Conflict Serializability Precedence Graph

Sharifa Rania Mahmud

T_1	T_2
read(A)	
$A := A - 50$	
write(A)	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
read(B)	
$B := B + 50$	
write(B)	
	read(B)
	$B := B + temp$
	write(B)

Schedule-3

T_1	T_2
read(A)	
$A := A - 50$	
write(A)	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
read(B)	
$B := B + 50$	
write(B)	
	read(B)
	$B := B + temp$
	write(B)

Schedule-3

T_1	T_2
read(A)	
$A := A - 50$	
write (A)	
read(B)	
$B := B + 50$	
write(B)	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
	read(B)
	$B := B + temp$
	write(B)

Schedule-1

T_1	T_2
read(A)	
$A := A - 50$	
write(A)	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
read(B)	
$B := B + 50$	
write(B)	
	read(B)
	$B := B + temp$
	write(B)

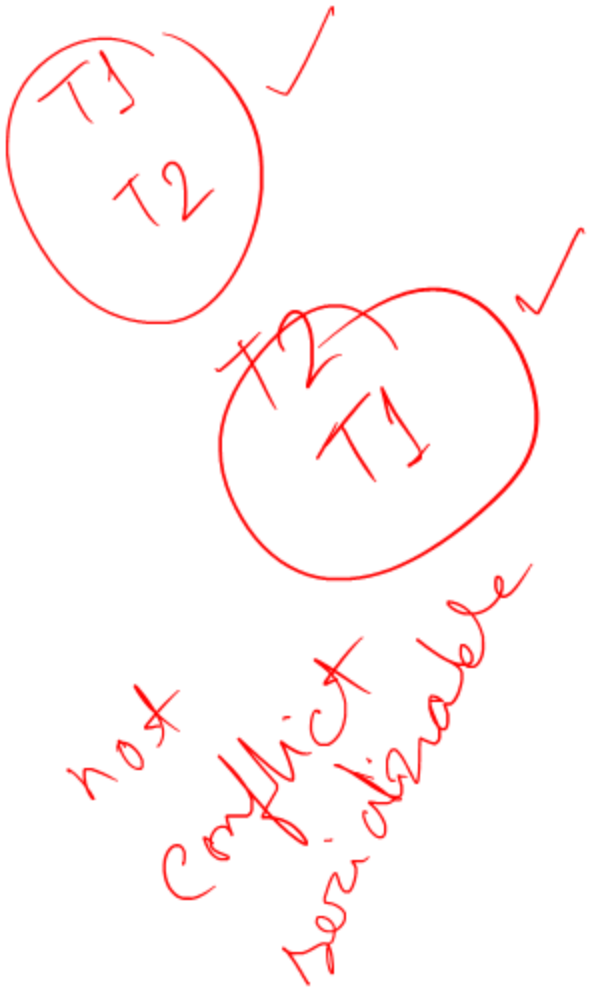
Schedule-3

T_1	T_2
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
	read(B)
	$B := B + temp$
	write(B)
read(A)	
$A := A - 50$	
write(A)	
read(B)	
$B := B + 50$	
write(B)	

Schedule-2

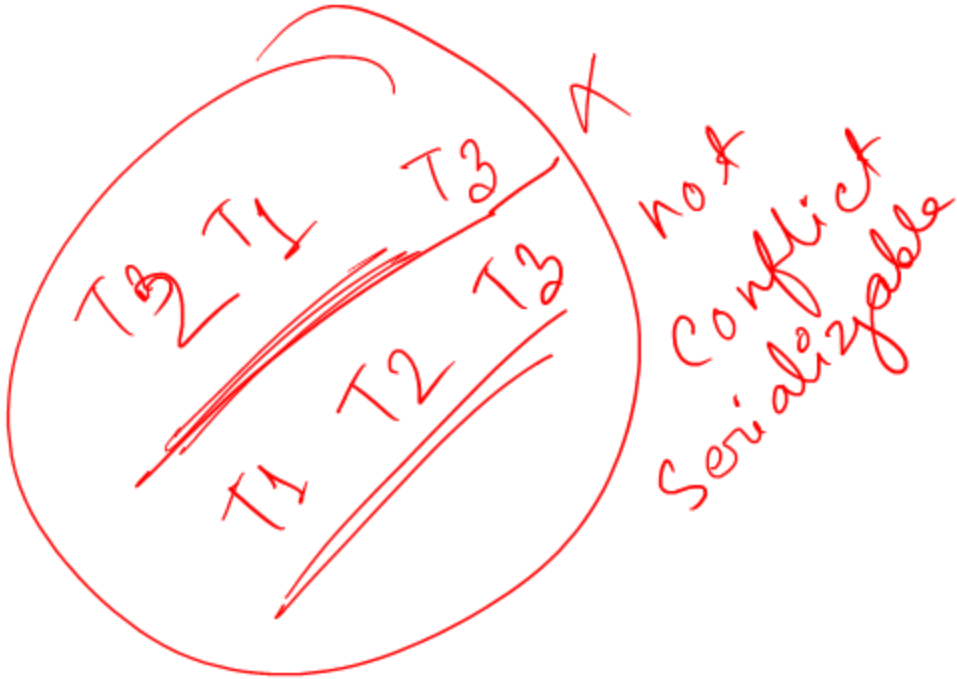
T_1	T_2
read(A)	
$A := A - 50$	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
	read(B)
write(A)	
read(B)	
$B := B + 50$	
write(B)	
	$B := B + temp$
	write(B)

Schedule-4



T1	T2	T3
Read(A)		
	Read(B)	
	Write(A)	
Write(A)		
		Write(A)

Schedule-A



Testing of Serializability

The set of edges consists of all edges Ti →Tj for which one of three conditions holds:

1. Ti executes write(Q) before Tj executes read(Q).

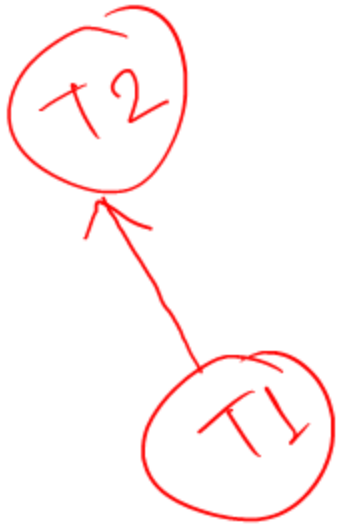
2. Ti executes read(Q) before Tj executes write(Q).

3. Ti executes write(Q) before Tj executes write(Q).

Precedence graph — a direct graph where the vertices are the transactions.

Precedence Graph

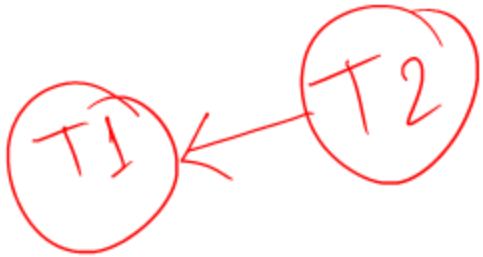
T_1	T_2
read(A)	
$A := A - 50$	
write (A)	
read(B)	
$B := B + 50$	
write(B)	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
	read(B)
	$B := B + temp$
	write(B)



Schedule-1

Precedence Graph

T_1	T_2
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
	read(B)
	$B := B + temp$
	write(B)
read(A)	
$A := A - 50$	
write(A)	
read(B)	
$B := B + 50$	
write(B)	



Schedule-2

Precedence Graph

T_1	T_2
read(A)	
$A := A - 50$	
write(A)	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
read(B)	
$B := B + 50$	
write(B)	
	read(B)
	$B := B + temp$
	write(B)

Schedule-3

$R_1(A)$ — $W_2(A)$

$W_1(A)$ — $W_2(A)$ $R_2(A)$

$R_1(B)$ - $W_2(B)$

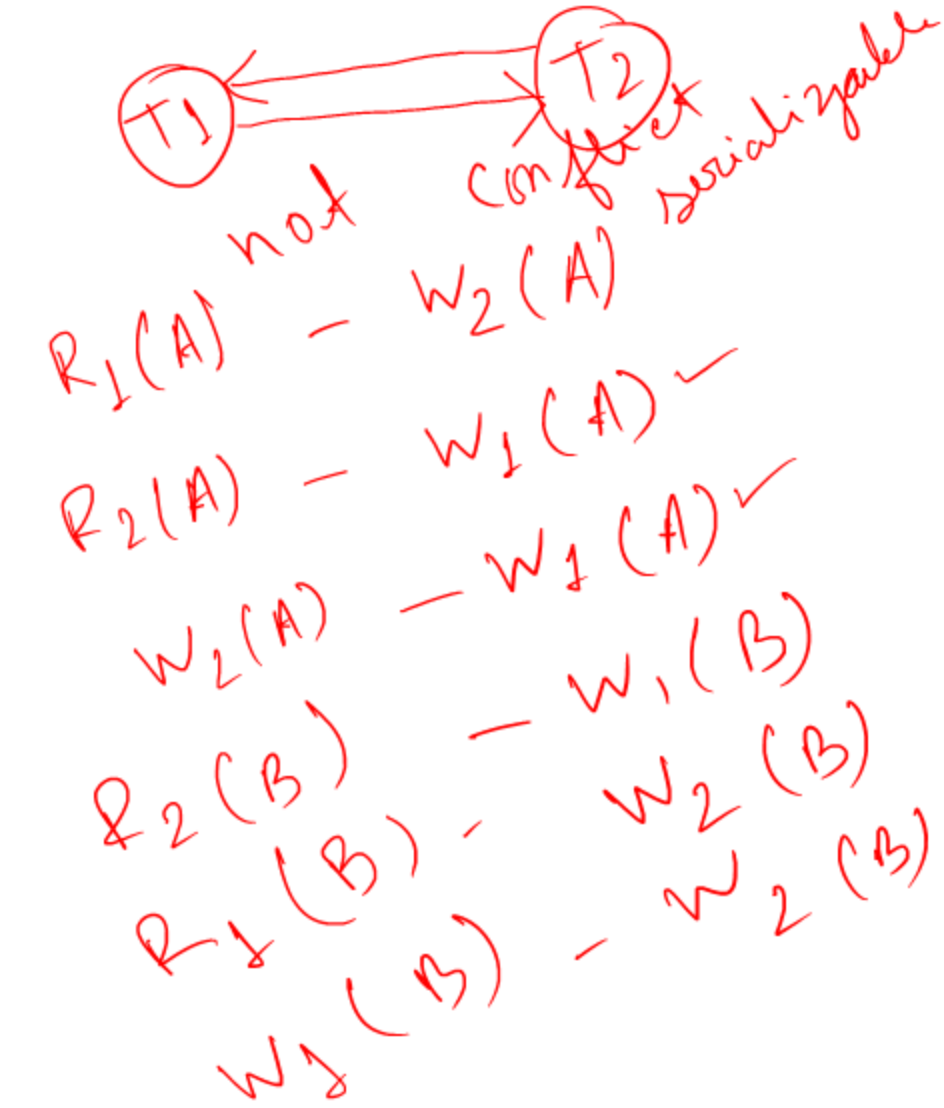
$W_1(B)$ - $R_2(B)$ $W_2(B)$

Conflict Serializable

Precedence Graph

T_1	T_2
read(A)	
$A := A - 50$	
	read(A)
	$temp := A * 0.1$
	$A := A - temp$
	write(A)
	read(B)
write(A)	
read(B)	
$B := B + 50$	
write(B)	
	$B := B + temp$
	write(B)

Schedule-4



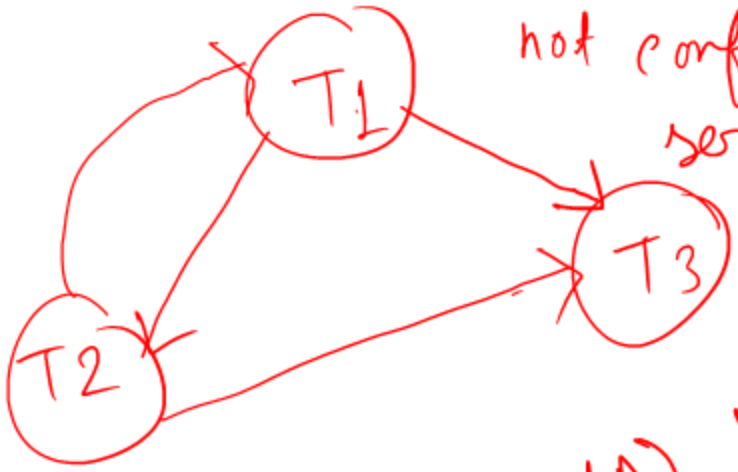
Precedence Graph

Cycle (DFS)

not conflict serializable

T1	T2	T3
Read(A)		
	Read(B)	
	Write(A)	
Write(A)		
		Write(A)

Schedule-A



$R_1(A) - W_2(A)$

$W_2(A) - W_1(A)$

$W_1(A) - W_3(A)$

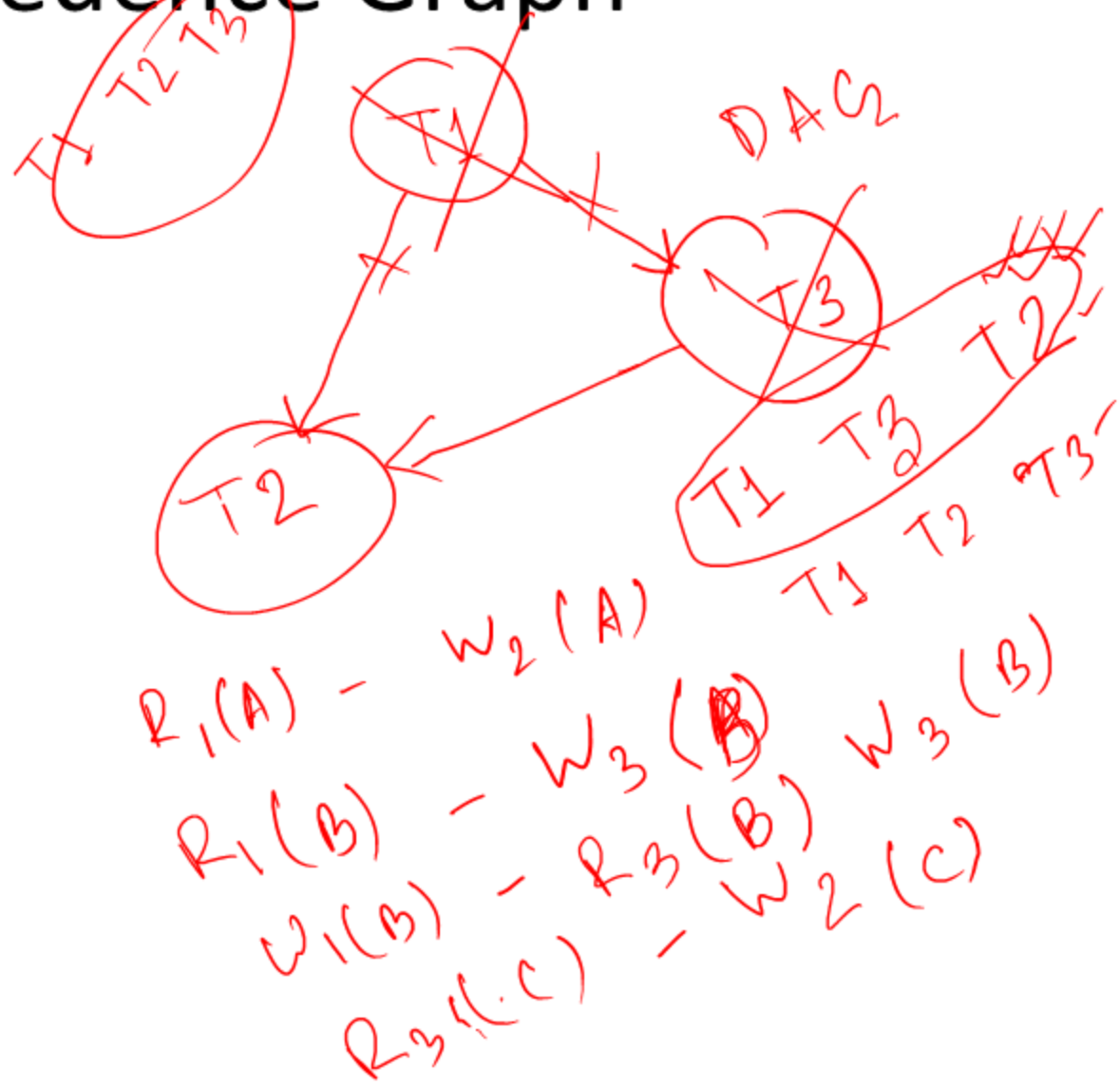
$W_3(A)$

$W_3(A)$

Precedence Graph

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

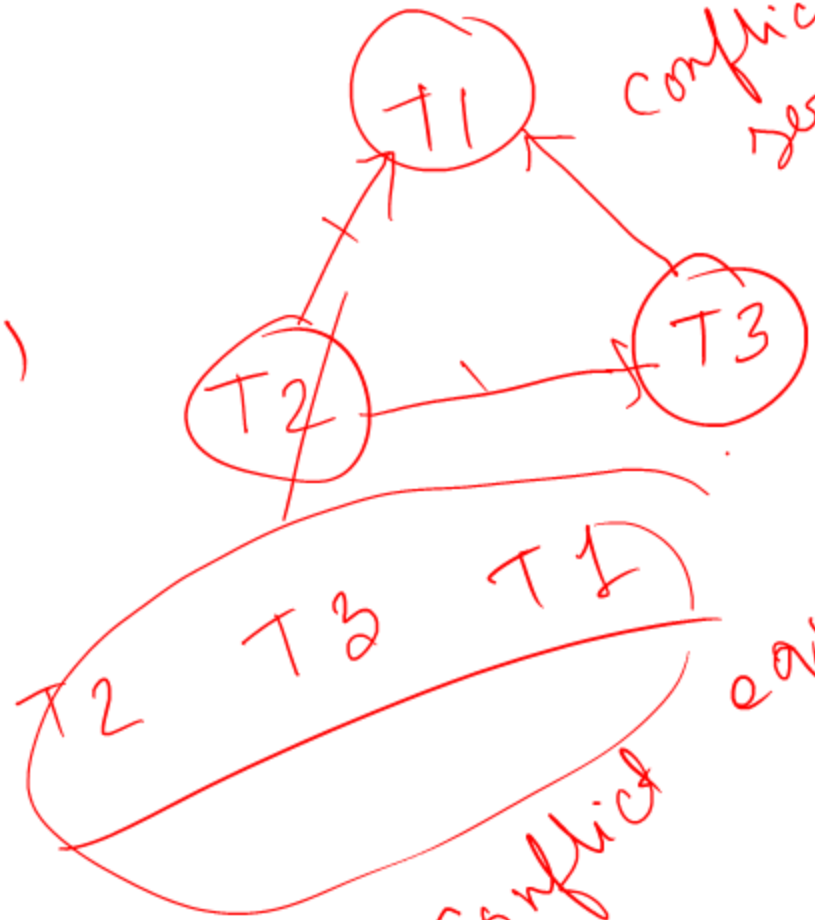
Schedule-B



Precedence Graph

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

Schedule-C



Thank You

Sharifa Rania Mahmud