**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
2. 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** | [Hub](https://www.geeksforgeeks.org/advantages-and-disadvantages-of-hub/) is operated on **Physical layer of OSI model**. | While [switch](https://www.geeksforgeeks.org/what-is-a-network-switch-and-how-does-it-work/) is operated on **Data link** [**layer of OSI Model**.](https://www.geeksforgeeks.org/layers-of-osi-model/) |
| **2** | Hub is a broadcast type transmission. | While switch is a Unicast, multicast and broadcast type transmission |
| **3** | Hub has 4/12 ports. | While switch can have 24 to 48 ports. |
| **4** | In hub, there is only one collision domain. | While in switch, different ports have own collision domain. |
| **5** | Hub is a half-duplex transmission mode. | While switch is a full duplex transmission mode. |

**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 |
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**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