

Transaction management exercises

Part 1: Concurrency

1. Are the following interleavings conflict serializable or not? Explain your answer. If the interleavings are serializable, what is the equivalent serial schedule?
 - a. T1: Read(x)
T2: Read(x)
T1: Write(x)
T2: Write(y)
 - b. T1: Read(A)
T1: Write(A)
T2: Read(B)
T2: Write(B)
T2: Read(A)
T2: Write(A)
T1: Read(B)
T1: Write(B)
 - c. T1: Read(x)
T2: Read(y)
T1: Write(x)
T3: Read(y)
T2: Write(y)
T3: Read(z)
T3: Write(z)
2. At what point in the following interleavings (if ever) should a timestamp-based concurrency manager ask a transaction to abort and restart, and which transaction? If the interleavings are serializable, what is the equivalent serial schedule? Note: the numbers of the transactions (e.g. T1) are their timestamps.
 - a. T1: Read(x)
T1: Write(x)
T2: Read(x)
T2: Read(y)
T3: Write(x)
T1: Read(y)
T2: Write(x)

T2: Write(y)

- b. T1: Read(A)
- T2: Read(A)
- T2: Write(A)
- T3: Read(A)
- T1: Write(A)
- T3: Write(B)
- T2: Read(B)

Part 2: Recovery

3. Based on the contents of the following log, what work needs to be done to restore the database to a consistent state?

Tid	Operation	Object	Before-image	After-image	Op #
T27	INSERT	STAFF SG90		(a, b, c)	1
T29	COMMIT				final
T32	UPDATE	STAFF SG12	(d, e, f)	(d, e, g)	1
T32	UPDATE	PROPERTY P290	(x, y)	(z, w)	2
	CHECKPOINT	T27, T32			
T35	DELETE	CUSTOMER C124	(a, b, c, d)		1
T35	COMMIT				final
T32	UPDATE	PROPLEASE L2903	(e, f, g, h)	(e, f, i, h)	3
T36	INSERT	CUSTOMER C124		(k, l, m, n)	1
T32	COMMIT				final
T27	UPDATE	PROPERTY P309	(a, b)	(c, b)	2
End of log.					