A database is a collection of related data.
- Elmasri & Navathe

An organized collection of logically related data.
- Hoffer, Prescott & McFadden

A shared collection of logically related data. Viva

and description of this data, designed to meet the information needs of an organization.
- Connolly & Begg

Database is a logic related data and also the data description is stored ~~and it is designed~~ which is designed to meet the information needs of an organization.

Essential Characteristics of a database:
i. It has to represent an aspect of real world (UoD, miniworld)
ii. It has to be very well structured.
iii. It has to reflect the current state of any real world object or UoD (Universe of Discourse).

iv. It must has users and applications.

v. It has to be stored in a permanent persisten computer memory. HD/storage

All these characeteristies have to be meet.

#Data (Raw facts and figures)

what can be data?

⇒ Any meaningful facts, texts, graphics, images, sound, video segments.

– Hoffer, Prescott & McFadden.

** So it can be said any information of areal world object or UoD can be data.

According to Elmasri & Navathe entity

" Data is a value of property of an individual UoD. object or a relationship (between two UoD objects) at a perticular time.

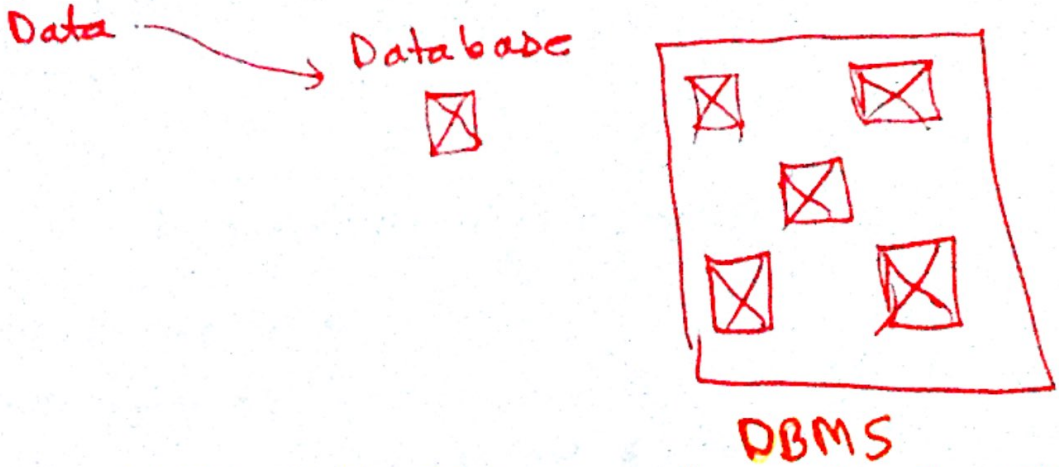
For Example:

UoD objects	James	James & CS
property	Age	Num. of points
Time	Feb 2005	Feb 2005
value	21	240

#DBMS

" A software system that enables users to define (design), create, maintain and control to the database is a Database mangement system (DBMS).

— Connolly & Begg



Some DBMS → MySQL, Oracle, SQL Servere, DB2, PostgreSQL.

Fully Explained of DBMS.

A collection of program that enable

- Defining → describing the structure.
- constructing → populating the data.
- Manipulating → quering, updating.
- Preserving consistancy
- Proteeting from misuse.
- Recovery from failure, and

- Maintain Concurrency.
  ↳ Perallally access from different places of a database. from different users.

Data Model

A Data Model is a mathematical abstraction:-

OR, Real world থেকে database তৈরি করতে আমাদের যে abstract করতে হয় সেটাই Data Model

- to make approximate representation of a real system.
- to make a model of database of this real system.

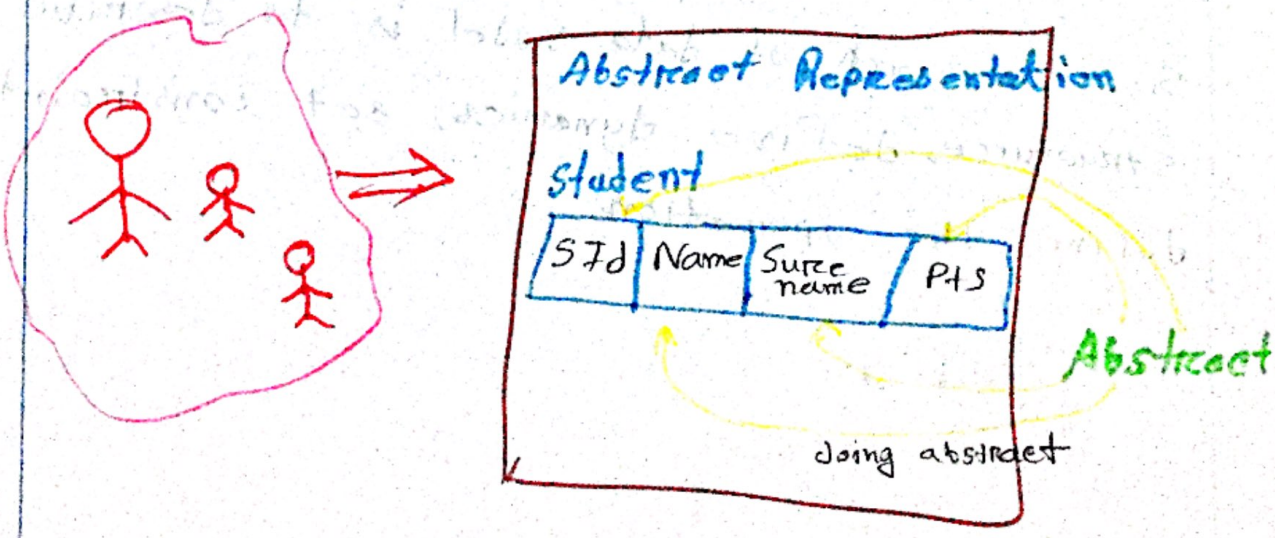
A data model provides components to represent-
- the structure
- and Dynmies

of a real world system to map theme to a database structure, constraints and operations.

So the work of data model is to describe the structure, define dynamics, set constraints and define the operations.

Classifications of Data Models

- High level conceptual data models
  - Enhanced Entity Relationship (EER - highly abstract, no DBMS)
- Higher level implementations data models
  - Object oriented (Some DBMS, mainly navigational)
- Representation implementation data models
  - Network (legacy, navigational)
  - Hierarchical (legacy, navigational)
  - Relational (contemporary, declarative) SQL
- Low level physical storage data models
  - ISAM, VSAM (file system)



* DDL - Data definition language, this is use to creat database. (table) ~~SQL~~ e. Java

* DML - Data Manipulation Language, this is use to manipulate data SQL, MySQL

how?

⇒ by inserting, retrieving, deleting and modifying data. (Insert, Modify, Update)

A DML can be navigational or Delarative.
- navigational → what + How to fetch data
- Delarative → What data to fetch

Navigational DML

A Navigational DML:

- Procedural (has loops, branching condition)
- Selects one record at time.
- Programmer explicitly uses databases physical information to navigate throug database.
  - information → need to give the location or address of hard disk
- Programmer has to define what and how.

Declarative DML

A Declarative DML:

SQL

- Non procedural
- Set oriented (selects all data that match the given condition)
- Programmers completely independent of a database physical organization
- Programmer has to define just (What.)

Better side

Data Organization Approaches

- Traditional file Approach.
- Database Approach..

Advantages

- Control of Data Redundancy.
- Data consistancy.
- Centralized data sharing.
- Program and data independent.
- Improve Data Integrity
- Improve Data concurrency.
- economy
- Improved maintanance, Security, Backup, and Recovery etc.

hardware, and software.

Disadvantages

- Data Redundancy
- Data inconsistancy
- No centralized data sharing
- No data concurrency.
- Program and data dependency

Disadvantages

- complexity
- DBMS cost
- Hardware cost
- Implementation cost
- Possible Technical Failure Risk
- Computer literate user needed to use a database etc.