**Chapter 8**

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| **Num** | **Multiple Choice Answers** | **Matching Answers** |
| 1 | B | E |
| 2 | A | G |
| 3 | D | D |
| 4 | A | H |
| 5 | D | A |
| 6 | B | B |
| 7 | A | F |
| 8 | B | I |
| 9 | C | C |
| 10 | C | J |

**Open Ended Questions:**

1. **Discuss communication channels including physical connections and wireless connections.**

* **Communications Channels**
* Carry the data from one computer to another
* Two categories of communication channels, wireless and wired
* Wireless communications send information through the air, such as when you use a cell phone. Wired communications require a physical connection and are more common with desktop computers.
* **Wireless Connections**
* Do not use a solid substance to connect sending and receiving devices. Data is moved through the air. Primary technologies used for wireless connections are Bluetooth, Wi-Fi, microwave, WiMax, cellular, and satellite connections.
* **Cellular** – uses multiple antennae (cell towers) to send and receive data within relatively small geographic areas regions (cells). Most cell phones and mobile devices use cellular networks.
* **Bluetooth** is a short-range radio communication standard that transmits data over short distances of up to approximately 33 feet. Bluetooth is widely used for wireless headsets, printer connections, and handheld devices.
* **Wi-Fi (wireless fidelity)** uses high frequency radio signals to transmit data. A number of standards for Wi-Fi exist, and each can send and receive data at a different speed. Most home and business wireless networks use Wi-Fi.
* **Microwave** - communication through high-frequency radio waves. It is sometimes referred to as line-of-sight communication because microwaves can only travel in a straight line.
* Because waves cannot bend with the curvature of the earth they can only be transmitted over relatively short distances.
* For longer distances, the waves must be relayed by means of microwave stations with microwave dishes or antennas.
* **WiMax (Worldwide Interoperability for Microwave Access**) is a new standard that extends the range of Wi-Fi networks using microwave connections. WiMax is commonly used by universities and others to extend the capability of existing Wi-Fi networks.
* **Satellite -** amplified microwaves that use point-to-point communication to relay devices (satellites) orbiting 22,000 miles above the earth
* Rotate at a precise point and speed above the earth
* Amplify and relay microwave signals from one transmitter on the ground to another
* Used to send and receive large volumes of data
* Communication interferences can occur in bad weather.
* Used by global positioning system (GPS) devices
* Used by many cell phones, including the Apple iPhone
* Uplink relates to sending data to a satellite.
* Downlink refers to receiving data from a satellite.
* **Physical Connections- a solid medium to connect sending and receiving devices. These connections include:**
* **Fiber-optic cable** - transmits data as pulses of light through tiny tubes of glass.
* Compared to coaxial cable, it is lighter, faster, and more reliable at transmitting data.
* Rapidly replacing twisted-pair cable telephone lines.
* **Coaxial cable** - a high-frequency transmission cable consisting of a single, solid copper core.
* Used to deliver television signals as well as to connect computers in a network
* **Twisted pair** – pairs of copper wires twisted together
* Landline telephone lines, Ethernet cables
* Ethernet cables are often used in networks and to connect a variety of components to the system unit.
* **通信通道：数据传输通道，包括无线通信和有线通信通道。**
* **无线连接：隔空传输数据，无线通信技术主要有蜂窝、蓝牙、微波技术、Wi-Fi 、卫星、WiMax等。**
* **有线连接：通过物理线路传输数据，包括光纤、同轴电缆、双绞线等。**

1. **Define network architecture including topologies (bus, ring, star, tree, and mesh) and strategies (client/server and peer-to-peer).**

* **Network Architecture**
  + Describes how a network is arranged and how resources are coordinated and shared
  + **Topology –** describes the physical arrangement of a networkand how resources are coordinated and shared
    - **Bus network** 
      * Each device is connected to a common cable called a bus or backbone and all communications travel along this bus.
    - **Ring network**
      * Each device is connected to two other devices, forming a ring. When a message is sent, it is passed around the right until it reaches the intended destination.
    - **Star network**
      * Each device is connected directly to a central network switch.
      * Whenever a node sends a message, it is routed to the switch, which then passes the message along to the intended recipient.
      * Most widely used network topology today
      * Range of applications includes small networks in the home to very large networks in major corporations.
    - **Tree network**
      * Each device is connected to a central node, either directly or through one or more other devices.
      * Central node is connected to two or more subordinate nodes that in turn are connected to other subordinate nodes, and so forth, forming a treelike structure.
      * Also known as a hierarchical network
    - **Mesh** **network**
      * Newest type of topology and does not use a specific physical layout
      * Requires that each node have more than one connection to the other nodes, resulting pattern forms the appearance of a mesh
      * If a path between two nodes is somehow disrupted, data can be automatically rerouted.
      * Wireless technologies are frequently used to build mesh networks.
  + **Strategies** - Every network has a strategy, or way of coordinating the sharing of information and resources. Two of the most common network strategies are client/server and peer-to-peer.
    - **Client/server network** - use central computers to coordinate and supply services to other nodes on the network. The server provides access to resources such as web pages, databases, application software, and hardware.
      * Strategy is based on specialization. Server nodes coordinate and supply specialized services, and client nodes request the services.
      * Commonly used server operating systems are Windows Server, mac OS X Server, Linux, and Solaris.
      * Client/server networks are widely used on the Internet.
      * Advantages of the client/server network strategy include:
        + Ability to handle very large networks efficiently
        + Availability of powerful network management software to monitor and control network activities
        + Disadvantage of the client/server network strategy is cost of installation and maintenance.
    - **Peer-to-peer (P2P) network** - nodes have equal authority and can act as both clients and servers. Many current popular game, movie, and music sharing services use this network strategy.
      * Advantage of P2P:
        + Easy and inexpensive (often free) to set up and use
      * Disadvantage of P2P:
        + Lack of security controls or other common management functions
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