3. Given a network address of 10.0.0.0/24, divide it into 4 equal subnets.

Calculate the new subnet mask.

Determine the valid host range for each subnet.

Assign IP addresses to devices in Packet Tracer and verify connectivity.

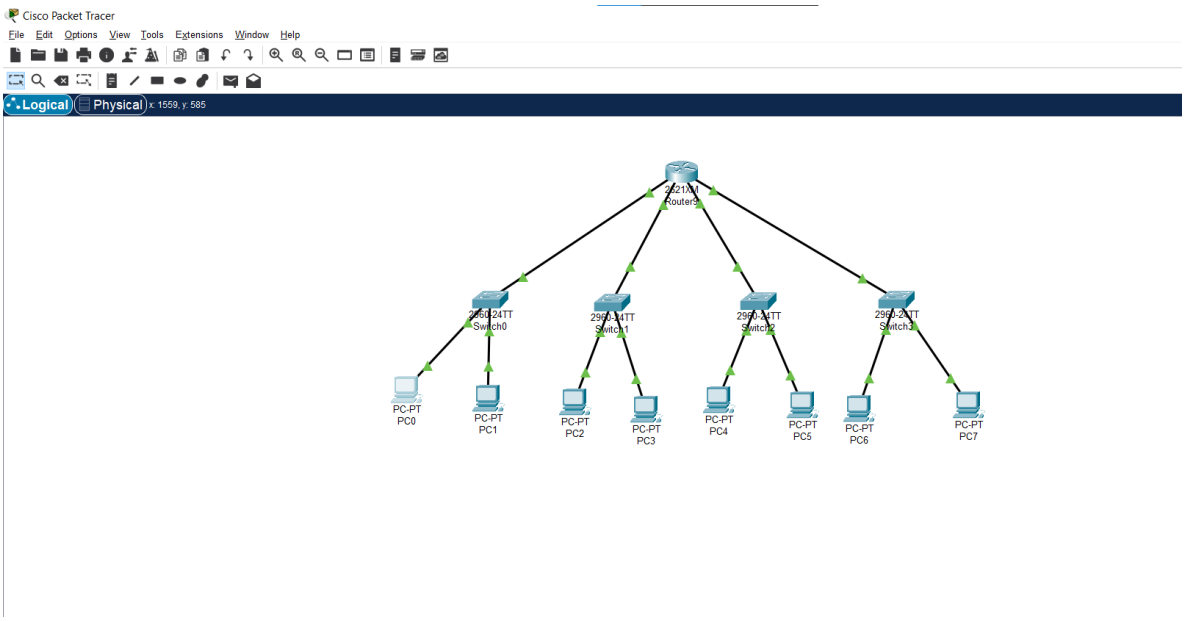
To create 4 subnets, we need 2 bits ($2^2 = 4$). So we'll extend the subnet mask by 2 bits from /24 to /26.

New subnet mask: 255.255.255.192 (/26)

With a /26 subnet mask, each subnet has 64 addresses (2^(32-26) = 2^6 = 64).

1. First subnet:
    a. Network ID: 10.0.0.0/26
    b. First usable host: 10.0.0.1
    c. Last usable host: 10.0.0.62
    d. Broadcast address: 10.0.0.63
2. Second subnet:
    a. Network ID: 10.0.0.64/26
    b. First usable host: 10.0.0.65
    c. Last usable host: 10.0.0.126
    d. Broadcast address: 10.0.0.127
3. Third subnet:
    a. Network ID: 10.0.0.128/26
    b. First usable host: 10.0.0.129
    c. Last usable host: 10.0.0.190
    d. Broadcast address: 10.0.0.191

4. Fourth subnet:
    a. Network ID: 10.0.0.192/26
    b. First usable host: 10.0.0.193
    c. Last usable host: 10.0.0.254
    d. Broadcast address: 10.0.0.255



Router9

Physical Config CLI Attributes

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 10.0.0.1 255.255.255.192
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
exit
Router(config)#interface FastEthernet0/1
Router(config-if)#ip address 10.0.0.65 255.255.255.192
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
exit
Router(config)#interface FastEthernet1/0
Router(config-if)#ip address 10.0.0.129 255.255.255.192
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/0, changed state to up
exit
Router(config)#interface FastEthernet1/1
Router(config-if)#ip address 10.0.0.193 255.255.255.192
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet1/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet1/1, changed state to up
exit
Router(config)#show ip route
                ^
% Invalid input detected at '^' marker.

Router(config)#exit
Router#
```

```
Router#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

     10.0.0.0/26 is subnetted, 4 subnets
C       10.0.0.0 is directly connected, FastEthernet0/0
C       10.0.0.64 is directly connected, FastEthernet0/1
C       10.0.0.128 is directly connected, FastEthernet1/0
C       10.0.0.192 is directly connected, FastEthernet1/1

Router#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        10.0.0.1        YES manual up                    up
FastEthernet0/1        10.0.0.65       YES manual up                    up
Serial0/0              unassigned      YES unset  administratively down down
Serial0/1              unassigned      YES unset  administratively down down
Serial0/2              unassigned      YES unset  administratively down down
Serial0/3              unassigned      YES unset  administratively down down
FastEthernet1/0        10.0.0.129      YES manual up                    up
FastEthernet1/1        10.0.0.193      YES manual up                    up
Router#
```

PC0

Physical Config Desktop Programming Attributes

Command Prompt

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time<1ms TTL=128
Reply from 10.0.0.3: bytes=32 time<1ms TTL=128
Reply from 10.0.0.3: bytes=32 time<1ms TTL=128
Reply from 10.0.0.3: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.0.0.66

Pinging 10.0.0.66 with 32 bytes of data:

Request timed out.
Reply from 10.0.0.66: bytes=32 time<1ms TTL=127
Reply from 10.0.0.66: bytes=32 time<1ms TTL=127
Reply from 10.0.0.66: bytes=32 time<1ms TTL=127

Ping statistics for 10.0.0.66:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>ping 10.0.0.66

Pinging 10.0.0.66 with 32 bytes of data:

Reply from 10.0.0.66: bytes=32 time<1ms TTL=127
Reply from 10.0.0.66: bytes=32 time<1ms TTL=127
Reply from 10.0.0.66: bytes=32 time=12ms TTL=127
Reply from 10.0.0.66: bytes=32 time<1ms TTL=127

Ping statistics for 10.0.0.66:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 12ms, Average = 3ms

C:\>tracert 10.0.0.130

Tracing route to 10.0.0.130 over a maximum of 30 hops:

  1    0 ms      0 ms      0 ms      10.0.0.1
  2    *         0 ms      0 ms      10.0.0.130

Trace complete.
```