Alexandria University
Faculty of Engineering
Comp. & Comm. Engineering
CC471: Database Systems
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جامعة الاسكندرية
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Sheet9
Recovery Techniques

1) The following figure shows the log corresponding to a particular schedule at the point of system crash for four transactions T1, T2, T3, and T4. Suppose that we use *the immediate update protocol* with checkpointing. Describe the recovery process from the system crash. Specify which transactions are rolled back, which operations in the log are redone and which (if any) are undone, and whether any cascading rollback takes place.

```
[start_transaction, T1]
[read_item, T1, A]
[read_item, T1, D]
[write_item, T1, D, 20, 25]
[commit, T1]
[checkpoint]
[start_transaction, T2]
[read_item, T2, B]
[write_item, T2, B, 12, 18]
[start_transaction, T4]
[read_item, T4, D]
[write_item, T4, D, 25, 15]
[start_transaction, T3]
[write_item, T3, C, 30, 40]
[read_item, T4, A]
[write_item, T4, A, 30, 20]
[commit, T4]
[read_item, T2, D]
[write_item, T2, D, 15, 25]        ←System crash
```

it has too Check Points

2) Suppose that we use the deferred update protocol for the example in the Figure in the previous problem. Show how the log would be different in the case of deferred update by removing the unnecessary log entries; then describe the recovery process, using your modified log. Assume that only REDO operations are applied, and specify which operations in the log are redone and which are ignored.

How to submit the homework assignments?

- Solve the sheet individually without looking up the solution on the Internet. The sheet is to practice; it is a learning tool not an exam.
- Assignments are to be **handwritten**.

DBMS

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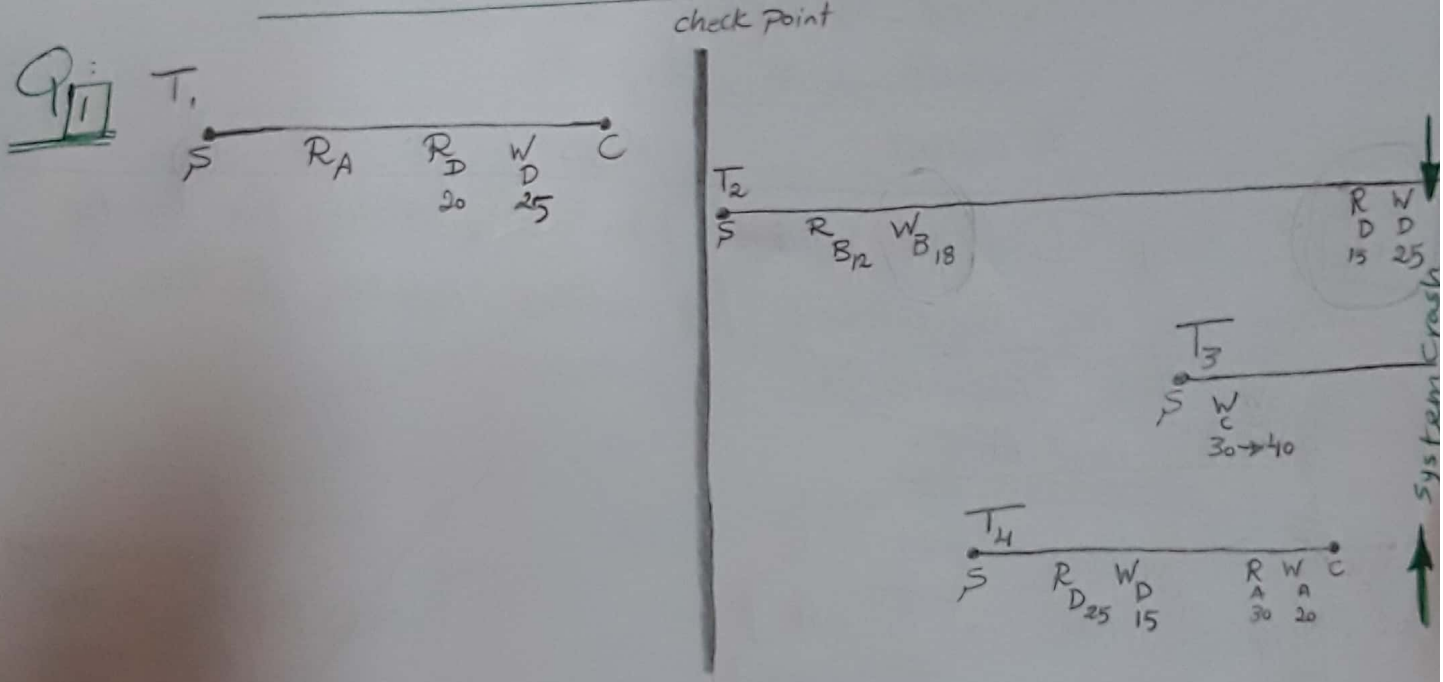
Recovery Techniques

S → Start C → Commit
R → Read W → Write



∴ T_2, T_3 are rolled back.

∴ T_4 is redone.

∴ T_1 is undone (Because it has already been committed)

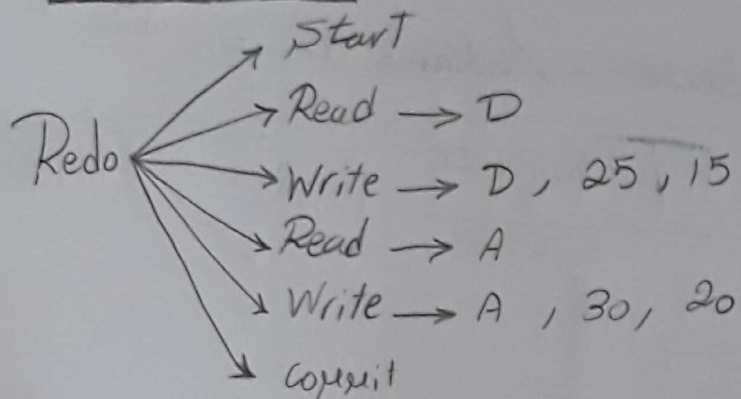
∴ Here There aren't any Cascading roll backs

Because T_2 & T_3 haven't any related transaction operations after Our CheckPoint

The Recovery Process after system Crash

① Rollback T_2 & T_3

② Redo T_4 :



Q2: Using Deferred Update Protocol, modify the log by removing the unnecessary log entries related to the (uncommitted transaction).

∴ The new Log :

[Start_transaction, T_1]
[read_item, T_1, A]
[read_item, T_1, D]
[Write_item, T_1, D, 20, 25]
[Commit, T_1]
[Check Point]
[Start_transaction, T_2]
[read_item, T_2, B]
[Start_transaction, T_4]
[read_item, T_4, D]
[write_item, T_4, D, 25, 15]
[Start_transaction, T_3]
[write_item, T_3, C, 30, 40]
[read_item, T_4, A]
[write_item, T_4, A, 30, 20]
[Commit, T_4]

the unnecessary log entries in T_2 were removed here

The Recovery Process Using < new log / Only REDO operation

1. Determine the most recent **Checkpoint** befor the crash
2. **Redo** all committed transactions after check point (T_4)
3. **Ignore** any unCommitted " " " " -- (T_2, T_3)
4. Note: T_1 has been Committed before check point, so, it Can't be redone & it is **undone**

Done !

Thanks ^_^

AAH

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