Database Administration and Security

1. Define the following key terms:

a. *Data administration.* A high-level function that is responsible for the overall management of data resources in an organization, including maintaining corporate-wide definitions and standards
b. *Database administration.* A technical function that is responsible for physical database design and for dealing with technical issues such as security enforcement, database performance, and backup and recovery
c. *Encryption.* The coding (or scrambling) of data so that humans cannot read them

2. Compare and contrast the following terms:

a. Data administration; database administration. Data administration is the overall management of data resources. The second function, that of database administration, has been regarded as responsible for physical database design and for dealing with the technical issues, such as security enforcement, database performance, backup, and recovery, associated with managing a database.
b. *Backward recovery; forward recovery.* With backward recovery (also called rollback), the DBMS backs out of or undoes unwanted changes to the database. Before-images of the records that have been changed are applied to the database. As a result, the database is returned to an earlier state; the unwanted changes are eliminated. With forward recovery (also called rollforward), the DBMS starts with an earlier copy of the database. By applying after-images (the results of good transactions), the database is quickly moved forward to a later state (Figure 12-7).
c. *Before-image; after-image.* A before-image is simply a copy of a record before it has been modified, and an after-image is a copy of the same record after it has been modified.
d. *Authorization; authentication.* Authentication schemes positively identify a person attempting to gain access to a database. For example, a person has to first supply a particular password (or another required proof of identity, according to the authentication scheme in use), and after successfully completing the authentication procedure (if any) may be authorized to read any record in a database.
e. *Data backup; data archiving.* Data backup is a process that creates a backup copy of data which can be used to recover lost data due to hardware and/or software failures. Data archiving is a process, which moves inactive data to another place for storage.

3. Briefly describe the four DBMS facilities that are required for database backup and recovery:

a. *Backup facilities* provide periodic backup copies of the entire database.
b. *Journalizing facilities* maintain an audit trail of transactions and database changes.
c. *Checkpoint facility* allows periodic suspension of all processing and synchronization of a database's files and journals.
d. *Recovery manager* allows the DBMS to restore the database to a correct condition and restart processing transactions.