



VIT[®]

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

School of Information Technology and Engineering
Lab Assignment-II, MARCH 2021
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COURSE CODE	CSE3502
COURSE NAME	INFORMATION SECURITY AND MANAGEMENT
SLOT	L39+L40
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Gdrive link for .pkt files and video:

[Click Here](#)

1. Configure Internet Access on CISCO ASA firewall (5 marks)

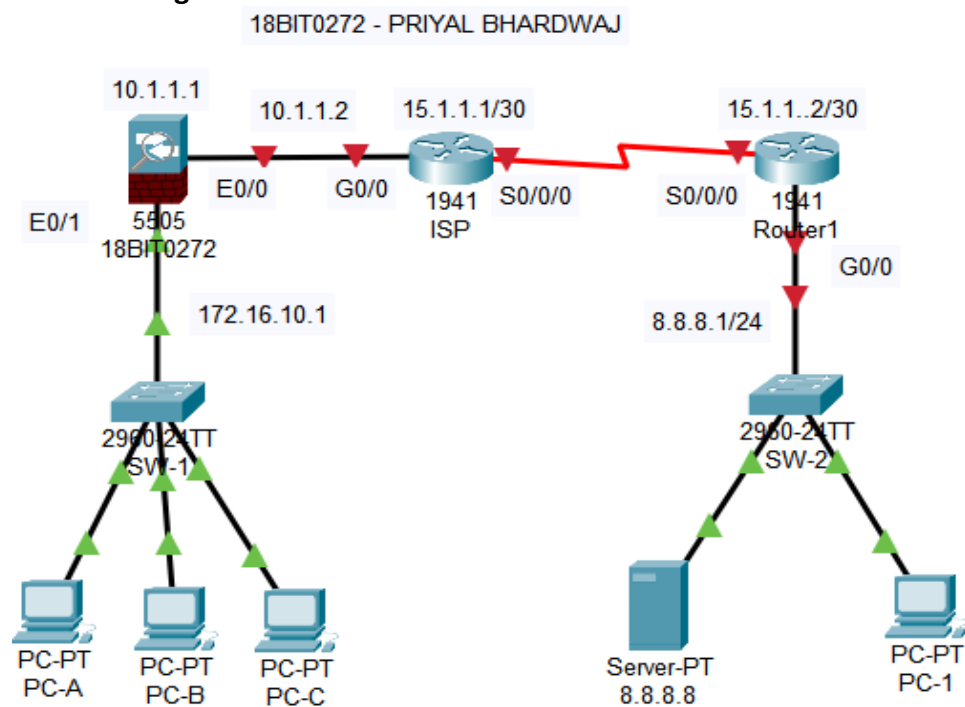
Rename the ASA device with your registration number and show the snapshot of configuration commands of firewall only.

The last octet IP address of PC-A should be the first two digits of your registration number.

The last octet IP address of PC-B should be the last two digits of your registration number.

Network Topology:

Before configuration:



ASA device renamed to 18BIT0272 (registration number)

ASA Configuration:

```

ASA>en
Password:
ASA#show run
: Saved
:
ASA Version 8.4(2)
!
hostname ASA
names
!
interface Ethernet0/0
  switchport access vlan 2
!
interface Ethernet0/1
!
interface Ethernet0/2
!
interface Ethernet0/3
!
interface Ethernet0/4
!
interface Ethernet0/5
!
interface Ethernet0/6
!
interface Ethernet0/7
!
interface Vlan1
  nameif inside
  security-level 100
  ip address 192.168.1.1 255.255.255.0

```

```

interface Vlan1
  nameif inside
  security-level 100
  ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
  nameif outside
  security-level 0
  ip address dhcp
!
!
!
!
!
!
!
!
!
!
telnet timeout 5
ssh timeout 5
!
dhcpd auto_config outside
!
dhcpd address 192.168.1.5-192.168.1.36 inside
dhcpd enable inside
!
!
!
!
!
!
!
ASA#

```

When we use the **show run** command, we can see that **vlan1** **vlan2** interfaces and **dhcpd** are already there. Therefore, we use **no** command to remove them.

Physical Config **CLI** Attributes

IOS Command Line Interface

```

ASA#conf t
ASA(config)#no dhcpd address 192.168.1.36 inside
ASA(config)#exit
ASA#show run
: Saved
:
ASA Version 8.4(2)
!
hostname ASA
names
!
interface Ethernet0/0
  switchport access vlan 2
!
interface Ethernet0/1
!
interface Ethernet0/2
!
interface Ethernet0/3
!
interface Ethernet0/4
!
interface Ethernet0/5
!
interface Ethernet0/6
!
interface Ethernet0/7
!

```

Physical Config **CLI** Attributes

IOS Command Line Interface

```

interface Vlan1
  nameif inside
  security-level 100
  ip address 192.168.1.1 255.255.255.0
!
interface Vlan2
  nameif outside
  security-level 0
  ip address dhcp
!
!
!
!
!
!
!
!
telnet timeout 5
ssh timeout 5
!
dhcpd auto_config outside
!
dhcpd enable inside
!
!
!
!

```

Now we configure vlan in ASA:

Physical Config **CLI** Attributes

IOS Command Line Interface

```

ASA#conf t
ASA(config)#int vlan1
ASA(config-if)#no ip address
WARNING: DHCPD bindings cleared on interface 'inside',
address pool removed
ASA(config-if)#ip address 172.16.10.1
ASA(config-if)#ip address 172.16.10.1 255.255.255.0
ASA(config-if)#nameif inside
ASA(config-if)#security-level 100
ASA(config-if)#exit
ASA(config)#int e0/1
ASA(config-if)#switchport access vlan 1
ASA(config-if)#exit
ASA(config)#int vlan2
ASA(config-if)#ip address 10.1.1.1 255.255.255.0
ASA(config-if)#nameif outside
ASA(config-if)#security-level 0
ASA(config-if)#exit
ASA(config)#int e0/0
ASA(config-if)#switchport access vlan2
^
% Invalid input detected at '^' marker.
ASA(config-if)#switchport access vlan 2

```

Ctrl+F6 to exit CLI focus

Copy

Paste

Router Configuration:



```
Physical  Config  CLI  Attributes

ISP#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
ISP(config)#int g0/0
ISP(config-if)#ip address 10.1.1.2 255.255.255.0
ISP(config-if)#no shut

ISP(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
ISP(config-if)#int s0/0/0
ISP(config-if)#ip address 15.1.1.1 255.255.255.252
ISP(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
```



```
Physical  Config  CLI  Attributes

IOS Command Line Interface

Router1>en
Router1#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router1(config)#int s0/0/0
Router1(config-if)#ip address 15.1.1.2 255.255.255.252
Router1(config-if)#no shut

Router1(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up

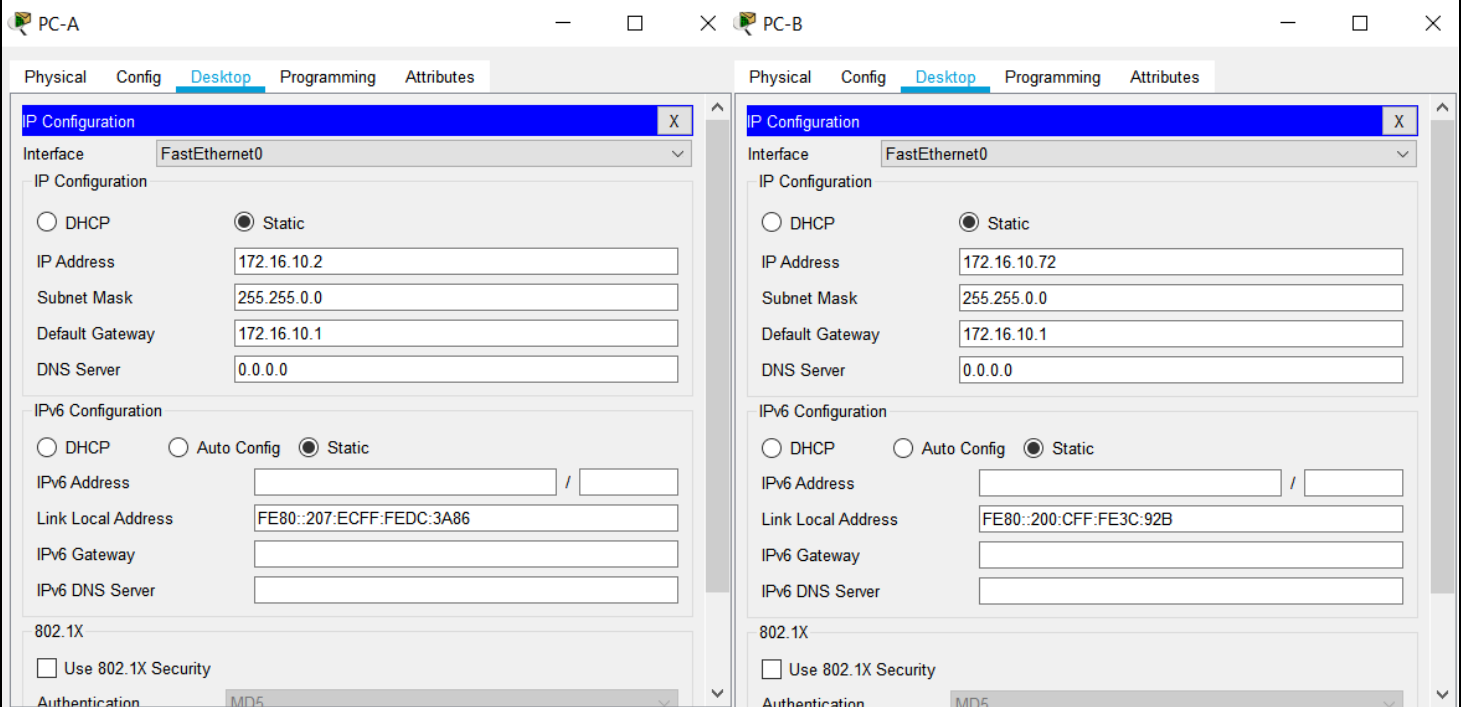
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to up

Router1(config-if)#int g0/0
Router1(config-if)#ip address 8.8.8.1 255.255.255.0
Router1(config-if)#no shut

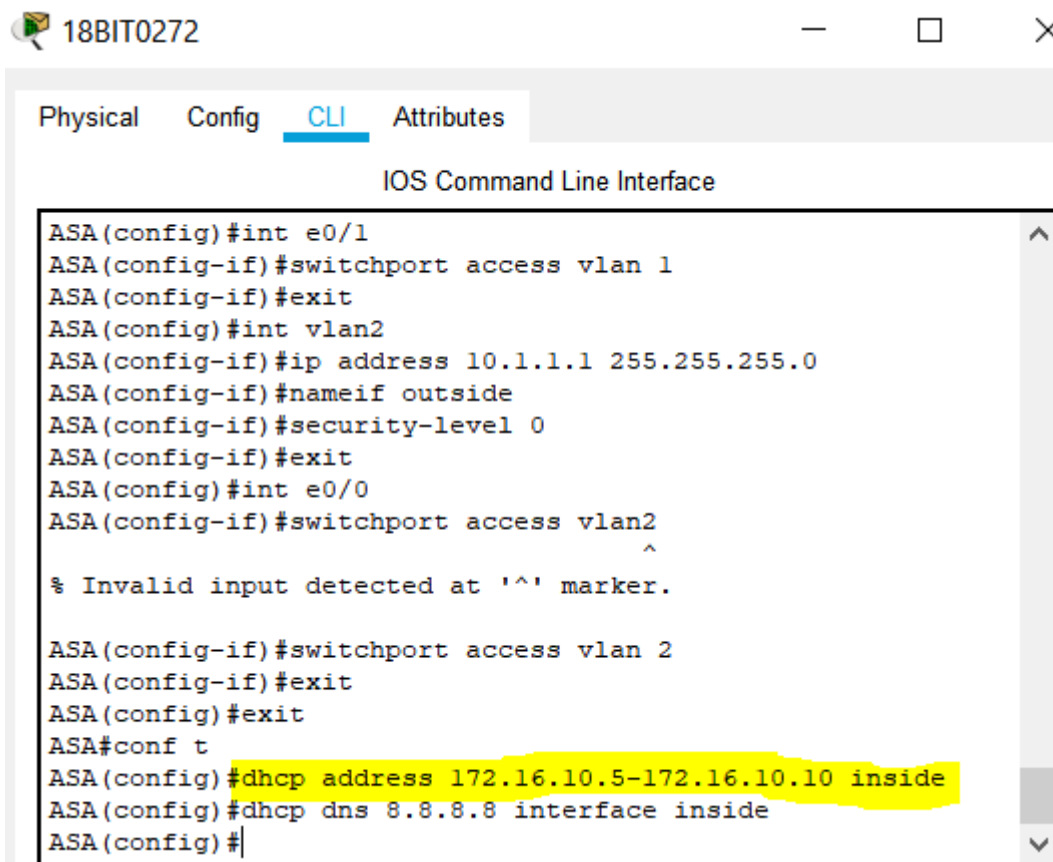
Router1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
```

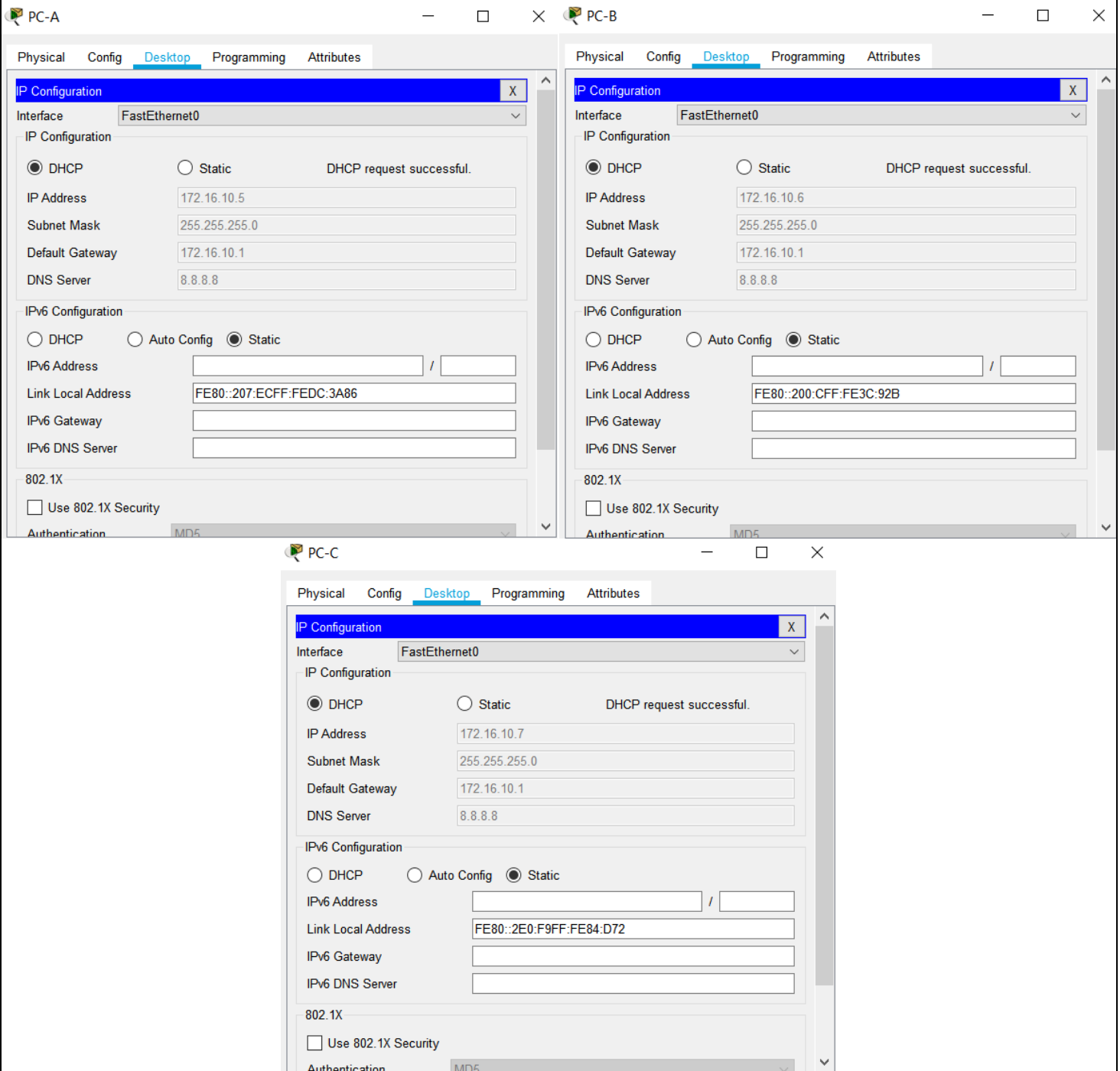
Before we configure DHCP, the IP addresses of PC-A and PC-B as per question are: 172.16.10.2 (18BIT0272) and 172.16.10.72 (18BIT0272) respectively.



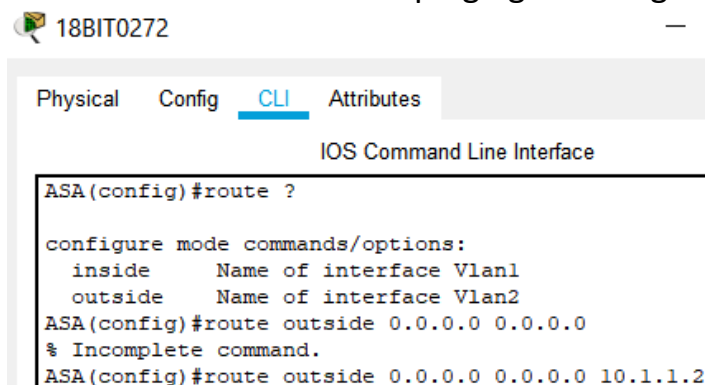
DHCP Configuration:



Now we check IP of PC-A, PC-B and PC-C after selecting DHCP.



Configuration of route outside for ASA and pinging default gateway from PC-A:



PC-A

Physical Config Desktop Programming Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ping 172.16.10.1

Pinging 172.16.10.1 with 32 bytes of data:

Reply from 172.16.10.1: bytes=32 time<1ms TTL=255
Reply from 172.16.10.1: bytes=32 time<1ms TTL=255
Reply from 172.16.10.1: bytes=32 time<1ms TTL=255
Reply from 172.16.10.1: bytes=32 time<1ms TTL=255

Ping statistics for 172.16.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

Router OSPF configuration:

ISP

Physical Config CLI Attributes

IOS Command Line Interface

```
ISP>en
ISP#conf t
Enter configuration commands, one per line. End with CNTL/Z.
ISP(config)#router ospf 1
ISP(config-router)#network 10.1.1.0 0.0.0.255 area 0
ISP(config-router)#network 15.1.1.0 0.0.0.3 area 0
ISP(config-router)#
13:14:58: %OSPF-5-ADJCHG: Process 1, Nbr 15.1.1.2 on Serial0/0/0 from LOADING to FULL, Loading Done
```

Router1

Physical Config CLI Attributes

IOS Command Line Interface

```
Router1>en
Router1#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router1(config)#router ospf 1
Router1(config-router)#network 15.1.1.0 0.0.0.3 area 0
Router1(config-router)#network
13:14:58: %OSPF-5-ADJCHG: Process 1, Nbr 15.1.1.1 on Serial0/0/0 from LOADING to FULL, Loading Done

% Incomplete command.
Router1(config-router)#network 8.8.8.0 0.0.0.255 area 0
```

Network Address Translation (NAT) configuration on ASA:

18BIT0272

Physical Config CLI Attributes

IOS Command Line Interface

```
ASA(config)#object network INSIDE
ASA(config-network-object)#subnet 172.16.10.0 255.255.255.0
ASA(config-network-object)#nat (inside,outside) dynamic interface
ASA(config-network-object)#exit
ASA#conf t
ASA(config)#access-list INTERNET extended permit tcp any any
ASA(config)#access-list INTERNET extended permit icmp any any
ASA(config)#access-list INTERNET in interface outside
^
% Invalid input detected at '^' marker.

ASA(config)#access-group INTERNET in interface outside
```


NAT configuration is done and we have created 2 ACLs which will permit tcp and icmp.

Pinging Server(8.8.8.8) from PC-A and PC-B:

PC-A

```
Physical  Config  Desktop  Programming  Attributes
Command Prompt

C:\>ping 8.8.8.8

Pinging 8.8.8.8 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 8.8.8.8: bytes=32 time=12ms TTL=125
Reply from 8.8.8.8: bytes=32 time=15ms TTL=125

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 15ms, Average = 13ms
```

PC-B

```
Physical  Config  Desktop  Programming  Attributes
Command Prompt

C:\>ping 8.8.8.8

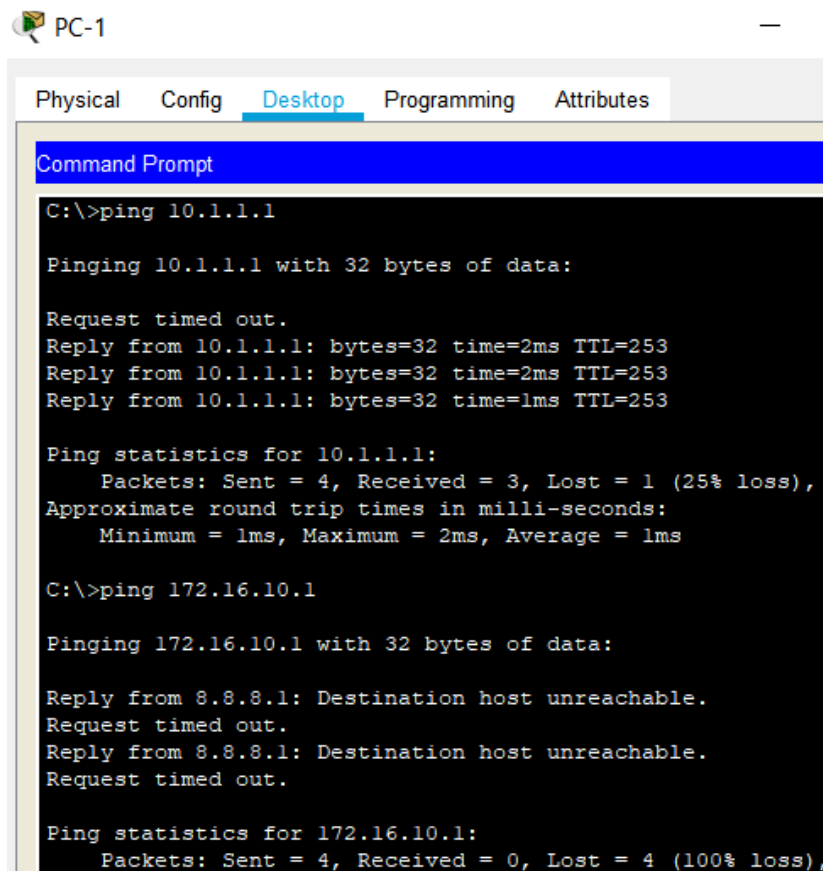
Pinging 8.8.8.8 with 32 bytes of data:

Reply from 8.8.8.8: bytes=32 time=14ms TTL=125
Reply from 8.8.8.8: bytes=32 time=3ms TTL=125
Reply from 8.8.8.8: bytes=32 time=1ms TTL=125
Reply from 8.8.8.8: bytes=32 time=19ms TTL=125

Ping statistics for 8.8.8.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 19ms, Average = 9ms
```

We have received reply from the server.

Pinging firewall interface and default gateway of network from PC-1:



PC-1

Physical Config **Desktop** Programming Attributes

Command Prompt

```
C:\>ping 10.1.1.1

Pinging 10.1.1.1 with 32 bytes of data:

Request timed out.
Reply from 10.1.1.1: bytes=32 time=2ms TTL=253
Reply from 10.1.1.1: bytes=32 time=2ms TTL=253
Reply from 10.1.1.1: bytes=32 time=1ms TTL=253

Ping statistics for 10.1.1.1:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

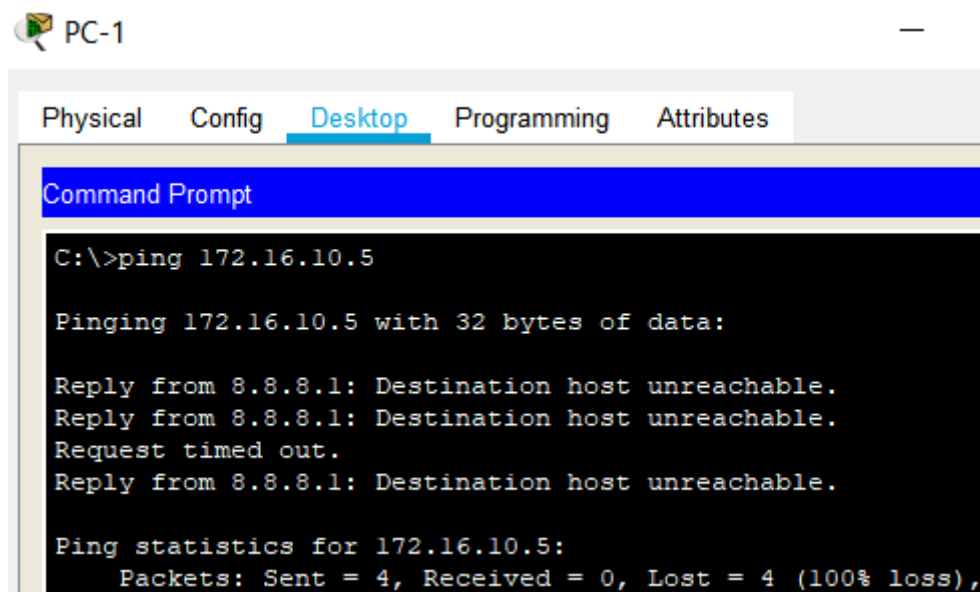
C:\>ping 172.16.10.1

Pinging 172.16.10.1 with 32 bytes of data:

Reply from 8.8.8.1: Destination host unreachable.
Request timed out.
Reply from 8.8.8.1: Destination host unreachable.
Request timed out.

Ping statistics for 172.16.10.1:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC-1 can ping the ASA firewall but cannot go inside the 172.16.10.1 network because of ASA configuration. We can recheck this by pinging PC-A from PC-1.



PC-1

Physical Config **Desktop** Programming Attributes

Command Prompt

```
C:\>ping 172.16.10.5

Pinging 172.16.10.5 with 32 bytes of data:

Reply from 8.8.8.1: Destination host unreachable.
Reply from 8.8.8.1: Destination host unreachable.
Request timed out.
Reply from 8.8.8.1: Destination host unreachable.

Ping statistics for 172.16.10.5:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

PC-1 cannot ping PC-A because of ASA configuration.

Verifying NAT configuration:

18BIT0272

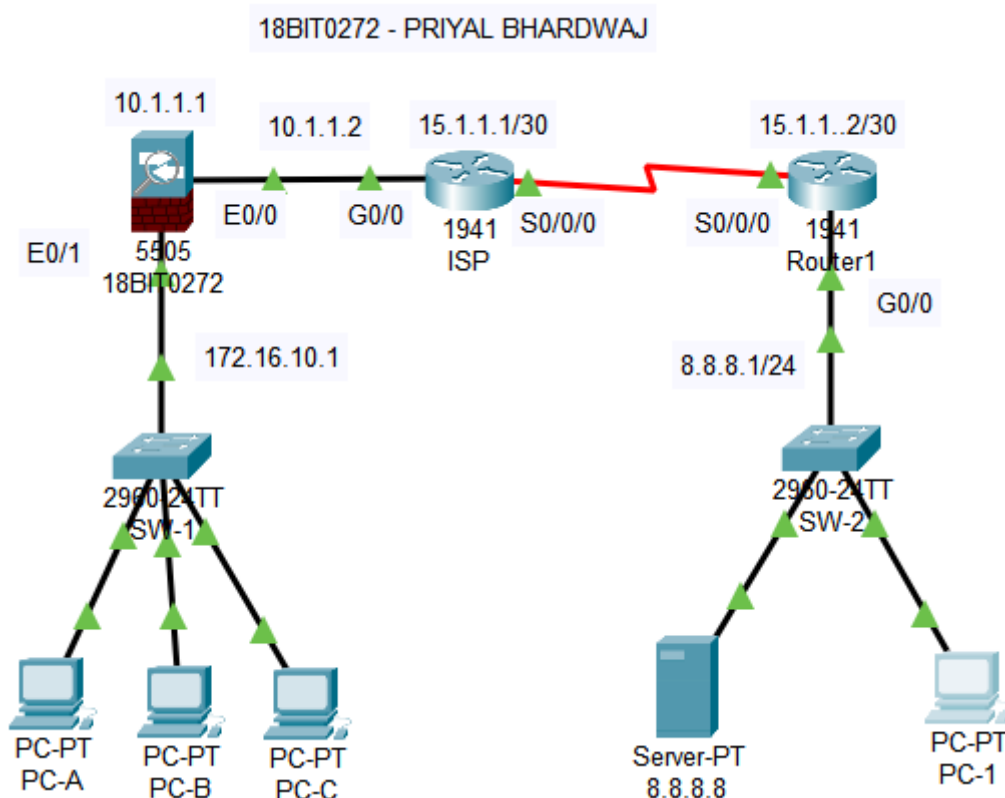
Physical Config CLI Attributes

IOS Command Line Interface

```
ASA(config)#show xlate
0 in use, 0 most used
ASA(config)#show nat
Auto NAT Policies (Section 2)
1 (inside) to (outside) source dynamic INSIDE interface
    translate_hits = 8, untranslate_hits = 6
```

We can see the NAT configurations from inside to outside dynamic INSIDE interface. We can also see the translated and the untranslated hits.

Network topology after configuration of vlans and routers:



So, we have successfully configured ASA and firewall as per the different vlans.

2. Configure AAA authentication on Cisco Routers. (5 marks)

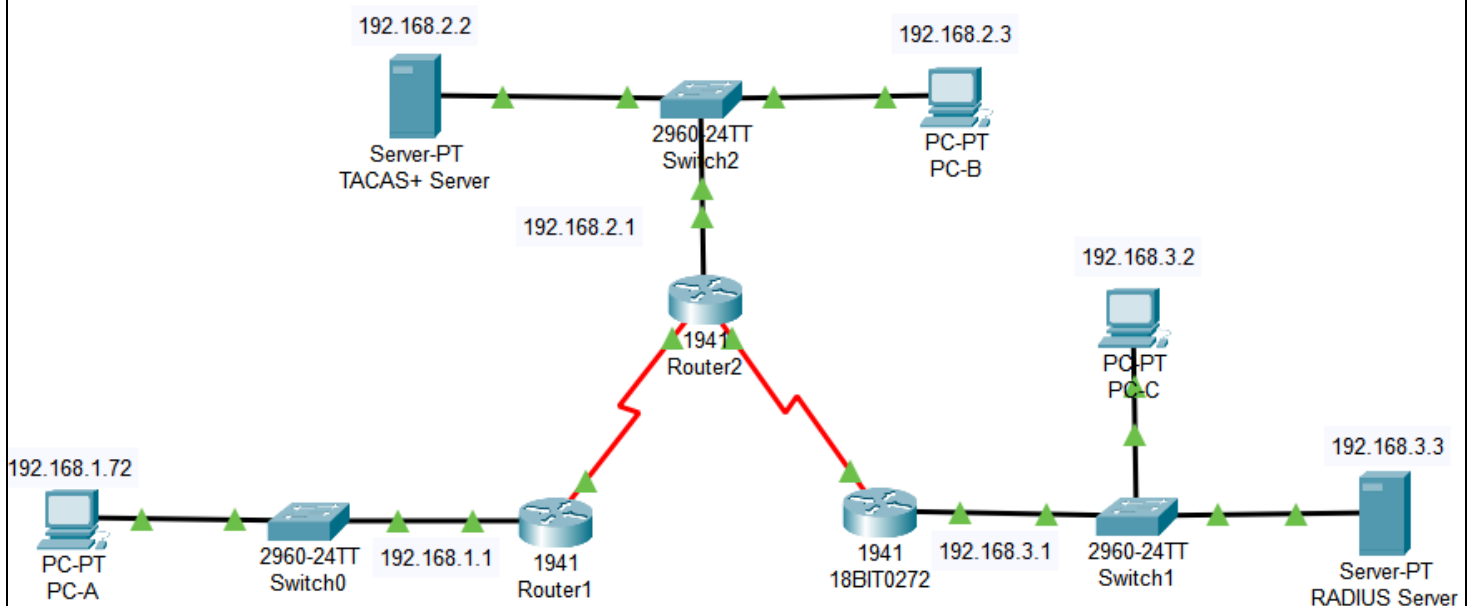
Show only the configuration commands of Router R3. R3 should be renamed with your registration number.

PC-A ip address last octet should be the last two digits of your registration number.

PCA-C ip address last octet should be the first two digits of your registration number.

Network Topology:

18BIT0272 - PRIYAL BHARDWAJ



Registration Number: 18BIT0272

PC-A last octet: 72 → 192.168.1.72

PC-C last octet: 02 = 2 → 192.168.3.2

NOTE: 192.168.3.2 was the RADIUS Server IP so I have changed the Server's IP to 192.168.3.3

PC-A

Physical
Config
Desktop
Programming
Attributes

IP Configuration

Interface
FastEthernet0

IP Configuration

☐ DHCP
☒ Static

IP Address
192.168.1.72

Subnet Mask
255.255.255.0

Default Gateway
192.168.1.1

DNS Server
0.0.0.0

IPv6 Configuration

☐ DHCP
☐ Auto Config
☒ Static

IPv6 Address
/

Link Local Address
FE80::2E0:A3FF:FEC5:24BC

IPv6 Gateway

IPv6 DNS Server

802.1X

☐ Use 802.1X Security

Authentication
MD5

Top

PC-C

Physical
Config
Desktop
Programming
Attributes

IP Configuration

Interface
FastEthernet0

IP Configuration

☐ DHCP
☒ Static

IP Address
192.168.3.2

Subnet Mask
255.255.255.0

Default Gateway
192.168.3.1

DNS Server
0.0.0.0

IPv6 Configuration

☐ DHCP
☐ Auto Config
☒ Static

IPv6 Address
/

Link Local Address
FE80::290:2BFF:FE99:1EE3

IPv6 Gateway

IPv6 DNS Server

802.1X

☐ Use 802.1X Security

Authentication
MD5

Top

ROUTER 3: 18BIT0272 configuration

18BIT0272

Physical
Config
CLI
Attributes

IOS Command Line Interface

```

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#enable secret cisco
Router(config)#username admin3 secret admin3
Router(config)#radius-server host 192.168.3.3
Router(config)#radius-server key radius
Router(config)#aaa new-model
Router(config)#aaa authentication login default group radius local
Router(config)#line console 0
Router(config-line)#login authentication default
Router(config-line)#exit
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#exit

```

Ctrl+F6 to exit CLI focus

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Top

RADIUS Server configuration:

RADIUS Server

Physical Config **Services** Desktop Programming Attributes

SERVICES

- HTTP
- DHCP
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA**
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

AAA

Service ☒ On ☐ Off Radius Port 1645

Network Configuration

Client Name Client IP

Secret ServerType Radius

	Client Name	Client IP	Server Type	Key	
1	18BIT0272	192.168.3.1	Radius	radius	<div>Add</div> <div>Save</div> <div>Remove</div>

User Setup

Username Password

	Username	Password	
1	user3	user3	<div>Add</div> <div>Save</div> <div>Remove</div>

Verification of AAA in Router 3: 18BIT0272

18BIT0272

Physical Config **CLI** Attributes

IOS Command Line Interface

```
User Access Verification
Username: admin3
Password:
% Login invalid

Username: user3
Password:
Router>en
Password:
```

Ctrl+F6 to exit CLI focus

Copy Paste

So, we can access the router only with **user3** as username and password. When we try to access by using **admin3** as username and secret key password we get **Login Invalid**.

Password for en is **cisco**.