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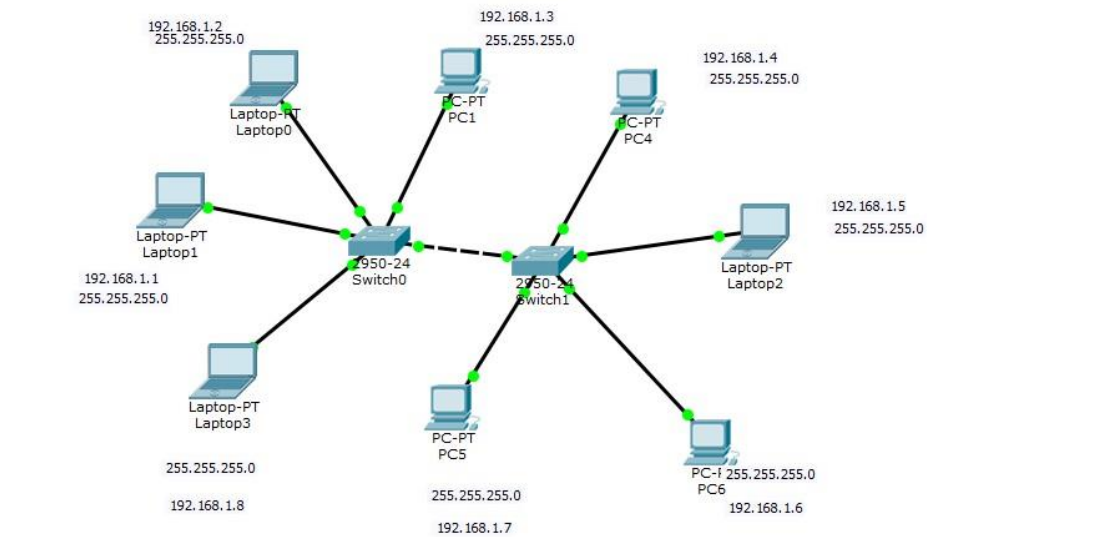
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Computer Networks

Creating a Virtual connection on Cisco Packet Tracer Student

1. Select 'End Devices' from the bottom left of the screen
2. Select 'Switches'
3. Place the machines around the switches to make a network
4. Use 'Copper straight line through' to connect a machine and switch and 'Copper-cross over' to connect the switches
5. Assign IP addresses to all devices
6. Go to command prompt and give the two commands 'ipconfig' and 'ping ip address' 7. Name all the devices with their IP addresses and subnet mask



Command PromptX

```
Packet Tracer PC Command Line 1.0
PC>ipconfig

FastEthernet0 Connection:(default port)

    Link-local IPv6 Address.....: FE80::203:E4FF:FE27:9BCA
    IP Address.....: 192.168.1.6
    Subnet Mask.....: 255.255.255.0
    Default Gateway.....: 0.0.0.0

PC>ping 192.168.1.6

Pinging 192.168.1.6 with 32 bytes of data:

Reply from 192.168.1.6: bytes=32 time=7ms TTL=128
Reply from 192.168.1.6: bytes=32 time=0ms TTL=128
Reply from 192.168.1.6: bytes=32 time=0ms TTL=128
Reply from 192.168.1.6: bytes=32 time=8ms TTL=128

Ping statistics for 192.168.1.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 8ms, Average = 3ms

PC> ping 192.168.1.9

Pinging 192.168.1.9 with 32 bytes of data:

Request timed out.
Request timed out.
```

## Writeup

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## CN Lab Assignment 1

### Theory:

#### 1. Definition of LAN and its advantages

→ A local area network (LAN) is a group of computers and peripheral devices that share a common communications line or wireless link to a server within a distant geographical area.

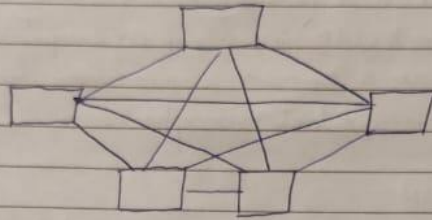
#### Advantages of LAN:

- Simple and relatively inexpensive: It is quick to set-up and is reasonably priced when compared to other alternatives
- Collaboration of resources: The group as a collective can share resources as they can be connected to the LAN and be accessed by everyone
- Accessing of software programs: One can share software programs on LAN as well. You can incorporate a single licensed program that can be used by any device on a network
- Data Protection: It is more safe and secure to keep information on the server. It is easier to update/eliminate data when it is present on one server

2. Explain various network topologies

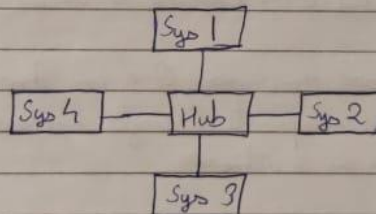
→ a) Mesh Topology

Every device is connected to another device via a particular channel. In Mesh topology, the protocols used are AHCP, DHCP, etc



b) Star Topology

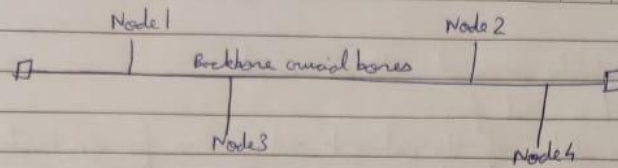
All devices are connected to a single hub through a cable. This hub is the central node and all other nodes are connected to the central node



c) Bus Topology

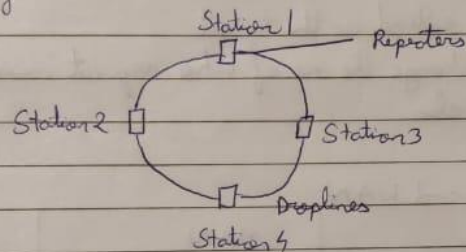
Every computer and network device is connected to a single cable. It is bi-directional. It is a multipoint connection and a non-robust ~~technology~~ topology because if the backbone fails the topology crashes. Various MAC protocols are followed by LAN ethernet connections like TDMA, Pure Aloha, CDMA, Slotted Aloha





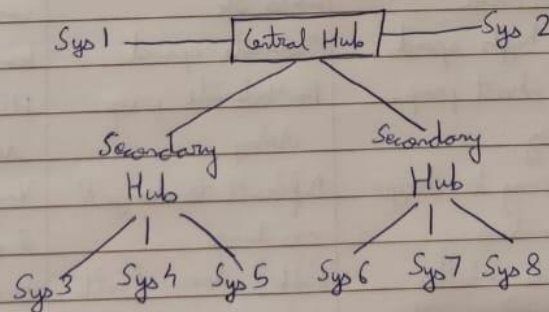
#### d) Ring Topology

It forms a ring connecting devices with exactly two neighbouring devices. The data flows in one direction, i.e., unidirectional but it can be made bidirectional by having 2 connections between each network node, it is called Dual Ring Topology.



#### e) Tree Topology

It's a variation of the star topology. This topology has a hierarchical flow of data. In tree topology, protocols like DHCP and SAC are used.



## FAQ's

1. Explain the ping utility command with an example

→ The ping command is used for:

- i) Determining the status of the network and various foreign hosts
- ii) Tracking and isolating hardware and software problems.
- iii) Testing, measuring, & managing networks
- iv) It can be used to test a connection between one computer & another

For example:

- /t - ping continues sending Echo request message to the destination until interrupted manually
- /a - the ping tries to resolve and show the hostname of an IP address that is entered as the target
- /n count - use this change the no. of Echo request messages from 4 to something else

2. Compare LAN, MAN and WAN

Parameter	LAN	MAN	WAN
1. Full form	Local Area Network	Metropolitan Area Network	Wide Area Network
2. Definition	Connects a small group of computers in a given area	Wide area network that covers towns, cities, etc	Spans to even wider areas, like various countries
3. Speed	Very high speed	Moderate speed	Low speed
4. Delay in propagation	Very short prop. delay	Moderate prop. delay	High propagation delay
5. Maintenance & Design	Very easy to design & maintain	Difficult to design & maintain	Very difficult to design & maintain
6. Fault tolerance	Exhibits a better fault tolerance than rest	Exhibits lesser fault tolerance	Exhibits higher tolerance

7.	Congestion	Very low	Higher congestion	Higher congestion
8.	Network Owner	It is private	Can be public or private	Can be public or private
9.	Uses	Schools, homes, offices, hospitals	City, towns, any area with larger area than LAN	Countries, subcontinents or an equivalent area