ASSIGNMENT-1 CN CE092

Aim-To Understand Cisco Packet Tracer and various network Topologies.

Cisco Packet Tracer:

Cisco packet tracer is network simulator software.With the help of this tool we can build our own network topology, and can practice different scenarios. Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface.

Network Topology:

Network topology refers to how various nodes, devices, and connections on your network are physically or logically arranged in relation to each other.

There are several different types of network topology and all are suitable for different purposes, depending on the overall network size and objectives.

- Star Topology
- Bus Topology
- Mesh Topology
- Ring Topology
- Tree Topology
- Point to Point Topology

Star Topology

A star topology is a topology in which all nodes are individually connected to a central connection point like switch or hub.

Advantages:-

- Less I/O Port are required.
- Easy to Extend
- Single computer's failure does not affect full network.
- Easy Fault detection

Disadvantages:-

- If Connecting network device(switch) fails,nodes attached are disabled and can't participate in network communication
- Expensive,as more cables are used
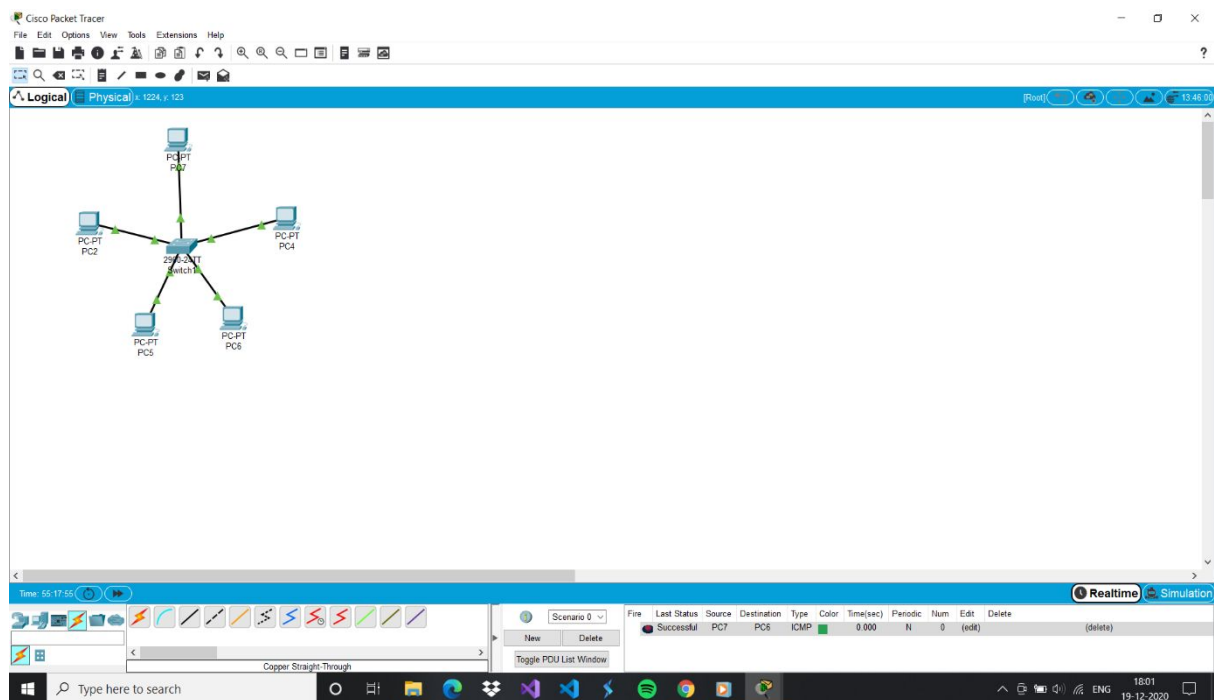
Bus Topology

Bus topology is a specific kind of network topology in which all of the various devices in the network are connected to a single cable or line.

Advantages:-

- Complexity is less as compared to mesh topology
- If any one device is affected, then the whole system will not be affected.
- Easier to install

Disadvantages:-

- Cannot be used for large network
- Performance decreases when number of devices connected to it increases.
- Terminator are required for ends of main cable.
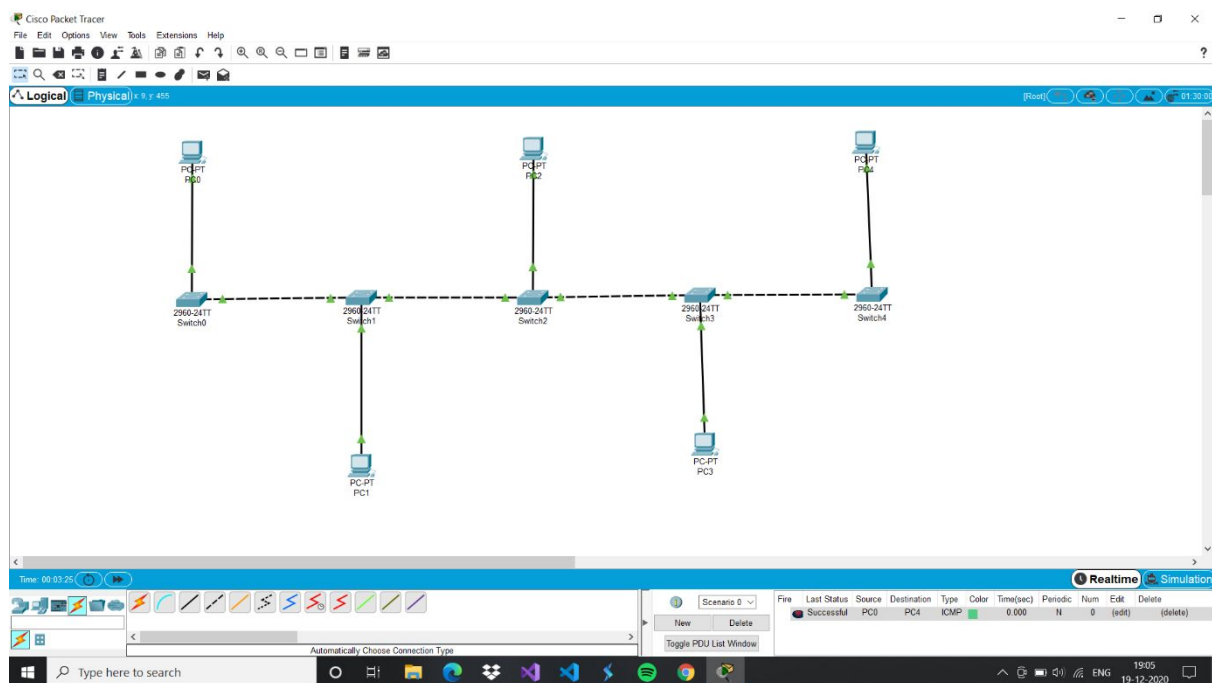
Mesh Topology

Mesh topology is a type of networking in which each and every nodes or devices are connected to each other. It is commonly used in wireless networks. In this if any of the components fails, there is always alternative present so that the data transfer does not get affect.

Advantages:-

- Can handle large volume of traffic.
- Failure of one device does not cause a break in network or transmission of data.

Disadvantages:-

- Implementation cost is high.
- Maintaining mesh netwoks can be very hard to manage.
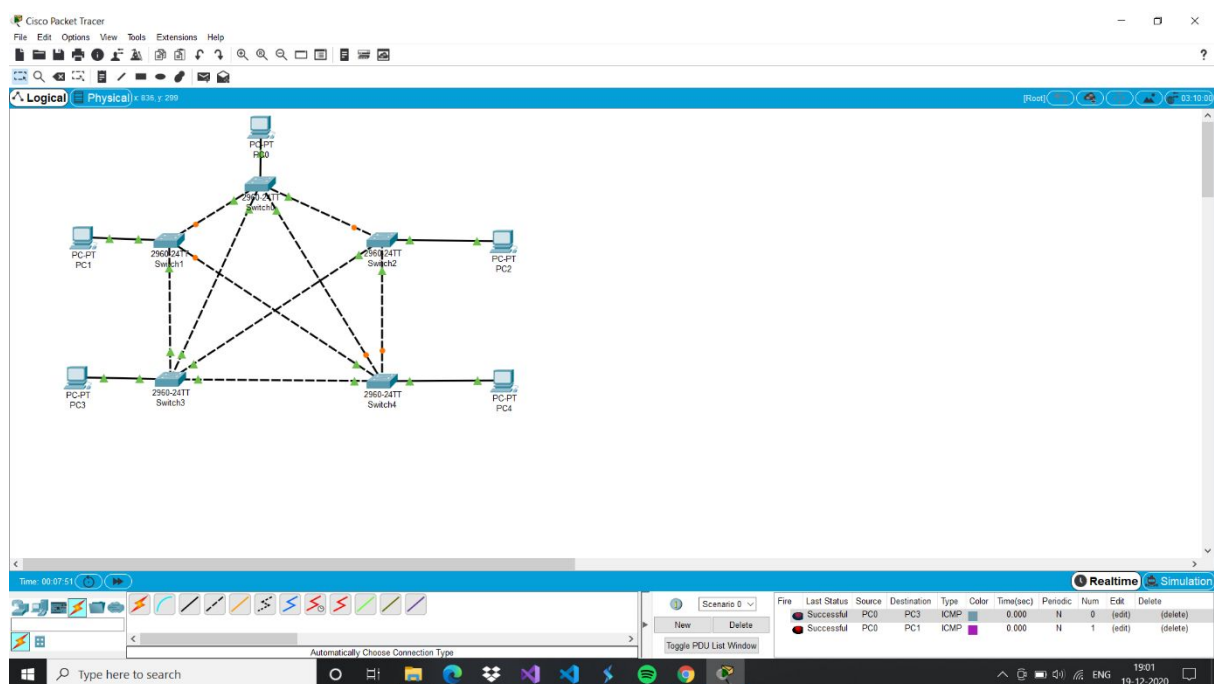
Ring Topology

A ring topology is a network topology which each node connected to two other nodes then it form a closed loop or follow the continuous pathway.Then the data transfer from node to node.

Advantages:-

- Less costly than star topology.
- Fault identification is easy.
- In comparision to bus,ring is better at handling load.

Disadvantages:-

- Failure of single node in the network can cause the entire network to fail.
- Network is highly dependent on the wire which connects different components.
- Ring topology is unidirectional , data can travel only to forward nodes not backward nodes.
- Adding or deleting devices disturbs network activity.
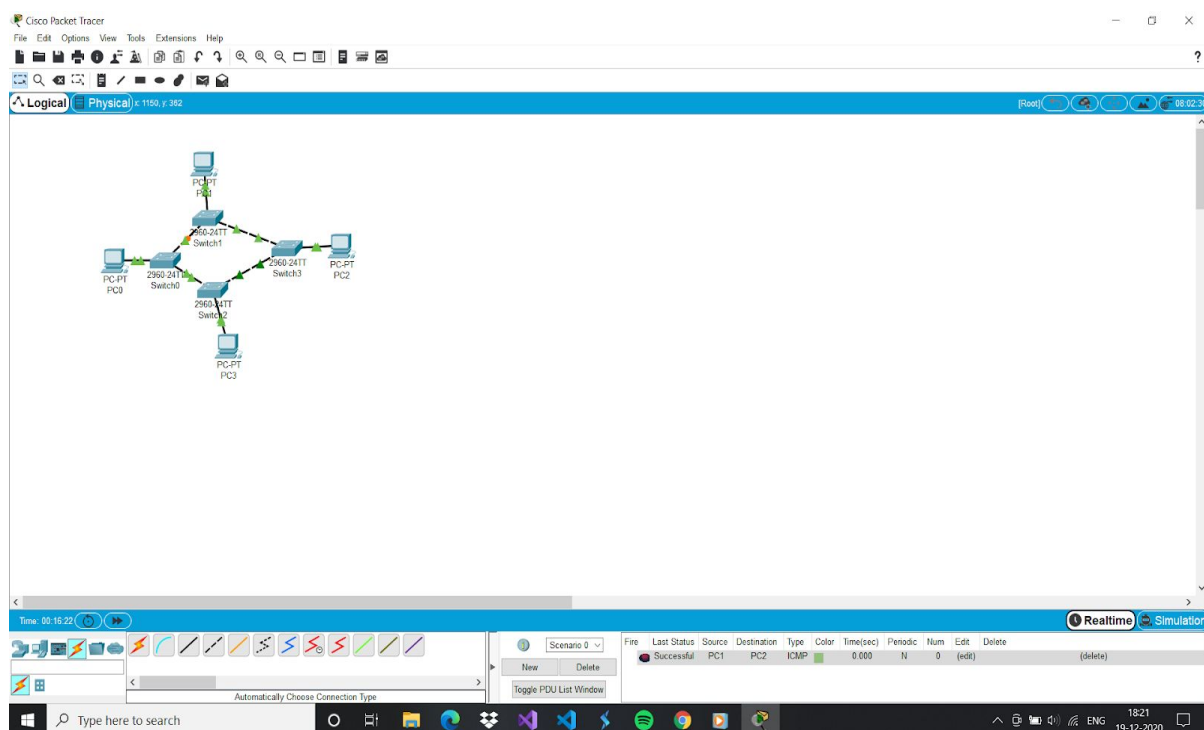
Tree Topology

Tree topology is a type of network topology in which the nodes are arranged in the design of a tree. In tree topology, branching cable starts from the node at the head top known as the root node. The branching cable having no loops connect the root with all other nodes in hierarchical manner for communication. Tree topology is more expensive as it is densely wired

Advantages:-

- Failure of one node never affects the rest of the network.
- Detection of error is an easy process
- It is easy to manage and maintain

Disadvantages:-

- It is heavily cabled topology
- If more nodes are added, then its maintenance is difficult
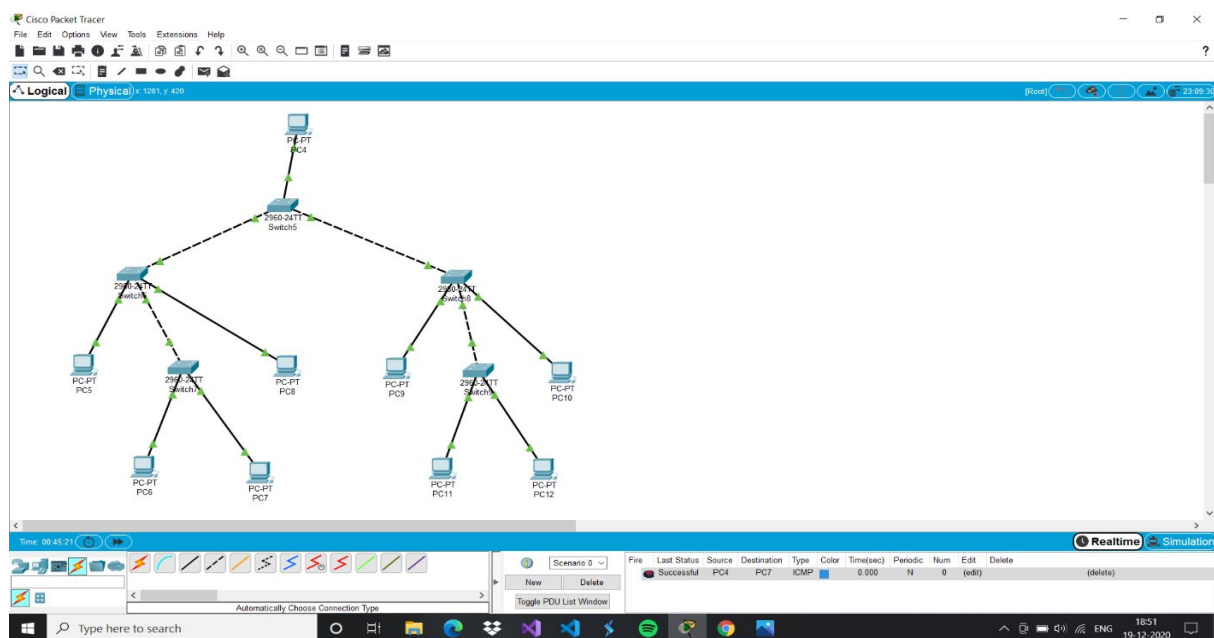
Point To Point Topology

Point to point topology connects any two devices in a network. Point to point is a one to one type of connection. Device can be any network device.

Advantages:-

- Highest Bandwidth as there are only two nodes having entire bandwidth of a link
- Fast as compared to other topologies.
- Simple Connection
- Easy to handle and maintain.

Disadvantages:-

- Can be used only for small ares where nodes are closely located.

- As there are only two nodes if any of the node stops working, data cannot be transfer across the network.
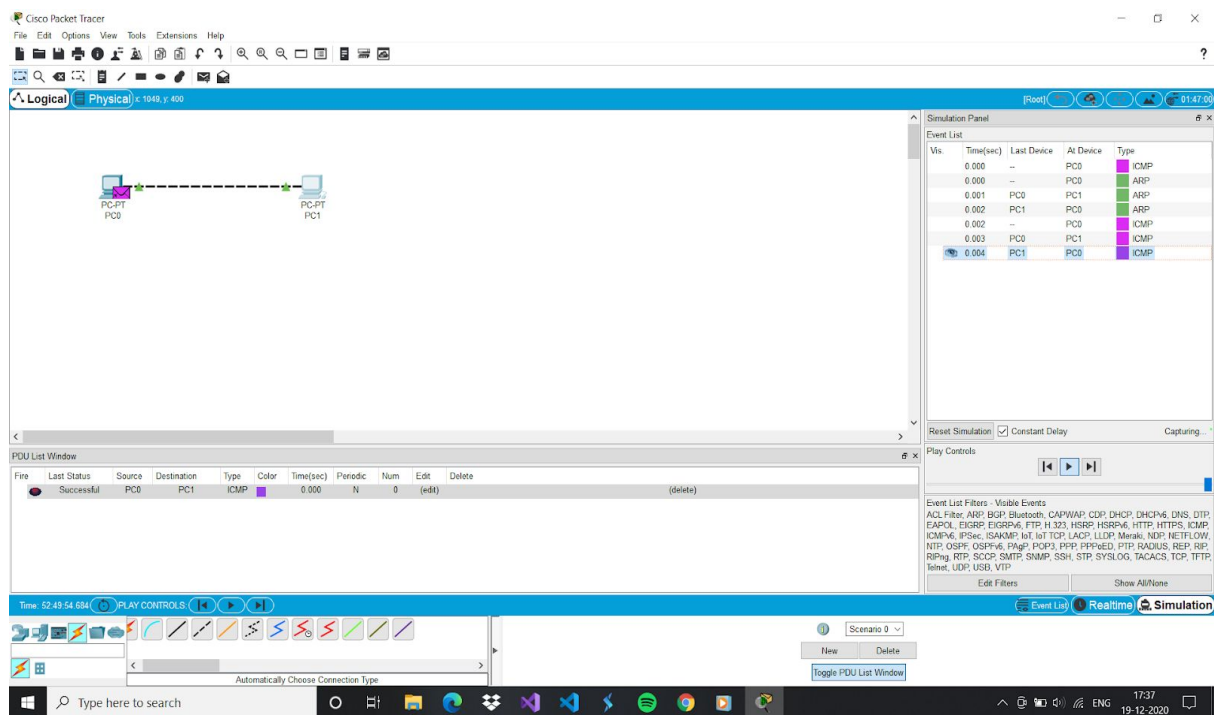
Switch and Hub

Hub:

A Hub is a networking device that allows you to connect multiple PCs to a single network. It is used to connect segments of a LAN. A hub stores various ports, so when a packet arrives at one port, it is copied to various other ports. Hub works as a common connection point for devices in a network.

Switch:

A network switch is a computer networking device that connects various devices together on a single computer network. It may also be used to route information in the form of electronic data sent over networks.

Difference between Switch And Hub:

- Hub is slower than switch because hub sends data to all device in a network.
- Hub is on the physical layer of the OSI model and the switch is on the data link layer of OSI model.
- Hub container fewer number of ports,while switch contains more number of ports.
- Speed of hub is up to 10Mbps whereas switch comes with 10/100Mbps,1 Gbps.

Cross Over v/s Straight through cables:-

Straight through cables are used for connecting two different devices(e.g router to switch).

Cross Over cables are used for connecting two same devices(e.g router to router).

Method of allocation of IP Address:-

1st method:

- Single click on the end device to which ip address is to be allocated.
- Now,a dialog box will appear and then go to desktop>Ip configuration.
- Now add Ip Address and subnet mask

2nd method:

- Single click on the end device to which ip address is to be allocated.
- Now,a dialog box will appear and then go to config.
- Now,go to "FastEthernet" option and add IP Address and subnet mask.