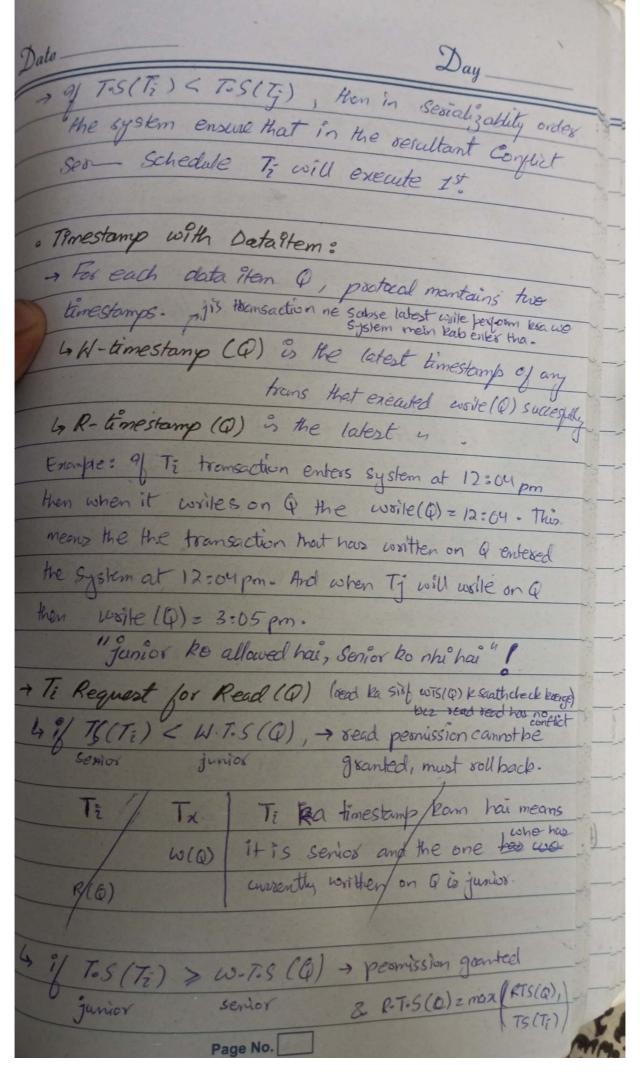
Day Date " LANGURENCY LANTROL -> TEll now we already know how to check whether a shadule will mentain the consistency of DB or not using [C-s, V.s, secoverability, cascodless, strict] - Now are study protects that quarentees to generate Schedule which satisfy propesties specially (C.S) - Actual problem is, different boursaction trying to access data at same time. -> Following are the concurring control methods. 1) Timestamping Protocol: (no deadlock -> Basic idea of timestamping is to decide the order blow he hansactions before it enters into the system. -> So that in case of conflict during execution we can sesolve the conflict using ordering. o Threstomp with tromsactions With each transaction To we associate a time-stamp denoted by T.S (Ti), It is the value of the system clock when a transce enters into the system, so if a new trans Tj enters after T_i , then $T.S(T_i) < T.S(T_j)$, always lingue; This will always be unique and will remain fixed throughout the execution Page No.



Day Date > Ti request for write (Q) 4if T.S(Ti) < RTS (Q) > not granted, on Whale 4 if TS(Ti) < WTS (Q) > not granted would back 4. 1. 5 (Ti) > RTS(0) > gounted

7. 5 (Ti) > WTS(0) & wTS(0) = max(wTS(0), TS(Ti)) juncior · Strict To Algorithim: 4 Ensurer Scheduler are both strict & C-S. 4 A transaction T issues a read-item (x) or write -ilem(X) such that, TS (T) > cu-TS (&) has it's read or write oper delayed until T' that wrote the value of X has comitted or aborted. · Thomas Write Rule 3 required TS (7i) < kITS (Q), here instead of roll back ignose the write operation requested by Ti 2 in the control of the person of the write operation requested by Ti & continue processing. be cos but it will be vis. Page No.

Day De tak Based Protacol: First obtain a lock on odata them then performed a desised operation and then anlack it. Adodes of Lak: Binory locks: Two slates -> Locked (X) Unlocked (X) Binory locking let sestrictive for Bilemy before any read(X)/while(X) the transaction T must it acquire lock. Or elx it must wait fer the lock to be freed. In Affect completion of operation free the lak. Shored / Exclusive Or Read/Wille locks In Read oper on the same Nem are not conficting. In Must have the exclosive lock to usile. Shore lock (read-lock(X): Ags Kiel Re sist seed operation have the same item for the X. Shore lock (read-lock(X): Ags Kiel Re sist seed operation have the same item for the X. Exclusive / write-lak(X): Ags Viel to work or Fred done kind have be welled lock bin have a page as exclusive lock have to keed doos to a page item X pars Graved lock bin in the less saleta it must wait. Page No. Page No.	
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First obtain a lock on adata them then performed a desired operation and then anlock it. Adots of Lak: Binary locks: Two states - Locked (X) Unlocked (X) Binary locking the sestrictive for 08 ilems Ly before any sead (X) / write (X) the transaction T must ist acquired lock. Or else it must want for the lock to be freed. Ly After completion of operation free the late. Shored / Exclusive Or Read/Wille Locks Ly Read oper on the Same Nem are not confecting. Ly Must have the exclusive lock to usite. Shore lock (read-lockéx): Agr Kini ke sixty seed opos pestorm kana hai to ye to sake hai. Multiple transaction intending to seed X can acquire this lock at sume item for the X. Exclusive (write-lock(X): Agr Vaisi ke write or Pad done kana hai to we ye lega. Or agr Kin K paar exclusivelock hai to kei doos Ta aakr ilem X par Shared lock bhi nhi	To M ak Based Protocol:
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opos pestorm Rona hai to ye le salta hai. Multiple transaction intending to read X can acquire this lock at same item for the X. Exclusive (write-lak(X): Agr Risi ke write or read done know hai to we ye lega. Or agr Rix R paaz exclusi relak hai to koi doorra aakr ilem X par Shared lock bhi nhi	· Sharp lock (xand larlefy). An Bis he all
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read done kona hai to we ye lega. Or agr Rix R paaz exclusive lock hai to kei doos a aakr ilem x par shared lock bhi nhi	Multiple transaction intending to send X can
read done kana hai to we ye lega. Or agr kix k paar exclusive lock hai to keei doosta aakr ilem x par shared lock bhi nhi	acquise this lock of same item I the X.
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Rix R paar exclusivelock hai to koi doosta aakr ilem x par shared lock bhi nhi	
eaks item x pax shared lock bhinhi	
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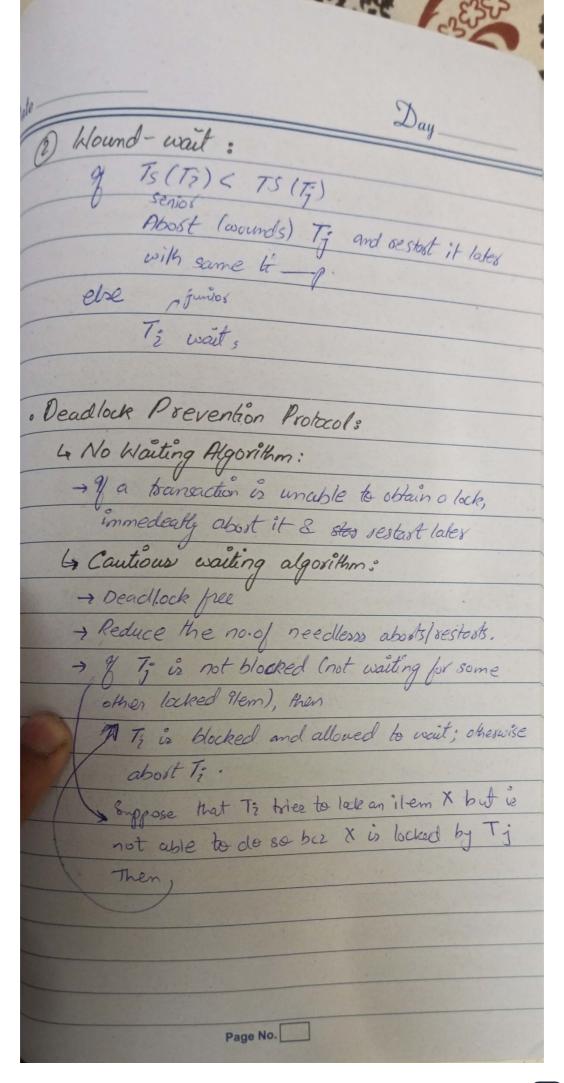
Day-Date · 2 - Phase Locking: 4 Basic 2PL & + This protocol requires that each towns in a school will be two praxed: 4 Expanding / Growing phase New tocks can be acquired but none can be seleased. Lack conversion approales must be clone in this phase La Shrinking phase Existing locks can be seleased but none can be acquired Downgrades must be done during this phaselock point -> Ensures C-S/VoS, the order of serialistity is the order in which transaction seach lock point. - May generates insecoverable schedules & cascachy sollbacks. or Deedleck cem occur. > lock X(A) RLH well) locas(B) 160K 8162 JOEKS (A)

Nate —	Day
La Conservatione (Static) 2 PL:	
La Requires a bansaction to lock of	all the item 24
accesses before the transaction	begins
G Decalock-free protocol. (kg H	here is not dd
must release the lock ocquired	He then transaction
must selease the lock ocquired	t so far and weit.
G made of freeze, wansac	tion just will -
start from lock point. In C.S & V.S gurenteed	I then directly
start from lock point.	Jack point
La C.S & V.S gurenteed	phase phase
4 But it is cascade rollbacks &	8 Precoventle
	schedule.
4 Rigorous 2PL:	
-> All the locks must be held until	transaction tock point
Comitts	growing Shrinking prosel
-> There is no shrinking phase	/
→ Te jab tak koi data ilem unlock	
be sold usko tak nhi ke sakta t	o airry read
the nhe hoga. all locks	and freed.
or the table hoga jab comitt h	ofayega. is
comit & bacd Disty sead which	les en Dish Ball
> Ensurer secoverability, cascadless	
U	Tock (4)
+ Deadlack can occur.	P(A) W(A)
degree of Page No.	Count lockes(A)
degree of concerning deer.	(KIA)

Day-Date 4 Strict 2PL: - In shrinking phase untaking of exclusive tack not allowed but shared lacks can be untaked - Pashal Shoinking phase - Doved to isting unlock books gooing phase bez us se disty seed to Poi issell nhe hota. OR gab shared lock acquire kroke the to esi votes iska ntlb us value por sist read hi pestorm hosha that woile how hi whi they to disty recol bhi nhi hoga. -> Decolock cem occur. ≥ Dealing with Deadlocks: / 4. Transaction that needs several impractical I tem will lock them in that order · Protocols based on timestamp: 1) Wait-die if TS (Ti) < TS (Ti)

To waits

else pib junior About Ti and sestost it lates with same timestrup. Page No.



Day_ Date · Deadlack Detection: · Wait-for- Graph: is one node created for each transaction that is currently executing 4 When Ti is waiting to lock on Hem. X that is arrently locked by Tj, a directed edge (Ti + Tj) is created 4 When Ti seleases the locks on the ikm Ti was waiting edge is removed. grap has a cycle. " · Victim Selection: La Deciding which brans to about in case of deadloss 4 select the youngest transaction. · Timeouts & It about the bransaction. · Starration : Endefinite period of time while other trans