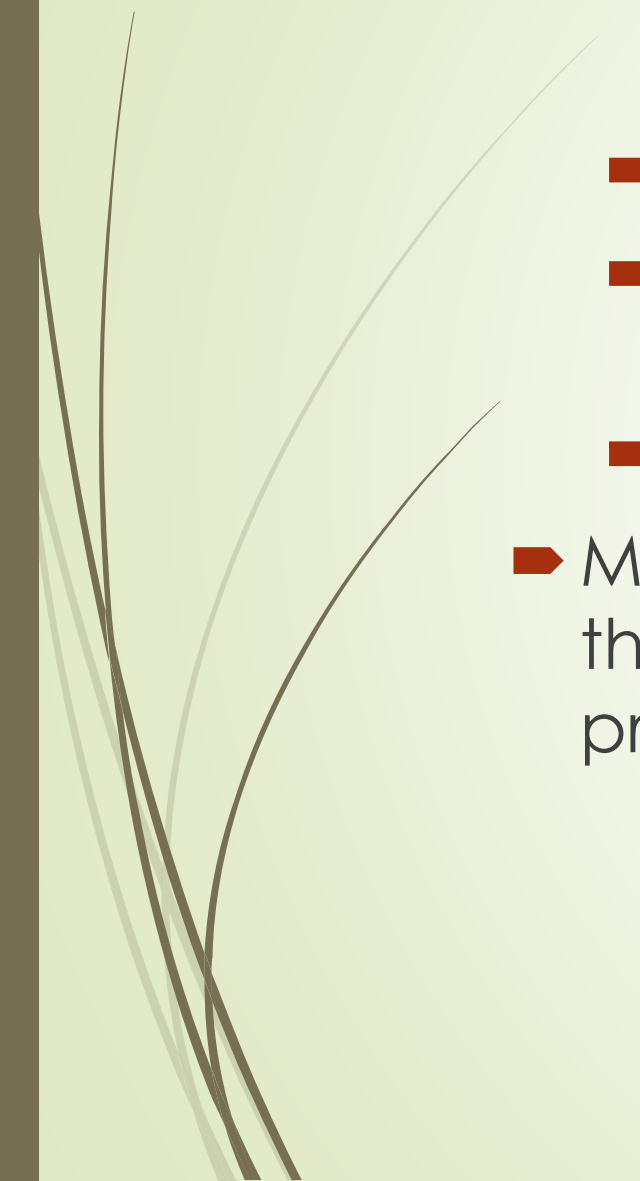


Kinds of databases: bibliographic databases

- BD from the basis of most of the IRSs available today, whether home-grown or available, on CD-ROM or through online access.
 - BD can be divided into several broad categories,
 - Catalogue databases, provide access to the collection of one or more libraries or internet resources.
 - Large discipline-oriented databases
 - Multidisciplinary databases
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Kinds of databases: bibliographic databases

- Referral databases
 - Smaller, specialized databases; serving a particular technology or application area
 - Databases covering specific types of publication
 - Most of these databases are available online and through one or more database search service providers, some also have CD-ROM versions.
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Database Technology: digital libraries and web-based information services

- A number of digital libraries and web-based information services have appeared over the past few years
 - Digital libraries
 - Open archives
 - Specialized web-based information services
 - E-government and e-business databases