ASSIGNMENT # 01
BS it third semester.

Name:

Hamna Khalid (110798)

Subject:

Computer Networks (CC-211)

Topic:

Topology

Instructor:

Mam Sehrish Khan

"TOPOLOGY":

The physical layout or arrangement of connected device in a network is called network topology. It describes how these devices are connected, communicated, and data is transmitted between them. A network can be configured or arranged by different ways.

- Types:
    I. Physical topology

II. Logical topology

- Key points:
  I. Connectivity
  II. Scalability
  III. Fault tolerance
  IV. Performance
  V. Cost

- Common network topology types:

Following are the common network topology types. ○

Bus topology:

- Bus topology is the simplest type of network.
- It supports a small number of computers.
- In bus topology all the computers are connected to common communication.
- Bus topology is mostly used in peer to peer network.
- The medium is often a central wire is known as bus.

✞ Advantages:

- Cost effective.
- Simple to install and maintain.
- Easy to expand.

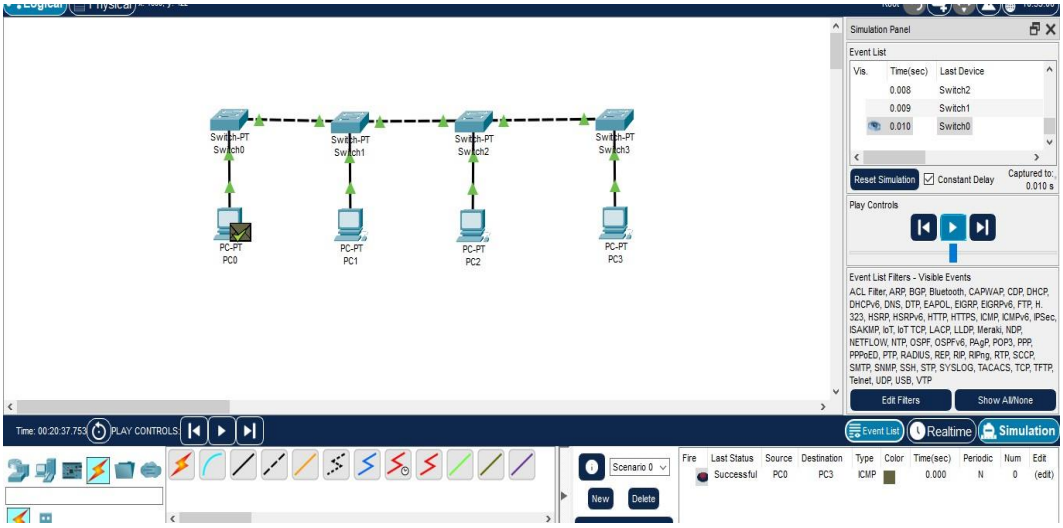
✞ Disadvantages:

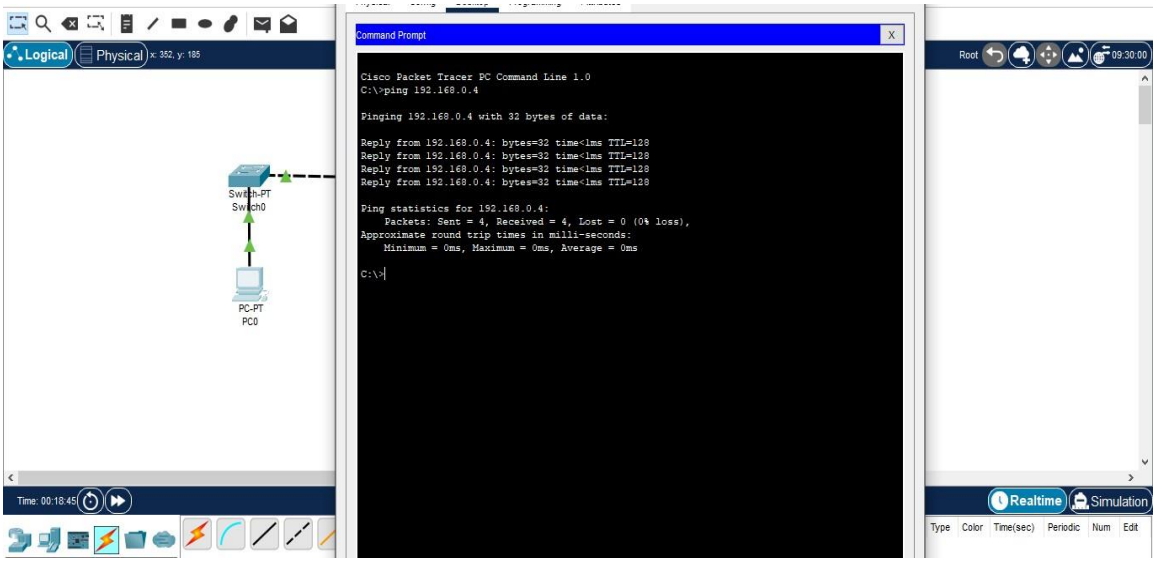
- Difficult to troubleshoot.
- Single point failure.
- Limited scalability.
- Data collisions can occur.

✞ Applications:

- Small networks
- LAN
- Simple communication system.

✞ Procedure:





- At first, open cisco packet tracer.
- Create a file.
- Take four switches.
- Also take four PCs.
- Connect all the switches with wire.
- Also connect all the PCs to their respective switches by wires.
- Give IP addresses to all the PCs.
- Now click on first PC and then click on command prompt and write the IP address of another PC.
- Result: Click on the “Stimulation” tool bar button.
- Run the simulation.
- Test the connectivity between devices using ping and other network tools.
- Thus, network is formed.

○ Star topology:

- All computer is star topology are connected to a central device called a hub.
- This topology is mostly used in client server model.
- The sending computer sends data to hub.
- The hub sends data to receiving computer.
- Each computer in star network communicate with central hub.

✞ Advantages:

- It is to maintain and modify computer network.
- Finding faults become very easy
- Single computer failure does not bring down the whole network.

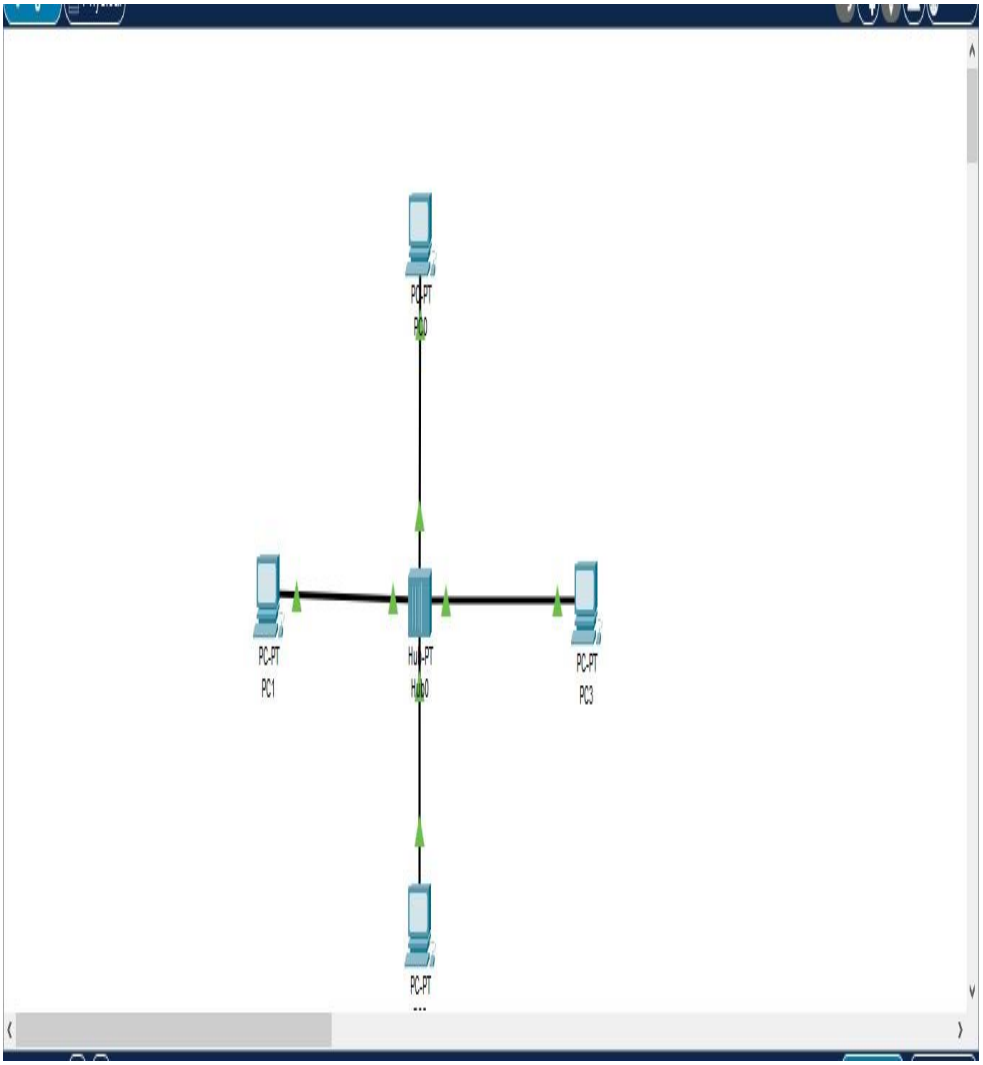
✞ Disadvantages:

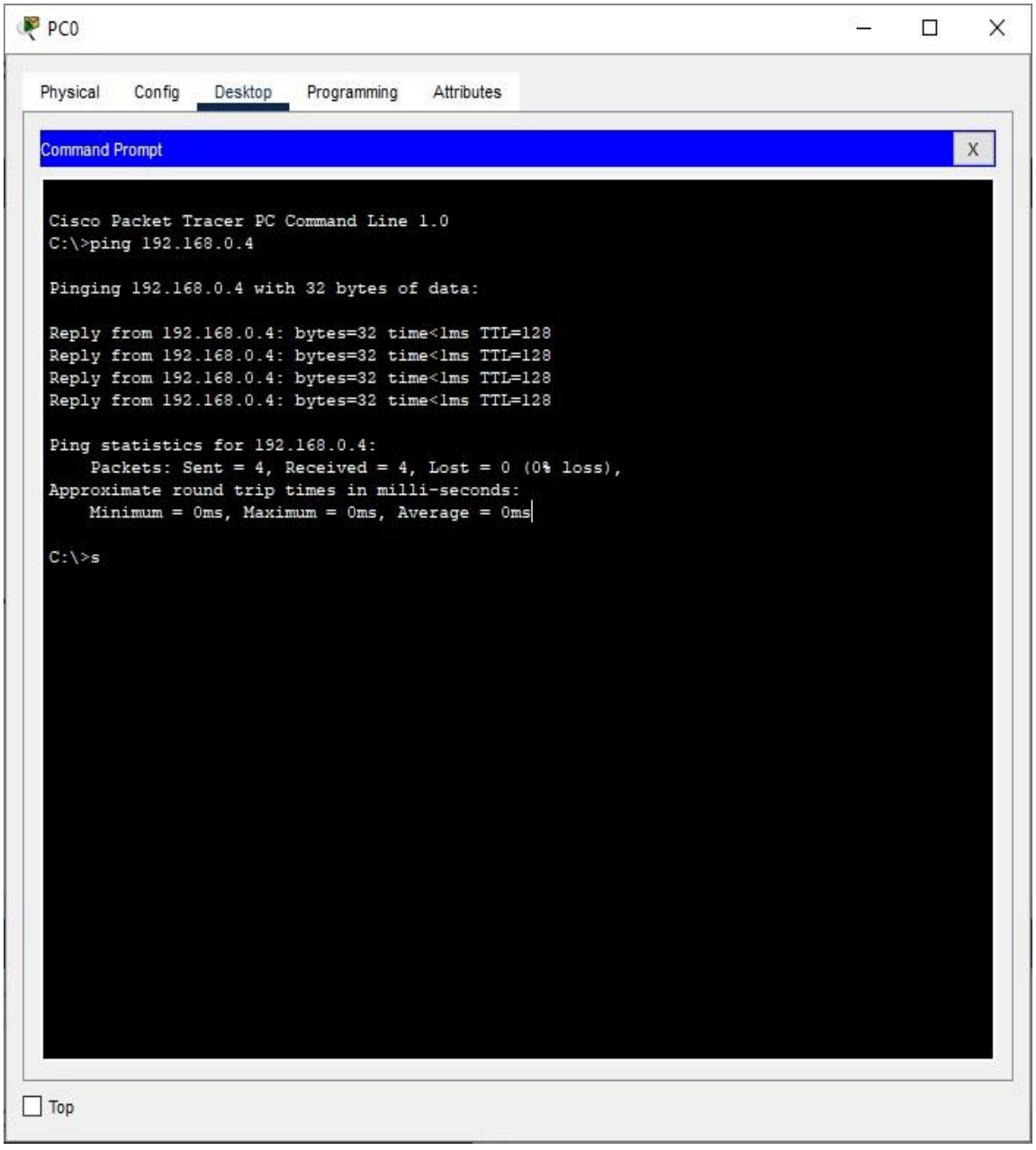
- It is more expensive.
- If central hub fails, the entire network breaks down.

✞ Procedure:

- Open cisco tracer. Create a file.
- Take one hub,
- Also take four PCs.
- Now connect all PCs to a hub.
- Configure IP addresses to all PCs.
- Now click on first PC and then click on command prompt and write the IP address of another PC.
- Select the simulation tool button.
- Run the simulation.

- Test the connectivity between devices using ping and other network tools. Thus, network is formed.




PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.4
Pinging 192.168.0.4 with 32 bytes of data:
Reply from 192.168.0.4: bytes=32 time<1ms TTL=128
Reply from 192.168.0.4: bytes=32 time<1ms TTL=128
Reply from 192.168.0.4: bytes=32 time<1ms TTL=128
Reply from 192.168.0.4: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.0.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>s
Top

○ Ring topology:

- A Ring Topology is a network architecture where devices are connected in a circular configuration, forming a ring.
- Data travels in one direction, and each device acts as a repeater, amplifying and forwarding data to the next device.

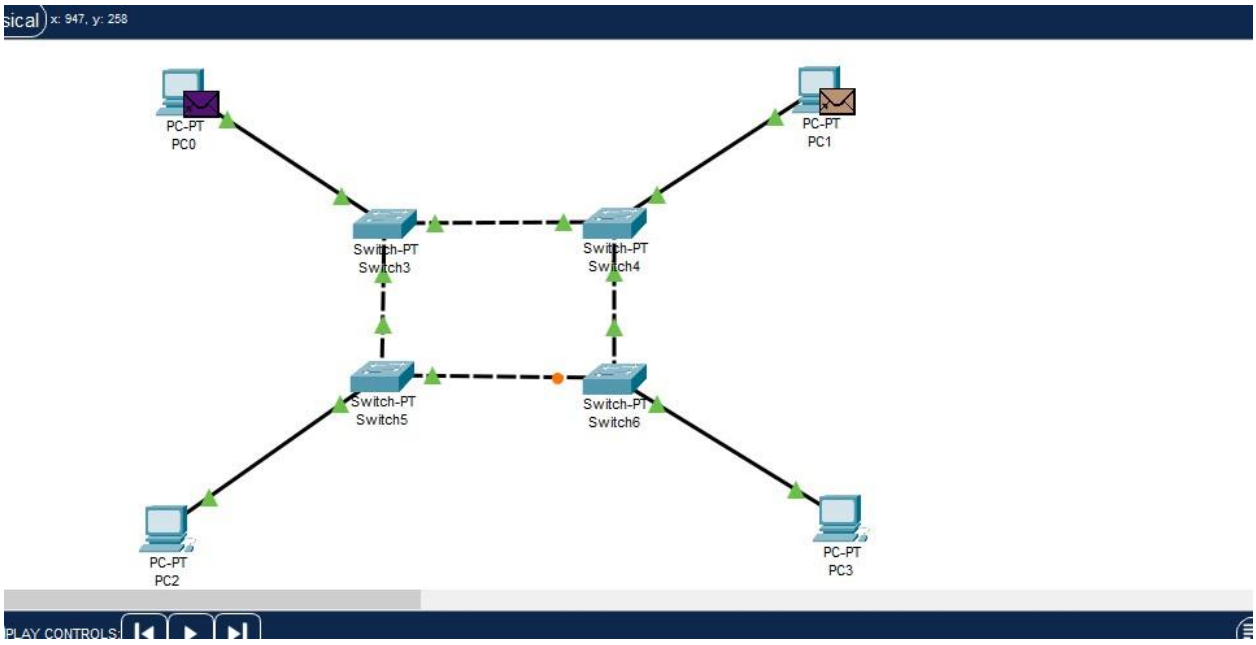
✞ Advantages:

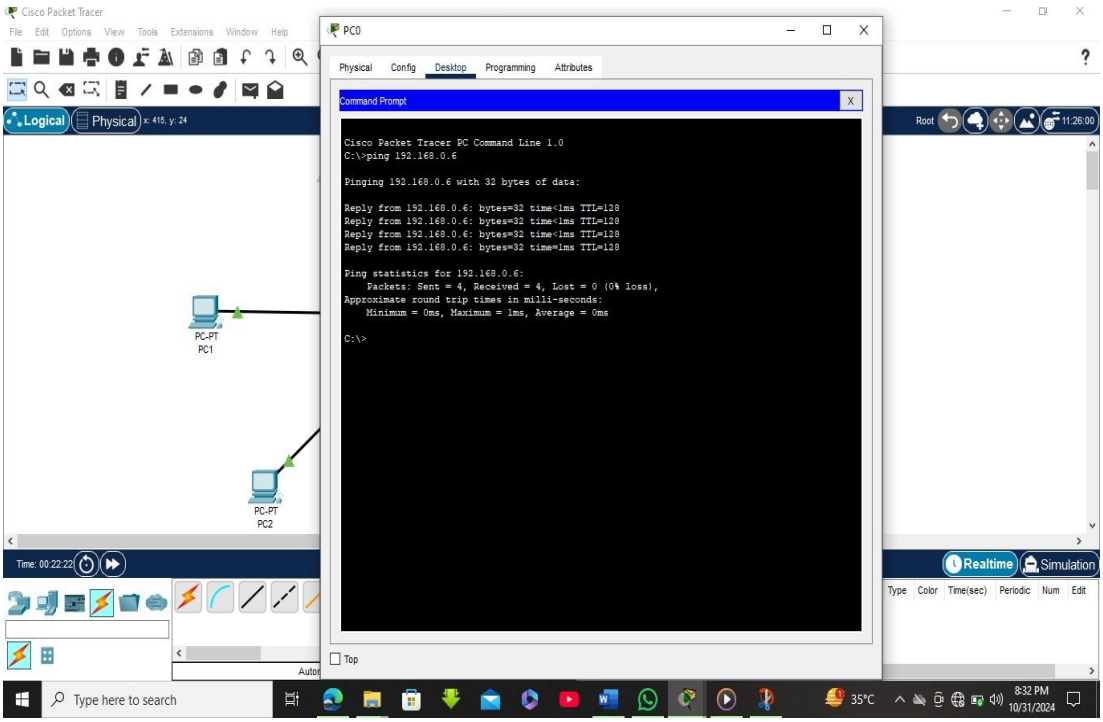
- Fault tolerance.
- Efficient data transmission.
- Scalable.

✞ Disadvantages:

- Difficult installation and maintenance.
- Single point failure.
- High cost. ✞ Procedure:
- Open cisco tracer.
- Create a file.
- Take four switches.
- Also take four PCs.
- Connect all the switches with wires.
- Also connect all the PCs to their respective switches with wire.
- Configure IP addresses to all PCs.
- Now click on first PC and then click on command prompt and write the IP address of another PC.

- Select the simulation tool button.
- Run the simulation.
- Test the connectivity between devices using ping and other network tools.
- Thus, network is formed.





○ Hybrid topology:

- A hybrid topology combines two or more different network topologies to create a more efficient and reliable network.
- It is flexible and scalable.

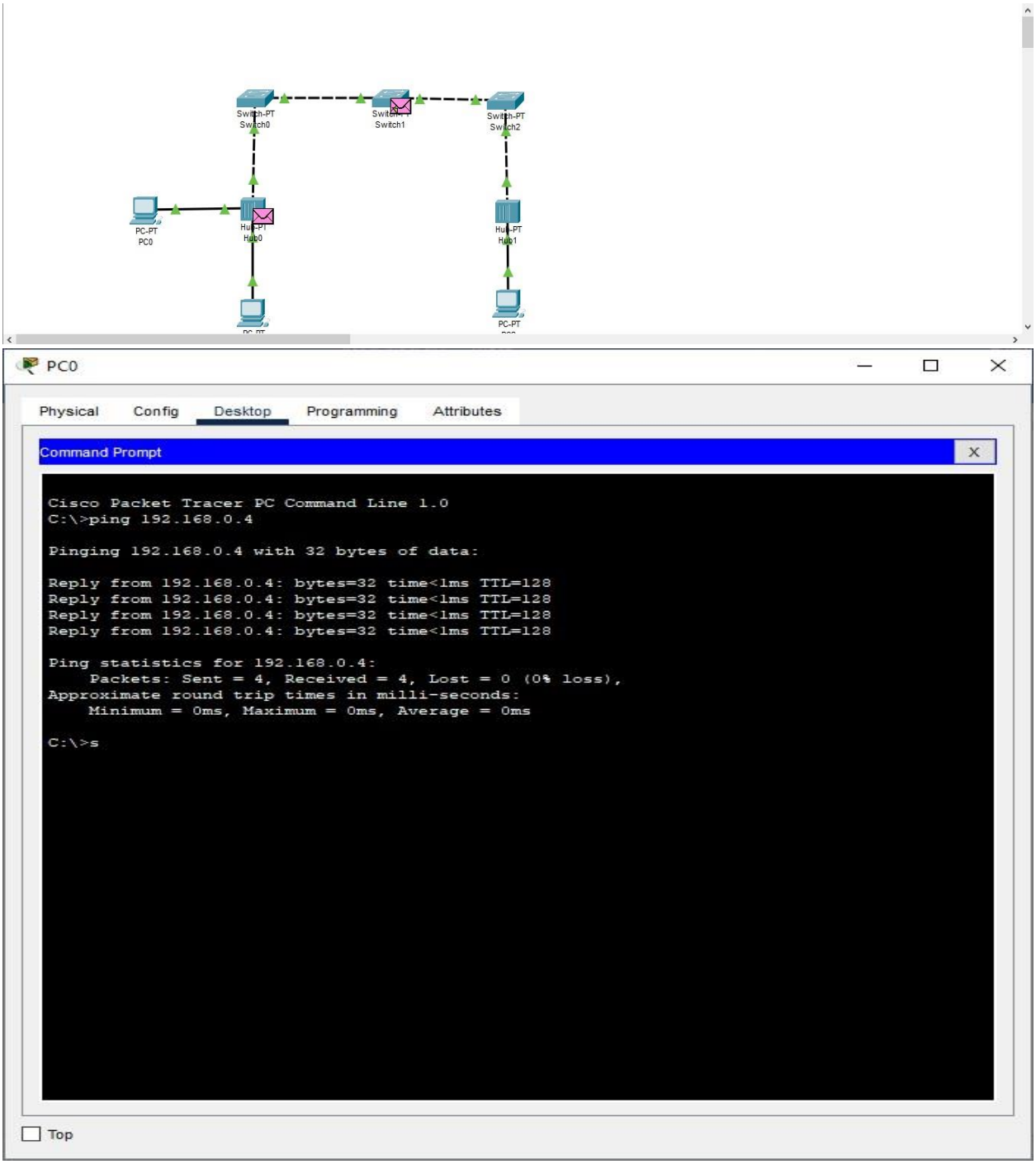
✞ Advantages:

- Improved fault tolerance.
- Best performance.
- Flexible design.

✞ Disadvantages:

- High cost.

- Complex installation.
- Difficult maintenance.



✞ Procedure:

- Open a cisco packet tracer.

- Create a file.
- Select three PCs.
- Select three switches and two hubs.
- Connect them by wires.
- Configure IP addresses to all the PCs.
- Select the simulation button tool.
- Run the simulation.
- Test the connectivity between devices with ping and other tools.

○ Mesh topology:

- A Mesh Topology is a network architecture where each device is connected to every other device, allowing multiple paths for data transmission.
- It is flexible and scalable.
- It has multiple paths for data transmission.
- Each device connects to every other device.
- Only some devices connect to each other.

✞ Advantages:

- High reliability and fault tolerance.
- Fast data transmission.
- Improved network security.

✞ Disadvantages:

- High cost.
- Complex installation and maintenance. ✞

Procedure:

- Open cisco packet tracer.
- Create a file.
- Select two PCs and one laptop.
- Select three switches.
- Connect all the devices to their respective switches.
- Connect the switches with each other.
- Configure IP addresses to all devices.
- Select the simulation tool button.
- Run the simulation.
- Test the connectivity of all devices with ping and other tools.
- Network is formed.

PC0

Physical Config Desktop Programming Attributes

Command Prompt X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.4

Pinging 192.168.0.4 with 32 bytes of data:

Reply from 192.168.0.4: bytes=32 time<1ms TTL=128
Reply from 192.168.0.4: bytes=32 time<1ms TTL=128
Reply from 192.168.0.4: bytes=32 time<1ms TTL=128
Reply from 192.168.0.4: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
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C:\>s
```

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