# Chapter 6 Solution For System Malfunction

In this Chapter, we mainly discuss *How to control the Data Access in DBMS*. There have two main parts:

***Recovery***:

When there has *System Malfunction*, data must be protected. This Chapter includes Recovery. Recovery means that when there has System Malfunction, then Data should remain *Data Integrity*.

The basic technology to support Recovery is *Logging*, and logging is used to record the database changing history in a safe way. Here we will discuss three different types of logging, and they are called ‘*undo*’, ‘*redo*’ and ‘*undo/redo*’.

We will also discuss *Recovery*, Recovery is the database update process when using logging to rebuild database. One important point of Logging and Recovery is that we should avoid keeping back trace to far long ago. Therefore we need to learn the important technology of *Checkpoint*, it limits the logging length when do Recovery.

In the last chapter, we discuss *Backup technology*, it make the database to undergo System Malfunction temporarily but also can undergo the lost of the whole database. Under such situation, we need to depend on one copy and the survived Logging information, and recover the database to the latest status for one time.

***Second issue:***

Data should not be corrupted because proceeding several Query or Database Update together.