**Lab Practical #02:**

Study of different network devices in detail.

**Practical Assignment #02:**

1. Give difference between below network devices.

* Hub and Switch
* Switch and Router
* Router and Gateway

1. Working of below network devices:
   * Repeater
   * Modem((DSL and ADSL)
   * Hub
   * Bridge
   * Switch
   * Router
   * Gateway

# Hub and Switch

|  |  |  |
| --- | --- | --- |
| No. | Hub | Switch |
| 1 | Hub is operated on Physical layer in OSI Model. | Switch is operated on Data Link Layer of OSI Model. |
| 2 | Hub is a broadcast type Transmission. | Switch is Unicast, multicast and broadcast type transmission. |
| 3 | Hub has 4/12 ports. | Switch can have 24 to 48 ports. |
| 4 | Hub is a half-duplex transmission mode. | Switch is a full duplex transmission mode. |
| 5 | Speed of original hub 10Mbps and modern internet hub is 100Mbps. | Maximum speed is 10Mbps to 100Mbps. |

# Switch and Router

|  |  |  |
| --- | --- | --- |
| No. | Switch | Router |
| 1 | It works in Data Link Layer. | It works in Network Layer. |
| 2 | Switch is used by only LAN. | Router is Used by LAN as well as MAN. |
| 3 | There is no Collison taking place in full duplex switch. | There is less Collison taking place in the router. |
| 4 | Switch needs at least single network is to connect. | Router needs at least two network to connect. |
| 5 | Maximum speed is 10Mbps to 100Mbps. | Maximum speed for wireless is 1-10Mbps and maximum speed for wired connections is 100Mbps. |

# Router and Gateway

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| --- | --- | --- |
| No. | Router | Gateway |
| 1 | It is a hardware device which is responsible for receiving, analyzing and forwarding the data packets to other networks. | It is a device that is used for the communication among the networks which have a different set of protocols. |
| 2 | It supports the dynamic routing. | It does not support dynamic routing. |
| 3 | A Router operates on layer 3 and layer 4 of the OSI model. | A Gateway operates up to layer 5 of the OSI model. |
| 4 | The main function of a Router is routing the traffic from one network to the other. | The main function of Gateway is to translate one protocol to the other. |
| 5 | The additional features provided by a Router are Wireless networking, Static routing, NAT, DHCP server etc. | The additional features provided by a gateway are network access control, protocol conversion etc. |

# Working of below network devices:

1. **Repeater**

* Regenerates and amplifies weak signals to extend the transmission distance.
* Used in long-distance wired or wireless communications to avoid signal degradation.

1. **Modem**

* Converts digital data from a computer to analog for transmission over phone lines and vice versa.
* DSL (Digital Subscriber Line) and ADSL (Asymmetric DSL) modems provide internet access through telephone lines, with ADSL offering faster download than upload speeds.

1. **Hub**

* Broadcasts data to all devices connected to it, regardless of the destination.
* Operates at OSI Layer 1 (Physical Layer) and doesn't filter traffic — causes network collisions.

1. **Bridge**

* Connects and filters traffic between two network segments at the data link layer (Layer 2).
* Reduces network traffic by dividing it into separate collision domains.

1. **Switch**

* Forwards data only to the specific device (MAC address) it's intended for.

Operates at Layer 2 and creates a separate collision domain for each connected device.

1. **Router**

* Connects multiple networks together and routes data between them based on IP addresses.
* Works at Layer 3 (Network Layer) and determines the best path for data packets.

1. **Gateway**

* Acts as a translator between different network protocols (e.g., IP to IPX).
* Used when networks with different architectures or protocols need to communicate.