

Distributed computing small project I (Spring 2023)

Assignment 6

Distributed Network Design and Documentation

Introduction:

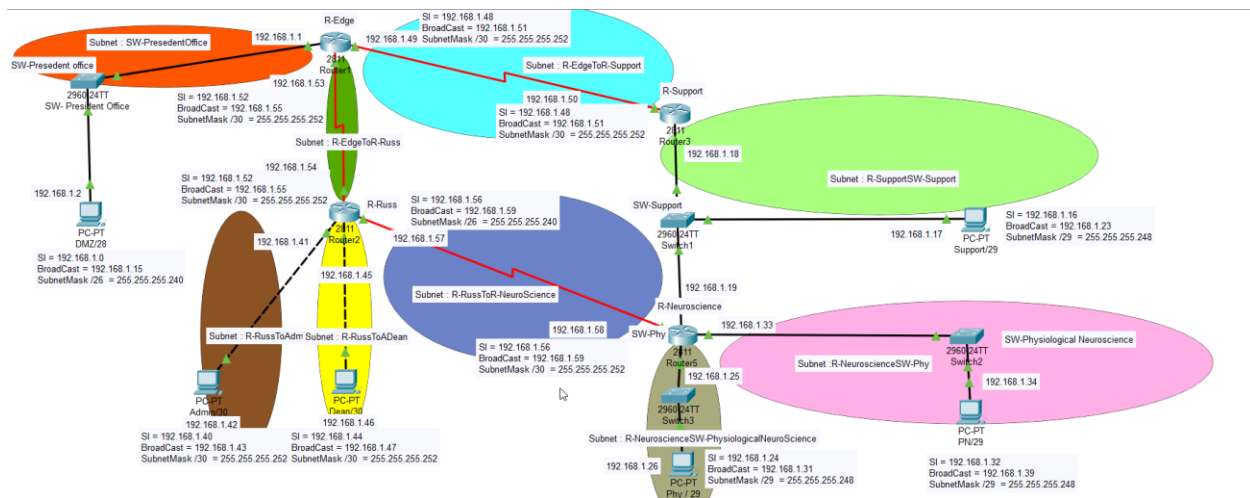
There is a distributed college network which must be configured such that every computer in the respective department needs to be assigned a unique IP address such that communication can be established from any computer to any other. In order to accomplish this, initial information regarding subnetting has been shared (e.g. subnets Admin/30, PN/29) for the respective departments.

Objective:

The main objective of this task is to utilize knowledge about subnetting networks learnt in the class and use Cisco Packet Tracer to create the topology diagram, group different subnets and assign IP addresses accordingly.

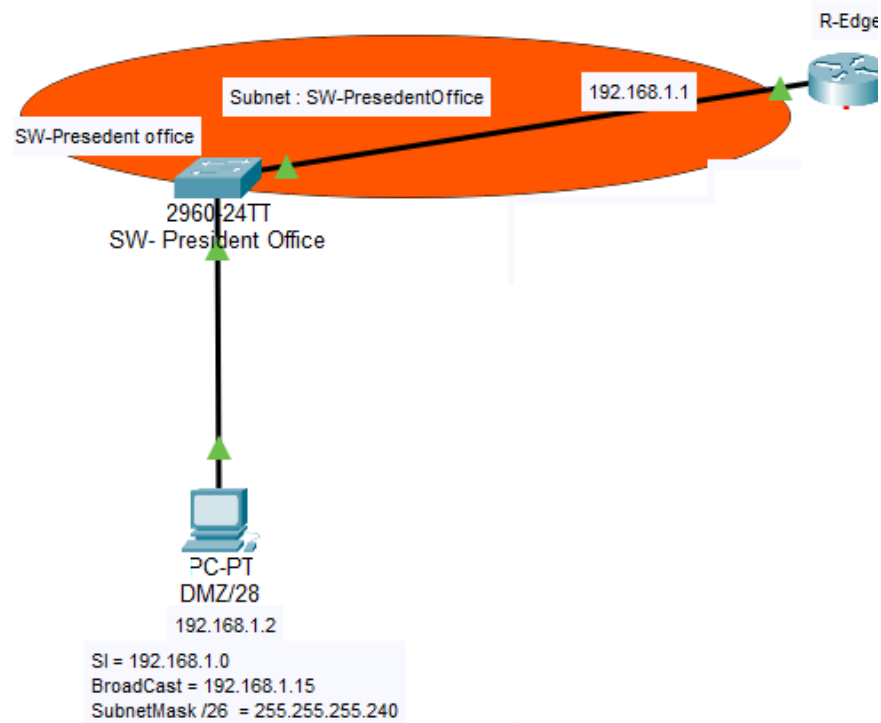
Screenshot of the DS subnet Network:

(Note : Please check attachment in the submission for clear visibility)



The above screen shot is captured from the Cisco Packet Tracer where implemented the distributed college network and sub netted it successfully.

1. Totally there will be 9 small subnetworks required in order to successfully subnet and allow any user to send and receive packet from any computer in the distributed network.
 - a. Each oval shape with a unique color represents a unique subnet.



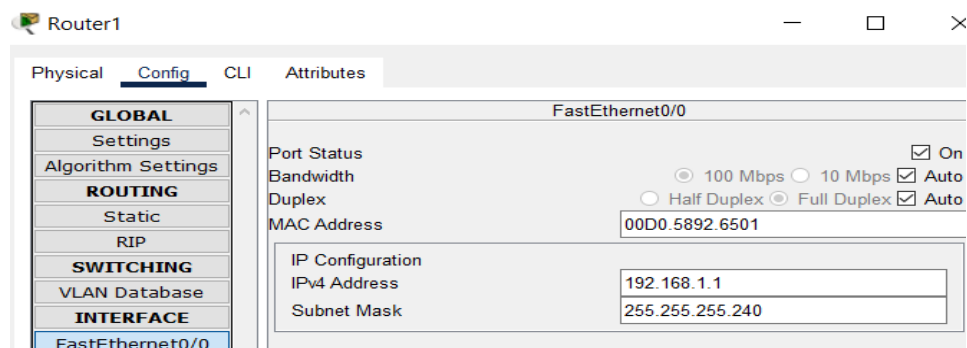
b. It can be seen from the above figure.

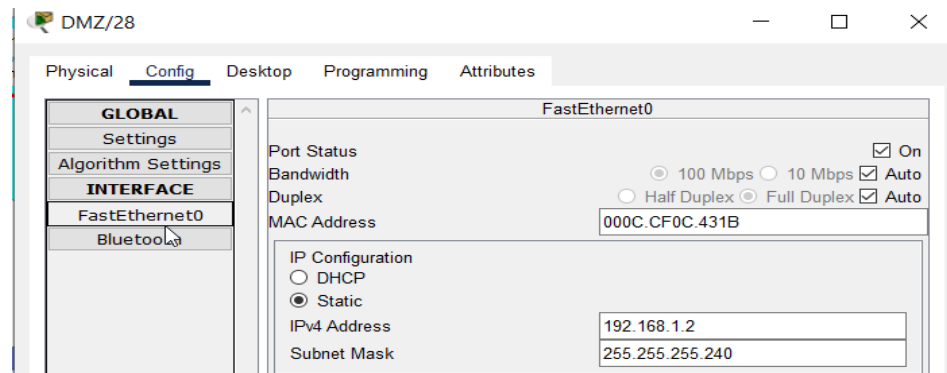
Subnet name : SW-PrsedentOffice

Subnet Mask : 255.255.255.240 (/28) - 16 IP address in the subnet

Router R-Edge is assigned : 192.168.1.1 on FastEthernet 0/0

First Host is assigned : 192.168.1.2 on FastEthernet 0



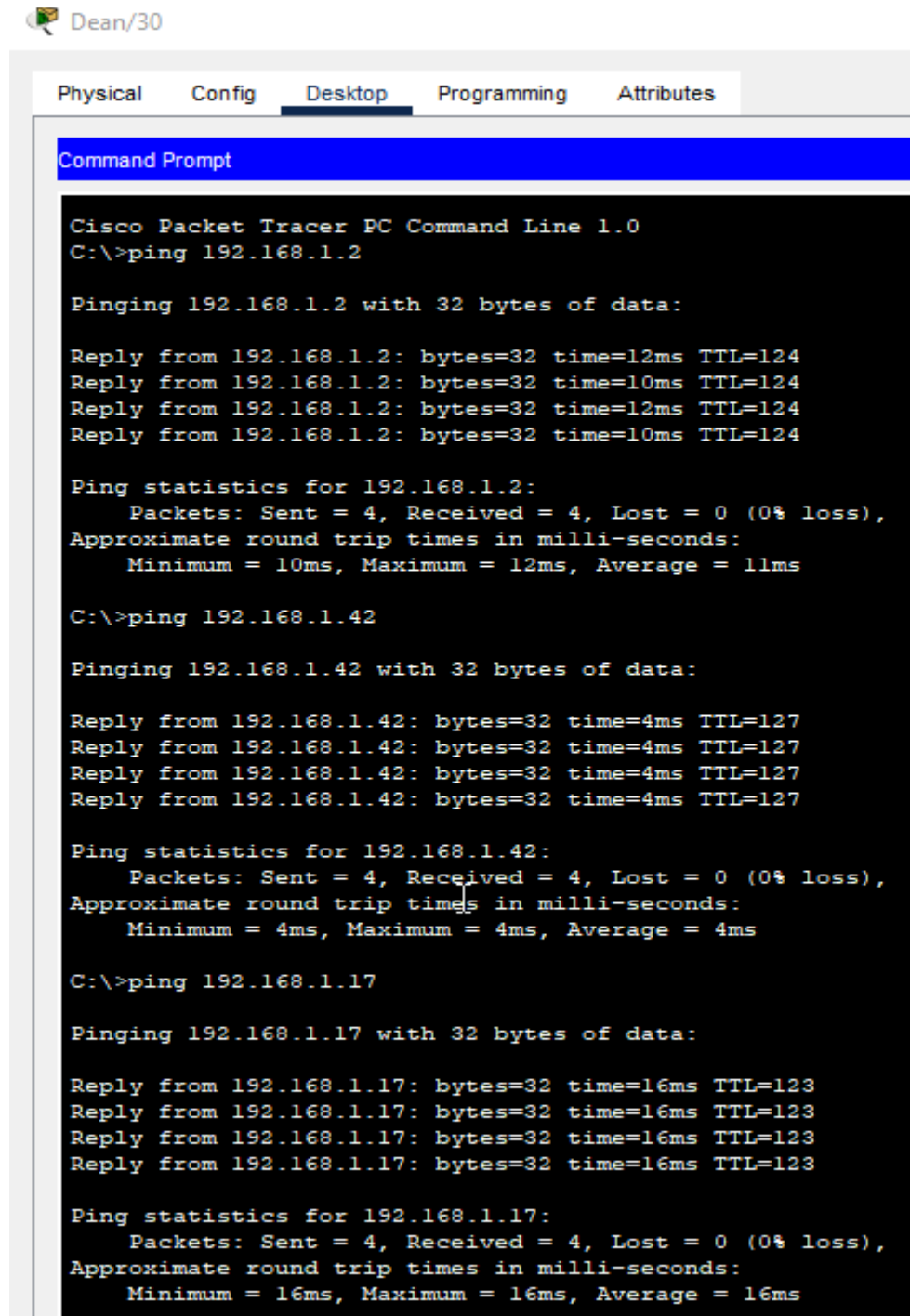


Similarly, information about the subnet name, IP address, subnet mask, broadcast and SI has been provided for every subnet on the topology diagram created on Cisco Packet Tracer.

- 9 different colors on the screen shot represent 9 different subnetworks. (Attached a .PNG image in the submission for better visibility)
- Below table represent each subnetwork subnet name and size of it as requested in the assignment:

Subnet Name	Size (Including Subnet Address and Broadcast
SW- President Office	16 IP Address 192.168.1.0 - 192.168.1.15 Mask 255.255.255.240
R-SupportSW-Support	8 IP Address 192.168.1.16 - 192.168.1.23 Mask 255.255.255.248
R-NeuroscienceSW-Phy	8 IP Address 192.168.1.24 - 192.168.1.31 Mask 255.255.255.248
R-NeuroscienceSW-PhysiologicalNeuroScience	8 IP Address 192.168.1.32 - 192.168.1.39 Mask 255.255.255.248
R-RussToAdmin	4 IP Address 192.168.1.40 - 192.168.1.43 Mask 255.255.255.252
R-RussToDean	4 IP Address 192.168.1.44 - 192.168.1.47 Mask 255.255.255.252
R-EdgeToR-Support	4 IP Address 192.168.1.48 - 192.168.1.51 Mask 255.255.255.252
R-EdgeToR-Russ	4 IP Address 192.168.1.52 - 192.168.1.55 Mask 255.255.255.252
R-RussToR-Neuroscience	4 IP Address 192.168.1.56 - 192.168.1.59 Mask 255.255.255.252

4. After the subnet is created, validation has been performed to check if we can send/ receive packets from any host to any other host.
 - a. In order to show the results, I am considering a host Dean (IP : 192.168.1.46) who is part of the subnet : R-RussToDean.



```
Dean/30
Physical Config Desktop Programming Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=12ms TTL=124
Reply from 192.168.1.2: bytes=32 time=10ms TTL=124
Reply from 192.168.1.2: bytes=32 time=12ms TTL=124
Reply from 192.168.1.2: bytes=32 time=10ms TTL=124

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 10ms, Maximum = 12ms, Average = 11ms

C:\>ping 192.168.1.42

Pinging 192.168.1.42 with 32 bytes of data:

Reply from 192.168.1.42: bytes=32 time=4ms TTL=127
Reply from 192.168.1.42: bytes=32 time=4ms TTL=127
Reply from 192.168.1.42: bytes=32 time=4ms TTL=127
Reply from 192.168.1.42: bytes=32 time=4ms TTL=127

Ping statistics for 192.168.1.42:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 4ms, Average = 4ms

C:\>ping 192.168.1.17

Pinging 192.168.1.17 with 32 bytes of data:

Reply from 192.168.1.17: bytes=32 time=16ms TTL=123
Reply from 192.168.1.17: bytes=32 time=16ms TTL=123
Reply from 192.168.1.17: bytes=32 time=16ms TTL=123
Reply from 192.168.1.17: bytes=32 time=16ms TTL=123

Ping statistics for 192.168.1.17:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 16ms, Maximum = 16ms, Average = 16ms
```

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C:\>ping 192.168.1.26

Pinging 192.168.1.26 with 32 bytes of data:

Reply from 192.168.1.26: bytes=32 time=8ms TTL=126
Reply from 192.168.1.26: bytes=32 time=8ms TTL=126
Reply from 192.168.1.26: bytes=32 time=8ms TTL=126
Reply from 192.168.1.26: bytes=32 time=8ms TTL=126

Ping statistics for 192.168.1.26:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 8ms, Maximum = 8ms, Average = 8ms

C:\>ping 192.168.1.34

Pinging 192.168.1.34 with 32 bytes of data:











Reply from 192.168.1.34: bytes=32 time=8ms TTL=126
Reply from 192.168.1.34: bytes=32 time=8ms TTL=126
Reply from 192.168.1.34: bytes=32 time=8ms TTL=126
Reply from 192.168.1.34: bytes=32 time=8ms TTL=126

Ping statistics for 192.168.1.34:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 8ms, Maximum = 8ms, Average = 8ms

```











I have used a ping command to initiate communication with the host from various subnets that are part of the distributed network. The above screenshot attached shows the packet delivery and receipt to and from the host of each subnet successfully. Also, we can see the same on the Cisco Packet Tracer SW via performing the simulations.

Dean/30











Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	Dean/30	DMZ/28	ICMP		0.000	N	0	(edit)
	Successful	Dean/30	Admin/30	ICMP		0.000	N	1	(edit)
	Successful	Dean/30	Support/29	ICMP		0.000	N	2	(edit)
	Successful	Dean/30	PN/29	ICMP		0.000	N	3	(edit)
	Successful	Dean/30	Phy / 29	ICMP		0.000	N	4	(edit)

I have performed similar tests from all other hosts to ensure the subnetting carried out is correct. Below are the attachments of the packet simulations performed.











DMZ/28:

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num
	Successful	DMZ/28	Admin/30	ICMP		0.000	N	0
	Successful	DMZ/28	Dean/30	ICMP		0.000	N	1
	Successful	DMZ/28	Phy / 29	ICMP		0.000	N	2
	Successful	DMZ/28	PN/29	ICMP		0.000	N	3
	Successful	DMZ/28	Support/29	ICMP		0.000	N	4











Admin/30 :

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	Admin/30	DMZ/28	ICMP		0.000	N	0	(edit)
	Successful	Admin/30	Dean/30	ICMP		0.000	N	1	(edit)
	Successful	Admin/30	Support/29	ICMP		0.000	N	2	(edit)
	Successful	Admin/30	Phy / 29	ICMP		0.000	N	3	(edit)
	Successful	Admin/30	PN/29	ICMP		0.000	N	4	(edit)











Support/29

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	Support/29	DMZ/28	ICMP		0.000	N	0	(edit)
	Successful	Support/29	Admin/30	ICMP		0.000	N	1	(edit)
	Successful	Support/29	Dean/30	ICMP		0.000	N	2	(edit)
	Successful	Support/29	PN/29	ICMP		0.000	N	3	(edit)
	Successful	Support/29	Phy / 29	ICMP		0.000	N	4	(edit)

Phy/29

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	Phy / 29	DMZ/28	ICMP		0.000	N	0	(edit)
	Successful	Phy / 29	Admin/30	ICMP		0.000	N	1	(edit)
	Successful	Phy / 29	Dean/30	ICMP		0.000	N	2	(edit)
	Successful	Phy / 29	PN/29	ICMP		0.000	N	3	(edit)
	Successful	Phy / 29	Support/29	ICMP		0.000	N	4	(edit)

PN/29

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit
	Successful	PN/29	DMZ/28	ICMP		0.000	N	0	(edit)
	Successful	PN/29	Support/29	ICMP		0.000	N	1	(edit)
	Successful	PN/29	Admin/30	ICMP		0.000	N	2	(edit)
	Successful	PN/29	Dean/30	ICMP		0.000	N	3	(edit)
	Successful	PN/29	Phy / 29	ICMP		0.000	N	4	(edit)

