

Worksheet – 2.3

Student Name: Vivek Kumar

UID: 21BCS8129

Branch: BE-CSE (LEET)

Section/Group: 809/A

Semester: 4th

Date of Performance: 15/04/2022

Subject Name: Computer Network Lab

Subject Code: 20CSP-257

1. Aim/Overview of the practical:

Create a network to implement Distance Vector routing Protocol using Packet Tracer (STATIC).

2. Task to be done/ Which logistics used:

Distance Vector routing Protocol using Packet Tracer (STATIC).

Prerequisites:

S/W:

- Laptop/Desktop
- CISCO Packet Tracer program

H/W:

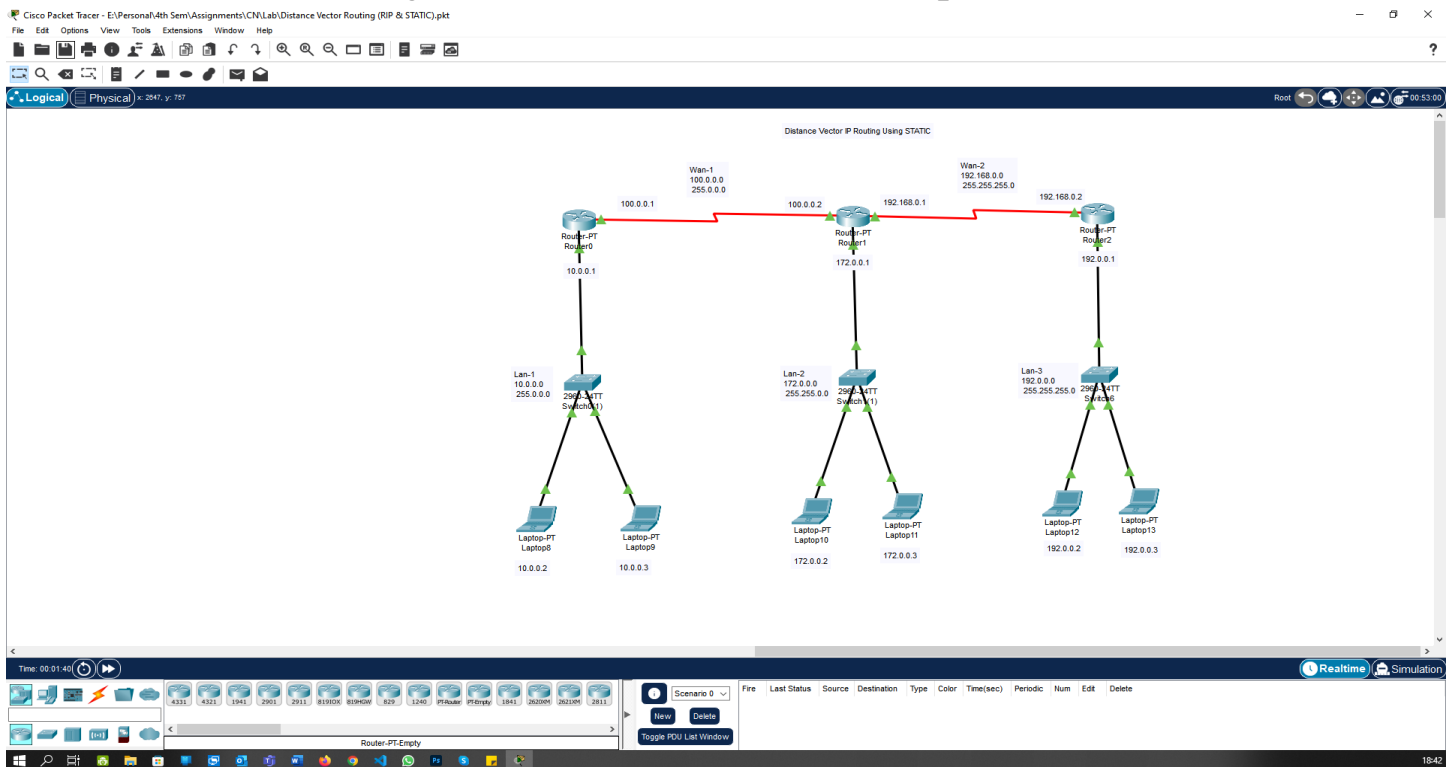
- Main Memory - 128 MB RAM
- Hard Disk – minimum 20 GB IDE Hard Disk
- 44 MB Floppy Disk Drive
- –52X IDE CD-ROM Drive
- PS/2 HCL

3. Steps for experiment/Code with Result/Output:

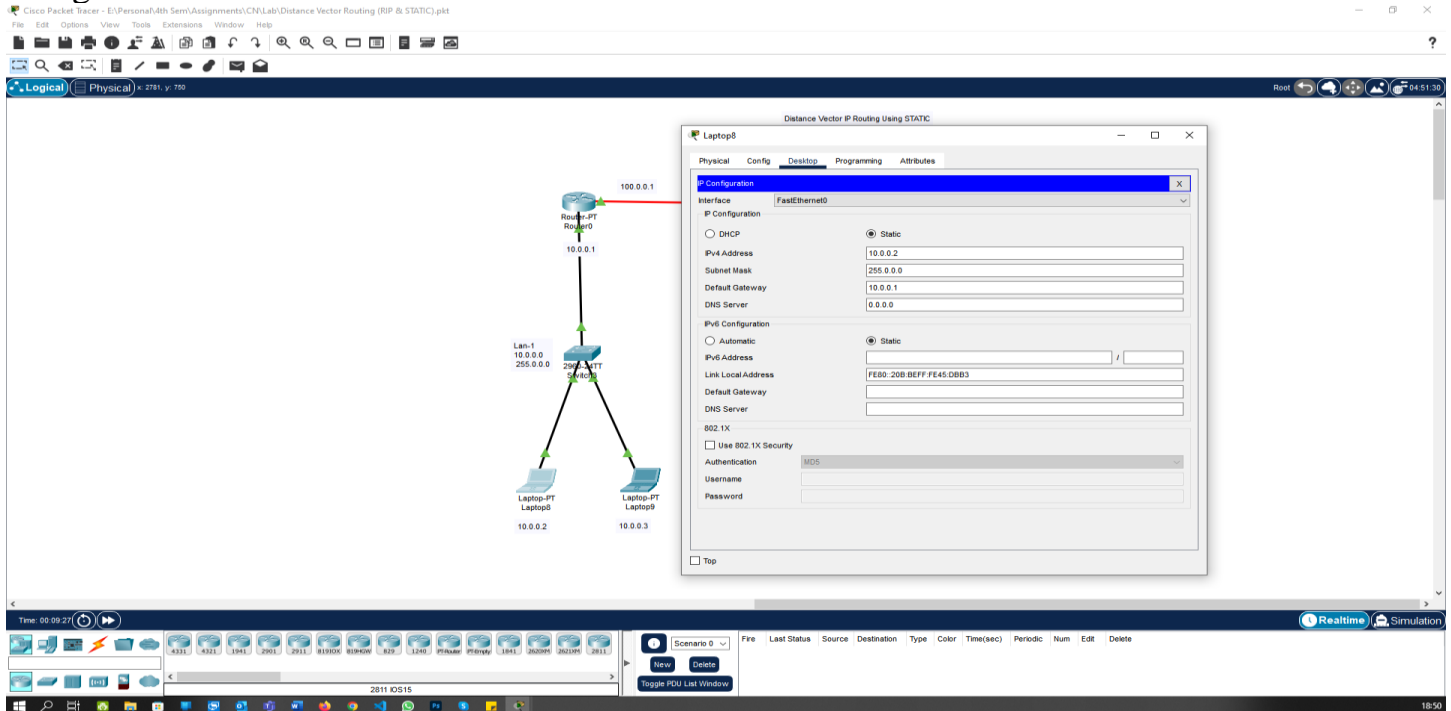
Theory: In computer communication theory relating to packet-switched networks, a distance-vector routing protocol is one of the two major classes of routing protocols, the other major class being the link-state protocol. Distance-vector routing protocols use the Bellman–Ford algorithm, Ford–Fulkerson algorithm, or DUAL FSM (in the case of Cisco System’s protocols) to calculate paths. A distance-vector routing protocol requires that a router informs its neighbors of topology changes periodically. Compared to link-state protocols, which require a router to inform all the nodes in a network of topology changes, distance-vector routing protocols have less computational complexity and message overhead.

Procedure:

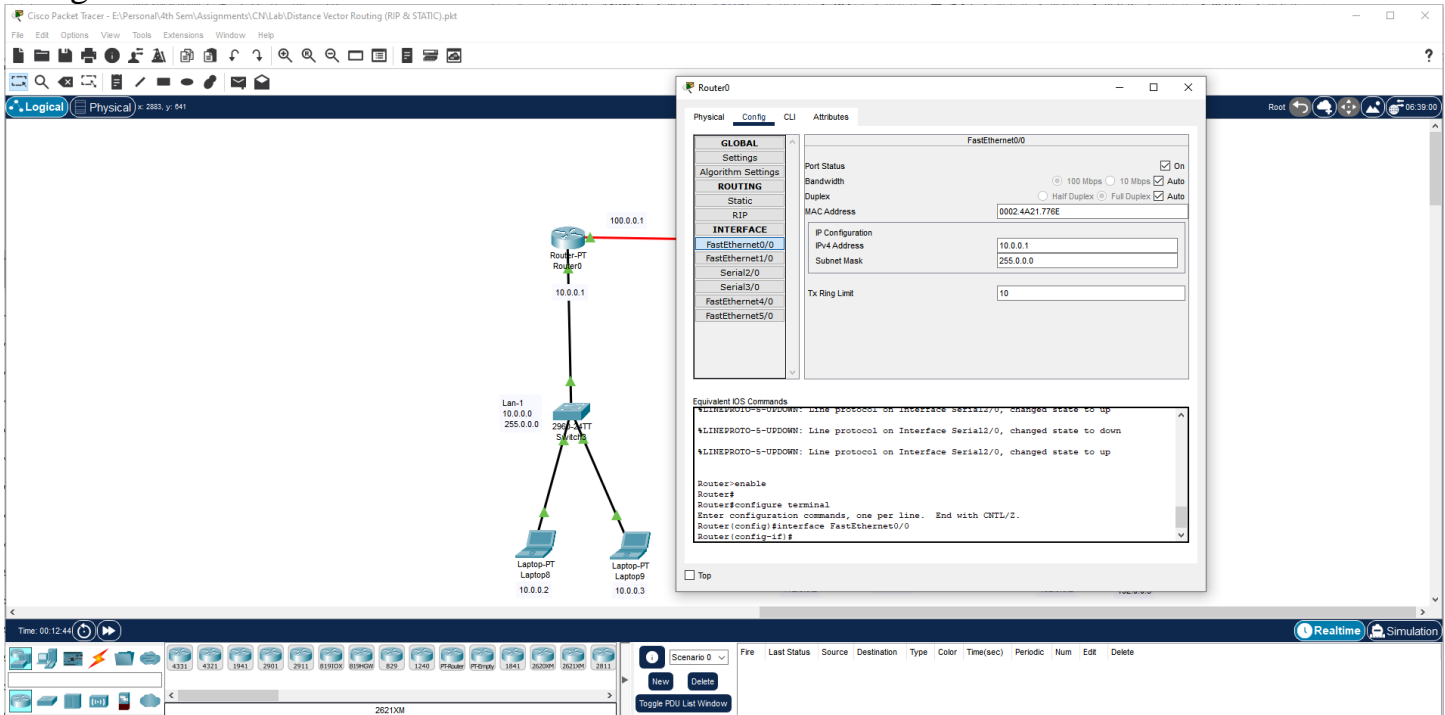
Create the network using 3 router which contains serial port in it.



Assign the IP address for all PC and Router connected to the Switch 3.

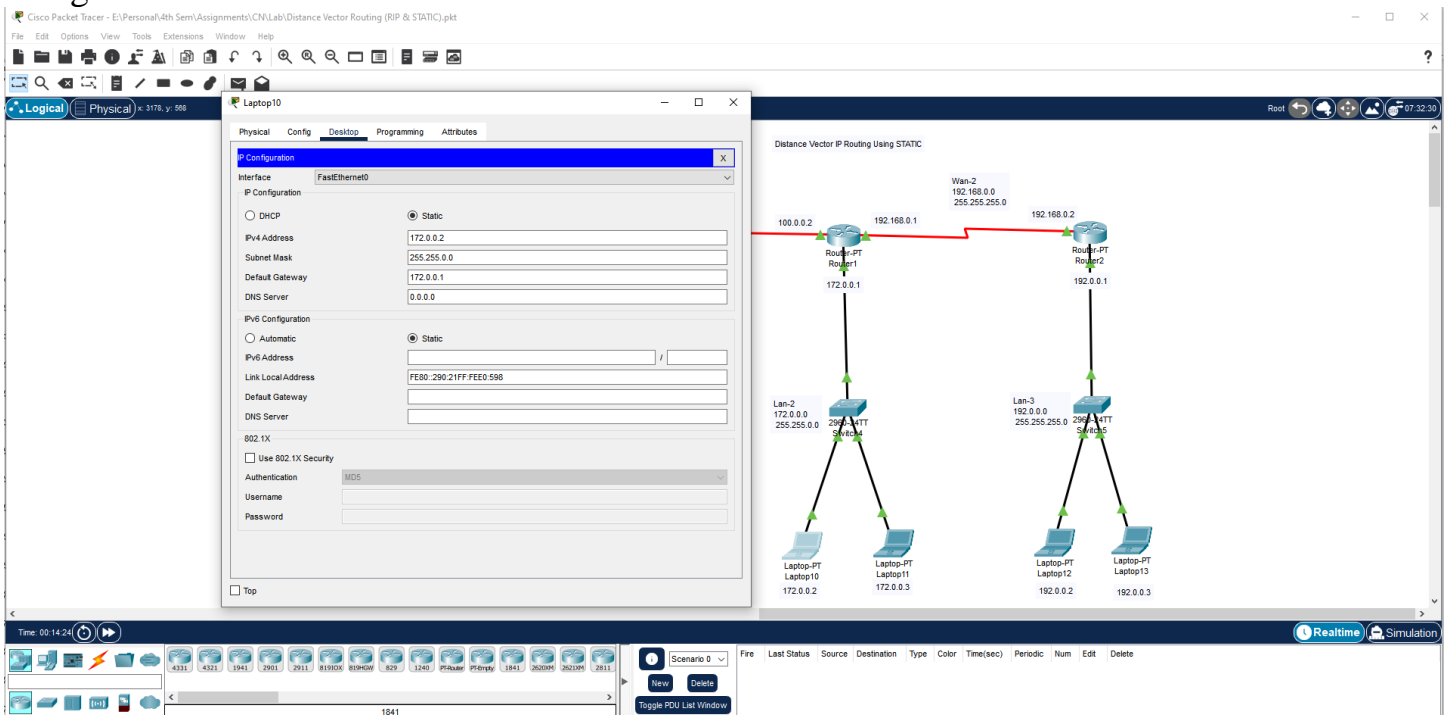


Assign the IP address for Router 0.



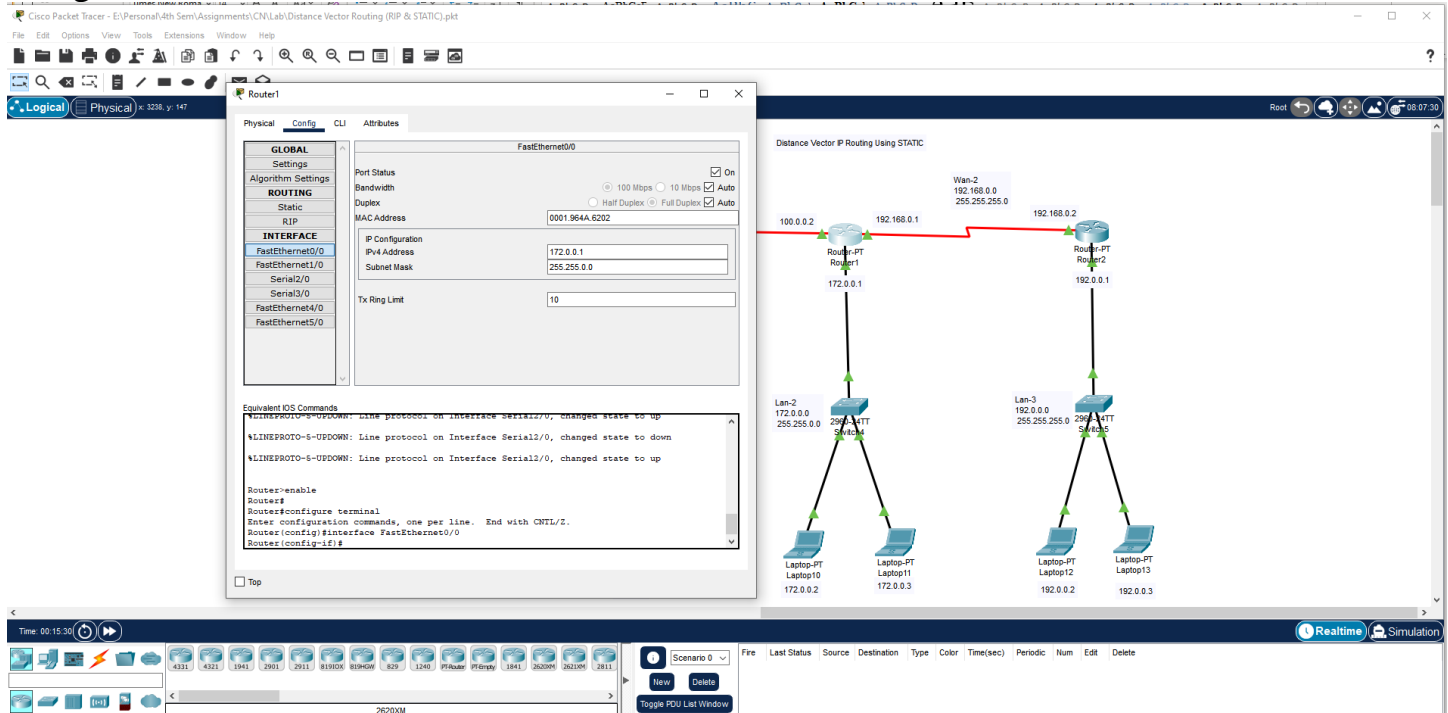
The screenshot shows the Cisco Packet Tracer interface with a network diagram and the configuration window for Router0. The network diagram shows Router0 connected to a switch (Lan-1) which is connected to two laptops (Laptop-PT Laptop9 and Laptop-PT Laptop10). The configuration window for Router0 is open, showing the configuration for the FastEthernet0/0 interface. The IP address is set to 10.0.0.1 and the subnet mask is 255.0.0.0. The configuration window also shows the equivalent IOS commands and the configuration mode prompt.

Assign the IP address for all PC and Router connected to the Switch 4.



The screenshot shows the Cisco Packet Tracer interface with a network diagram and the configuration window for Laptop10. The network diagram shows two routers (Router-PT Router1 and Router-PT Router2) connected to each other. Router1 is connected to a switch (Lan-2) which is connected to two laptops (Laptop-PT Laptop10 and Laptop-PT Laptop11). Router2 is connected to a switch (Lan-3) which is connected to two laptops (Laptop-PT Laptop12 and Laptop-PT Laptop13). The configuration window for Laptop10 is open, showing the configuration for the FastEthernet0 interface. The IP address is set to 172.0.0.2 and the subnet mask is 255.255.0.0. The configuration window also shows the configuration mode prompt.

Assign the IP address for Router 1.



The screenshot shows the Cisco Packet Tracer interface with the 'Router1' configuration window open. The 'Config' tab is selected, and the 'FastEthernet0/0' interface is being configured. The 'IP Configuration' section shows the following settings:

- Port Status: On
- Bandwidth: 100 Mbps
- Duplex: Auto
- MAC Address: 0001.96AA.6202
- IP Configuration:
 - IPv4 Address: 172.0.0.1
 - Subnet Mask: 255.255.0.0
- Tx Ring Limit: 10

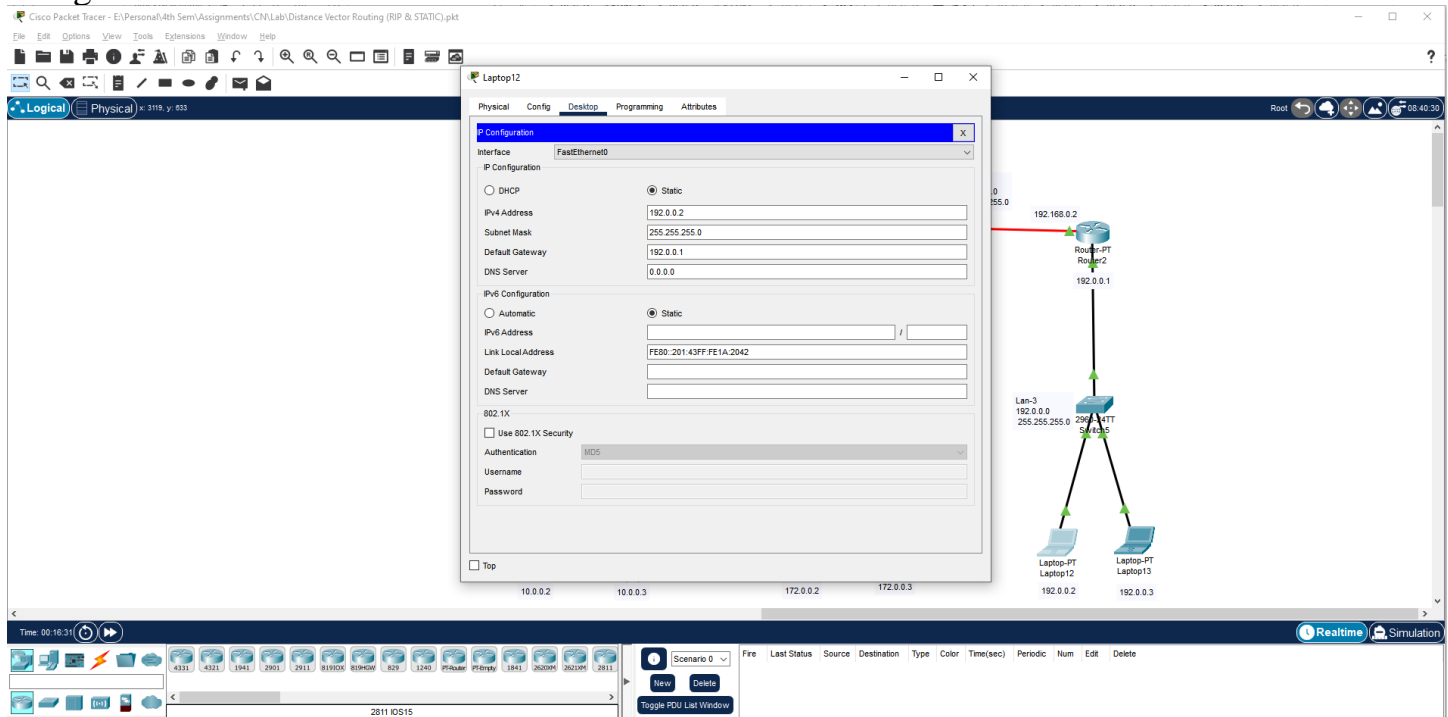
The 'Equivalent IOS Commands' section shows the following commands:

```

Router1>enable
Router1#configure terminal
Router1(config)#interface FastEthernet0/0
Router1(config-if)#
  
```

The background network diagram shows a topology with two routers (Router-PT Router1 and Router-PT Router2) connected via a WAN link. Router1 is connected to a switch (Lan-2) which is connected to two laptops (Laptop-PT Laptop10 and Laptop-PT Laptop11). Router2 is connected to a switch (Lan-3) which is connected to two laptops (Laptop-PT Laptop12 and Laptop-PT Laptop13).

Assign the IP address for all PC and Router connected to the Switch 4.

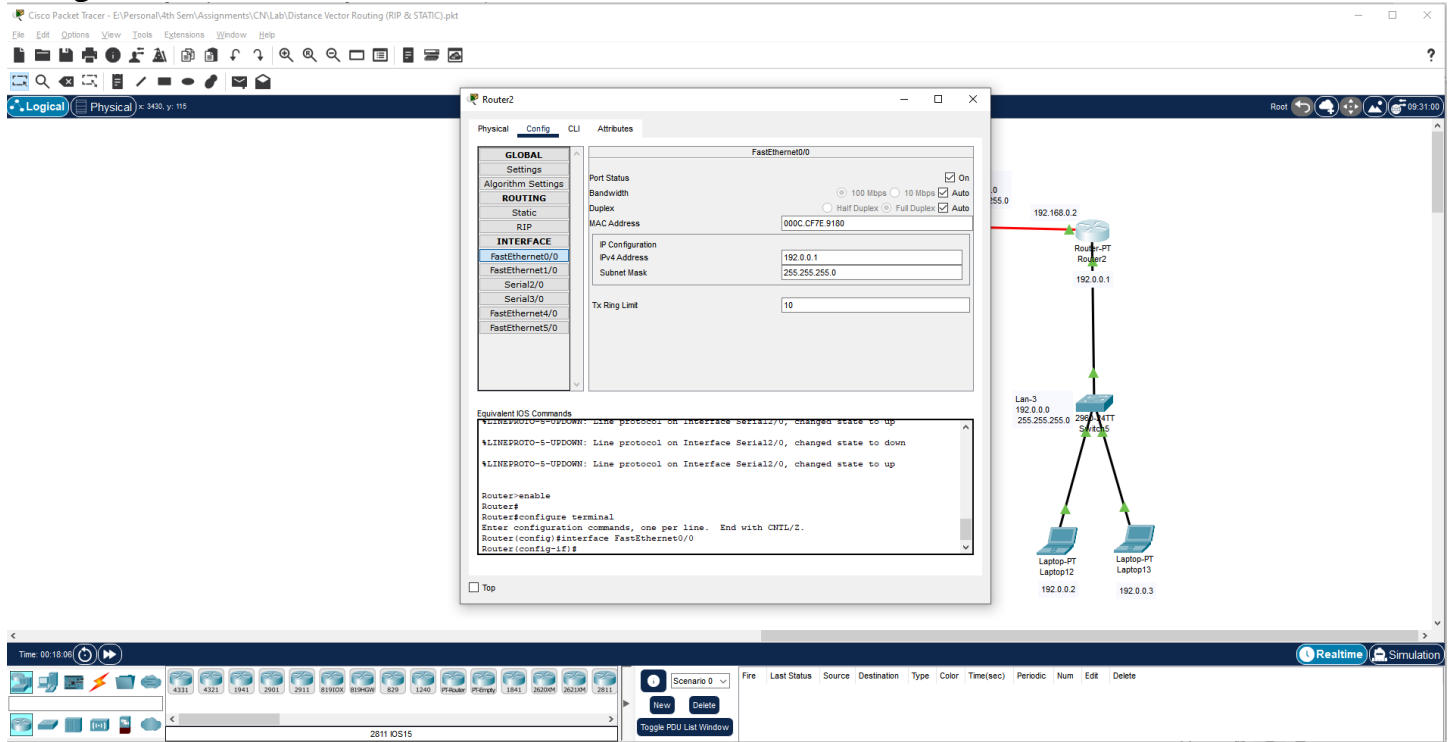


The screenshot shows the Cisco Packet Tracer interface with the 'Laptop12' configuration window open. The 'Desktop' tab is selected, and the 'IP Configuration' section is being configured. The 'Static' radio button is selected, and the following settings are shown:

- Interface: FastEthernet0
- IP Configuration:
 - Static: Selected
 - IPv4 Address: 192.0.0.2
 - Subnet Mask: 255.255.255.0
 - Default Gateway: 192.0.0.1
 - DNS Server: 0.0.0.0
- IPv6 Configuration:
 - Static: Selected
 - IPv6 Address: FE80::201:43FF:FE1A:2042
 - Link Local Address: FE80::201:43FF:FE1A:2042
 - Default Gateway:
 - DNS Server:
- 802.1X:
 - Use 802.1X Security:
 - Authentication:
 - Username:
 - Password:

The background network diagram shows a topology with two routers (Router-PT Router1 and Router-PT Router2) connected via a WAN link. Router1 is connected to a switch (Lan-2) which is connected to two laptops (Laptop-PT Laptop10 and Laptop-PT Laptop11). Router2 is connected to a switch (Lan-3) which is connected to two laptops (Laptop-PT Laptop12 and Laptop-PT Laptop13).

Assign the IP address for Router 2.



The screenshot shows the Cisco Packet Tracer interface with Router 2 selected. The configuration window for FastEthernet0/0 is open, showing the following settings:

- Port Status:** On
- Bandwidth:** 100 Mbps
- Duplex:** Full Duplex
- MAC Address:** 000C.CF7E.9180
- IP Configuration:**
 - IPv4 Address: 192.0.0.1
 - Subnet Mask: 255.255.255.0
- Tx Ring Limit:** 10

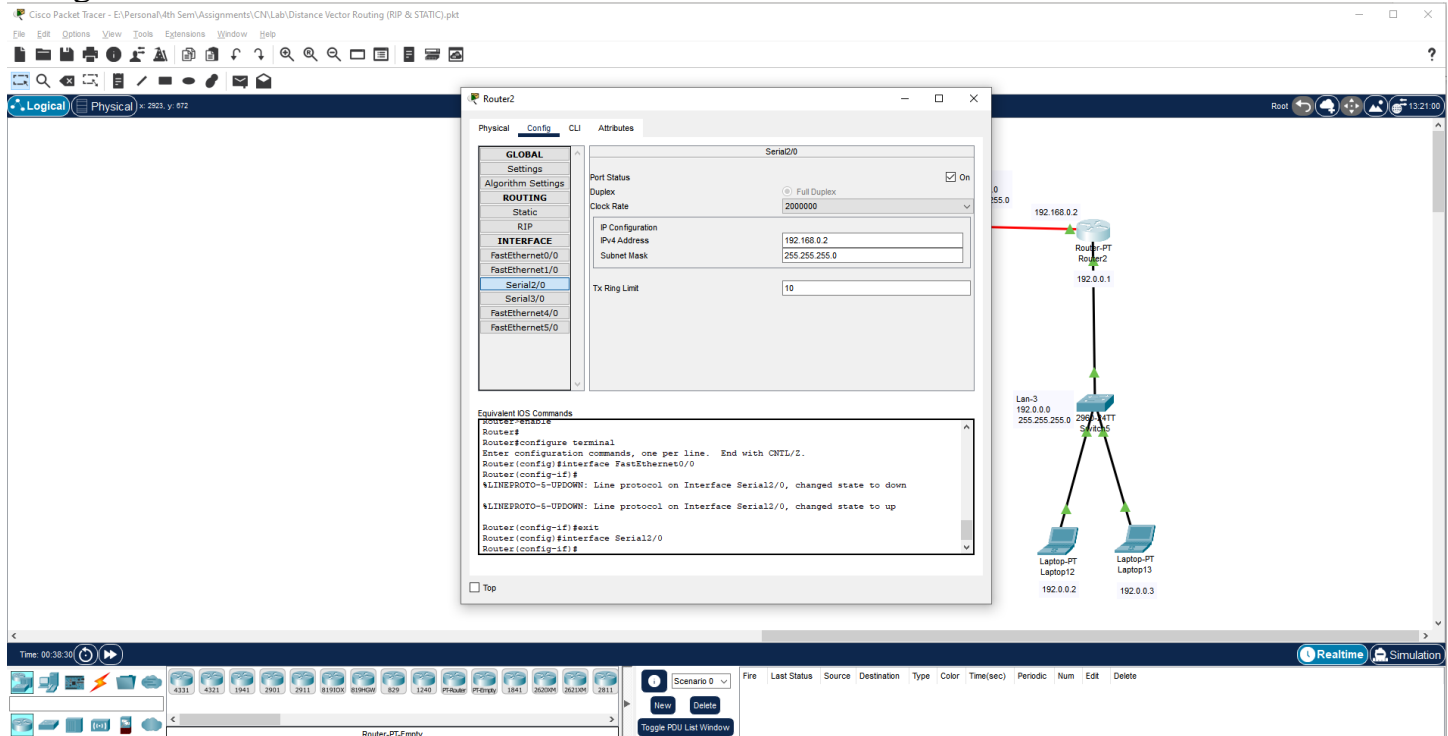
The Equivalent IOS Commands window shows the following commands:

```

Router>enable
Router>configure terminal
Router(config)#interface FastEthernet0/0
Router(config-if)#
  
```

The network diagram shows Router 2 connected to a switch (Lan-3) which is connected to two laptops (Laptop-PT 12 and Laptop-PT 13). The switch has IP 192.0.0.0 and 255.255.255.0. The laptops have IP 192.0.0.2 and 192.0.0.3 respectively.

Assign the IP address for Serial Ports of Router 2.



The screenshot shows the Cisco Packet Tracer interface with Router 2 selected. The configuration window for Serial0/0 is open, showing the following settings:

- Port Status:** On
- Duplex:** Full Duplex
- Clock Rate:** 2000000
- IP Configuration:**
 - IPv4 Address: 192.168.0.2
 - Subnet Mask: 255.255.255.0
- Tx Ring Limit:** 10

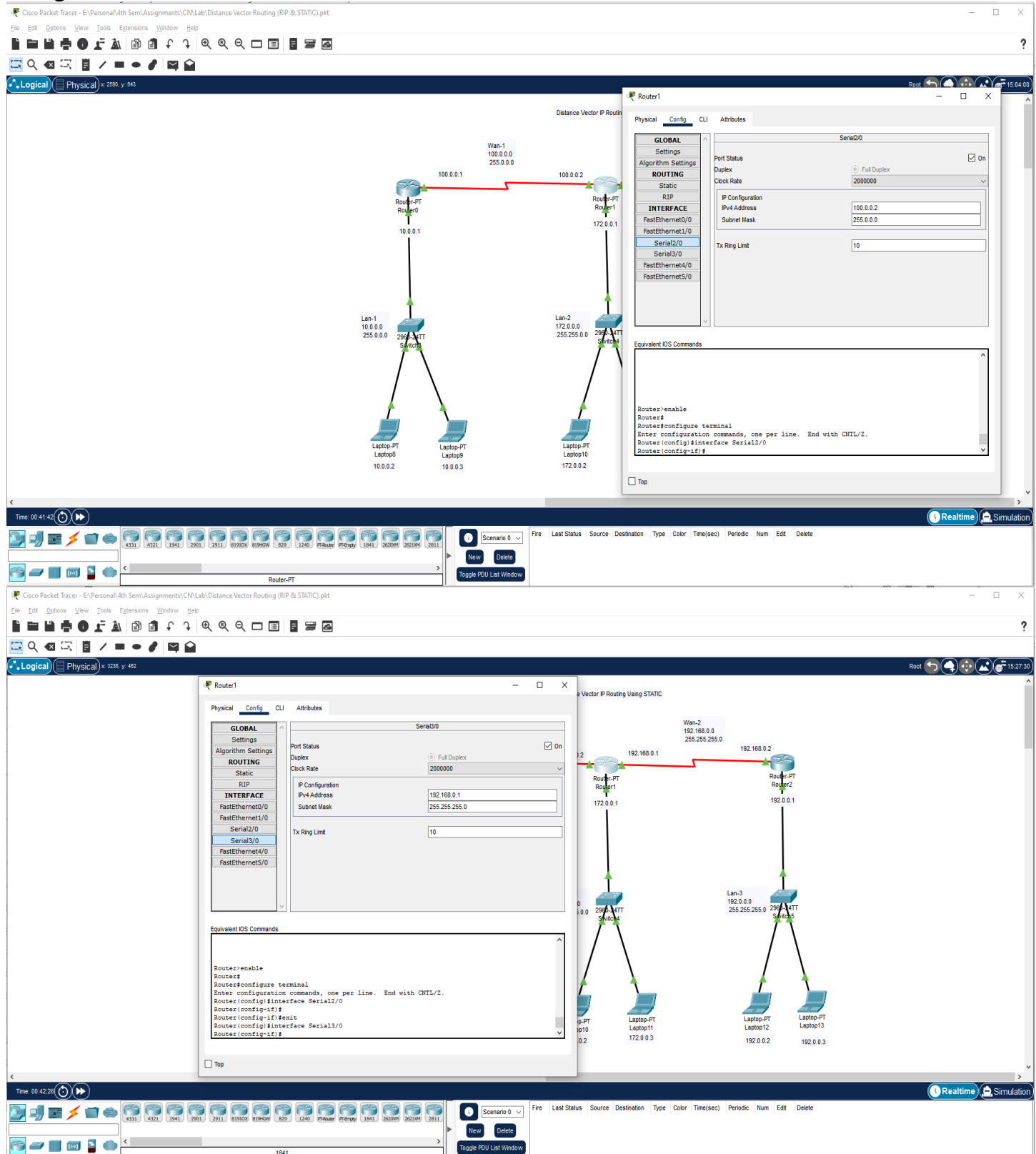
The Equivalent IOS Commands window shows the following commands:

```

Router>enable
Router>configure terminal
Router(config)#interface Serial0/0
Router(config-if)#
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/0, changed state to down
Router(config-if)#exit
Router(config)#interface Serial12/0
Router(config-if)#
  
```

The network diagram shows Router 2 connected to a switch (Lan-3) which is connected to two laptops (Laptop-PT 12 and Laptop-PT 13). The switch has IP 192.0.0.0 and 255.255.255.0. The laptops have IP 192.0.0.2 and 192.0.0.3 respectively.

Assign the IP address for Serial Ports of Router 1.



The screenshot displays the Cisco Packet Tracer interface with a network topology and the configuration window for Router1.

Network Topology:

- Router1 (PT Router0):** Connected to Router2 (PT Router1) via a serial link. It has a LAN connected to a switch (2960-ATT Switch0) which is connected to two laptops (Laptop-PT Laptop9 and Laptop-PT Laptop10).
- Router2 (PT Router1):** Connected to Router1 via a serial link. It has a LAN connected to a switch (2960-ATT Switch1) which is connected to two laptops (Laptop-PT Laptop11 and Laptop-PT Laptop12).
- IP Addresses:**
 - Router1 Serial2/0: 100.0.0.1
 - Router2 Serial2/0: 100.0.0.2
 - Router1 LAN: 10.0.0.0/24
 - Router2 LAN: 172.0.0.0/24

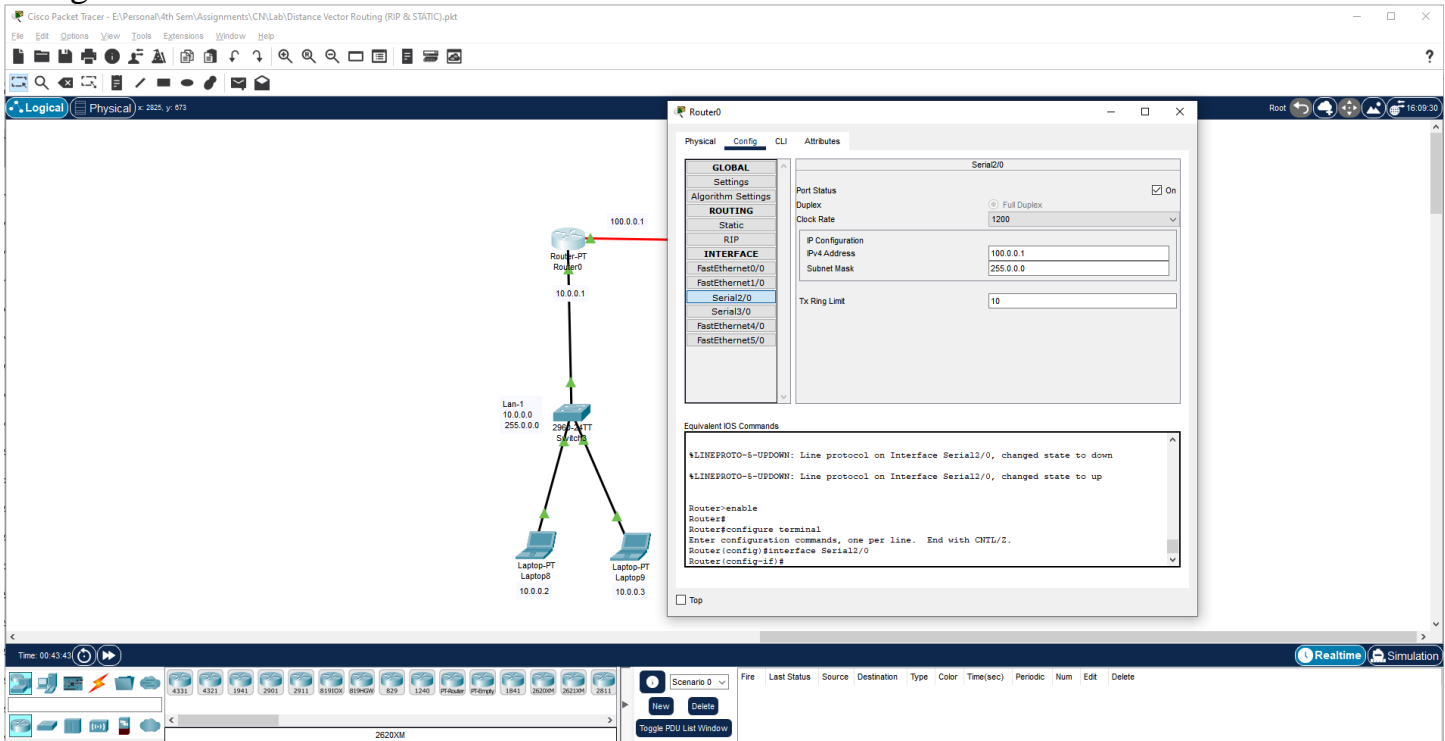
Router1 Configuration (Config Tab):

- GLOBAL Settings:**
 - Port Status: ☒ On
 - Duplex: Full Duplex
 - Clock Rate: 2000000
- ROUTING:**
 - Static: ☒ (Selected)
 - RIP: ☐
- INTERFACE:**
 - FastEthernet0/0:
 - FastEthernet1/0:
 - Serial2/0: (Selected)
 - Serial3/0:
 - FastEthernet4/0:
 - FastEthernet5/0:

Equivalent IOS Commands:

```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface Serial2/0
Router(config-if)#
```

Assign the IP address for Serial Ports of Router 0.



The screenshot shows the Cisco Packet Tracer interface with a network diagram and the configuration window for Router0.

Network Diagram:

- Router-PT Router0 is connected to a 2960-KTT Switch via a serial link (100.0.0.1 to 10.0.0.1).
- The switch is connected to two laptops: Laptop-PT Laptop8 (10.0.0.2) and Laptop-PT Laptop9 (10.0.0.3).
- The switch has a LAN-1 interface with IP 10.0.0.0 and subnet mask 255.0.0.0.

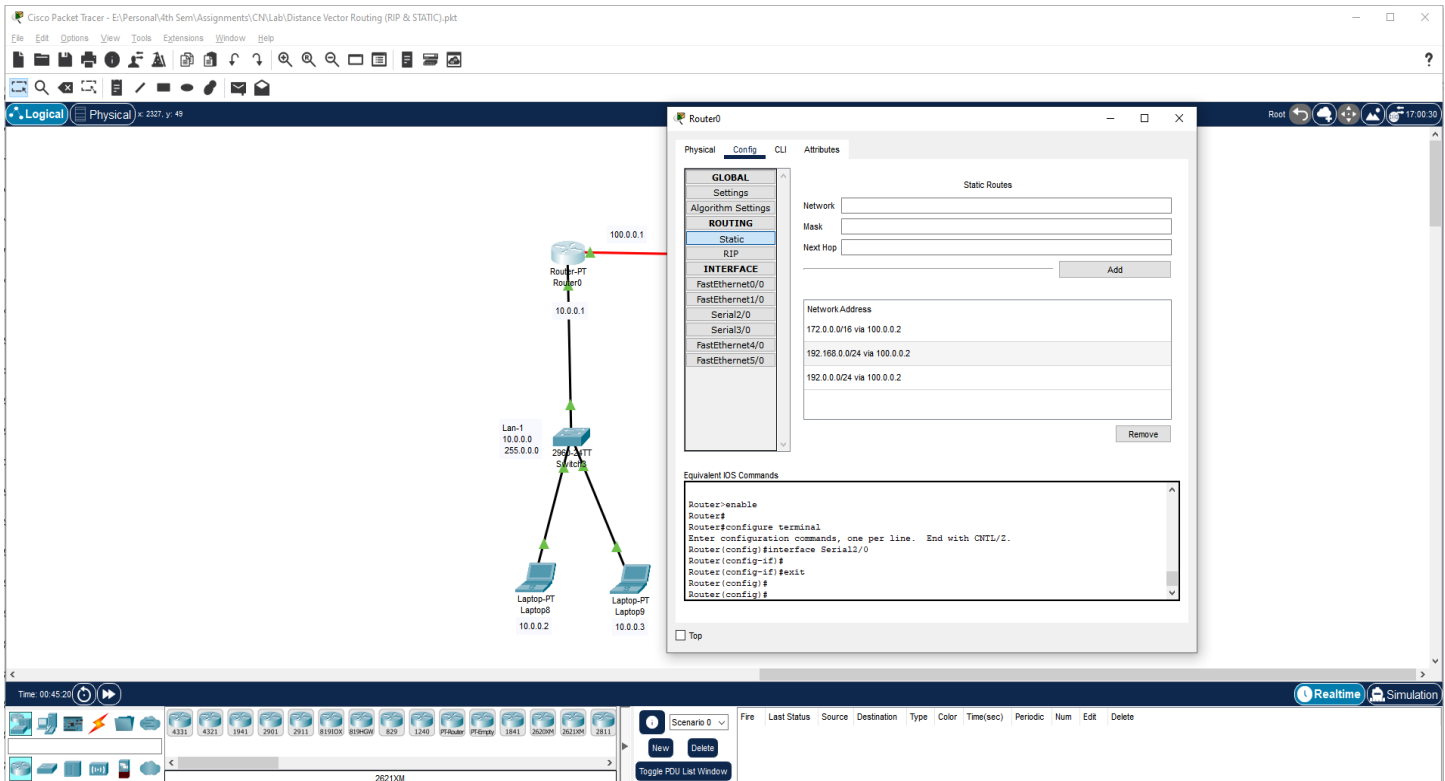
Router0 Configuration Window:

- Physical Tab:** Shows the Serial2/0 interface.
- Config Tab:**
 - GLOBAL Settings:**
 - ROUTING:** Static, RIP.
 - INTERFACE:** FastEthernet0/0, Serial2/0, FastEthernet4/0, FastEthernet5/0.
 - Serial2/0 Configuration:**
 - Port Status: On
 - Duplex: Full Duplex
 - Clock Rate: 1200
 - IP Configuration:
 - Pv4 Address: 100.0.0.1
 - Subnet Mask: 255.0.0.0
 - Tx Ring Limit: 10
- Equivalent IOS Commands:**

```

Router>enable
Router#
Router>configure terminal
Router(config)#interface Serial2/0
Router(config-if)#
          
```

Add the Static Routes in Router 0.



The screenshot shows the Cisco Packet Tracer interface with the same network diagram and the configuration window for Router0.

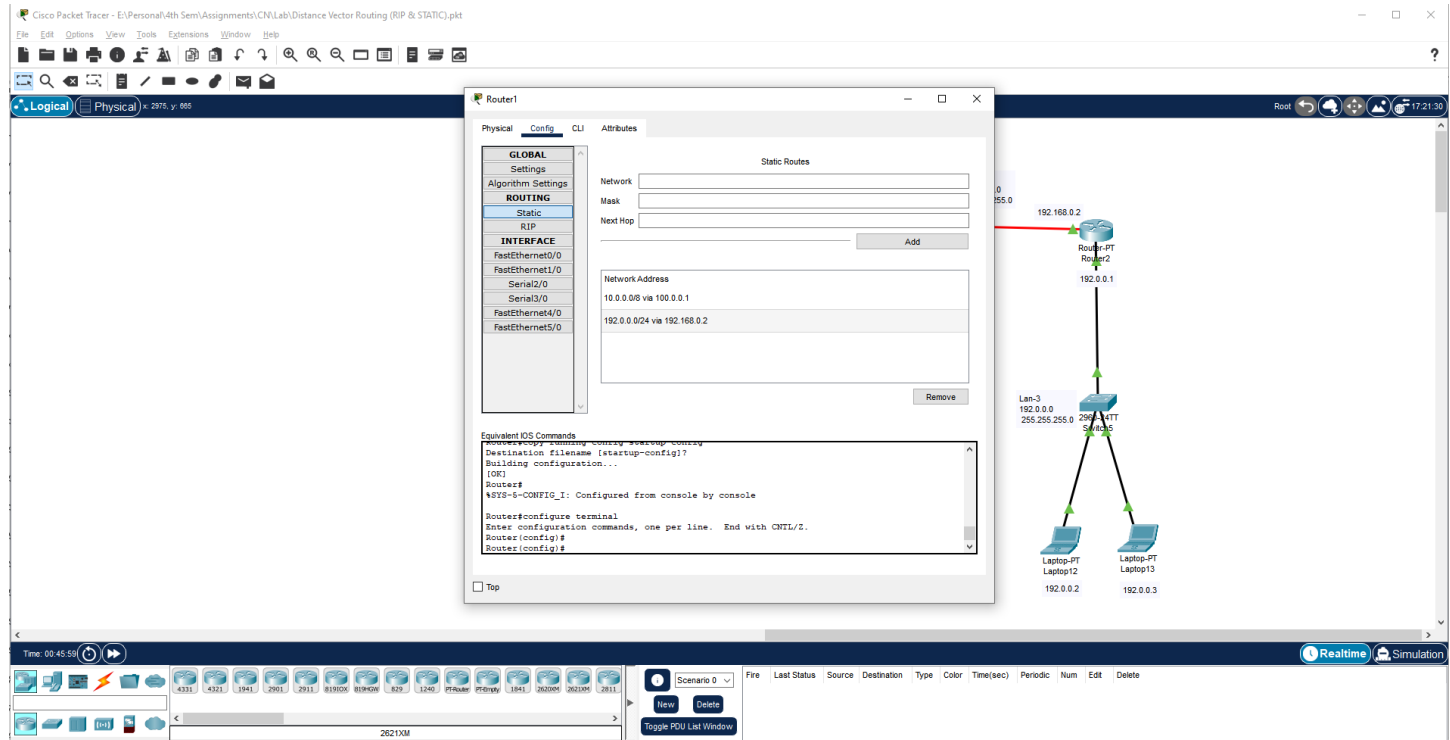
Router0 Configuration Window:

- Physical Tab:** Shows the Serial2/0 interface.
- Config Tab:**
 - GLOBAL Settings:**
 - ROUTING:** Static, RIP.
 - INTERFACE:** FastEthernet0/0, Serial2/0, FastEthernet4/0, FastEthernet5/0.
 - Static Routes:**
 - Network: 172.0.0.0/16 via 100.0.0.2
 - Network: 192.168.0.0/24 via 100.0.0.2
 - Network: 192.0.0.0/24 via 100.0.0.2
- Equivalent IOS Commands:**

```

Router>enable
Router#
Router>configure terminal
Router(config)#interface Serial2/0
Router(config-if)#
Router(config)#exit
Router(config)#
Router(config)#
          
```


Add the Static Routes in Router 1.



The screenshot shows the Cisco Packet Tracer interface with Router 1's configuration window open. The 'Static Routes' tab is selected, and the following routes are added:

- Network: 10.0.0.0/8, Next Hop: 192.0.0.1
- Network: 192.0.0.0/24, Next Hop: 192.168.0.2

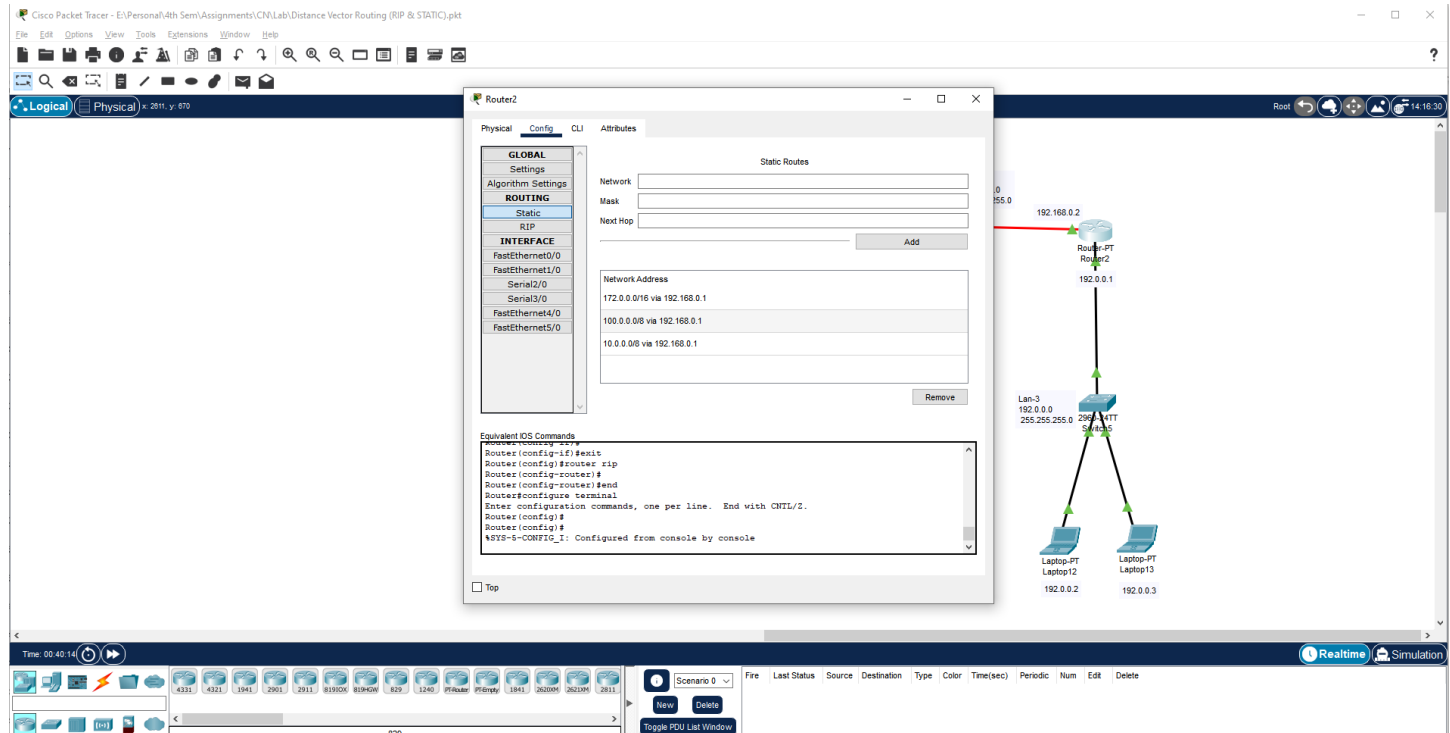
The 'Equivalent IOS Commands' section shows the following commands:

```

Router>copy running-config startup-config
Destination filename [startup-config]?
[OK]
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
  
```

The network diagram shows Router 1 (192.0.0.1) connected to Router 2 (192.168.0.2) via a serial link. Router 2 is connected to a switch (2951) which is connected to two laptops (Laptop-PT 192.0.0.2 and 192.0.0.3).

Add the Static Routes in Router 2.



The screenshot shows the Cisco Packet Tracer interface with Router 2's configuration window open. The 'Static Routes' tab is selected, and the following routes are added:

- Network: 172.0.0.0/16, Next Hop: 192.168.0.1
- Network: 100.0.0.0/8, Next Hop: 192.168.0.1
- Network: 10.0.0.0/8, Next Hop: 192.168.0.1

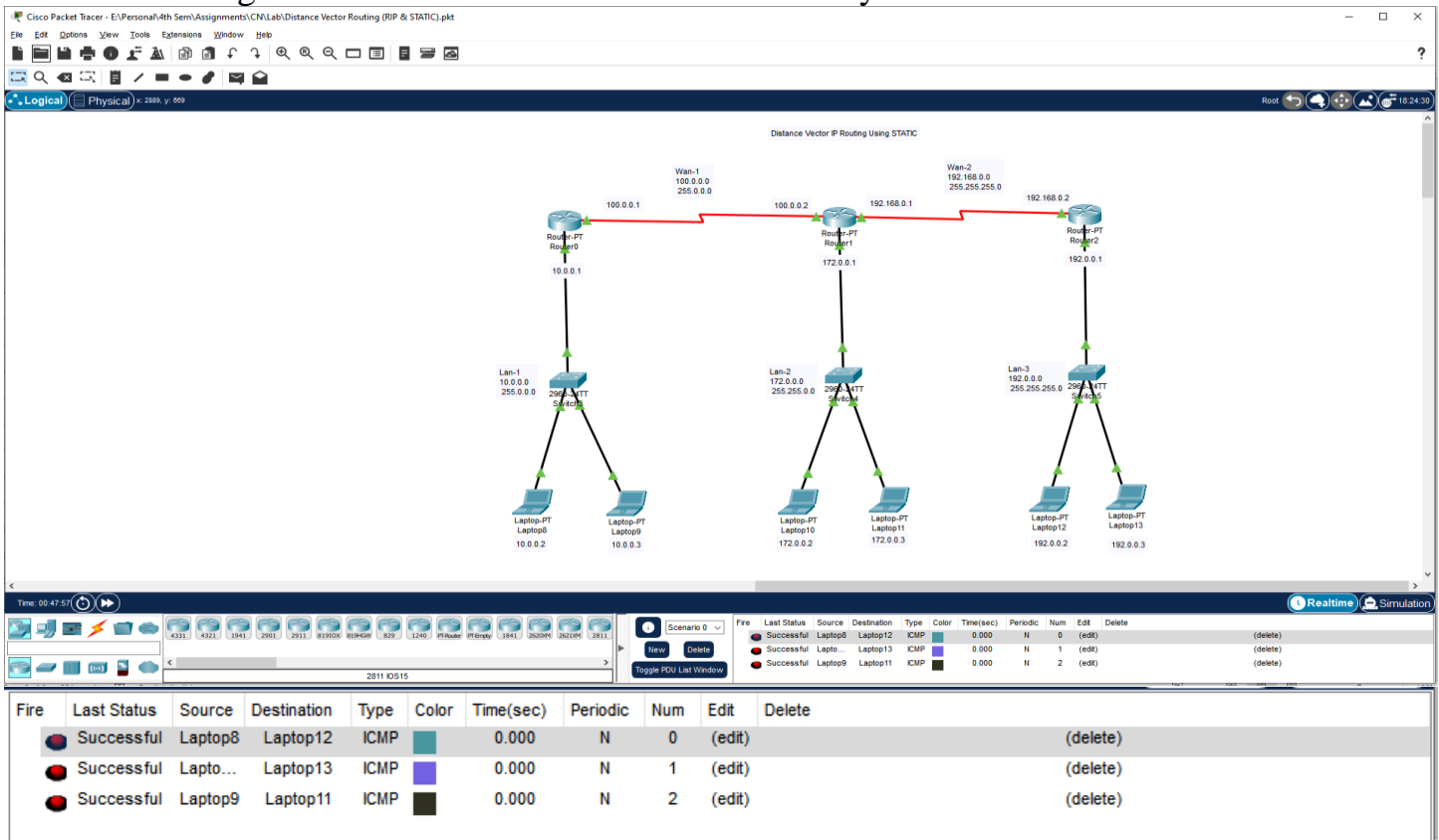
The 'Equivalent IOS Commands' section shows the following commands:

```

Router>configure terminal
Router(config)#ip route 172.0.0.0 16 192.168.0.1
Router(config)#ip route 100.0.0.0 8 192.168.0.1
Router(config)#ip route 10.0.0.0 8 192.168.0.1
Router(config)#end
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#
%SYS-5-CONFIG_I: Configured from console by console
  
```

The network diagram is the same as in the previous screenshot, showing Router 1 connected to Router 2, which is connected to a switch and two laptops.

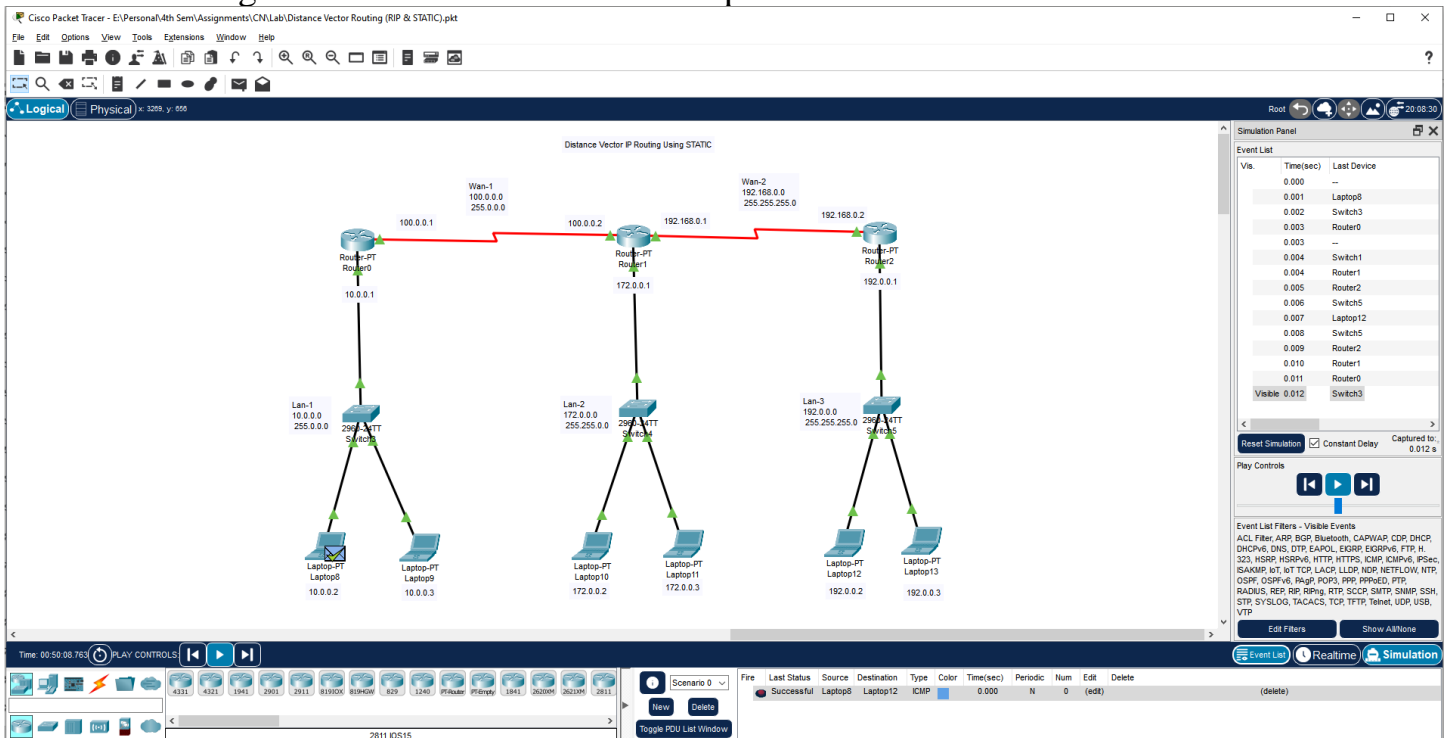
Send the Message in Realtime and Check the Connectivity.



The screenshot shows the Cisco Packet Tracer interface in Realtime mode. The network topology consists of three routers (R0, R1, R2) connected in a line. R0 is connected to R1, and R1 is connected to R2. Each router has a LAN connected to it. R0's LAN (Lan-1) has two laptops (Laptop8, Laptop9). R1's LAN (Lan-2) has two laptops (Laptop10, Laptop11). R2's LAN (Lan-3) has two laptops (Laptop12, Laptop13). The routers are configured with static IP addresses. The Realtime mode is selected, and the network is running. The bottom panel shows a list of events, including successful ICMP messages between the laptops.

| Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete |
|------------|-------------|----------|-------------|------|-------|-----------|----------|--------|----------|--------|
| Successful | Laptop8 | Laptop12 | ICMP | | 0.000 | N | 0 | (edit) | (delete) | |
| Successful | Laptop... | Laptop13 | ICMP | | 0.000 | N | 1 | (edit) | (delete) | |
| Successful | Laptop9 | Laptop11 | ICMP | | 0.000 | N | 2 | (edit) | (delete) | |

Send the Message in Simulation and See the Steps.



The screenshot shows the Cisco Packet Tracer interface in Simulation mode. The network topology is the same as in the Realtime mode. The Simulation mode is selected, and the network is running. The bottom panel shows a list of events, including successful ICMP messages between the laptops. The Simulation Panel on the right shows the Event List, which includes the source and destination of the messages, the time taken, and the device involved.

| Fire | Last Status | Source | Destination | Type | Color | Time(sec) | Periodic | Num | Edit | Delete |
|------------|-------------|----------|-------------|------|-------|-----------|----------|--------|----------|--------|
| Successful | Laptop8 | Laptop12 | ICMP | | 0.000 | N | 0 | (edit) | (delete) | |

Learning outcomes (What I have learnt):

1. Understand working of network device Network Topologies.
2. Create and Executed all Network Topologies using switch.

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

| Sr. No. | Parameters | Marks Obtained | Maximum Marks |
|---------|------------|----------------|---------------|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| | | | |