COMPUTER SCIENCE

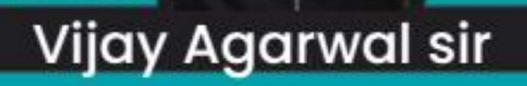


Database Management System

Transaction & Concurrency Control

Finding Number of Conflict Serializable Schedule









Problem due to Concurrent Execution

Finding Conflict Serializable Schedule



Serjalizable Schedule.

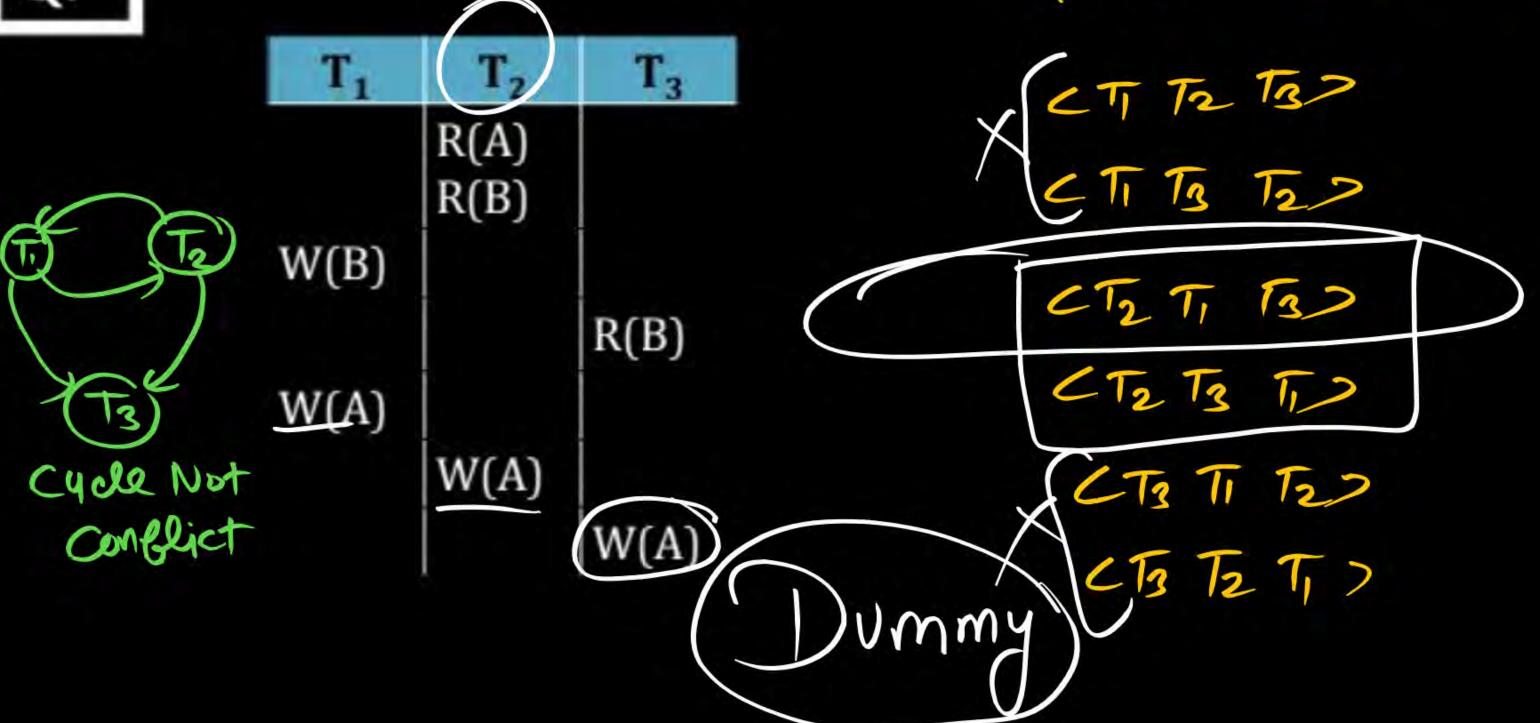
Conflict Serializable

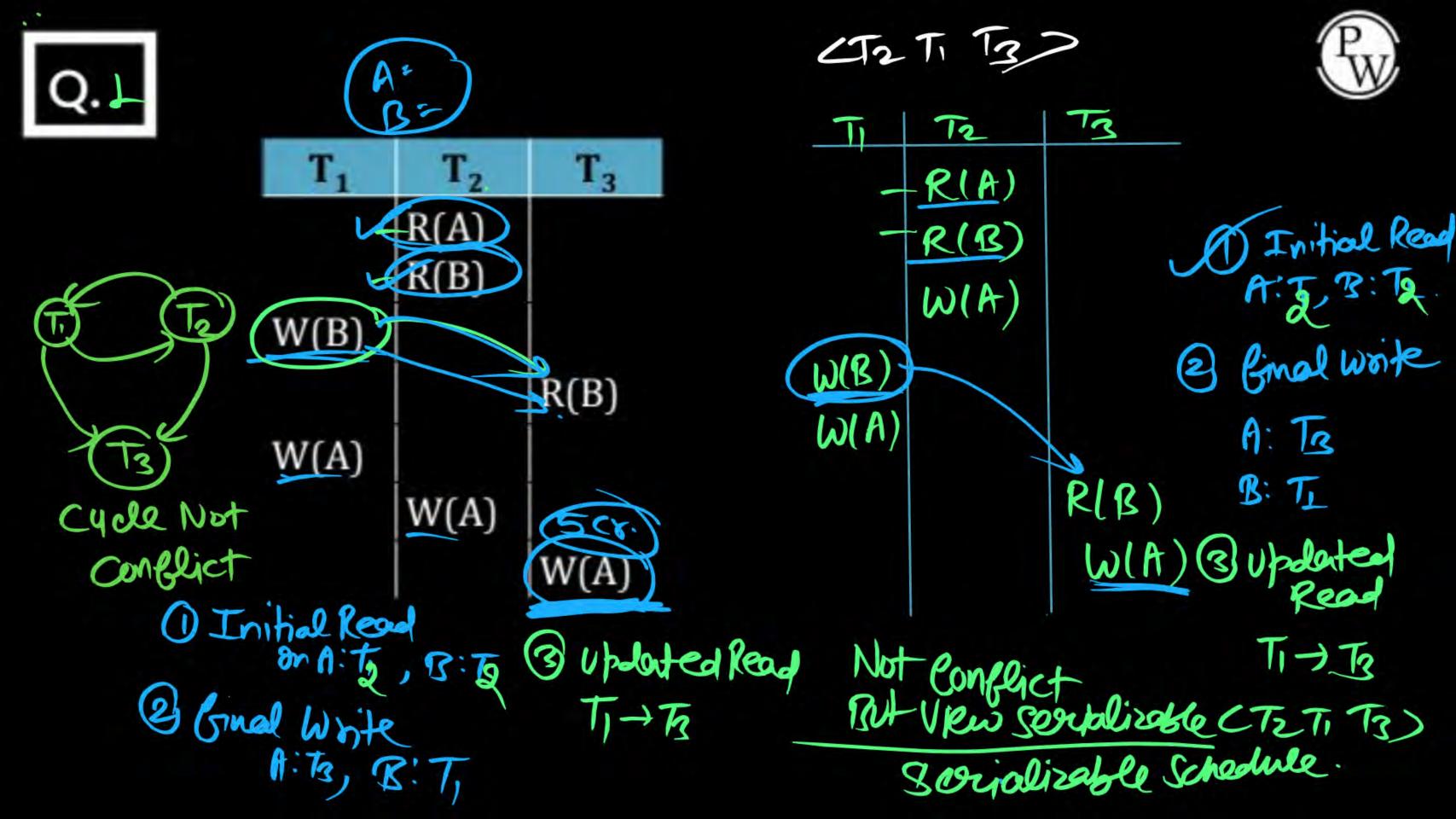
Bosic Concept Bosic Concept Breedence Graph Conflict PAIR. View Serializable

- 1 Initial Read
- & Ginal Write
- Write-Read
 [Uhdated Read]

Q.

31 = 6 Serval Scheelul





In Previous Bruestian Not Conflict But view Servializable (Rainel Write) Serializable Schedule

| Q. | 2 |
|----|---|
| | _ |

Consider the following schedule S of transactions T₁ and T₂:



Which of the following is TRUE about the schedule S? [2004: 2 Marks]

| | | T ₁ | T ₂ |
|---|---|-------------------------------------|--------------------------|
| Α | S is serializable only as T ₁ , T ₂ | Read(A) $A = A-10$ | |
| В | S is serializable only as T_2 , T_1 | | Read(A) $Temp = 0.2 * A$ |
| C | S is serializable both as $\rm T_1$, $\rm T_2$ and $\rm T_2$ $\rm T_1$ | | Write(A) Read(B) |
| D | S is not serializable either as T_1 or as T_2 | Write(A) Read(B) B = B +10 Write(B) | |
| | Cycle Not Conflict | | B = B + Temp Write(B) |

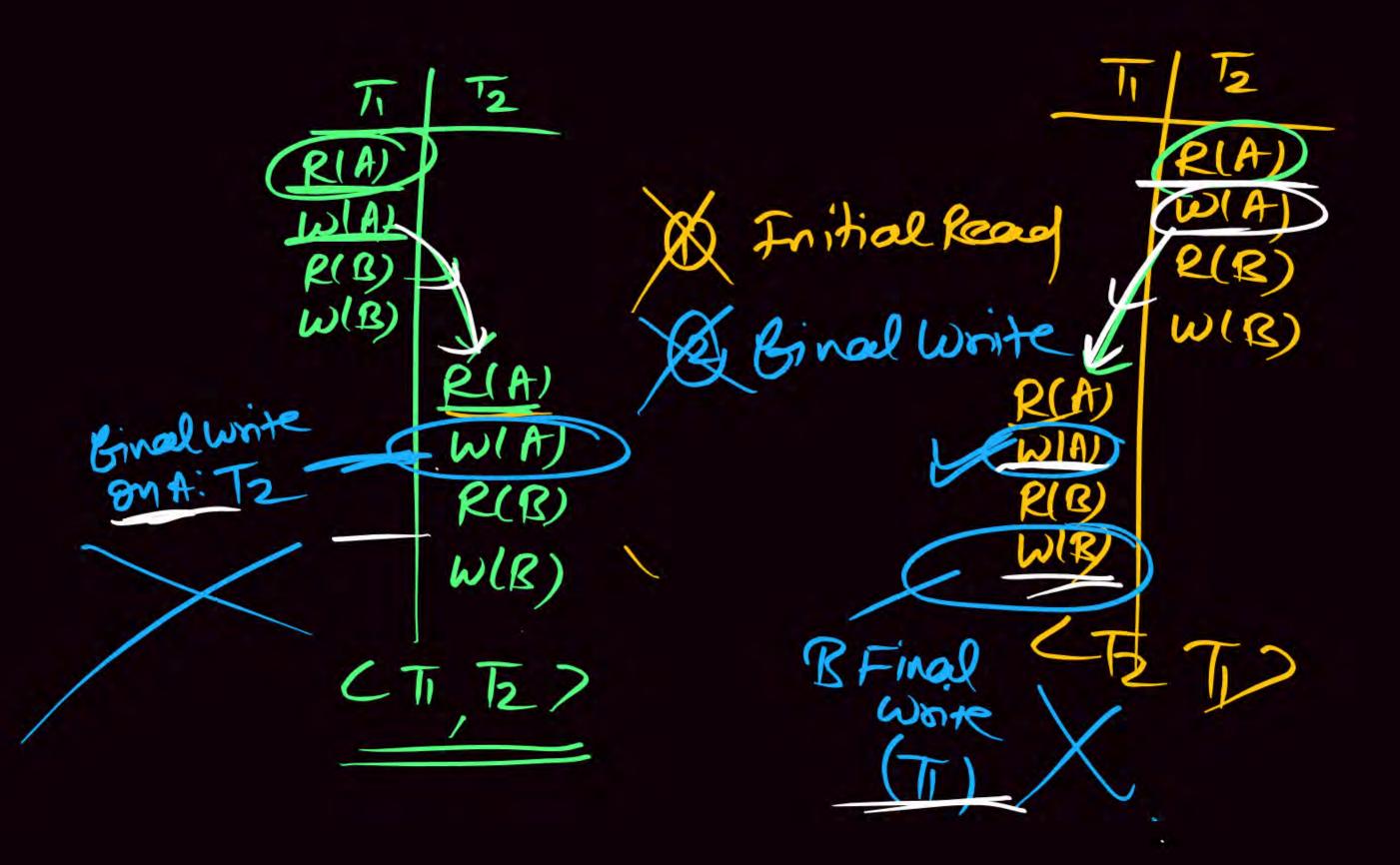


Consider the following schedule S of transactions T₁ and T₂:



Which of the following is TRUE about the schedule S? [2004: 2 Marks]

| | A=1000 | T ₁ | T ₂ |
|---|---|------------------------|---------------------------------------|
| Α | S is serializable only as T ₁ , T ₂ | Read(A) $A = A-10$ | |
| В | S is serializable only as T2, T1> | | Read(A) $A = 100$ Temp = $0.2 * A$ |
| C | S is serializable both as T_1 , T_2 and T_2 T_1 | | Write(A) Read(B) |
| D | S is not serializable either as T ₁ or as T ₂ | Write(A) Read(B) | |
| | Ang (D) | B = B + 10 Write(B) | |
| | | | B = B + Temp Write(B) |





| Ti | 12 |
|-------|------|
| (RIA) | |
| | RIA) |
| W(A) | |
| | R(B) |
| | W(A) |

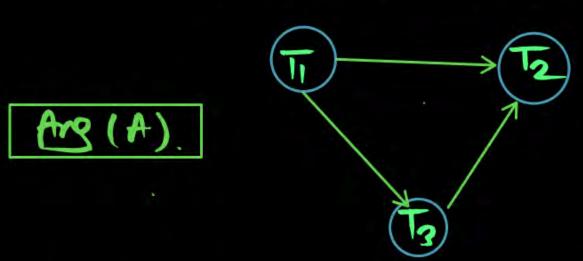


Pw

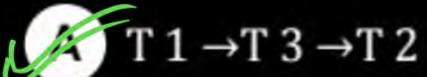
Consider the following schedule for transactions T1, T2 and T3:

Which one of the schedules below is the correct serialization of the above?

[GATE-2010-CS: 2M]



| T1 | TZ | Т3 |
|-----------|-----------|-----------|
| Read(X) | | |
| U | Read (Y) | |
| | e | Read (Y) |
| L | Write (Y) | |
| Write (X) | | |
| | | Write (X) |
| | Read (X) | |
| | Write (X) | |



B T 2 \rightarrow T 1 \rightarrow T 3

C
$$T2 \rightarrow T3 \rightarrow T1$$

D T3
$$\rightarrow$$
T1 \rightarrow T2





Consider two transactions T_1 and T_2 , and four schedules S_1 , S_2 , S_3 , S_4 of T_1 and T_2 as given below:

 T_1 : $R_1[x] W_1[x] W_1[y]$;

 T_2 : $R_2[x] R_2[y] W_2[y]$;

 S_1 : $R_1[x] R_2[x] R_2[y] W_1[x] W_1[y] W_2[y]$;

 S_2 : $R_1[x] R_2[x] R_2[y] W_1[x] W_2[y] W_1[y];$

 S_3 : $R_1[x] W_1[x] R_2[x] W_1[y] R_2[y] W_2[y];$

 S_4 : $R_2[x] R_2[y] R_1[x] W_1[x] W_1[y] W_2[y];$

Which of the above schedules are conflict serializable?

[GATE-2009-CS: 2M]

A S_1 and S_2





C S_3 only



MCQ (S)



Consider the following three schedules of transactions T1, T2 and T3.

[Notation: In the following NYO represents the action Y (R for read, W

for write) performed by transaction N on object 0.]

S1: 2RA 2WA 3RC 2WB 3WA 3WC 1RA 1RB 1WA 1WB

S2: 3RC 2RA 2WA 2WB 3WA 1RA 1RB 1WA 1WB 3WC

S3: 2RA 3RC 3WA 2WA 2WB 3WC 1RA 1RB 1WA 1WB

Which of the following statements is TRUE?

VA 1WB
VB 3WC
VA 1WB
(GATE-2008-CS

 $R_2(A) = 2RA$

- A S1, S2 and S3 are all conflict equivalent to each other
- B No two of S1, S2 and S3 are conflict equivalent to each other
- C S2 is conflict equivalent to S3, but not to S1

Ang (D).



S1 is conflict equivalent to S2, but not to S3

MCQ (Q.6)



Consider the transactions T1, T2 and T3 and the schedules S1 and S2 given below.

```
T1: r1(X); r1(Z); w1(X); w1(Z)
```

T2:
$$r2(Y)$$
; $r2(Z)$; $w2(Z)$

T3:
$$r3(Y)$$
; $r3(X)$; $w3(Y)$

S2:
$$r1(X)$$
; $r3(Y)$; $r2(Y)$; $r3(X)$; $r1(Z)$; $r2(Z)$; $w3(Y)$; $w1(X)$; $w2(Z)$; $w1(Z)$

Which one of the following statements about the schedules is TRUE?

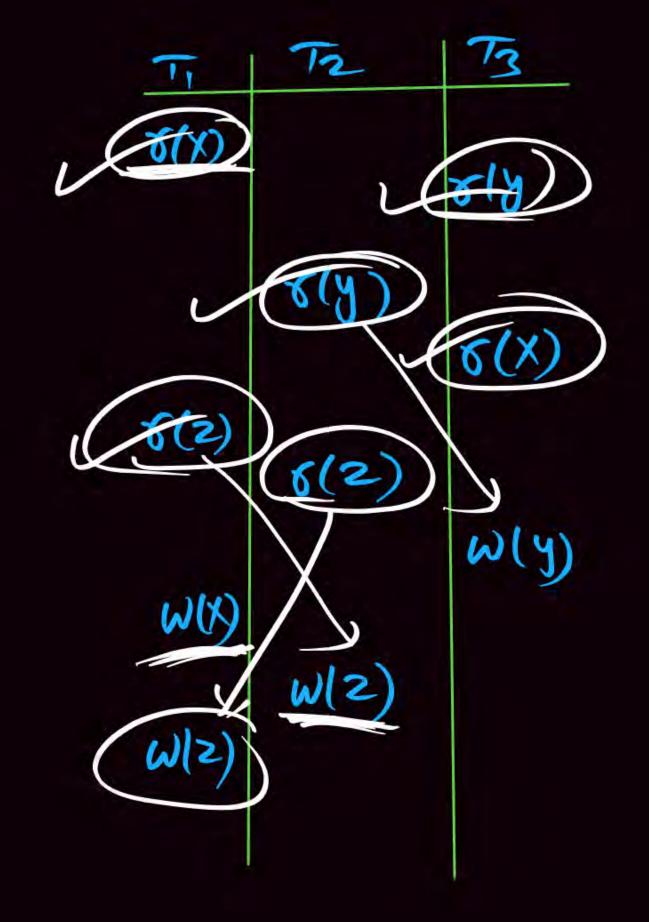
[GATE-2014-CS: 2M]

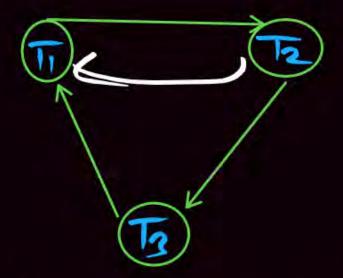


Only S1 is conflict-serializable.

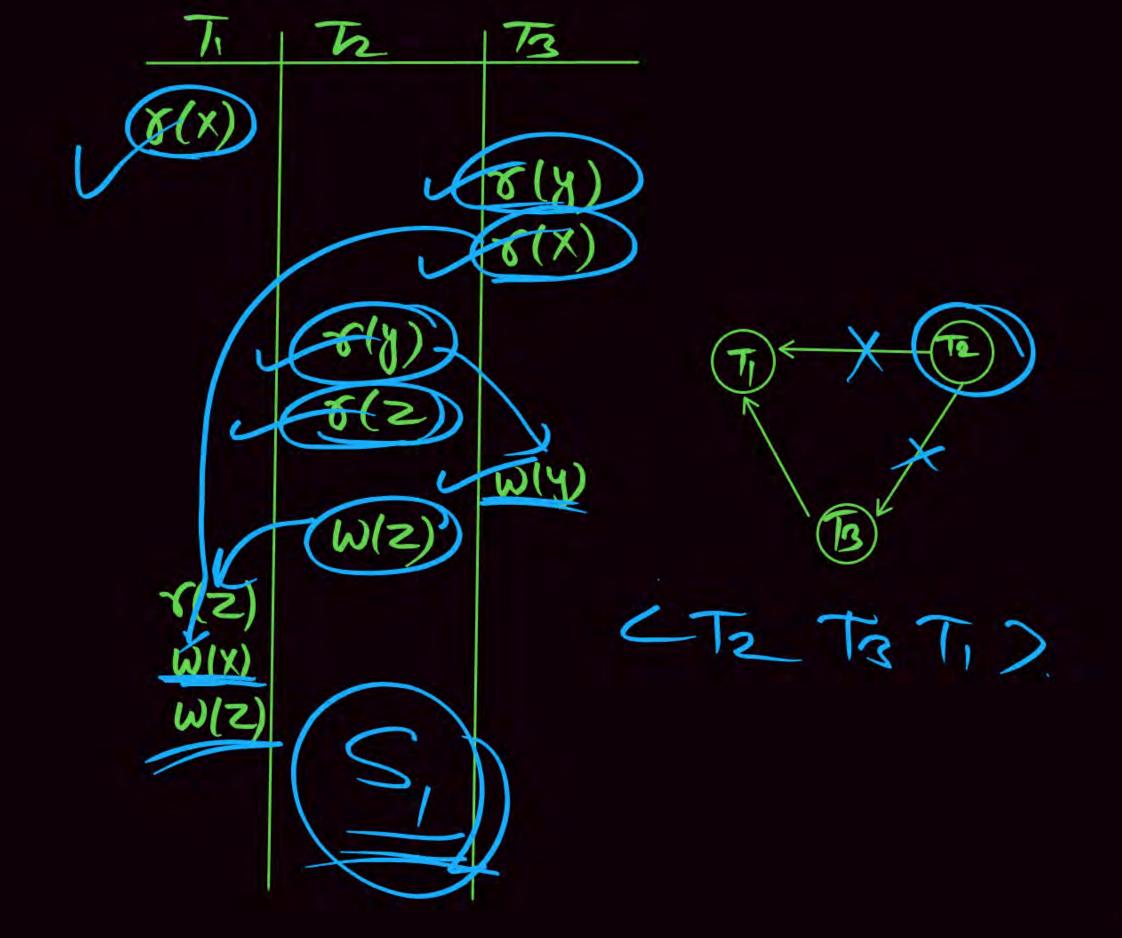


- B Only S2 is conflict-serializable.
- C Both S1 and S2 are conflict-serializable.
- D Neither S1 nor S2 is conflict-serializable.





Cycle Not Conflict



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Enjoying the transaction Concept

Problem Because of concurrent Execution

- 1) WR (Write Read) Problem Un committed Disty Read Problem
- (2) RW (Read Write) Problem Non-Repeatable Unrepeatable Read Problem.

 (3) WW (Write-Write) Problem Lost Update Problem.
- 1) Phantom Tuble Problem.

W: Write. R: Read.

1) WR (Work - Read) Problem Disty uncommitted Read.

W(A)
RIA

RIA

RIA

Hore Transaction To Read the Value of Data Item A, that is uplated (Written) by Un Committed Transaction

Uncommitted Dirty Read: Modified (Updated) by
One transaction (Uncommitted)

Fread by other transaction
is colled Dirty Read Uncommitted Read.

MA)

RIA)

W(A)

W(A)

Not uncommit Read

Not Dirty Read

TI TZ

W(A)

W(A)

R(A)

Not D'oty Read

Rez Tz Read the value of A

that is ubdated by same (Tz)

Transaction.

2) RW (Read-Write) Non Vn Repeatable Read. (korth(A) = 10) A= 10 A=10 72 7 A= 10 R(A) Library DB 16(A>0) R(A) A=10 16(A>0) R(A) R(A) WIA) 16(A>0) W. Akran Besk. A = A - 1 Write (A) 10-leq A = A-1 A-A-Write(A) Write(A) else A= 9 2 Book Issue No Book Issue Inconsistent

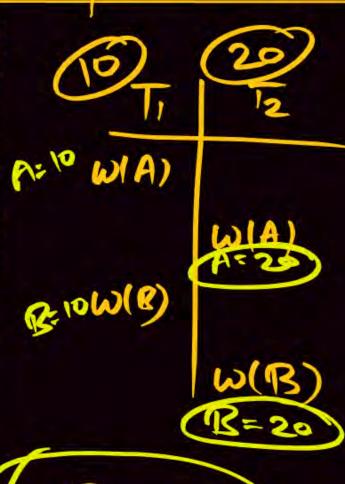
3) WW (write-write) Problem Lost Update Problem

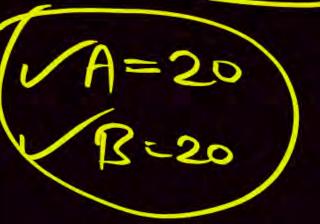
Ti T2

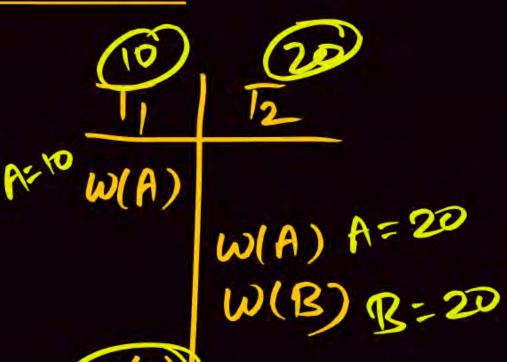
Set (10) Set 20

Ti T2

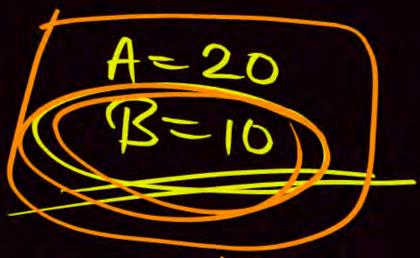
$$W(A)$$
 $W(A)$
 $W(A)$

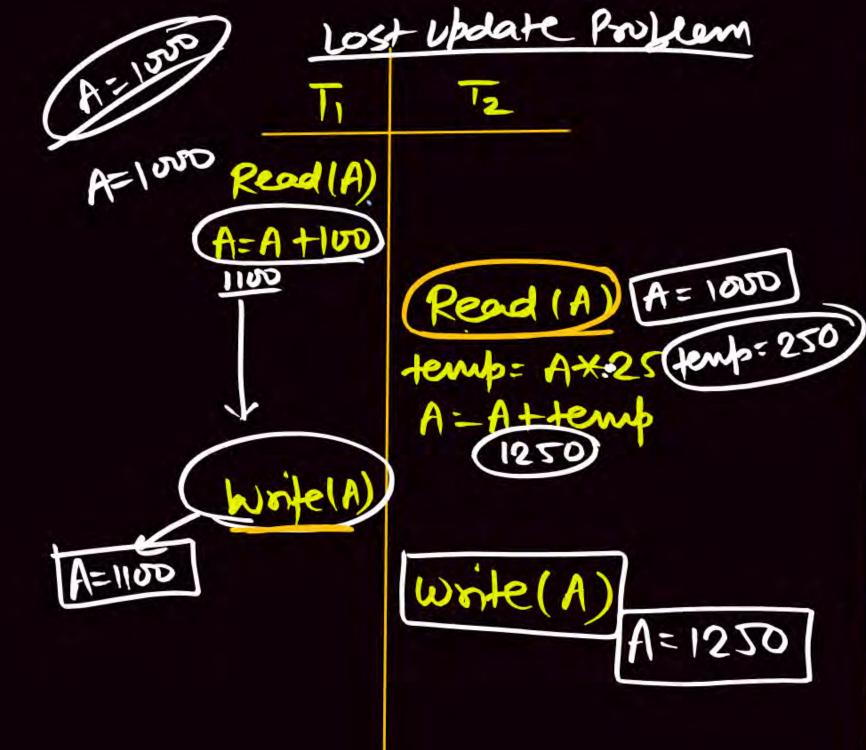












Suppose Transaction Tid To all Intellegred in Suma Manner,

The Read the Value of Dorta Item A,

(or Value of Account A) Before TL

Uhdate:

Now When TI Update the Value of Account A (Data Item A) then that Value is overwritten by Later Transaction (TZ) so its Courte as Lost ab Updation.

Lost update! If there are Two write obserations of Different Transaction & Between these

two write operation there is No Read operation then second write operation overwritten the value of birst write operation, so whatever whate done by first write operation is lost (overwritten by later Transaction)

4) Phantom Tuble Problem

ens enam solm e1 A Sk e3 C Gk

Select*
FROM Emp
Whele Sel 24500

Insert into Emp Volum (Cey, D, 5100)

12

en ename salary

Select *

FROM Emp

es c 6k Where sal > 4500

Phantom

Tuble

Eid enam Solve eid enam Solve el A Sk el B 4k el C Gk el D Silk there Toansaction T, Read a Set of Tuples from Emptable
Rased on Some Canalition (Query), Now Suppose
Transaction To insert a New Tuble that tuple also Soutisfy
the Condition of Ti

Now IB To Repeated the Same Query than To Will See a New Type that Beviously Not exists, Such type of Phenoma is Called Phantom Tuple/Phenoma.

Any Doubt?

