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Doubt Clearing Session

Complete Course on Database Management System

Vishvadeep Gothi • Lesson 24 • July 19, 2023

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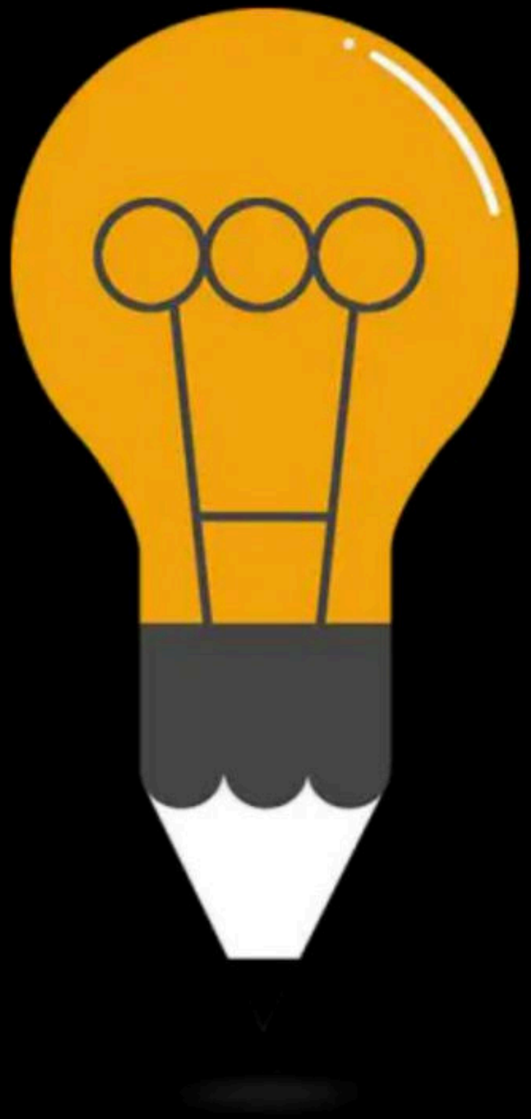

DBMS

Doubts & View Serializability

By: Vishvadeep Gothi

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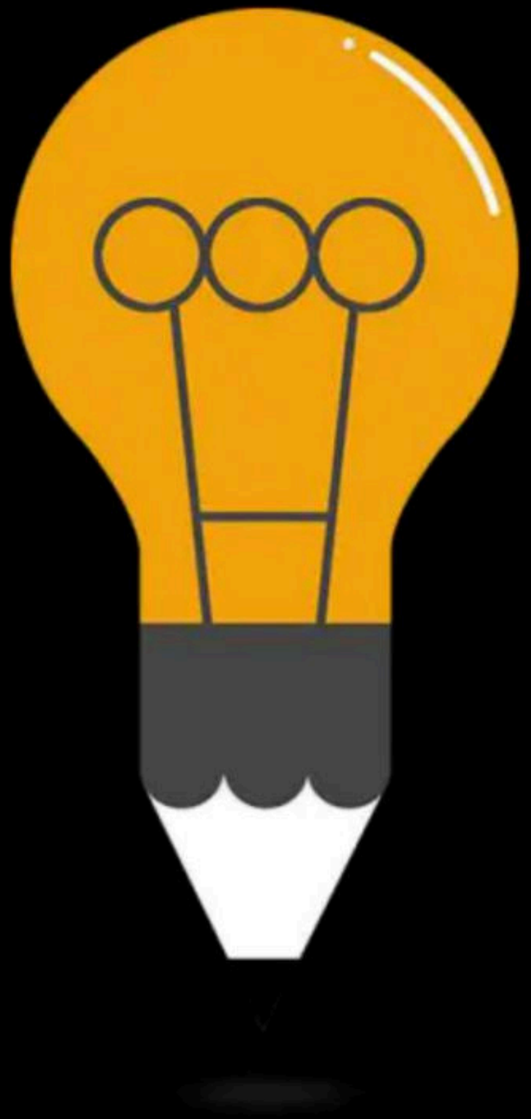
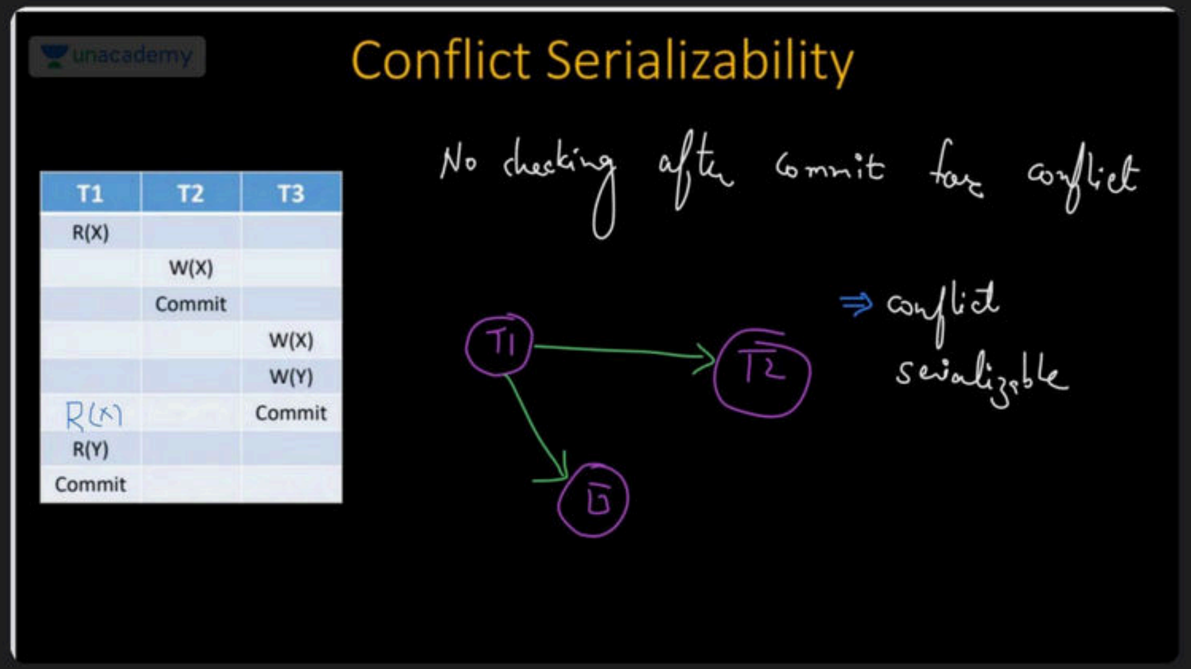


DPP
Transaction

By: Vishvadeep Gothi

▲ 1 • Asked by Swarnabha

Would we consider the last R(x) here for checking conflict or not?



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Question 1

The given schedules are conflict serializable or not?

1. 2RA, 2WA, 3RC, 2WB, 3WA, 3WC, 1RA, 1RB, 1WA, 1WB → yes
2. 3RC, 2RA, 2WA, 2WB, 3WA, 1RA, 1RB, 1WA, 1WB, 3WC → yes
3. 2RA, 3RC, 3WA, 2WA, 2WB, 3WC, 1RA, 1RB, 1WA, 1WB → no
4. 2RX, 3WX, 3Commit, 1WY, 1Commit, 2RY, 2WZ, 2Commit → yes

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Question 2 gate-2014

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

- $T1 : r1(X); r1(Z); w1(X); w1(Z)$
- $T2 : r2(Y); r2(Z); w2(Z)$
- $T3 : r3(Y); r3(X); w3(Y)$
- $S1 : r1(X); r3(Y); r3(X); r2(Y); r2(Z); w3(Y); w2(Z); r1(Z); w1(X); w1(Z)$
- $S2 : r1(X); r3(Y); r2(Y); r3(X); r1(Z); r2(Z); w3(Y); w1(X); w2(Z); w1(Z)$

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

A. 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.

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Question 3 gate-2021

Let $r_i(z)$ and $w_i(z)$ denote read and write operations respectively on a data item z by a transaction T_i. Consider the following two schedules.

- $S_1 : r_1(x)r_1(y)r_2(x)r_2(y)w_2(y)w_1(x)$
- $S_2 : r_1(x)r_2(x)r_2(y)w_2(y)r_1(y)w_1(x)$

Which one of the following options is correct?

A. S_1 is conflict serializable, and S_2 is not conflict serializable
B. S_1 is not conflict serializable, and S_2 is conflict serializable
C. Both S_1 and S_2 are conflict serializable
D. Niether S_1 nor S_2 is conflict serializable

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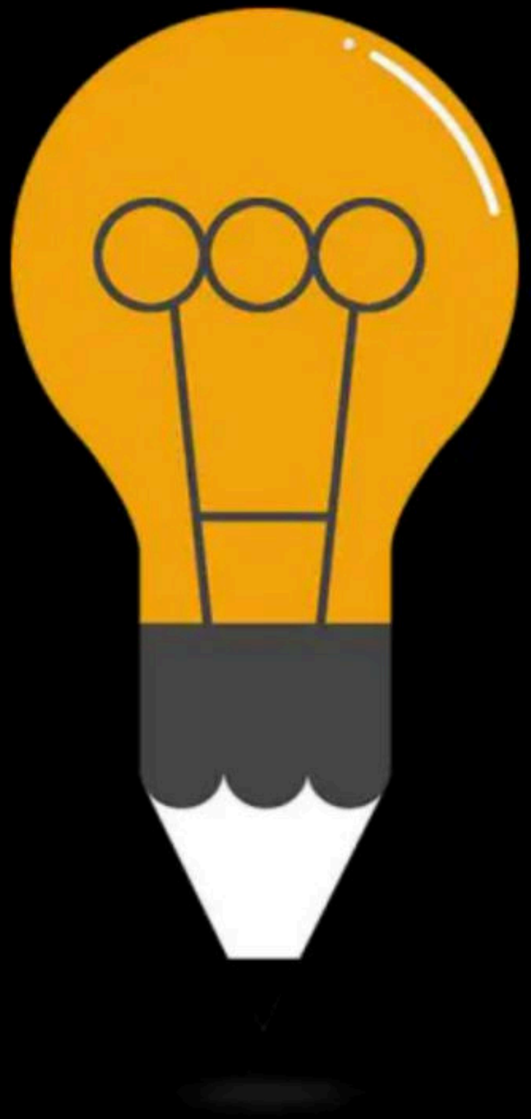
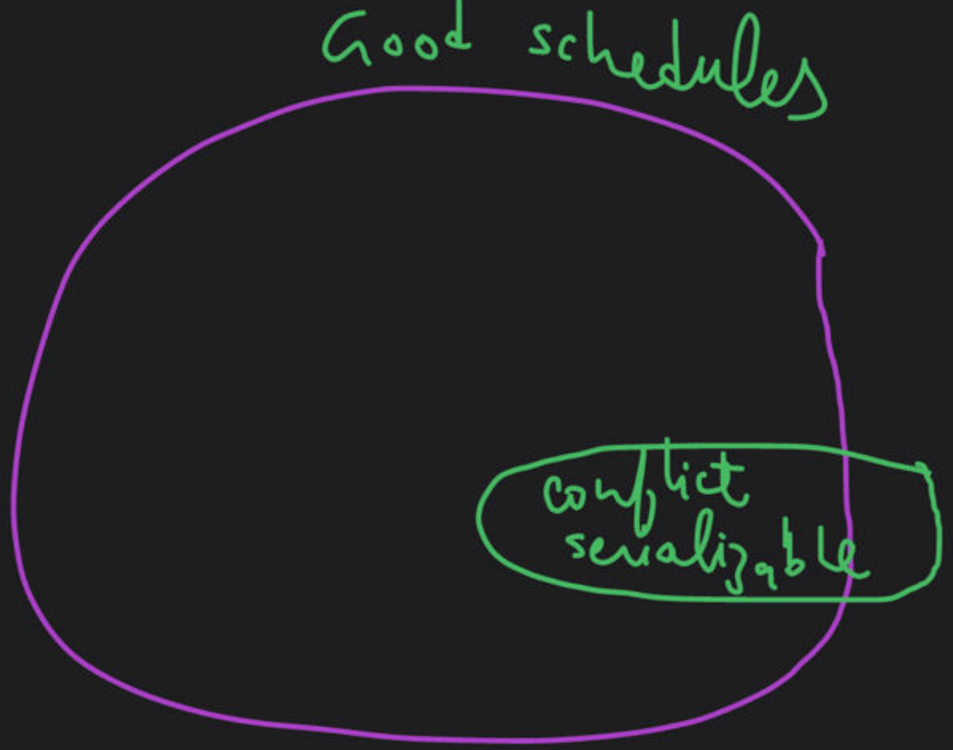


View Serializability

By: Vishvadeep Gothi



View Equivalence

1. Who is Reading first from database
2. Who is reading from other
3. Who is writing last

T_1	T_2
$R(x)$	
$W(x)$	
	$R(x)$

1. T_1 reads x first
2. T_2 reads x from T_1

T_1	T_2
	$R(x)$
	$W(y)$
$R(x)$	

T_1	T_2	T_3
$R(x)$		
	$R(x)$	
	$W(x)$	
$W(x)$		
		$R(x)$

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View Equivalence

$S1 \overset{\text{View}}{\equiv} S2$

When both schedules S1, S2 are following same all 3 points for all data items

View Equivalence

S1

T1	T2	T3
R(X)		
W(X)		
	R(X)	
		W(X)
	W(X)	

not view equivalent

S2

T1	T2	T3
R(X)		
	R(X)	
W(X)		
	W(X)	
		W(X)

① t1 Reads x first from db ⟷ ① t1, t2 Read x first from db

Ex:-

S1 ≡ S2 view

S1 ≡ S3 view

S2 ≡ S3 view

S1

T1	T2	T3
		R(x)
	R(x)	
	w(x)	
R(x)		
w(x)		
		w(x)
	w(x)	

S2

T1	T2	T3
	R(x)	
		R(x)
	w(x)	
R(x)		
w(x)		
	w(x)	

S3

T1	T2	T3
		R(x)
	R(x)	
		w(x)
R(x)		
R(x)		
	w(x)	

View Equivalence

S1

T1	T2	T3
R(X)		
	W(X)	
	R(Y)	
		W(Y)
	R(Z)	
W(Z)		
		W(Z)

S1 ≡ view ↑ Yes

S2

T1	T2	T3
R(X)		
	W(X)	
	R(Y)	
	R(Z)	
W(Z)		
		W(Y)
		W(Z)

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View Serializability

A schedule is called view serializable if it is view equivalent to any serial schedule.

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View Serializability

Is view serializable

T1	T2	T3	T4
W(X)			
	R(X)		
		W(X)	
			W(X)

t_1, t_2, t_3, t_4 — possible

$4!$ ⇒ serial schedules

t_1, t_2, t_3 t_4

(1) no one reads from db

(2) t_2 reads x from t_1

(3) t_4 writes last

t_1, t_3, t_2, t_4 ⇐ t_2 will read x from t_3

(1) t_1, t_2, t_3, t_4 ✓

(2) ✗ t_3, t_1, t_2, t_4

t_1	t_2	t_3	t_4
		$w(x)$	
$w(x)$			
	$R(x)$		
			$w(x)$

Serial

Schedule $\Rightarrow t_3 \rightarrow t_1 \rightarrow t_2 \rightarrow t_4$

t_1	t_2	t_3	t_4
			$w(x)$
		$w(x)$	
$w(x)$			
	$R(x)$		

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View Serializability

T1	T2	T3
R(X)		
	R(Y)	
		W(Y)
W(Y)		
	W(X)	

write

$T_3 \longrightarrow T_1 \longrightarrow T_2$

$T_2 \longrightarrow T_1$

not view serializable

T_3	T_1	T_2
w(y)		
	r(x)	
	w(y)	
		R(y)
		w(x)

x :-

1 :- T_1 Reads x from db

2 :-

3 :- T_2 writes x last

y :-

1 :- T_2 reads y from db

2 :-

3 :- T_1 writes y last

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View Serializability

Hw (1)

T1	T2	T3
R(X)		
	W(X)	
W(X)		
		W(X)

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View Serializability

Hw 2

T1	T2	T3
R(X)		
	R(Y)	
W(Z)		
		W(Z)
		R(Y)
	W(Y)	

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View Serializability

HW 3

T1	T2	T3
W(X)		
	R(X)	
		W(X)
		W(Y)
	R(Y)	
W(Y)		
	W(X)	

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Role of abort or rollback

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View Serializability

T1	T2	T3
R(X)		
	W(X)	
		W(X)
W(X)		
Abort		
	Commit	
		Commit

Do not include transaction which is having abort or roll back.

In given example T2, T3 only checked

View serializable

Sequence ⇒ T2 ⟶ T3

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Recoverability

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Recoverability

Recoverable schedule:

When no any committed transaction should be rolled back.

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Recoverable Schedule

T1	T2
R(X)	
X=X+2	
W(X)	
	R(X)
	X=X+3
	W(X)
	Commit
failed	

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Recoverable Schedule

T1	T2
R(X)	
X=X+2	
W(X)	
	R(X)
	X=X+3
	W(X)
	Commit
Commit	

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Recoverable Schedule

T1	T2
R(X)	
X=X+2	
W(X)	
	R(X)
	X=X+3
	W(X)
Commit	
	Commit

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Recoverable Schedule

1. Cascadeless Recoverable Rollback
2. Cascading Recoverable Rollback

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Cascading Recoverable Rollback

T1	T2	T3
R(X)		
X=X+2		
W(X)		
	R(X)	
	X=X+3	
	W(X)	
		R(X)
		X=X+4
		W(X)
Commit		
	Commit	
		Commit

Cascadeless Recoverable Rollback

T1	T2	T3
R(X)		
X=X+2		
W(X)		
Commit		
	R(X)	
	X=X+3	
	W(X)	
	Commit	
		R(X)
		X=X+4
		W(X)
		Commit

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Question

T1	T2	T3
W(X)		
	W(Y)	
	R(X)	
		R(Y)
		Commit
Commit		
	Commit	

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Question

T1	T2	T3
R(X)		
W(X)		
	R(X)	
	W(X)	
		R(X)
		W(X)
		Rollback
Commit		
	Commit	

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Happy Learning.!

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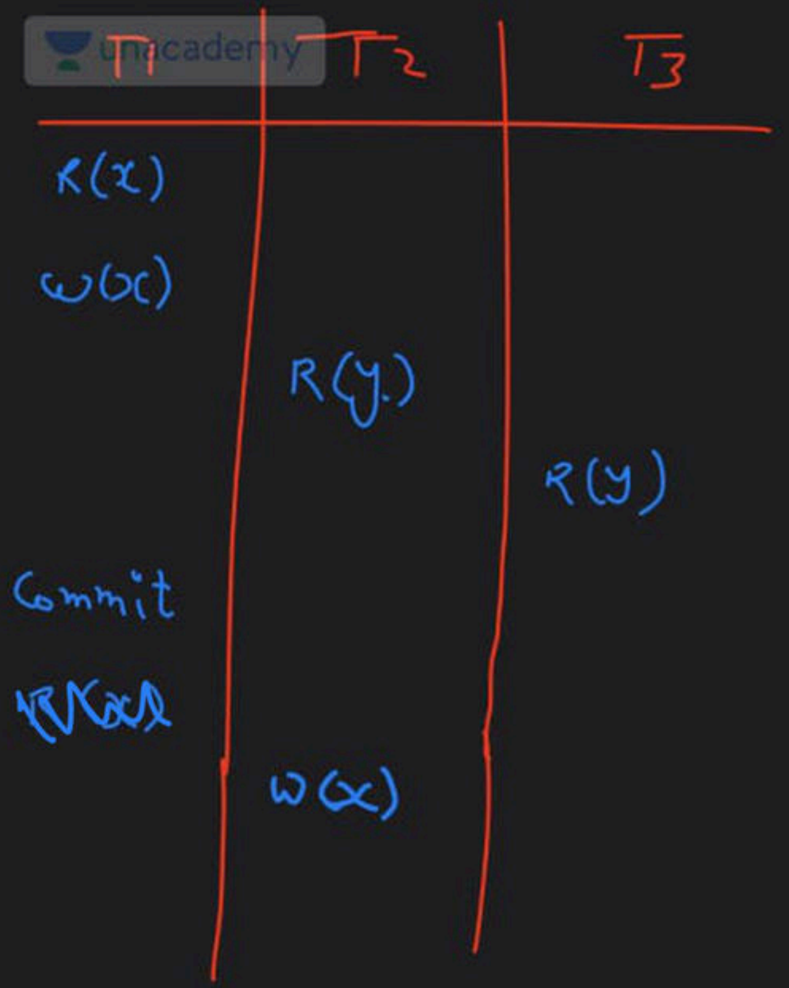
▲ 1 • Asked by Anil

sir sedules ka VE check karke fir given transection ka (!) krke check kre if kam transection h to usme kya dikkat aayegii ?

▲ 1 • Asked by Vaishnavij...

In this example, read(x) after commit and w(x) of t2 can be called conflict ?



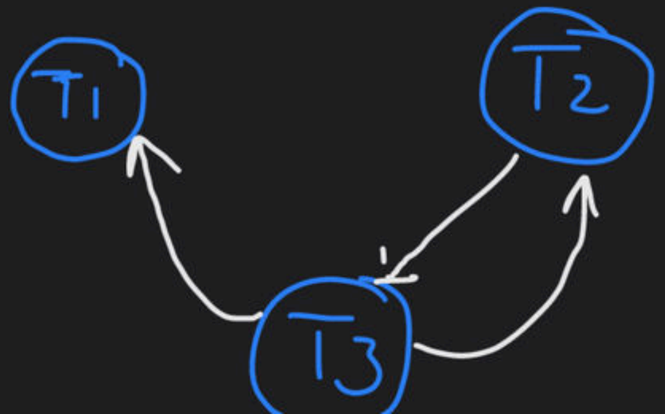
▲ 1 • Asked by Sakshi

sir can you please explain 3rd example

Question 1

The given schedules are conflict serializable or not?

1. 2RA, 2WA, 3RC, 2WB, 3WA, 3WC, 1RA, 1RB, 1WA, 1WB
2. 3RC, 2RA, 2WA, 2WB, 3WA, 1RA, 1RB, 1WA, 1WB, 3WC
3. 2RA, 3RC, 3WA, 2WA, 2WB, 3WC, 1RA, 1RB, 1WA, 1WB —>
4. 2RX, 3WX, 3Commit, 1WY, 1Commit, 2RY, 2WZ, 2Commit



not conflict serializable

T1	T2	T3
	R(A)	
		R(C)
		W(A)
	W(A)	
	W(B)	
		W(C)
R(A)		
R(B)		
W(A)		
W(B)		

▲ 1 • Asked by Shreyas

Please help me with this doubt

Consider a join (relation algebra) between relations $r(R)$ and $s(S)$ using the nested loop method. There are 3 buffers each of size equal to disk block size, out of which one buffer is reserved for intermediate results.

Assuming size($r(R)$) < size($s(S)$), the join will have fewer number of disk block accesses if

(a) relation $r(R)$ is in the outer loop.

(b) relation $s(S)$ is in the outer loop.

(c) join selection factor between $r(R)$ and $s(S)$ is more than 0.5.

(d) join selection factor between $r(R)$ and $s(S)$ is less than 0.5.