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Subnetting In Cisco Packet Tracer

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INDIVIDUAL ASSIGNMENT

Subnetting:

Subnetting is a technique for creating logical sub-networks from a single physical network (subnets). A company can grow its network via subnetting without asking for a new network number from its ISP.

A rapid, effective, and reliable computer network is what subnetting is meant to create. Network traffic must find more effective routes as they become larger and more complicated. If all network traffic used the same path and moved through the system at once, bottlenecks and congestion would form, creating sluggish and inefficient backlogs. You may reduce the number of routers that network traffic must transit through by setting up a subnet. In order to make traffic go the shortest distance feasible inside a bigger network, an engineer will effectively create smaller mini routes. (Javatpoint, 2024)

Purpose of Subnetting :

1) IP Address Optimization : Subnetting allows for the efficient use of IP addresses by dividing a large network into smaller, more manageable segments, preventing address wastage.

2) Enhanced Security : By segmenting the network into subnets, administrators can implement targeted security measures and control access to resources more effectively, reducing the risk of unauthorized access or data breaches.

3) Improved Network Performance : Subnetting helps in reducing network congestion and improving overall performance by containing broadcast traffic within individual subnets and enabling more efficient routing.

4) Simplified Network Management: Subnetting facilitates easier network administration and troubleshooting by organizing devices into logical groups, allowing for more granular control over configurations and simplifying the identification and resolution of network issues.

Question :

Make 3 Subnet For 200.100.10.0 For

a) 2 Host

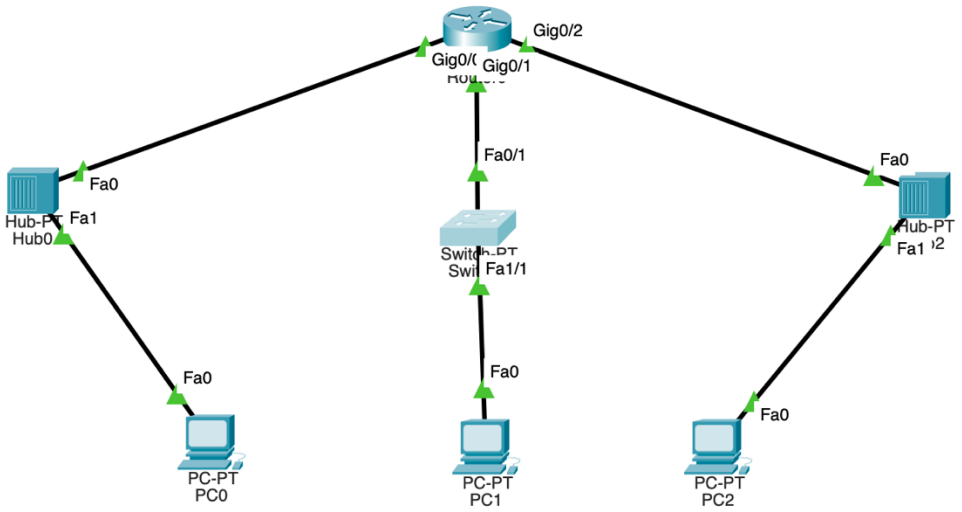
b) 30 Host

c) 120 Host

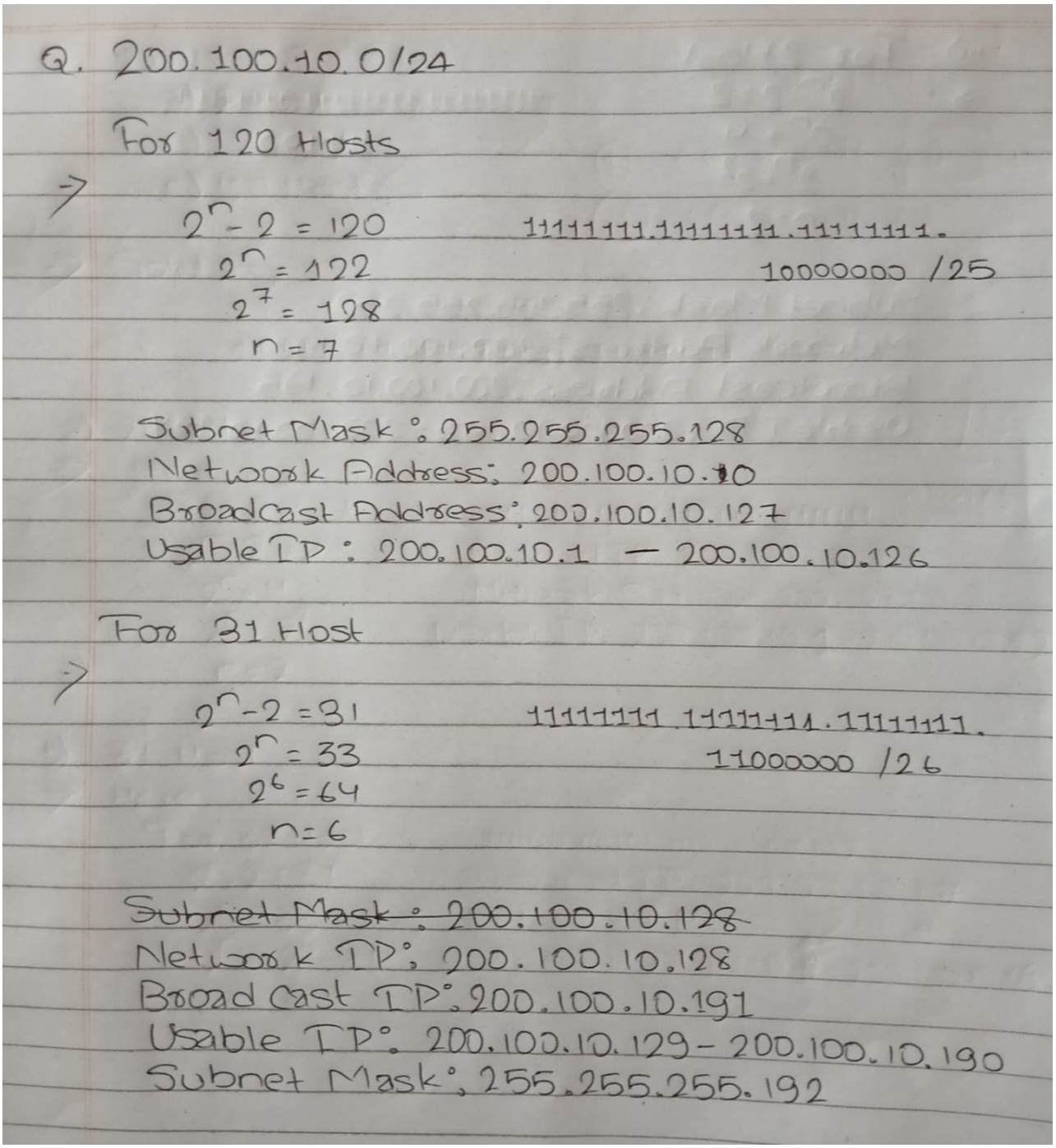
Solution : -

STEP 1 : Setup Computer, Switch and Router in Cisco Packet Tracer

- Use Router (2911) and Drag It to the Empty Space.
- Use 2 Hub and Switch and Drag It to the Empty Space.
- Use 3 PC And Drag It to the Empty Space.
- Connect The PC To the Switch and Hub Using Cable.
- Connect The Switch, Hub to the Router.



STEP 2 : Calculate Subnet Mask , Broadcast Address, Network Address & Usable IP Range.



Q. 200.100.10.0/24

For 120 Hosts

→

$2^n - 2 = 120$

$2^n = 122$

$2^7 = 128$

$n = 7$

11111111.11111111.11111111.
10000000 /25

Subnet Mask : 255.255.255.128
Network Address: 200.100.10.0
Broadcast Address: 200.100.10.127
Usable IP : 200.100.10.1 — 200.100.10.126

For 31 Host

→

$2^n - 2 = 31$

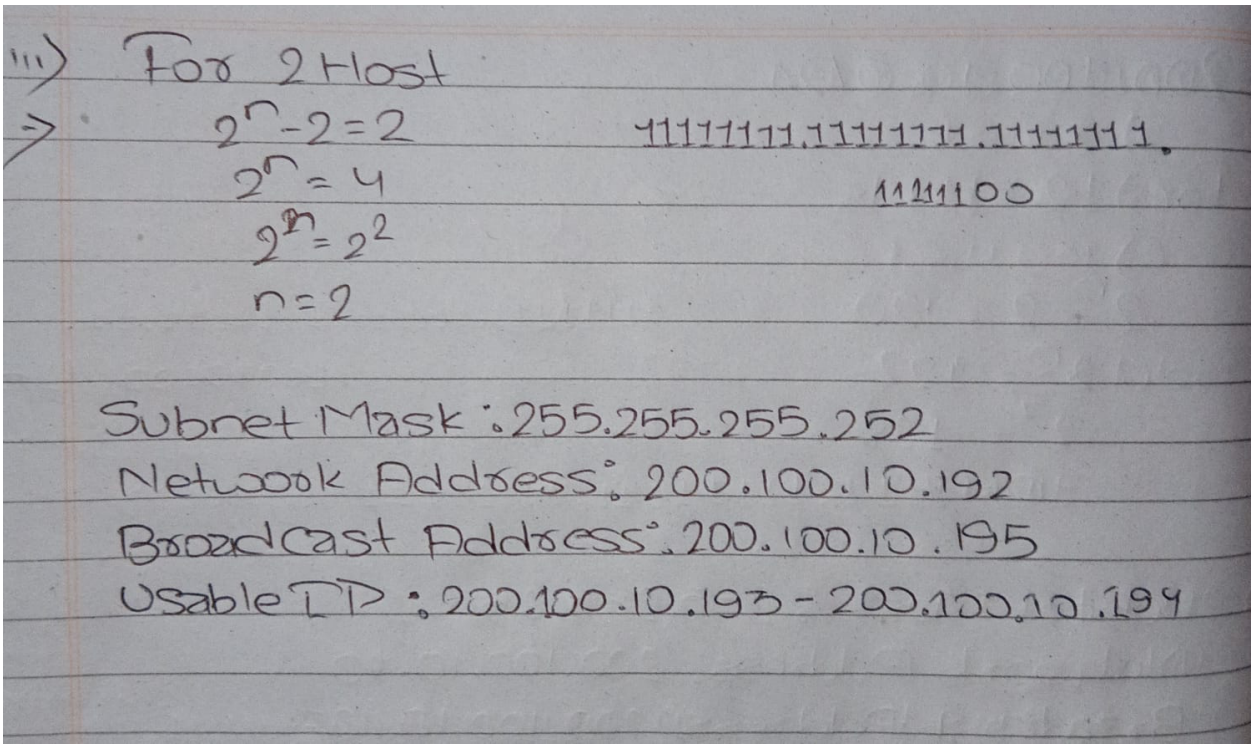
$2^n = 33$

$2^6 = 64$

$n = 6$

11111111.11111111.11111111.
11000000 /26

~~Subnet Mask : 200.100.10.128~~
Network IP: 200.100.10.128
Broad Cast IP: 200.100.10.191
Usable IP: 200.100.10.129 - 200.100.10.190
Subnet Mask: 255.255.255.192



STEP 3 : Configure Router For Each Network

- Establish First Gig0/0 Network For 120 Host

```
Press RETURN to get started!



Router>enable
Router#config terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface g0/0
Router(config-if)#ip address 200.100.10.1 255.255.255.252
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
```

- Establish Second Gig0/1 Network For 30 Host

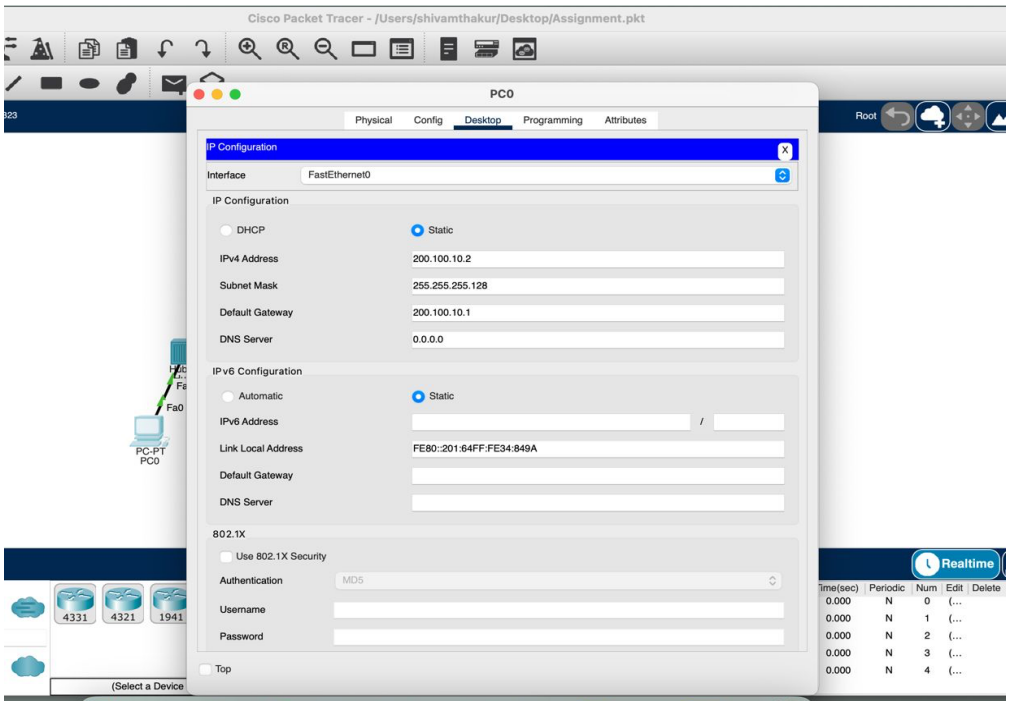
```
Router(config-if)#exit
Router(config)#int g0/1
Router(config-if)#ip address 200.100.10.129 255.255.255.192
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/1, changed state to up

Router(config-if)#exit
Router(config)#
```

- Establish Third Gig0/2 Network For 2 Host

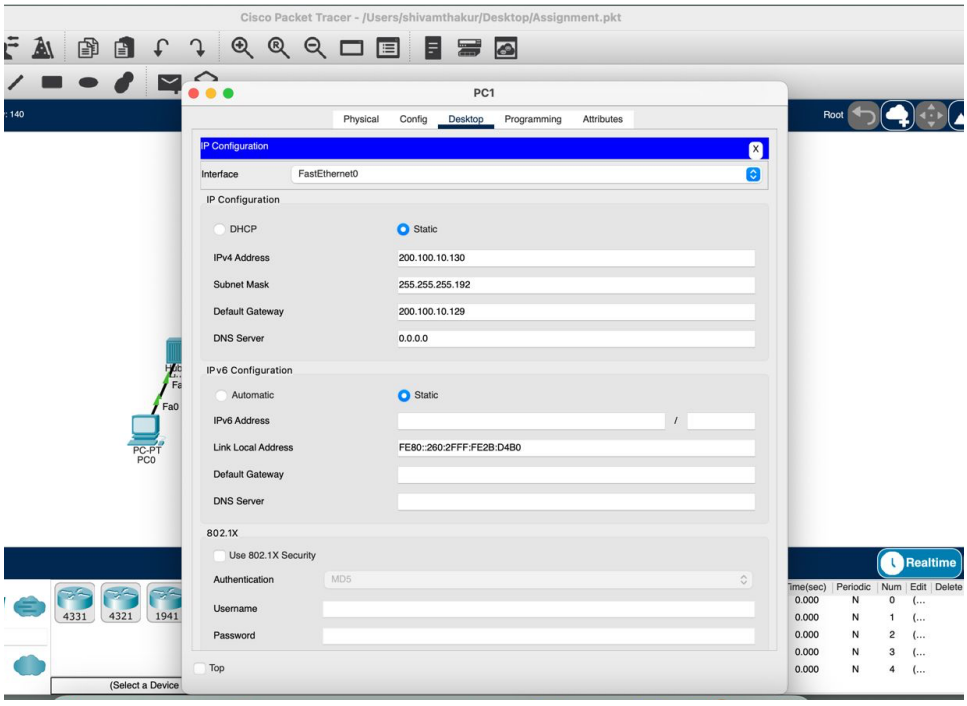
```
Router(config)#int g0/2
Router(config-if)#ip address 200.100.10.193 255.255.255.252
Router(config-if)#no shut

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/2, changed state to up

Router(config-if)#exit
Router(config)#
```

STEP 4 : Change IP Configuration of PC’s

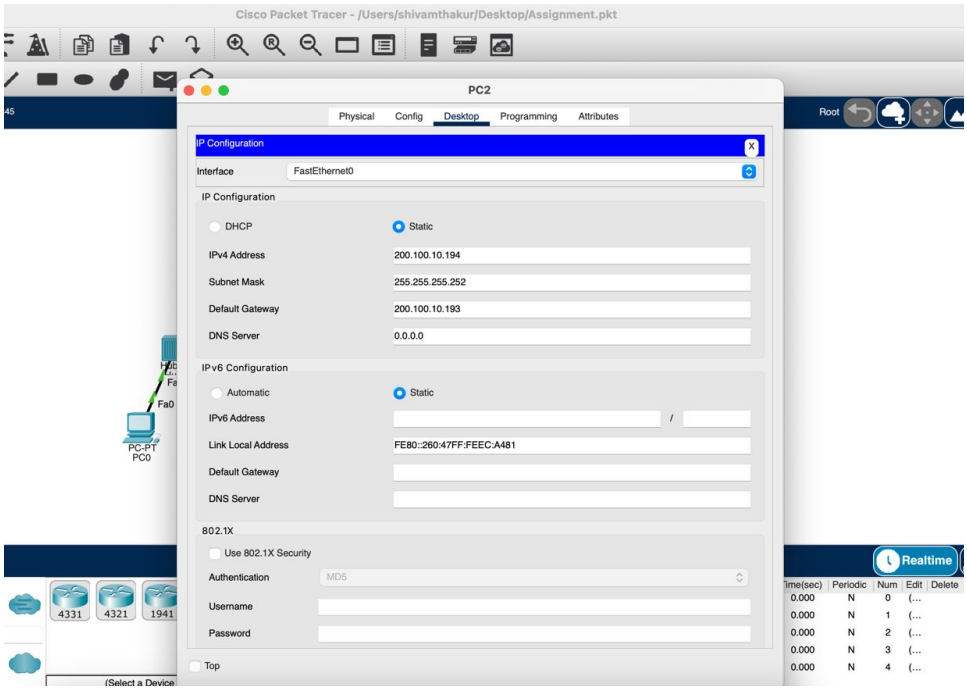
- For PC0



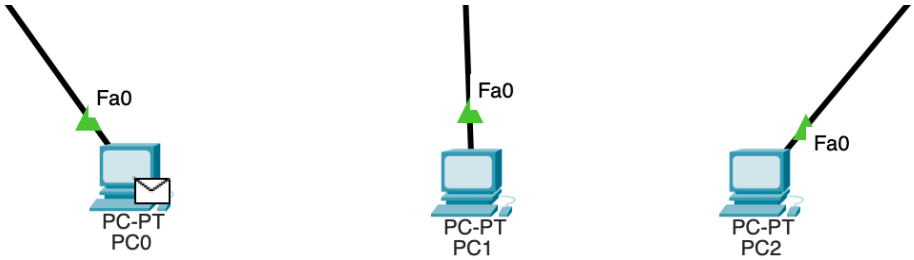
- For PC1



- For PC2


Cisco Packet Tracer - /Users/shivamthakur/Desktop/Assignment.pkt
PC2
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
200.100.10.194
Subnet Mask
255.255.255.252
Default Gateway
200.100.10.193
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::260:47FF:FEEC:A481
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top
Root
Realtime
Fa0
PC-PT
PC0
4331
4321
1941
Time(sec)
Periodic
Num
Edit
Delete

STEP 5 : Sending PDU From One PC To Another



Results :