

# CS 3002D

## Database Management Systems

### Lecture 2

#### Introduction and basic concepts

Data →  
something that  
is having  
implicit  
meaning.

Database ↗  
① Collection of related  
data.  
② It can represent features  
of real world.  
③ Designed, built for a  
specific  
purpose.

## Data and Database

- Data
  - Known facts that can be recorded and have an implicit meaning.  
Eg : Address Book
- Database
  - A collection of related data
  - DB represents some aspects of the real world
  - Logically coherent collection of data with some inherent meaning
  - Designed, built and populated with data for a specific purpose
  - Intended for a group of users and some preconceived applications in which these users are interested

④ Logically coherent  
collection of data  
that has implicit meaning

- Database → is a collection of data from real world → ∴ which part from real world the data is collected is called

Mini World.

## What is a Miniworld

- Some part of the real world about which data are stored in a database.

Eg:- Academic details of Students in an Institute

Institute → mini-world.

Ex  
Academic  
Details of  
Students in  
Institute.

### DBMS

- A software system used to create & manage computerized database.

- A DBMS is used to create, define, manipulate databases

Relational → Non Relational

## Database Management System

- A software package/system to facilitate the creation and maintenance of a computerized database
- General purpose software system that facilitates the process of defining, constructing and manipulating databases for various applications

Eg: MySQL, Oracle

Relational ⇒ Data stored in form of tables.

Tables → Rows & Cols

Ex :- MySQL,  
Oracle etc.

Non-Relational ⇒  
Store data in any  
format but other  
than table.

Ex :- File or Graph  
etc.  
JSON file etc.

Ex MongoDB etc.

## Defining Database?

Generally database → created as table in MySQL. ∴ For table we need to define  
29-Jul-24

what are columns (attributes or fields) ∴ Defining a database ⇒ Defining the

Schema of  
Database.

↓  
Data-types,  
constraints of  
data  
etc  
are to be specified.

## Defining a Database

- Specifying the data types, structures and constraints for the data

## Constructing DBMS

## Constructing a Database

- Process of storing the data on some storage medium that is controlled by DBMS

-Process of  
storing data on  
some storage  
medium that  
is controlled  
by DBMS.

## Manipulating a Database

- Includes functions such as querying the DB to retrieve specific data
- Updating the database to reflect changes in the mini-world
- Generating reports from data

Eg: Mark list

-It means using functions on DB like querying to retrieve specific data.

-Whenever changes happen in Mini world database has to be updated as well.

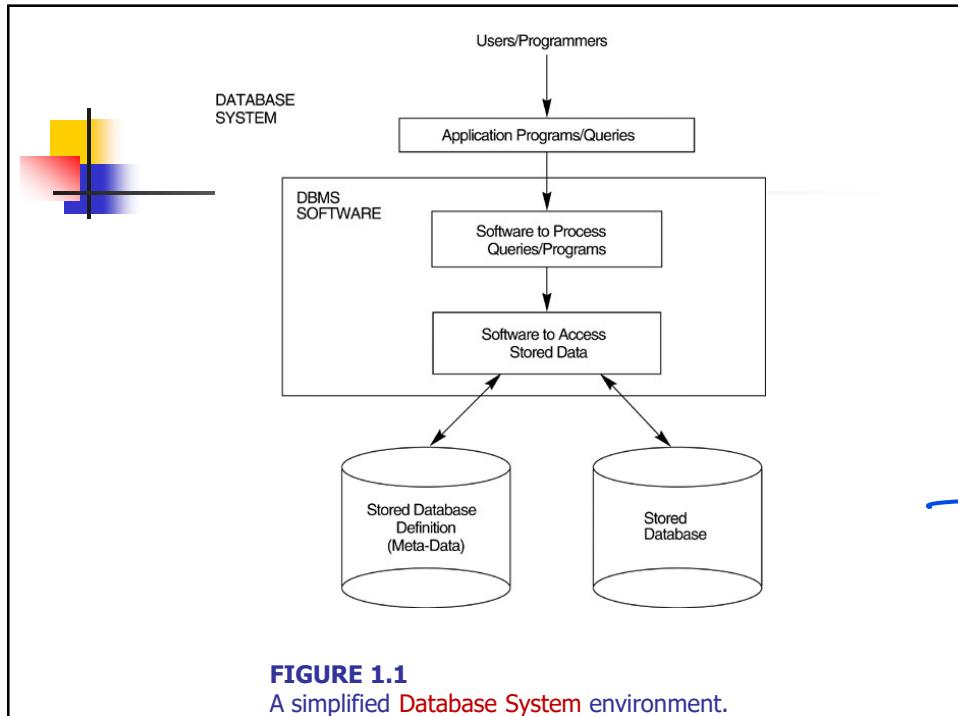
DBMS is different  
from  
Database  
System

## What is a Database System?

- The DBMS Software together with the data itself
- Sometimes the applications are also included

DBMS + Data  
↳  
Database  
System.  
Might also  
include  
applications  
also. ↳  
apps that  
use data.

Meta-data  
Data about  
Data:



## Typical DBMS Functionality

- **Define a database:** in terms of data types, structures and constraints
- **Construct or Load the Database** on a secondary storage medium
- **Manipulating the database:** querying, generating reports, insertions, deletions and modifications to its content
- **Concurrent Processing and Sharing** by a set of users and programs – yet, keeping all the data valid and consistent

DBMS is generally used to  
 ① create  
 ② define  
 ③ manipulate  
 Database.

## Typical DBMS Functionality

### Other features:

- Protection or Security measures to prevent unauthorized access
- Presentation and Visualization of data

② Presentation & visualisation of data.

DBMS other features include:

① Protection of data to prevent unauthorised access.

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