Task-9

9a). Configure network topology and implement dynamic routing protocol RIP

Routing Information Protocol (RIP) is a **distance-vector routing protocol** used to enable routers in a network to dynamically share routing information. It's one of the simplest routing protocols and is typically used in smaller networks due to its limitations in scalability and performance.

Key Features of RIP

1. **Distance-Vector Protocol**:
    - Relies on information from neighboring routers (vector = next hop and distance = hop count).
2. **Periodic Updates**:
    - Routing updates are sent every 30 seconds, even if there are no changes in the network.
3. **Hop Count Metric**:
    - RIP uses hop count to measure distance. A lower hop count means a better route.
4. **Maximum Hop Limit**:
    - Limits the maximum network size to 15 hops. Networks beyond 15 hops are considered unreachable.
5. **Split Horizon and Poison Reverse**:
    - Mechanisms used to prevent routing loops:
        - **Split Horizon**: A route learned on an interface is not advertised back on the same interface.
        - **Poison Reverse**: A route is advertised back with an infinite metric (hop count = 16) to indicate it is unreachable.
6. **Simplicity**:
    - Easy to configure and understand, but lacks scalability for larger networks.

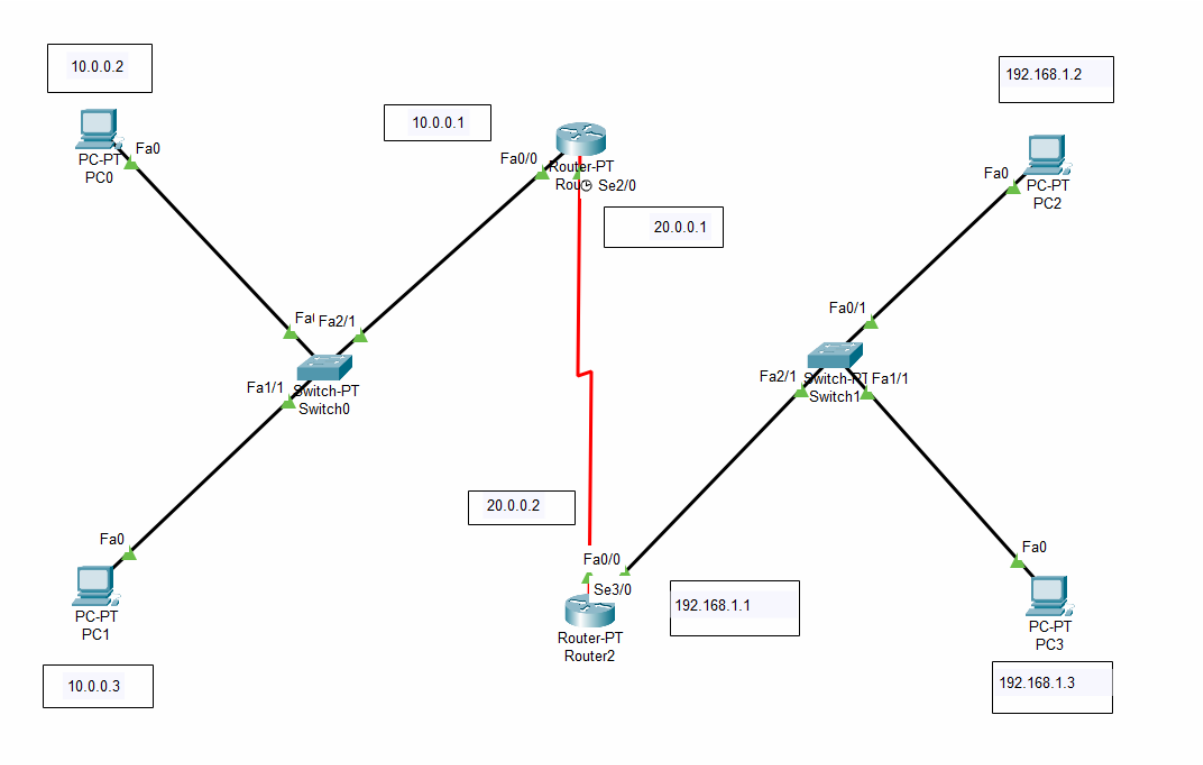
Configure Hosts

Assign IP addresses to hosts as per the diagram:

- **PC0**: IP `10.0.0.2`, Gateway `10.0.0.1`.
- **PC1**: IP `10.0.0.3`, Gateway `10.0.0.1`.
- **PC2**: IP `192.168.1.2`, Gateway `192.168.1.1`.
- **PC3**: IP `192.168.1.3`, Gateway `192.168.1.1`.

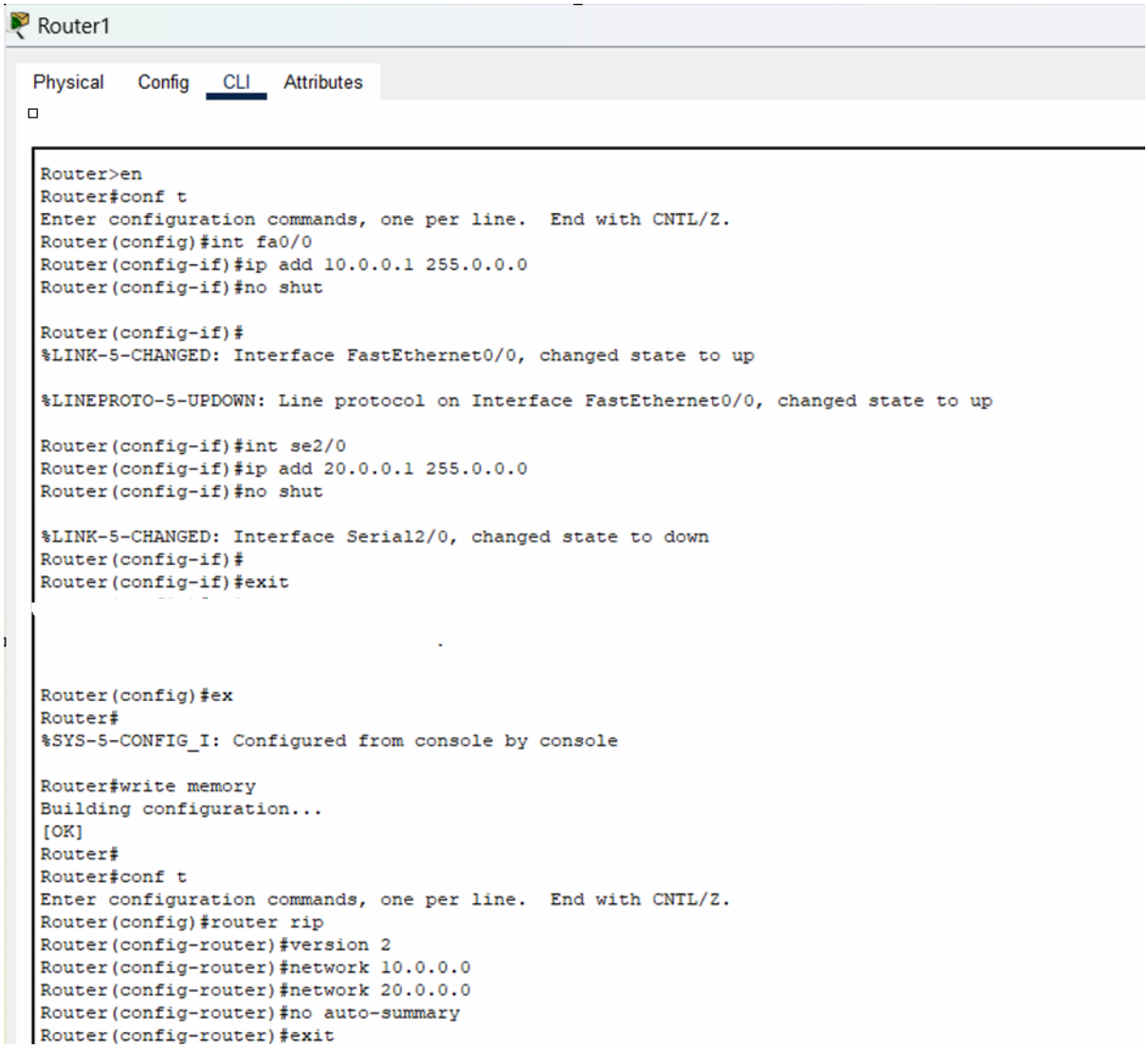
Network Overview

- **Router1 (R1)** connects:
  - **10.0.0.0 network** on Fa0/0.
  - **20.0.0.0 network** on Se2/0.
- **Router2 (R2)** connects:
  - **20.0.0.0 network** on Se3/0.
  - **192.168.1.0 network** on Fa0/0.



Configuration Steps

1. Configure Interfaces on R1



no auto-summary:

Auto-summarization is a feature that automatically summarizes routes at classful network boundaries. This means that when a routing protocol shares routes between routers, it automatically summarizes them based on their default classful boundaries (e.g., Class A, B, or C networks).

Example in RIP Configuration:

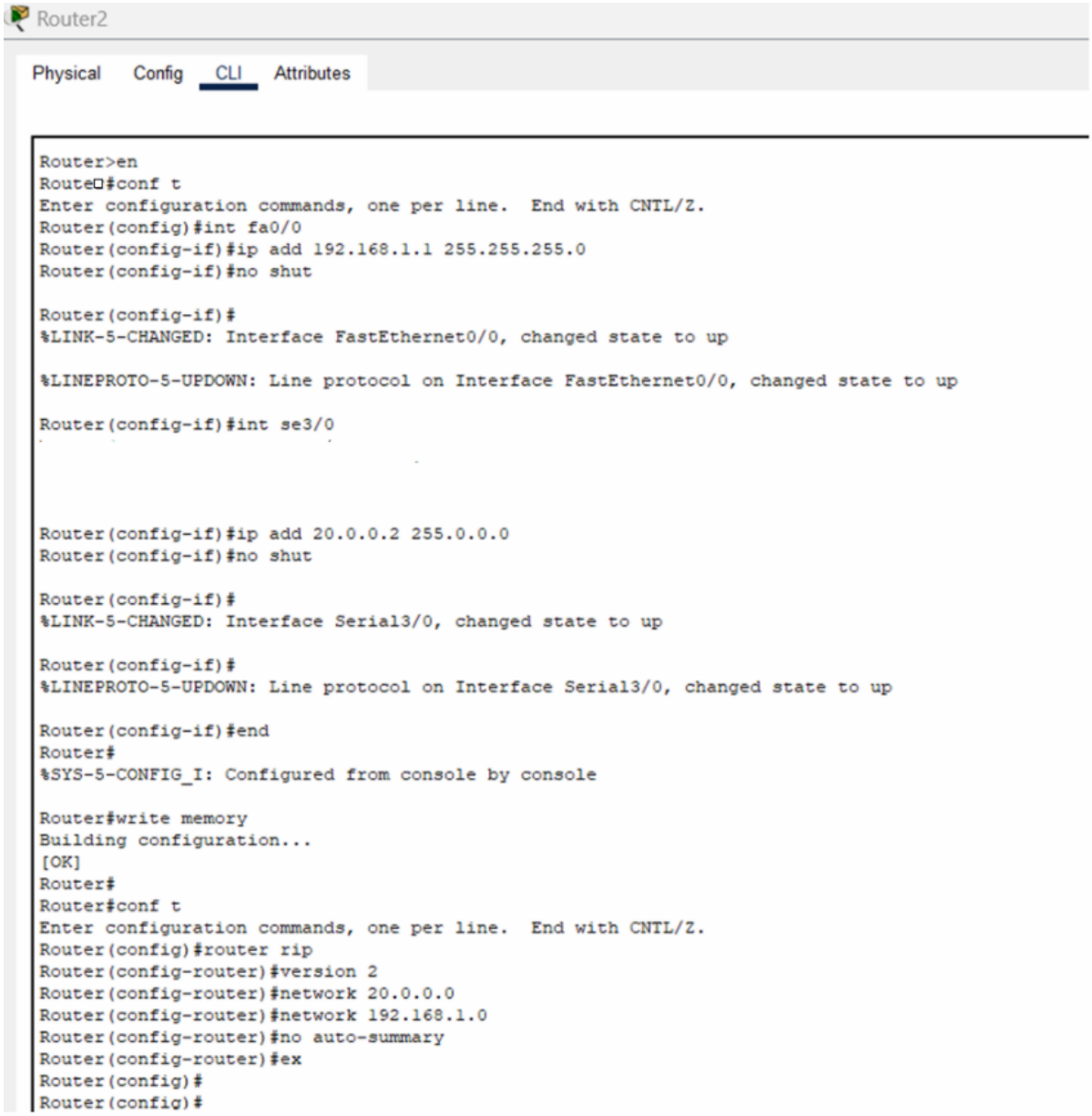
```
Router(config)# router rip
Router(config-router)# version 2
Router(config-router)# no auto-summary
```

In this configuration:

`version 2` enables RIP version 2, which supports classless routing.

`no auto-summary` ensures that RIP does not summarize routes at classful boundaries.

2. Configure Interfaces on R2



Test the Configuration:

From PC0 (10.0.0.2), ping PC3 (192.168.1.3)

Command:

ping 192.168.1.3