IPSEC ASSIGNMENT

Q.1) Configuring all the Vlans on all switches.

Switch SWA1:

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/3, Fa0/4, Fa0/5,
Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9,
Fa0/10
                                                 Fa0/11, Fa0/12,
Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16,
Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20,
Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24,
Gig0/1, Gig0/2
2    UserSiteA                         active    Fa0/1, Fa0/2
3    Manage&Production                 active
10   Interconnection                   active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

Switch SWA2:

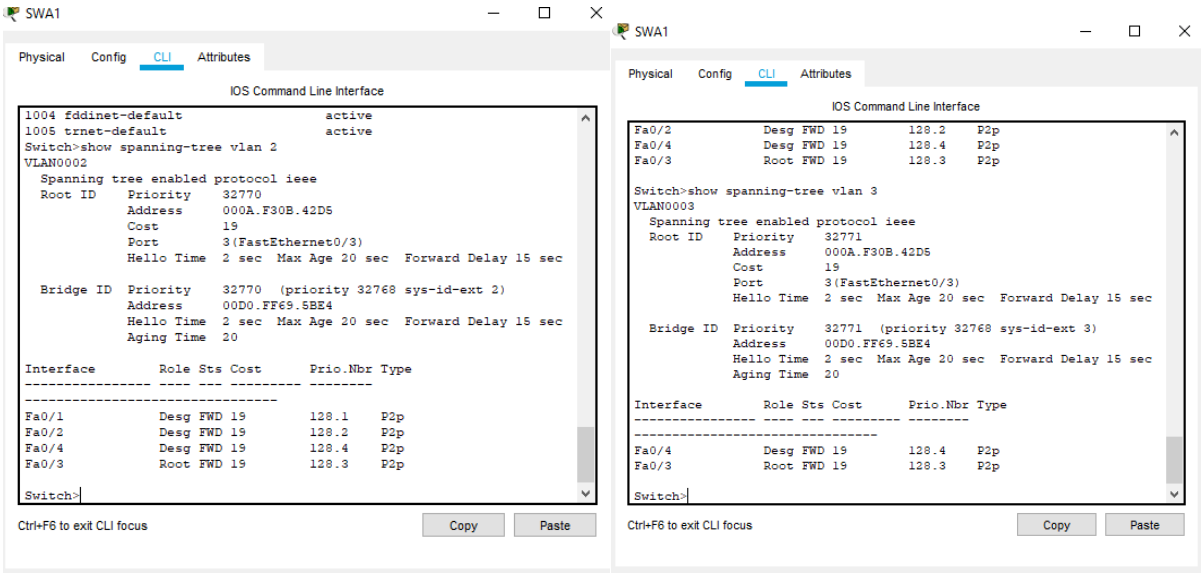
```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/3, Fa0/4, Fa0/5,
Fa0/6
                                                 Fa0/7, Fa0/8, Fa0/9,
Fa0/10
                                                 Fa0/11, Fa0/12,
Fa0/13, Fa0/14
                                                 Fa0/15, Fa0/16,
Fa0/17, Fa0/18
                                                 Fa0/19, Fa0/20,
Fa0/21, Fa0/22
                                                 Fa0/23, Fa0/24,
Gig0/1, Gig0/2
2    UserSiteA                         active
3    Manage&Production                 active    Fa0/1, Fa0/2
10   Interconnection                   active
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

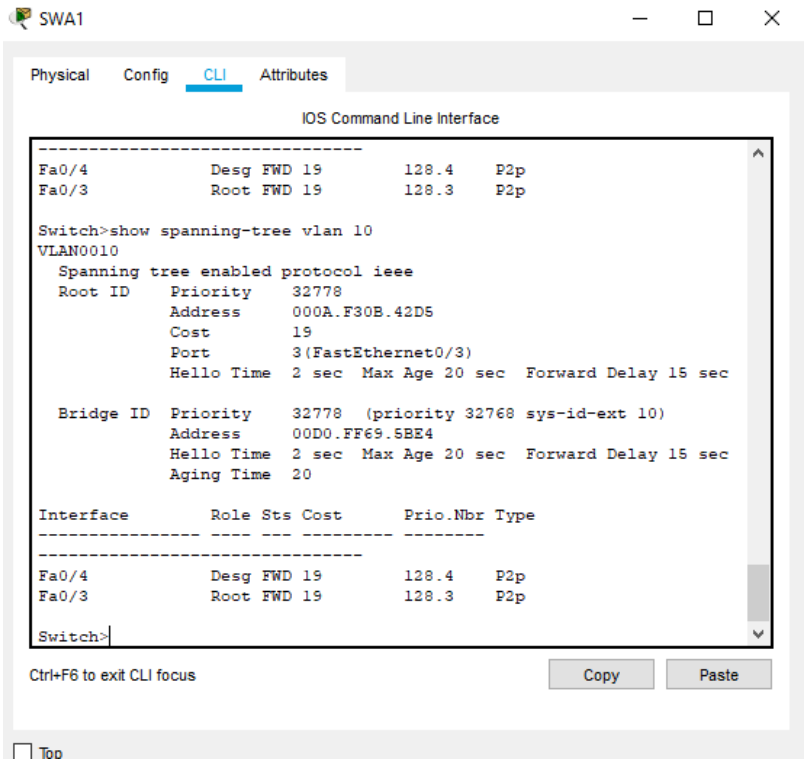
Switch SWD:

```
VLAN Name                              Status    Ports
---- --------------------------------- --------- -------------------------------
1    default                           active    Fa0/1, Fa0/2, Fa0/4,
Fa0/5
                                                 Fa0/6, Fa0/7, Fa0/8,
Fa0/9
                                                 Fa0/10, Fa0/11,
Fa0/12, Fa0/13
                                                 Fa0/14, Fa0/15,
Fa0/16, Fa0/17
                                                 Fa0/18, Fa0/19,
Fa0/20, Fa0/21
                                                 Fa0/22, Fa0/23,
Fa0/24, Gig0/1
                                                 Gig0/2
2    UserSiteA                         active
3    Manage&Production                 active
10   Interconnection                   active    Fa0/3
1002 fddi-default                      active
1003 token-ring-default                active
1004 fddinet-default                   active
1005 trnet-default                     active
Switch#
```

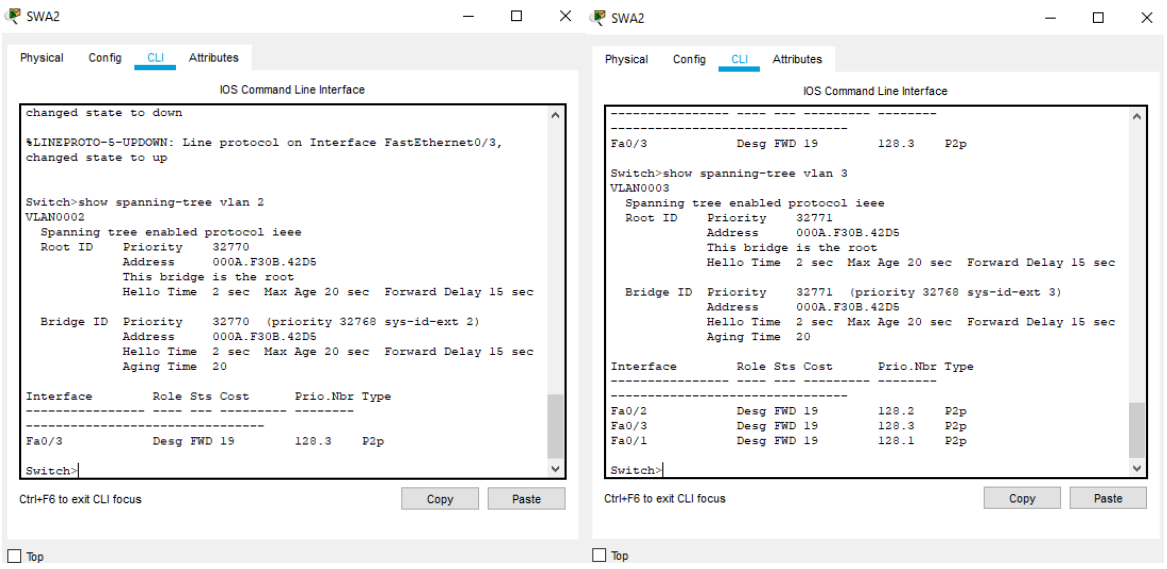
Q.2) Spanning Trees on Each Switch.

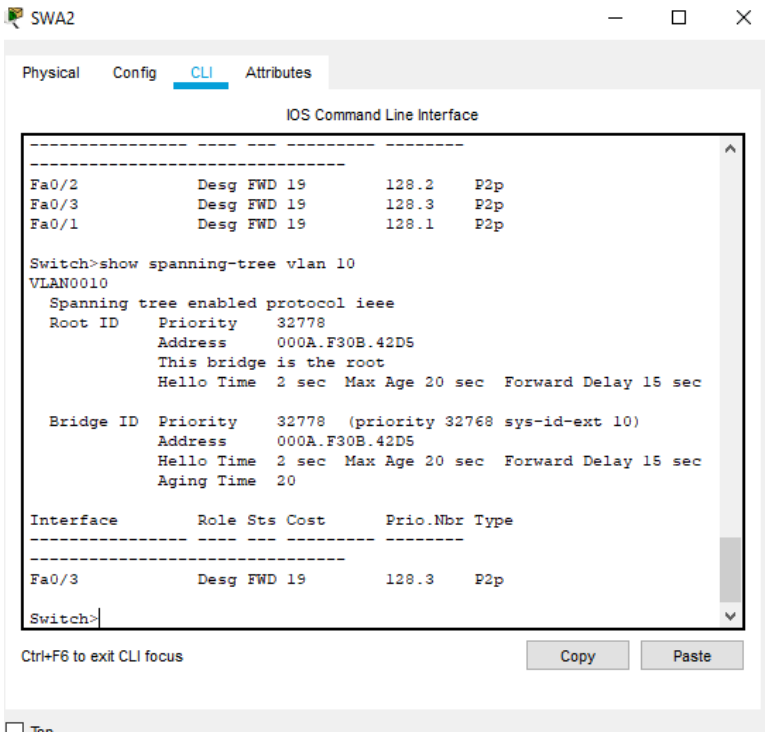
Switch SWA1




SWA1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Fa0/4 Desg FWD 19 128.4 P2p
Fa0/3 Root FWD 19 128.3 P2p
Switch>show spanning-tree vlan 10
VLAN0010
Spanning tree enabled protocol ieee
Root ID Priority 32778
Address 000A.F30B.42D5
Cost 19
Port 3(FastEthernet0/3)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address 00D0.FF69.5BE4
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
Interface Role Sts Cost Prio.Nbr Type
Fa0/4 Desg FWD 19 128.4 P2p
Fa0/3 Root FWD 19 128.3 P2p
Switch>
Ctrl+F6 to exit CLI focus
Copy
Paste
Top

Switch SWA2

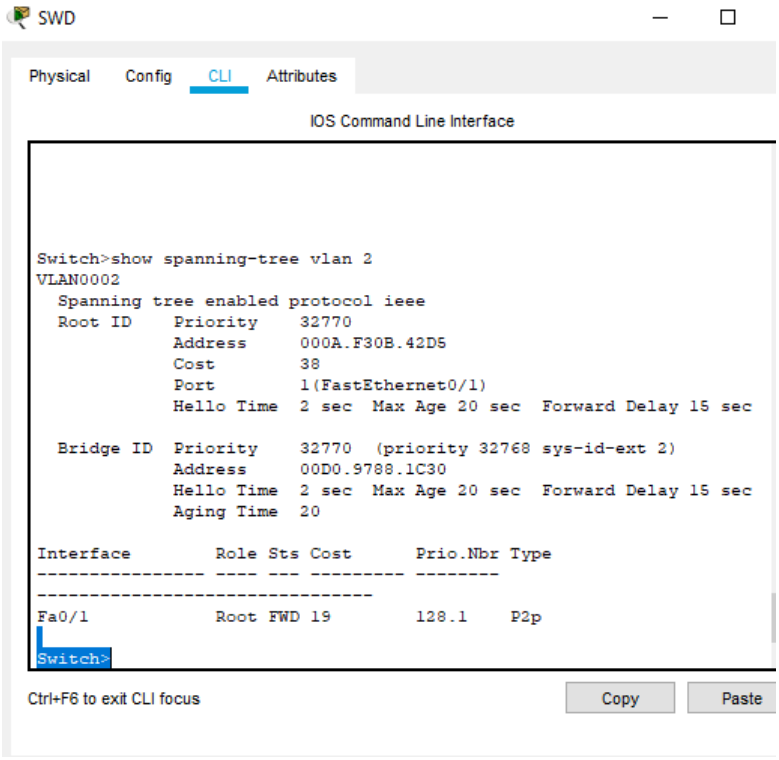

SWA2
Physical
Config
CLI
Attributes
IOS Command Line Interface
changed state to down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up
Switch>show spanning-tree vlan 2
VLAN0002
Spanning tree enabled protocol ieee
Root ID Priority 32770
Address 000A.F30B.42D5
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32770 (priority 32768 sys-id-ext 2)
Address 000A.F30B.42D5
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
Interface Role Sts Cost Prio.Nbr Type
Fa0/3 Desg FWD 19 128.3 P2p
Switch>
Ctrl+F6 to exit CLI focus
Copy
Paste
Top
SWA2
Physical
Config
CLI
Attributes
IOS Command Line Interface
Fa0/3 Desg FWD 19 128.3 P2p
Switch>show spanning-tree vlan 3
VLAN0003
Spanning tree enabled protocol ieee
Root ID Priority 32771
Address 000A.F30B.42D5
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32771 (priority 32768 sys-id-ext 3)
Address 000A.F30B.42D5
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
Interface Role Sts Cost Prio.Nbr Type
Fa0/2 Desg FWD 19 128.2 P2p
Fa0/3 Desg FWD 19 128.3 P2p
Fa0/1 Desg FWD 19 128.1 P2p
Switch>
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


SWA2
Physical
Config
CLI
Attributes
IOS Command Line Interface
---------------- ---- --- --------- --------

Fa0/2 Desg FWD 19 128.2 P2p
Fa0/3 Desg FWD 19 128.3 P2p
Fa0/1 Desg FWD 19 128.1 P2p
Switch>show spanning-tree vlan 10
VLAN0010
Spanning tree enabled protocol ieee
Root ID Priority 32778
Address 000A.F30B.42D5
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address 000A.F30B.42D5
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
Interface Role Sts Cost Prio.Nbr Type
---------------- ---- --- --------- --------

Fa0/3 Desg FWD 19 128.3 P2p
Switch>
Ctrl+F6 to exit CLI focus
Copy
Paste

Switch SWD:


SWD
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>show spanning-tree vlan 2
VLAN0002
Spanning tree enabled protocol ieee
Root ID Priority 32770
Address 000A.F30B.42D5
Cost 38
Port 1(FastEthernet0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 32770 (priority 32768 sys-id-ext 2)
Address 00D0.9788.1C30
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 20
Interface Role Sts Cost Prio.Nbr Type
---------------- ---- --- --------- --------

Fa0/1 Root FWD 19 128.1 P2p
Switch>
Ctrl+F6 to exit CLI focus
Copy
Paste

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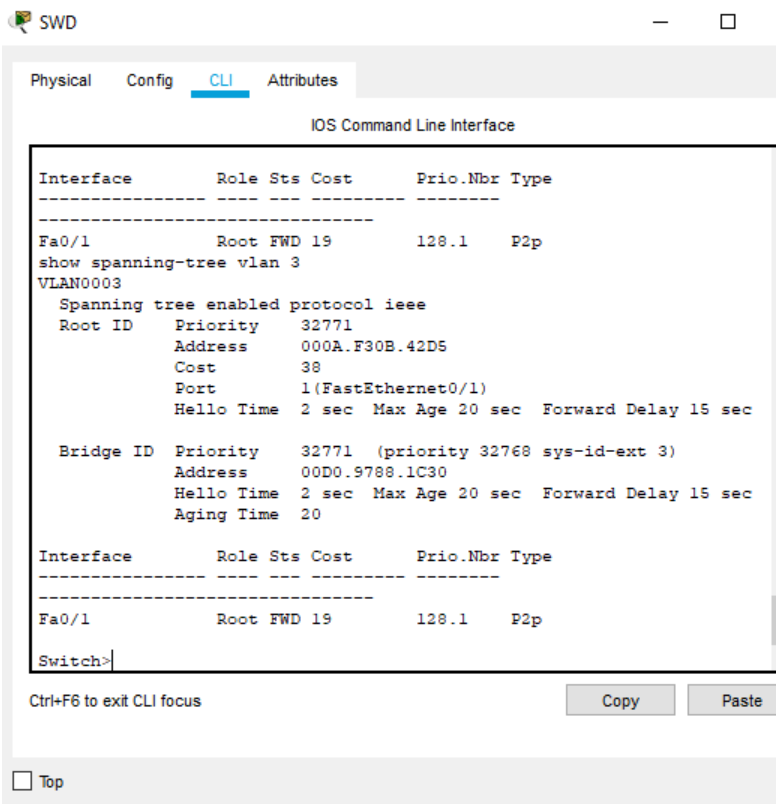
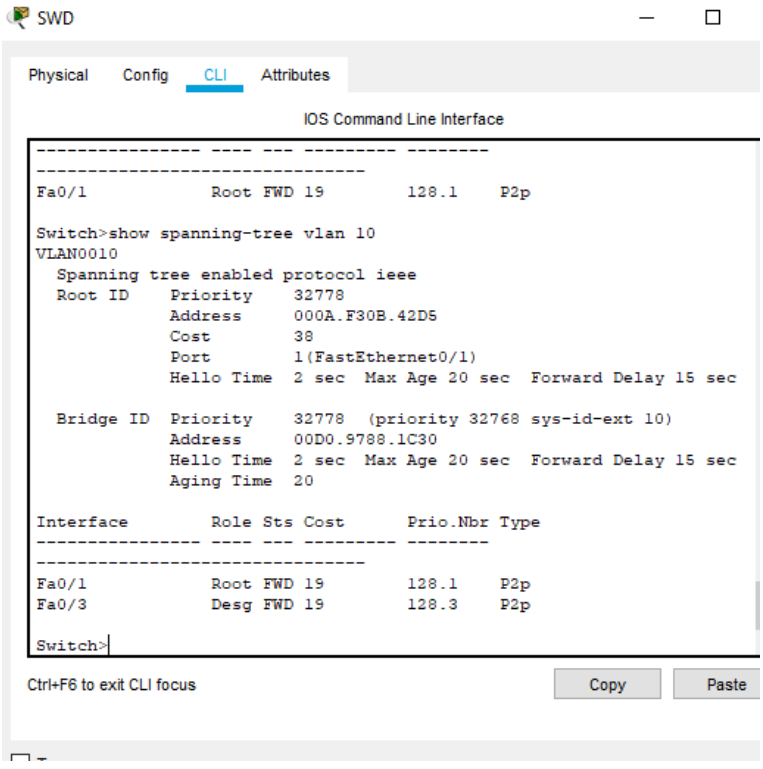


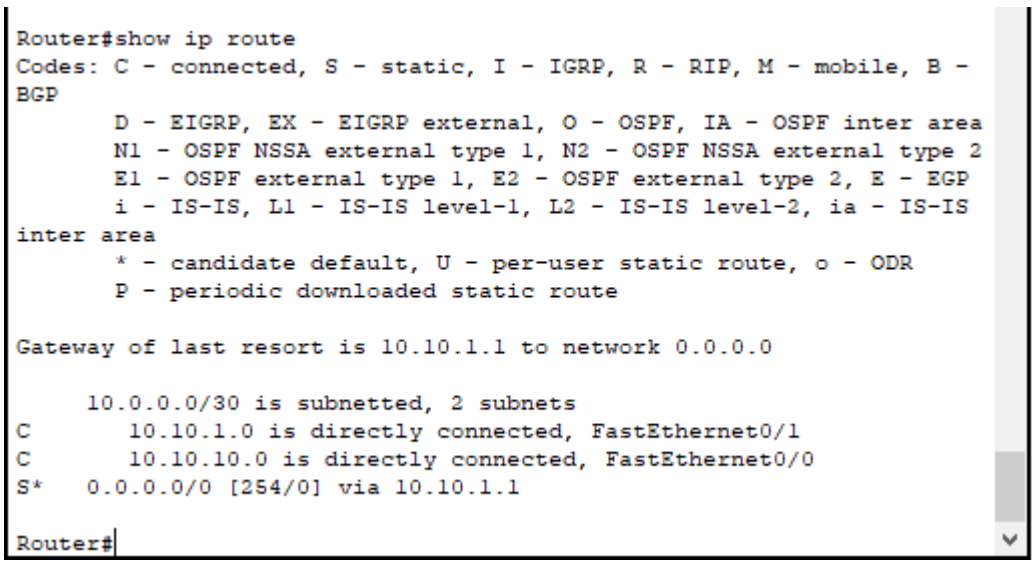


Q.3) Configuring the Cloud-PT-Empty and other Cisco Devices.

RA: Show interfaces FastEthernet0/1

Router>show interfaces fa0/1
FastEthernet0/1 is up, line protocol is up (connected)
Hardware is Lance, address is 0001.c919.8002 (bia 0001.c919.8002)
Internet address is 10.10.1.2/30
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Full-duplex, 100Mb/s, media type is RJ45
ARP type: ARPA, ARP Timeout 04:00:00,
Last input 00:00:08, output 00:00:05, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0 (size/max/drops); Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
2 packets input, 132 bytes, 0 no buffer
Received 2 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
0 input packets with dribble condition detected
2 packets output, 178 bytes, 0 underruns
0 output errors, 0 collisions, 1 interface resets
0 babbles, 0 late collision, 0 deferred

RA's IP WAN address is 10.10.1.2/30.



The default gateway of the router RA is 10.10.1.1.

RB: show interfaces fastEthernet 0/1.

Router>show interfaces fa0/1
FastEthernet0/1 is up, line protocol is up (connected)
Hardware is Lance, address is 00d0.ff98.0002 (bia 00d0.ff98.0002)
Internet address is 10.10.2.2/30
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Full-duplex, 100Mb/s, media type is RJ45
ARP type: ARPA, ARP Timeout 04:00:00,
Last input 00:00:08, output 00:00:05, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0 (size/max/drops); Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
2 packets input, 132 bytes, 0 no buffer
Received 2 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
0 input packets with dribble condition detected
3 packets output, 267 bytes, 0 underruns
0 output errors, 0 collisions, 1 interface resets
0 babbles, 0 late collision, 0 deferred

RB's IP WAN address is 10.10.2.2/30.

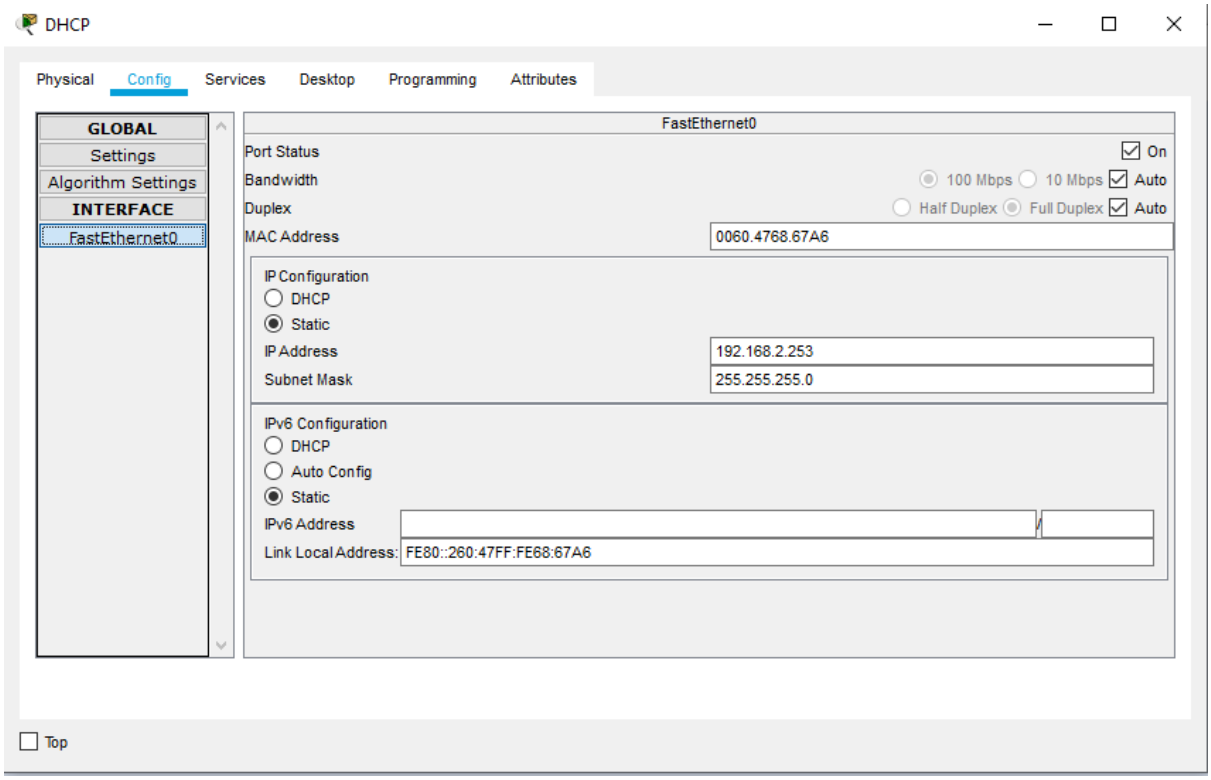
Show ip route on RB

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -
BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.10.2.1 to network 0.0.0.0

     10.0.0.0/30 is subnetted, 1 subnets
C       10.10.2.0 is directly connected, FastEthernet0/1
C    192.168.4.0/24 is directly connected, FastEthernet0/0
S*   0.0.0.0/0 [254/0] via 10.10.2.1

Router>
```

SWD:Configuration

```
Switch>enable
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface vlan 2
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan2, changed state to up
ip address 192.168.2.254 255.255.255.252
Switch(config-if)#ip address 192.168.2.254 255.255.255.0
Switch(config-if)#no shutdown
Switch(config-if)#interface vlan 3
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan3, changed state to up
ip address 192.168.3.254 255.255.255.0
Switch(config-if)#no shutdown
Switch(config-if)#interface vlan 10
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan10, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan10, changed state
to up
ip address 10.10.10.2 255.255.255.252
Switch(config-if)#no shutdown
Switch(config-if)#
```

Q.4) Configure the DHCP Server to attribute the IP configuration to PCA.



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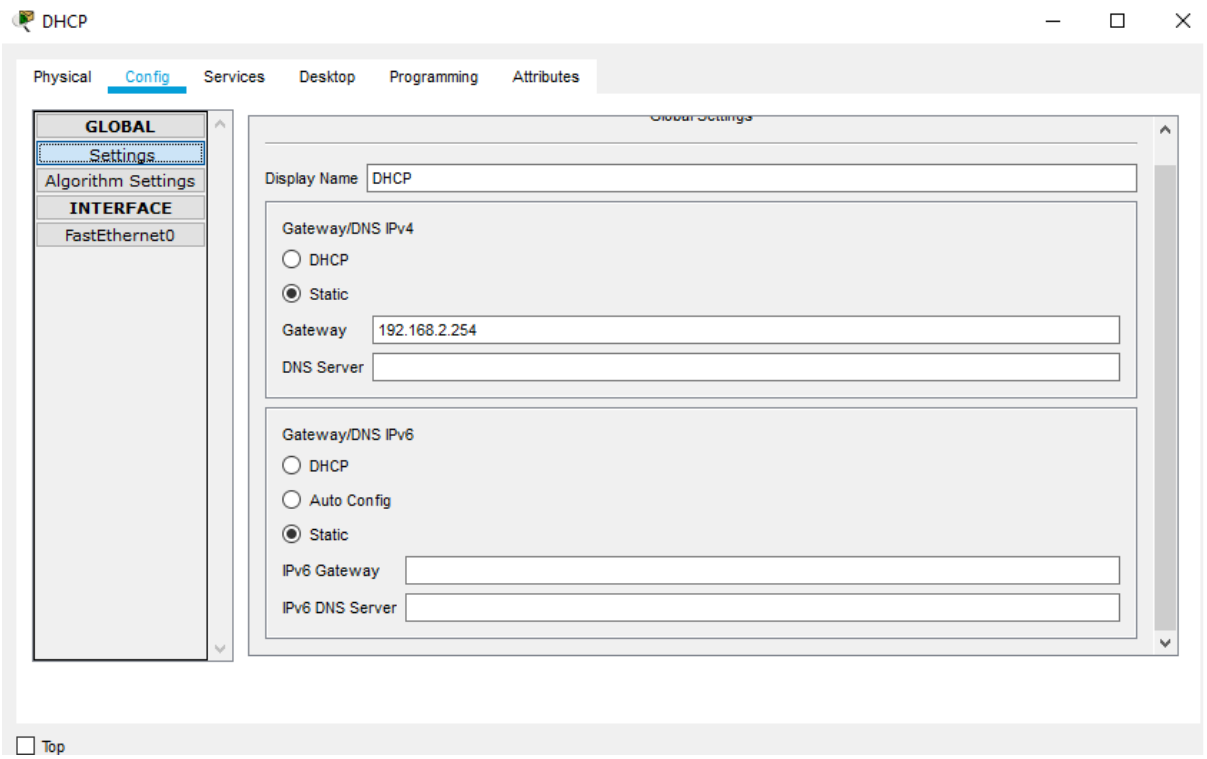
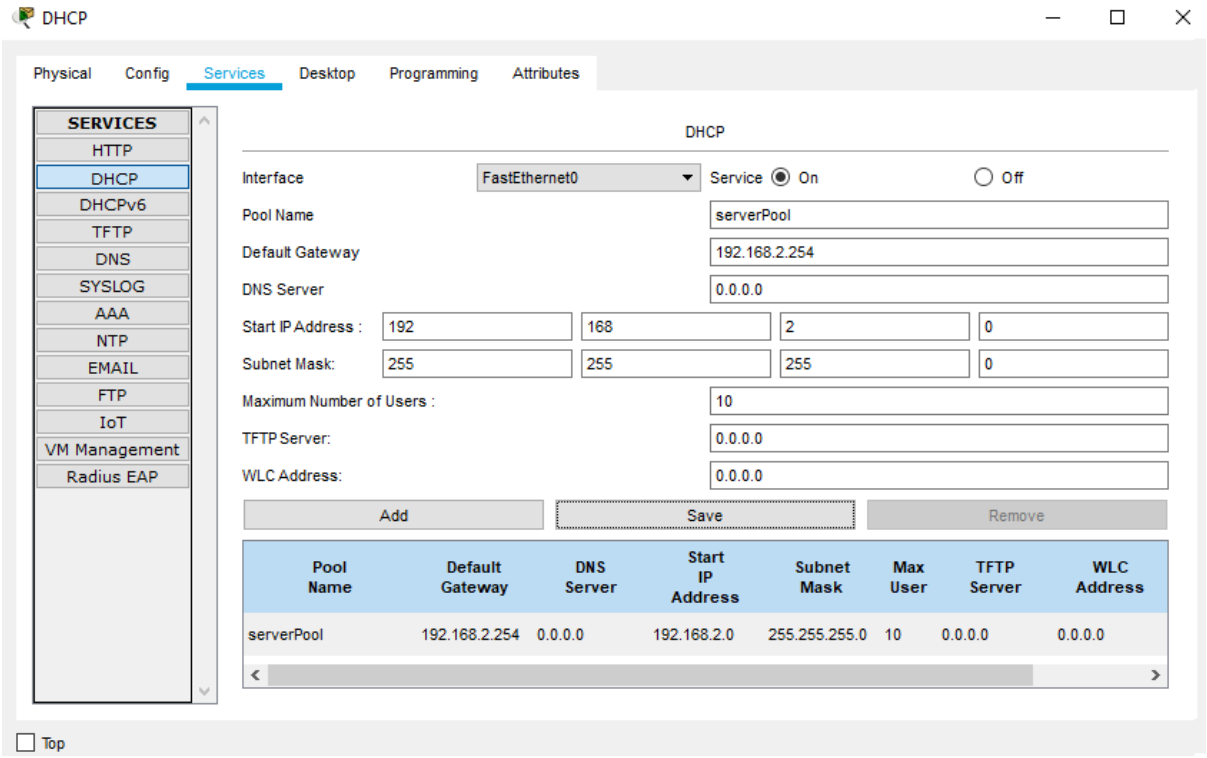
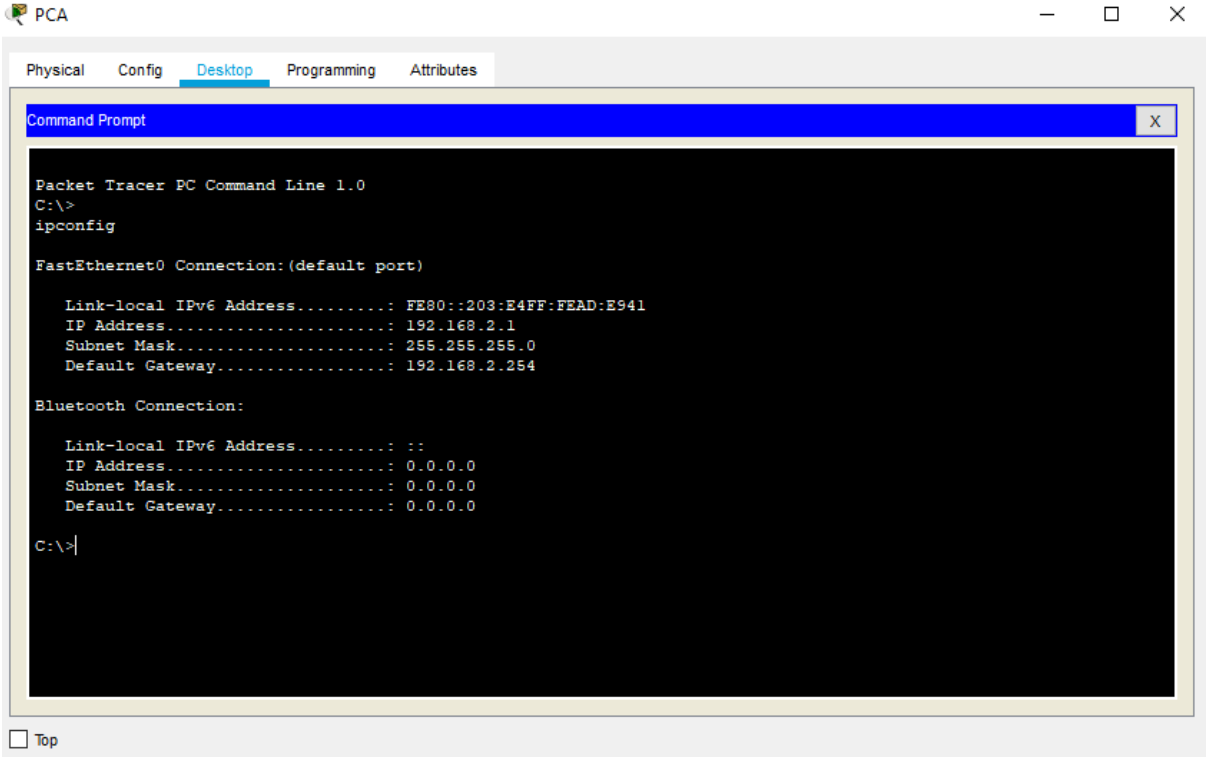
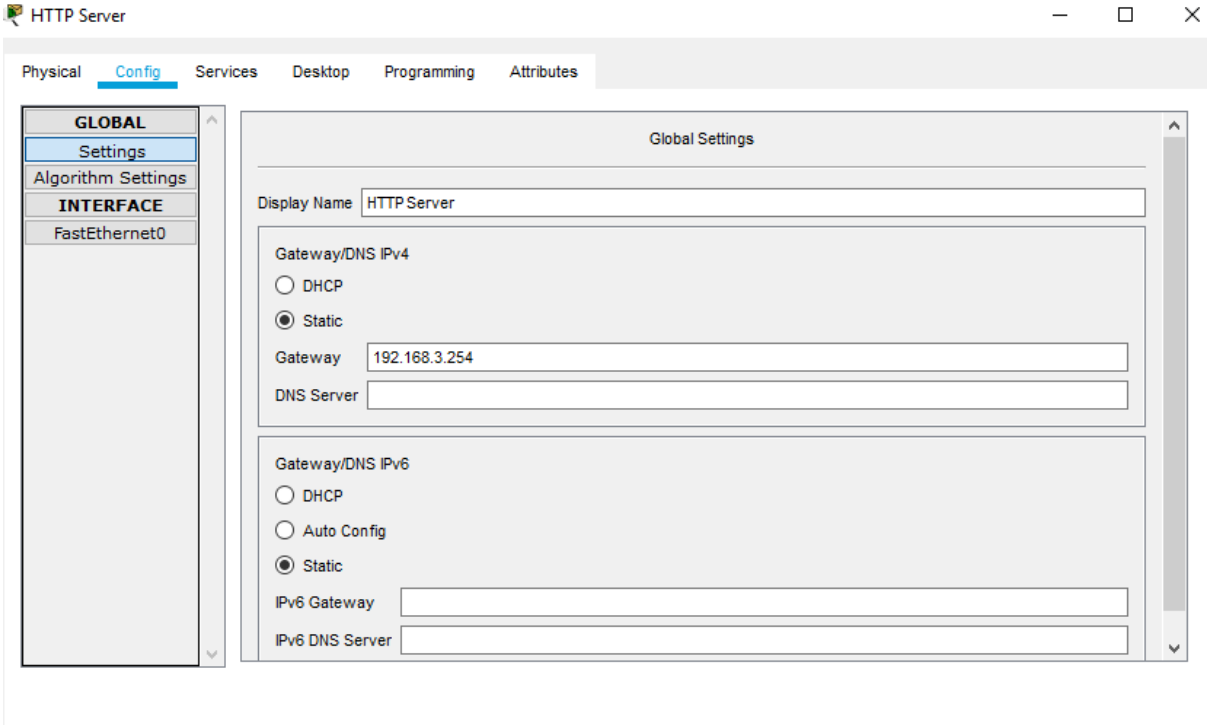




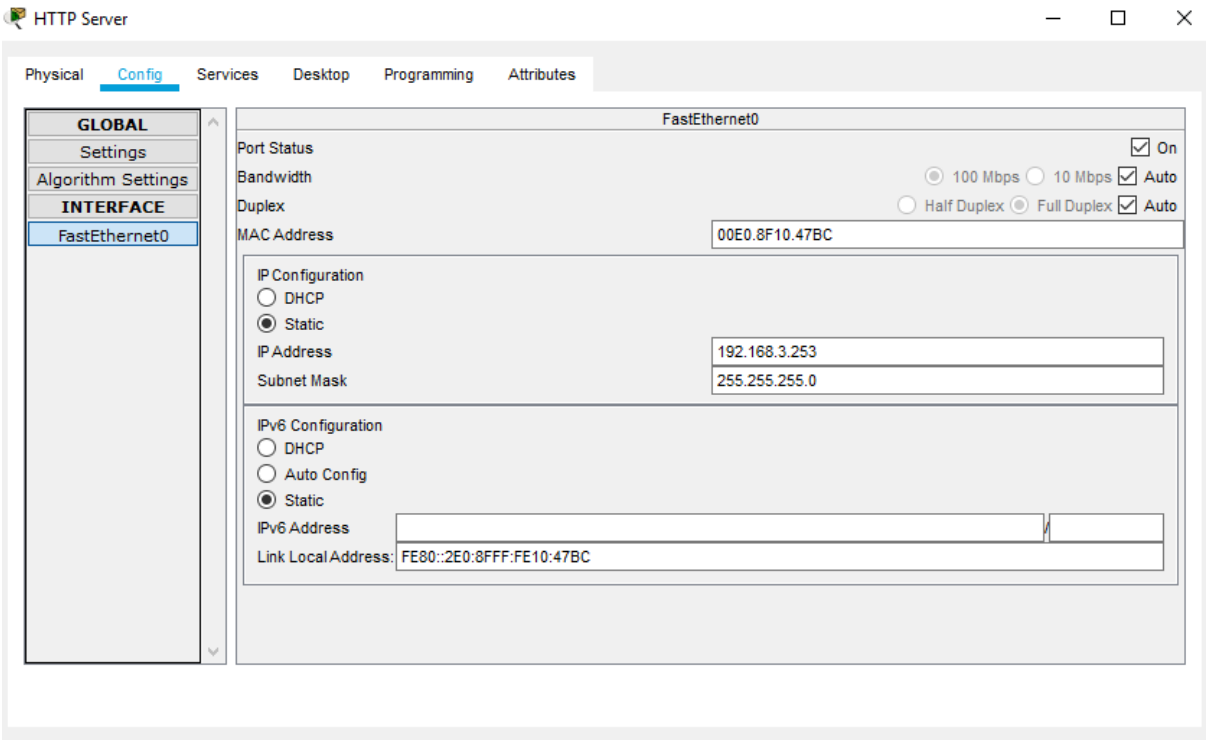
Q.5) Ipconfig of PCA:

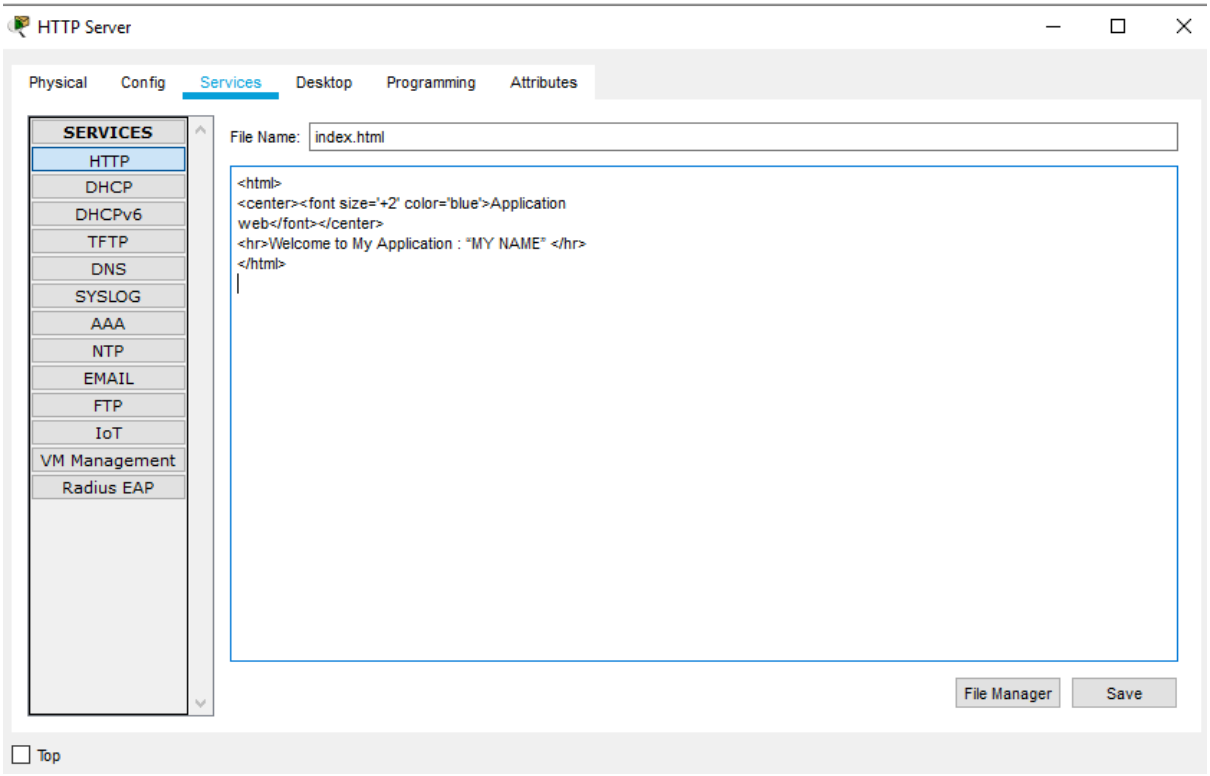


Q.6) Configure PCT et HTTP server.



Souradeep Banerjee **Devyanshi Tiwari**





Q.7) Ping and tracert

PCT-PCA:

```
C:\>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:

Reply from 192.168.2.1: bytes=32 time<1ms TTL=127
Reply from 192.168.2.1: bytes=32 time=23ms TTL=127
Reply from 192.168.2.1: bytes=32 time=43ms TTL=127
Reply from 192.168.2.1: bytes=32 time=30ms TTL=127

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 43ms, Average = 24ms

C:\>
```

```
C:\>tracert 192.168.2.1

Tracing route to 192.168.2.1 over a maximum of 30 hops:

  1    1 ms      10 ms     3 ms      192.168.3.254
  2    *         11 ms     13 ms     192.168.2.1

Trace complete.

C:\>
```

PCT-DHCP:

```
C:\>ping 192.168.2.253

Pinging 192.168.2.253 with 32 bytes of data:

Reply from 192.168.2.253: bytes=32 time=1ms TTL=127
Reply from 192.168.2.253: bytes=32 time=12ms TTL=127
Reply from 192.168.2.253: bytes=32 time=12ms TTL=127
Reply from 192.168.2.253: bytes=32 time=10ms TTL=127

Ping statistics for 192.168.2.253:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 12ms, Average = 8ms

C:\>
```

```
C:\>tracert 192.168.2.253

Tracing route to 192.168.2.253 over a maximum of 30 hops:

  1    1 ms      1 ms      10 ms     192.168.3.254
  2    11 ms     12 ms     10 ms     192.168.2.253

Trace complete.

C:\>
```

PCA-HTTP:

```
C:\>ping 192.168.3.253

Pinging 192.168.3.253 with 32 bytes of data:

Reply from 192.168.3.253: bytes=32 time<1ms TTL=127
Reply from 192.168.3.253: bytes=32 time=11ms TTL=127
Reply from 192.168.3.253: bytes=32 time<1ms TTL=127
Reply from 192.168.3.253: bytes=32 time=29ms TTL=127

Ping statistics for 192.168.3.253:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 29ms, Average = 10ms

C:\>
```

```
Packet Tracer PC Command Line 1.0
C:\>tracert 192.168.3.253

Tracing route to 192.168.3.253 over a maximum of 30 hops:

  1   0 ms      0 ms      0 ms      192.168.2.254
  2   *         0 ms      0 ms      192.168.3.253

Trace complete.

C:\>
```

Q.8) Configure the routing on SWD and RA.

RA IpRoute:

```
Router>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -
BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.10.1.1 to network 0.0.0.0

     10.0.0.0/30 is subnetted, 2 subnets
C       10.10.1.0 is directly connected, FastEthernet0/1
C       10.10.10.0 is directly connected, FastEthernet0/0
S    192.168.2.0/24 is directly connected, FastEthernet0/0
S    192.168.3.0/24 is directly connected, FastEthernet0/0
S*   0.0.0.0/0 [254/0] via 10.10.1.1

Router>
```

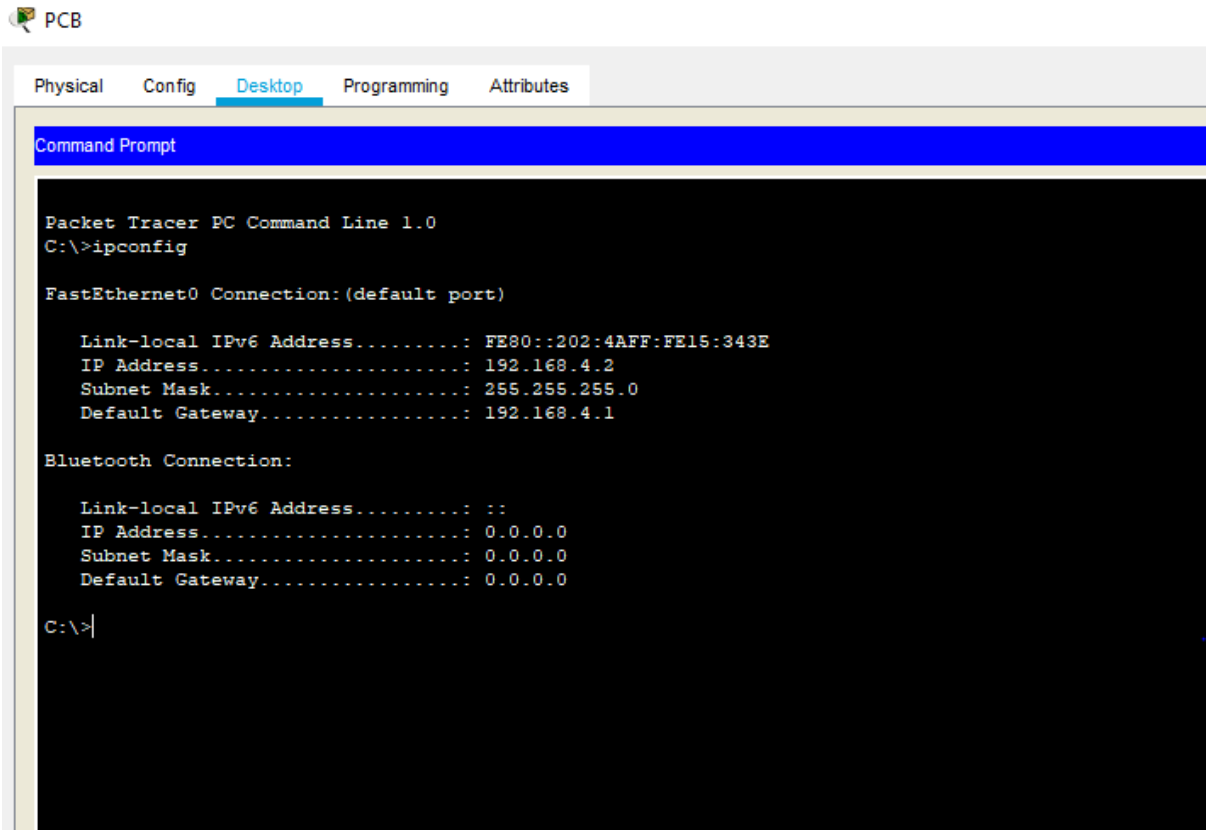
SWD IPROUTE:

```
Switch#disable
Switch>show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -
BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.10.10.1 to network 0.0.0.0

     10.0.0.0/30 is subnetted, 1 subnets
C       10.10.10.0 is directly connected, Vlan10
C    192.168.2.0/24 is directly connected, Vlan2
C    192.168.3.0/24 is directly connected, Vlan3
S*   0.0.0.0/0 [1/0] via 10.10.10.1

Switch>
```

Q.9) Configure dhcp server on the router RB.

```
Router(config-if)#interface fa0/0
Router(config-if)#ip address 192.168.4.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#ip dhcp pool POOL
Router(dhcp-config)#network 192.168.4.0 255.255.255.0
Router(dhcp-config)#default-router 192.168.4.1
Router(dhcp-config)#ip dhcp excluded-address 192.168.4.13
192.168.2.254
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Q.10) Configure the PCB on DHCP.



Q.11) We will configure a tunnel IPSec between RA and RB to provide a secure communication between Site A and Site B.

RA:

```
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#crypto isakmp policy 101
Router(config-isakmp)#authentication pre-share
Router(config-isakmp)#encr des
Router(config-isakmp)#hash md5
Router(config-isakmp)#exit
Router(config)#crypto isakmp key cisco address 10.10.2.2
Router(config)#crypto ipsec transform-set labset esp-3des esp-sha-
hmac
Router(config)#access-list 100 permit ip 192.168.3.0 0.0.0.255
192.168.4.0 0.0.0.255
Router(config)#crypto map labmap 10 ipsec-isakmp
% NOTE: This new crypto map will remain disabled until a peer
        and a valid access list have been configured.
Router(config-crypto-map)#
Router(config-crypto-map)#set peer 10.10.2.2
Router(config-crypto-map)#set transform-set labset
Router(config-crypto-map)#match address 100
Router(config-crypto-map)#exit
Router(config)#exit
```

```
show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B -
BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS
inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 10.10.1.1 to network 0.0.0.0

     10.0.0.0/30 is subnetted, 2 subnets
C       10.10.1.0 is directly connected, FastEthernet0/1
C       10.10.10.0 is directly connected, FastEthernet0/0
S    192.168.2.0/24 is directly connected, FastEthernet0/0
S    192.168.3.0/24 is directly connected, FastEthernet0/0
S*   0.0.0.0/0 [254/0] via 10.10.1.1
```

RB:

```
Router(config)#crypto isakmp policy 101
Router(config-isakmp)#authentication pre-share
Router(config-isakmp)#encr des
Router(config-isakmp)#hash md5
Router(config-isakmp)#exit
Router(config)#crypto isakmp key cisco address 10.10.1.2
Router(config)#crypto ipsec transform-set labset esp-3des esp-sha-
hmac
Router(config)#access-list 100 permit ip 192.168.4.0 0.0.0.255
192.168.3.0 0.0.0.255
Router(config)#crypto map labmap 10 ipsec-isakmp
% NOTE: This new crypto map will remain disabled until a peer
        and a valid access list have been configured.
Router(config-crypto-map)#
Router(config-crypto-map)#set peer 10.10.1.2
Router(config-crypto-map)#set transform-set labset
Router(config-crypto-map)#match address 100
Router(config-crypto-map)#exit
Router(config)#exit
Router#
```

```
show crypto map
Crypto Map labmap 10 ipsec-isakmp
        Peer = 10.10.1.2
        Extended IP access list 100
            access-list 100 permit ip 192.168.4.0 0.0.0.255
192.168.3.0 0.0.0.255
        Current peer: 10.10.1.2
        Security association lifetime: 4608000 kilobytes/3600 seconds
        PFS (Y/N): N
        Transform sets={
                labset,
        }
        Interfaces using crypto map labmap:

Router#
```

SSSSS

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