**Module : 2 Ech Malware And System Hack**

**1. Difference between Hardware and Software**

* **Hardware:** Physical components of a computer system, such as CPU, RAM, hard drives, and peripherals like keyboards and monitors. Example: Motherboard.
* **Software:** Intangible instructions or programs that run on hardware to perform tasks. Example: Operating systems (Windows) and applications (Microsoft Word).

**2. Define IP Address Range and Private Address Range**

* **IP Address Range:** A numerical label assigned to devices in a network for communication. Public IP ranges are globally unique and assigned by ISPs.
  + Example of public IP range: **1.0.0.0 – 223.255.255.255**.
* **Private Address Range:** Reserved IP addresses used within local/private networks.
  + **Private IP Ranges:**
    - Class A: **10.0.0.0 – 10.255.255.255**
    - Class B: **172.16.0.0 – 172.31.255.255**
    - Class C: **192.168.0.0 – 192.168.255.255**

**3. Explain Network Protocol and Port Number**

* **Network Protocol:** A set of rules that govern communication between devices over a network. Examples: **TCP, UDP, HTTP, FTP, ICMP.**
* **Port Number:** A logical identifier for specific processes or services in a system. Examples:
  + **80:** HTTP
  + **443:** HTTPS
  + **25:** SMTP (Email)

**4. Explain Types of Network Devices**

1. **Router:** Connects multiple networks and directs data packets.
2. **Switch:** Connects devices within a LAN and uses MAC addresses to forward data.
3. **Hub:** Connects multiple devices but sends data to all connected devices (broadcast).
4. **Firewall:** Filters network traffic to prevent unauthorized access.
5. **Access Point:** Allows wireless devices to connect to a network.
6. **Modem:** Converts digital signals to analog for internet access via ISPs.

**5. Tools Used for Data Backup and Recovery**

1. **Acronis True Image:** Full system backups.
2. **Veeam Backup & Replication:** Virtual and physical backups.
3. **Cloud Solutions:** Google Drive, OneDrive, Dropbox.
4. **Time Machine (macOS):** Automatic backups for Apple devices.
5. **Windows Backup and Restore:** Built-in tool for Windows systems.

**6. Explain HTTP and HTTPS Protocols**

* **HTTP (HyperText Transfer Protocol):**
  + Used for transferring data over the web.
  + No encryption, making it less secure.
  + Operates on **Port 80**.
* **HTTPS (HyperText Transfer Protocol Secure):**
  + Encrypted version of HTTP using SSL/TLS for secure communication.
  + Operates on **Port 443**.

**7. What is SSL and TLS Security?**

* **SSL (Secure Sockets Layer):** A cryptographic protocol for encrypting data between a browser and server.
* **TLS (Transport Layer Security):** An improved and more secure version of SSL, offering better encryption and authentication.
* **Purpose:** Protects sensitive information like login credentials, credit card numbers, etc.

**8. Explain the MAC Address**

* **MAC Address (Media Access Control):**
  + A unique identifier assigned to a network interface card (NIC) for communication within a network.
  + Format: **00:1A:2B:3C:4D:5E** (hexadecimal).
  + **Types:**
    - **Unicast:** Single device communication.
    - **Multicast/Broadcast:** Communication to multiple devices.