Practical 1: LAN Design with Subnetting and Router ConfigurationAim:

Design a Local Area Network (LAN) using 3 PCs connected to a router.

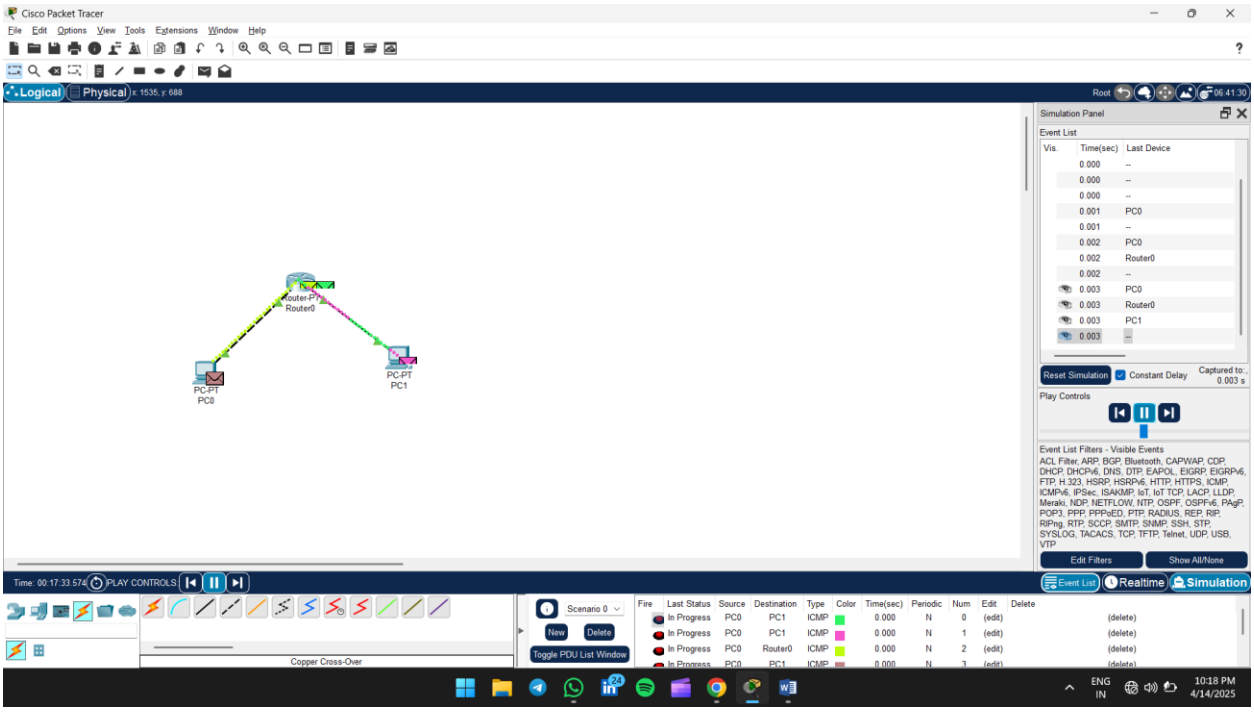
Instructions:

• Assign each PC a unique subnet.

• Configure IP addresses and subnet masks.

• Configure the router interfaces to connect the subnets.

• Ensure all devices can communicate via the router.



1. Add Devices

- **Drag and drop** the following from the bottom device list:
  - 1 Router (`Router0`)
  - 2 PCs (`PC0` and `PC1`)

2. Connect Devices

- Use **Copper Cross-Over Cable**:
  - Connect **PC0 → Router0**
  - Connect **PC1 → Router0**

You can use **FastEthernet0 on PCs** and **GigabitEthernet0/0 or 0/1 on the router** depending on availability.

3. Configure IP Addresses

- **PC0 Configuration:**
  - Go to **Desktop > IP Configuration**
  - IP Address: `192.168.1.1`
  - Subnet Mask: `255.255.255.0`
  - Default Gateway: `192.168.1.254`
- **PC1 Configuration:**
  - IP Address: `192.168.2.1`
  - Subnet Mask: `255.255.255.0`
  - Default Gateway: `192.168.2.254`

4. Configure Router Interfaces

- Click on **Router0 > CLI** or **Config tab**, then configure interfaces:

```
enable
configure terminal

interface gigabitEthernet0/0
ip address 192.168.1.254 255.255.255.0
no shutdown
exit

interface gigabitEthernet0/1
ip address 192.168.2.254 255.255.255.0
no shutdown
exit
```

5. Verify Connection

- Use **Simulation Mode** to test ICMP (ping):
  - From **PC0 Desktop > Command Prompt**, type:
  - `ping 192.168.2.1`

You should see the ping packets go from PC0 → Router → PC1 and a successful reply if configured correctly.

Practical 2: Router-to-Switch Connection and Basic Configuration

Aim:

Connect a router to a switch and perform initial router configurations.

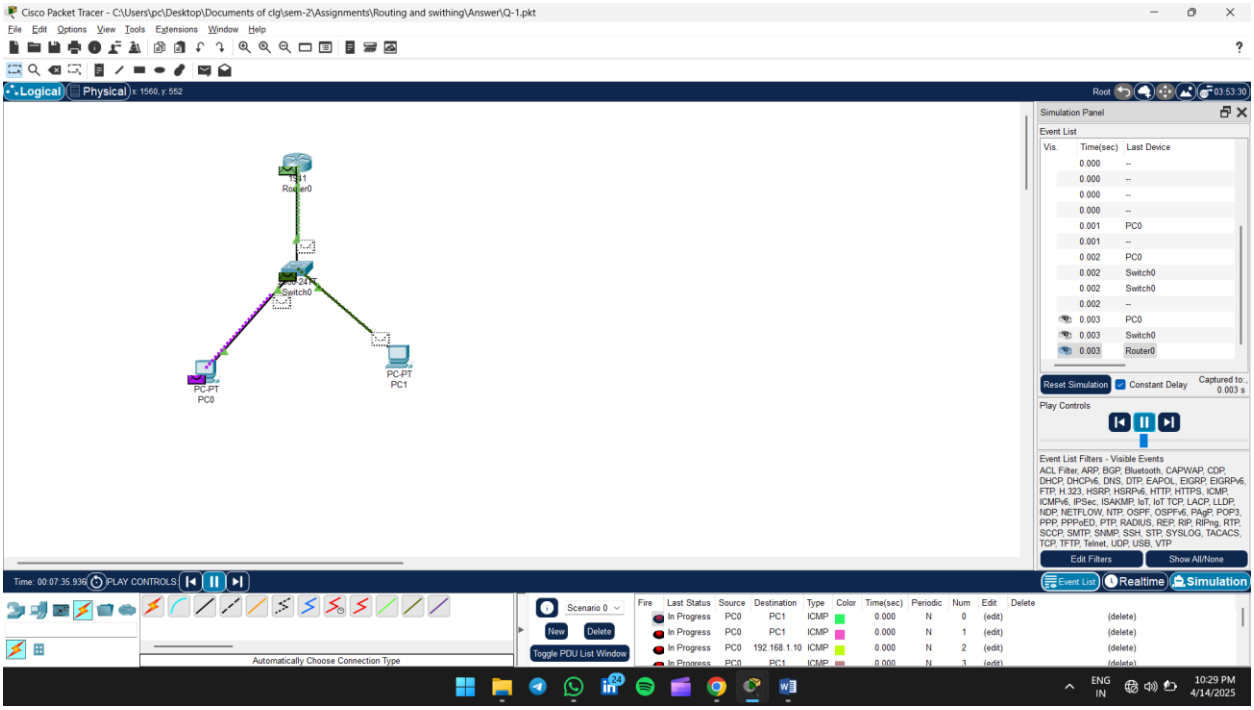
Instructions:

• Connect the router to the switch using proper cabling.

• Assign IP addresses to connected devices.

• Configure basic settings such as hostname, interface IP, and default gateway.

• Verify end-to-end connectivity using ping.



1. Add Devices

- 1 **Router** (e.g. `Router0`)
- 1 **Switch** (e.g. `Switch0`)
- 2 **PCs** (e.g. `PC0`, `PC1`)

2. Connect Devices

- Use **Copper Straight-Through Cable**:
  - `Router0` ↔ `Switch0` (e.g., `Gig0/0` to `FastEthernet0/1`)
  - `PC0` ↔ `Switch0` (e.g., `FastEthernet0/2`)
  - `PC1` ↔ `Switch0` (e.g., `FastEthernet0/3`)

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3. Configure VLANs on the Switch

1. Go to the **Switch CLI**:

```
enable
configure terminal

vlan 10
name VLAN10

vlan 20
name VLAN20

exit
```

2. Assign switch ports to VLANs:

```
interface fastEthernet0/2
switchport mode access
switchport access vlan 10
exit

interface fastEthernet0/3
switchport mode access
switchport access vlan 20
exit
```

3. Configure the trunk port (connection to router):

```
interface fastEthernet0/1
switchport mode trunk
exit
```

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4. Configure Router Subinterfaces for Inter-VLAN Routing

Go to the **Router CLI**:

```
enable
configure terminal

interface gigabitEthernet0/0.10
encapsulation dot1Q 10
ip address 192.168.10.1 255.255.255.0
```

```
exit

interface gigabitEthernet0/0.20
encapsulation dot1Q 20
ip address 192.168.20.1 255.255.255.0
exit

interface gigabitEthernet0/0
no shutdown
exit
```

---

5. Configure IP on PCs

PC0:

- IP Address: `192.168.10.2`
- Subnet Mask: `255.255.255.0`
- Default Gateway: `192.168.10.1`

PC1:

- IP Address: `192.168.20.2`
- Subnet Mask: `255.255.255.0`
- Default Gateway: `192.168.20.1`

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6. Test Connectivity

- Go to `PC0 > Command Prompt`:

```
ping 192.168.20.2
```

You should receive successful replies — meaning inter-VLAN routing is working properly.

Would you like to add **DHCP**, **DNS**, or **more VLANs** to this setup?

Practical 3: Setup a Small Office/Home Office (SOHO) Network

Aim:

Design and configure a basic SOHO network with internet access.

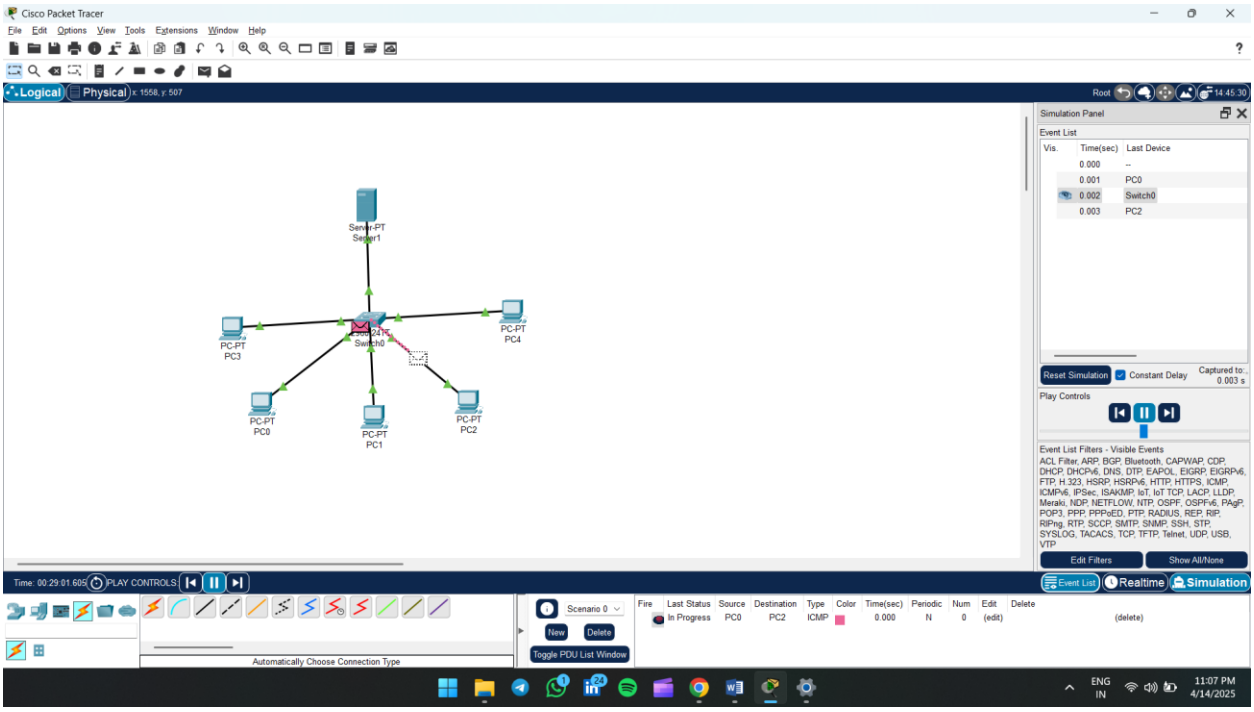
Instructions:

• Use a router, switch, and multiple PCs.

• Assign appropriate IP addresses.

• Configure DHCP (if required).

• Simulate internet connectivity using a cloud device.



1. Add Devices

From the device selection at the bottom of Cisco Packet Tracer:

- 1 **Switch** (e.g., `Switch0`)
- 5 **PCs** (e.g., `PC0` to `PC4`)
- 1 **Server** (e.g., `Server0`)

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2. Connect Devices to the Switch

Use **Copper Straight-Through Cable** to connect each device to the switch:

- `PC0` to `Switch0`
- `PC1` to `Switch0`
- `PC2` to `Switch0`
- `PC3` to `Switch0`
- `PC4` to `Switch0`
- `Server0` to `Switch0`

(Connect all to different **FastEthernet ports**, like `Fa0/1` to `Fa0/6`)

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3. Assign IP Addresses

Use **manual IP configuration**:

Device	IP Address	Subnet Mask	Default Gateway (optional)
PC0	192.168.1.1	255.255.255.0	192.168.1.254 (if needed)
PC1	192.168.1.2	255.255.255.0	192.168.1.254
PC2	192.168.1.3	255.255.255.0	192.168.1.254
PC3	192.168.1.4	255.255.255.0	192.168.1.254
PC4	192.168.1.5	255.255.255.0	192.168.1.254
Server0	192.168.1.10	255.255.255.0	192.168.1.254

To assign IPs:

- Click each **PC or Server**
- Go to **Desktop > IP Configuration**
- Manually enter the IP Address and Subnet Mask

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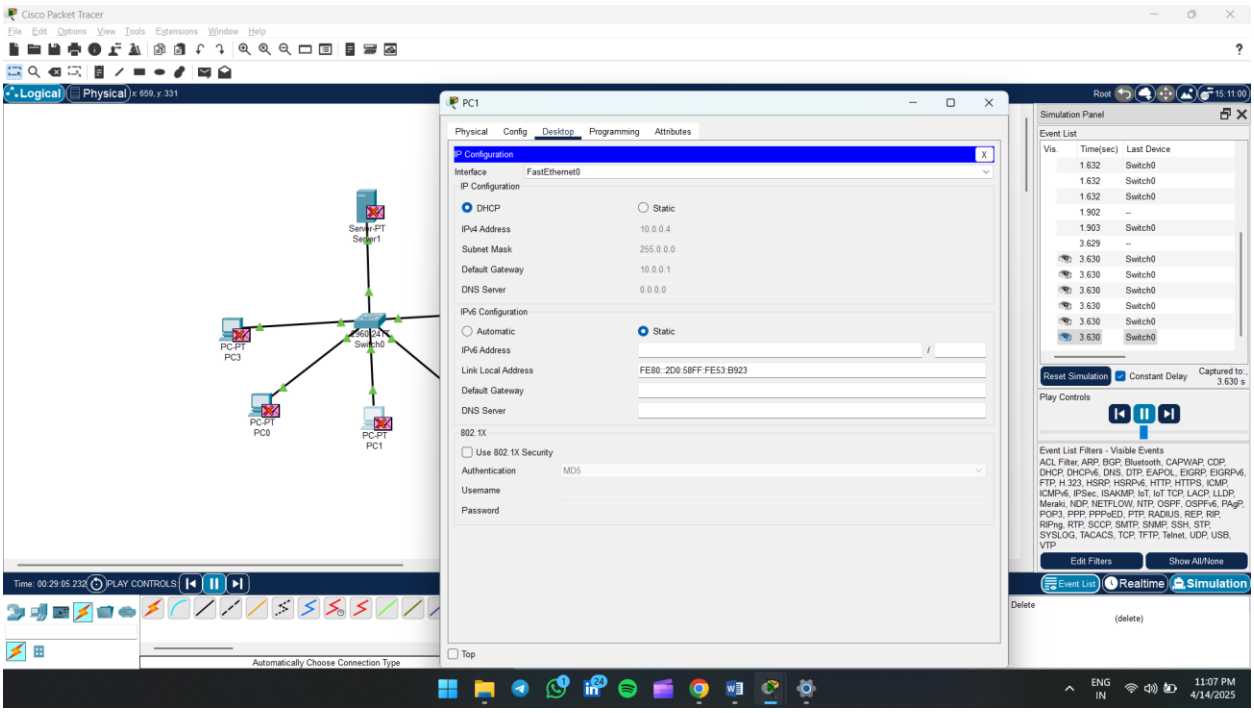
4. Test Connectivity

To verify the LAN is working:

- Open **Command Prompt** on `PC0`
- Type:
- `ping 192.168.1.3`
- `ping 192.168.1.10`

If responses return without packet loss, your LAN setup is working correctly.



1. **Click on the PC** (e.g., PC1).
2. Go to the **Desktop** tab.
3. Click on **IP Configuration**.
4. Select **Static**.
5. Enter:
    - **IP Address**: `10.0.0.X` (e.g., `10.0.0.4`)
    - **Subnet Mask**: auto-fills as `255.0.0.0`
    - **Default Gateway**: `10.0.0.1`
6. Close the window.

Practical 4: Secure a Cisco Router or Switch with Passwords

Aim:

Secure access to Cisco devices using different types of passwords.

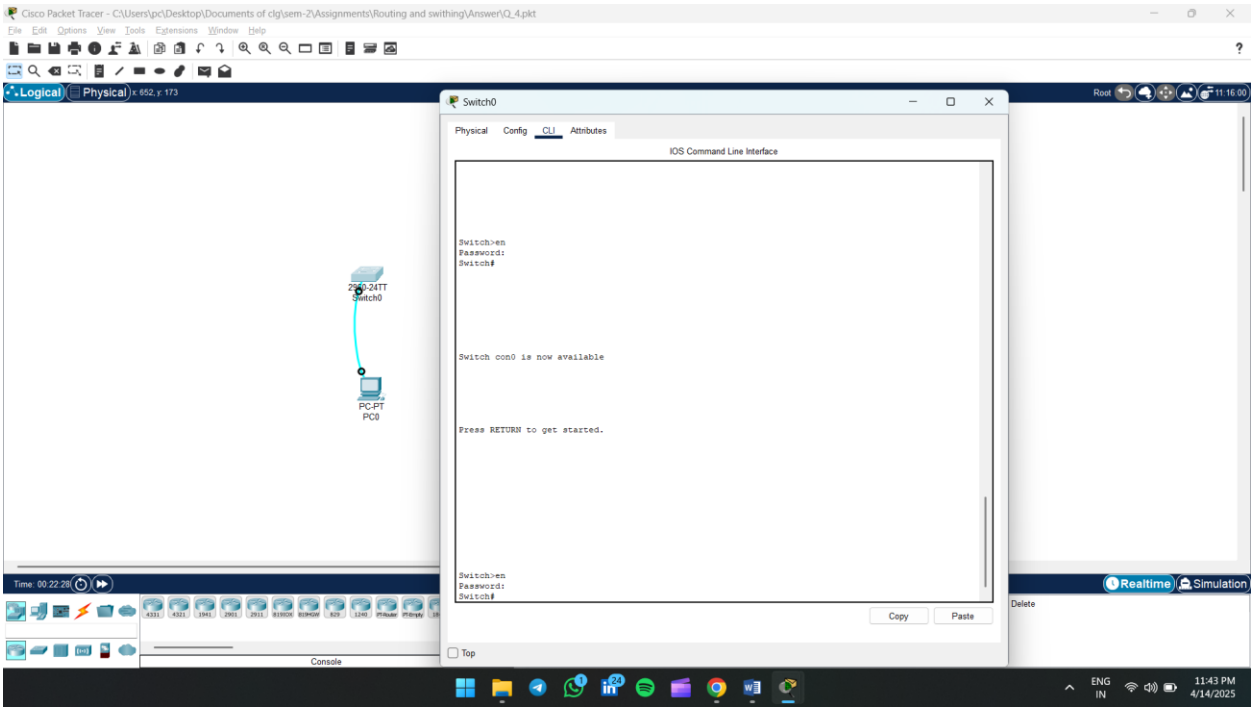
Instructions:

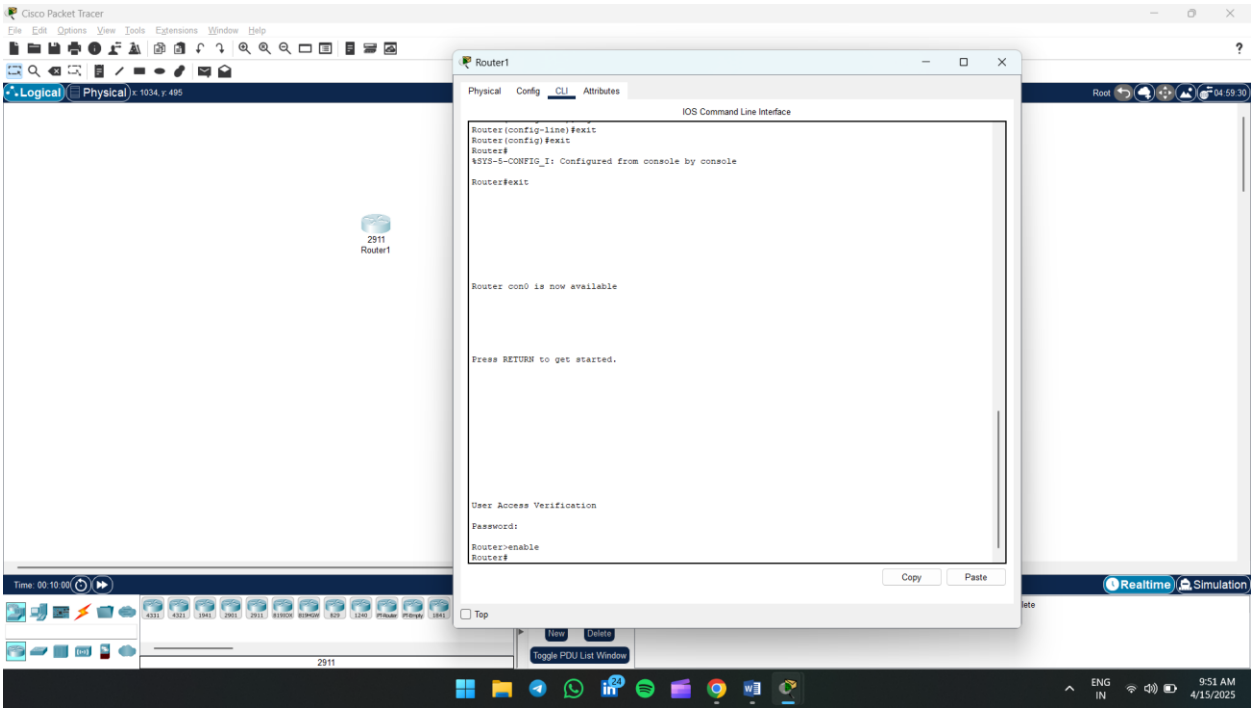
• Set a console password for accessing the device locally.

• Set an enable password for privileged mode.

• Configure VTY (telnet/SSH) passwords for remote access.

• Save the configuration and test login access





1. Start the CLI

When prompted, press `Enter`.

2. Enter Privileged EXEC Mode:

```
enable
```

3. Enter Global Configuration Mode:

```
configure terminal
```

4. Set a Hostname (Optional):

```
hostname Switch0
```

5. Set Console Password:

```
line console 0
password cisco
login
exit
```

6. Set Enable Password:

```
enable password class
```

7. Set IP Address for VLAN 1 (Switch Management):

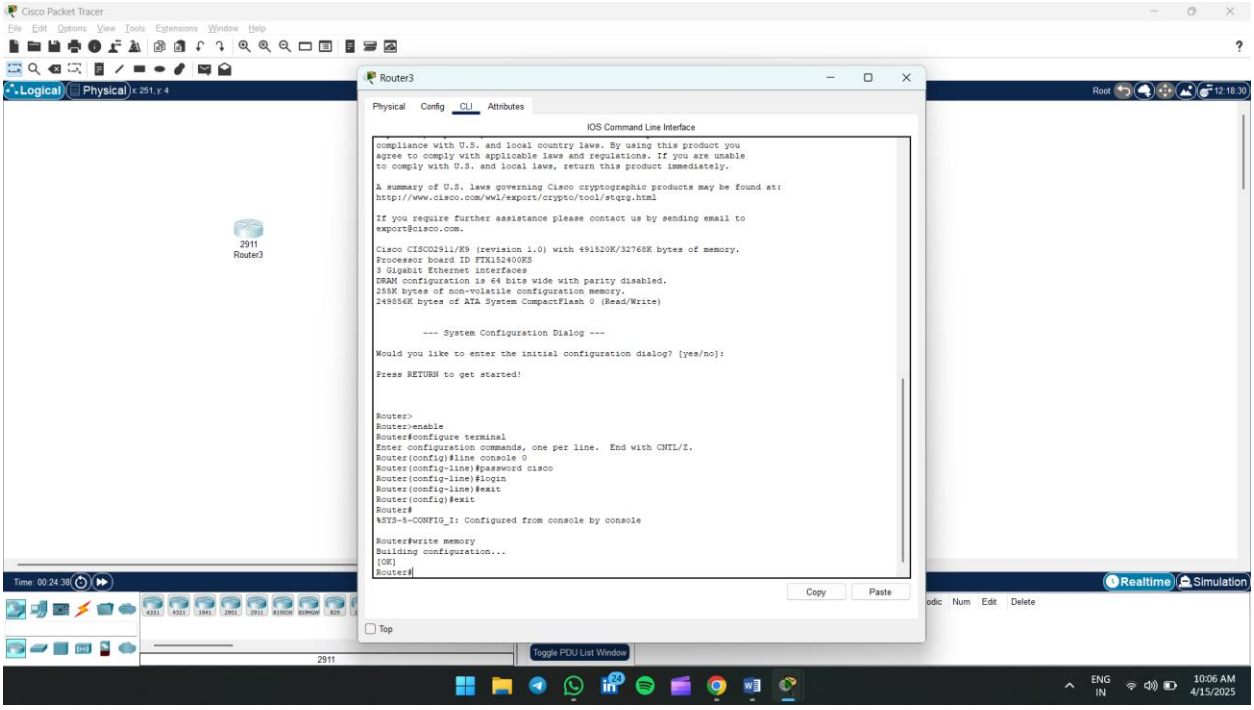
```
interface vlan 1
ip address 192.168.1.2 255.255.255.0
no shutdown
exit
```

8. Set Default Gateway (for remote access):

```
ip default-gateway 192.168.1.1
```

9. Save the Configuration:

```
exit
write memory
```



1. Enter Privileged EXEC Mode:

```
enable
```

2. Enter Global Configuration Mode:

```
configure terminal
```

3. Set Console Password:

```
line console 0
password cisco
login
exit
```

4. Set Enable Password:

```
enable password class
```

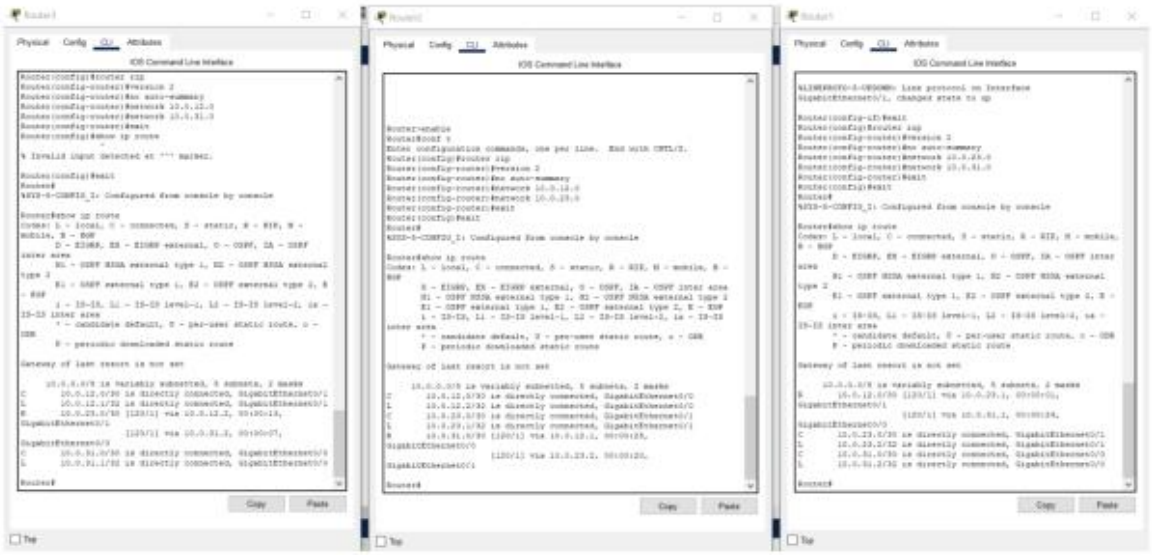
5. Save the Configuration:

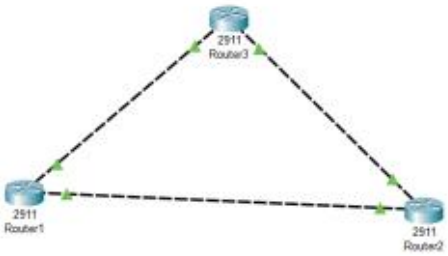
```
write memory
```

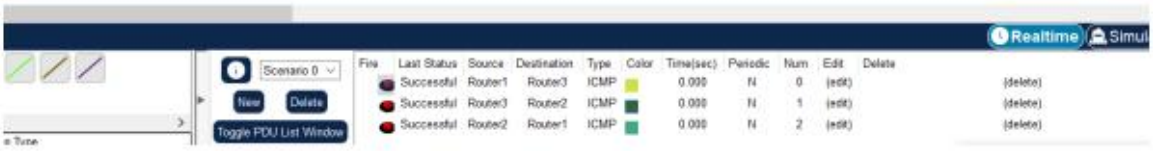
✅ Now your router is secured with:

- Console access requiring the password `cisco`
- Privileged mode access requiring the password `class`

Practical 5: Configure RIP v2 on Multiple Router







🔁 Static Routing Between 3 Routers

🛠 Step 1: Assign IP Addresses to Router Interfaces

Do this for **each router**:

```
enable
configure terminal
interface <INTERFACE_NAME>
ip address <IP_ADDRESS> <SUBNET_MASK>
no shutdown
exit
```

➞ Example from your image:

Router1:

```
interface g0/0
ip address 12.0.0.1 255.255.255.0
no shutdown
exit
interface g0/1
ip address 13.0.0.1 255.255.255.0
no shutdown
```

Router2:

```
interface g0/0
ip address 12.0.0.2 255.255.255.0
no shutdown
exit
interface g0/1
ip address 23.0.0.2 255.255.255.0
no shutdown
```

Router3:

```
interface g0/0
ip address 13.0.0.3 255.255.255.0
no shutdown
exit
interface g0/1
ip address 23.0.0.3 255.255.255.0
no shutdown
```

🚌 Step 2: Configure Static Routes

On each router, add static routes to the **networks not directly connected**.

Router1:

```
ip route 23.0.0.0 255.255.255.0 12.0.0.2
```

Router2:

```
ip route 13.0.0.0 255.255.255.0 12.0.0.1
```

Router3:

```
ip route 12.0.0.0 255.255.255.0 13.0.0.1
```

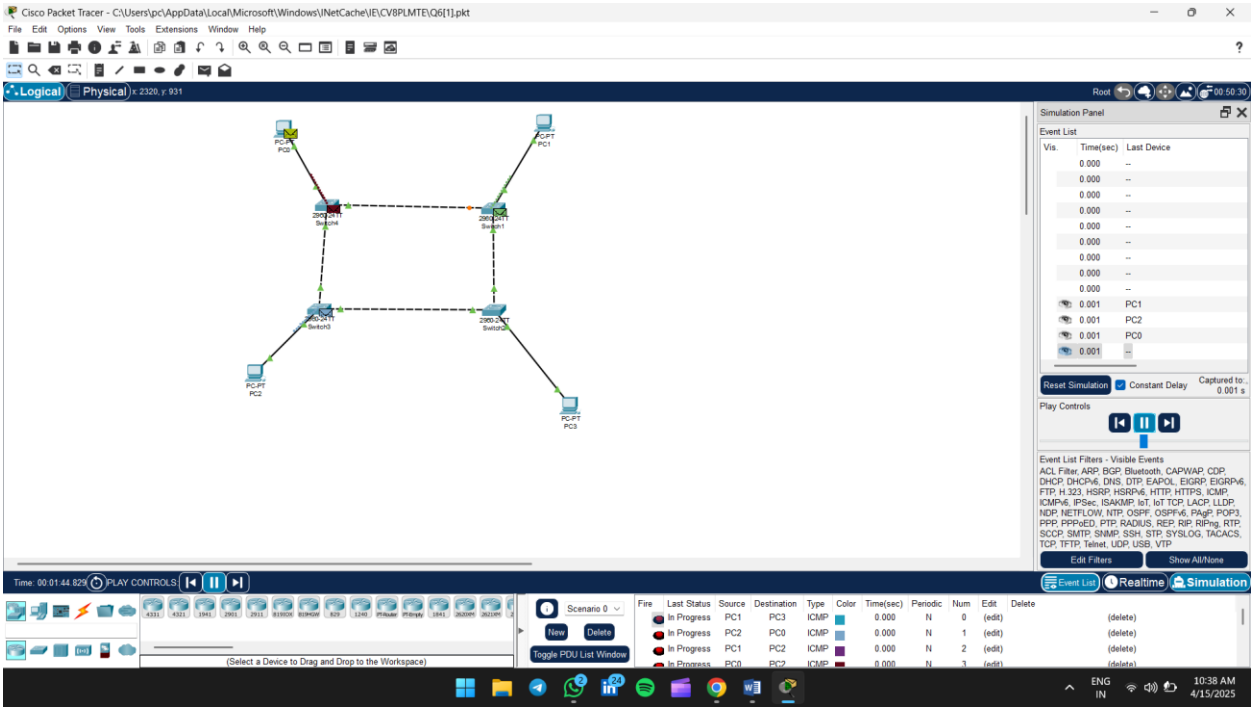
✅ Step 3: Verify Connectivity

Use the **ping** command from one router to another:

```
ping 13.0.0.3
ping 12.0.0.1
ping 23.0.0.2
```

Or use the **Simulation Mode** like you've shown — all pings should be **successful**.

Practical 6: VLAN and VTP Configuration on Switches



✓ Static Routing in Cisco Packet Tracer (3 Routers)

🖥 Step 1: Connect the Routers

Use **copper cross-over cables** to connect the routers like this:

`Router1 ↔ Router2 ↔ Router3 ↔ Router1`

(Connect via GigabitEthernet or FastEthernet ports)

⚙ Step 2: Assign IP Addresses

Go to each router CLI and enter:

Router1

```
enable
configure terminal
```

```
interface g0/0
ip address 12.0.0.1 255.255.255.0
no shutdown
exit
interface g0/1
ip address 13.0.0.1 255.255.255.0
no shutdown
exit
```

Router2

```
enable
configure terminal
interface g0/0
ip address 12.0.0.2 255.255.255.0
no shutdown
exit
interface g0/1
ip address 23.0.0.2 255.255.255.0
no shutdown
exit
```

Router3

```
enable
configure terminal
interface g0/0
ip address 13.0.0.3 255.255.255.0
no shutdown
exit
interface g0/1
ip address 23.0.0.3 255.255.255.0
no shutdown
exit
```

🔑 Step 3: Add Static Routes

Router1

```
ip route 23.0.0.0 255.255.255.0 12.0.0.2
```

Router2

```
ip route 13.0.0.0 255.255.255.0 12.0.0.1
```

Router3

```
ip route 12.0.0.0 255.255.255.0 13.0.0.1
```

🔄 Step 4: Test the Network

1. Click on **Simulation Mode**.
2. Use **Add Simple PDU (the lightning icon)**.
3. Click **Router1**, then **Router3** (and vice versa).
4. Check that the packets show **"Successful"** in the event list (as in your screenshot).
