DATA BASE SYSTEMS

LECTURE 1

PROPOSED BY

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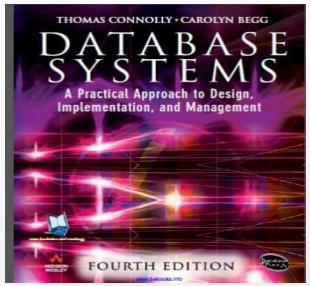
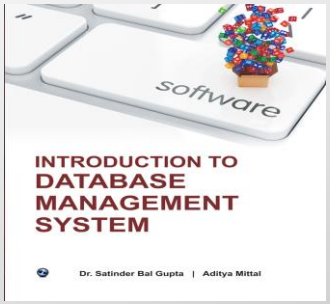
LECTURE RULES

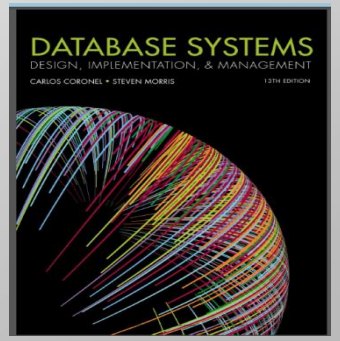
1. **ARRIVE ON TIME.**
2. **TURN OFF CELL PHONES (SILENT).**
3. **IF YOU HAVE A QUESTION, ASK FOR HELP**
4. **DO NOT HAVE PRIVATE CONVERSATIONS.**

RESOURCES AND REFERENCES

- **DATABASE SYSTEMS: A PRACTICAL APPROACH TO DESIGN, IMPLEMENTATION, AND MANAGEMENT-** THOMAS M. CONNOLLY- 2005.
- **INTRODUCTION TO DATABASE MANAGEMENT SYSTEM-** DR. SATINDER BAL GUPTA- 2017
- **DATABASE SYSTEMS DESIGN, IMPLEMENTATION, AND MANAGEMENT-** 13E-CARLOS CORONEL | STEVEN MORRIS- 2017







EVALUATION

- TOTAL DEGREE: 150
- MID TERM: 15
- PRACTICAL: 30
- ORAL: 15
- FINAL EXAM: 90

PRACTICAL SECTION

COURSE AIMS

- List and explain the fundamental concepts of a relational database system.
- Utilize a wide range of features available in a dbms package.
- Analyze database requirements and determine the entities involved in the system and their relationship to one another.
- Develop the logical design of the database using data modeling concepts such as entity-relationship diagrams.
- Create a relational database using a relational database package.
- Manipulate a database using sql.

COURSE SCHEDULING

1. Introduction to database systems
2. Database environment
3. Data models
4. The relational database model
5. E-R and EER models
6. Database planning, design, and administration
7. Normalization

CHAPTER 1

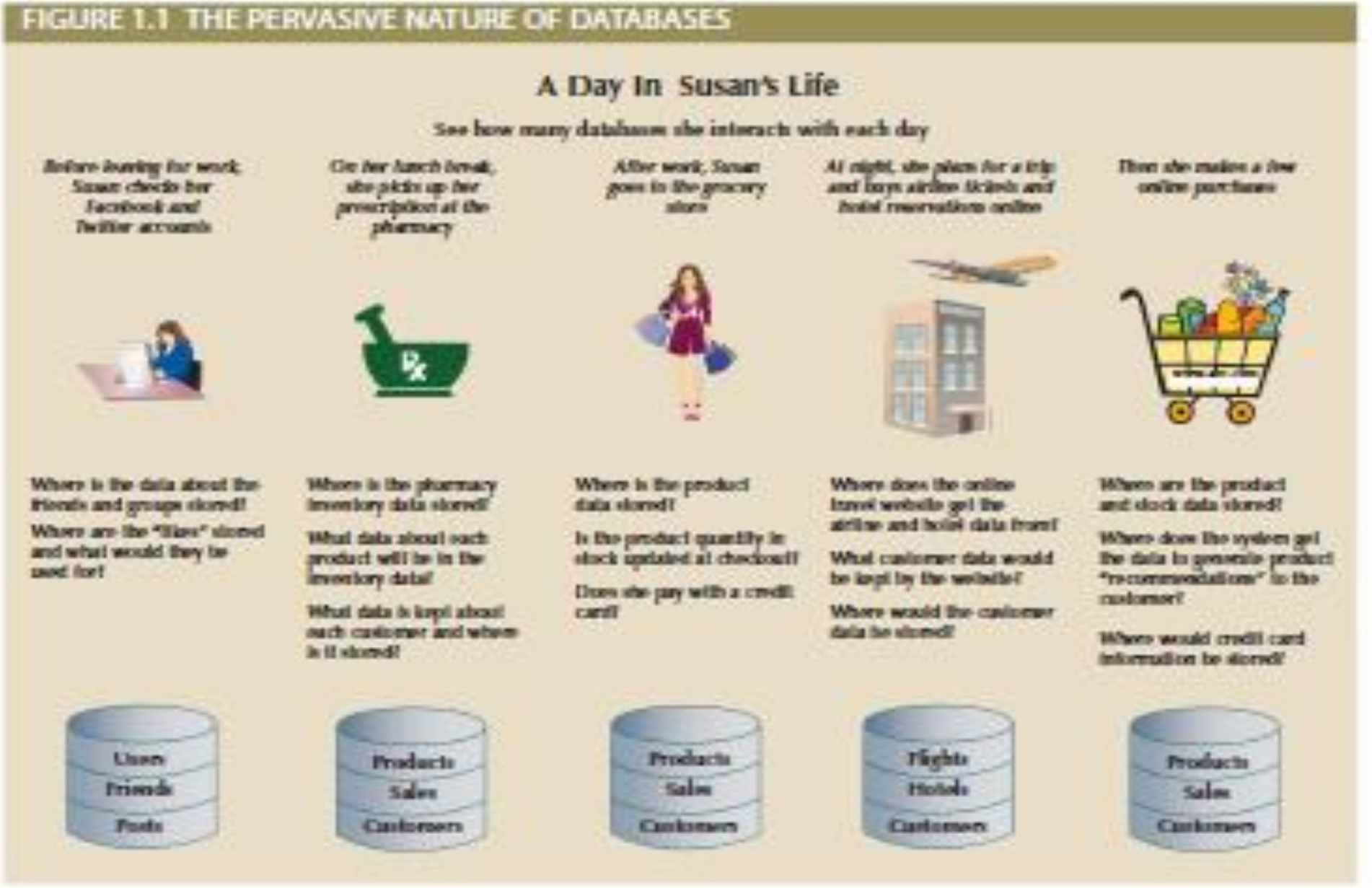
INTRODUCTION TO DATABASE SYSTEMS

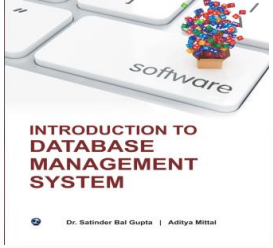
OBJECTIVES

- Define the difference between data and information
- Describe what a database is, the various types of databases, and why they are valuable assets for decision making
- Explain the importance of database design
- See how modern databases evolved from file systems
- Outline the main components of the database system
- Describe the main functions of a database management system (DBMS)

WHY DATABASE?

FIGURE 1.1 THE PERVASIVE NATURE OF DATABASES





INTRODUCTION

- Organization must have accurate and reliable data (information) for effective decision making.
- Data (information) is the backbone and most critical resource of an organization that enables managers and organizations to gain a competitive edge.
- Only those organizations will survive that successfully manage information.

INTRODUCTION

- A Database System simplifies the tasks of managing the data and extracting useful information in a timely fashion.
- A Database System is an integrated collection of related files, along with the details of the interpretation of the data.
- A Data Base Management System is a software system or program that allows access to data contained in a database.

INTRODUCTION

- The objective of the DBMS is to provide a convenient and effective method of defining, storing, and retrieving the information stored in the database.
- The database and database management systems have become essential for managing business, governments, schools, universities, banks etc.

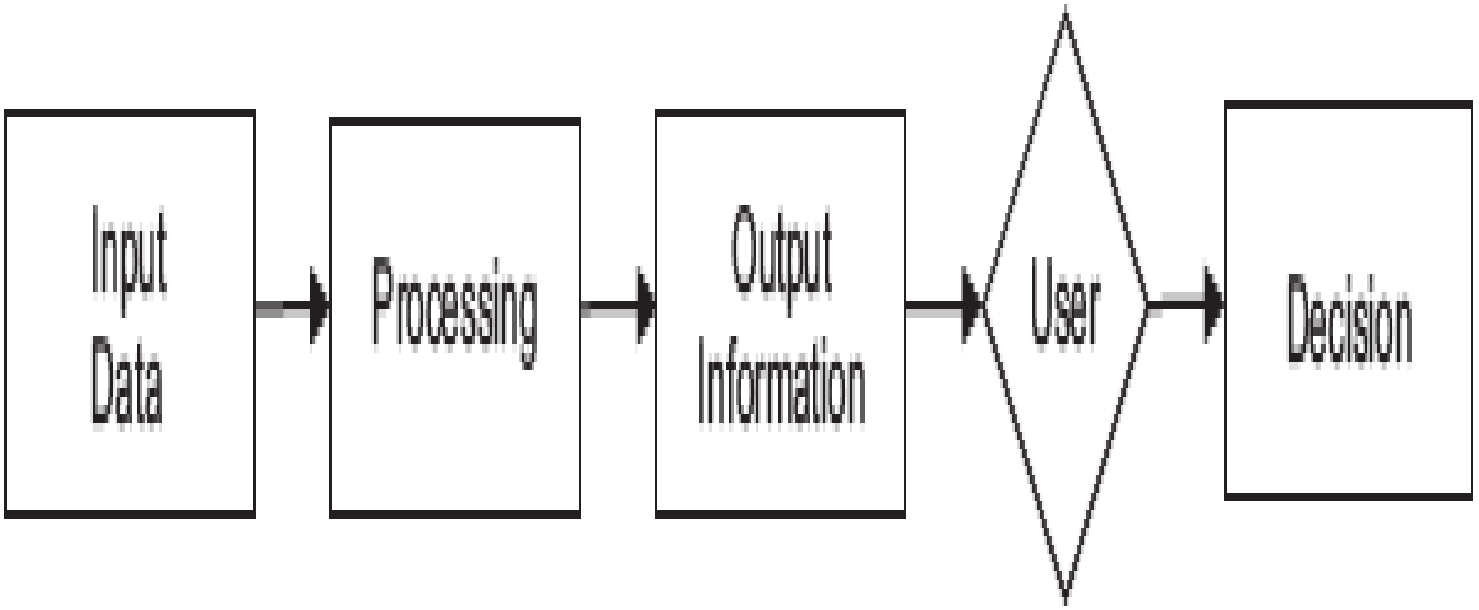
BASIC DEFINITIONS AND CONCEPTS

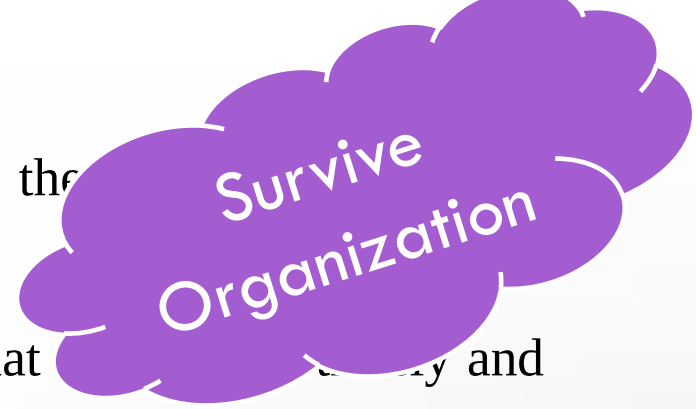
➢DATA

- Defined as known facts that could be recorded and stored on computer media.
- It is also defined as raw facts from which the required information is produced.

➢INFORMATION

- Information is nothing but refined data.
- Information is processed, organized or summarized data.
- Information is data that have been put into a meaningful and useful content and communicated to a recipient who uses it to made decisions
- Information consists of data, images, text, documents and voice, but always in a meaningful content.


Input Data
Processing
Output Information
User
Decision



- In these days, there is no lack of data, but the
information.
- The quality information means information that
relevant, which are the three major key attributes of information.

1. **Accuracy :** it means that the information is free from errors, and it clearly and accurately reflects the meaning of data on which it is based. It also means it is free from bias and conveys an accurate picture to the recipient.

2. **Timeliness :** it means that the recipients receive the information when they need it and within the required time frame.

3. **Relevancy :** it means the usefulness of the piece of information for the corresponding persons. It is a very subjective matter. Some information that is relevant for one person might not be relevant for another and vice versa *e.G.,* The price of printer is irrelevant for a person who wants to purchase computer.

META DATA

- The data about data.
- Describe objects in the database and makes easier for those objects to be accessed or manipulated.
- Describes the database structure, sizes of data types, constraints, applications, authorization etc.

META DATA

➢TYPES OF META DATA

1. **Descriptive meta data :** it describes a resource for purpose such as discovery and identification. In a traditional library cataloging that is form of meta data, title, abstract, author and keywords .
2. **Structural meta data :** it describes how compound objects are put together. The example is how pages are ordered to form chapters.
3. **Administrative meta data :** it provides information to help manage a resource, such as when and how it was created, file type and other technical information, and who can access it.

DATA BASE

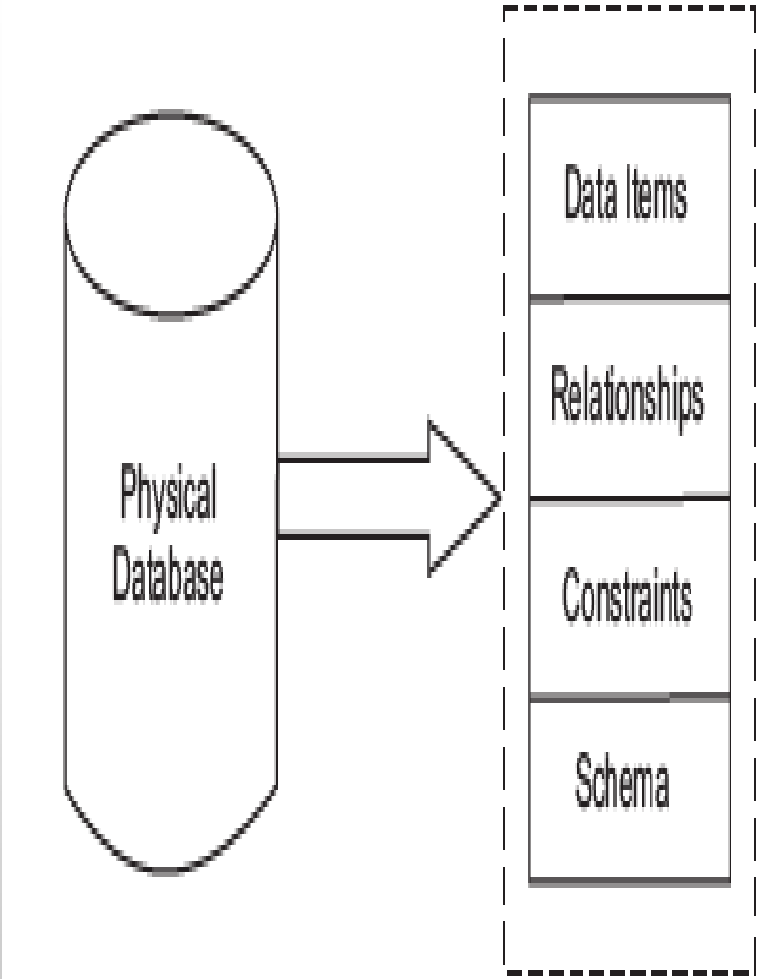
- A collection of interrelated data stored together with controlled redundancy to serve one or more applications in an optimal way.
- The data are stored in such a way that they are independent of the programs used by the people for accessing the data.

DATA BASE

- Collection of logically related data stored together that is designed to meet information requirements of an organization.
- The example of a database is a telephone directory that contains names, addresses and telephone numbers of the people stored in the computer storage.

- Databases are organized by fields, records and files.
- **Fields:** it is the smallest unit of the data that has meaning to its users and is also called data item or data element. Name, address and telephone number are examples of fields. These are represented in the database by a value.
- **Records:** a record is a collection of logically related fields, and each field is possessing a fixed number of bytes and is of fixed data type. Alternatively, we can say a record is one complete set of fields and each field have some value. The complete information about a particular phone number in the database represents a record. Records are of two types **fixed length records** and **variable length records**.

- **Files:** a file is a collection of related records. Generally, all the records in a file are of same size and record type but it is not always true. The records in a file may be of fixed length or variable length depending upon the size of the records contained in a file. The telephone directory containing records about the different telephone holders is an example of file.

COMPONENTS OF A DATABASE

1. **Data item :** it is defined as a distinct piece of information.
2. **Relationships :** it represents a correspondence between various data elements.
3. **Constraints :** these are the predicates that define correct database states.
4. **Schema :** it describes the organization of data and relationships within the database. The schema consists of definitions of the various types of record in the database,