Quiz5 (Solution)
Database Systems
CE 373/ CS 355 (L5)

Fall 2023

Student Name: _____   **Student ID:** _____

Question 1 (2 points)

Assume that the database locations A and B store the balances of two bank accounts. Consider the following code for transaction T1 (using the notations discussed in class) that transfers Rs.100 between two accounts:

```
Read(A)
A := A -100
Write(A)
Read(B)
B := B + 50
Write(B)
Commit( )
Send-Email-Confirmation()
```

Does this code violate any of the ACID properties of a transaction. If there is a violation, identify the property that is being violated.

Solution:
    Yes, consistency property is being violated.

Question 2 (3 points)

Consider three transactions: T1, T2, T3.
- a.) How many serial execution schedules are possible? (6)
- b.) If the precedence graph of a concurrent execution schedule of these transactions includes the edge T1→ T3, can the following be a conflict-equivalent serial schedule: [T2,T1,T3] (**Yes** / No)
- c.) A cascadeless transaction schedule is always a recoverable schedule (**True** / False)

Question 3 (2 points)

Consider the following two transactions: T1, T2. Generate a non-serializable and a serializable concurrent schedule of these transactions.

		Non-Serializable Schedule		Serializable Schedule	
T1	T2	T1	T2	T1	T2
Read(A)	Read(A)	Read(A)		Read(A)	
A:=A+1	A:=A+10	A:=A+1		A:=A+1	
Write(A)	Write(A)		Read(A)	Write(A)	
Read(B)	Read(B)		A:=A+10		Read(A)
B:=B-1	B:=B+10		Write(A)		A:=A+10
Write(B)	Write(B)	Write(A)			Write(A)
		Read(B)		Read(B)	
		B:=B-1		B:=B-1	
		Write(B)		Write(B)	
			Read(B)		Read(B)
			B:=B+10		B:=B+10
			Write(B)		Write(B)

Consider the following sequential file for the Player relation in a database.

ID	Name	Category	PSL Team
8	Faheem	AllRounder	Islamabad
2	Abdullah	Batter	Lahore
9	Shan	Batter	Multan
10	Babar	Batter	Peshawar
4	Shaheen	Bowler	Lahore
5	Haris	Bowler	Lahore
1	Rizwan	Wicketkeeper	Multan
3	Sarfaraz	Wicketkeeper	Quetta

a.) Assume that a dense index file is created using Category as the search key. How many rows/entries will that index file contain. (4)

b.) If an index file is created using ID as the search key, will this index be clustering index? (Yes / **No**)

c.) Assume that a dense index file has been created using Category as the search key. If a new entry is made in the database file (11, Saim, Batter, Quetta), will there be any change in the index file? (Yes / **No**)