

Assignment #10

1. If T_i is trying to lock an item but T_j already has it locked the wait-die and wound-wait deadlock preventions methods will resolve this issue with one of two conditions per method. For wait-die if T_i is older than T_j then T_i is allowed to wait for the lock but if T_i is younger than T_j then T_i will be aborted and restarted later with the same timestamp. For wound-wait if T_i is older than T_j then T_j will be aborted and restarted later with the same timestamp but if T_i is younger than T_j then T_i is allowed to wait.
2. RWC (Read-Write-Certify) is a two phase locking method used for deadlock prevention in multi version concurrency control. The certify lock is used when a transaction is ready to commit its changes. This lock prevents other transactions from reading item X while the transaction holding the certify lock merges its X' with X. The advantage of using a certify lock is other transactions will see all of the modifications made at the same time while the disadvantage would be transactions not being able to see the incremental changes made by the locking transaction.
3. To resolve the dilemma using the NO-UNDO/REDO recovery algorithm we'd look at the last checkpoint that occurred before the commits stopped happening and redo all transactions whose commits occurred after checkpoint. Using the UNDO/REDO algorithm we'd look at the last checkpoint that occurred before the commits stopped happening and undo all of the write_items after that checkpoint. Once we hit the checkpoint we redo write_items whose transactions had been committed. If the DBMS was using immediate updates than transactions may perform writes on the actual data before their commit point is reached but if deferred updates is used then a transaction cannot write on the actual data until it reaches a commit point.
4. The shadow paging recovery technique will copy the databases current directory when a transaction begins and allows the transaction to operate the database. The shadow copy is never modified. If recovery from a failure is required the database will drop the current directory and reinstating the shadow directory thus returning the database to its prior state. Logs are not required for a single user database but may be required for a multiuser environment with concurrency control.
5. Transaction 3 never reaches its commit point and must be rolled back. Since Transaction 2 reads B after Transaction 3 writes to B it must also be rolled back.