Week6:

Connect the computers in Local Area Network and Observe Static and Dynamic Routing using Packet Tracer

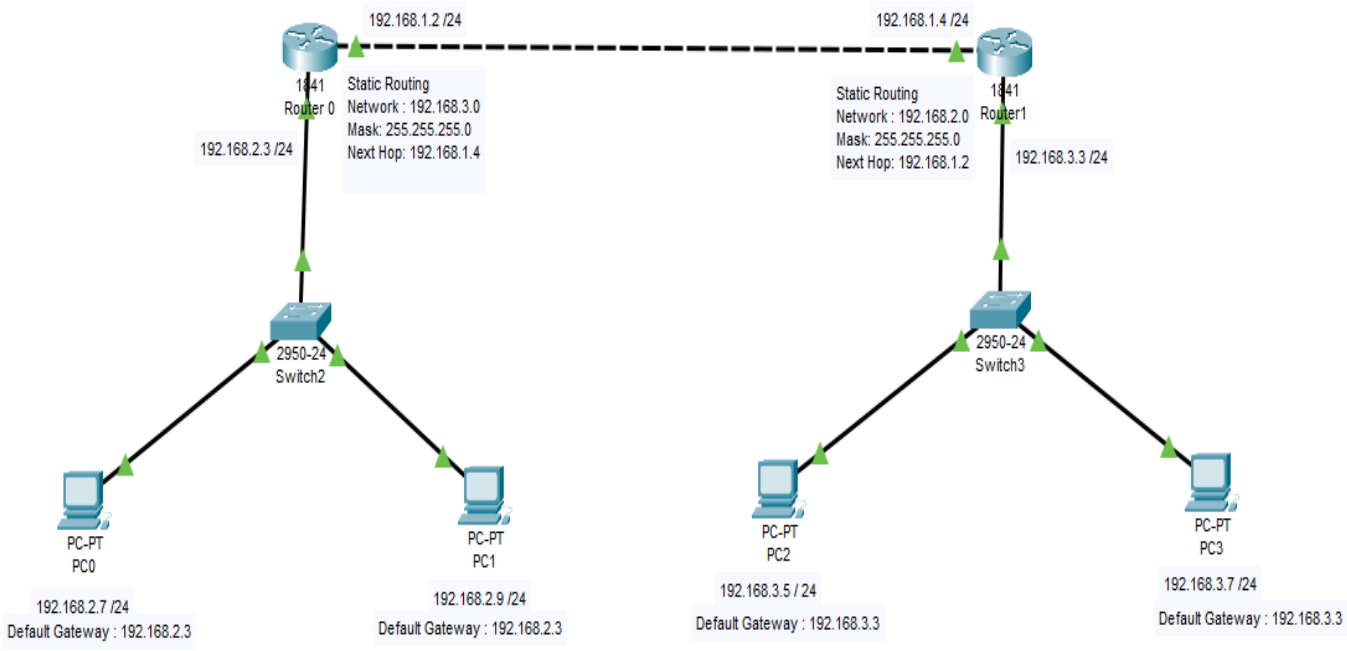
Aim:

To design and configure a Local Area Network (LAN) in Cisco Packet Tracer and implement both **Static Routing** and **Dynamic Routing (RIP)** to observe how data is transferred between networks.

Requirements

- **Software**: Cisco Packet Tracer
- **Equipment**:
  - PCs – 4
  - Routers (1841 model) – 2
  - Switches (2950–24 model) – 2
  - Copper Straight-Through cables
  - Copper Cross-Over Cable

Procedure: Static Routing



1. **Network Topology Setup**
   - Place **2 routers**, **2 switches**, and **4 PCs** in Packet Tracer.
   - Connect PCs to switches, switches to routers using **copper straight-through cables**.
   - Connect routers to each other using **serial cables (cross-over cable)**.
2. **Assign IP Addresses**
   - Assign IP addresses to all PCs and router interfaces as per your subnet design (as shown in the diagram).
   - Ensure default gateway for each PC is the connected router's interface IP.

3. **Router Configuration**

   - Open the CLI of **Router0**:

```
Router> enable
Router# configure terminal
Router(config)# interface FastEthernet0/0
(Router(config-if)# ip address <IP> <Subnet Mask>)
Router(config-if)# ip address 192.168.2.3 255.255.255.0
Router(config-if)# exit
Router(config)# interface FastEthernet0/1
Router(config-if)# ip address 192.168.1.2 255.255.255.0
Router(config-if)# exit
```

   - Open the CLI of **Router1**:

```
Router> enable
Router# configure terminal
Router(config)# interface FastEthernet0/0
(Router(config-if)# ip address <IP> <Subnet Mask>)
Router(config-if)# ip address 192.168.3.3 255.255.255.0
Router(config-if)# exit
Router(config)# interface FastEthernet0/1
Router(config-if)# ip address 192.168.1.4 255.255.255.0
Router(config-if)# exit
```

4. **Configure Static Routes**

- On Router0:
  `(Router(config)# ip route <Network> <Subnet Mask> <Next Hop IP>)`
  `Router(config)# ip route 192.168.3.0 255.255.255.0 192.168.1.4`

- On Router1:
  `(Router(config)# ip route <Network> <Subnet Mask> <Next Hop IP>)`
  `Router(config)# ip route 192.168.2.0 255.255.255.0 192.168.1.2`

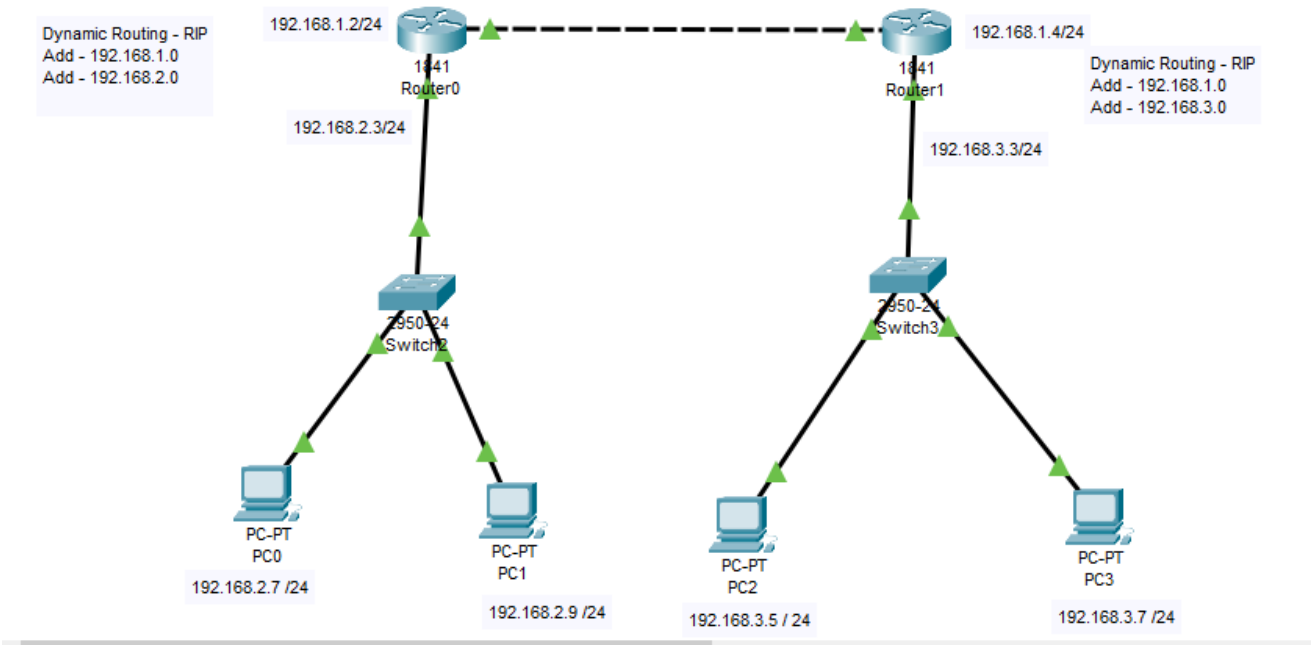
5. **Testing**

- Use `ping` command from one PC to another across the network.
- Verify connectivity for all nodes.

Results:

Static Routing: Packets successfully travelled between networks when manually configured routes were added. No route updates occurred automatically.

Procedure: Dynamic Routing using RIP



1. Network Topology Setup

- Place **2 routers**, **2 switches**, and **4 PCs** in Packet Tracer.
- Connect PCs to switches, switches to routers using **copper straight-through cables**.
- Connect routers to each other using **serial cables (cross-over cable)**.

2. Assign IP Addresses

- Assign IP addresses to all PCs and router interfaces as per your subnet design (as shown in the diagram).
- Ensure default gateway for each PC is the connected router's interface IP.

3. Router Configuration

➢ Open the CLI of **Router0**:

```
Router> enable
Router# configure terminal
Router(config)# interface FastEthernet0/0
(Router(config-if)# ip address <IP> <Subnet Mask>)
Router(config-if)# ip address 192.168.2.3 255.255.255.0
Router(config-if)# exit
Router(config)# interface FastEthernet0/1
Router(config-if)# ip address 192.168.1.2 255.255.255.0
Router(config-if)# exit
```

- Open the CLI of **Router1**:

```
Router> enable
Router# configure terminal
Router(config)# interface FastEthernet0/0
(Router(config-if)# ip address <IP> <Subnet Mask>)
Router(config-if)# ip address 192.168.3.3 255.255.255.0
Router(config-if)# exit
Router(config)# interface FastEthernet0/1
Router(config-if)# ip address 192.168.1.4 255.255.255.0
Router(config-if)# exit
```

4. **Configure Dynamic Routes (RIP)**

- Open the CLI of **Router0**:

```
Router> enable
Router# configure terminal
Router(config)# router rip
Router(config-router)# network <Network ID>
Router(config-router)# add network 192.168.1.0
Router(config-router)# add network 192.168.2.0
```

- Open the CLI of **Router1**:

```
Router> enable
Router# configure terminal
Router(config)# router rip
Router(config-router)# network <Network ID>
Router(config-router)# add network 192.168.1.0
Router(config-router)# add network 192.168.3.0
```

5. **Verify Routing**

- On each router, check learned routes (click on CLI):

```
Router> show ip route
```

6. **Testing**

- Ping across PCs in different networks.
- Observe how routes are learned automatically without manual configuration.

Results:

Dynamic Routing (RIP): Packets successfully travelled between networks with routers automatically learning routes through RIP updates. No manual route entries required after setup.