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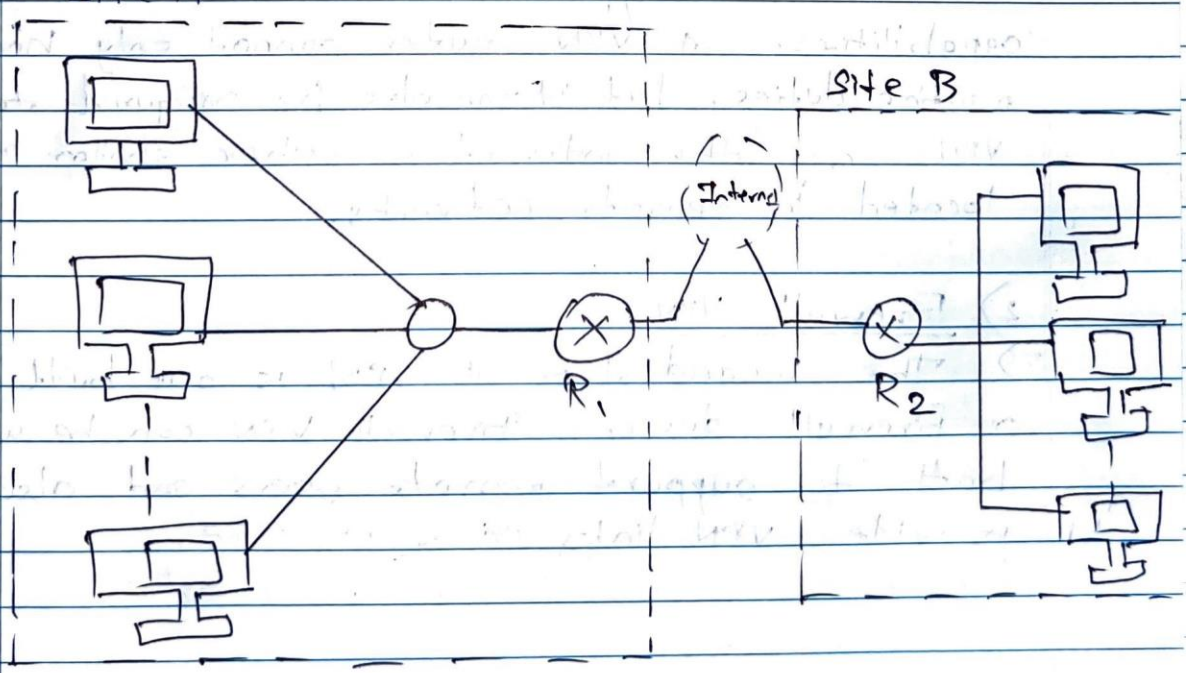
Experiment No: 6

Aim: Design VPN and Configure RIP/OSPF using packet tracer.

Theory:

- **Virtual Private Network (VPN)**:

- VPN stands for virtual private network.
- It allows you to connect your computer to a private network, creating an encrypted connections that masks your IP address to securely share data and surf the web, protecting your identity online.
- A VPN connection is shown in the figure below:



- In this figure, Routers R_1 and R_2 use VPN technology to guarantee privacy for the organization.
- A VPN is an encrypted connection over the Internet from a device to a network.
- The encrypted connection helps ensure that sensitive data is safely transmitted.
- It prevents unauthorized people from eavesdropping on traffic and allows the user to conduct work remotely.
- VPN technology widely used in corporate environments.
- Types of VPNs :

1) Router VPN

⇒ The first type uses a router with added VPN capabilities. A VPN router cannot only handle normal routine duties, but it can also be configured to form VPNs over the internet to other similar routers located in remote networks.

2) Firewall VPN

⇒ The second type of VPN is one build into a firewall device. Firewall VPN can be used both to support remote users and also to provide VPN links

- **Routing Information Protocol (RIP)**

⇒ RIP is dynamic routing protocol that uses hop count as a routing metric to find the best path between the source and the destination network.

- It is a distance-vector routing protocol that has an AD value of 120 and works on the Network layer of OSI model.
- RIP uses port number 520.
- **Hop Count**

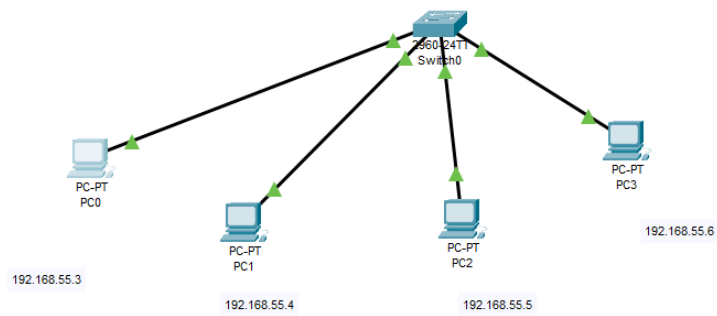
⇒ Hop count is the no. of routers occuring in between the source and destination network.

- The path with the lowest hop count is considered as the best route to reach a network and therefore placed in routing table.
- RIP prevents routing loops by limiting the number of loops allowed in a path from source and destination.
- **Features of RIP :**

1) Updates of the network are exchanged periodically.
2) Updates are always broadcast.
3) Full routing tables are sent in updates.
4) Routers always trust routing information received from neighbour routers. This is also known as Routing on rumours.

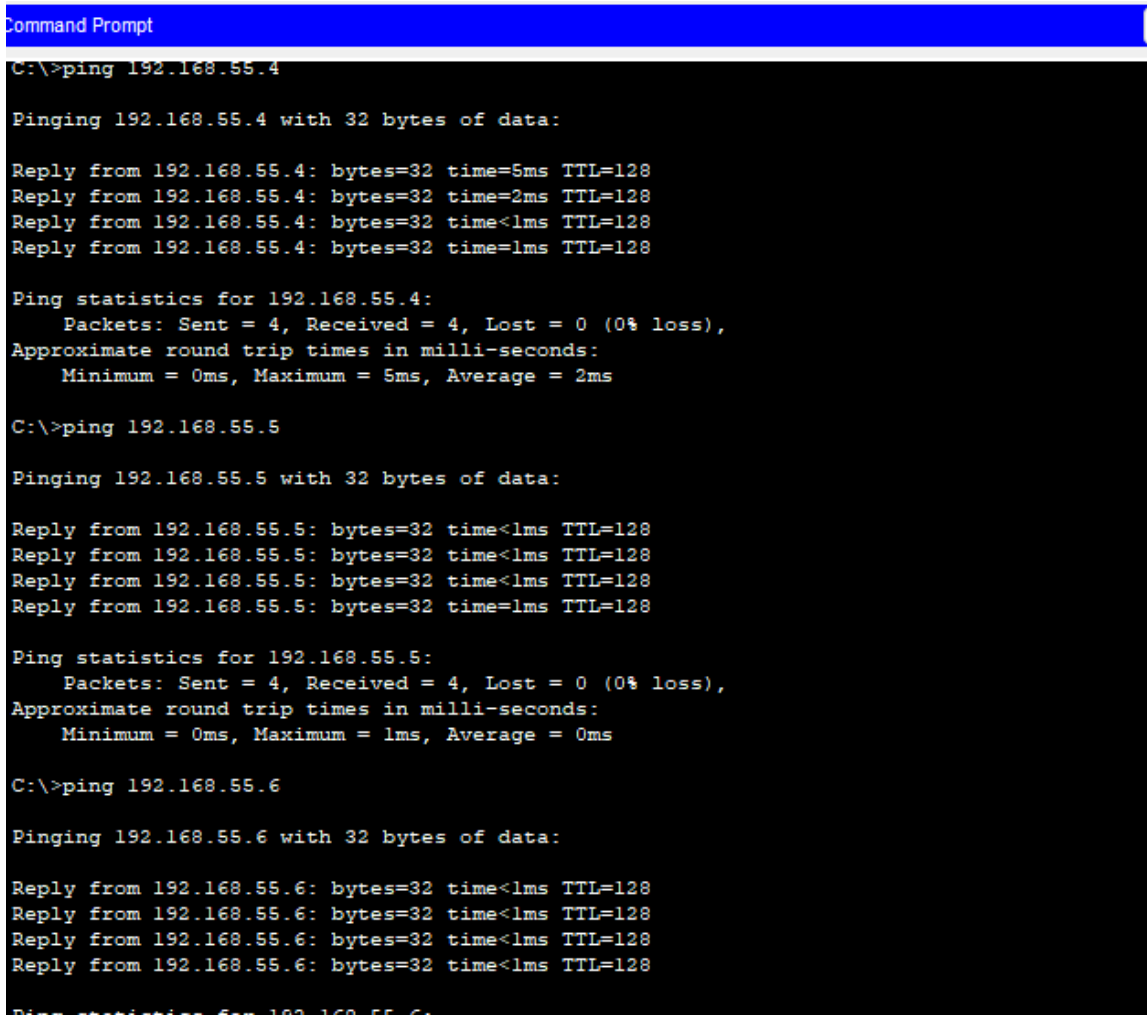
Output:

VPN

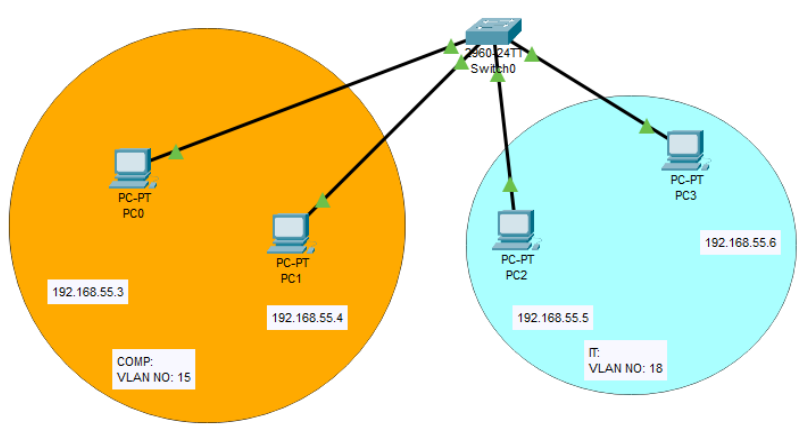


Command Prompt

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

FastEthernet0 Connection:(default port)

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: FE80::260:5CFF:FE90:477B
   IPv6 Address.....: ::
   IPv4 Address.....: 192.168.55.3
   Subnet Mask.....: 255.255.255.0
   Default Gateway.....: ::
                                 0.0.0.0

Bluetooth Connection:

   Connection-specific DNS Suffix..:
   Link-local IPv6 Address.....: ::
   IPv6 Address.....: ::
   IPv4 Address.....: 0.0.0.0
   Subnet Mask.....: 0.0.0.0
   Default Gateway.....: ::
                                 0.0.0.0

C:\>ping 192.168.55.3

Pinging 192.168.55.3 with 32 bytes of data:

Reply from 192.168.55.3: bytes=32 time=1ms TTL=128
Reply from 192.168.55.3: bytes=32 time=5ms TTL=128
Reply from 192.168.55.3: bytes=32 time=4ms TTL=128
Reply from 192.168.55.3: bytes=32 time=3ms TTL=128

Ping statistics for 192.168.55.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 5ms, Average = 3ms
```

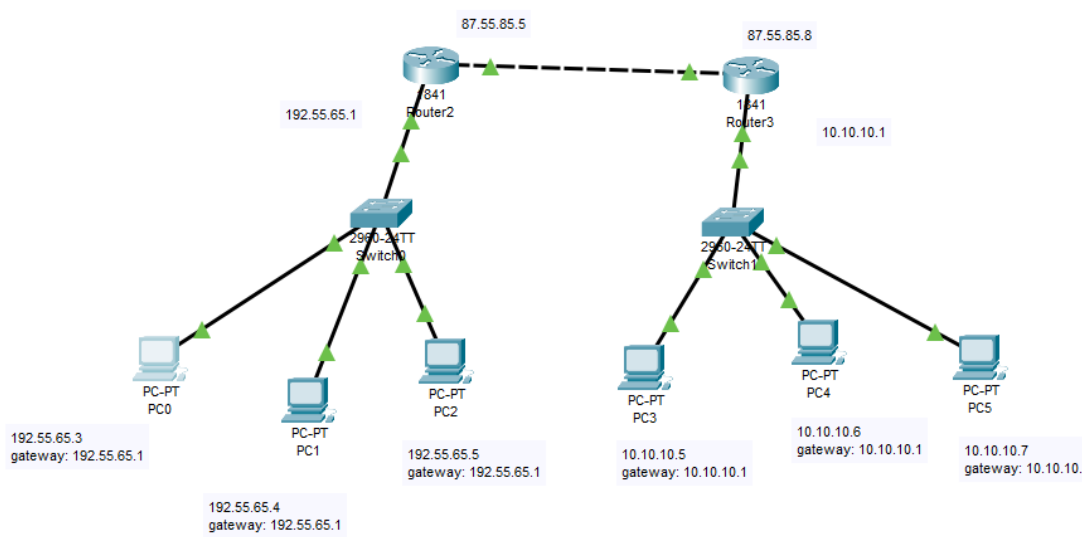

Command Prompt
C:\>ping 192.168.55.4
Pinging 192.168.55.4 with 32 bytes of data:
Reply from 192.168.55.4: bytes=32 time=5ms TTL=128
Reply from 192.168.55.4: bytes=32 time=2ms TTL=128
Reply from 192.168.55.4: bytes=32 time<1ms TTL=128
Reply from 192.168.55.4: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.55.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 5ms, Average = 2ms
C:\>ping 192.168.55.5
Pinging 192.168.55.5 with 32 bytes of data:
Reply from 192.168.55.5: bytes=32 time<1ms TTL=128
Reply from 192.168.55.5: bytes=32 time<1ms TTL=128
Reply from 192.168.55.5: bytes=32 time<1ms TTL=128
Reply from 192.168.55.5: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.55.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.55.6
Pinging 192.168.55.6 with 32 bytes of data:
Reply from 192.168.55.6: bytes=32 time<1ms TTL=128
Reply from 192.168.55.6: bytes=32 time<1ms TTL=128
Reply from 192.168.55.6: bytes=32 time<1ms TTL=128
Reply from 192.168.55.6: bytes=32 time<1ms TTL=128

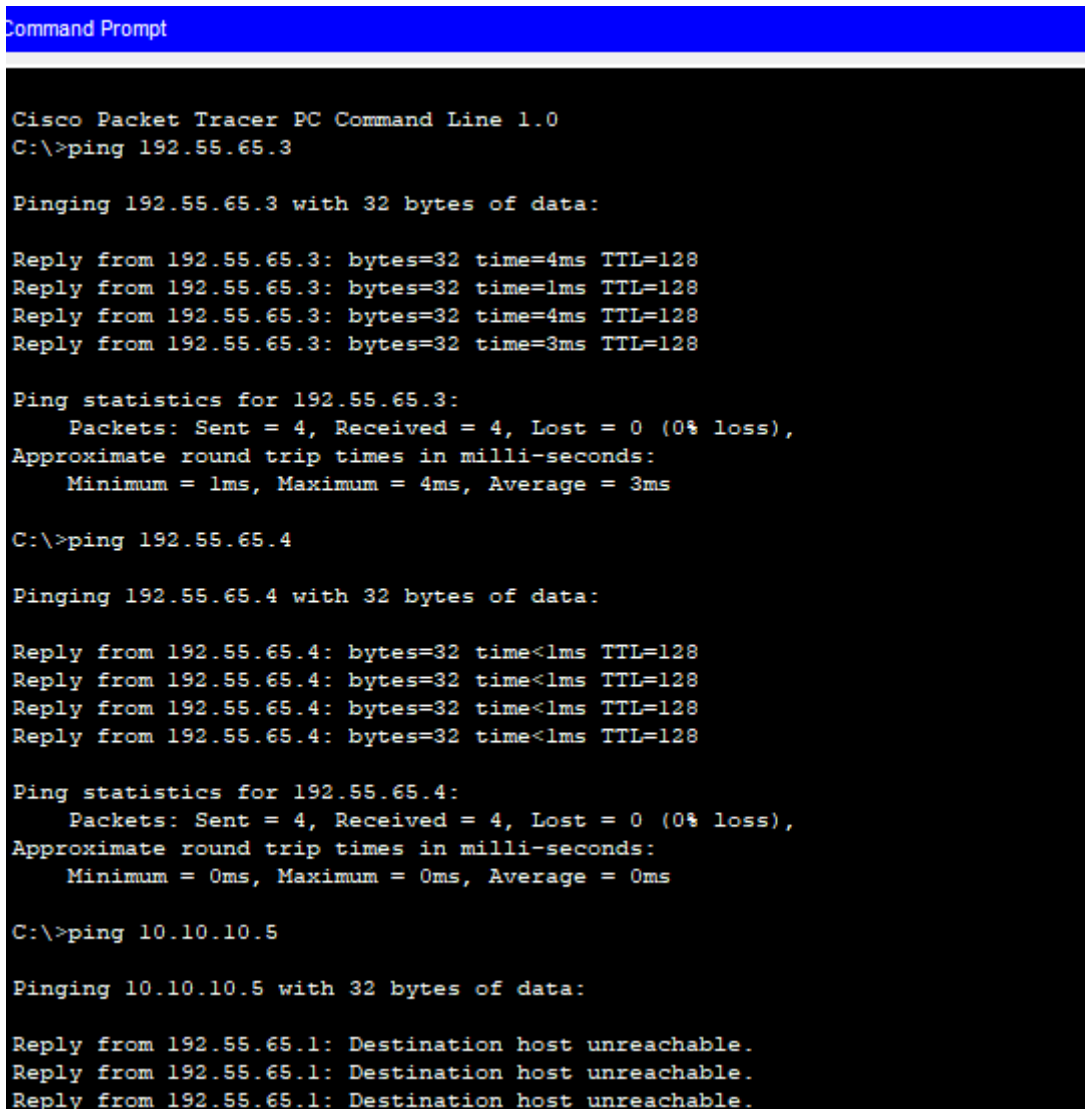
```
Command Prompt

Reply from 192.168.55.4: bytes=32 time<1ms TTL=128
Reply from 192.168.55.4: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.55.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 5ms, Average = 2ms

C:\>ping 192.168.55.5

Pinging 192.168.55.5 with 32 bytes of data:

Reply from 192.168.55.5: bytes=32 time<1ms TTL=128
Reply from 192.168.55.5: bytes=32 time<1ms TTL=128
Reply from 192.168.55.5: bytes=32 time<1ms TTL=128
Reply from 192.168.55.5: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.55.5:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.55.6

Pinging 192.168.55.6 with 32 bytes of data:

Reply from 192.168.55.6: bytes=32 time<1ms TTL=128
Reply from 192.168.55.6: bytes=32 time<1ms TTL=128
Reply from 192.168.55.6: bytes=32 time<1ms TTL=128
Reply from 192.168.55.6: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.55.6:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

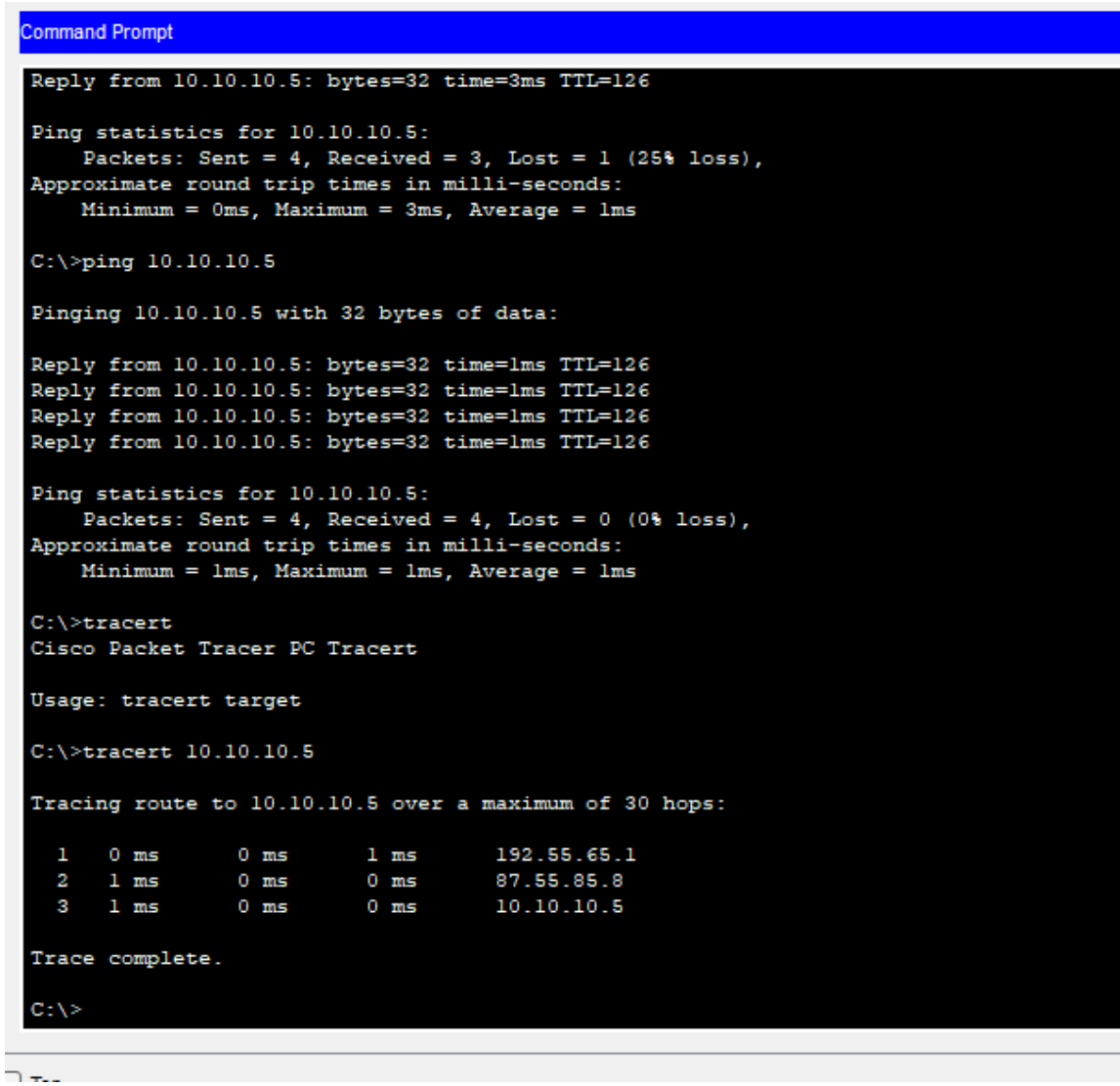


```
C:\>ping 192.168.55.4

Pinging 192.168.55.4 with 32 bytes of data:

Reply from 192.168.55.4: bytes=32 time<1ms TTL=128
Reply from 192.168.55.4: bytes=32 time=1ms TTL=128
Reply from 192.168.55.4: bytes=32 time<1ms TTL=128
Reply from 192.168.55.4: bytes=32 time=1ms TTL=128

Ping statistics for 192.168.55.4:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\>ping 192.168.55.5

Pinging 192.168.55.5 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

Ping statistics for 192.168.55.5:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),

C:\>
```

RIP:




Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.55.65.3
Pinging 192.55.65.3 with 32 bytes of data:
Reply from 192.55.65.3: bytes=32 time=4ms TTL=128
Reply from 192.55.65.3: bytes=32 time=1ms TTL=128
Reply from 192.55.65.3: bytes=32 time=4ms TTL=128
Reply from 192.55.65.3: bytes=32 time=3ms TTL=128
Ping statistics for 192.55.65.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 4ms, Average = 3ms
C:\>ping 192.55.65.4
Pinging 192.55.65.4 with 32 bytes of data:
Reply from 192.55.65.4: bytes=32 time<1ms TTL=128
Reply from 192.55.65.4: bytes=32 time<1ms TTL=128
Reply from 192.55.65.4: bytes=32 time<1ms TTL=128
Reply from 192.55.65.4: bytes=32 time<1ms TTL=128
Ping statistics for 192.55.65.4:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 10.10.10.5
Pinging 10.10.10.5 with 32 bytes of data:
Reply from 192.55.65.1: Destination host unreachable.
Reply from 192.55.65.1: Destination host unreachable.
Reply from 192.55.65.1: Destination host unreachable.


Command Prompt
Reply from 10.10.10.5: bytes=32 time=3ms TTL=126
Ping statistics for 10.10.10.5:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 3ms, Average = 1ms
C:\>ping 10.10.10.5
Pinging 10.10.10.5 with 32 bytes of data:
Reply from 10.10.10.5: bytes=32 time=1ms TTL=126
Reply from 10.10.10.5: bytes=32 time=1ms TTL=126
Reply from 10.10.10.5: bytes=32 time=1ms TTL=126
Reply from 10.10.10.5: bytes=32 time=1ms TTL=126
Ping statistics for 10.10.10.5:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
C:\>tracert
Cisco Packet Tracer PC Tracert
Usage: tracert target
C:\>tracert 10.10.10.5
Tracing route to 10.10.10.5 over a maximum of 30 hops:
1 0 ms 0 ms 1 ms 192.55.65.1
2 1 ms 0 ms 0 ms 87.55.85.8
3 1 ms 0 ms 0 ms 10.10.10.5
Trace complete.
C:\>