

**Network Programming Lab****End Term Examination**

28-05-2021

20181CSE0621

Sai Ram. K

6-CSE-10

**Set – B**

**Question:** - Mahima's laptop was connected to network1(IP address=192.168.0.0/24) with router1(WEP=2342342341), later she leaves that network and moves to other network2(IP address=20.0.0.0/10) with router2(2345678901), help Mahima to connect to router2 automatically using wireless connection.

Complete the following –

Construct two networks with given IP address

Configure wireless router

Connect laptop to router 1 using wireless connection

Remove laptop from network 1 and connect to network 2

Check connectivity using ping

**NS 2 :-**

Simulate a eight node point to point network with the links connected as follows: n0 – n1, n1 – n2, n1 – n4, n1-n5, n1-n6, n6-n7 and n4-n3.

Apply TCP agent between n0 – n3 and UDP agent between n5 – n3.

Apply relevant applications over TCP and UDP agents changing the parameter and determine the number of packets dropped by TCP / UDP.

## Question 1]

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SET-B

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NETWORK PROGRAMMING LAB

Q.1] Cisco Packet Tracer

Step 1] Assemble all the network devices and arrange the devices as shown in the diagram or picture above.

Step 2] Let address of network-1 = 192.168.0.0 and address of network 2 = 20.0.0.0 as per the given question.

Step 3] To configure Server1 click on the server and navigate to DHCP tab and set the start IP address as 192.168.0.0 and the subnet mask as 255.255.255.0 and click save.

Step 4] Click on config in server1 and click on the Fast Ethernet0. Give the ipv4 address as 192.168.0.1 and turn on.

Step 5] Click on the router 1 and navigate to wireless tab. Click on the radio button for WEP and give the key as 2342342341.

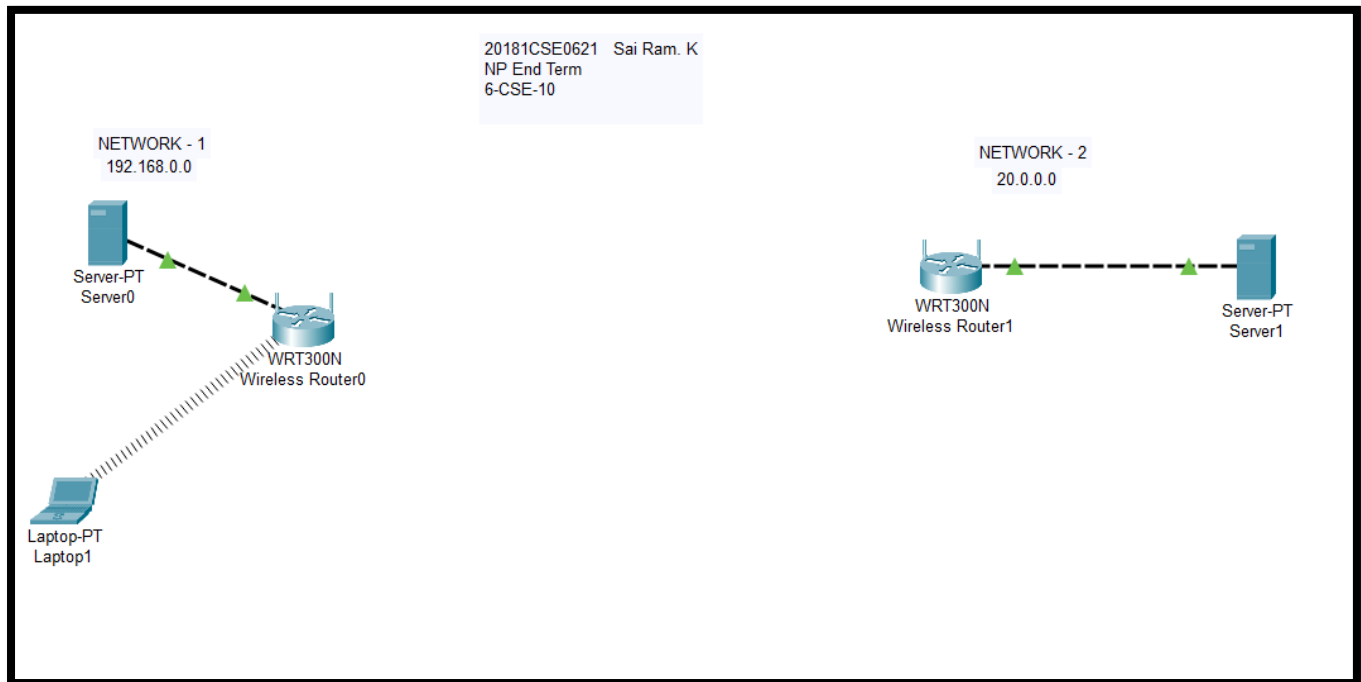
Step 6] To configure laptop, click on laptop. Go to the physical tab and remove the extra space and insert the WPC300N module.

Step 7] Click on desktop > PC wireless and go to connect tab. Choose the router name & type the key and click 'connect'.

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- Step 8] To setup second network, click on the server 2 and navigate to DHCP and give the start IP address as 20.0.0.1 and subnet mask as 255.0.0.0. & click save.
- Step 9] Click on the config-tab and fast ethernet 0. Provide the ipv4 address as 20.0.0.1 and turn on the port.
- Step 10] To configure router 2 click on the router and navigate to config tab. Under the wireless pane choose the WEP radio button and provide key as 2345678901.
- Step 11] Go to the laptop and search for available networks and connect to network 2 by giving the WEP key as 2345678901.
- Step 12] In order to check the connectivity of the laptop, go to desktop and command prompt.  
Type: `ping 192.168.0.0`
- Step 13] To check connectivity of network 2. Click desktop > command prompt.  
Type: ~~ping~~ `ping 20.0.0.0`
- Step 14] Thus, we have managed to establish a DHCP wireless connection for the given question and conditions.

## Topology:



## Step 1: Configuring DHCP

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Server0

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

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

**DHCP**

Interface: FastEthernet0 Service: ☐ On ☒ Off

Pool Name: serverPool

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

Start IP Address: 192 168 0 0

Subnet Mask: 255 255 255 0

Maximum Number of Users: 256

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	192....	255....	256	0.0.0.0	0.0.0.0

< >

☐ Top

## Step 2: Configuring Fast Ethernet

The screenshot shows the configuration window for the FastEthernet0 interface. The left sidebar has a tree view with 'GLOBAL' and 'INTERFACE' sections. 'FastEthernet0' is selected under 'INTERFACE'. The main area is titled 'FastEthernet0' and contains the following settings:

- Port Status:** ☒ On
- Bandwidth:** ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex:** ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address:** 0007.ECB2.41C8
- IP Configuration:** ☐ DHCP ☒ Static
  - IPv4 Address:** 192.168.0.1
  - Subnet Mask:** 255.255.255.0
- IPv6 Configuration:** ☐ Automatic ☒ Static
  - IPv6 Address:** (empty field)
  - Link Local Address:** FE80::207:ECFF:FEB2:41C8

At the bottom left, there is a 'Top' button.

## Step 3: Wireless Router WEP configuration

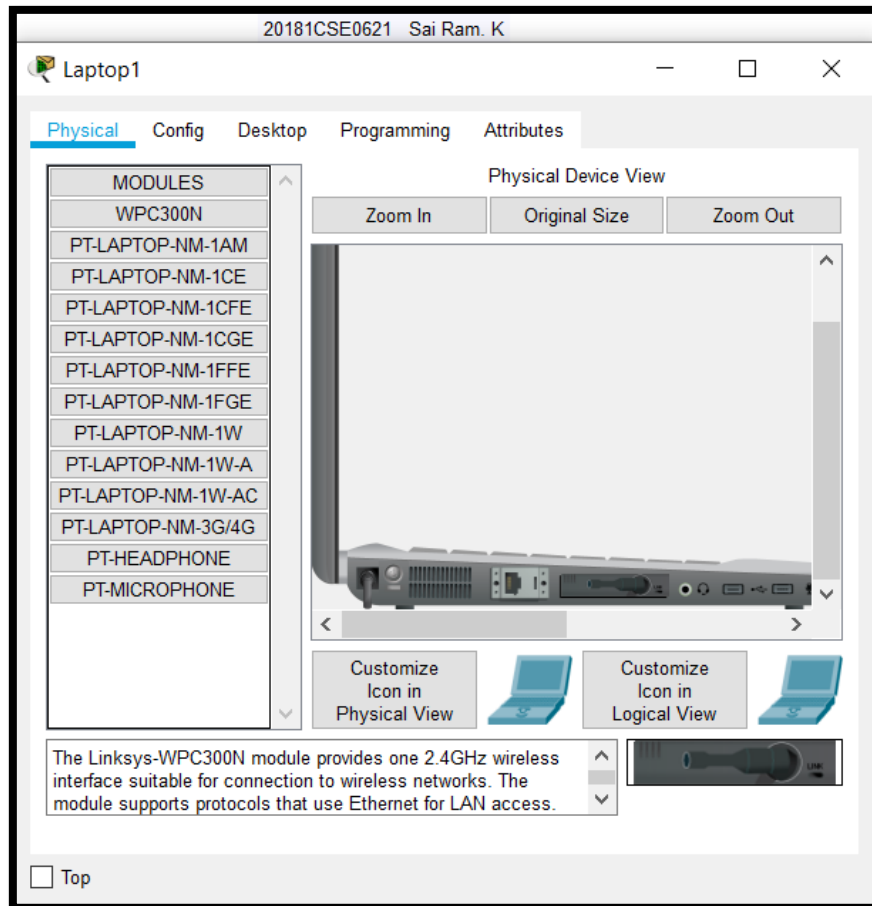
The screenshot shows the configuration window for the Wireless Router0. The left sidebar has a tree view with 'GLOBAL' and 'INTERFACE' sections. 'Wireless' is selected under 'INTERFACE'. The main area is titled 'Wireless Settings' and contains the following settings:

- SSID:** Network - 1
- 2.4 GHz Channel:** 6 - 2.437GHz
- Authentication:** ☐ Disabled ☒ WEP ☐ WPA-PSK ☐ WPA2-PSK ☐ WPA
  - WEP Key:** 2342342341
  - PSK Pass Phrase:** (empty field)
- RADIUS Server Settings:**
  - IP Address:** (empty field)
  - Shared Secret:** (empty field)
  - Encryption Type:** 40/64-Bits (10 Hex digits)

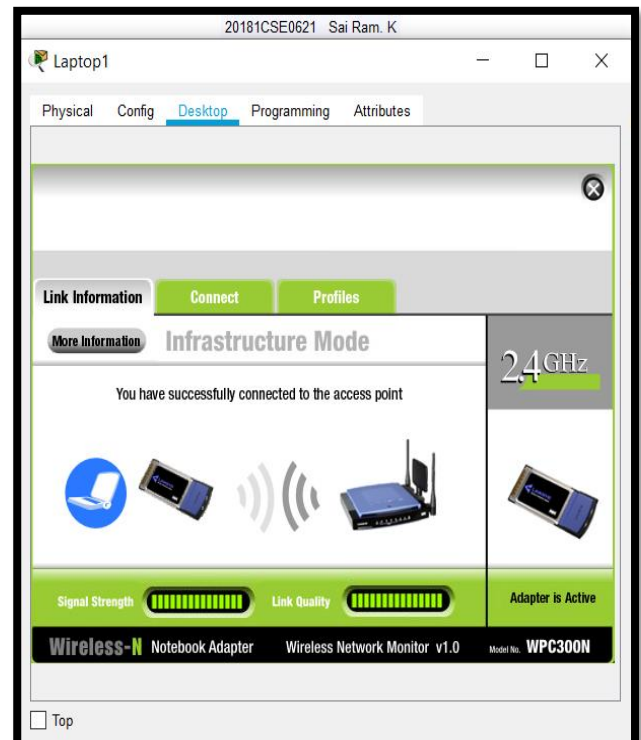
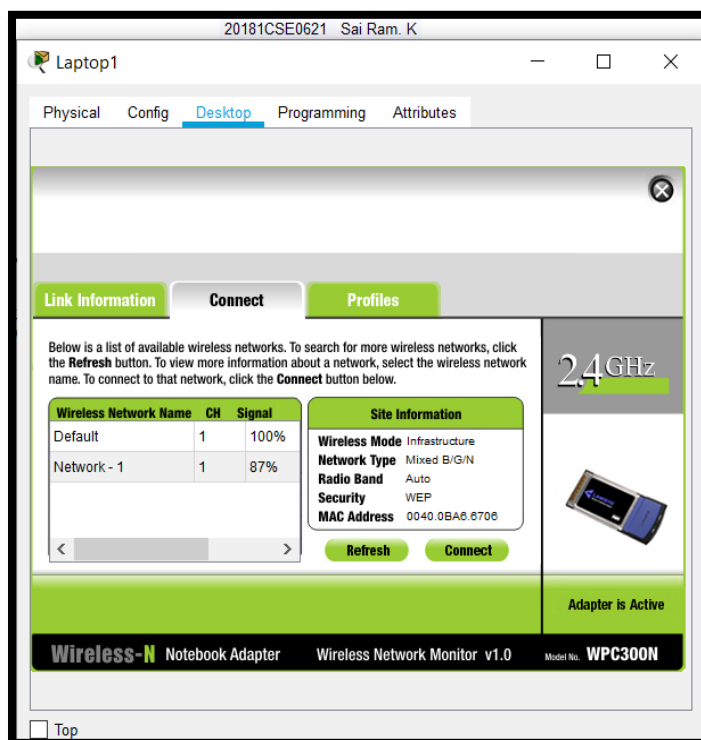
At the bottom left, there is a 'Top' button.



## Step 4: Configuring Laptop (physical)



## Step 5: Connecting Laptop to Wireless Network



## Step 6: Configuring Server 2 fast ethernet & DHCP

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Server1

Physical **Config** Services Desktop Programming Attributes

**GLOBAL**

Settings

Algorithm Settings

**INTERFACE**

FastEthernet0

**FastEthernet0**

Port Status ☒ On

Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto

Duplex ☐ Half Duplex ☒ Full Duplex ☒ Auto

MAC Address 0002.4A6E.175A

IP Configuration

☐ DHCP

☒ Static

IPv4 Address 20.0.0.1

Subnet Mask 255.0.0.0

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

Link Local Address: FE80::202:4AFF:FE6E:175A

☐ Top

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Server1

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

HTTP

**DHCP**

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

**DHCP**

Interface FastEthernet0 Service ☐ On ☒ Off

Pool Name serverPool

Default Gateway 0.0.0.0

DNS Server 0.0.0.0

Start IP Address 20 0 0 0

Subnet Mask: 255 0 0 0

Maximum Number of Users : 512

TFTP Server: 0.0.0.0

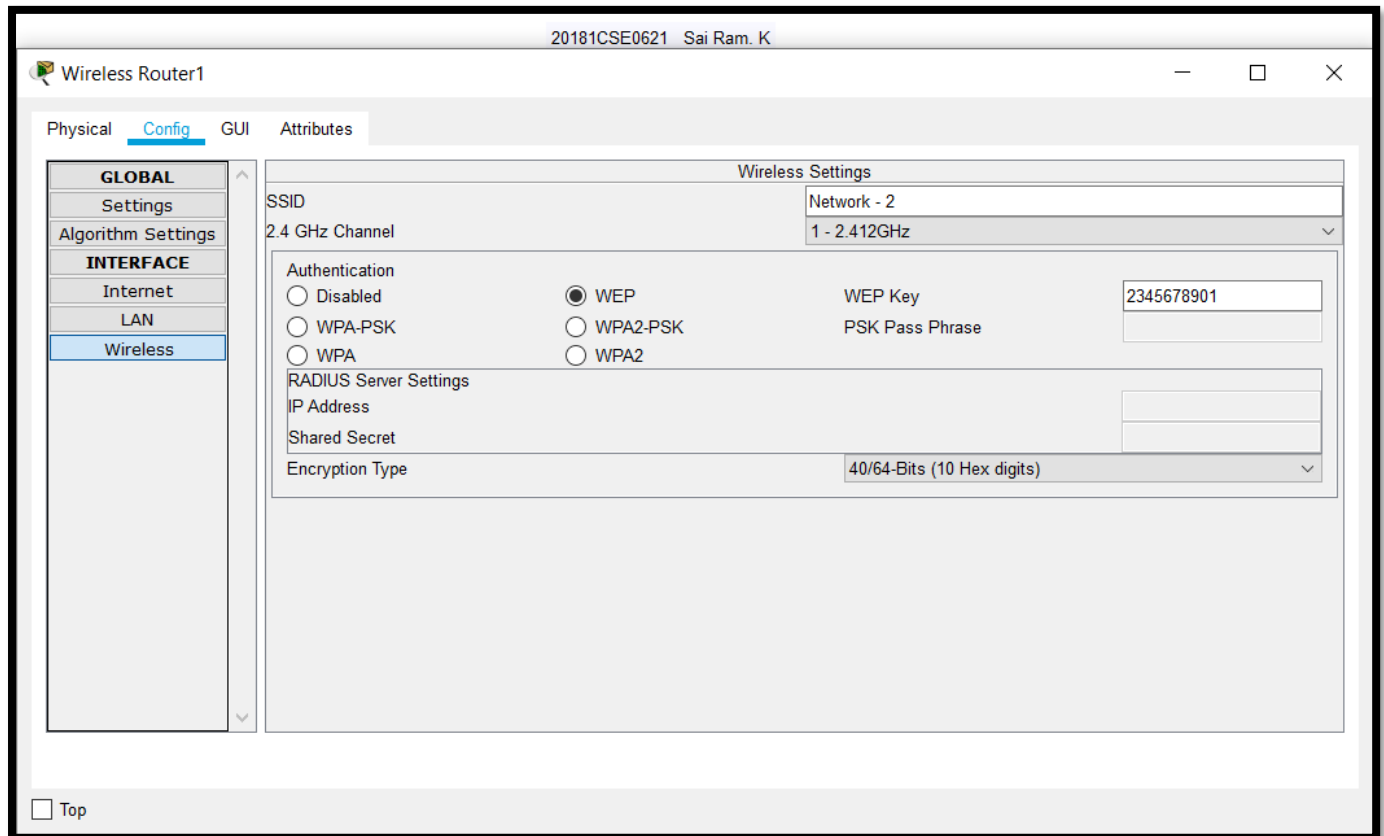
WLC Address: 0.0.0.0

Add Save Remove

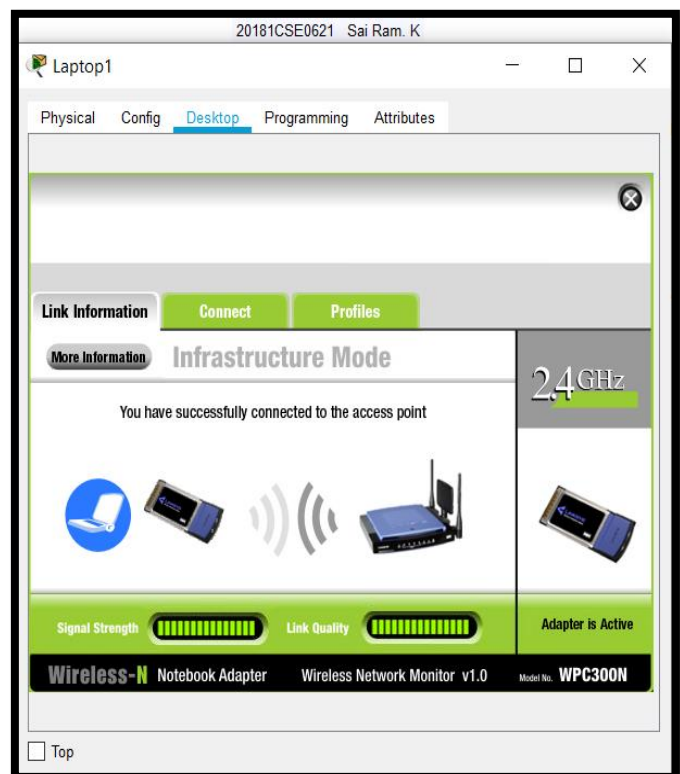
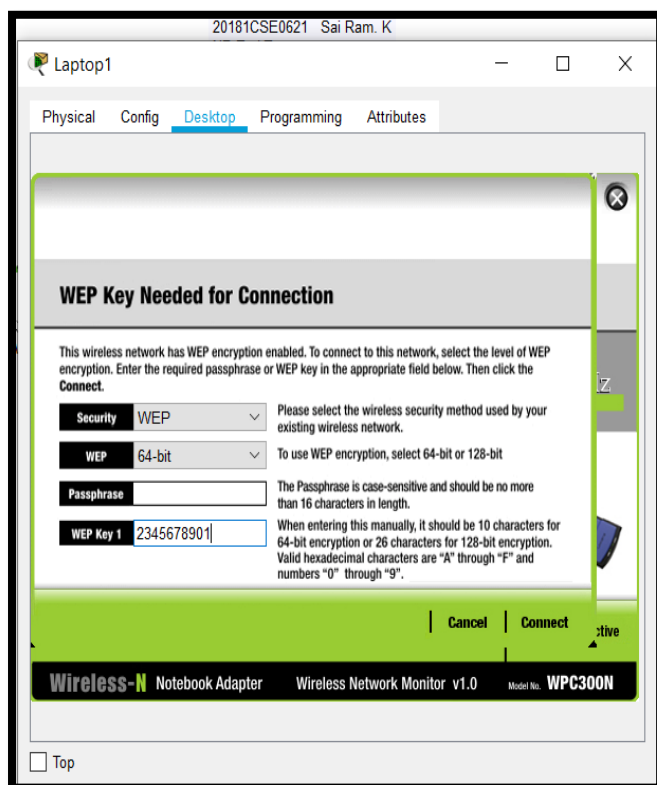
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	0.0.0.0	0.0.0.0	20.0.0.1	255.0.0.0	512	0.0.0.0	0.0.0.0

☐ Top

## Step 7: Configuring Wireless WEP for router 2

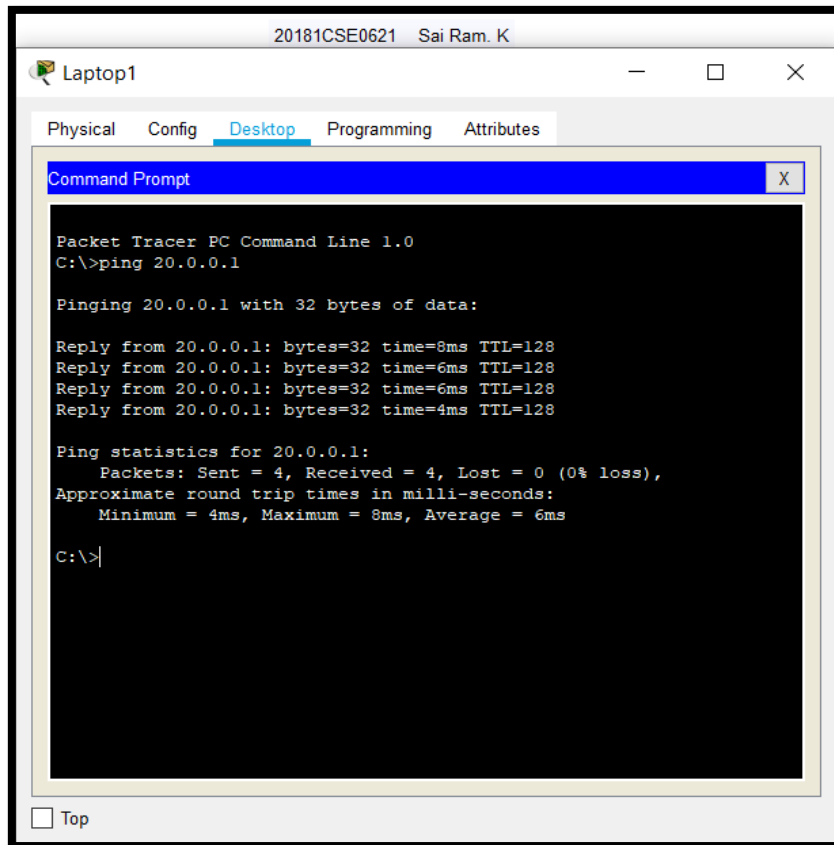


## Step 8: Connecting Laptop to Network 2





## Step 9: Checking ping for Network-2



The screenshot shows a Packet Tracer PC Command Line window for 'Laptop1'. The 'Desktop' tab is selected. The command prompt shows the command 'C:\>ping 20.0.0.1' being executed. The output displays four successful replies from 20.0.0.1 with varying times (8ms, 6ms, 6ms, 4ms) and a TTL of 128. The ping statistics show 4 packets sent, 4 received, and 0 lost, with an average round trip time of 6ms.

```
Packet Tracer PC Command Line 1.0
C:\>ping 20.0.0.1

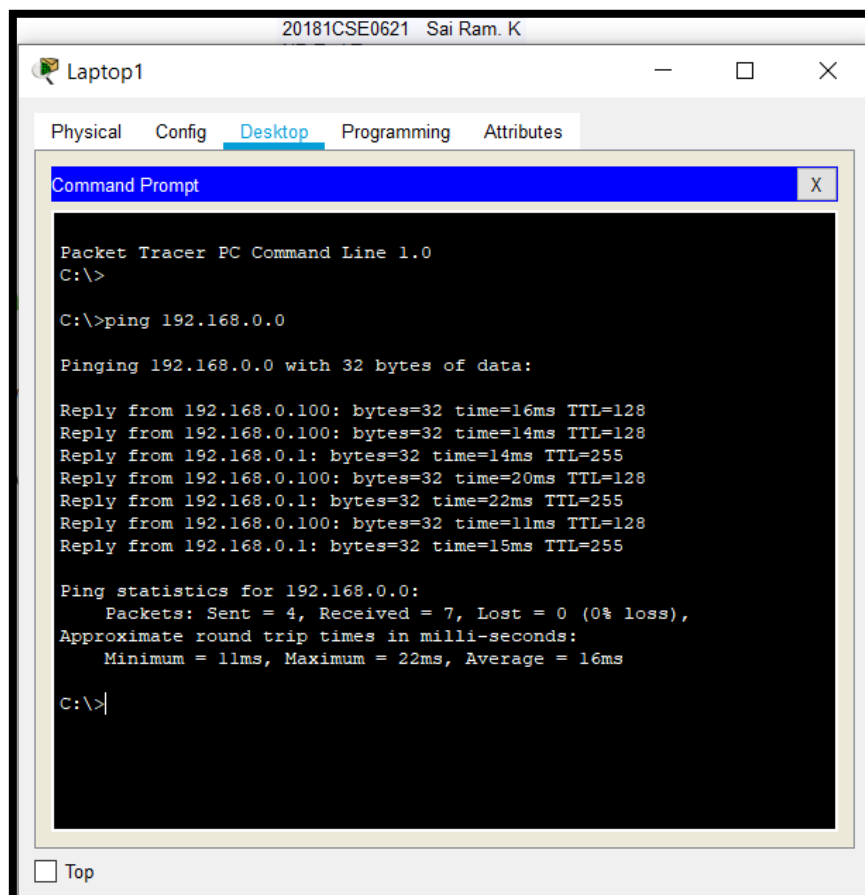
Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1: bytes=32 time=8ms TTL=128
Reply from 20.0.0.1: bytes=32 time=6ms TTL=128
Reply from 20.0.0.1: bytes=32 time=6ms TTL=128
Reply from 20.0.0.1: bytes=32 time=4ms TTL=128

Ping statistics for 20.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 8ms, Average = 6ms

C:\>
```

## Step 10: Checking Network-1 connectivity



The screenshot shows a Packet Tracer PC Command Line window for 'Laptop1'. The 'Desktop' tab is selected. The command prompt shows the command 'C:\>ping 192.168.0.0' being executed. The output displays seven successful replies from 192.168.0.100 and 192.168.0.1 with varying times (16ms, 14ms, 14ms, 20ms, 22ms, 11ms, 15ms) and TTLs of 128 or 255. The ping statistics show 4 packets sent, 7 received, and 0 lost, with an average round trip time of 16ms.

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

C:\>ping 192.168.0.0

Pinging 192.168.0.0 with 32 bytes of data:

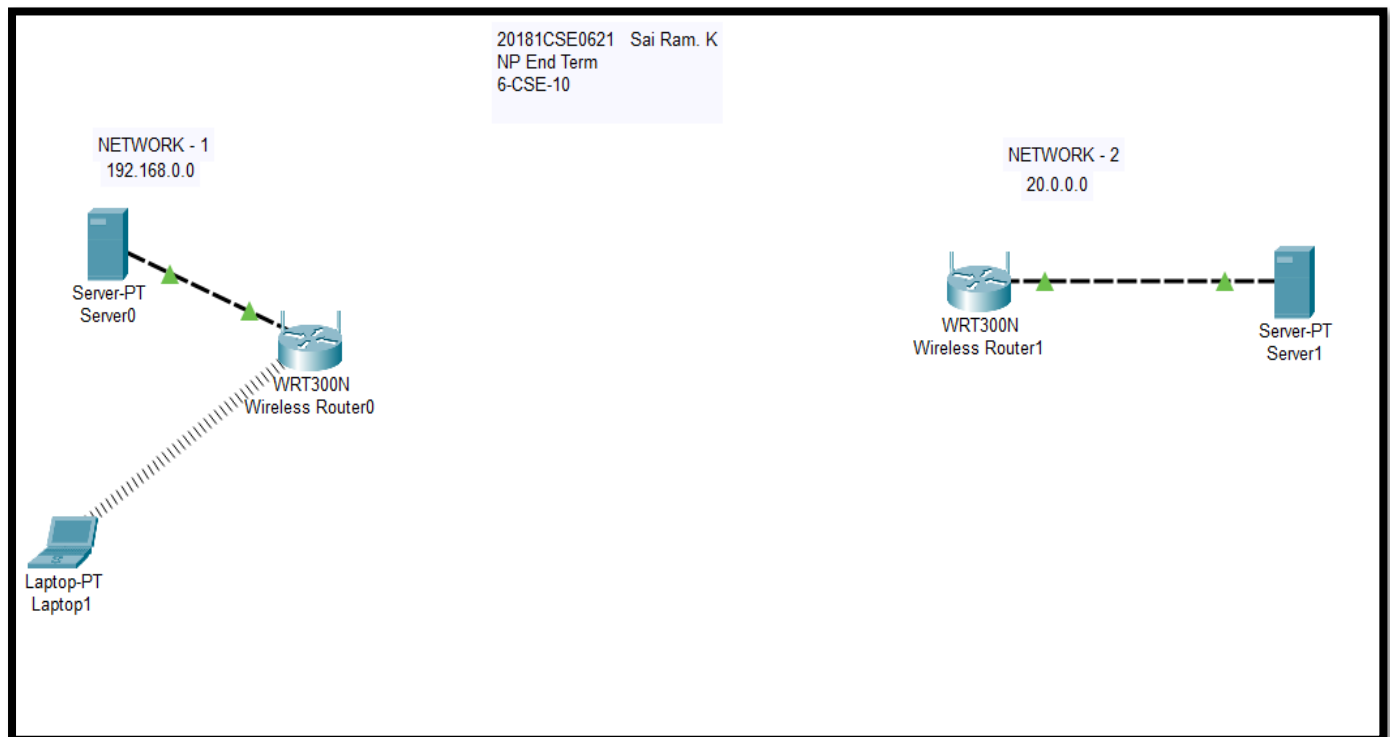
Reply from 192.168.0.100: bytes=32 time=16ms TTL=128
Reply from 192.168.0.100: bytes=32 time=14ms TTL=128
Reply from 192.168.0.1: bytes=32 time=14ms TTL=255
Reply from 192.168.0.100: bytes=32 time=20ms TTL=128
Reply from 192.168.0.1: bytes=32 time=22ms TTL=255
Reply from 192.168.0.100: bytes=32 time=11ms TTL=128
Reply from 192.168.0.1: bytes=32 time=15ms TTL=255

Ping statistics for 192.168.0.0:
    Packets: Sent = 4, Received = 7, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 22ms, Average = 16ms

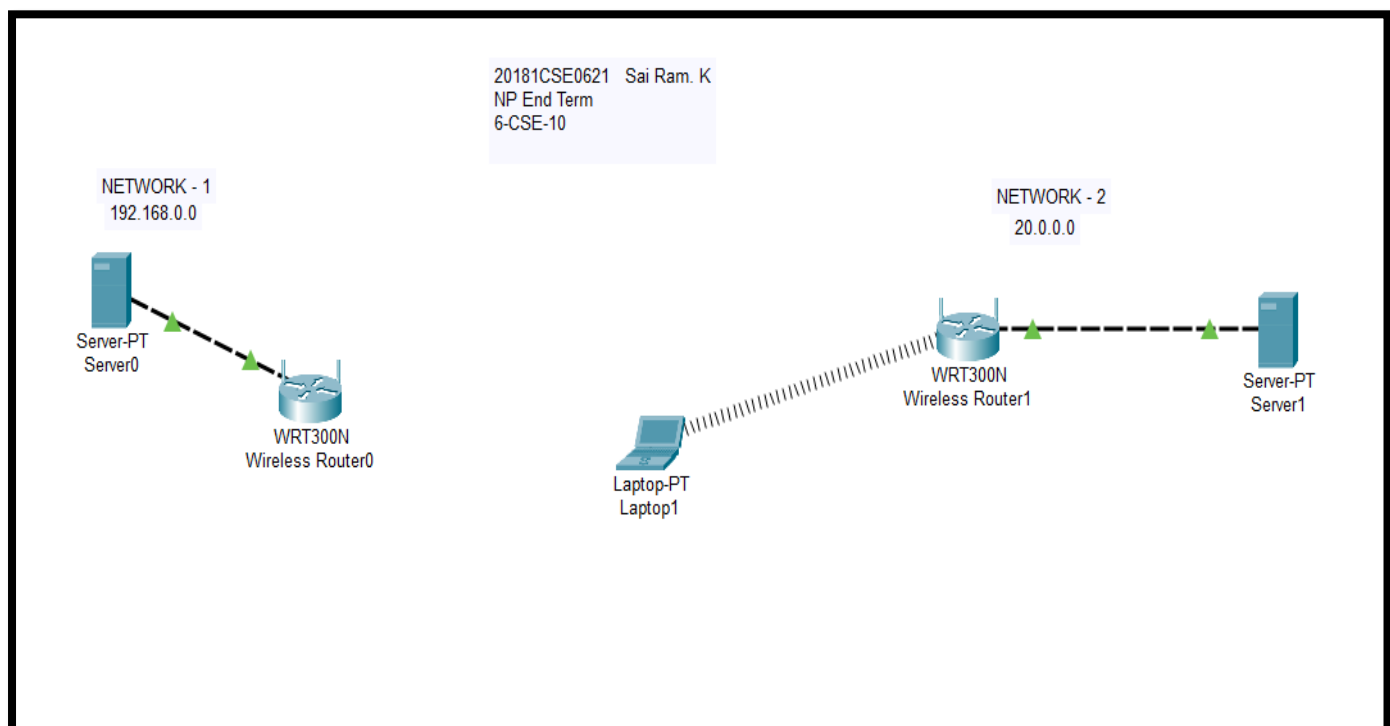
C:\>
```

## Final Output

### Stage 1:



### Stage 2: -



## Question 2]

Network Simulator -2TCL: -

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Q.2 ]  
→

Tcl file:

```

set ns [new Simulator]
set nf [open lab4.nam w]
$ns namtrace-all $nf
set tf [open lab4.tr w]
$ns trace-all $tf
set n0 [$ns node]
set n1 [$ns node]
set n2 [$ns node]
set n3 [$ns node]
set n4 [$ns node]
set n5 [$ns node]
set n6 [$ns node]
set n7 [$ns node]
$ns duplex-link $n0 $n1 100mb 1ms DropTail
$ns duplex-link $n1 $n2 100mb 1ms DropTail
$ns duplex-link $n1 $n4 100mb 1ms DropTail
$ns duplex-link $n1 $n5 100mb 1ms DropTail
$ns duplex-link $n1 $n6 100mb 1ms DropTail
$ns duplex-link $n6 $n7 100mb 1ms DropTail
$ns duplex-link $n4 $n3 100mb 1ms DropTail
set tcp0 [new Agent/TCP]
$ns attach-agent $n0 $tcp0
set ftp0 [new Application/FTP]
$ftp0 attach-agent tcp0
$ftp0 set packetSize - 500
$ftp0 set interval - 0.0001
set sink3 [new Agent/TcpSink]
$ns attach-agent $n3 $sink3
$ns connect $tcp0 $sink3
set udp [new Agent/UDP]
$ns attach-agent $n5 $udp
set cbr [new Application/Traffic/UBR]

```

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```

$chr attach-agent $udp
$chr set fid_ 0
$chr set packetSize - 1000
$chr set interval - 0.0001
set null (new Agent/Null)
$ns attach-agent $n3 $null
$ns connect $udp $null
$ns at 0.1 "$chr start"
$ns at 0.2 "$ftp start"
$ns at 1.0 "finish"
$ns run

```

—> AWK file:

```

BEGIN
{

```

```

    udp = 0;

```

```

    tcp = 0;

```

```

}
if ($1 == "d" && $5 == "chr")
{

```

```

    udp++;

```

```

}
else if ($1 == "d" && $5 == "tcp")
{

```

```

    tcp++;

```

```

}
}

```

```

END
{

```

```

    printf("Packets dropped by TCP = %d\n", tcp);

```

```

    printf("Packets dropped by UDP = %d\n", udp);
}

```

## Steps for Execution

→ STEPS for Execution:-

- 1] Open the vi editor and type the program of TCL in the file with extension ".tcl".
- 2] Save the program by pressing "ESC key" followed by "shift and :" simultaneously and type "wq" and press enter.
- 3] Open the vi editor and type the AWK program with extension ".awk".
- 4] Save the above program by following step 2.
- 5] Run the simulation program by typing  
ns lab4.tcl
- 6] Press the play button in the simulation and the simulation will begin.
- 7] After the simulation run the 'awk file' to see the output.
- 8] To see the contents of the trace file type:  
awk -f lab4.awk lab4.tr

