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Lec-1

DBMS

Unit - 1

Introduction to DBMS

Data :- Data is a collection of raw facts & figure from which information is derived.

for ex 2, 3 → Data
↓ ↓
2+3 → Process
↓ ↓
5 → Called information.

Data may be text, no images, audio, video, etc.

Information :- when data is processed or organised so it becomes useful called information for ex 2, 3 +

2+3 = 5 → information

Database :- A database is a collection of related data from which user can effectively retrieved the derived information

for eg :- dictionary (Keyvalue pair)

Dictionary

- Computerized (softcopy) — Phone
- Non - Computerized (Hardcopy) — tells transition, Customer file

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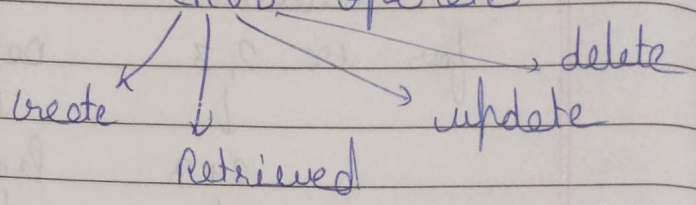
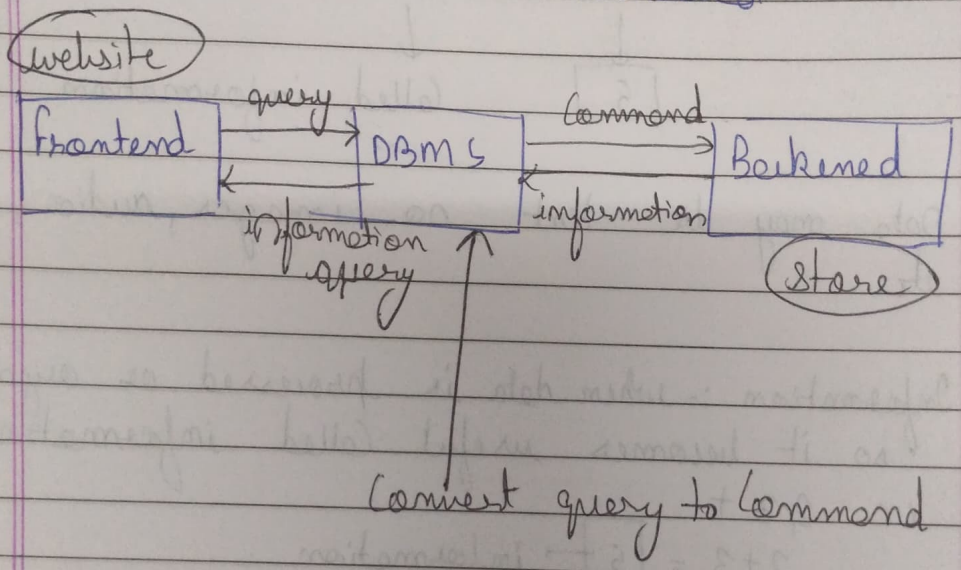
DBMS :- A DBMS is an integrated set of programs use to create an maintain database.

Main Objective :- defined, retrieved, CRUD operate





D/B file system & DBMS :-

	File System	DBMS
1	Redundency	No Redundency (Ex :- Enrollment No is different)
2	Inconsistent (No backup)	Consistent
3	C, C++, Core (frontend)	backened

4 difficult CRUD operation — Easy
5) Backup is not easy (Not smart)
6 less cost
7 less secure
8 format NTFS, FAT (Nude technology, finame system) (File allocation table)

Data stores → Mysql, MongoDB

Advantages & Disadvantages of DBMS :-

• Advantages :-
1 Controlling data Redundancy
2 Data consistency
3 Backup & recovery procedure
4 Data independency
5 Enforcing data integrity (overall description of data here is correct & accurate)
6 Easy for application development
7 data security
8 Support multiple views of data
9 Data atomicity (changes show)
10 Concurrency control (Multiple user transaction in bank)

• Disadvantages :-
1 Cost of hardware & software
2 Cost of staff & training
3 System failure
4 Explicit backup & recovery

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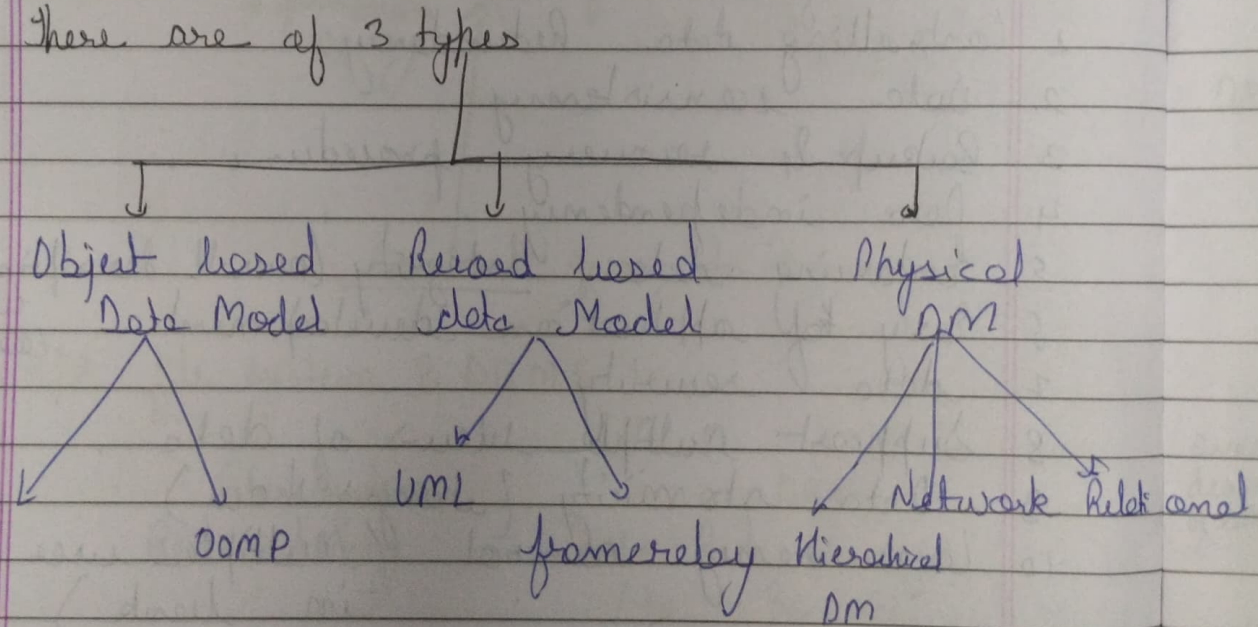
Data Models :-

A model is an abstraction process that represent essential features without including the background details or explanation.

→ A data model provides abstraction for database application.

→ It defines the logical structure of database how data is connected to each other and stored inside a system. It helps to create design in plan.

There are of 3 types



Hierarchical DM :-

It stores data in the form of tree like data structure in which parent child relationship is there. It has One - to One & One to many relationship. We use pointer to

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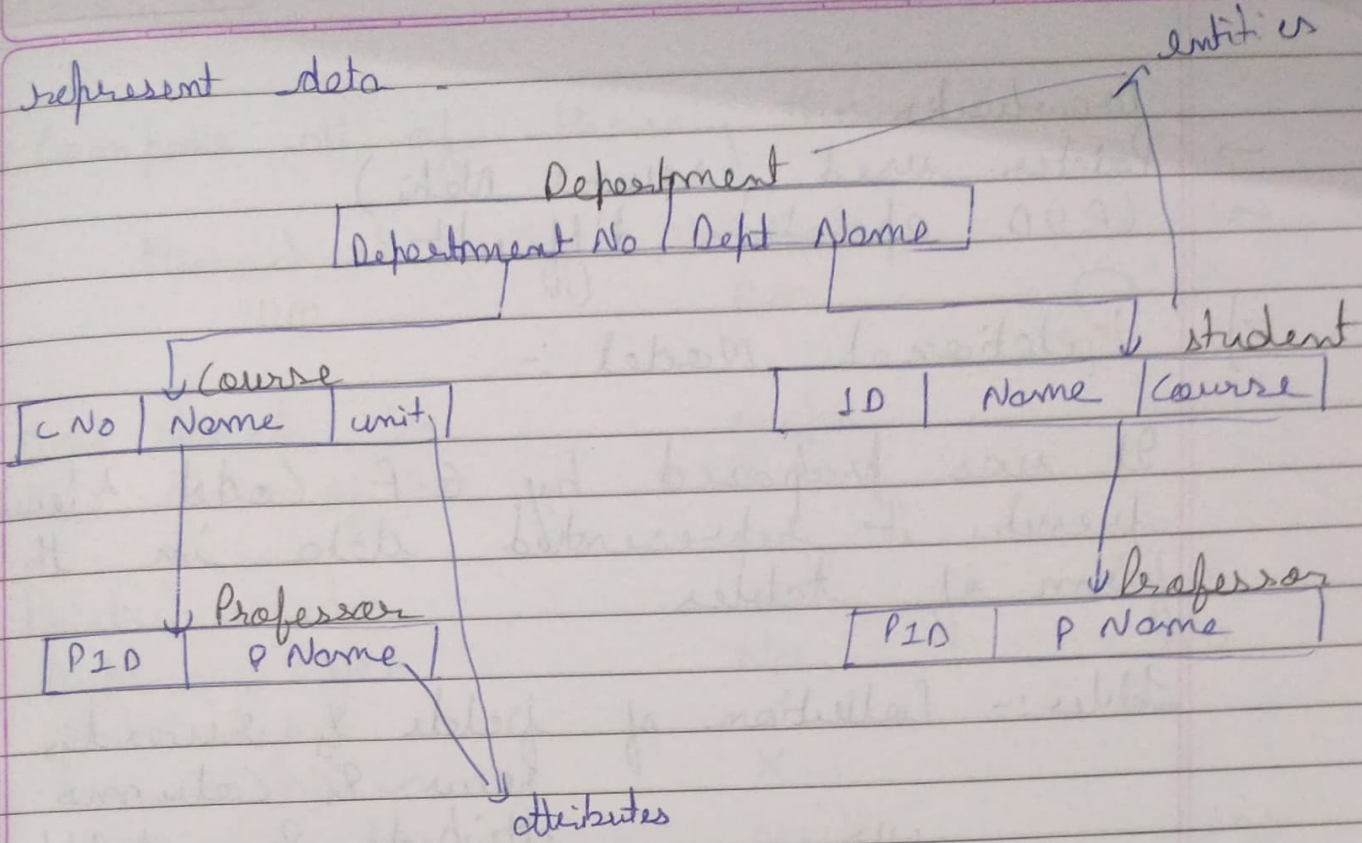
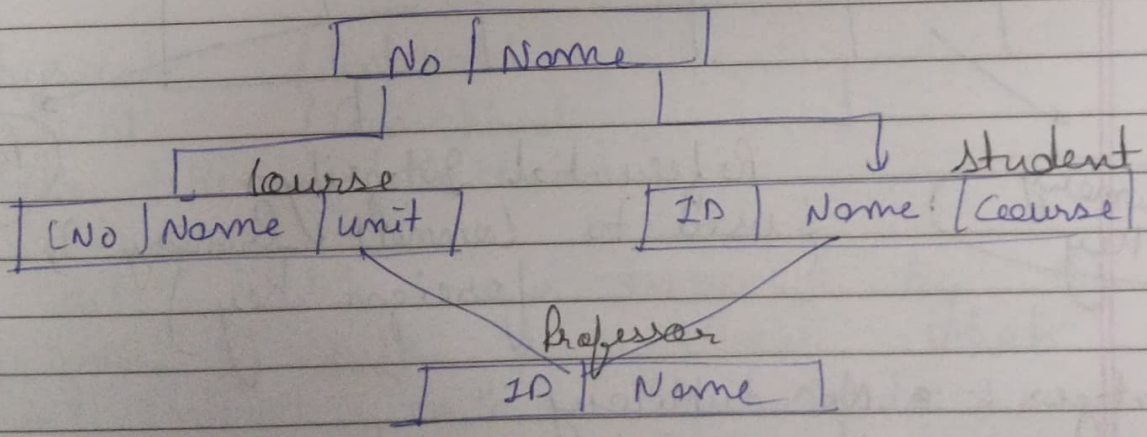
represent data -



2) Network DM :-

A Network model represent data in the form of graph the graph is collection of vertices & edges in which one to One, One to Many, Many to One & Many to many is possible & data stored with the help of pointer.



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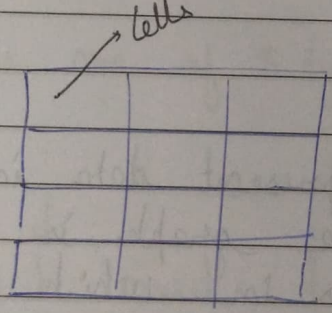
Drawbacks :-
→ Pointer used (secure Nahi)
→ CRUD operation difficult

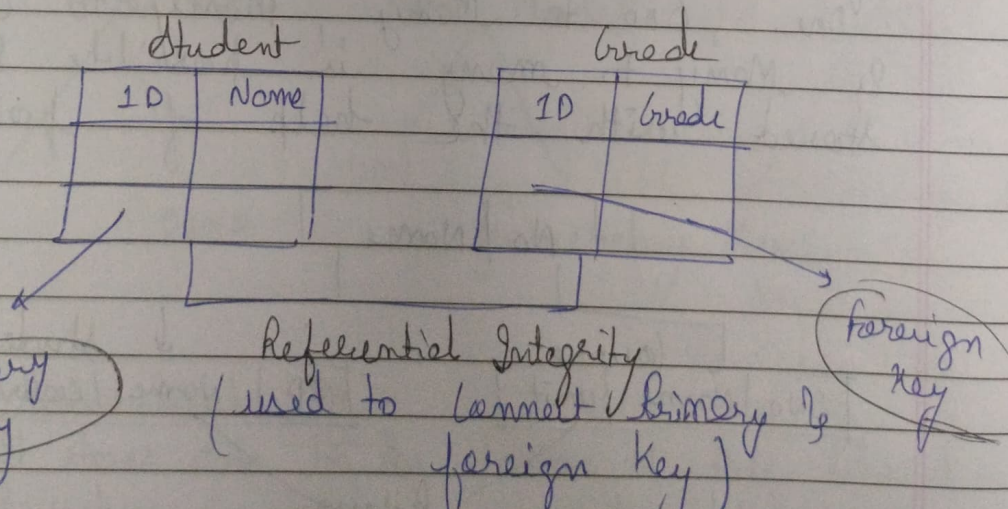
3] Relational Model :-

It was proposed by E.F Codd & their french it represented data in the form of tables

Tables :- Collection of fields & records
rows & columns
attribute & tuples



rows :- Cardinality
Column :- Degree



Advantages :-
- No duplicacy
- No pointer used

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* Q Compare all of three them

	Hierarchical DM	Network DM	Relational DM
→	Data stored in the form of tree	graph	tables
→	Pointer used	✓	x
→	Duplicacy yes	No	No
→	Relationship		
→	Parent child ✓	x	x
→	CRUD diffiult	quite	easy

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Schema & Instances :-

Schema :- The overall description or design of a database is called database schema. There are three types of database schema.

overall description of database

1) Physical (Internal)
2) Logical (Conceptual)
3) View Schema (External)

A database schema is designed by the database designer to help programmer which software will interact with the database.

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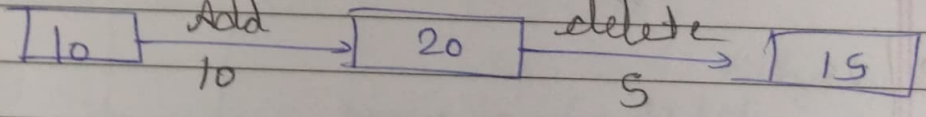
→ Schema creates abstraction to various level in the database.

Database Instance :-

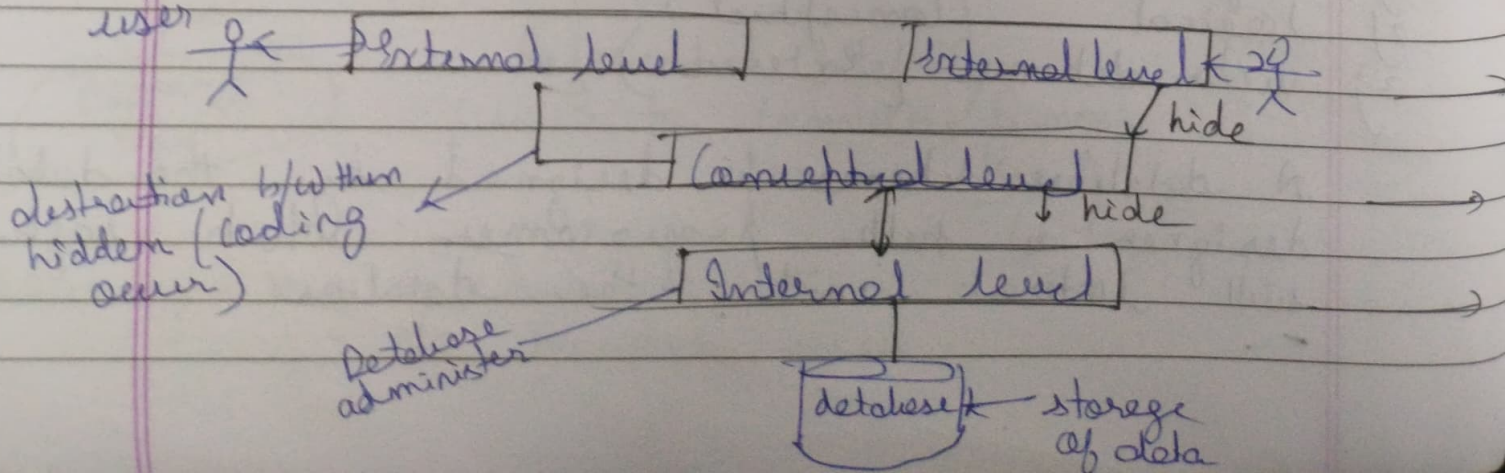
The data stored in a database at a particular moment of time is called instance of database. Instance can be change overtime when we add or delete data from the database.



Database instance is

DBMS Architecture :-

The DBMS architecture is divided into three levels also known as three Schema architecture



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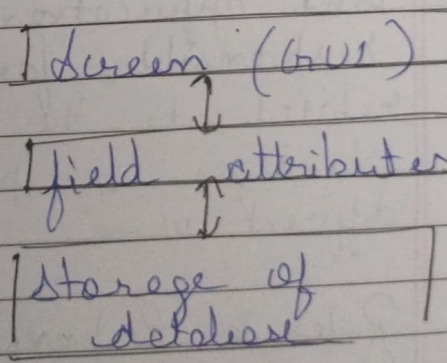
1) Internal level :- It is also known as physical level or low level representation. Here actual representation of entire database is assign. Only one internal schema per database
Data stored in the form of 0/1 (binary)

2) Conceptual level :- The conceptual or logical or logical level level describes what data are to be stored in a database & also described relationship among data. Implementation details of the data structure are hidden at conceptual level In this level programmer or somehow DBA works.

3) External level :- In this level users are present here. Multiple view is assigned to Multiple users

Student system



View level

Conceptual level

Physical level

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Database users :-

→ End users — Name (No knowledge of DB)
Sophesticated (great knowledge)

→ Application programming — business analyst
Data scientist

→ System analysis → design structure

→ DBA (properties of DB)

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DBA & its roles & Responsibilities

DBA can be a single person or group of person has central control over both database person has central control over both database and application program. DBA is responsible for everything that is related to the database. makes policies strategies & provide technical support to different user.

→ Roles & Responsibilities :-

1 Schema definition & Modification
2 Granting authorization for data access
3 Routine Maintenance check

4 New software installation
5 Monitoring performance
6 Security enforcement & Administration
7 deciding storage structure & query strategy
8 DB availability 24x7
9 Training & supporting users
10 Backup plan insurance

11 Data Independence :-
The ability to modify a schema definition in one level without affecting a schema definition in the next higher level is called data independency. Data Independency helps us to keep data seperated from all programs that makes use of it. There are two type of data independency.