**Lab Practical #02:**

Study of different network devices in detail.

**Practical Assignment #02:**

1. Give difference between below network devices.
2. Working of below network devices:
   * Repeater: A repeater receives a weak or corrupted signal and regenerates it to extend the range of the network. It works at the Physical Layer (Layer 1).
   * Modem((DSL and ADSL): A modem (Modulator-Demodulator) converts digital signals into analog for transmission over telephone lines and vice versa.  
     ● **DSL** provides high-speed internet over copper lines.  
     ● **ADSL** is a type of DSL with more bandwidth for download than upload.
   * Hub: A hub is a basic networking device that sends data to all connected devices regardless of destination. It works at Layer 1 and does not filter or route data.
   * Bridge: A bridge connects two similar LANs and filters traffic using MAC addresses. It helps reduce traffic by dividing networks into segments and operates at Layer 2.
   * Switch: A switch receives data from a device and uses MAC addresses to determine the destination port. It sends the data directly to the correct device, reducing unnecessary traffic. It operates on the Data Link Layer (Layer 2).
   * Router: A router connects different networks using IP addresses. It examines incoming packets and determines the best path to forward them. Routers are used to connect LANs to the internet or between different networks, operating at Layer 3.
   * Gateway: A gateway serves as a translator between different network architectures or protocols. It allows communication between two different systems (like TCP/IP to AppleTalk) and acts as an entry/exit point to another network.

# Hub and Switch

|  |  |  |
| --- | --- | --- |
| No. | Hub | Switch |
| 1 | Operates at OSI Layer 1 | Operates at OSI Layer 2 |
| 2 | Broadcasts data to all ports | Sends data only to the destination port |
| 3 | No MAC address table | Maintains MAC address table |
| 4 | More network traffic | Reduces network traffic |
| 5 | Less secure and slower | More secure and faster |

# Switch and Router

|  |  |  |
| --- | --- | --- |
| No. | Switch | Router |
| 1 | Connects devices in a LAN | Connects different networks (LAN to WAN) |
| 2 | Uses MAC addresses | Uses IP addresses |
| 3 | Works at Layer 2 | Works at Layer 3 |
| 4 | Does not assign IP addresses | Can assign IP addresses (via DHCP) |
| 5 | No routing capability | Has routing capabilities |

# Router and Gateway

|  |  |  |
| --- | --- | --- |
| No. | Router | Gateway |
| 1 | Forwards data between different networks | Acts as entry/exit point to another network |
| 2 | Works within similar protocols | Connects dissimilar networks |
| 3 | Works at OSI Layer 3 | Works at OSI Layer 4 or higher |
| 4 | Can perform NAT and firewall tasks | Can translate protocols between networks |
| 5 | Mainly used in home/office networks | Mainly used at network boundaries |

# Working of below network devices:

1. Switch

A switch receives data from a device and uses MAC addresses to determine the destination port. It sends the data directly to the correct device, reducing unnecessary traffic. It operates on the Data Link Layer (Layer 2).

1. Router

A router connects different networks using IP addresses. It examines incoming packets and determines the best path to forward them. Routers are used to connect LANs to the internet or between different networks, operating at Layer 3.

1. Gateway

A gateway serves as a translator between different network architectures or protocols. It allows communication between two different systems (like TCP/IP to AppleTalk) and acts as an entry/exit point to another network.