

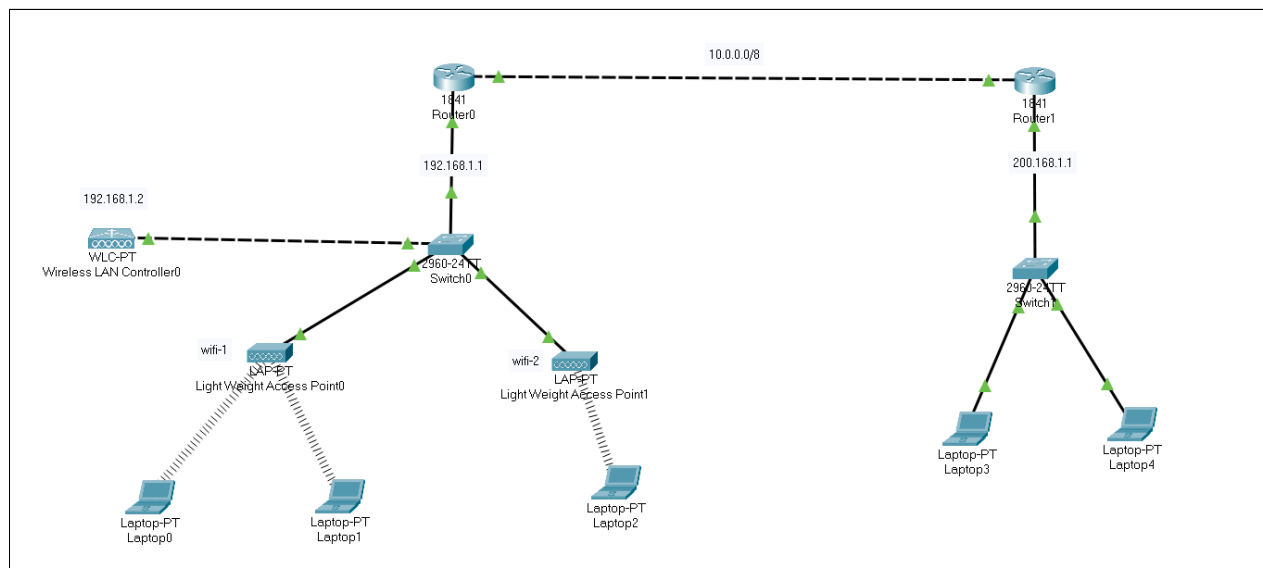
# GOA COLLEGE OF ENGINEERING

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Experiment 6.1

## AIM :

1. Considering a scenario network consisting of at least two LWAPP(lightweight Access Point) with WLC(Wireless Lan Controller), Design this network using packet tracer.
2. Design topology for implementing NAT( Network address Translation) using packet tracer.

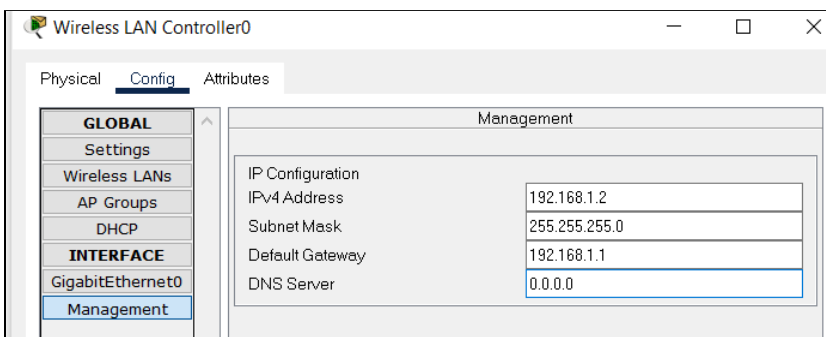
## DIAGRAM :



## PROCEDURE :

1. Select WLC(wireless lan controller) , two LAP-PT from wireless section. Select two switches (2960-24TT).Select 5 laptops .
2. Make the wired connections as shown above.
3. Now let's start working, click WLC

-Click WLC>Config>Management , set ip,subnet.. As follows



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- goto GigabitEthernet0 and turn it on and keep others as auto
- goto DHCP and make a pool named LAN , do as shown in pic

Wireless LAN Controller0

Physical Config Attributes

GLOBAL Settings Wireless LANs AP Groups DHCP INTERFACE GigabitEthernet0 Management

DHCP

Interface: Management Service: ☒ On ☐ Off

Pool Name: LAN

Default Gateway: 192.168.1.1

DNS Server: 0.0.0.0

Start IP Address: 192.168.1.5 Subnet Mask: 255.255.255.0

Maximum Number of Users: 100

TFTP Server: 0.0.0.0

WLC Address: 192.168.1.2

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
LAN	192.168.1.1	0.0.0.0	192.168.1.5	255.255.255.0	100	0.0.0.0	192.168.1.2

- Goto wireless lans section , here we'll configure our lwap(lightweight access points).
- Give a name ,ssid ,wep key for lwap0 as wifi-1 and click on save.
- Now click on new and do the same for lwap1 as wifi-2 , refer the pic below.
- Keeping wep key as 1234567890 for both for convenience.

Wireless LAN Controller0

Physical Config Attributes

GLOBAL Settings Wireless LANs AP Groups DHCP INTERFACE GigabitEthernet0 Management

Wireless LANs

Select WLAN: wifi-1

Name: wifi-1 SSID: wifi-1

VLAN: 0

Authentication:

☐ Disabled ☒ WEP ☐ WPA2-PSK ☐ WPA2

WEP Key: 1234567890

PSK Pass Phrase:

RADIUS Server Settings

IP Address:

Shared Secret:

Encryption Type: 40/64-Bits (10 HEX digits)

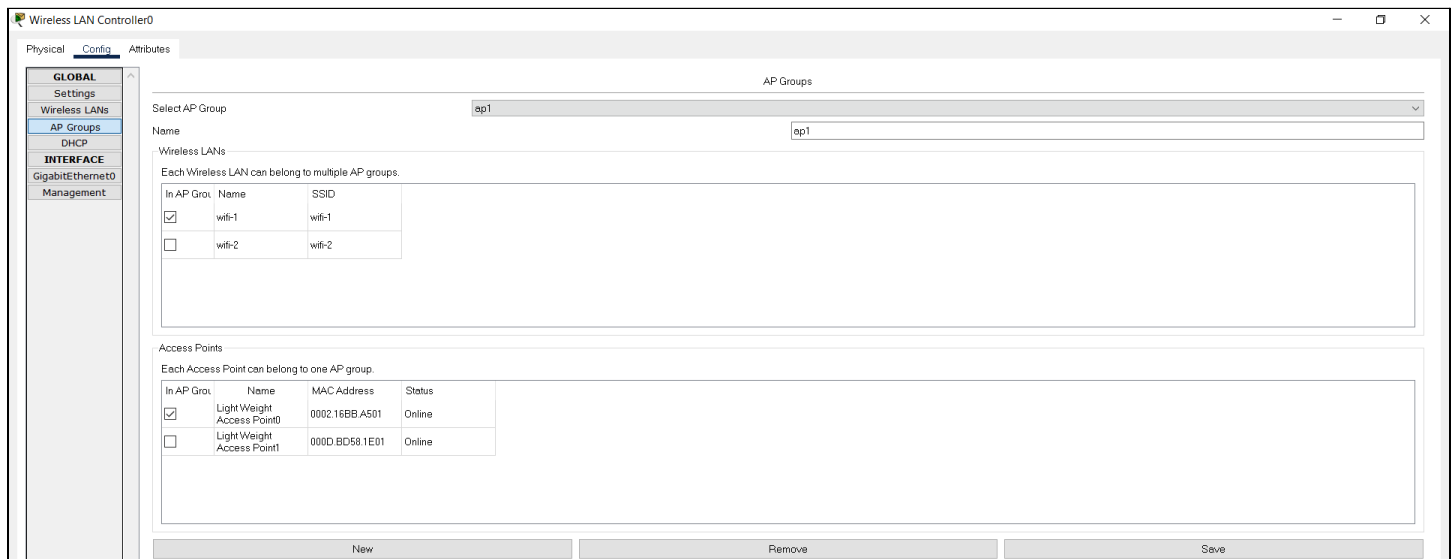
Central Control:

☐ Central switching, central authentication ☐ Local switching, central authentication ☒ Local switching, local authentication

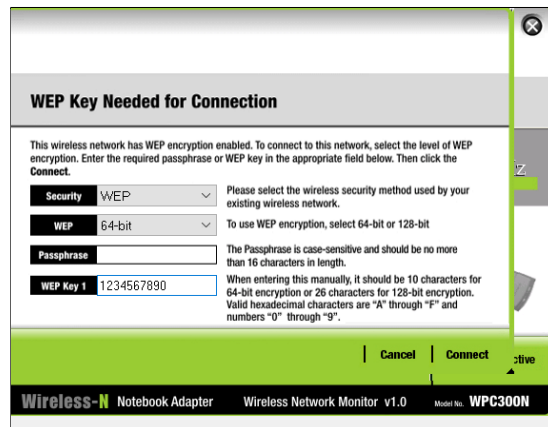
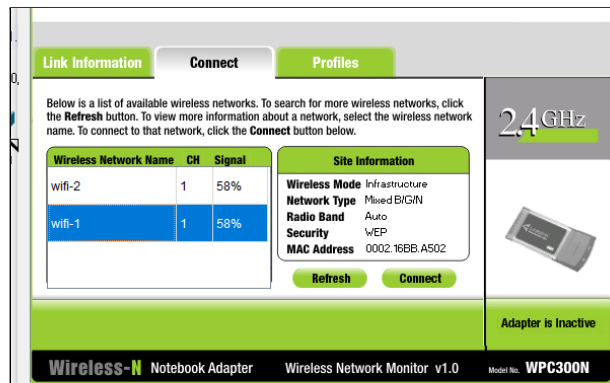
New Remove Save

- Now click the lwap0 goto physical tab and insert the **acces\_point\_power\_adapter** module. Do the same for lwap1.
- After doing this goto AP groups and white for a while until you can see some records under the access points section.
- Now in name we have a default-group , deselect all those check boxes and click on save.
- Now click on new give a name ap1 , select wifi1 , lwap0 ,by doing this we mean if someone wants to connect to wifi-1 he will be connected to lwap0.
- Make a similar entry for lwap1 as ap2..

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- Now insert WCC300N modules in all the laptops which are not connected with wire. , turn off > insert>turn on.
- Now click laptop0>Desktop>PC wireless>connect>refresh>wifi-1 and enter password 1234567890. Click on connect after doing so we have successfully connected our laptop wirelessly.

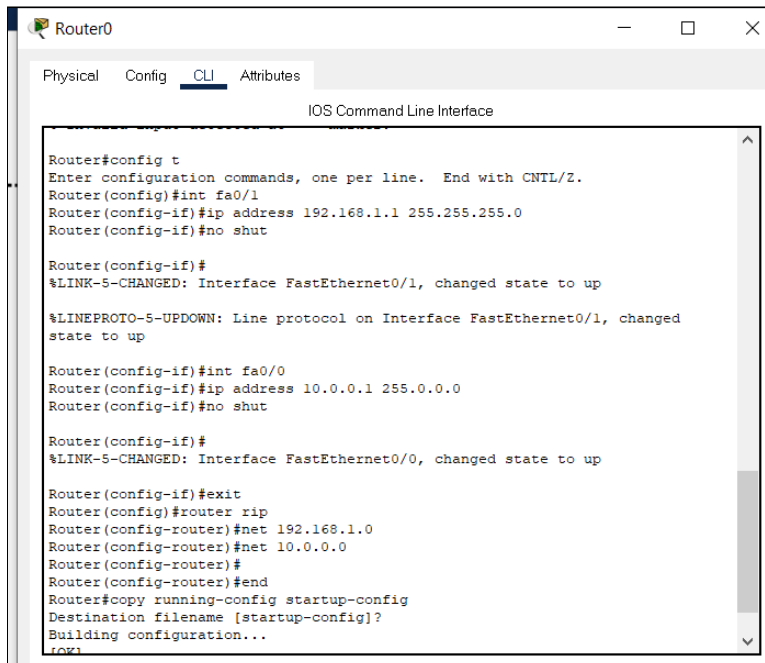


- do the same for laptop1 , connect laptop 2 to wifi-2.

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## 4. Now let's configure the router0

- Set ips to all interfaces and implement RIP protocol.



The screenshot shows the CLI window for Router0. The 'CLI' tab is selected. The command history shows the following sequence of commands and their outputs:

```
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/1
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

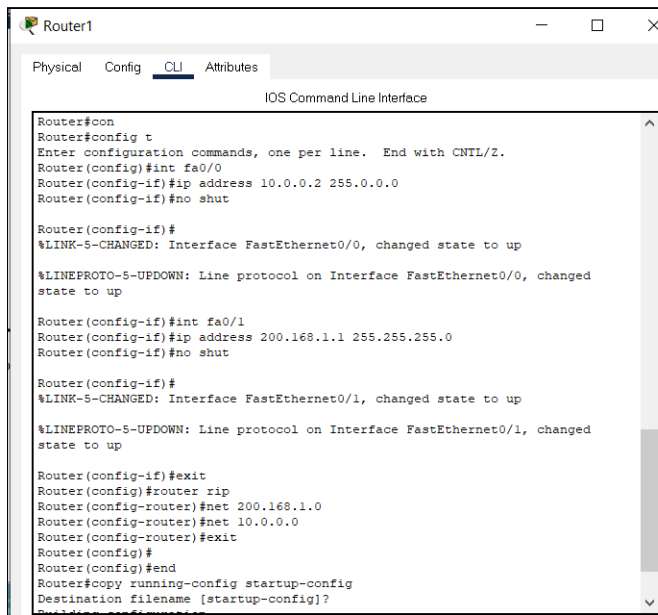
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up

Router(config-if)#int fa0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#router rip
Router(config-router)#net 192.168.1.0
Router(config-router)#net 10.0.0.0
Router(config-router)#
Router(config-router)#end
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
```

## 5. Configure the router1



The screenshot shows the CLI window for Router1. The 'CLI' tab is selected. The command history shows the following sequence of commands and their outputs:

```
Router#con
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 10.0.0.2 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

Router(config-if)#int fa0/1
Router(config-if)#ip address 200.168.1.1 255.255.255.0
Router(config-if)#no shut

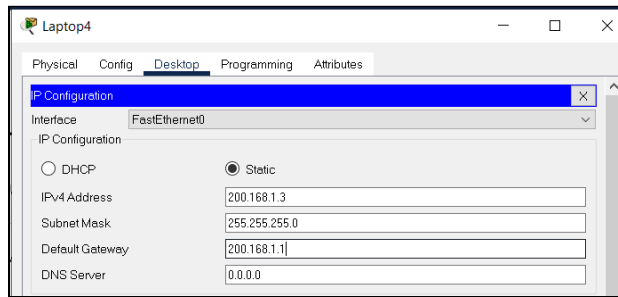
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up

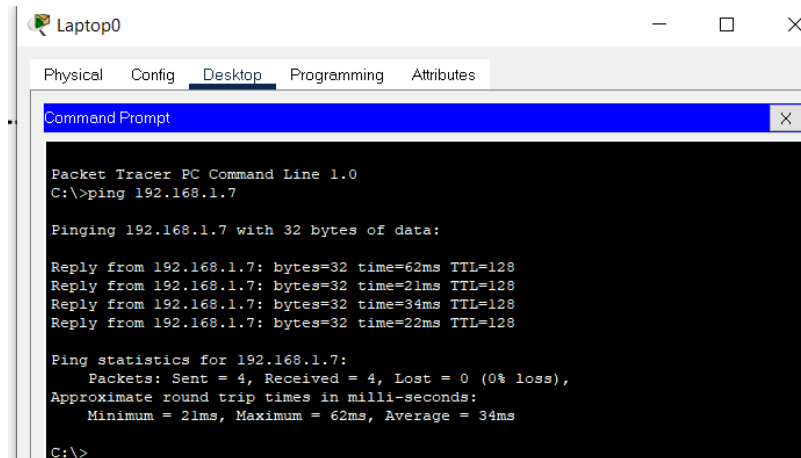
Router(config-if)#exit
Router(config)#router rip
Router(config-router)#net 200.168.1.0
Router(config-router)#net 10.0.0.0
Router(config-router)#exit
Router(config)#
Router(config)#end
Router#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
```

## 6. Set static ip configuration to laptop3/laptop4 under ( 200.168.1.0 ntwk).

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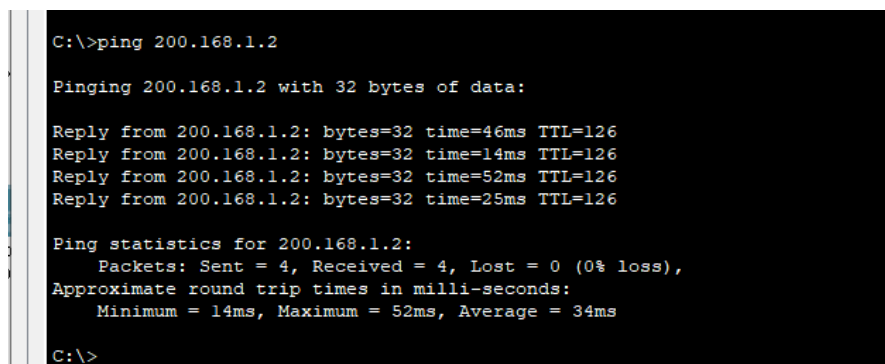


7. Now that we have everything setup, lets test it.
8. From laptop0 ping laptop2 ( these two are from different access points)



- This shows that lwaps are working correctly.

9. Now ping laptop3 ( of 200.168.1.0 ntwk) .



- This proves that the above diagram is working properly

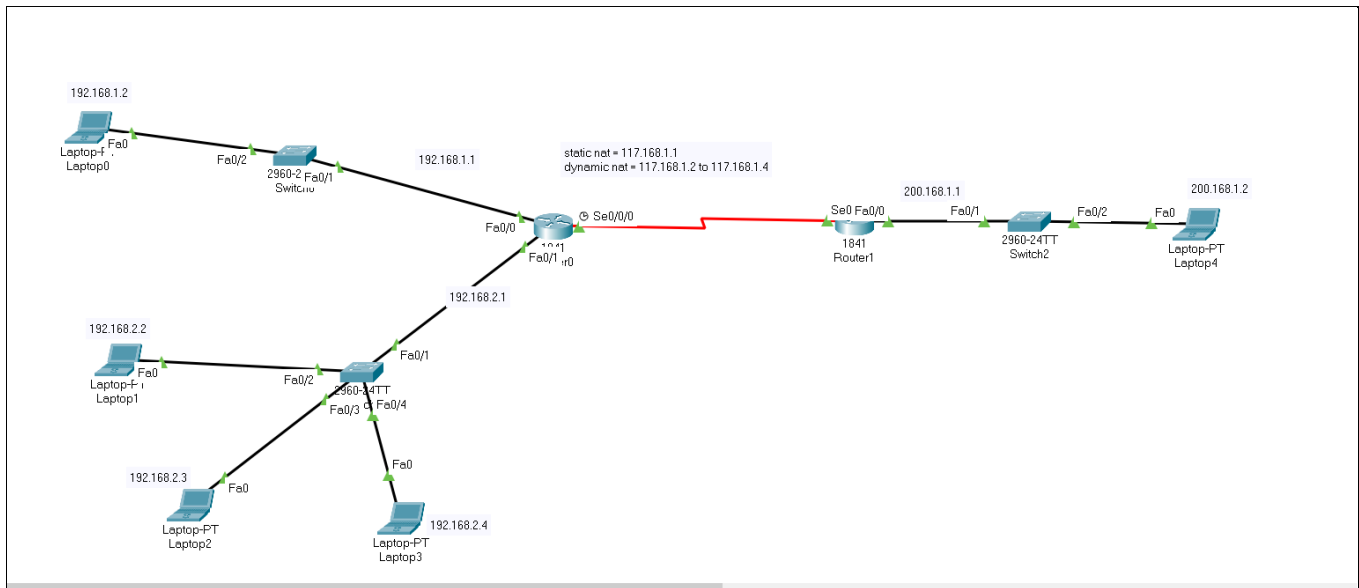
**CONCLUSION :** A network using at least two LWAPs and one WLC was implemented successfully.

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## Experiment : 6.2

**AIM :** Design topology for implementing NAT( Network address Translation) using packet tracer.

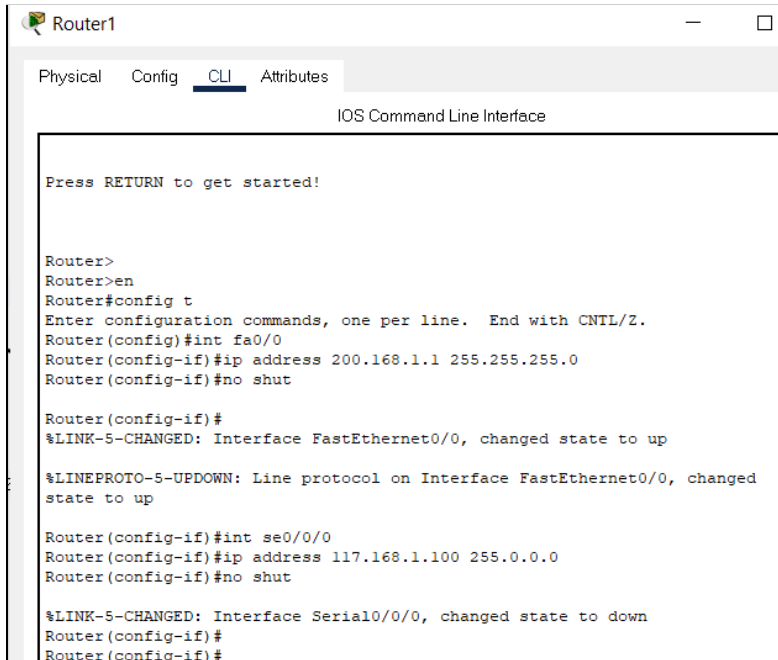
### DIAGRAM :



### PROCEDURE :

1. Select two 1841 routers , 3 switches, laptops.
2. Insert WIC-2T modules in routers and make the connections as shown above.
3. Make ip address assumptions as shown above.
4. NAT can be done in two ways i) Static NAT ii) Dynamic NAT
5. Let's do Static NAT first
6. Lets configure router1 also implement RIP protocol.

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```
Router1
Physical Config CLI Attributes
IOS Command Line Interface

Press RETURN to get started!

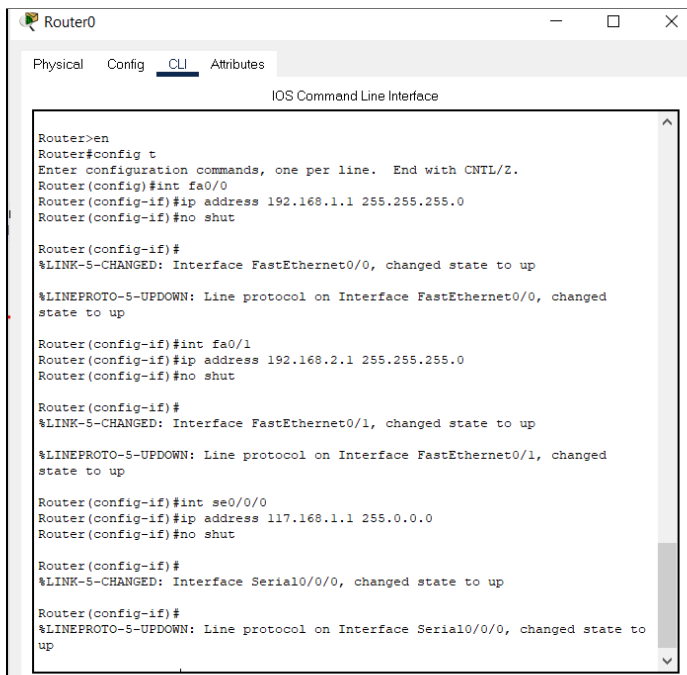
Router>
Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 200.168.1.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

Router(config-if)#int se0/0/0
Router(config-if)#ip address 117.168.1.100 255.0.0.0
Router(config-if)#no shut

%LINK-5-CHANGED: Interface Serial0/0/0, changed state to down
Router(config-if)#
Router(config-if)#
```

7. Let's configure router0, also implement RIP protocol



```
Router0
Physical Config CLI Attributes
IOS Command Line Interface

Router>en
Router#config t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fa0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
state to up

Router(config-if)#int fa0/1
Router(config-if)#ip address 192.168.2.1 255.255.255.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed
state to up

Router(config-if)#int se0/0/0
Router(config-if)#ip address 117.168.1.1 255.0.0.0
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/0/0, changed state to up
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0/0, changed state to
up
```

8. Now set ip configuration for all the laptops manually ( static ips). Be careful with gateway enter properly for each network laptop.
9. Do this for static NAT on router0
  - Coding on interfaces, creating a source static.

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```
Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#int fa0/0
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#int se0/0/0
Router(config-if)#ip nat outside
Router(config-if)#exit
Router(config)#ip nat inside source static 192.168.1.2 117.168.1.1
Router(config)#exit
Router#
%SYS-5-CONFIG_I: Configured from console by console

Router#show ip nat show transaltion
      ^
% Invalid input detected at '^' marker.

Router#show ip nat tran
Router#show ip nat translations
Pro  Inside global      Inside local      Outside local      Outside global
---  117.168.1.1          192.168.1.2      ---               ---
Router#
```

10. Now let's configure Dynamic NAT.

- Enter this commands in router0

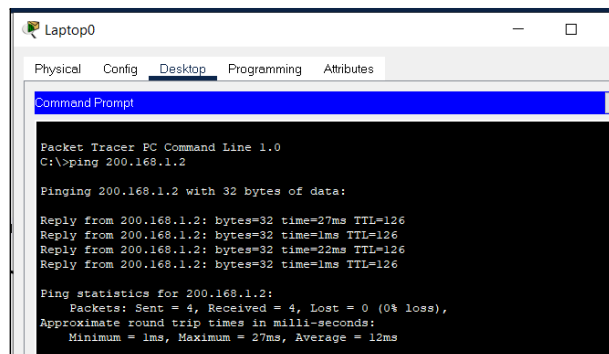
```
Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#
Router(config-if)#int fa0/1
Router(config-if)#ip nat inside
Router(config-if)#exit
Router(config)#acc
Router(config)#access-list 1 permit 192.168.2.1 0.0.0.255
Router(config)#ip nat pool mypool 117.168.1.2 117.168.1.4 netmask 255.0.0.0
Router(config)#ip nat inside source list 1 pool mypool
Router(config)#
```

Ctrl+F6 to exit CLI focus

Copy Paste

11. Now that we have everything configured ,we'll test this.

- From every laptop on the left side of router0 ping the laptop on the right of router1.
- By doing so we can see if ip's of all laptops are getting translated or not.



```
Laptop0
Physical Config Desktop Programming Attributes
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 200.168.1.2

Pinging 200.168.1.2 with 32 bytes of data:

Reply from 200.168.1.2: bytes=32 time=27ms TTL=126
Reply from 200.168.1.2: bytes=32 time=1ms TTL=126
Reply from 200.168.1.2: bytes=32 time=22ms TTL=126
Reply from 200.168.1.2: bytes=32 time=1ms TTL=126

Ping statistics for 200.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 27ms, Average = 12ms
```



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- Do the same for all laptops on the left or send a packet using GUI..
- Now click router0 CLI and
  - type show ip nat translations

```
Router#  
Router#  
Router#show ip nat trans  
Router#show ip nat translations  
Pro  Inside global      Inside local      Outside local      Outside global  
icmp 117.168.1.1:7      192.168.1.2:7      200.168.1.2:7      200.168.1.2:7  
icmp 117.168.1.2:1      192.168.2.2:1      200.168.1.2:1      200.168.1.2:1  
icmp 117.168.1.3:2      192.168.2.3:2      200.168.1.2:2      200.168.1.2:2  
icmp 117.168.1.4:1      192.168.2.4:1      200.168.1.2:1      200.168.1.2:1  
--- 117.168.1.1         192.168.1.1         ---                 ---  
Router#
```

- this proves that all laptop ip's were translated properly.

**CONCLUSION :** A Topology involving NAT was implemented successfully.