CT-05

1. Explain Granularity of Data items & multiple Granularity locking
2. Explain Recovery techniques based on immediate update. Discuss different db backup and recovery from catastrophic failures.

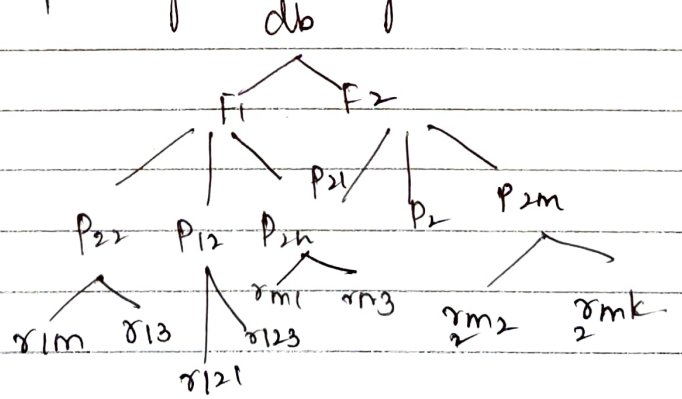
Q 1) Granularity of Data items

Size or granule of data for concurrency control.

It could be
* An attribute value
* A db record
* A disk block
* A whole file
* A whole db.

Data item granularity and degree of concurrency
→ fine granularity - refers to small items size.
→ coarse granularity - refers to large item sizes
→ Larger the data item size, lower the degree of concurrently

Data item size depends on the types of transactions
⇒ multiple granularity level locking



The multiple granularity locking protocol consisting of the following rules:

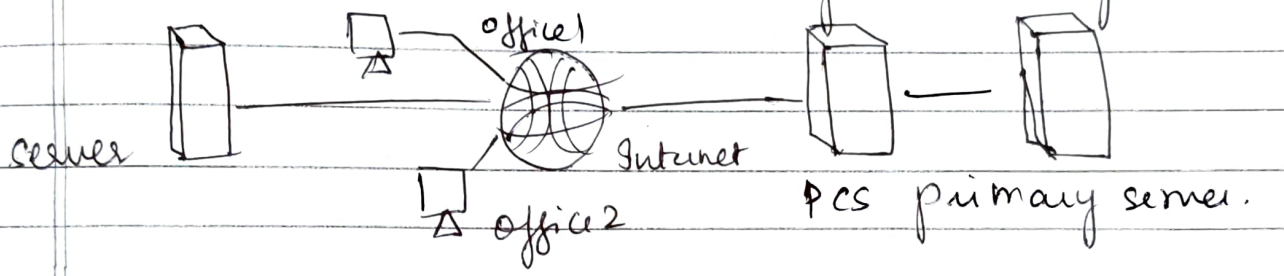
1. The lock compatibility must be adhered to.

2. The root of the tree must be locked first, in any mode
3. A node N can be locked by a transaction T in S or IS mode only if the parent node N is already locked by transaction T in either IS / IX mode

Q2) Recovery technique based on immediate update:
* Db can be updated immediately
* no need to wait for transaction to reach commit point
* UNDO-type log entries must be stored
* Recovery algorithms
  → UNDO / NO-REDO (steal / force strategy)
  → UNDO / REDO (steal / no-force strategy)

⇒ Database Backup from catastrophic failure:

(1) Remote backup:- Here a backup copy of the db is stored at a remote location from where it can be restored in case of a catastrophic



(2) Alternatively, db backups can be taken on magnetic tapes and stored at a safer place. This backup can later be transferred onto a freshly installed db to bring it to the point of backup.