INTERNETWORKING ESSENTIALS CA1

BACHELOR OF TECHNOLOGY

IN

Computer Science & Engineering

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SECTION-K23UP

Roll no: 17

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TO

Mr. Singh Malhi Sir

LOVELY PROFESSIONAL UNIVERSITY

PUNJAB INDIA

Project17:

You are hired as a network engineer for **LT Network Solutions**, a mid-sized enterprise with a **five-floor** office building. Each floor is equipped with **10 computers**, and the organization requires a well-structured network to ensure efficient communication and scalability.

Network Design Requirements:

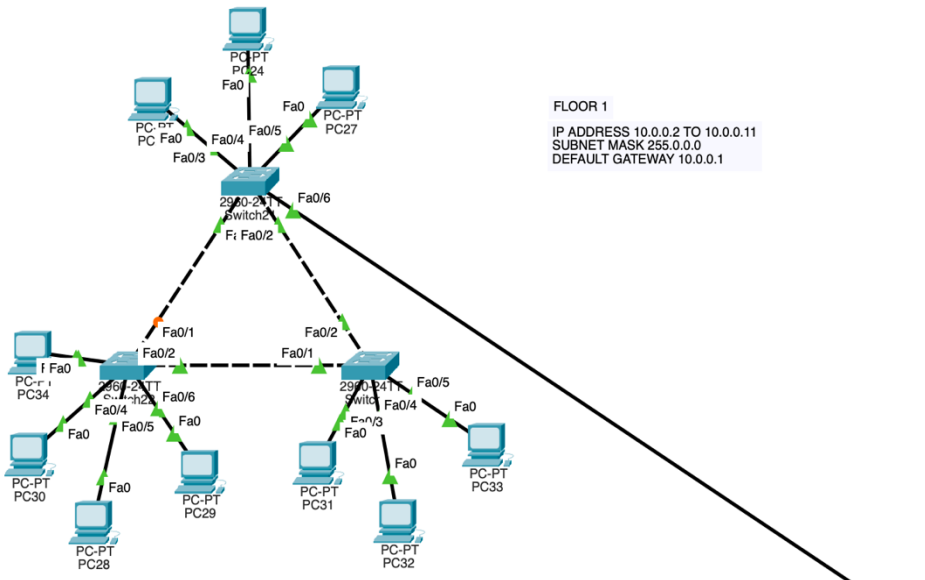
1. **Topology Selection:** Design a **ring topology** for first two floors, **mesh topology** for next two floors, and **star topology** for remaining floors, considering performance and fault tolerance.

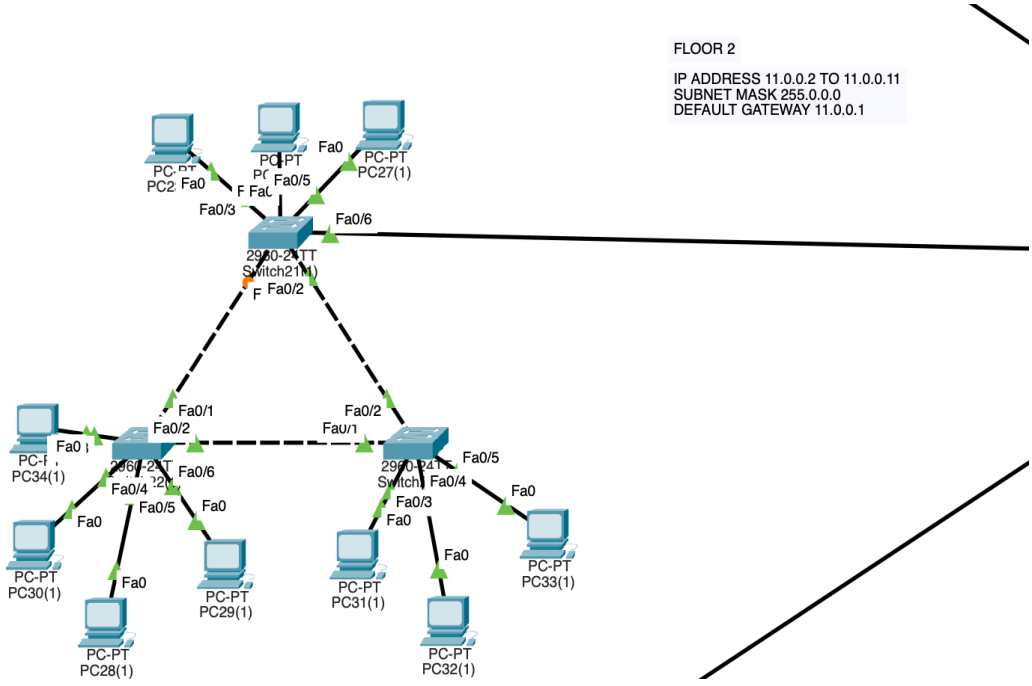
2. **IP Addressing Scheme:** The company has decided to use **Class A private IPv4 addresses for first three floors and then Class B public IPv4 addresses for remaining floors** following a **classful addressing scheme**. Allocate IP addresses properly for each floor, ensuring uniqueness.

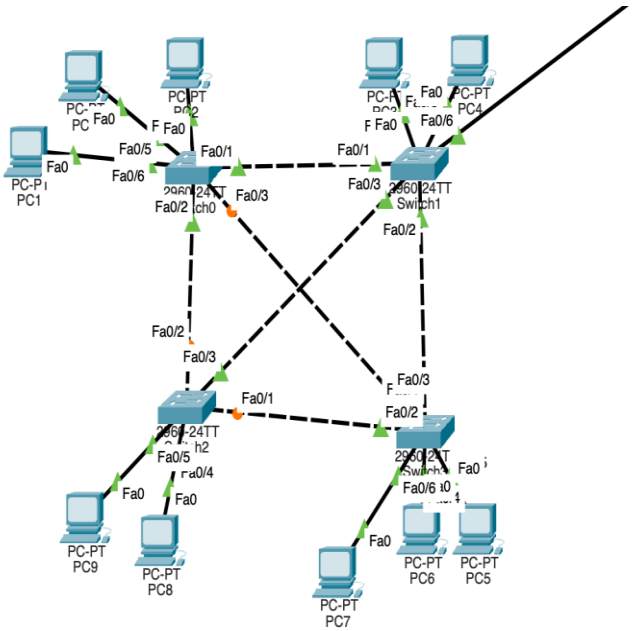
3. **Routing Strategy for Inter-Floor Communication & Connectivity:** Recommend a **routing approach** that is **static** for inter-floor communication.

- Design how the floors will be connected for **seamless inter-department communication**.
- Suggest the appropriate **network devices** (e.g., switches, routers, access points) and their placement.
- If using **dynamic routing**, suggest an appropriate routing protocol (e.g., RIP, OSPF, or EIGRP) with justification.
- If using **static routing**, define the static routes for efficient data flow.
- Specify the number of **default gateways** along with IP addresses.

1. Physical Connection:

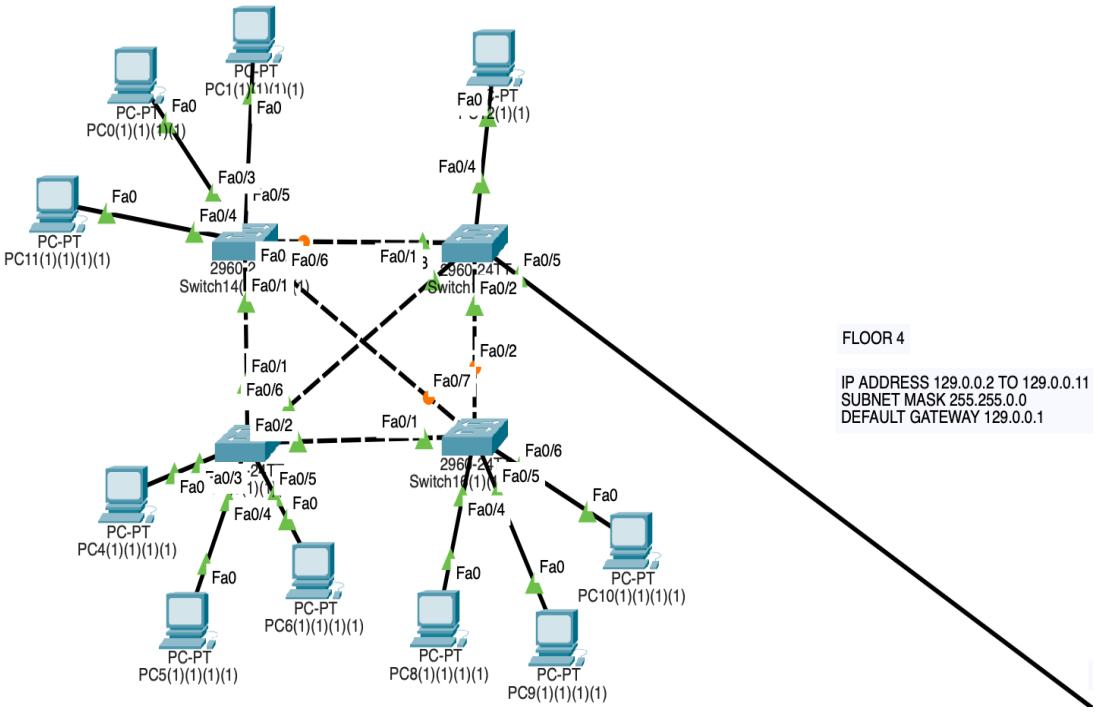






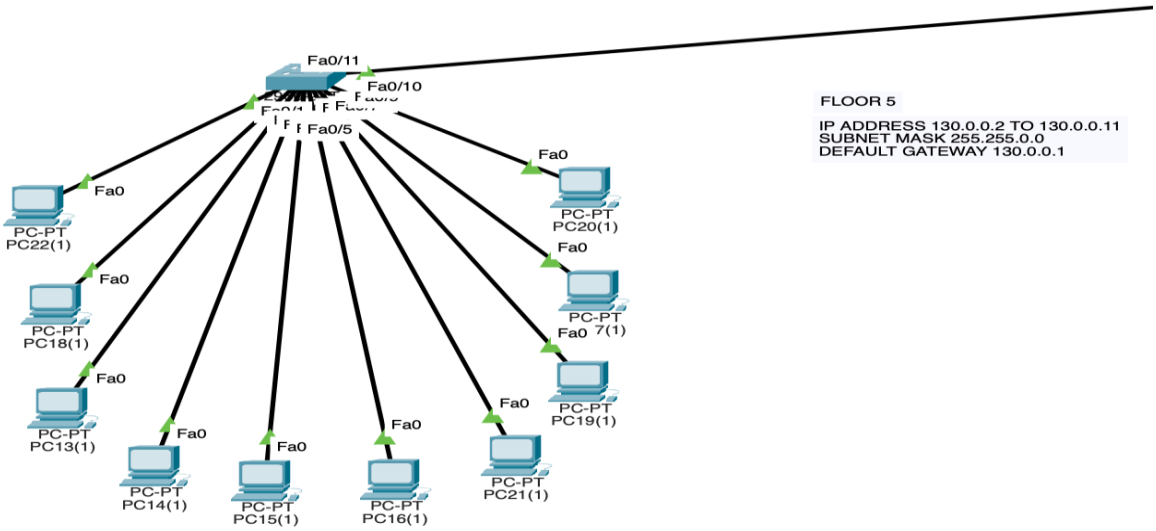
FLOOR 3

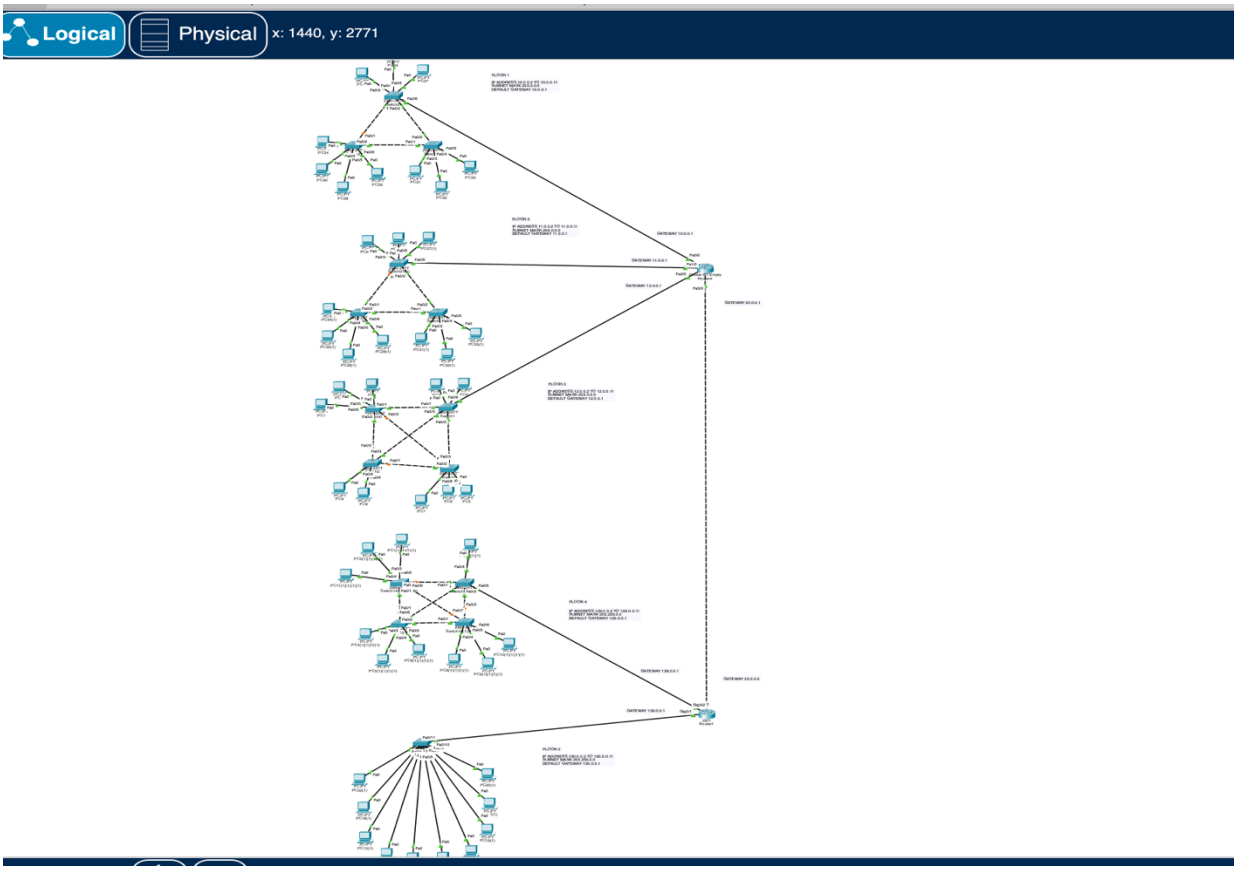
IP ADDRESS 12.0.0.2 TO 12.0.0.11
SUBNET MASK 255.0.0.0
DEFAULT GATEWAY 12.0.0.1



FLOOR 4

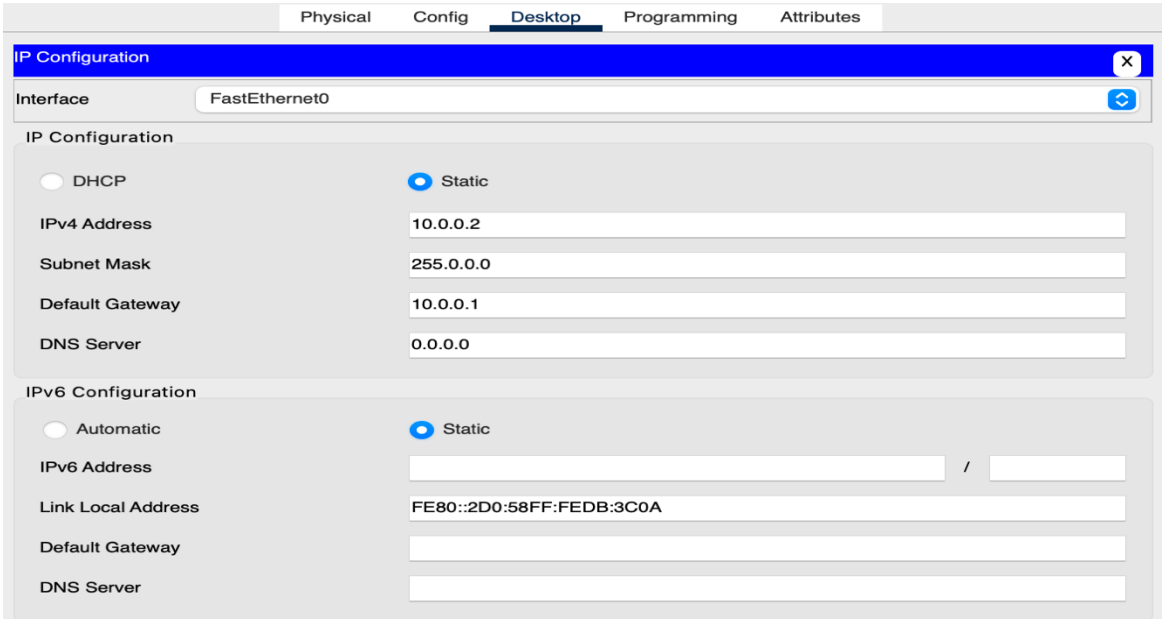
IP ADDRESS 129.0.0.2 TO 129.0.0.11
SUBNET MASK 255.255.0.0
DEFAULT GATEWAY 129.0.0.1


Fa0/11
Fa0/10
Fa0/5
Fa0
PC-PT
PC22(1)
PC-PT
PC18(1)
PC-PT
PC13(1)
PC-PT
PC14(1)
PC-PT
PC15(1)
PC-PT
PC16(1)
PC-PT
PC21(1)
PC-PT
PC19(1)
PC-PT
PC20(1)
FLOOR 5
IP ADDRESS 130.0.0.2 TO 130.0.0.11
SUBNET MASK 255.255.0.0
DEFAULT GATEWAY 130.0.0.1

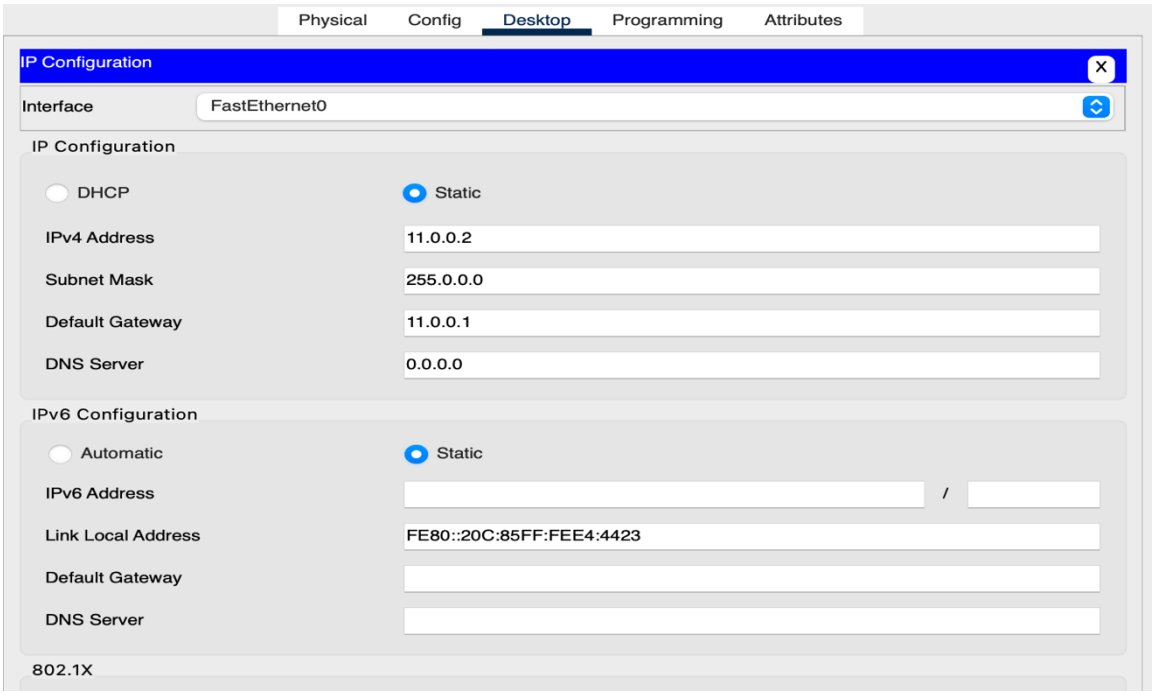

Logical
Physical
x: 1440, y: 2771

2. Allocation of IP Address:

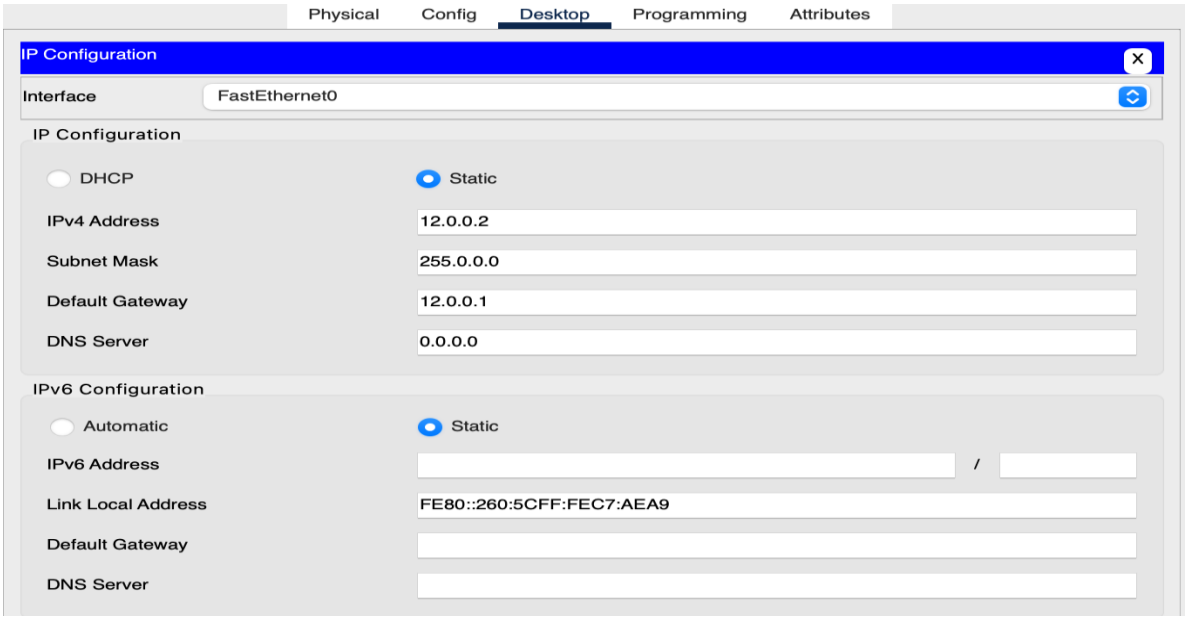
1st Floor:



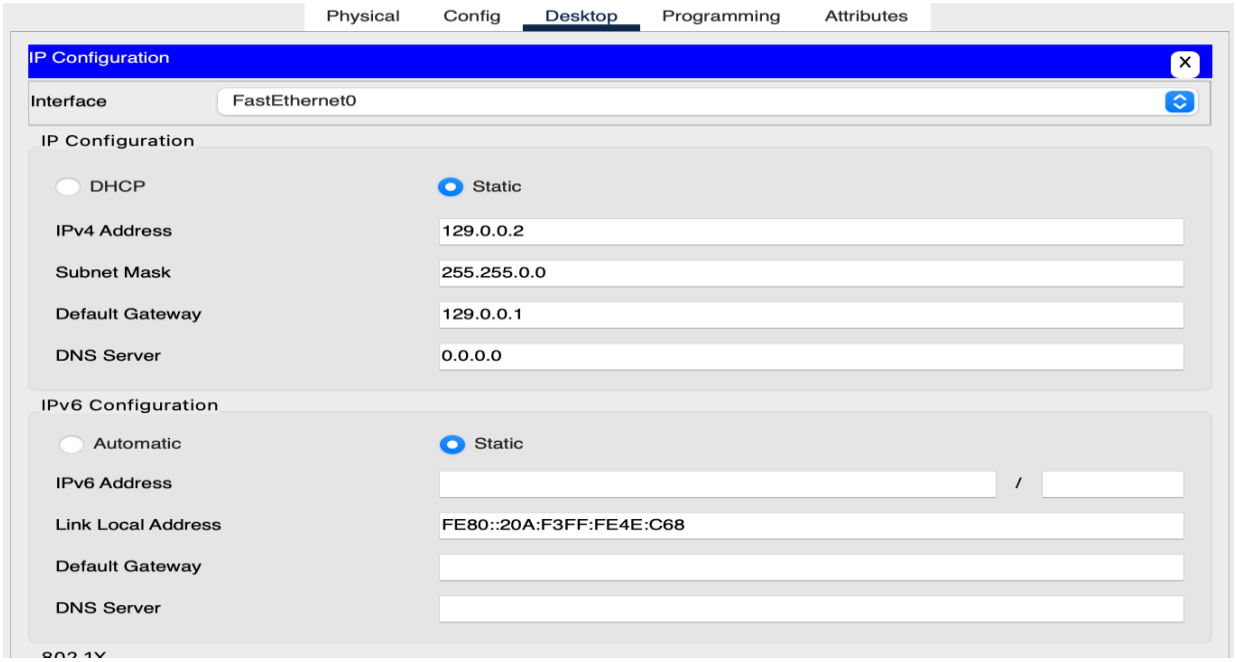
2nd Floor:



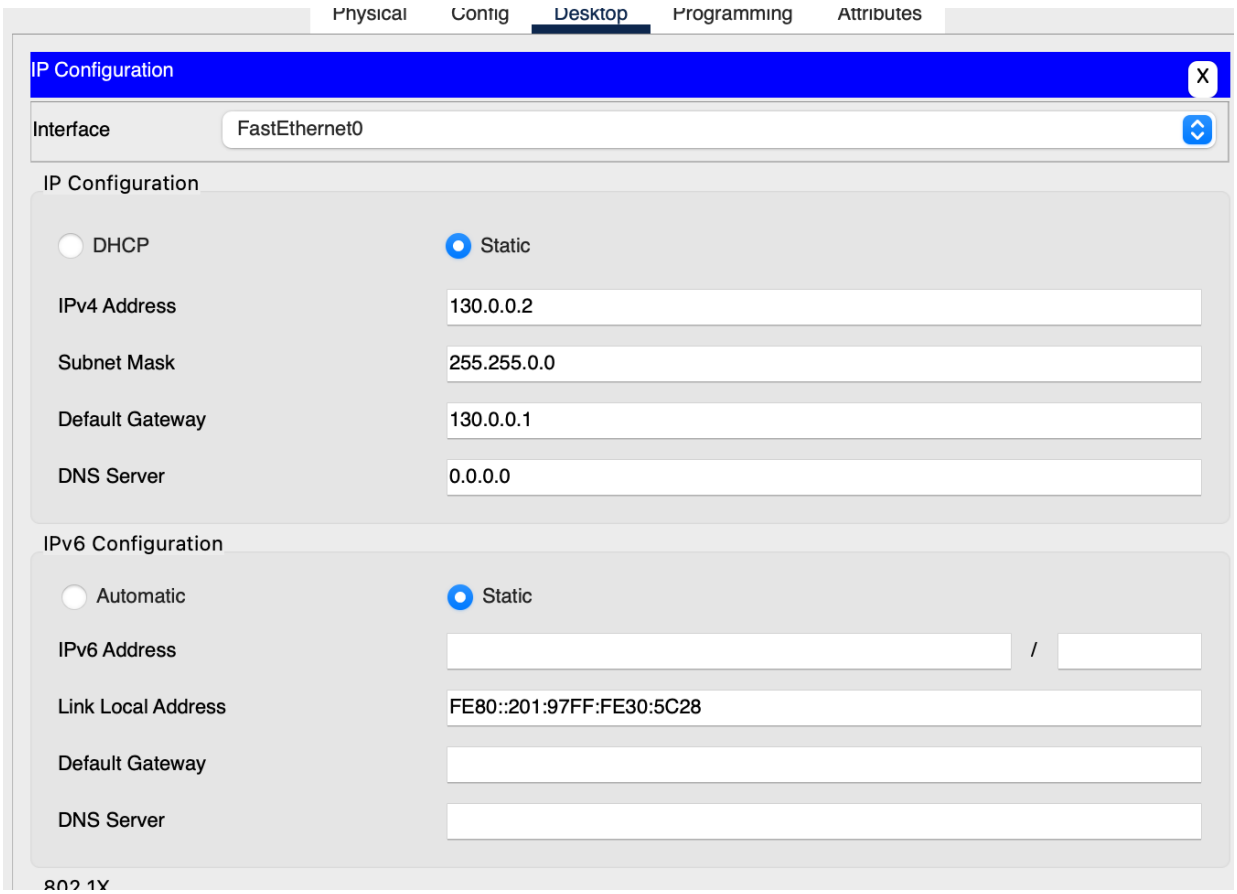
3rd Floor:



4th Floor:

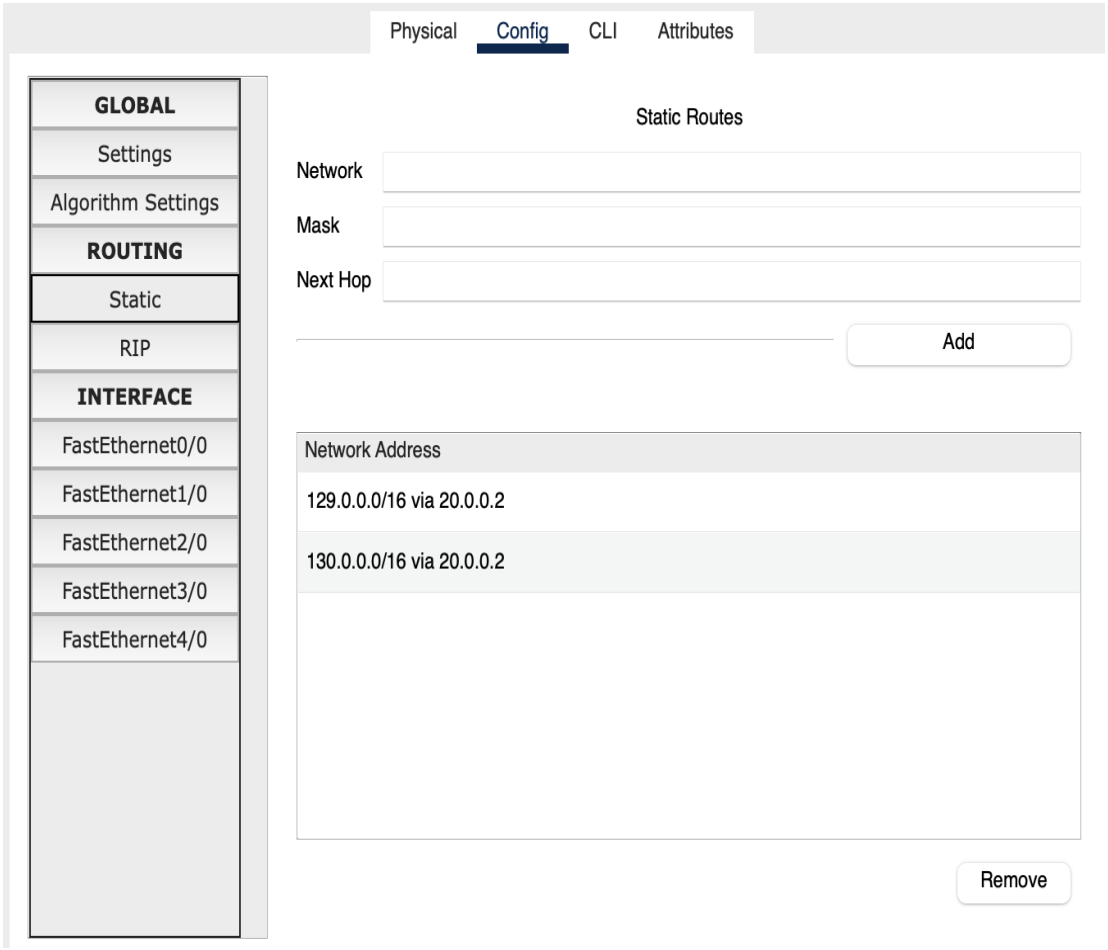


5th Floor:

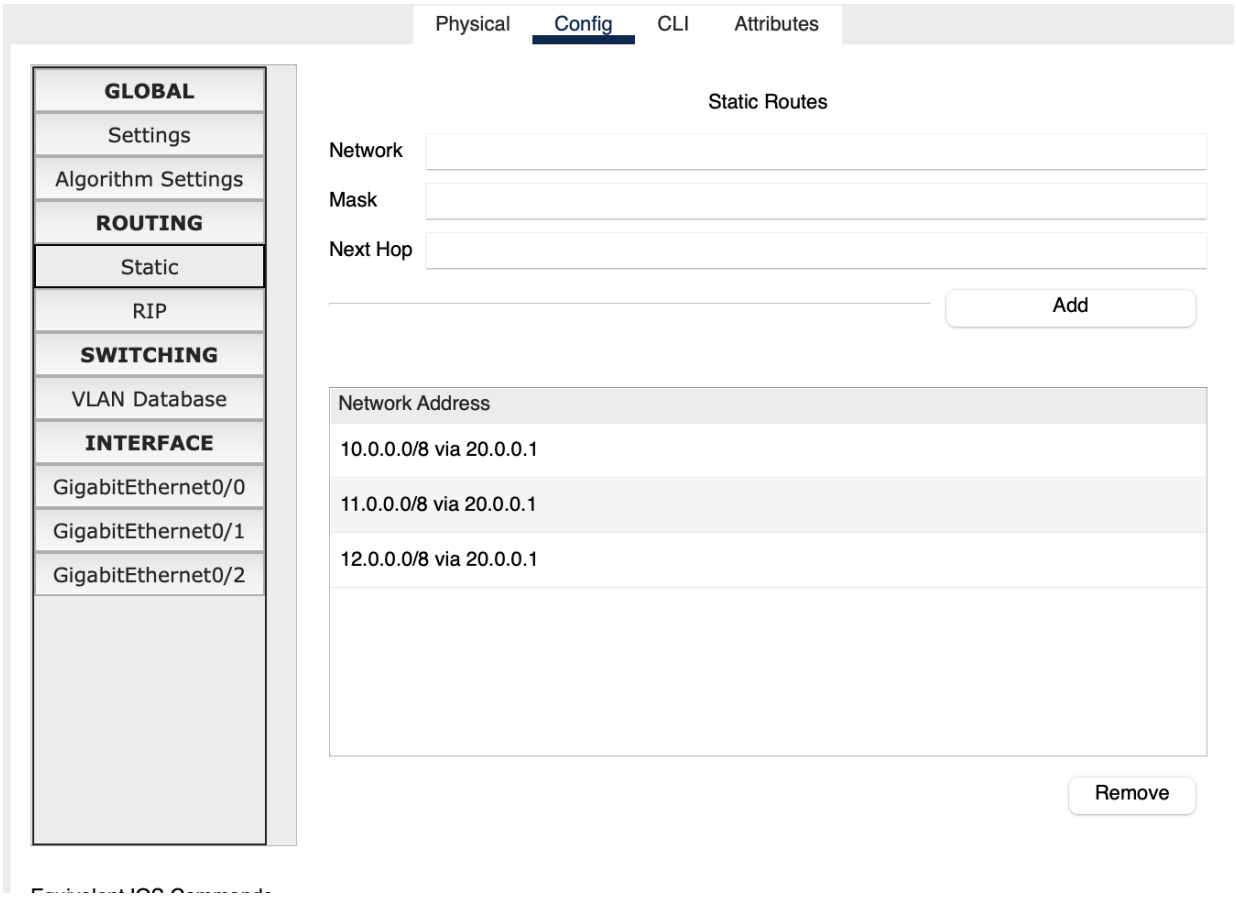

Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
130.0.0.2
Subnet Mask
255.255.0.0
Default Gateway
130.0.0.1
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address
FE80::201:97FF:FE30:5C28
Default Gateway
DNS Server
802.1X

3. Static Routing:

1st Router:

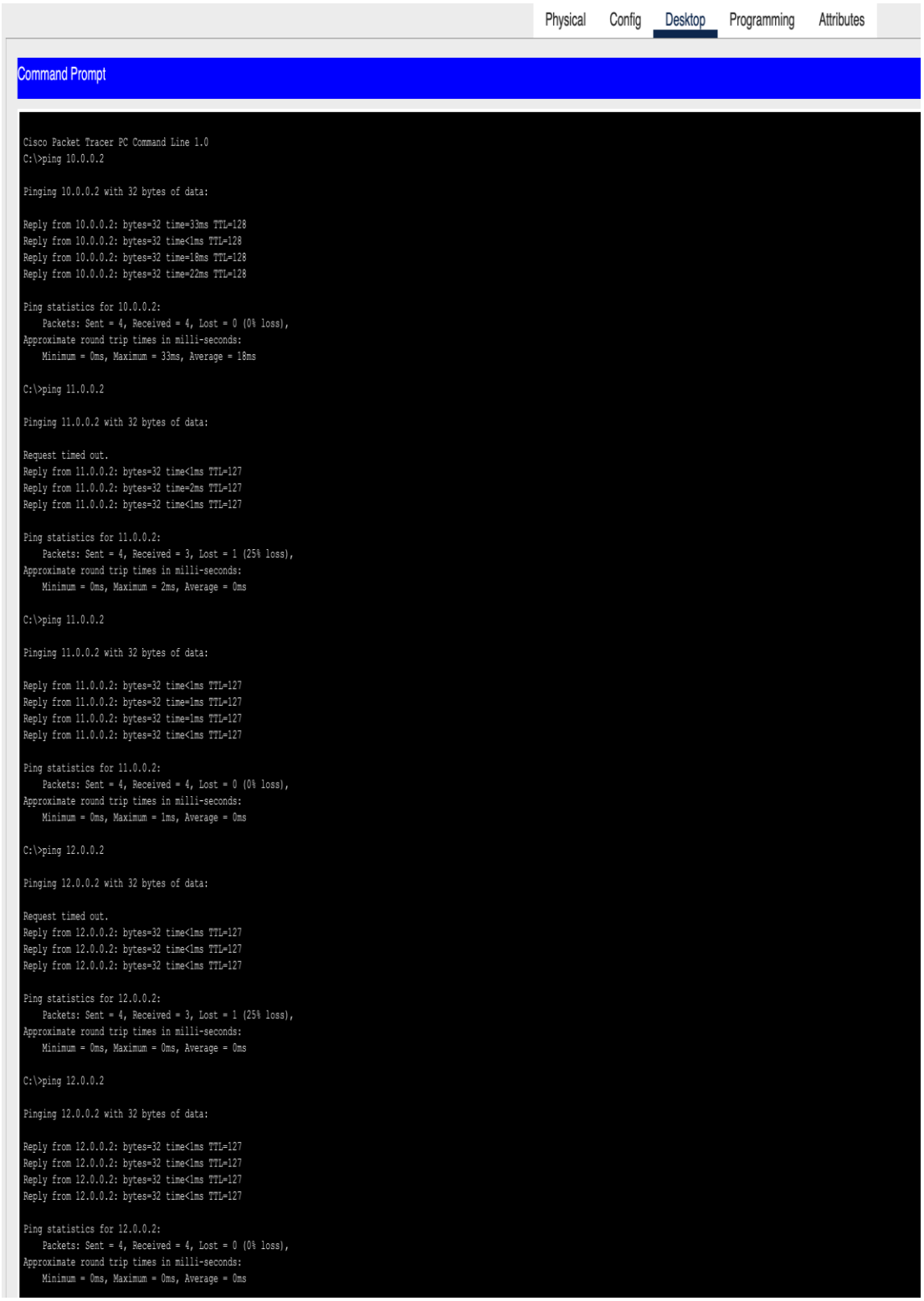


2nd Router:


Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
Static Routes
Network
Mask
Next Hop
Add
Network Address
10.0.0.0/8 via 20.0.0.1
11.0.0.0/8 via 20.0.0.1
12.0.0.0/8 via 20.0.0.1
Remove

4. Communication between all computers:

1st Floor PC to Floor to all PC's:




Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Ping statistics for 12.0.0.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 12.0.0.2
Pinging 12.0.0.2 with 32 bytes of data:
Reply from 12.0.0.2: bytes=32 time<1ms TTL=127
Reply from 12.0.0.2: bytes=32 time<1ms TTL=127
Reply from 12.0.0.2: bytes=32 time<1ms TTL=127
Reply from 12.0.0.2: bytes=32 time<1ms TTL=127
Ping statistics for 12.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 129.0.0.2
Pinging 129.0.0.2 with 32 bytes of data:
Request timed out.
Request timed out.
Reply from 129.0.0.2: bytes=32 time=1ms TTL=126
Reply from 129.0.0.2: bytes=32 time=1ms TTL=126
Ping statistics for 129.0.0.2:
Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
C:\>ping 129.0.0.2
Pinging 129.0.0.2 with 32 bytes of data:
Reply from 129.0.0.2: bytes=32 time<1ms TTL=126
Reply from 129.0.0.2: bytes=32 time<1ms TTL=126
Reply from 129.0.0.2: bytes=32 time<1ms TTL=126
Reply from 129.0.0.2: bytes=32 time<1ms TTL=126
Ping statistics for 129.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>ping 130.0.0.2
Pinging 130.0.0.2 with 32 bytes of data:
Request timed out.
Reply from 130.0.0.2: bytes=32 time=1ms TTL=126
Reply from 130.0.0.2: bytes=32 time<1ms TTL=126
Reply from 130.0.0.2: bytes=32 time<1ms TTL=126
Ping statistics for 130.0.0.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 130.0.0.2
Pinging 130.0.0.2 with 32 bytes of data:
Reply from 130.0.0.2: bytes=32 time<1ms TTL=126
Reply from 130.0.0.2: bytes=32 time=1ms TTL=126
Reply from 130.0.0.2: bytes=32 time<1ms TTL=126
Reply from 130.0.0.2: bytes=32 time<1ms TTL=126
Ping statistics for 130.0.0.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>

9th floor PC to all floor PC's :