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1. Problem Statement

Design a network for an 8-floor office building where each floor has different network topologies. The network must incorporate IPv4 addressing, routing, and inter-floor connectivity. The requirements are as follows:

Floors 1–3: 7 computers each (Hybrid Topology with switches and hubs)

Floors 4–6: 7 computers each (Mesh Topology with switches)

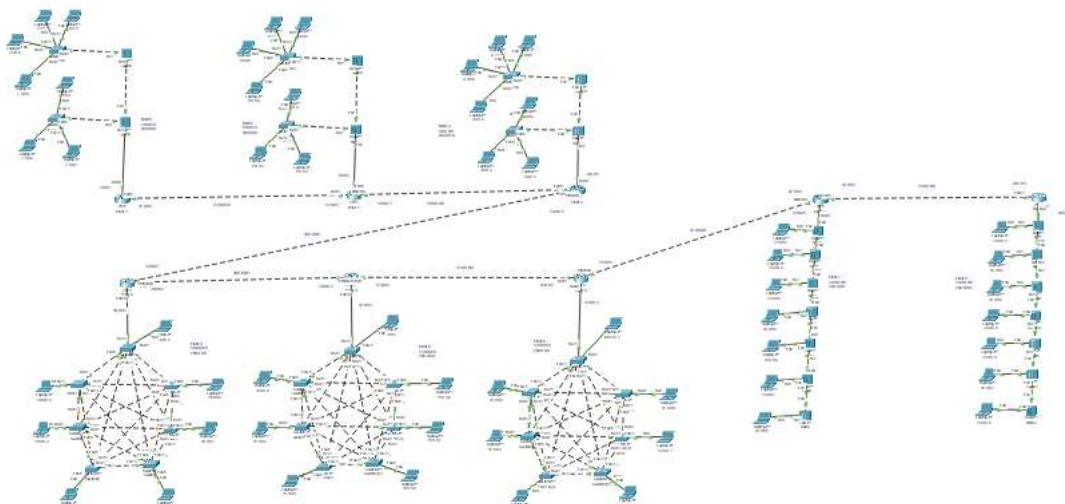
Floors 7–8: 7 computers each (Bus Topology with hubs)

The network should use Class A IPv4 addressing and dynamic routing for inter-floor communication.

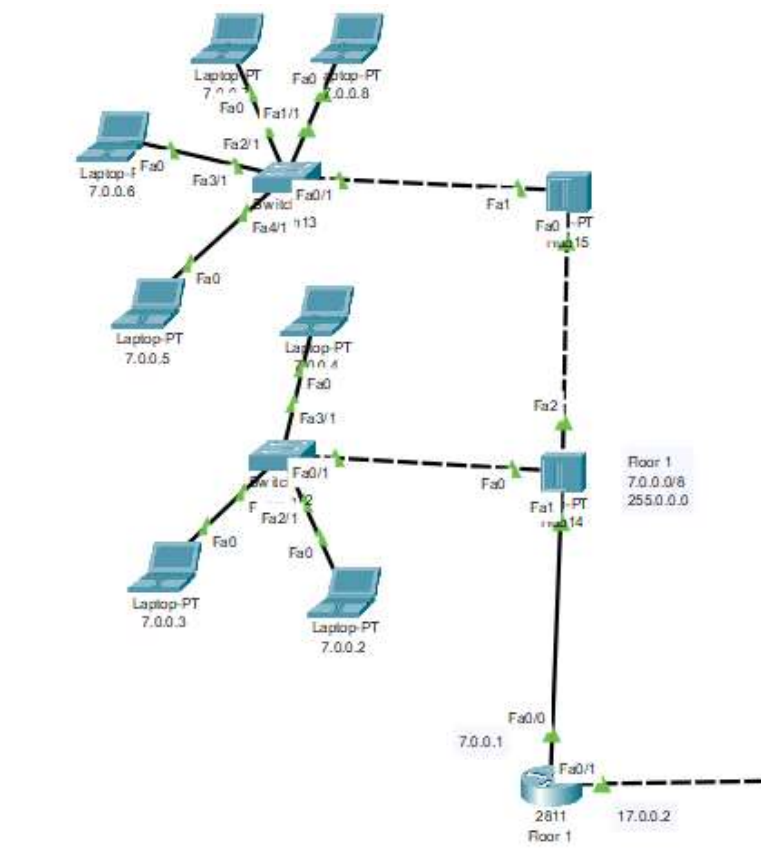
Physical Implementation:

Used Switch PT, Hub PT, connecting wires include cross and straight cables, pcs, laptops, routers, labels.

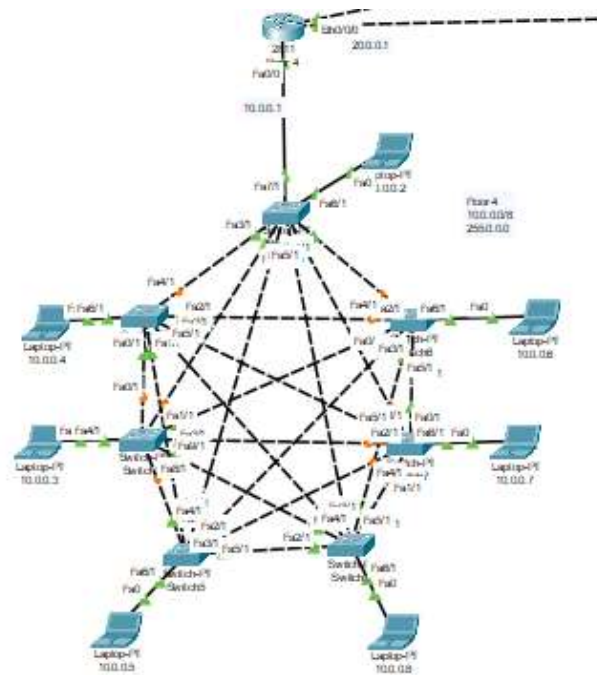
Whole structure



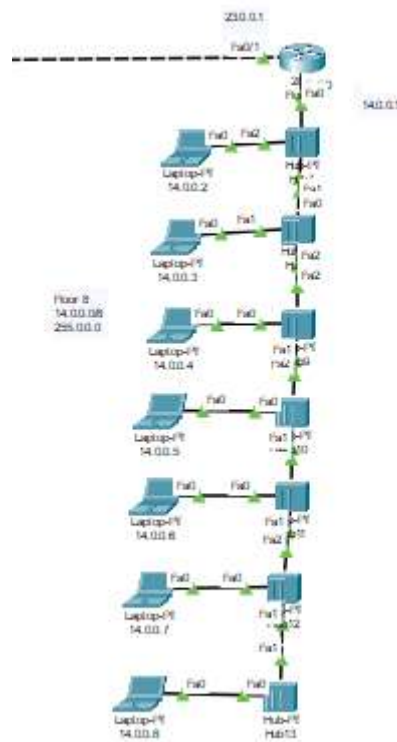
Floor 1-3 design (Hybrid topology)



Floor 4-6 design(Mesh)



Floor 6-7 design(Bus)



Router IP implementation use CLI commands

```

Router(config-if)#exit
Router(config)#int fa0/1
Router(config-if)#ip address 17.0.0.2 255.0.0.0
Router(config-if)#exit
Router(config)#int fa0/0
Router(config-if)#ip address 7.0.0.1 255.0.0.0
Router(config-if)#exit
Router(config)#

```

PC IP implementation using UI

The screenshot shows a network configuration window titled "7.0.0.4" with tabs for Physical, Config, Desktop, Programming, and Attributes. The "Config" tab is active, and the "FastEthernet0" interface is selected. The "IP Configuration" section is expanded, showing options for DHCP and Static IP. The Static IP is selected, and the fields are filled with the following values:

Field	Value
IPv4 Address	7.0.0.4
Subnet Mask	255.0.0.0
Default Gateway	7.0.0.1
DNS Server	0.0.0.0

The "IPv6 Configuration" section is also expanded, showing options for Automatic and Static IPv6. The Static IPv6 is selected, and the fields are filled with the following values:

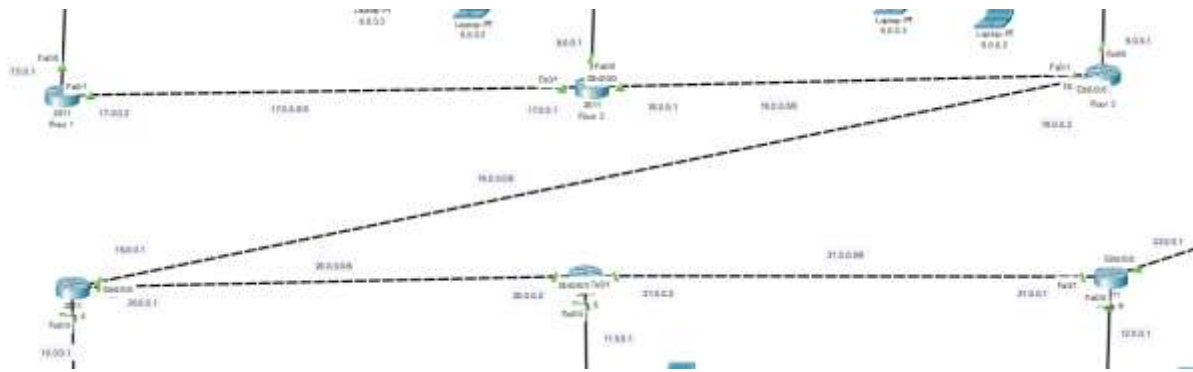
Field	Value
IPv6 Address	
Link Local Address	FE80::201:97FF:FE09:A421
Default Gateway	
DNS Server	

The "802.1X" section is expanded, showing options for Use 802.1X Security, Authentication, Username, and Password. The "Use 802.1X Security" checkbox is unchecked, and the "Authentication" dropdown is set to "MD5".

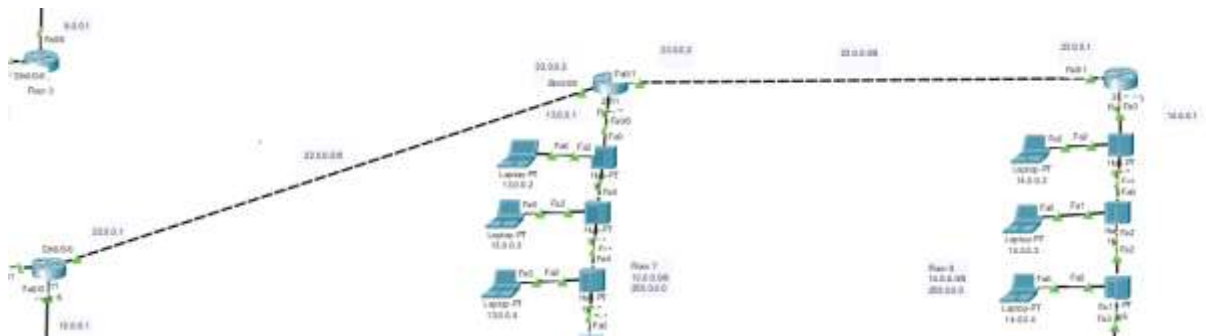
At the bottom left, there is a "Top" button.

Connections between floors

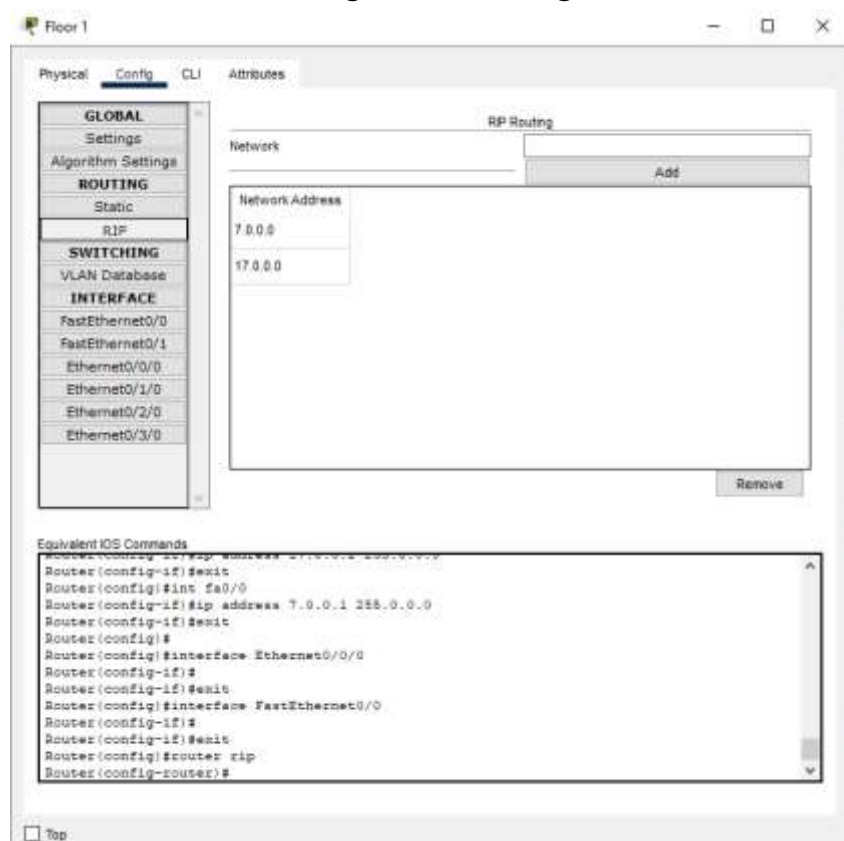
Floor 1-6



Floor 6-8



Routing method using UI



Routing method using CLI

```
Router(config-router)#exit
Router(config)#router rip
Router(config-router)#network 7.0.0.0
Router(config-router)#network 17.0.0.0
Router(config-router)#exit
Router(config)#
```

Some Communication Snippets

Communication is implemented using ping <target_ip_address> command in cmd

