Report for ECE4016 assignment 3

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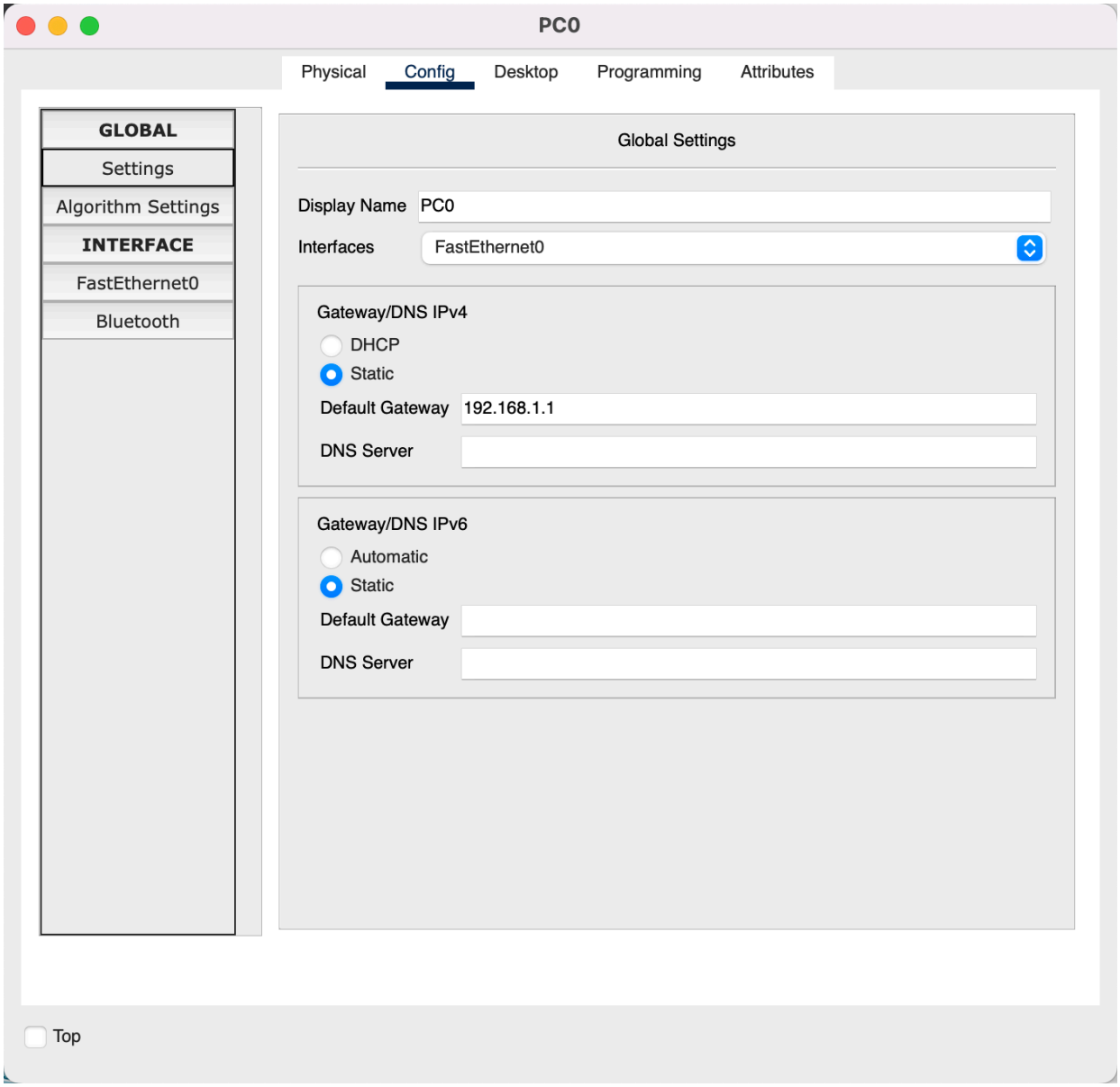
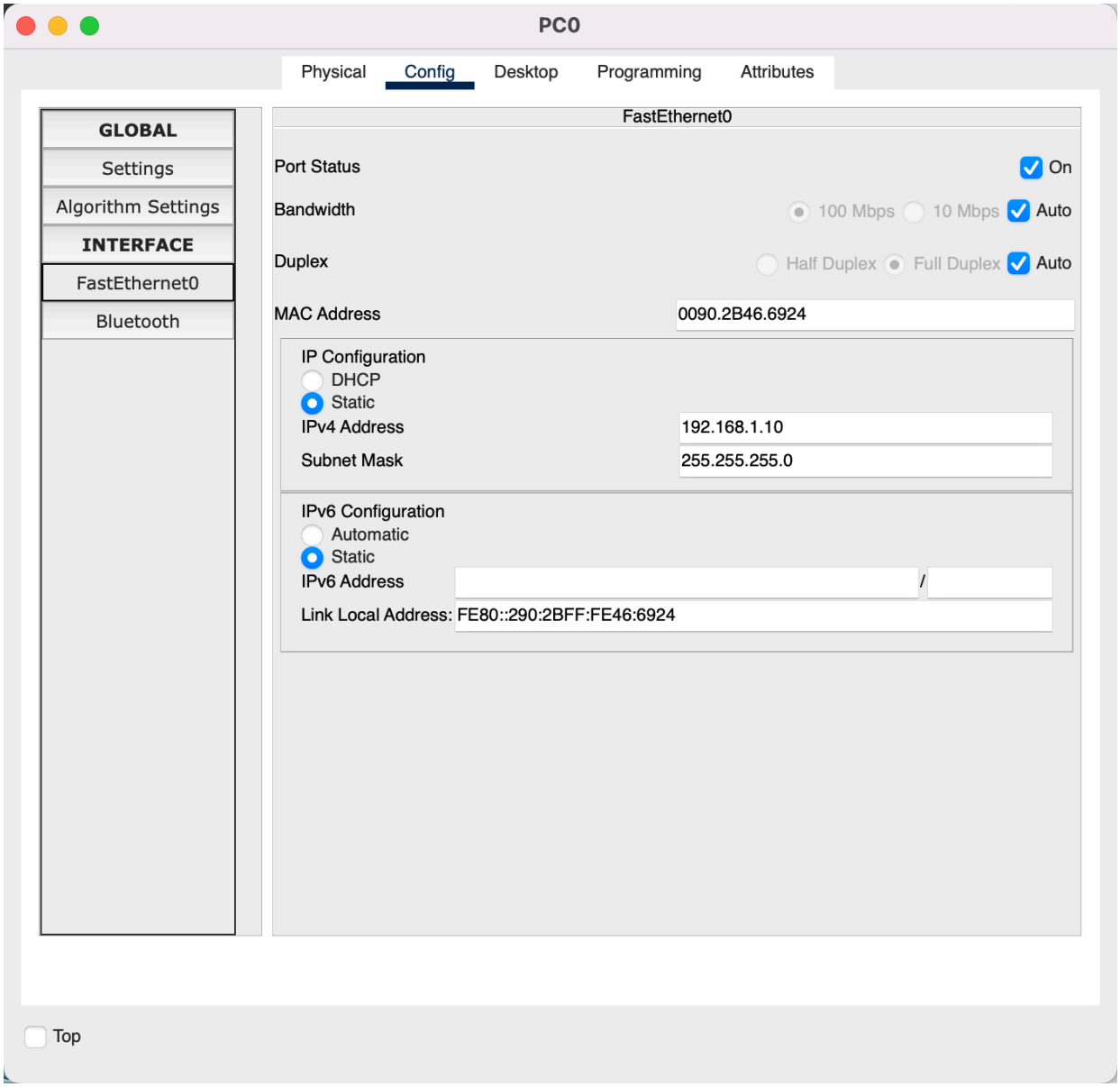
Network Design Simulation

Task 1

- Setting
    - Mapping relation
        - PC1: PC-PT PC0; PC2: PC-PT PC1 ...
        - Switch1: 2960-24TT Switch0; Switch2: 2960-24TT Switch1 ...
        - Router1: 1941 Router0; Router2: 1941 Router1

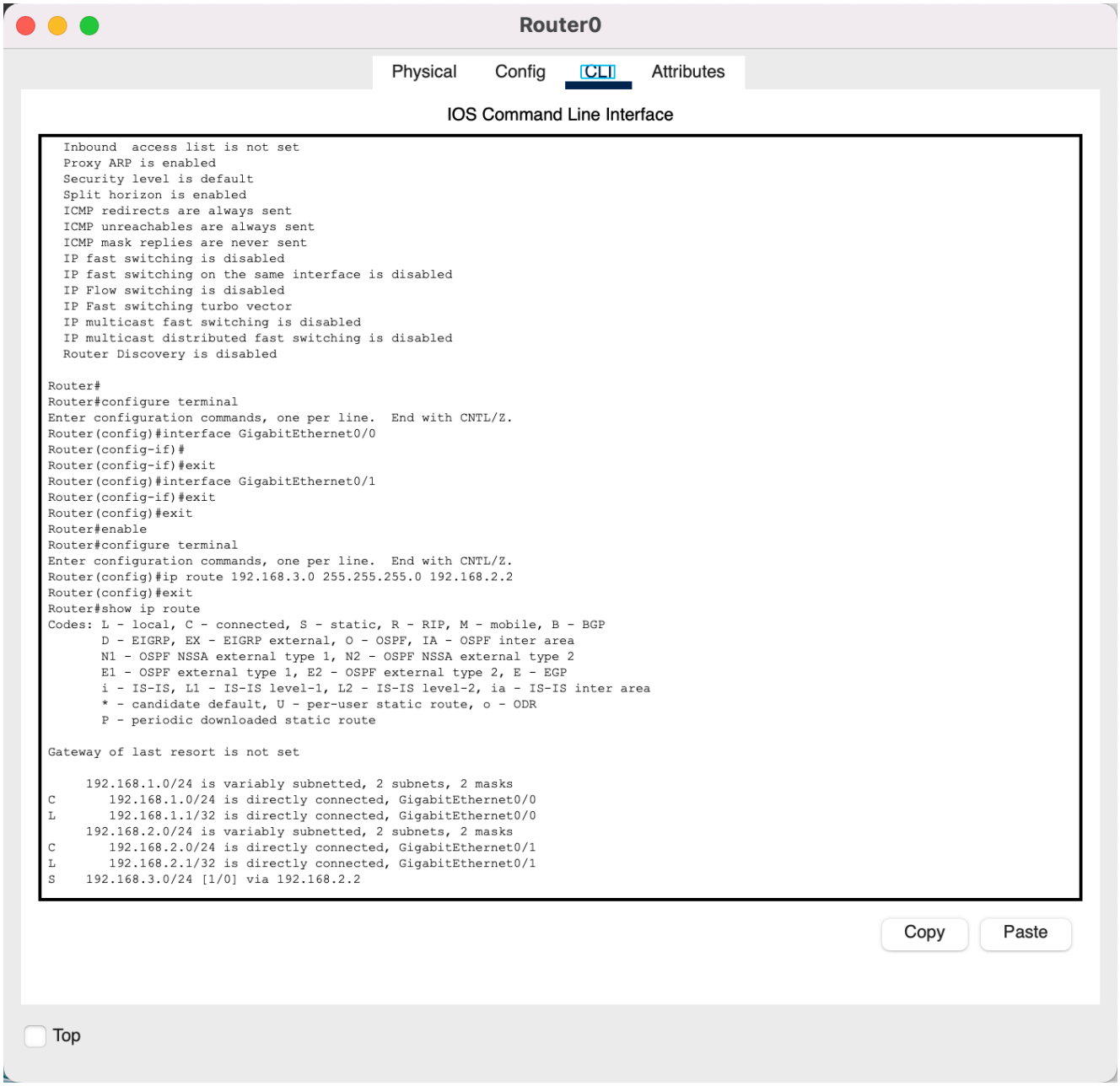
1. Set the default gateway of PC1 to be the IP address of the interface0 of Router1; then set the PC1 IP.


PC0
Physical
Config
Desktop
Programming
Attributes
GLOBAL
Settings
Algorithm Settings
INTERFACE
FastEthernet0
Bluetooth
Global Settings
Display Name
PC0
Interfaces
FastEthernet0
Gateway/DNS IPv4
DHCP
Static
Default Gateway
192.168.1.1
DNS Server
Gateway/DNS IPv6
Automatic
Static
Default Gateway
DNS Server
Top

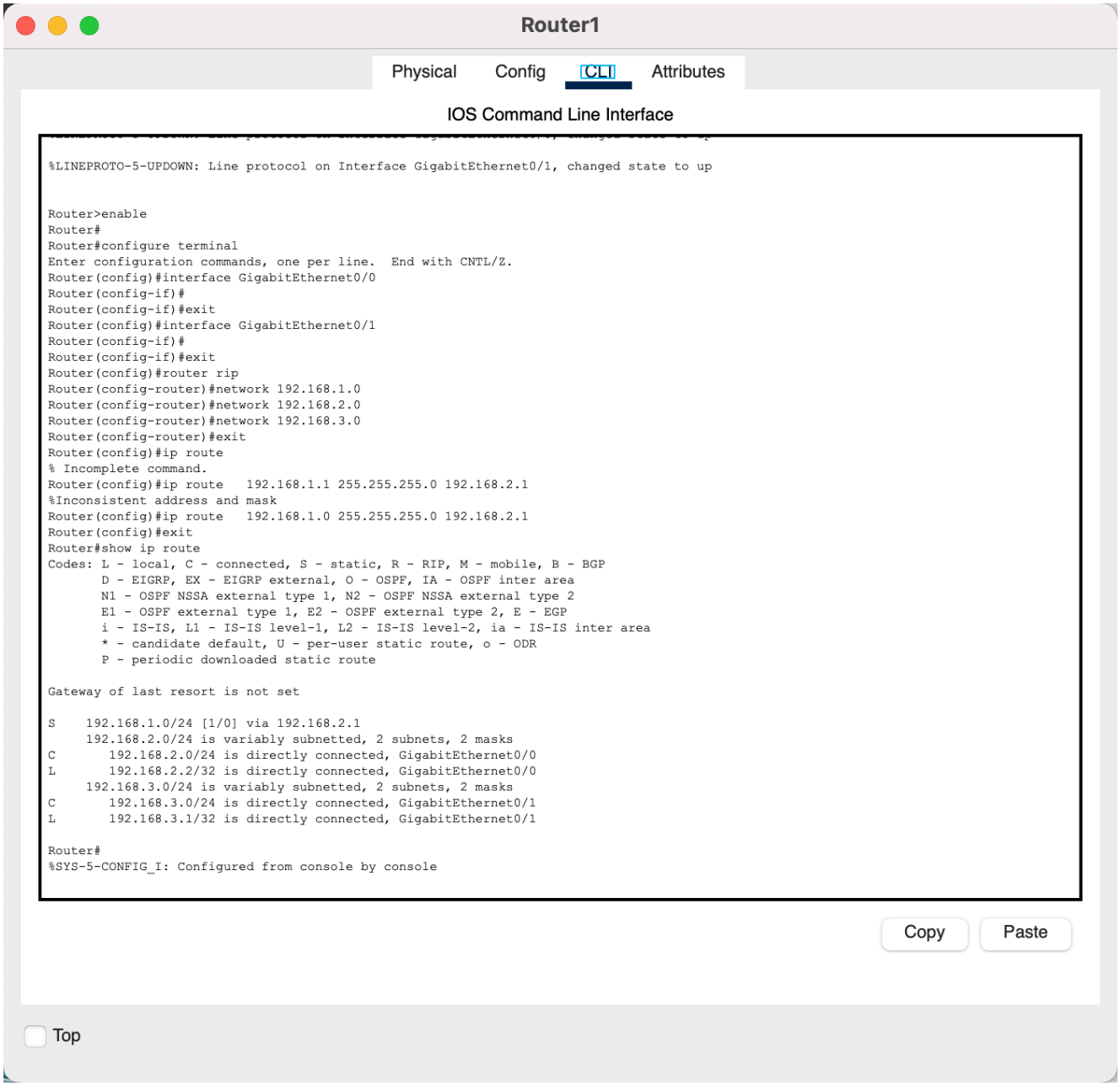


Similar for other PC.

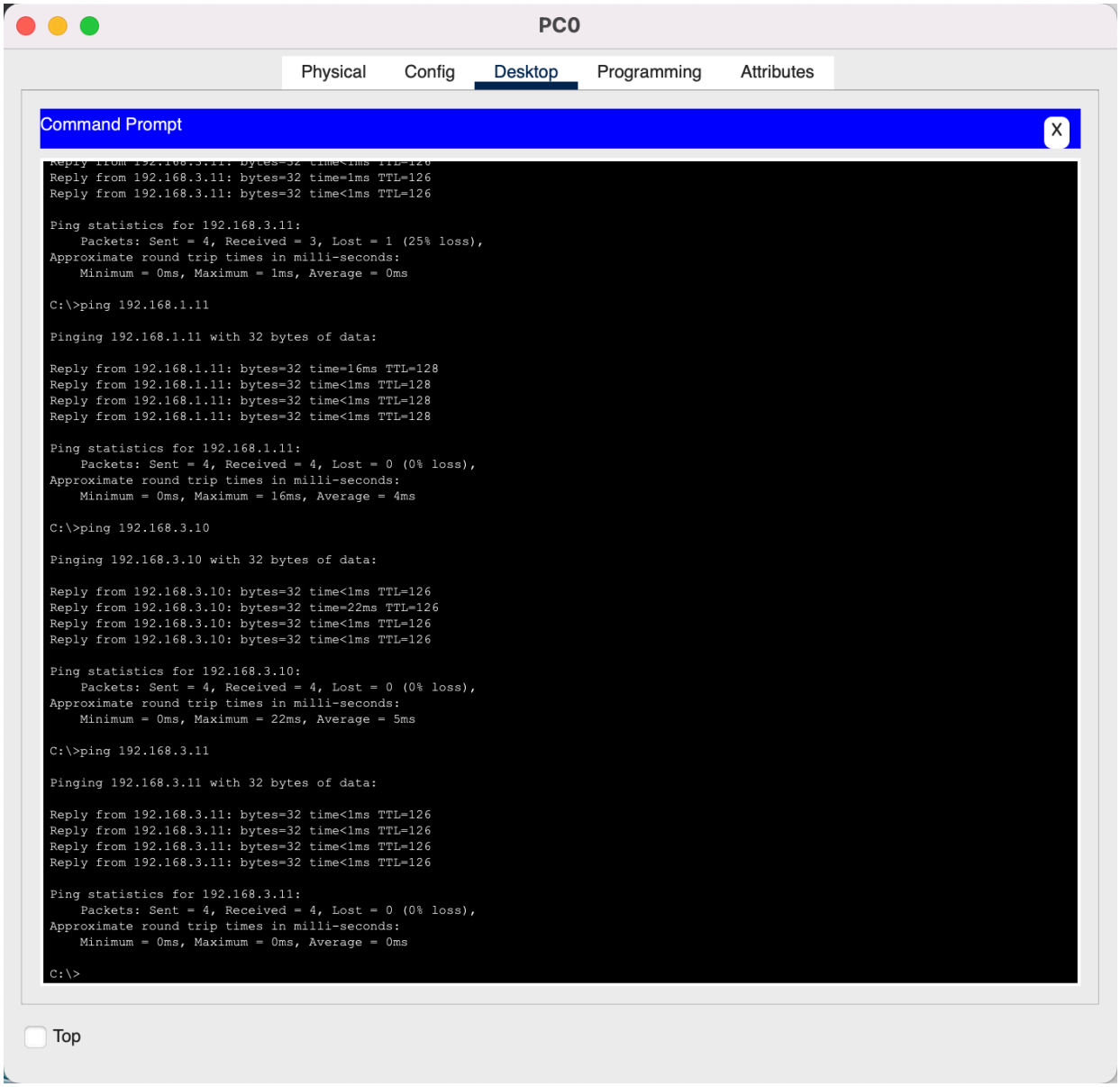
2. For Router1, `GigabitEthernet0/0` is connected to PC1 and `GigabitEthernet0/1` is connected to PC2. Add `ip route 192.128.3.0 255.255.255.0 192.168.2.2` route table, which means packet can send to network of 192.128.3.0 via 192.168.2.2 (Router2). Check route table by `show ip route`.



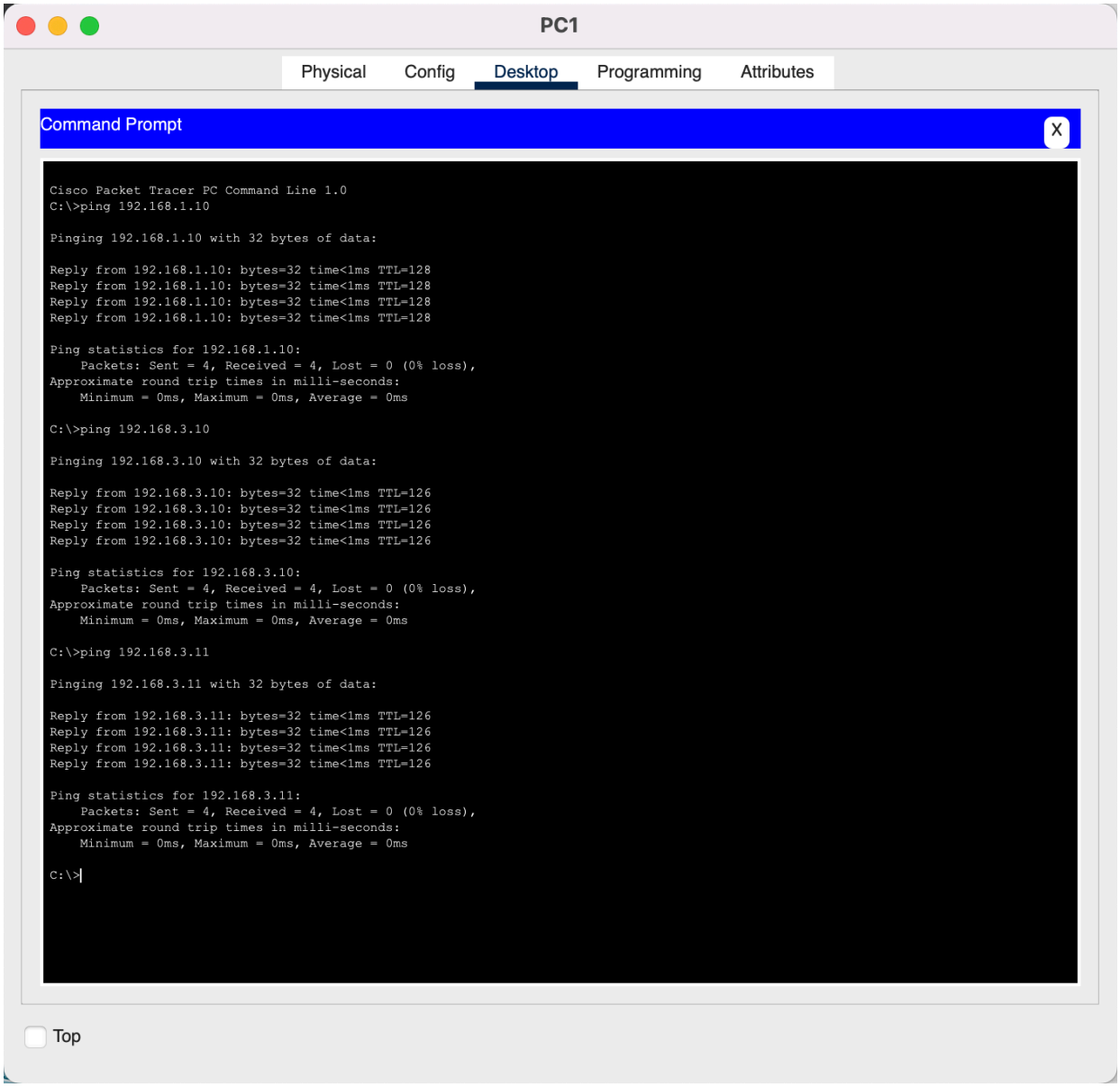
Similar for Router2, set the route path from Router1 to PC1 and PC2.



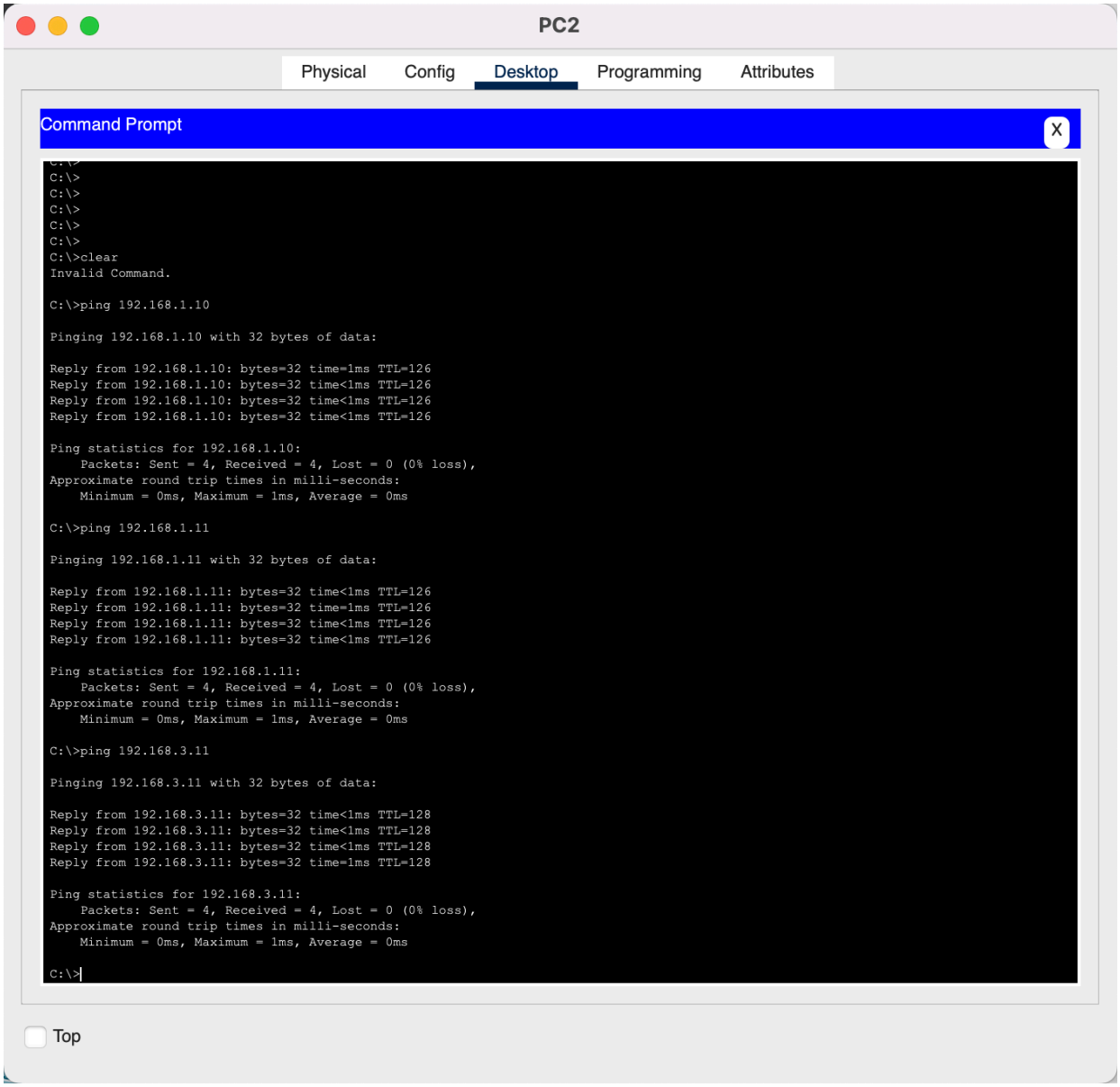
- Connection verification
  - PC1


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Reply from 192.168.3.11: bytes=32 time=1ms TTL=126
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Ping statistics for 192.168.3.11:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.1.11
Pinging 192.168.1.11 with 32 bytes of data:
Reply from 192.168.1.11: bytes=32 time=16ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Reply from 192.168.1.11: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.1.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 16ms, Average = 4ms
C:\>ping 192.168.3.10
Pinging 192.168.3.10 with 32 bytes of data:
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time=22ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Ping statistics for 192.168.3.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 22ms, Average = 5ms
C:\>ping 192.168.3.11
Pinging 192.168.3.11 with 32 bytes of data:
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Ping statistics for 192.168.3.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
Top

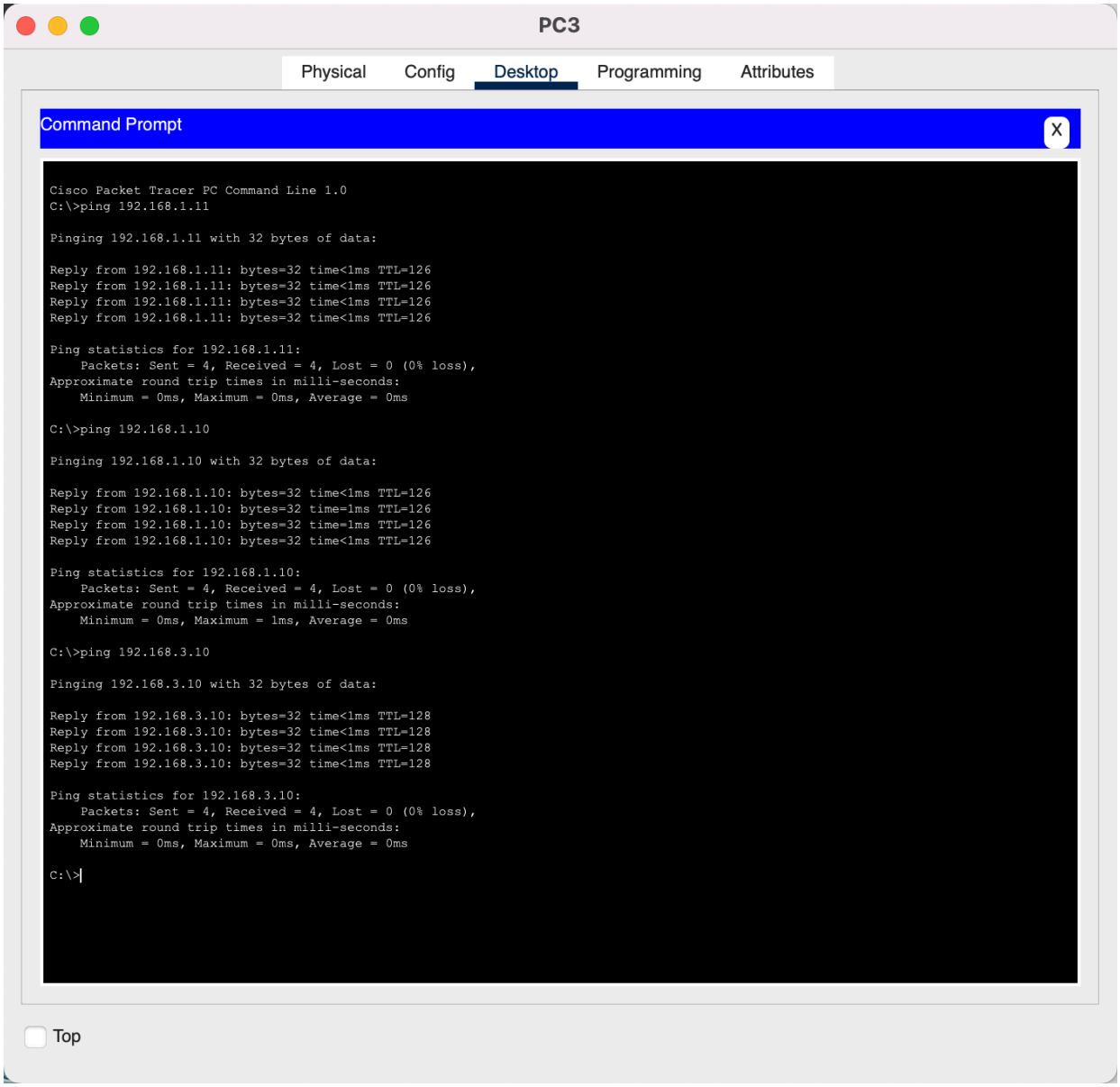
- PC2


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.10
Pinging 192.168.1.10 with 32 bytes of data:
Reply from 192.168.1.10: bytes=32 time<1ms TTL=128
Reply from 192.168.1.10: bytes=32 time<1ms TTL=128
Reply from 192.168.1.10: bytes=32 time<1ms TTL=128
Reply from 192.168.1.10: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.1.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.168.3.10
Pinging 192.168.3.10 with 32 bytes of data:
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Reply from 192.168.3.10: bytes=32 time<1ms TTL=126
Ping statistics for 192.168.3.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.168.3.11
Pinging 192.168.3.11 with 32 bytes of data:
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Reply from 192.168.3.11: bytes=32 time<1ms TTL=126
Ping statistics for 192.168.3.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
Top

- PC3


PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
C:\>
C:\>
C:\>
C:\>
C:\>
C:\>clear
Invalid Command.
C:\>ping 192.168.1.10
Pinging 192.168.1.10 with 32 bytes of data:
Reply from 192.168.1.10: bytes=32 time=1ms TTL=126
Reply from 192.168.1.10: bytes=32 time<1ms TTL=126
Reply from 192.168.1.10: bytes=32 time<1ms TTL=126
Reply from 192.168.1.10: bytes=32 time<1ms TTL=126
Ping statistics for 192.168.1.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.1.11
Pinging 192.168.1.11 with 32 bytes of data:
Reply from 192.168.1.11: bytes=32 time<1ms TTL=126
Reply from 192.168.1.11: bytes=32 time=1ms TTL=126
Reply from 192.168.1.11: bytes=32 time<1ms TTL=126
Reply from 192.168.1.11: bytes=32 time<1ms TTL=126
Ping statistics for 192.168.1.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.3.11
Pinging 192.168.3.11 with 32 bytes of data:
Reply from 192.168.3.11: bytes=32 time<1ms TTL=128
Reply from 192.168.3.11: bytes=32 time<1ms TTL=128
Reply from 192.168.3.11: bytes=32 time<1ms TTL=128
Reply from 192.168.3.11: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.3.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>
Top

- PC4

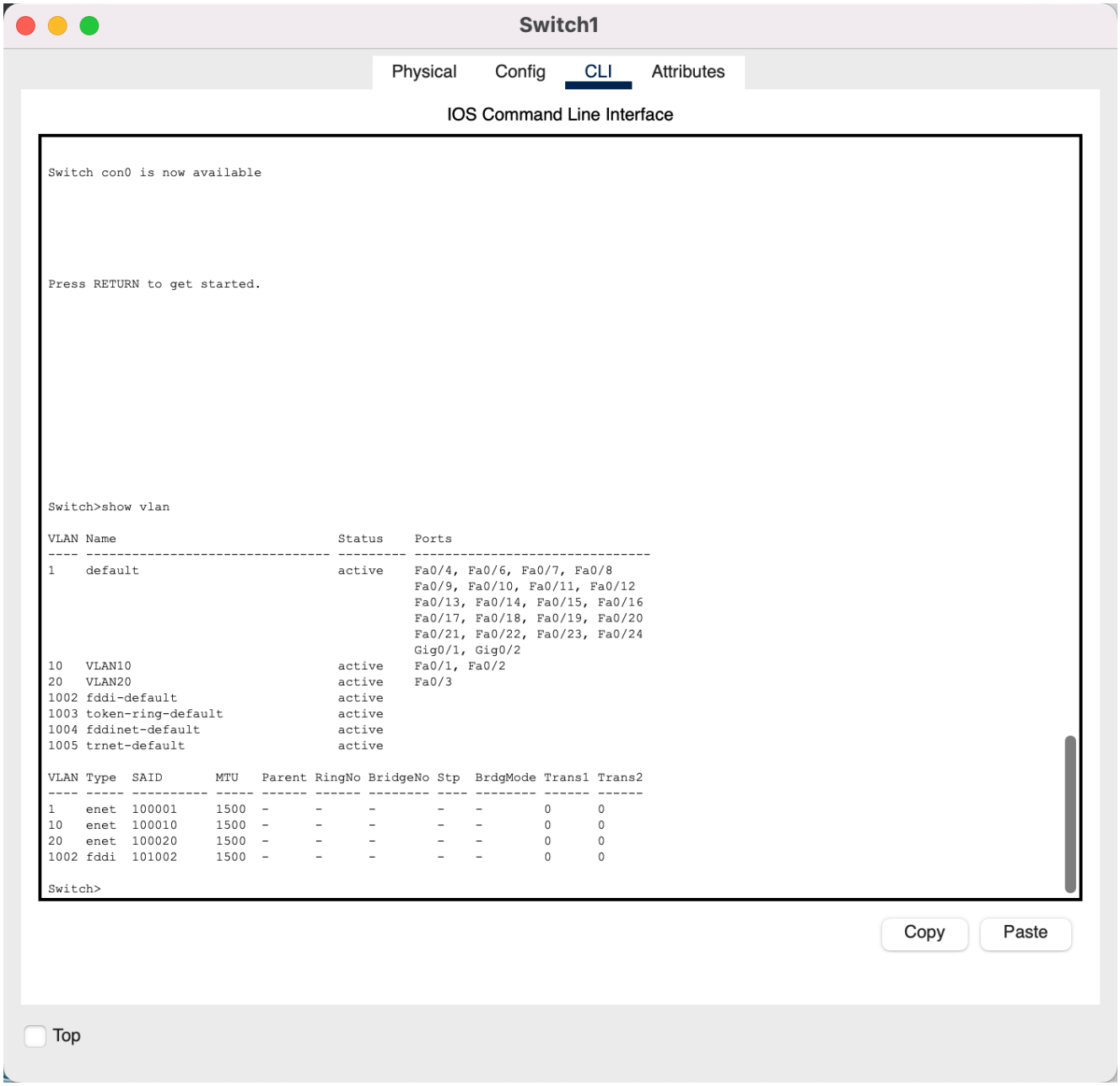


- Conclusion Four computers can ping each other successfully through switches and routers. The main job is to set the route path.

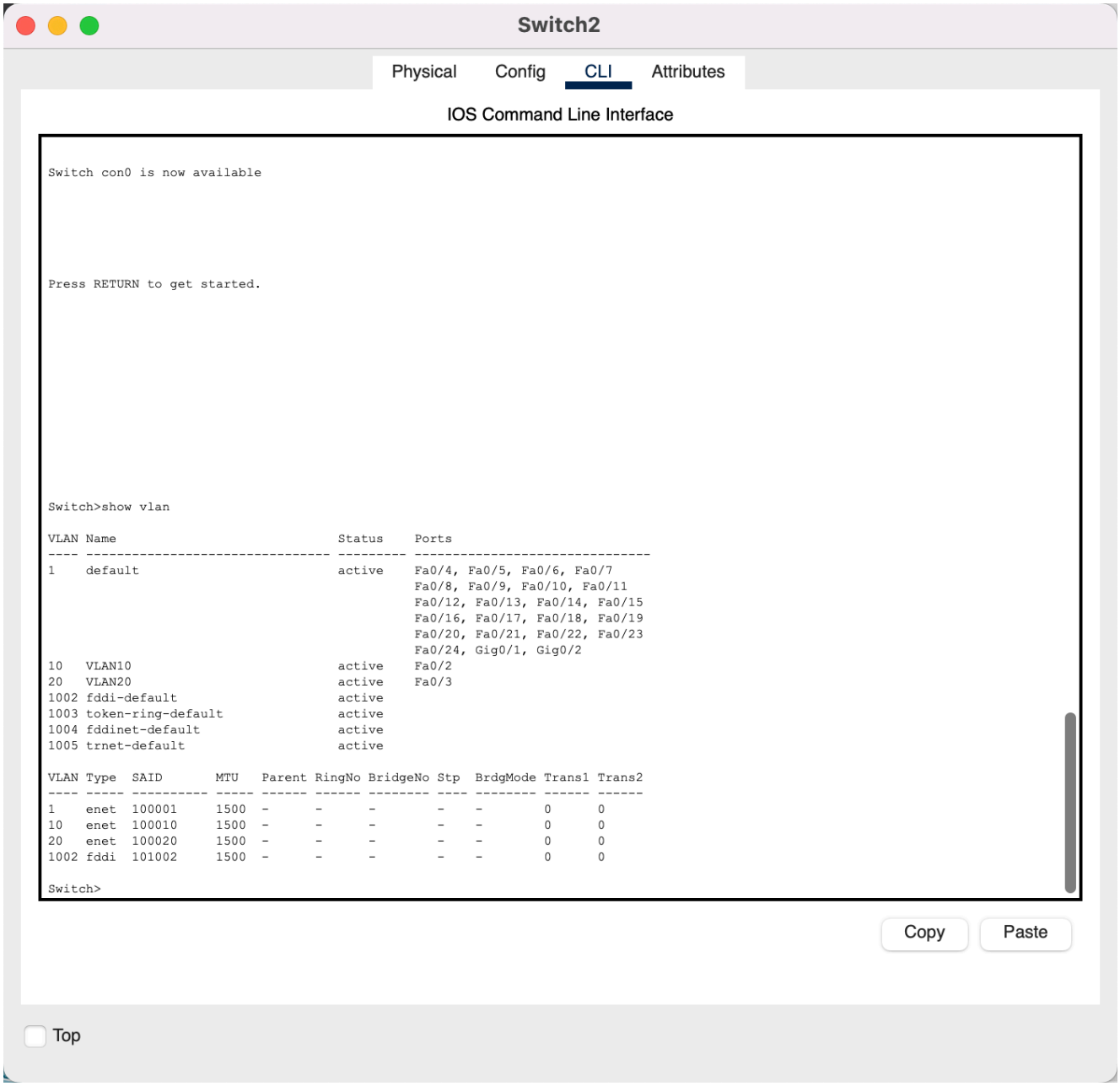
Task 2

- Setting
    - Mapping relation
        - PC1: PC-PT PC1; PC2: PC-PT PC2 ...
        - Switch1: 2960-24TT Switch1; Switch2: 2960-24TT Switch2...

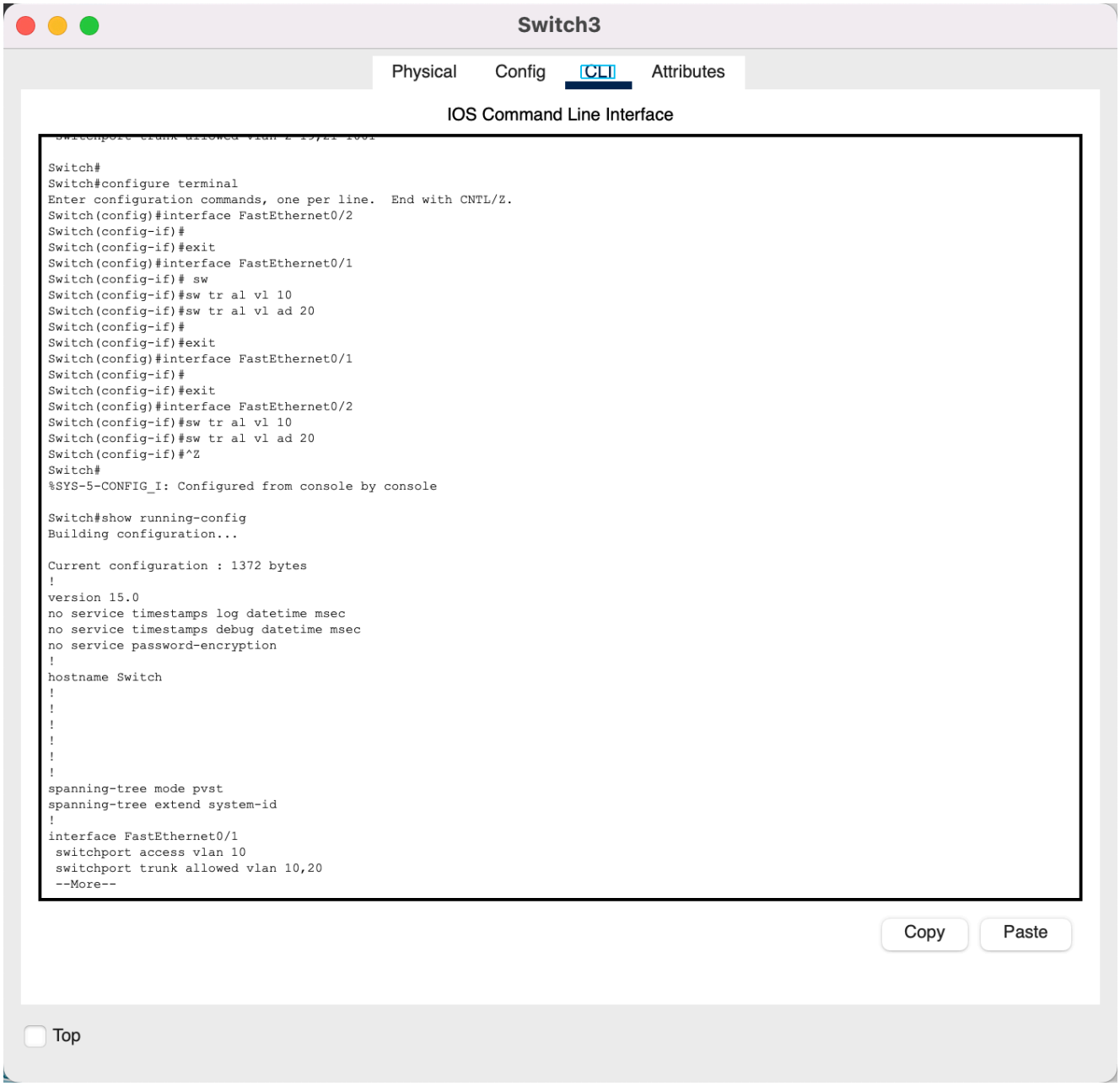
1. Set PC IP address. Similar to task 1.
2. For Switch1, `Fa0/2` is connected to PC1, `Fa0/1` is connected to PC2, `Fa0/3` is connected to PC3, `Fa0/5` is connected to Switch3. Add vlan 10 and vlan 20 in `Vlan Database` in config. Then set the vlan of `Fa0/1, Fa0/2` to be 10 under access mode. Set the vlan of `Fa0/3` to be 20 under access mode. Set the vlan of `Fa0/5` to be all under trunk mode. Check vlan setting by `show vlan`



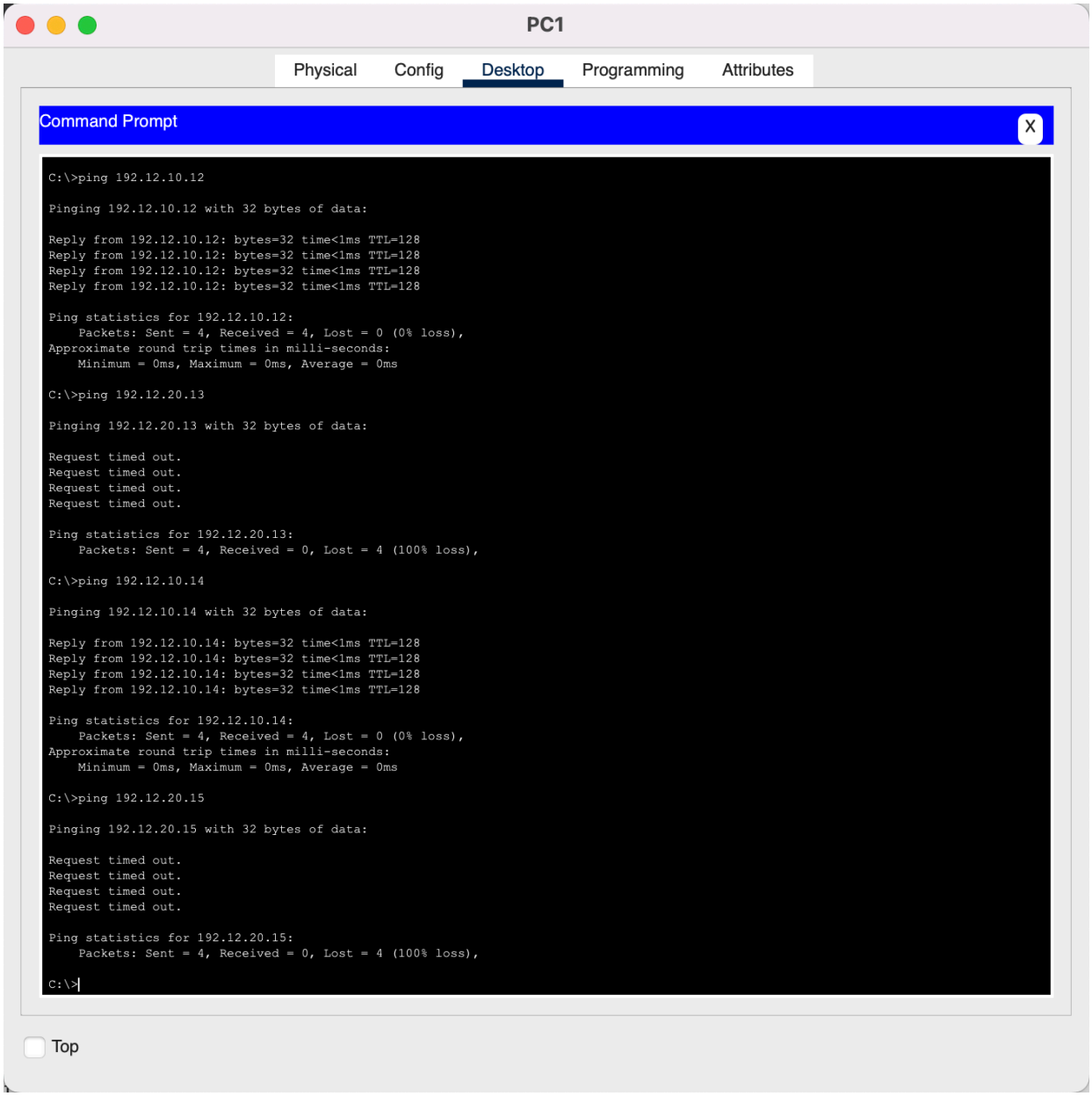
Simlar for Switch2, `Fa0\1` is connected to Switch3; `Fa0\2` is connected to PC4 in vlan 10; `Fa0\3` is connected to PC5 in vlan 20.



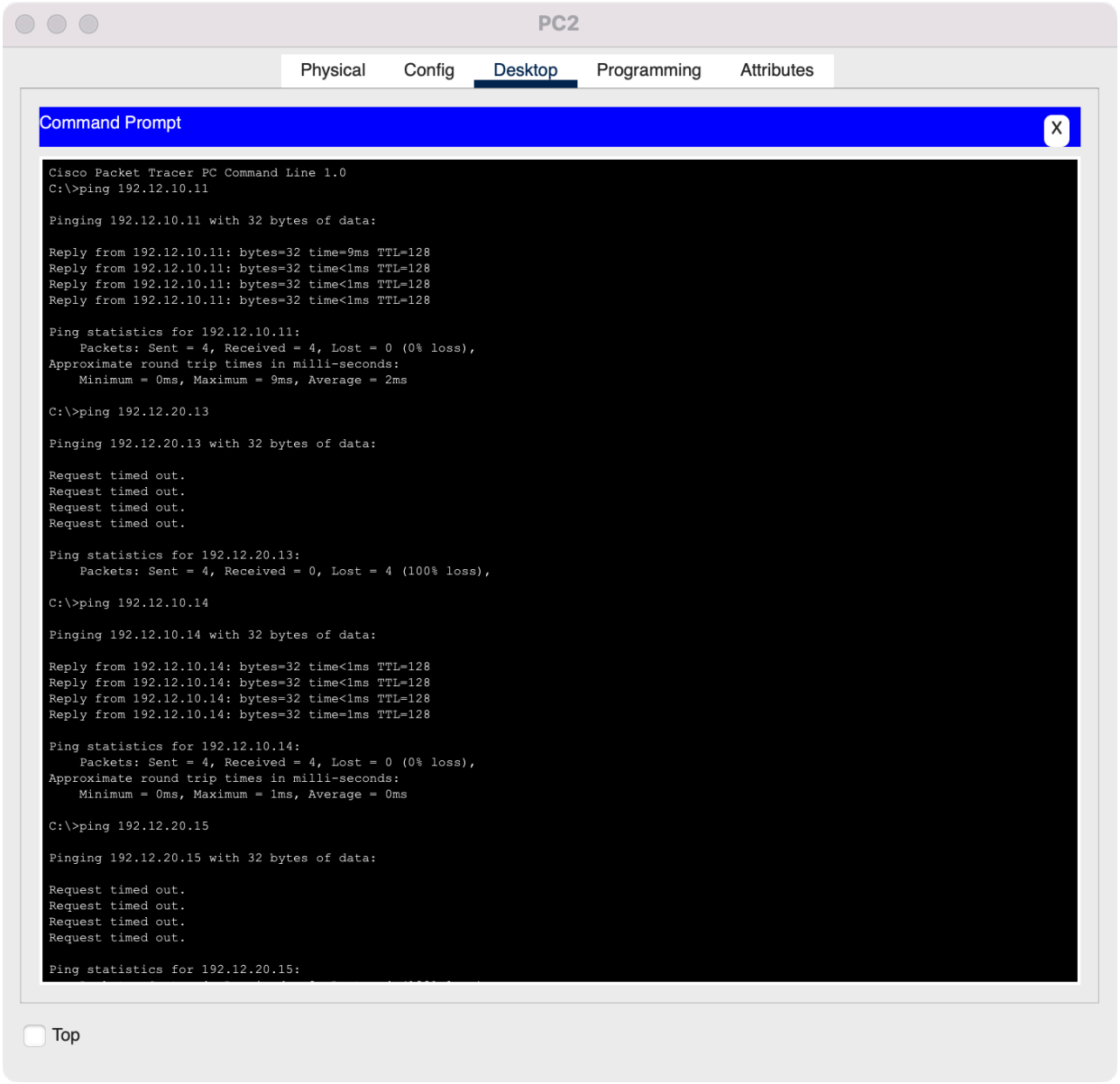
3. For Switch3, set `Fa0/1, Fa0/2` to access vlan 10 and 20 under trunk mode.



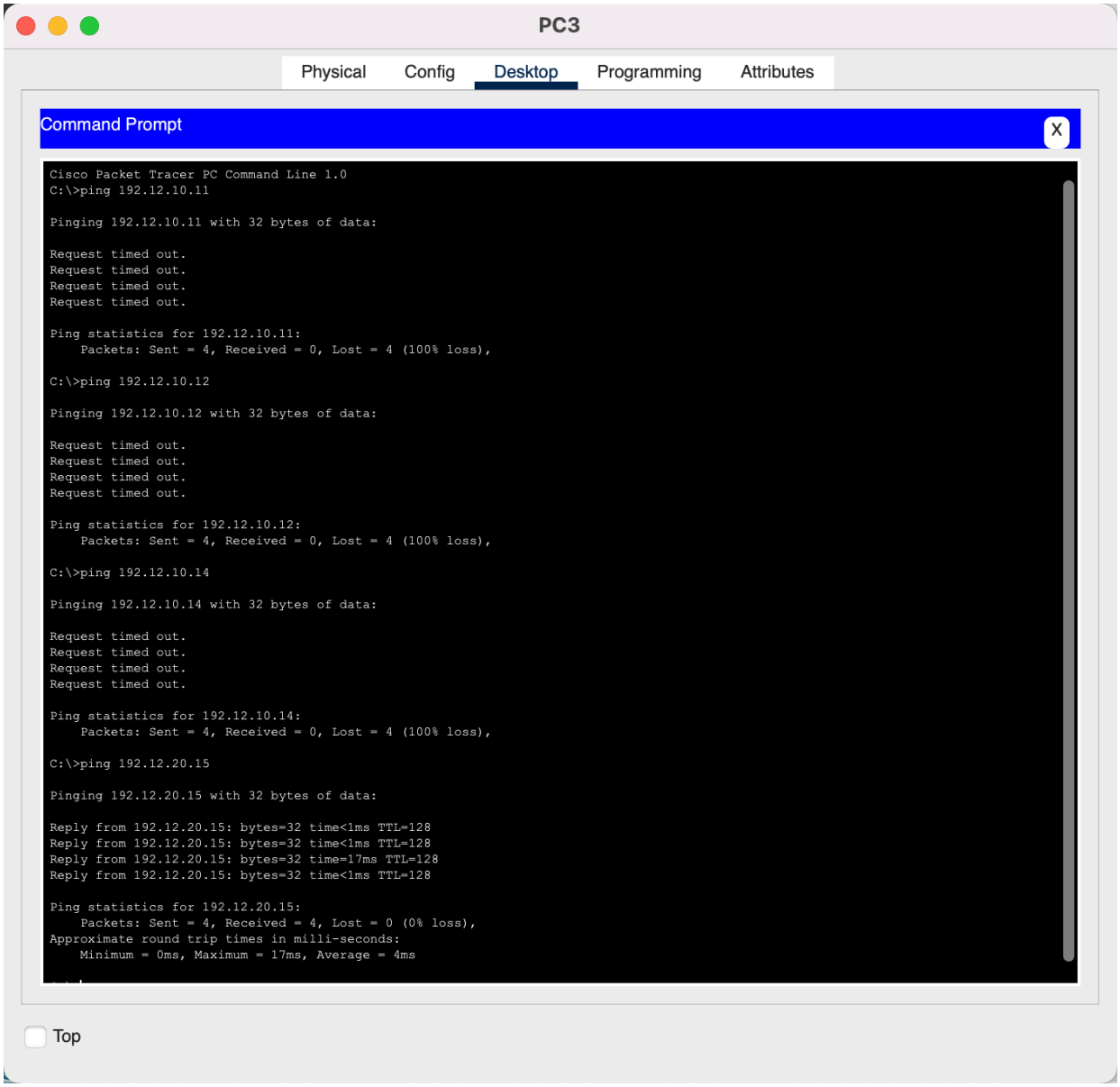
- Connection verification
    - PC1


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
C:\>ping 192.12.10.12
Pinging 192.12.10.12 with 32 bytes of data:
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Ping statistics for 192.12.10.12:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.12.20.13
Pinging 192.12.20.13 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.20.13:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.12.10.14
Pinging 192.12.10.14 with 32 bytes of data:
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Ping statistics for 192.12.10.14:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 192.12.20.15
Pinging 192.12.20.15 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.20.15:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>
Top

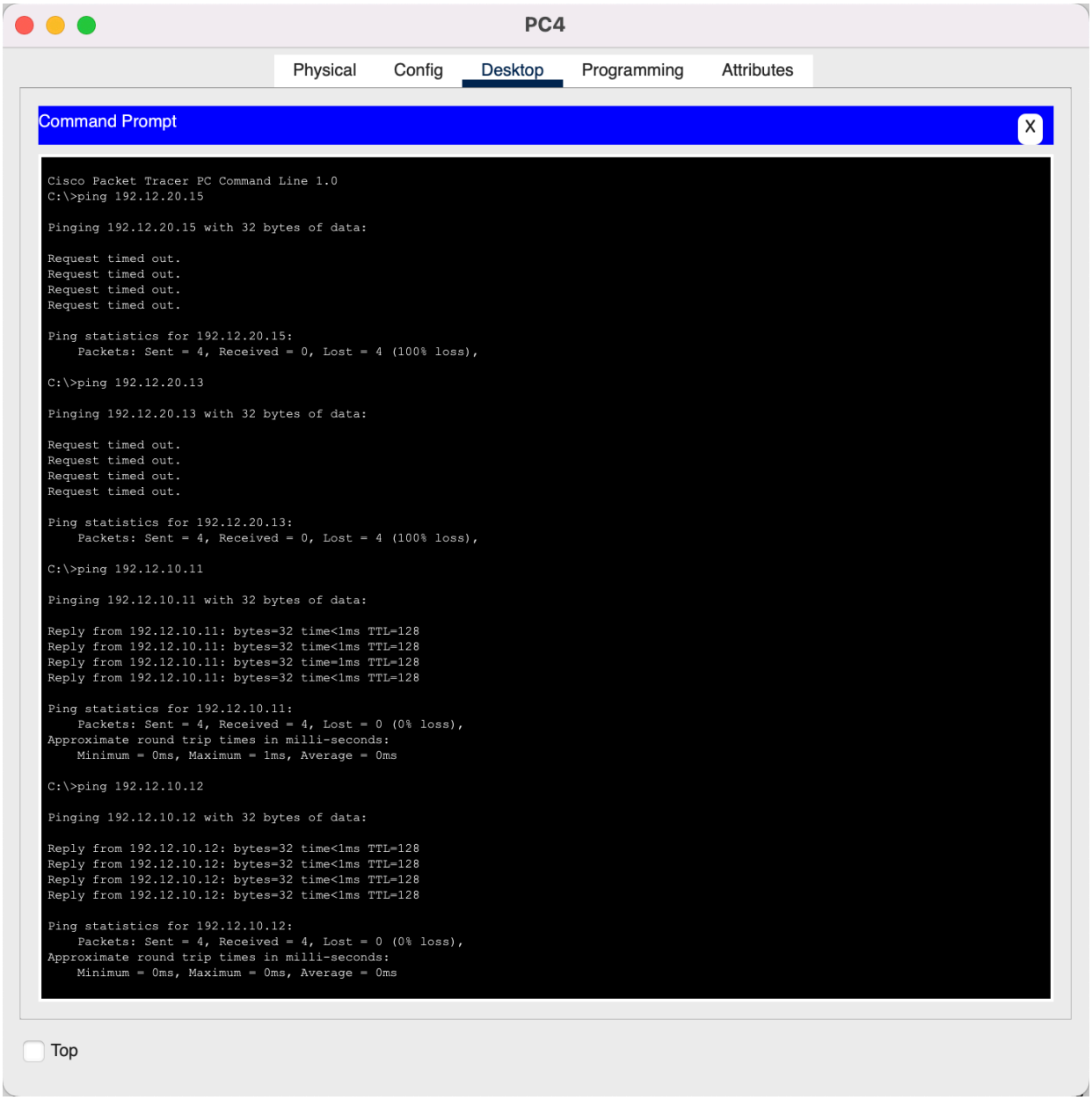
- PC2


PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.12.10.11
Pinging 192.12.10.11 with 32 bytes of data:
Reply from 192.12.10.11: bytes=32 time=9ms TTL=128
Reply from 192.12.10.11: bytes=32 time<1ms TTL=128
Reply from 192.12.10.11: bytes=32 time<1ms TTL=128
Reply from 192.12.10.11: bytes=32 time<1ms TTL=128
Ping statistics for 192.12.10.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 9ms, Average = 2ms
C:\>ping 192.12.20.13
Pinging 192.12.20.13 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.20.13:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.12.10.14
Pinging 192.12.10.14 with 32 bytes of data:
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Reply from 192.12.10.14: bytes=32 time<1ms TTL=128
Reply from 192.12.10.14: bytes=32 time=1ms TTL=128
Ping statistics for 192.12.10.14:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.12.20.15
Pinging 192.12.20.15 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.20.15:
Top

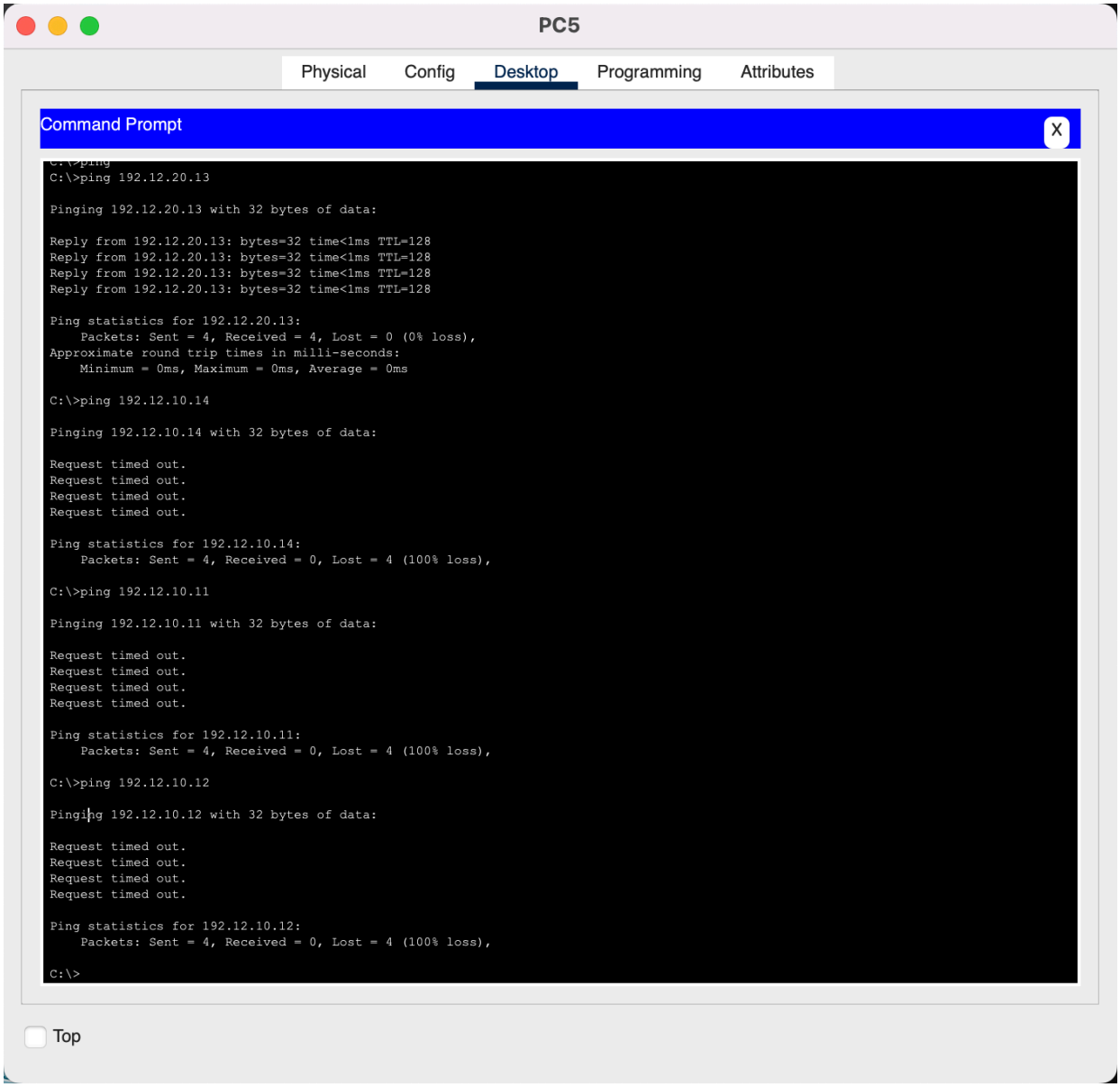
- PC3


PC3
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.12.10.11
Pinging 192.12.10.11 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.10.11:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.12.10.12
Pinging 192.12.10.12 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.10.12:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.12.10.14
Pinging 192.12.10.14 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.10.14:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.12.20.15
Pinging 192.12.20.15 with 32 bytes of data:
Reply from 192.12.20.15: bytes=32 time<1ms TTL=128
Reply from 192.12.20.15: bytes=32 time<1ms TTL=128
Reply from 192.12.20.15: bytes=32 time=17ms TTL=128
Reply from 192.12.20.15: bytes=32 time<1ms TTL=128
Ping statistics for 192.12.20.15:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 17ms, Average = 4ms
Top

- PC4


PC4
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.12.20.15
Pinging 192.12.20.15 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.20.15:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.12.20.13
Pinging 192.12.20.13 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 192.12.20.13:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
C:\>ping 192.12.10.11
Pinging 192.12.10.11 with 32 bytes of data:
Reply from 192.12.10.11: bytes=32 time<1ms TTL=128
Reply from 192.12.10.11: bytes=32 time<1ms TTL=128
Reply from 192.12.10.11: bytes=32 time=1ms TTL=128
Reply from 192.12.10.11: bytes=32 time<1ms TTL=128
Ping statistics for 192.12.10.11:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.12.10.12
Pinging 192.12.10.12 with 32 bytes of data:
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Reply from 192.12.10.12: bytes=32 time<1ms TTL=128
Ping statistics for 192.12.10.12:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
Top

- PC5



- Conclusion

  PC1, PC2, PC4 under vlan 10 can ping each other successfully. PC3, PC5 under vlan 20 can ping each other successfully. However, PC under vlan 10 cannot ping PC under vlan 20 successfully.

  Hosts within a VLAN can communicate directly with each other, but VLAN cannot communicate with each other, thus restricting the broadcast packets to one VLAN. This can save bandwidth and the network processing capacity is improved.

Challenge

When setting Switch3 in task 2, I first mimicked the procedure of setting Switch1 and Switch2. I set `Fa0\1` access vlan 10 and `Fa0\2` access vlan 20 because I thought the packet can find its path similar to task1. However, PC1 cannot ping PC4. After looking up some information, I understood that `access` adds VLAN tag on the port when receiving the packet. When packet going out, the switch

only forwards the data packet with the same VLAN tag as the port. Thus, two interfaces must both set vlan 10 and vlan 20.