CPA BEC - STUDY UNIT 14
Information Technology IV:
Core Concepts

A. Database Management Systems

1. A **database management system (DBMS)** is an integrated set of software tools superimposed on the data files that helps maintain the integrity of the underlying database. A DBMS allows programmers and designers to work independently of the physical and logical structure of the database.
2. A particular database's design, called its **schema**, consists of the layouts of the tables and the constraints on entering new records. To a great extent, a DBMS automates the process of enforcing the schema. The **data dictionary** contains the physical and logical characteristics of every data element in a database.
3. Those in the IT function responsible for dealing with the DBMS are called database administrators.

B. Transaction Processing Modes

1. **Batch processing.** In this mode, transactions are accumulated and submitted to the computer as a single "batch." In the early days of computers, this was the only way a job could be processed.
2. **Online processing.** In this mode, the computer processes each transaction individually as the user enters it. The user is in direct communication with the computer and gets immediate feedback on whether the transaction was accepted or not.
3. Many applications use **combined batch and online** modes.
4. **Real-time processing.** In some systems, having the latest information available at all times is crucial to the proper functioning of the system.
   a. A thermostat is a common example, constantly monitoring the temperature in the room and engaging the heating or cooling accordingly.
   b. Online, real-time systems combine the two modes of user data entry and instant update. A common example is an airline reservation system, which is constantly updated from moment to moment and must be available all the time.
5. **Centralization.** During the early days of computer processing, computers were very large and expensive and only organizations such as large banks and governmental agencies could afford them. Users connected to the mainframe via "dumb terminals," i.e., simple monitor-and-keyboard combinations with no processing power of their own.
6. **Decentralization.** As the data processing industry evolved, computers became smaller (so-called minicomputers), and branch offices of large organizations could have their own.
   a. Each branch could store and process its data onsite, transmitting the results overnight to the mainframe at the home office. This was an early form of **distributed processing**, in which parts of an organization's computer operations could be performed in separate physical locations.
7. **Client/server networks.** The key to the client/server model of distributed processing is that it runs processes on the platform most appropriate to that process while attempting to minimize traffic over the network.
   a. A "server" is centrally located and devoted to the functions that are needed by all network users.

b. Technically, a “client” is any object that uses the resources of another object. Thus, a client can be either a piece of hardware or a software program. In common usage, however, the client generally refers to a device that requests services from a server. This use of the term encompasses anything from a Palm Pilot, to a desktop computer, to another server.

8. **Outsourcing.** Some organizations farm out all or part of their IT function to an outside provider.

C. **Application processing phases** include data capture, edit routines, output controls, master file maintenance, reporting, accounting, control, management, query, audit trail, and ad hoc reports.

D. Disaster Recovery and Business Continuity

1. The information security goal of data availability is primarily the responsibility of the IT function. Contingency planning is the name commonly given to this activity.
   a. **Disaster recovery** is the process of resuming normal information processing operations after the occurrence of a major interruption.
   b. **Business continuity** is the continuation of business by other means during the period in which computer processing is unavailable or less than normal.
2. **Periodic backup and offsite rotation** of computer files is the most basic part of any disaster recovery/business continuity plan.
3. Dealing with specific types of contingencies.
   a. **Power failures** can be guarded against by the purchase of backup electrical generators. Attacks such as **viruses** and denial-of-service call for a completely different response. The system must be brought down “gracefully” to halt the spread of the infection.
   b. The most extreme contingency is when the organization’s main facility is rendered uninhabitable by **flood, fire, earthquake, etc**. It is to prepare for these cases that organizations contract for alternate processing facilities.
      1) An **alternate processing facility** is a physical location maintained by an outside contractor for the express purpose of providing processing facilities for customers in case of disaster.
         a) A hot site is a fully operational processing facility that is immediately available; a warm site is a facility with limited hardware; and a cold site is a shell facility lacking most infrastructure but readily available for the quick installation of hardware.