→ can be XXL

* What is DBMS ?

→ DBMS contains information about a particular enterprise such as -

1) Collection of interrelated data
2) set of programs to access the data
3) Convenient and user-efficient environment

Ex: banking transaction, university registration etc.
↳ add new std
compute cGPA

* Drawbacks of using file systems: (7)

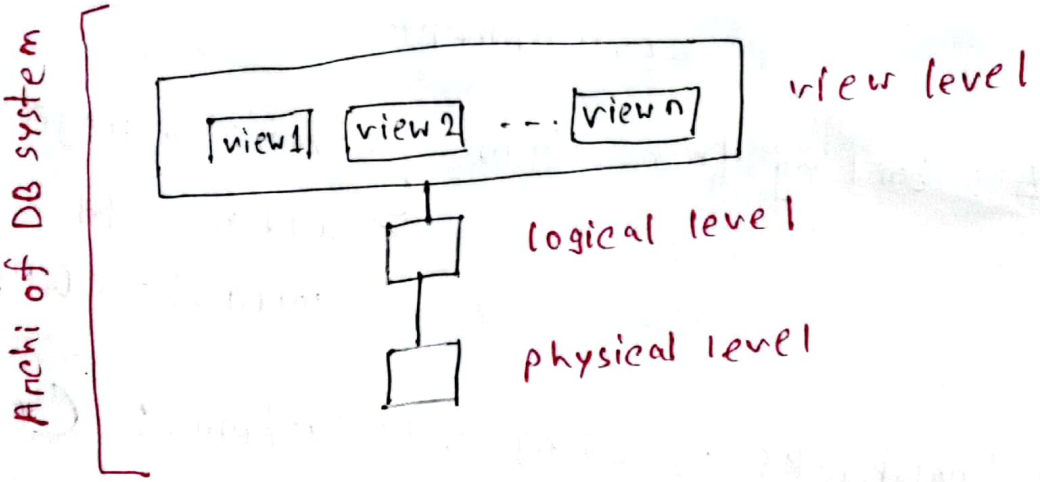
1) Data redundancy → duplicate info
2) Data inconsistency → multiple file format
3) Data isolation
4) Data integrity problems → hard to add and update info
5) Atomicity of updates → (data inconsistency)
6) Problems in Concurrent access by multiple users
7) Security problems

* Levels of abstraction:

1) Physical
- describes how data is stored

2) Logical
- describes about stored data and relationships among them

3) view Level
- hide data types' details
- hide info
- security purpose



* Schema: logical structure of DB

consists- stored data - relationship

- acts like variable

2 types: 1) Physical schema
2) Logical "

* Instance: actual content of dB
  - value of variable

* physical data - independent
  - not depend on logical schema
  - can modify it without changing logical

Interface between the various levels/components should be
- well-defined
- less dependency

* Data model

collection of tools to describe
- data
- " relationships
- " semantics
- " constraints

Ex:
- Relational model
- ER model
- object based data model
- semistructured data model (XML)
- network "
- hierarchical model

Structured Query Language (SQL) - non procedural language

DB design (2)
1) Logical
2) physical

DML - Data manipulation Language

- language for accessing and manipulating data
- organized by appropriate data model
- also known as **query language**

2 classes of language:
1) Procedural — what data needed, how to get that data
2) Non- " (declarative) (user specified)

what data needed — not knowing how to get that data

DDL - Data definition Language

- language for generating a set of table templates stored in a data dictionary

contains →
metadata
1) DB schema
2) integrity constraints
   - primary key
   - Referential integrity
3) Authorization

* XML - Extensible Markup Language

- before : document markup language
- now : db language
- defined by W3C (WWW Consortium)
- specify new tags
- create nested tag structures

not only doc exchange

special features of XML to exchange data

- basis of all generation data interchange formats

* Storage manager: program module
- provides interface between
  - low-level data stored in db
  - application programs and queries submitted to the system

↳ 2 tasks:

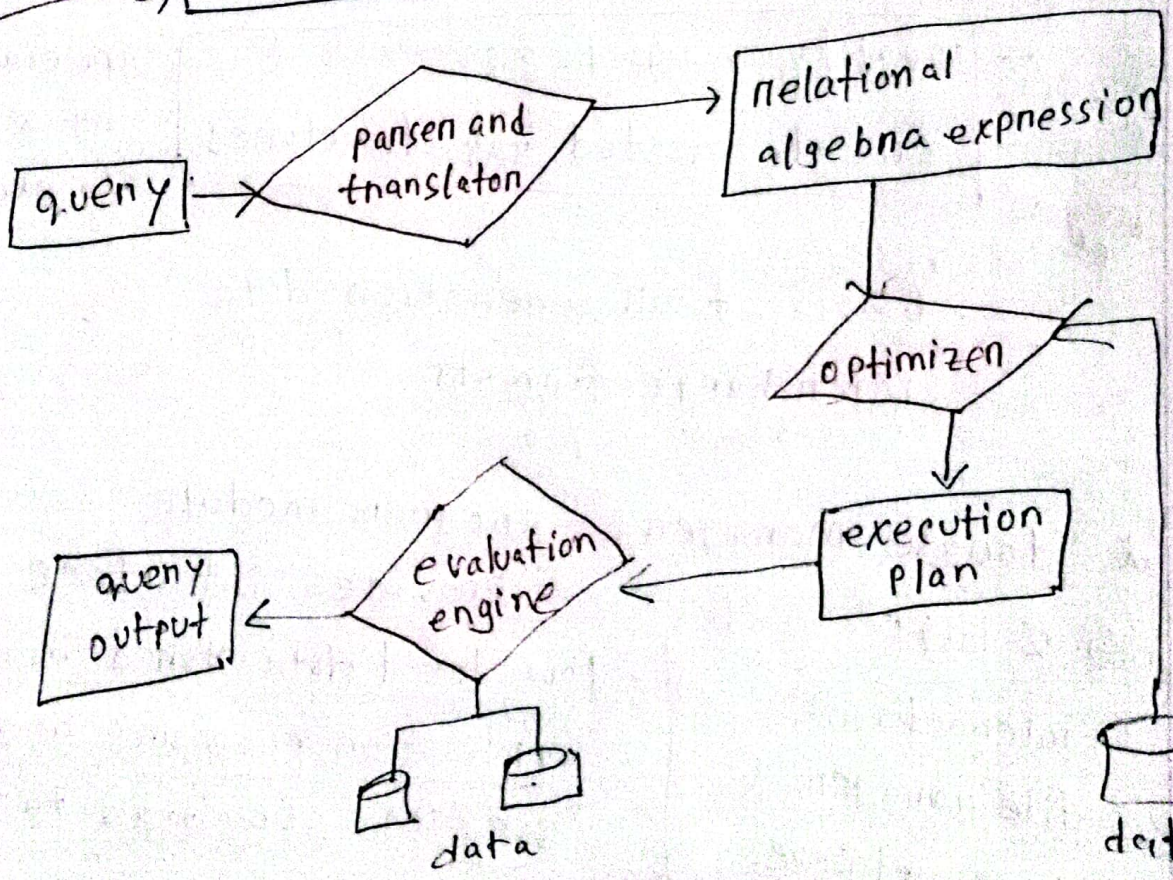
1) interact with file manager
2) store, retrieve, update data efficiently

3 Issue:

1) Storage access
2) File organization
3) indexing and hashing

3 step of Query Processing

1) pansing and translation
2) optimization
3) Evaluation



Steps of evaluating query:
1) equivalent expression
2) diff. algo for each operations
3) estimate cost of u
4) estimate stat.

4 steps

* DB archi : 4 types

1) centralized
2) client server
3) distributed
4) parallel (multi-processon)

* Transaction : collection of operations that
- performs a single logical function
- in db app

syntax:
db remains in consistent state despite
- system failure
  - power "
  - os "
- transaction "

* Concurrency control manager :
- controls interaction between concurrent transaction
- data remains consistent