***Topology***

**Topology is derived from two Greek words topo and logy, where topo means 'place' and logy means 'study'. In computer networks, a topology is used to explain how a network is physically connected and the logical flow of information in the network.**A topology mainly describes how devices are connected and interact with each other using communication links.

***In computer networks, there are mainly two types of topologies, they are:***

1. **Physical Topology:**A physical topology describes the way in which the computers or nodes are connected with each other in a computer network. It is the arrangement of various elements(link, nodes, etc.), including the device location and code installation of a computer network. In other words, we can say that it is the physical layout of nodes, workstations, and cables in the network.
2. **Logical Topology:**A logical topology describes the way, data flow from one computer to another. It is bound to a network protocol and defines how data is moved throughout the network and which path it takes. In other words, it is the way in which the devices communicate internally.

**Star Topology:**

1. **Star topology is a computer network topology in which all the nodes are connected to a centralized hub.**
2. The central device(hub or switch) has point to point communication link(the dedicated link between the devices which can not be accessed by some other computer) with the devices.
3. Centralized control.
4. Less Expensive.
5. Easy to troubleshoot(the faulty node does not give response).
6. Good fault tolerance due to centralized control on nodes.
7. Easy to scale(nodes can be added or removed to the network easily).

Mesh Topology:

1. **Mesh topology is a computer network topology in which nodes are interconnected with each other.**
2. **There are mainly two types of Mesh:**
   1. **Full Mesh**
   2. **Partial mesh**
3. Dedicated links facilitate direct communication.
4. No congestion or traffic problems on the channels.
5. Good Fault tolerance due to the dedicated path for each node.
6. Very fast communication.
7. Maintains privacy and security due to a separate channel for communication.

**Bus Topology:**

1. **Bus topology is the simplest kind of topology in which a common bus or channel is used for communication in the network. The bus is connected to various taps and droplines.**
2. Simple to use and install.
3. If a node fails, it will not affect other nodes.
4. Less cabling is required.
5. Cost-efficient to implement.

#### Ring Topology:

1. **Ring topology is a topology in which each computer is connected to exactly two other computers to form the ring.**
2. Easy Installation.
3. Less Cabling Required.
4. Reduces chances of data collision(unidirectional).
5. Easy to troubleshoot(the faulty node does not pass the token).
6. Each node gets the same access time.

#### Tree Topology:

1. **Tree topology is a computer network topology in which all the nodes are directly or indirectly connected to the main bus cable.**
2. Large distance network coverage.
3. Fault finding is easy by checking each hierarchy.
4. Least or no data loss.
5. A Large number of nodes can be connected directly or indirectly.
6. Other hierarchical networks are not affected if one of them fails.

#### Hybrid Topology:

1. **A Hybrid topology is a computer topology which is a combination of two or more topologies.**
2. In this topology, all topologies are interconnected according to the needs to form a hybrid. All the good features of each topology can be used to make an efficient hybrid topology.
3. It can handle a large volume of nodes.
4. It provides flexibility to modify the network according to our needs.
5. Very Reliable(if one node fails it will not affect the whole network).