Data Communication And Networking Lab

Aman Kumar Gupta

CSE DevOps 18

R171218016-500067759

Experiment 8

Aim: Configure a Network using Distance Vector Routing protocol.

- RIP

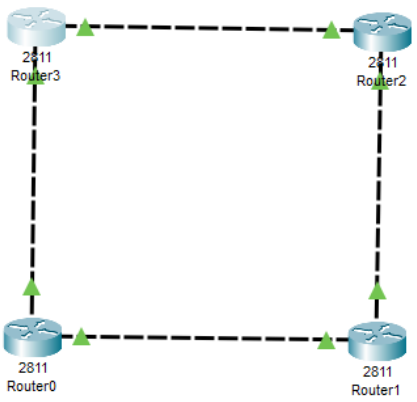
Apparatus (Software): packet tracer software

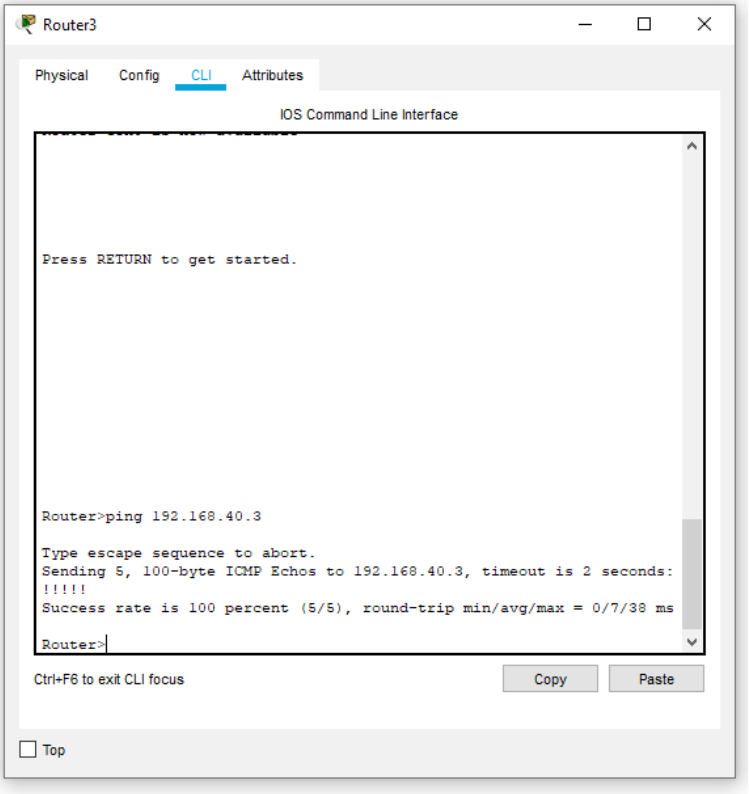
Theory: In computer communication theory relating to packet-switched networks, a distance-vector routing protocol is one of the two major classes of routing protocols, the other major class being the link-state protocol. Distance-vector routing protocols use the Bellman–Ford algorithm, Ford–Fulkerson algorithm, or DUAL FSM (in the case of Cisco Systems's protocols) to calculate paths. A distance-vector routing protocol requires that a router informs its neighbors of topology changes periodically. Compared to link-state protocols, which require a router to inform all the nodes in a network of topology changes, distance-vector routing protocols have less computational complexity and message overhead.

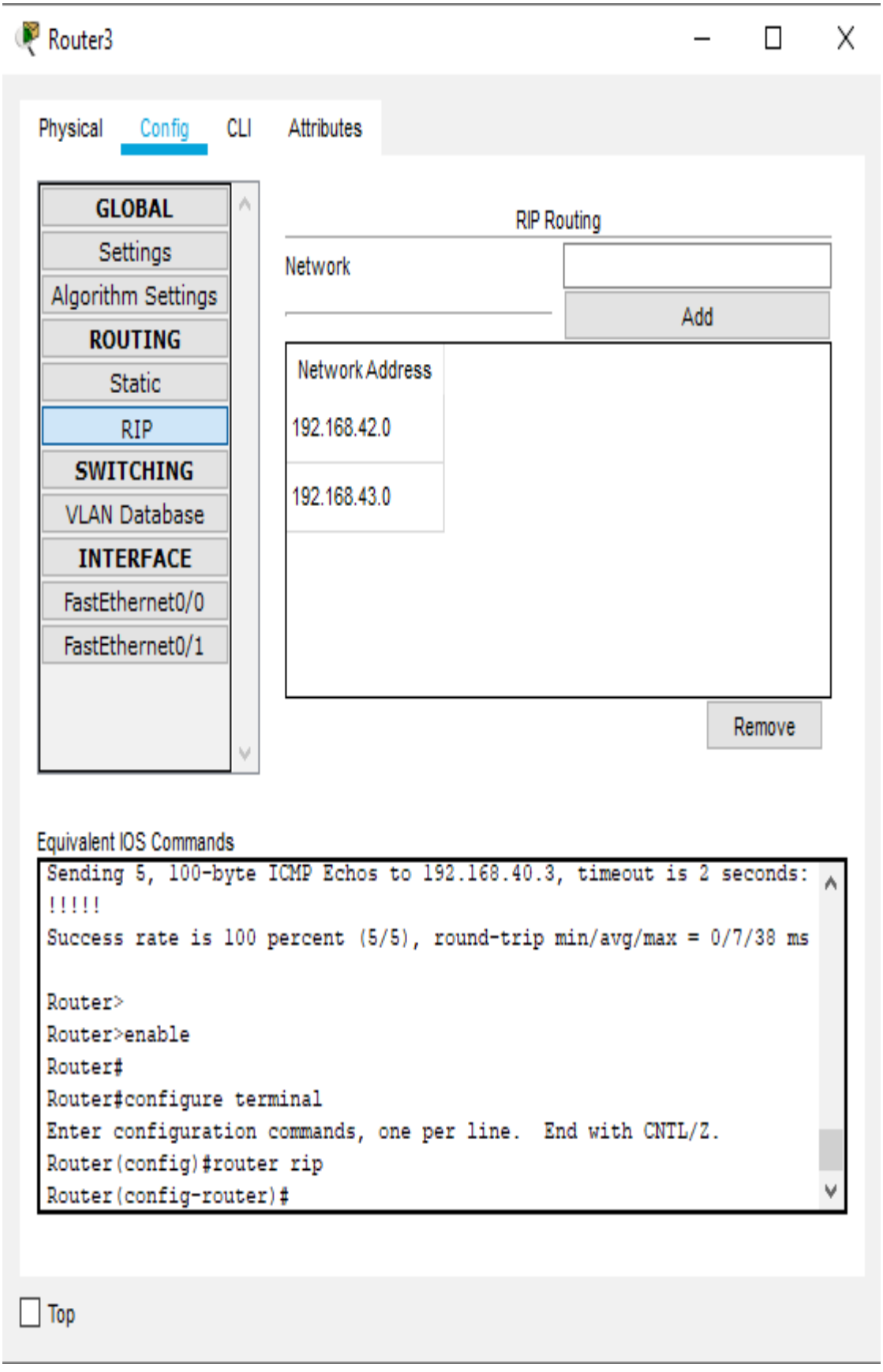
The Routing Information Protocol (RIP) is one of the oldest distance-vector routing protocols, which employs the hop count as a routing metric. RIP prevents routing loops by implementing a limit on the number of hops allowed in a path from the source to a destination. The maximum number of hops allowed for RIP is 15. This hop limit, however, also limits the size of networks that RIP can support. A hop count of 16 is considered an infinite distance, in other words the route is considered unreachable.

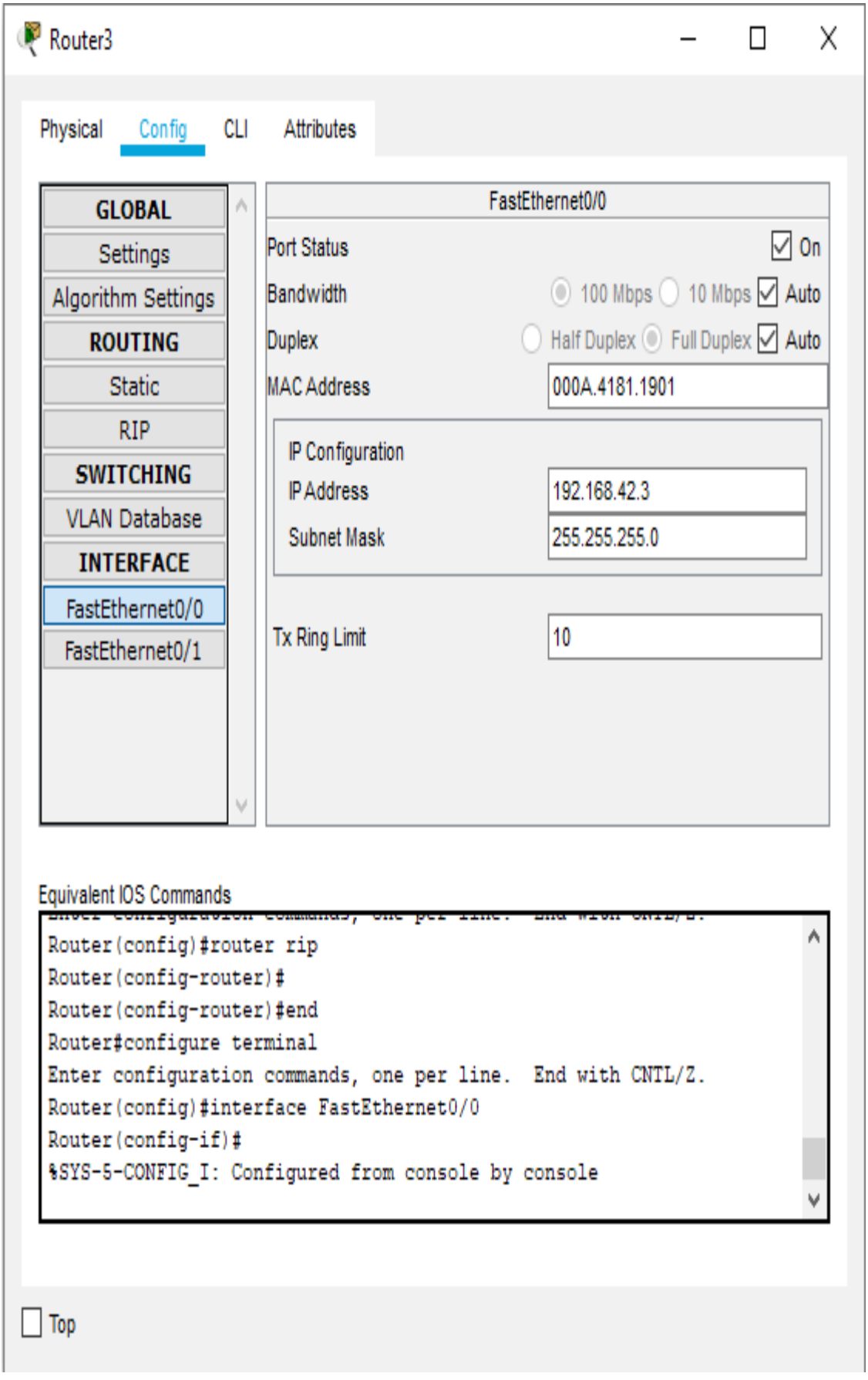
Procedure:

1. Develop a Topology shown in figure given below.
3. Configure all Routers
4. Implement RIP protocols in Router to configure Network.






Router3
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
RIP Routing
Network
Add
Network Address
192.168.42.0
192.168.43.0
Remove
Equivalent IOS Commands
Sending 5, 100-byte ICMP Echos to 192.168.40.3, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/7/38 ms
Router>
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#
Top


Router3
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1
FastEthernet0/0
Port Status
On
Bandwidth
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
000A.4181.1901
IP Configuration
IP Address
192.168.42.3
Subnet Mask
255.255.255.0
Tx Ring Limit
10
Equivalent IOS Commands
Router(config)#router rip
Router(config-router)#
Router(config-router)#end
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#
%SYS-5-CONFIG_I: Configured from console by console
Top

Experiment 9

Aim: Configure Network using Link State Vector Routing protocol.

- OSPF

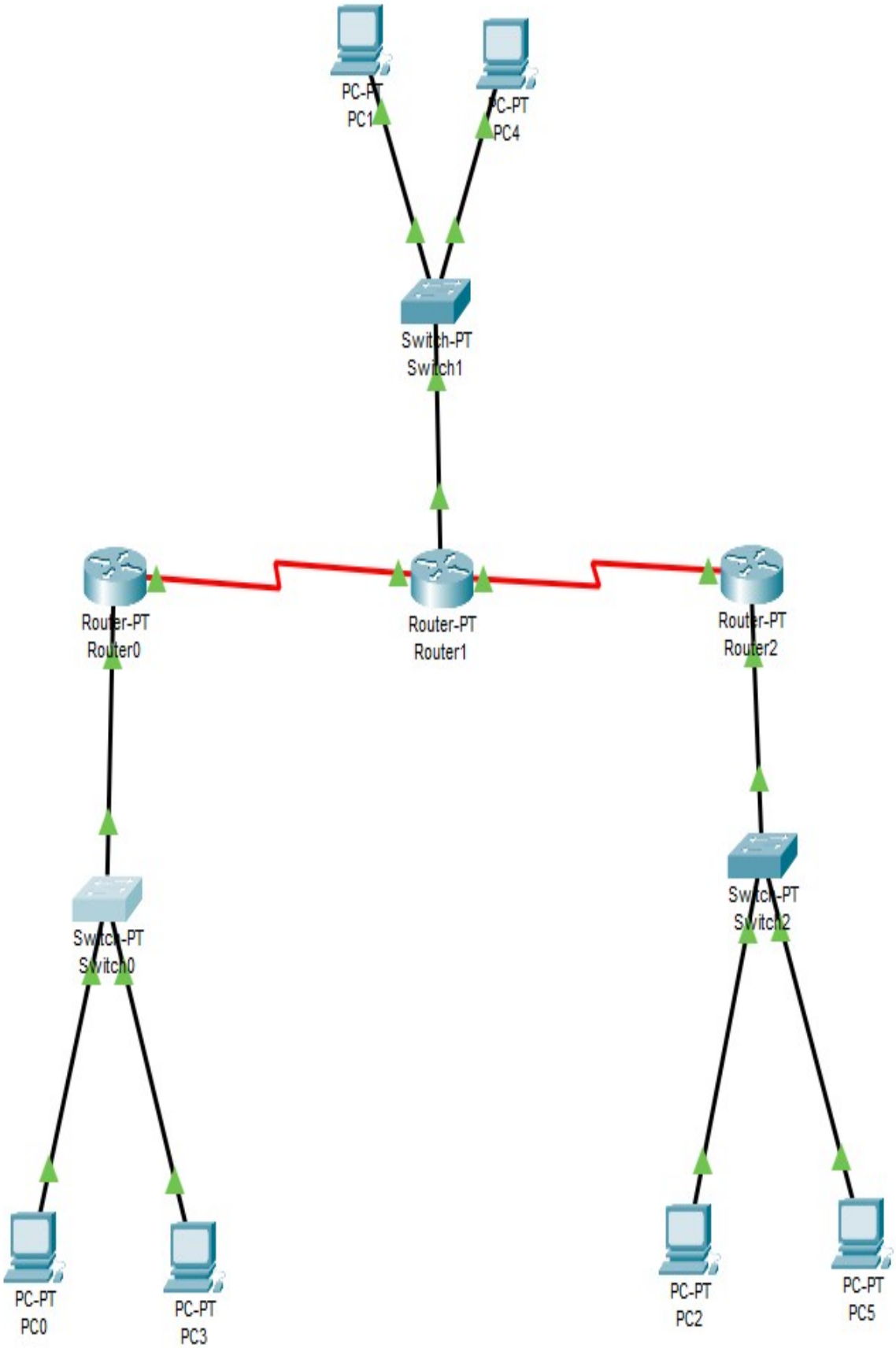
Apparatus (Software): Packet Tracer Software/GNS3

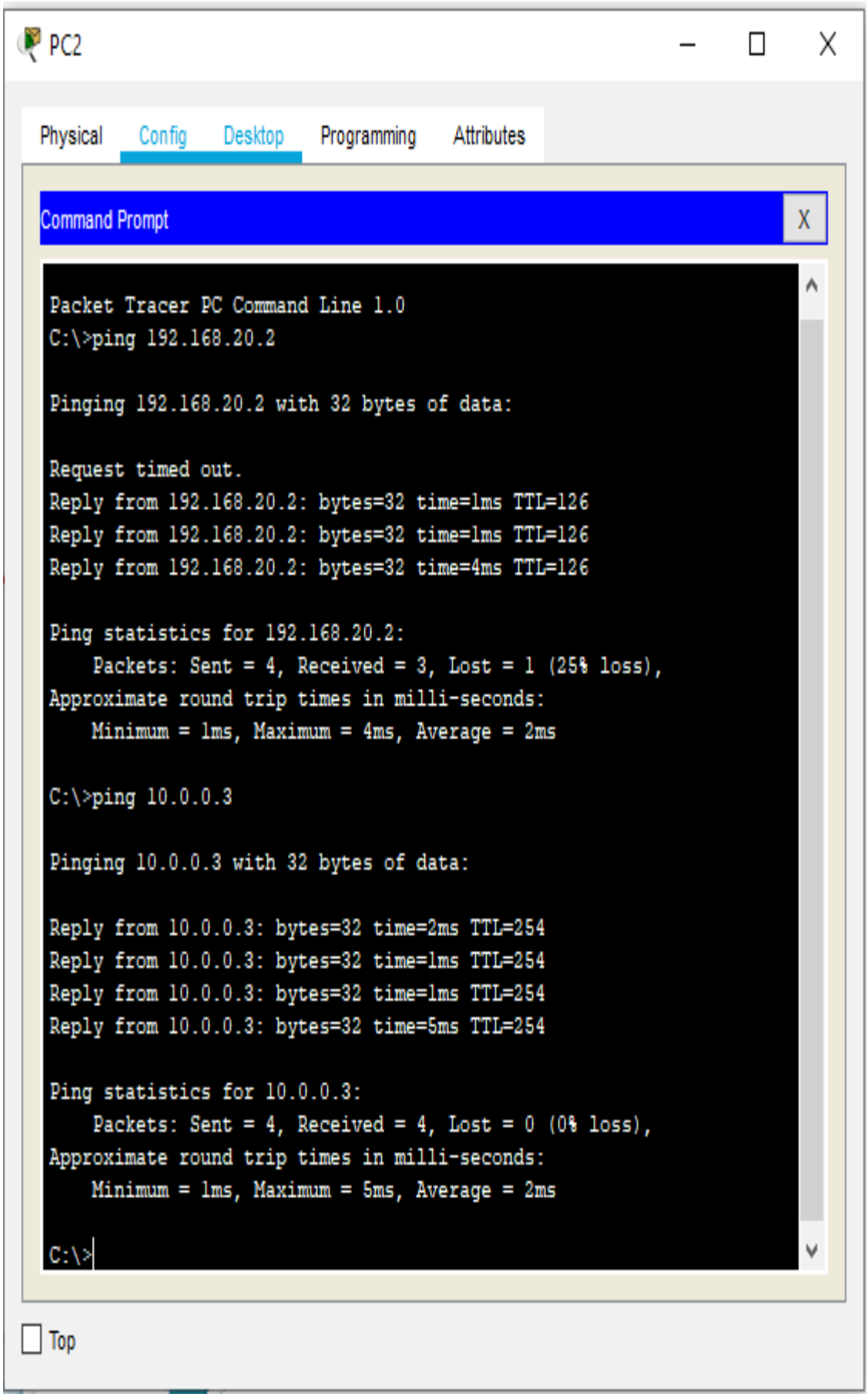
Theory: Open Shortest Path First (OSPF) is a link-state routing protocol for Internet Protocol (IP) networks. It uses a link state routing algorithm and falls into the group of interior routing protocols, operating within a single autonomous system (AS). It is defined as OSPF Version 2 in RFC 2328 (1998) for IPv4. The updates for IPv6 are specified as OSPF Version 3 in RFC 5340(2008).

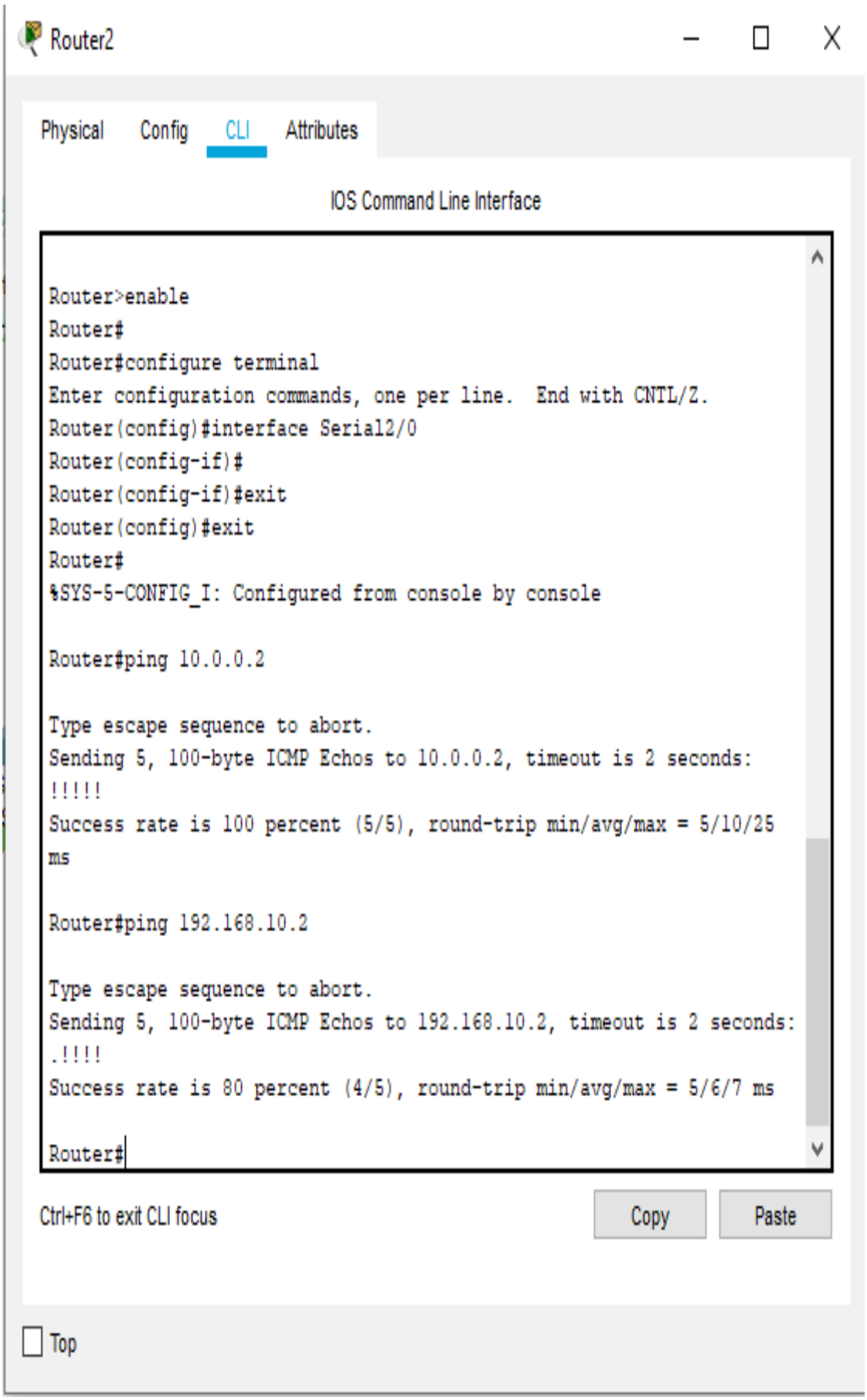
OSPF is perhaps the most widely used interior gateway protocol (IGP) in large enterprise networks. IS-IS, another link-state dynamic routing protocol, is more common in large service provider networks. The most widely used exterior gateway protocol is the Border Gateway Protocol (BGP), the principal routing protocol between autonomous systems on the Internet.

Procedure:

- Develop a Topology shown in figure given below.
- Configure all the workstations
- Configure all switches
- Configure all Routers
- Implement OSPF protocols in Router to configure Network.


PC-PT
PC1
PC-PT
PC4
Switch-PT
Switch1
Router-PT
Router0
Router-PT
Router1
Router-PT
Router2
Switch-PT
Switch0
Switch-PT
Switch2
PC-PT
PC0
PC-PT
PC3
PC-PT
PC2
PC-PT
PC5


PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.20.2
Pinging 192.168.20.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.20.2: bytes=32 time=1ms TTL=126
Reply from 192.168.20.2: bytes=32 time=1ms TTL=126
Reply from 192.168.20.2: bytes=32 time=4ms TTL=126
Ping statistics for 192.168.20.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 4ms, Average = 2ms
C:\>ping 10.0.0.3
Pinging 10.0.0.3 with 32 bytes of data:
Reply from 10.0.0.3: bytes=32 time=2ms TTL=254
Reply from 10.0.0.3: bytes=32 time=1ms TTL=254
Reply from 10.0.0.3: bytes=32 time=1ms TTL=254
Reply from 10.0.0.3: bytes=32 time=5ms TTL=254
Ping statistics for 10.0.0.3:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 5ms, Average = 2ms
C:\>
Top


Router2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#
Router(config-if)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#ping 10.0.0.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.0.0.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 5/10/25
ms
Router#ping 192.168.10.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.10.2, timeout is 2 seconds:
.!!!!
Success rate is 80 percent (4/5), round-trip min/avg/max = 5/6/7 ms
Router#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Experiment 10

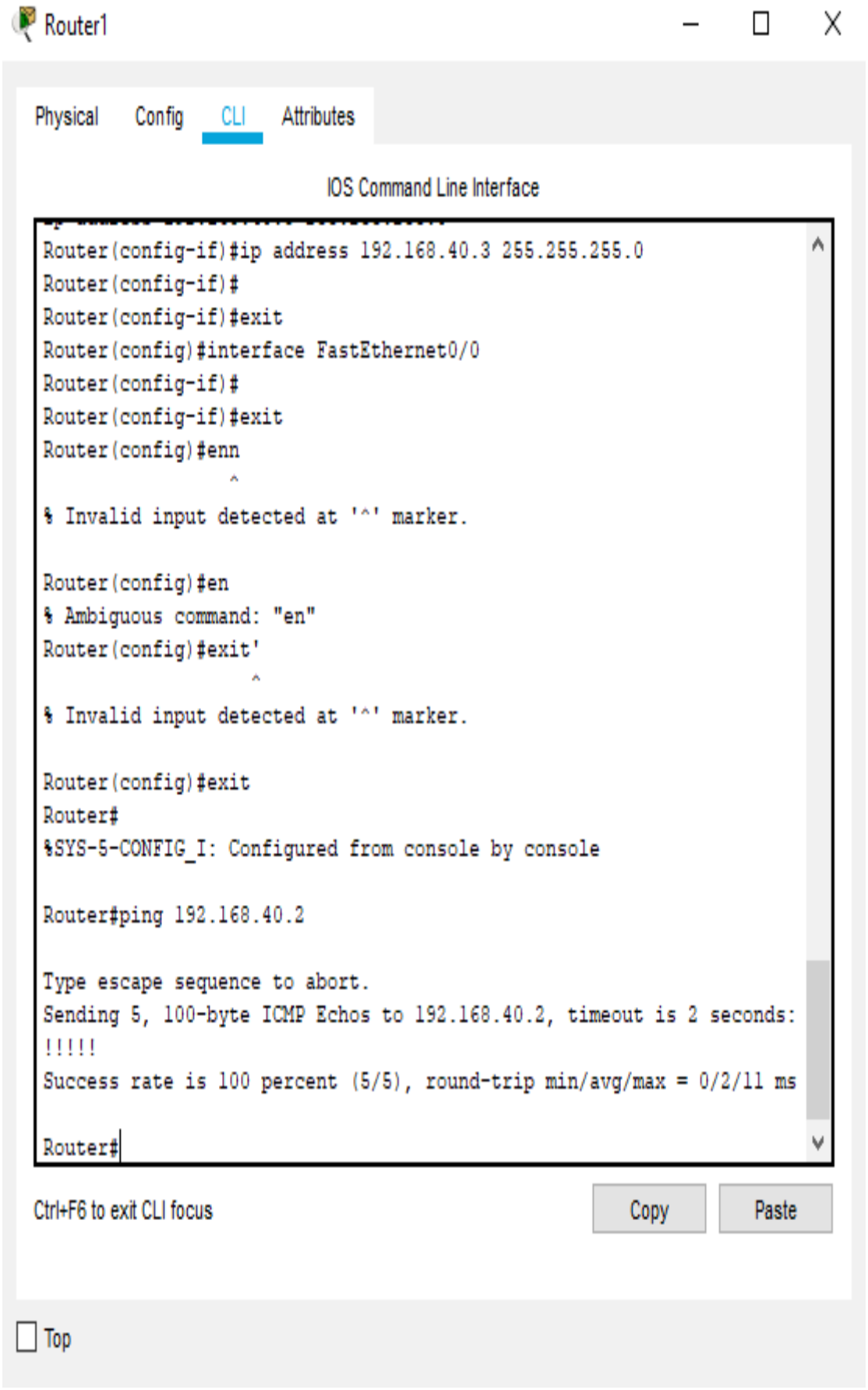
Aim: Configure Network using Border gateway protocol.

Apparatus (Software): Packet Tracer Software/GNS3

Theory: Border Gateway Protocol (BGP) is a standardized exterior gateway protocol designed to exchange routing and reachability information between autonomous systems (AS) on the Internet. The protocol is often classified as a path vector protocol, but is sometimes also classed as a distance vector routing protocol. The Border Gateway Protocol does not use Interior Gateway Protocol (IGP) metrics, but makes routing decisions based on paths, network policies and/or rule-sets configured by a network administrator. The Border Gateway Protocol plays a key role in the overall operation of the Internet and is involved in making core routing decisions.

Procedure:

- Develop a Topology shown in figure given below.
- Configure all the workstations
- Configure all switches
- Configure all Routers
- Implement BGP protocols in Router to configure Network.


Router1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Router(config-if)#ip address 192.168.40.3 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#enn
^
% Invalid input detected at '^' marker.
Router(config)#en
% Ambiguous command: "en"
Router(config)#exit'
^
% Invalid input detected at '^' marker.
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#ping 192.168.40.2
Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 192.168.40.2, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 0/2/11 ms
Router#
Ctrl+F6 to exit CLI focus
Copy
Paste
Top