

CS 386/586 Winter 2009 Exercise 7

Work through the exercises

Undergraduate students, please turn in your paper (with papers from all other exercises) at the end of the term.

(This is exercise 16.3 from the textbook by Ramakrishnan and Gehrke.)

1. Consider a database with objects X and Y. Assume that there are two transactions T1 and T2. T1 reads objects X and Y and then writes object X. T2 reads objects X and Y and then writes objects X and Y.

- a. Write a schedule for T1 and T2 that results in a Write-Read conflict.

Show how Strict 2PL would prevent this schedule from happening. That is, show the point in the schedule where Strict 2PL would NOT allow a lock to be acquired and force a transaction to wait.

- b. Write a schedule for T1 and T2 that results in a Read-Write conflict.

Show how Strict 2PL would prevent this schedule from happening. That is, show the point in the schedule where Strict 2PL would NOT allow a lock to be acquired and force a transaction to wait.

- c. Write a schedule for T1 and T2 that results in a Write-Write conflict.

Show how Strict 2PL would prevent this schedule from happening. That is, show the point in the schedule where Strict 2PL would NOT allow a lock to be acquired and force a transaction to wait.

2. Given that a log record contains the following information: *Transaction-id* *Page-id*, *offset*, and *length* of record that was involved in this update old-data – this is what we call the “before image” of the record new-data – this is what we call the “after image” of the record

Answer the following questions.

- a. What does a log record look like if a transaction has inserted a new record? That is, what is the content of each field?
- b. What does a log record look like if a transaction has deleted a record? That is, what is the content of each field?
- c. What does a log record look like if a transaction has updated a record? That is what is the content of each field?

3. During the UNDO phase, suppose that transaction with id of 128 is being redone. What exactly needs to happen when a log record for transaction 128 is encountered in the log file:

For an insert operation?

For a delete operation?

For an update operation?