

02/01/2025

DBMS

DBMS:

Collection of interrelated data and set of programmes to work with the data.

Database

provides convenient and efficient interface to store & retrieve data into/from database

Database \Rightarrow Disk

only data structures associated with disk \Rightarrow FILE

Why need database if in the end everything is file?

Difficulties in file processing based system

1. User doesn't have to implement synchronization principles. Knowledge of OS API not needed. DBMS system takes care of them.
2. Data redundancy & inconsistency.

\rightarrow multiple copies of same data.

\rightarrow certain data is stored that can be obtained from other data. (like age & DOB)

\downarrow Leads to

- waste of space
- Data inconsistency

multiple copies of same data exist then if they do not match \Rightarrow Data inconsistency.

\downarrow multiple copies need to be updated simultaneously.

3. Difficulties in accessing data.

Program is written to retrieve data as per the requirement



if requirement is changed, then new set of programmes may have to be written.

4. Data Isolation: Data is spread over multiple files. To gather all information, multiple files to be collected ~~##~~ MEANINGFULLY. ⇒ Difficult for a programmer

5. Concurrent access ANOMALY: Same piece of data being accessed by no. of users simultaneously.



if not controlled, updation of data may show improper values.

Concept of granularity.

imagine array of ^{items} elements. process P_1 & P_2 are updating the qty of items. If lock is applied on entire array, then diff. elements ~~by same~~ can't be updated simultaneously even if it is safe to do so. Hence we have to apply it at an individual item level. i.e. lock to be associated with just one item not collection of items.

6. Security Problem:

Centralized collection of Data.

Who can access which data. & what activities one can do.
→ Security.

7. Integrity enforcement

Data must satisfy certain constraint/
~~can~~ conditions.