ASSIGNMENT: 7

"DATABASE SYSTEMS"

Name: Huzaifa M. Arshad
Roll No: 21F-9323
Section: BCS4C

Q:1

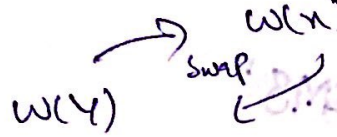
T_1	T_2	T_3	T_4
	R(x)		
		w(x)	
w(x)	w(y)		
	R(z)		
			R(x)
			R(y)

swap

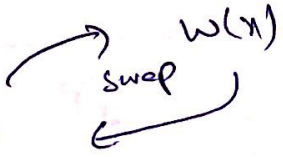
T_1	T_2	T_3	T_4
	R(x)		
		w(x)	
	w(y)		
w(x)	R(z)		
			R(x)
			R(y)

swap

T_1	T_2	T_3	T_4
	$R(x)$		
	$W(y)$		
	$R(z)$		
$W(x)$			$R(x)$
			$R(y)$

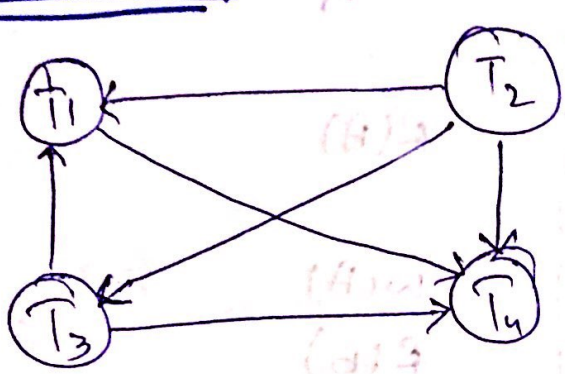


T_1	T_2	T_3	T_4
	$R(x)$		
	$W(y)$		
	$R(z)$		
$W(x)$			$R(x)$
			$R(y)$



T_1	T_2	T_3	T_4
	$R(x)$		
	$W(y)$		
	$R(z)$		
		$W(x)$	
$W(x)$			$R(x)$
			$R(y)$

Precedence Graph:-



As, there is no cycle/loop in graph so this schedule is conflict-serializable. seriel Schedule is;

T_2, T_3, T_1, T_4

Q.2

T_1	T_2
R(A)	
	R(A)
	W(A)
	R(B)
W(A)	
R(B)	
W(B)	
	W(B)

Swap

⇒

T_1	T_2
	R(A)
R(A)	
	W(A)
	R(B)
W(A)	
R(B)	
W(B)	
	W(B)

Swap

T_1	T_2
	R(A)
R(A)	
	W(A)
W(A)	
R(B)	
W(B)	
	W(B)

⇒

T_1	T_2
	R(A)
R(A)	
	W(A)
W(A)	
R(B)	
	R(B)
W(B)	
	W(B)

swap

No, more swaps can be done as after swapping all non-conflict pair the transactions are still executing concurrently. So, this schedule is not conflict-serializable Isolation property is violated.

Graph:

As, there is a cycle. So, this schedule is not conflict-serializable

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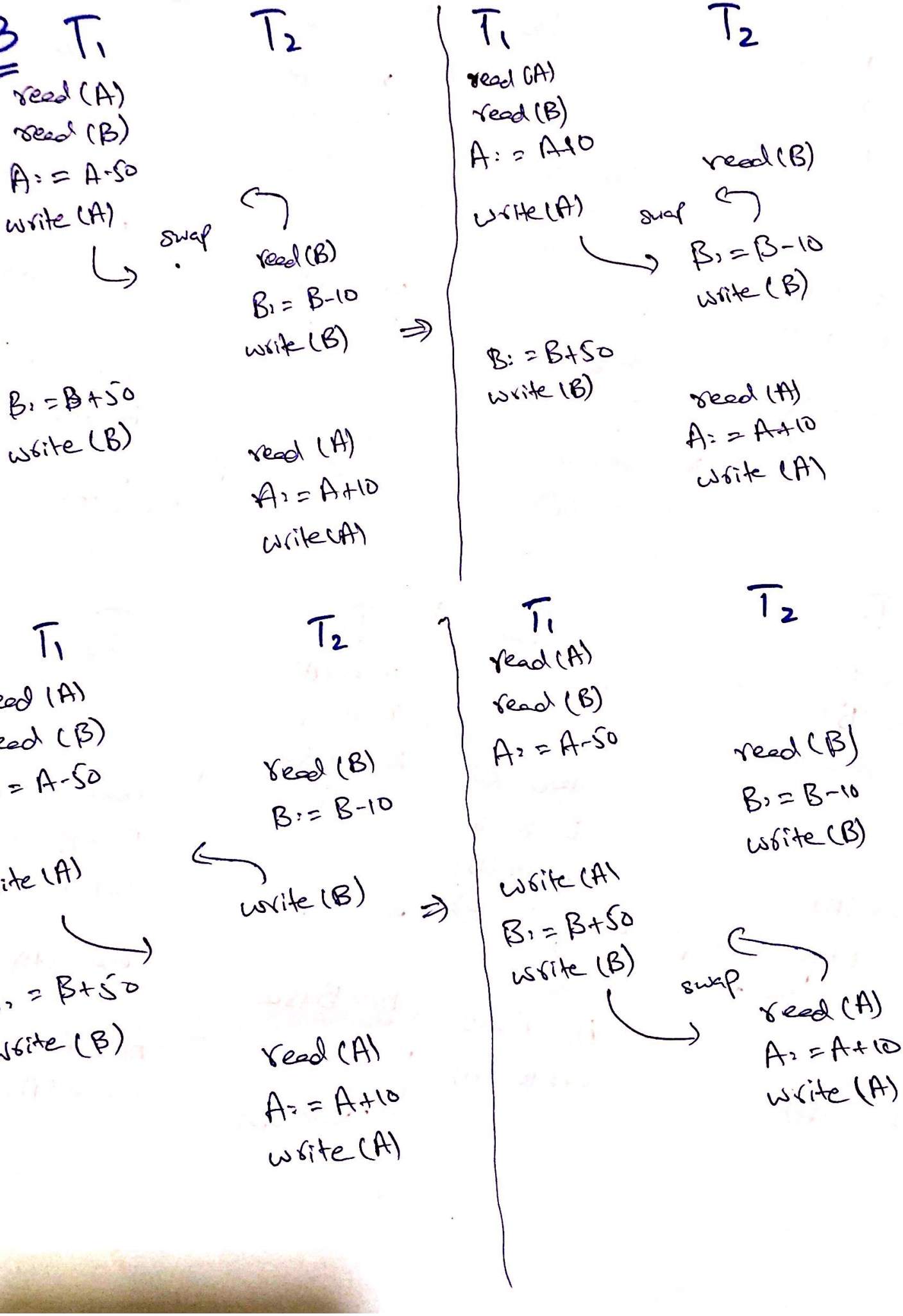
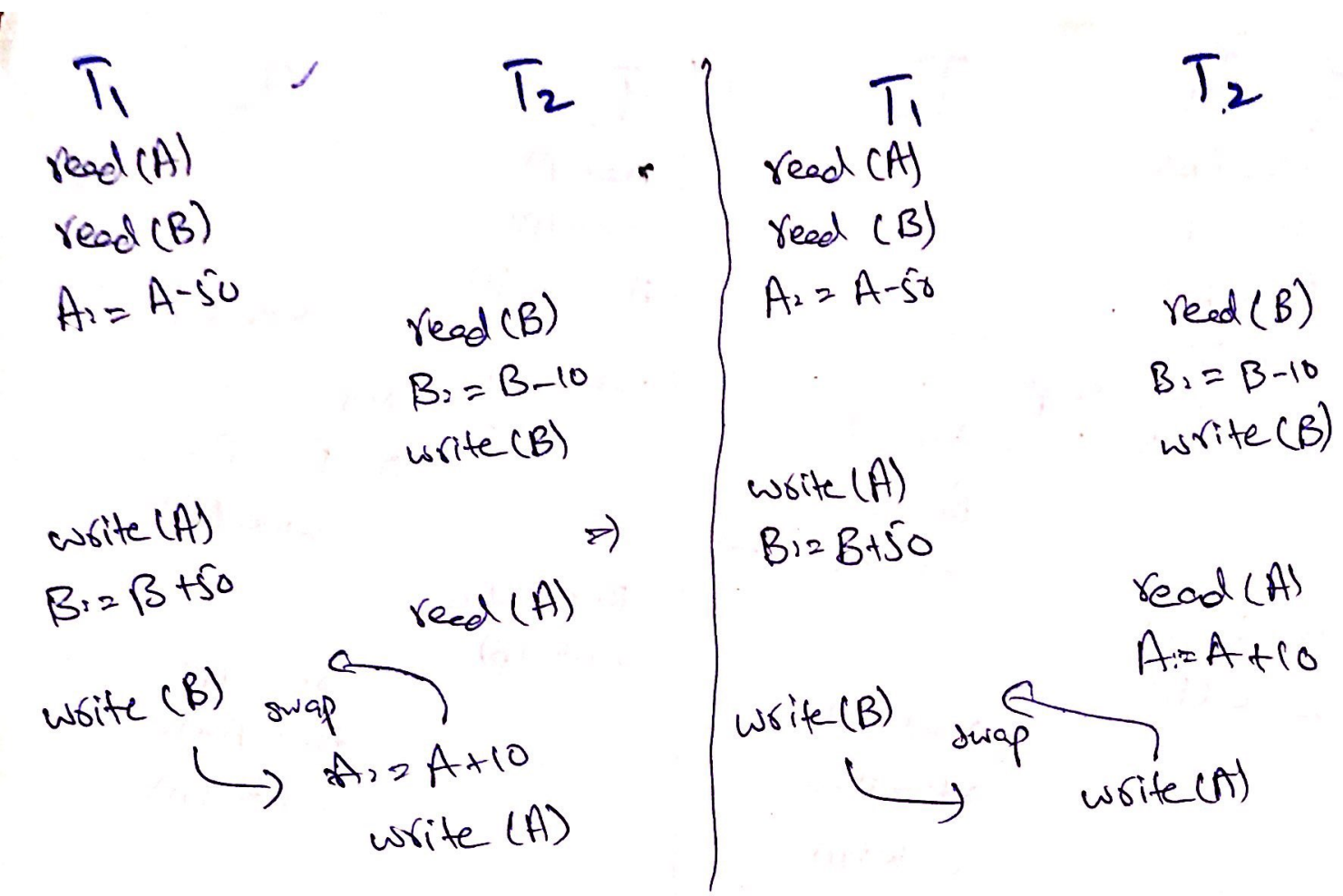
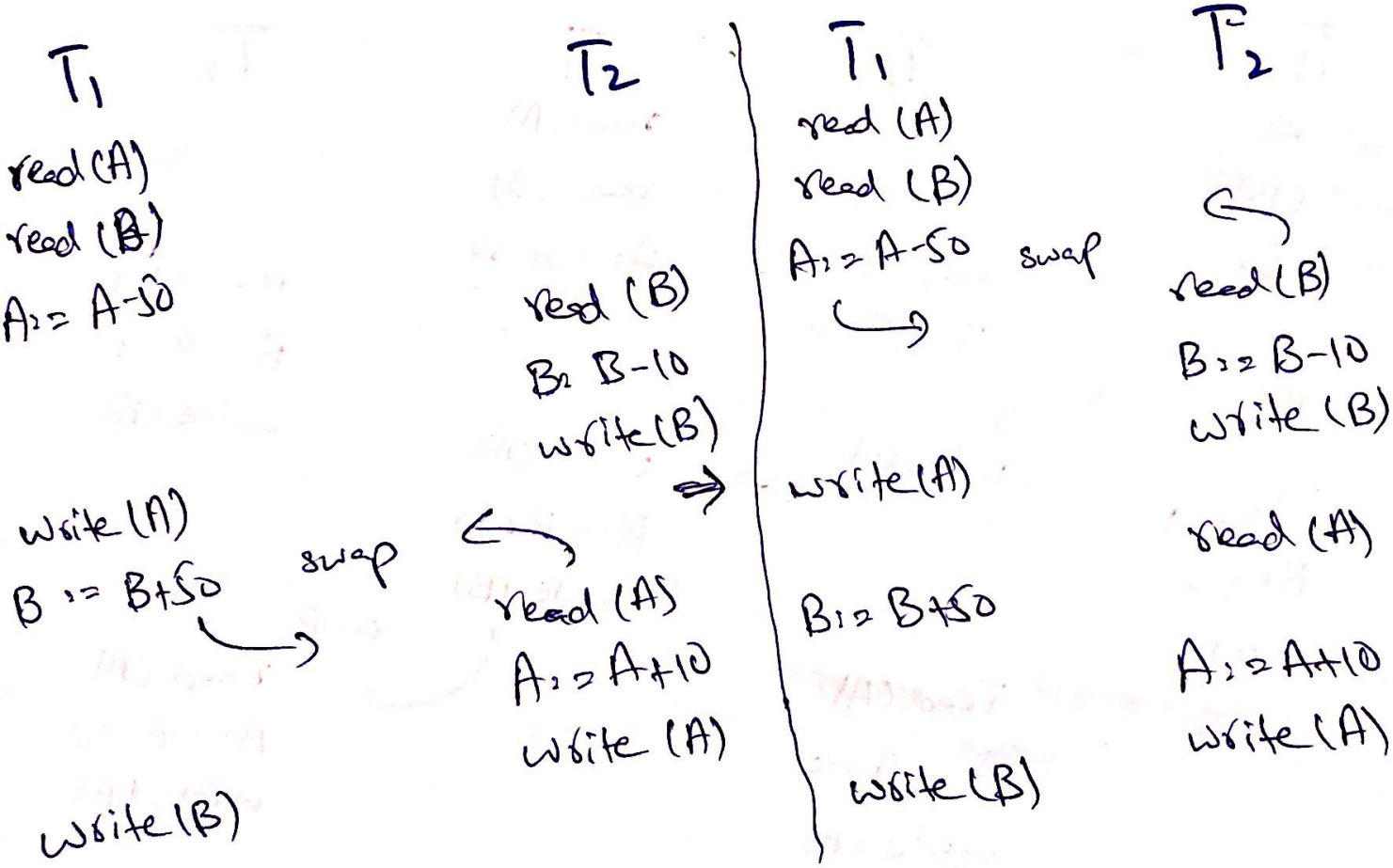
Q.3


T1
T2
read (A)
read (B)
A := A-50
write (A)
swap
read (B)
B1 = B-10
write (B)
B1 = B+50
write (B)
read (A)
A1 = A+10
write (A)
T1
T2
read (A)
read (B)
A := A+10
write (A)
swap
read (B)
B1 = B-10
write (B)
B := B+50
write (B)
read (A)
A := A+10
write (A)
T1
T2
read (A)
read (B)
A := A-50
write (A)
swap
read (B)
B := B-10
write (B)
B1 = B+50
write (B)
read (A)
A1 = A+10
write (A)
T1
T2
read (A)
read (B)
A := A-50
write (A)
B1 = B+50
write (B)
read (B)
B := B-10
write (B)
read (A)
A := A+10
write (A)

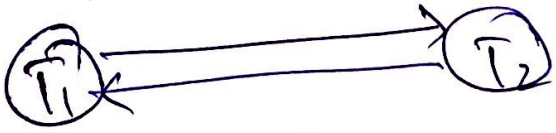

T1
T2
read(A)
read(B)
A1 = A-50
read(B)
B1 = B-10
write(B)
write(A)
B1 = B+50
read(A)
write(B)
swap
A1 = A+10
write(A)
T1
T2
read(A)
read(B)
A1 = A-50
read(B)
B1 = B-10
write(B)
write(A)
B1 = B+50
read(A)
A1 = A+10
write(B)
swap
write(A)


T1
T2
read(A)
read(B)
A1 = A-50
read(B)
B1 B-10
write(B)
write(A)
B1 = B+50
read(A)
A1 = A+10
write(A)
write(B)
swap
T1
T2
read(A)
read(B)
A1 = A-50
read(B)
B1 = B-10
write(B)
write(A)
B1 = B+50
read(A)
A1 = A+10
write(A)
write(B)
swap

T_1	T_2
read (A)	
read (B)	
	read (B)
$A_1 = A - 50$	
	$B_1 = B - 10$
	write (B)
write (A)	
	read (B)
$B_1 = B + 50$	
	$A_1 = A + 10$
	write (A)
write (B)	

⇒ If we swap all remaing non-conflict pair then there will be always cnflict in this area which means these can never be swapped so, this schedule is not conflict serializable

⇒ Isolation property being violated



cycle / loop in graph