



COMSATS University, Islamabad (CUI)
Department of Computer Science
Quiz - 4 [CLO-C4]

Course: GSC371 - Database Systems
Date: 30 DEC, 2022
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Time Allowed (min) / Total Marks: 20 / 10
Class / Semester: BS-IV / Spring 2022
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[CLO-C4]: Describe the principles of transaction management.

Question 1: If Bilal has account A having \$30 in his account from which he wishes to send \$10 to Ahsan's account, which is B. In account B, a sum of \$ 100 is already present. When \$10 will be transferred to account B, the sum will become \$110. Now, there will be two operations that will take place. One is the amount of \$10 that Bilal wants to transfer will be debited from his account A, and the same amount will get credited to account B, i.e., into Ahsan's account. Now, what happens - the first operation of debit executes successfully, but the credit operation, however, fails. Thus, in Bilal's account A, the value becomes \$20, and to that of Ahsan's account, it remains \$100 as it was previously present. The below Figures shows that both debit and credit operations are done either successfully or not.

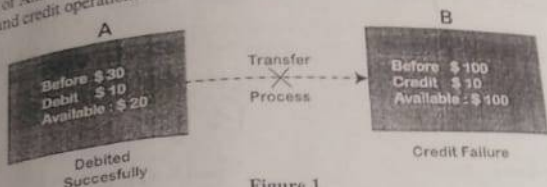


Figure 1

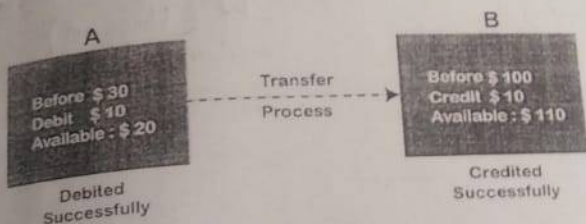


Figure 2

Based on the scenario above and Figures 1 and 2 answer the following [3 Marks]

- which ACID transaction properties it holds or not
Figure 1 => (Atomicity is not holding)
Figure 2 => (Holds Atomicity)
- Complete or partial execution
Figure 1 :- (Partial execution)
Figure 2 :- (complete execution)
- Execution successful or not
Figure 2 :- (Successful executed)
Figure 1 :- (unsuccessful)

Question 2: Let's say your account is A and your friend's account is B, you are transferring 10000 from A to B, the steps of the transaction are:

1. R(A);
2. $A = A - 10000$;
3. W(A);
4. R(B);
5. $B = B + 10000$;
6. W(B);

In the above transaction R refers to the Read operation and W refers to the write operation. The main problem that can happen during a transaction is that the transaction can fail before finishing the all the operations in the set. This can happen due to power failure, system crash etc. This is a serious problem that can leave database in an inconsistent state. Assume that transaction fail after third operation, then the amount would be deducted from your account but your friend will not receive it. What operations you will apply to solve this problem. [2 Marks]

Ans $\rightarrow$ We have to use following operations to solve this problem:

- ① Commit operation
- ② Roll back operation

Question 3: Suppose a bank employee transfers Rs 500 from Aslam's account to Hassan's account. This very simple and small transaction involves several low-level tasks. Provide all transactions of both Hassan account and Aslam account separately [1+1 Marks]

R(Aslam)
 $Aslam = Aslam - 500$
 W(Aslam)
 Commit

R(Hassan)
 $Hassan = Hassan + 500$
 W(Hassan)
 Commit

Question 4: Check whether the given schedule S1 is equivalent to view serializable / not ... Write down the steps. [3]

S1

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

$\Rightarrow$ This is serializable.