**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

|  |  |  |
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| No. | Hub | Switch |
| 1 | It is a broadcast device. | It is a point to point device. |
| 2 | It operates at physical layer. | It operates at datalink layer. |
| 3 | It is not an intelligent device. | It is an intelligent device. |
| 4 | It cannot be used as a repeater. | It can be used as a repeater. |
| 5 | Not very costly. | Costly. |

# Switch and Router

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| No. | Switch | Router |
| 1 | While the main objective of switch is to connect various devices simultaneously. | The main objective of router is to connect various networks simultaneously. |
| 2 | While it works in [data link layer](https://www.geeksforgeeks.org/data-link-layer/). | It works in [network layer](https://www.geeksforgeeks.org/network-layer-gq/). |
| 3 | While switch is used by only LAN. | Router is used by [LAN](https://www.geeksforgeeks.org/lan-full-form/) as well as [MAN](https://www.geeksforgeeks.org/man-full-form/). |
| 4 | While through switch data is sent in the form of frame. | Through the router, data is sent in the form of packets. |
| 5 | While there is no collision taking place in full duplex switch. | There is less collision taking place in the router |

# Router and Gateway

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| No. | Router | Gateway |
| 1 | It is a hardware device that is responsible for receiving, analyzing, and forwarding data packets to other networks. | It is a device that is used for communication among networks that have a different set of protocols. |
| 2 | It supports [dynamic routing](https://www.geeksforgeeks.org/what-is-dynamic-routing-in-computer-network/). | It does not support dynamic routing. |
| 3 | The main function of a router is routing the traffic from one network to the other. | The main function of a gateway is to translate one protocol to the other. |
| 4 | A router operates on layer 3 and layer 4 of the OSI model. | A gateway operates up to layer 5 of the [OSI model](https://www.geeksforgeeks.org/osi-model-full-form-in-computer-networking/). |
| 5 | It is hosted on only the dedicated applications. | It is hosted on dedicated applications, physical servers, or virtual applications. |

# Working of below network devices:

1. Switch:

* It operates in the Data Link Layer in the [OSI Model](https://www.geeksforgeeks.org/layers-of-osi-model/).
* It performs error checking before forwarding data.
* It transfers the data only to the device that has been addressed.
* It operates in full duplex mode.
* It allocates each [LAN](https://www.geeksforgeeks.org/lan-full-form/) segment to a limited bandwidth.
* It uses Unicast (one-to-one), multicast (one-to-many), and broadcast (one-to-all) transmission modes.
* Packet-switching techniques are used to transfer data packets from source to destination.
* Switches have a more significant number of ports.

1. Router:

* A router determines a packet's future path by examining the destination IP address of the header and comparing it to the routing [database](https://www.geeksforgeeks.org/what-is-database/). The list of [routing tables](https://www.geeksforgeeks.org/routing-tables-in-computer-network/) outlines how to send the data to a specific network location. They use a set of rules to determine the most effective way to transmit the[data](https://www.geeksforgeeks.org/what-is-data/) to the specified IP address.
* To enable communication between other devices and the internet, routers utilize a modem, such as a cable, fibre, or [DSL modem](https://www.geeksforgeeks.org/digital-subscriber-line-dsl/). Most routers include many ports that can connect a variety of devices to the [internet](https://www.geeksforgeeks.org/internet-and-its-services/) simultaneously. In order to decide where to deliver data and where traffic is coming from, it needs routing tables.
* A routing table primarily specifies the router's default path. As a result, it might not determine the optimum path to forward the data for a particular packet. For instance, the office router directs all networks to its internet service provider through a single default channel.
* Static and dynamic tables come in two varieties in the router. The [dynamic routing](https://www.geeksforgeeks.org/what-is-dynamic-routing-in-computer-network/) tables are automatically updated by dynamic routers based on network activity, whereas the [static routing tables](https://www.geeksforgeeks.org/difference-between-static-and-dynamic-routing/) are configured manually.

1. Gateway:

* Gateways provide a wide variety of features.
* A gateway is situated at a network edge and manages all data that enters or exits the network.
* A gateway is distinct from other network devices in that it can operate at any layer of the [OSI model](https://www.geeksforgeeks.org/open-systems-interconnection-model-osi/).
* Gateways made the transmission more feasible as it queued up all the data and divided it into small packets of data rather than sending it bulk.
* Gateways provide security within the network