Branch : CSE & IT Batch : English

Database Management System

Transaction & Concurrency Control

DPP 02

[MCQ]

1. Consider the following schedule S of transaction T_1, T_2 and T_3.

S: $r_1(x); r_2(x); r_3(y); w_1(x); r_2(z); r_2(y); w_2(y); w_1(z);$

Which one of the schedule below is the correct serialization of the above.

(a) $T_2 \rightarrow T_1 \rightarrow T_3$

(b) $T_3 \rightarrow T_2 \rightarrow T_1$

(c) $T_3 \rightarrow T_1 \rightarrow T_2$

(d) $T_2 \rightarrow T_3 \rightarrow T_1$

[MCQ]

2. Consider the transactions T_1, T_2 and T_3 and the schedules S_1 and S_2 given below.

T_1: $r_1(A); r_1(C); w_1(A); w_1(C)$

T_2: $r_2(B); r_2(C); w_2(C)$

T_3: $r_3(B); r_3(A); w_3(B)$

S_1: $r_1(A); r_3(B); r_3(A); r_2(B); r_2(C); w_3(B); w_2(C); r_1(C); w_1(A); w_1(C)$

S_2: $r_1(A); r_3(B); r_2(B); r_3(A); r_1(C); r_2(C); w_3(B); w_1(A); w_2(C); w_1(C)$

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

(a) Only S_1 is conflict serializable.

(b) Only S_2 is conflict serializable.

(c) Both S_1 and S_2 are conflict serializable.

(d) Neither S_1 nor S_2 is conflict serializable.

[MCQ]

3. Which of the following schedule is view serializable but not conflict serializable.

(a) $r_1(P); r_2(P); w_1(P); r_2(Q)$

(b) $r_1(P); w_1(P); r_2(P); w_2(Q)$

(c) $w_1(P); w_2(P); w_1(P); w_2(P); w_1(P)$

(d) None of these.

[MCQ]

4. Consider the following transactions T_1 and T_2:

T_1	T_2
Read(A);	Read(A);
Update A = A + 100;	
	Update A = A – 50;
Write(A);	
	Write(A);

The above transaction has _____.

(a) Lost update problem

(b) Dirty read problem

(c) Unrepeatable read problem

(d) Incorrect summary problem

[MCQ]

5. Consider the following schedule.

Time	T_1	T_2
t_0	Read Item(A);	
t_1		Read Item(A);
t_2		A = A + X;
t_3		Write Item(A);
t_4	Read Item(A);	

Which of the following concurrency problem exists in the above given schedule?

(a) Dirty read (b) Unrepeatable read

(c) Lost update (d) Both a and b

[MCQ]

6. _____Problem occurs when a transaction reads data from a database, then another transaction reads the same database data, and this particular data is deleted by an operation of the first transaction.

(a) Dirty read

(b) Unrepeatable read problem

(c) Phantom read

(d) Lost update problem

[MCQ]

7. Consider a schedule S:

$r_1(x), r_2(y), w_2(x), w_3(z), r_4(z), r_3(x), w_3(y), r_4(x), w_4(y)$

Choose the correct statements for the above schedule S.

(a) The schedule S is not serializable.

(b) The schedule S is conflict serializable with schedule S as $T_1 \rightarrow T_2 \rightarrow T_3 \rightarrow T_4$.

(c) The schedule S is not view serializable.

(d) None of the above.

[MCQ]

8. Consider the below schedule.

S: $r_1(A), r_2(B), w_2(A), r_3(A), w_1(B) w_3(A)$

choose the correct statement from the following.

(a) S is conflict serializable schedule.

(b) S is not conflict serializable schedule.

(c) S may or may not be view serializable schedule.

(d) None of these

[MSQ]

9. Choose the correct statements from the following.

(a) To test view serializability we make use of precedence graph

(b) To test conflict serializability we make use of precedence graph.

(c) If there exists no blind write and the schedule is not conflict serializable then we can conclude that it is not view serializable.

(d) All of the above.

Answer Key

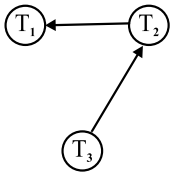
1. **(b)**
2. **(a)**
3. **(c)**
4. **(a)**
5. **(b)**
6. **(c)**
7. **(b)**
8. **(b)**
9. **(b, c)**

Hints & Solutions

1. (b)

Conflict operation are

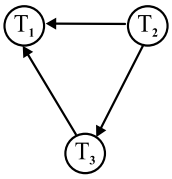
$R_2(X)$; $W_1(X)$; $R_3(Y)$; $W_2(Y)$, $R_2(Z)$; $W_1(Z)$



From precedence graph, the correct serialization order is $T_3 \rightarrow T_2 \rightarrow T_1$

2. (a)

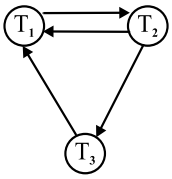
S_1: $r_1(A)$; $r_3(B)$; $r_3(A)$; $r_2(B)$; $r_2(C)$; $w_3(B)$; $w_2(C)$; $r_1(C)$; $w_1(A)$; $w_1(C)$



As there is no cycle is precedence graph

$\therefore$ S_1 is conflict serializable.

S_2: $r_1(A)$; $r_3(B)$; $r_2(B)$; $r_3(A)$; $r_1(C)$; $r_2(C)$; $w_3(B)$; $w_1(A)$; $w_2(C)$; $w_1(C)$

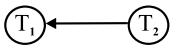


There exists a cycle hence it is not conflict serializable.

Hence, S_1 is conflict serializable but S_2 is not conflict serializable.

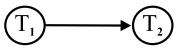
3. (c)

A : False



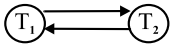
It is conflict serializable, hence it is also view serializable.

B : False



It is conflict serializable, hence it is also view serializable.

C : True



It is not conflict serializable, hence checking for view serializable.

T_1	T_2
W1(P)	
	W2(P)
W1(P)	
	W2(P)
W1(P)	

We check for order of read in view serializability. In order $T_2 \rightarrow T_1$, the schedule is view serializable.

4. (a)

The Transaction T_1 first reads data A from the database then transaction T_2 reads the same data from the database. Then T_1 Performs an operation to add 100 to A. Then transaction T_2 Performs an operation to subtract 50 from the data read by T_2. i.e., A. T_1 performs a write operation to save the value of A according to changes made to T_1. Then T_2 performs a write operation to update the value of A again in the DB. This situation causes changes to A made by T_1 to be lost because T_2 overwrites A again after T_1 update A. you could also say that the update of T_1 is lost.

Hence a is correct option.

5. (b)

In above schedule, T_1 reads value of A and then again reads the value of A. The I^{st} value of A is different from other value in 2^{nd} read.

Hence this is called unrepeatable read.

6. (c)

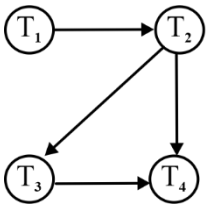
The phantom read problem arises when a transaction reads a variable once but when it tries to read the same variable again which was already deleted by other transaction, this problem known as phantom read problem.

7. (b)

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

for conflict serializability, we check precedence graph.

Conflict serial schedule $\Rightarrow T_1 \rightarrow T_2 \rightarrow T_3 \rightarrow T_4$

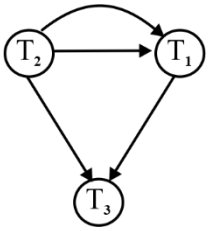


No cycle in precedence graph, therefore it is serializable

8. (b)

T_1	T_2	T_3
r(A)		
	r(B)	
	W(A)	
w(B)		
		r(A)
		w(A)

Precedence graph.



Cycle in the precedence graph, therefore not conflict serializable.

9. (b, c)

For checking conflict serializability we make use of precedence graph. For checking view serializability we check for 3 conditions.

1. Initial read
2. Updated read
3. Final write

If a schedule is not conflict serializable and there exists no blind write then we can conclude the schedule is not view serializable too.