Database Management System – cs422 DE

Assignment 8 – Week 12

This assignment is based on lecture 10 (chapter 22 – Database Recovery).

- Submit your *own work* on time. No credit will be given if the assignment is submitted after the due date.
- Note that the completed assignment should be submitted in .doc, .docx, .rtf or .pdf format only.
- In MCQs, if you think that your answer needs more explanation to get credit then please write it down.
- You are encouraged to discuss these questions in the Sakai forum.

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(1) What is meant by granularity? Give examples.

ANS: Granularity is basically defining the level of detail in a data structure. It refers to data's level of detail. It divides the data into smaller part. If the data is more granular then we can precisely analysis the data. For example, name can be divided into first name, middle name, and last name. While subdividing it results more granular.

(2) Discuss the types of failure that may occur in a database environment. Explain why it is important for a multi-user DBMS to provide a recovery mechanism.

ANS:

Software Failure:

- OS failure.
- Supporting software failure
- Memory crash.
- Power failure.

Hardware Failure:

- Faults in media.
- Malfunction in Read-Write
- Power Failure.
- Information corrupts on the disk.

Natural Disasters:

- A storm destroys server facilities.

Someone executes a wrong sql command that delete the data mistakenly.
Destroy data or facilities intentionally.

To safeguard the data from the listed above failure, then we need a strong recovery mechanism. So, it is the most key requirement feature of enterprise DBMS that should provide the strong recovery mechanism to keep the data coherent and safe.

(3) Discuss how the log file (or journal) is a fundamental feature in any recovery mechanism. Explain what is meant by forward and backward recovery and describe how the log file is used in forward and backward recovery.

ANS:

Log file is a fundamental feature in any recovery mechanism because it contains all the updates made in database such as transaction records as well as check point records. When there is any failure, database can be recovered using the log files. Forward recovery is about the starting from the last saved point and then applying transaction that are newer than the save point whereas backward recovery restores a journaled database to a prior state. Before and after images of updates of the database information are contain in log files. To perform backward recovery before images can be used to undo changes to the database and to perform forward recover after images can be used to redo changes.

(4) What is the significance of the write-ahead log protocol? How do checkpoints affect the recovery protocol?

ANS:

Program can check the write-ahead log and compare it when it was supposed to be doing when it unexpectedly lost the power to what was done. Based on that comparison, the program can decide to undo what is started, complete what it started or keep things as they are.

Checkpoints speeds up data recovery process and checkpoint records in log file is used to prevent unnecessary redo operations.

(5) Compare and contrast the deferred update and immediate update recovery protocols.

ANS:

Deferred Update is a technique used to maintain the transaction log files of the database. In deferred update, transactions/updates are not executed immediately to the database until transaction has been committed, if transaction fail before commit, no undo is needed.
Immediate Update is also a technique used to maintain the transaction log files of the database. In immediate update, when transaction/update is executed, the updates are made directly to the database and log file is also maintained which contains both old and new values. If transaction failed, changes need to be undone.