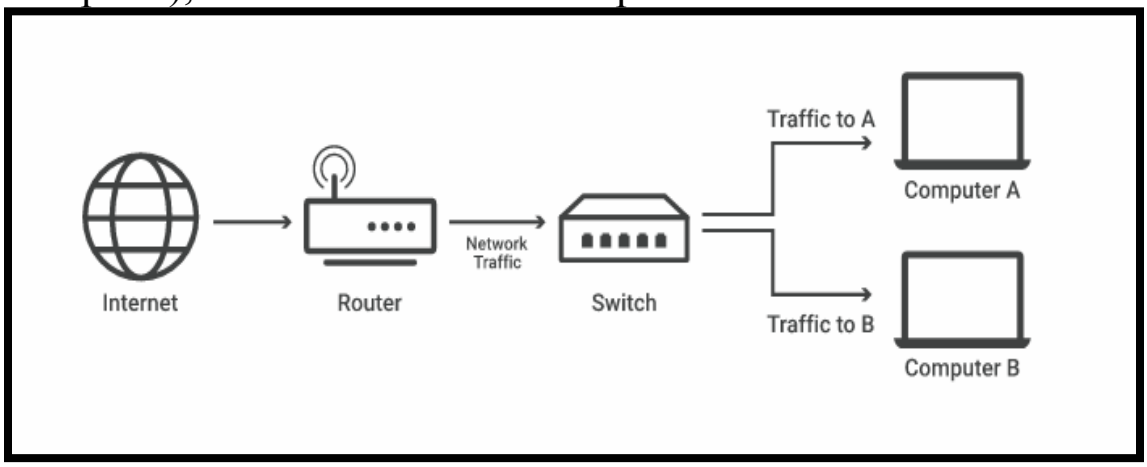
Experiment 6: Study of Network devices (Switch, Router, Bridge)

Switch:

- A network switch connects devices within a network (often a local area network, or LAN) and forwards data packets to and from those devices.
- Unlike a router, a switch only sends data to the single device it is intended for (which may be another switch, a router, or a user's computer), not to networks of multiple devices.



- Switch is data link layer device.
- Switch can perform error checking before forwarding data, that makes it very efficient as it does not forward packets that have errors and forward good packets selectively to correct port only.
- When data arrives, the switch extracts the destination address from the data packet and looks it up in a table to see where to send the packet.
- Thus, it sends signals to only selected devices instead of sending to all.
- It can forward multiple packets at the same time.
- A switch does not forward the signals, which are noisy or corrupted.

- It drops such signals and asks the sender to resend it.
- Cables connected to a network switch Ethernet switches are common in homes/offices to connect multiple devices thus creating LANs or to access the Internet.

Router:

- A router is a network device that can receive the data, analyse it and transmit it to other networks.
- A router connects a local area network to the internet.
- Compared to a hub or a switch, a router has advanced capabilities as it can analyse the data being carried over a network, decide/alter how it is packaged, and send it to another network of a different type.
- For example, data has been divided into packets of a certain size.
- Suppose these packets are to be carried over a different type of network which cannot handle bigger packets.
- In such a case, the data is to be repackaged as smaller packets and then sent over the network by a router.
- A router can be wired or wireless.
- A wireless router can provide Wi-Fi access to smartphones and other devices.
- Usually, such routers also contain some ports to provide wired Internet access.
- These days, home Wi-Fi routers perform the dual task of a router and a modem/ switch.

- These routers connect to incoming broadband lines, from ISP (Internet Service Provider), and convert them to digital data for computing devices to process.

Bridge:

- A bridge operates at data link layer. A bridge is a repeater; with add on functionality of filtering content by reading the MAC addresses of source and destination.
- It is also used for interconnecting two LANs working on the same protocol.
- It has a single input and single output port, thus making it a 2-port device.
- It is commonly used to connect two similar or dissimilar LANs.
- Use of bridges offer a number of advantages, such as higher reliability, performance, security, convenience and larger geographic coverage.
- A bridge uses a table for filtering/routing.
- A bridge does not change the physical (MAC) addresses in a frame.