Al Imam Mohammad Ibn Saud Islamic University
College of Computer and Information Sciences

Information Technology Department

Course Title:	Computer Networks
Course Code:	IT340
Course Instructor:	Dr. Muhana Muslam, Dr. Abdulelah Alwabel, Dr. Ghada Alnifie, Dr. Lulwah AlSuwaidan, Dr. Shakir Khan, Rahma Alahmary, Assadeq Abdallah, Thahab Albuhairi
Assessment:	Project
Semester:	Fall 2021
Submission Date:	Saturday (11th December 2021) at 11:59 PM
Marks:	20

Privileges: ☐ Open Book ☐ Open Notes ☐ Calculator Permitted ☐ Laptop Permitted

Student Name (in English):	Student Name (in Arabic):	Student ID	Section No.:
Nwara Aljoufi	نواره الجوفي	440019357	

Official Use Only		
Question	Student Marks	Question Marks
1		2.5
2		2.5
3		2.5
4		2.5
5		2.5
6		2.5
7		2.5
8		2.5
Total		**20**

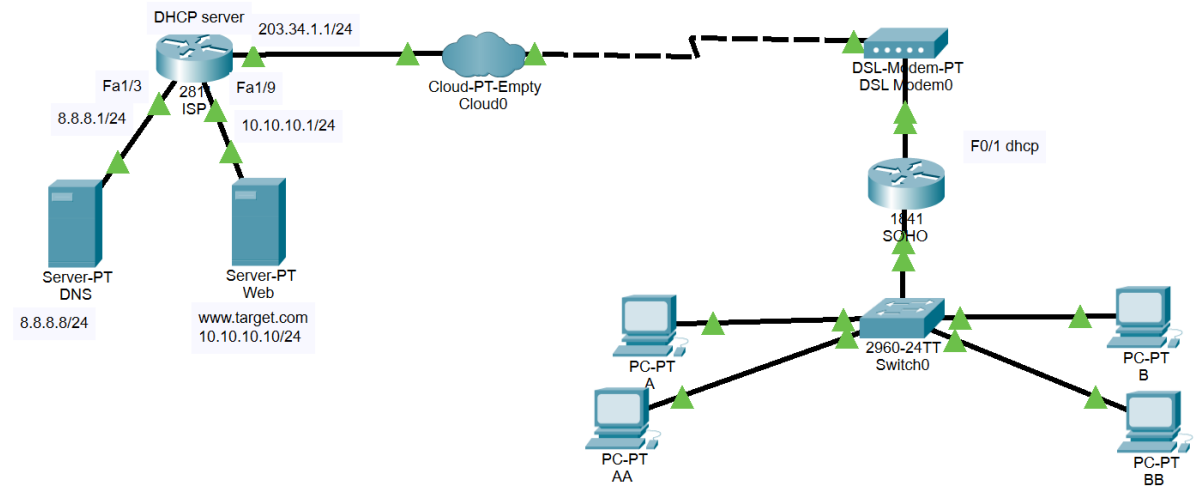
Student Name (in English): _____ Student ID: _____

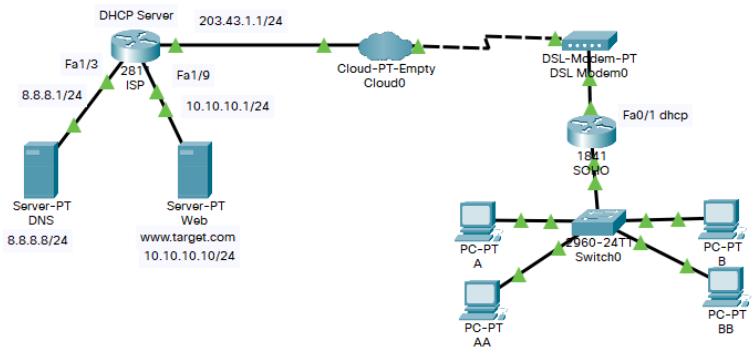
Question: Marks [ ] / _20_

Basic Scenario (as diagram)

Using Cisco Packet Tracer program do the followings:

1. Build a network as stated in the following diagram. [**2.5 marks**]

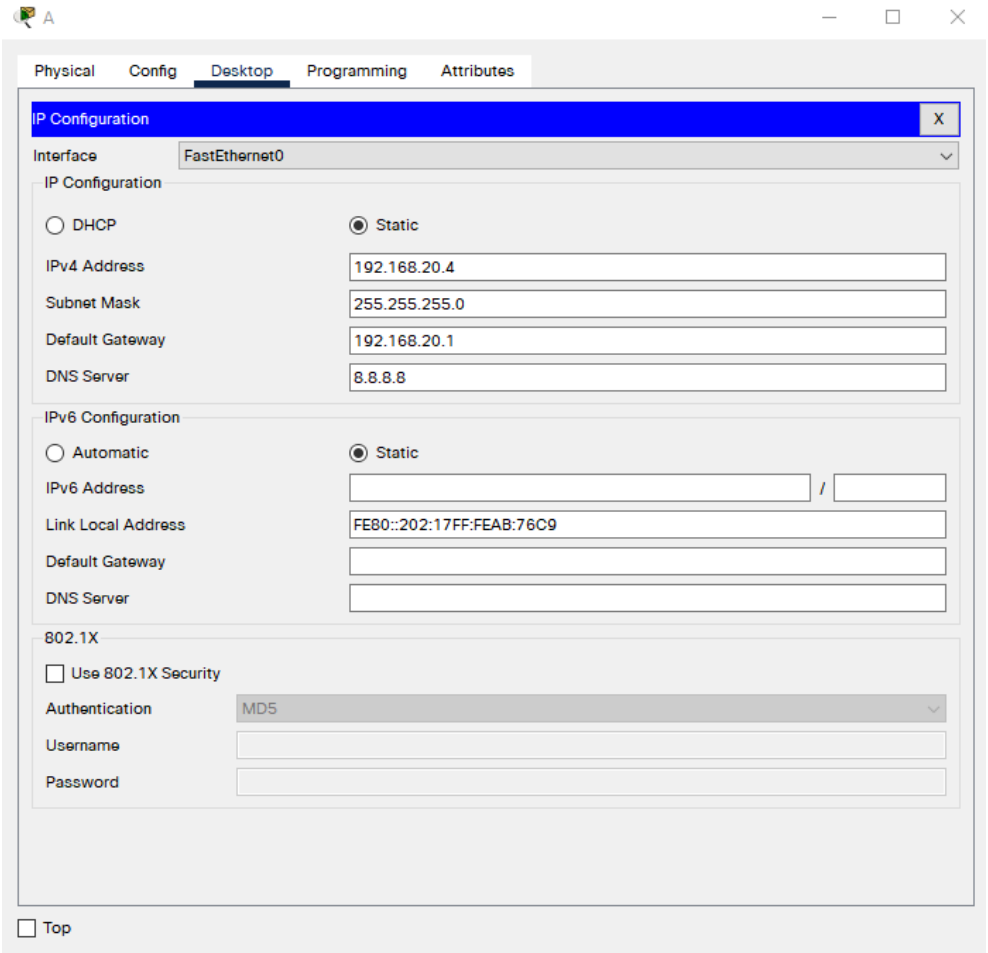




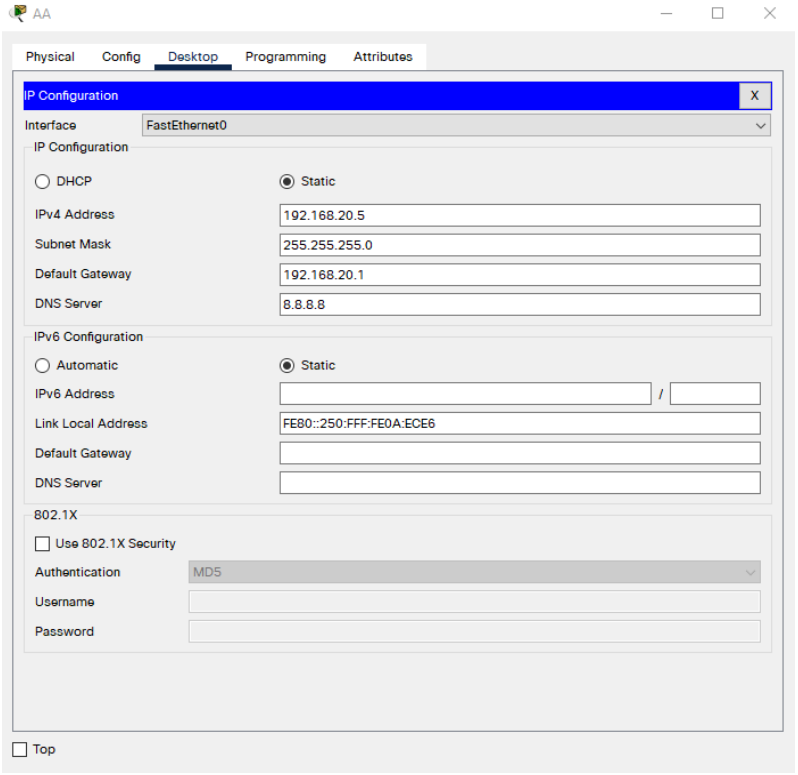
2. Configure PCs statically with IP addresses shown in the following table. [**2.5 mark**s]

Device Type	# of devices	Device name	IP address	Subnet mask	Gateway
PCs	**4**	A	192.168.20.4	255.255.255.0	192.168.20.1
		AA	192.168.20.5	255.255.255.0	192.168.20.1
		B	192.168.40.4	255.255.255.0	192.168.40.1
		BB	192.168.40.5	255.255.255.0	192.168.40.1
Servers	**2**	DNS	8.8.8.8	255.255.255.0	8.8.8.1
		Web	10.10.10.10	255.255.255.0	10.10.10.1

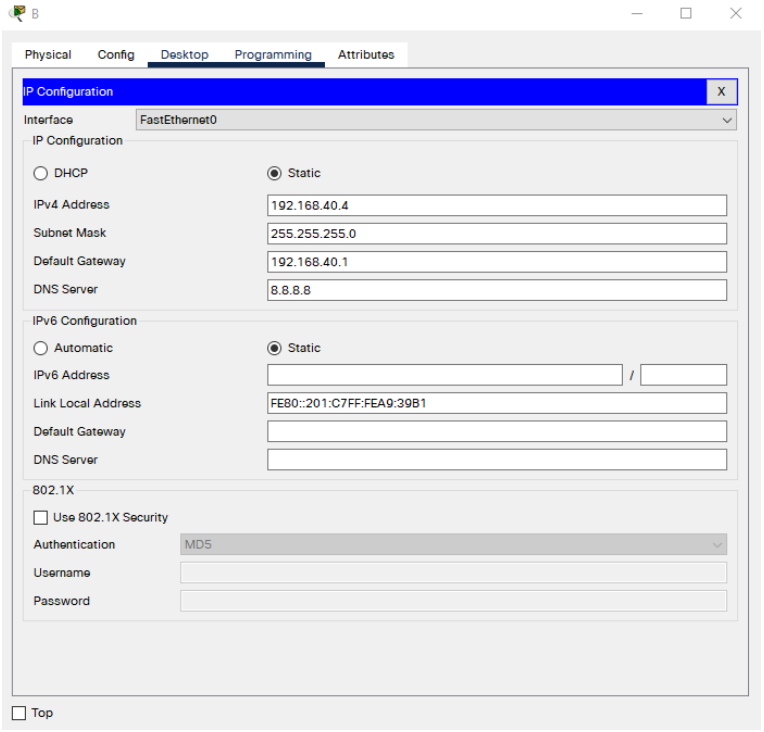
PC A:



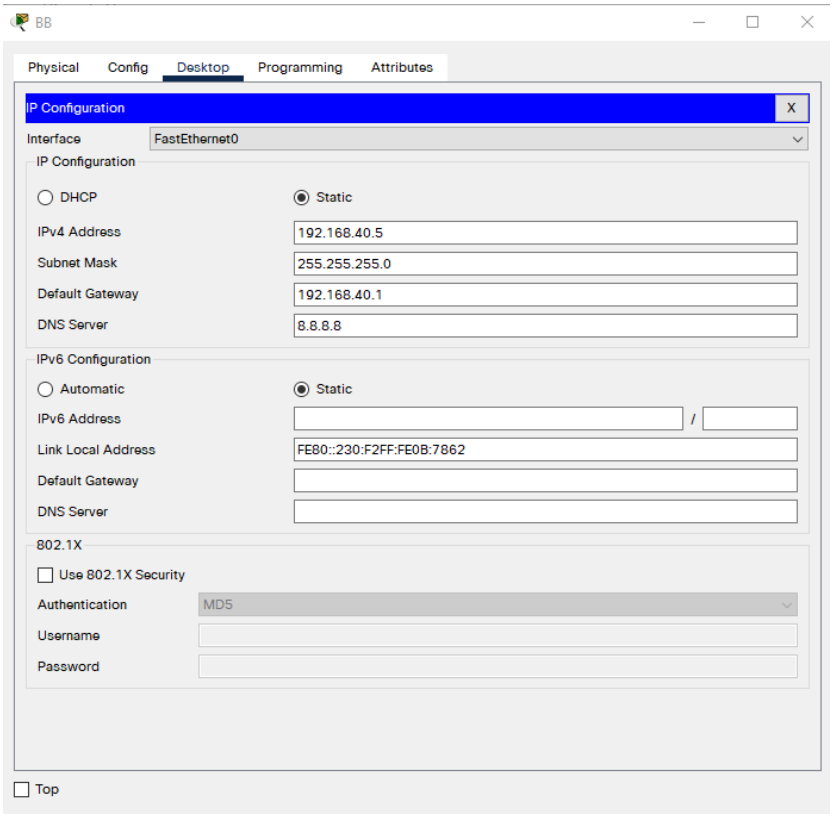
PC AA:


AA
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.20.5
Subnet Mask
255.255.255.0
Default Gateway
192.168.20.1
DNS Server
8.8.8.8
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address
FE80::250:FFF:FE0A:ECE6
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top

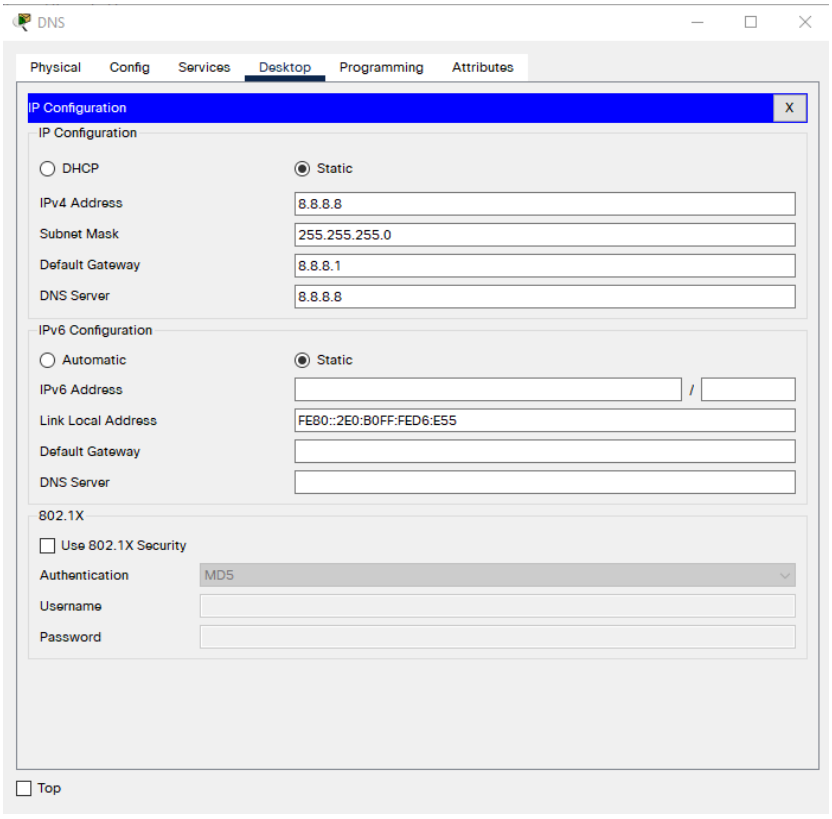
PC B:


B
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.40.4
Subnet Mask
255.255.255.0
Default Gateway
192.168.40.1
DNS Server
8.8.8.8
IPv6 Configuration
Automatic
Static
IPv6 Address
/
Link Local Address
FE80::201:C7FF:FEA9:39B1
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Username
Password
Top

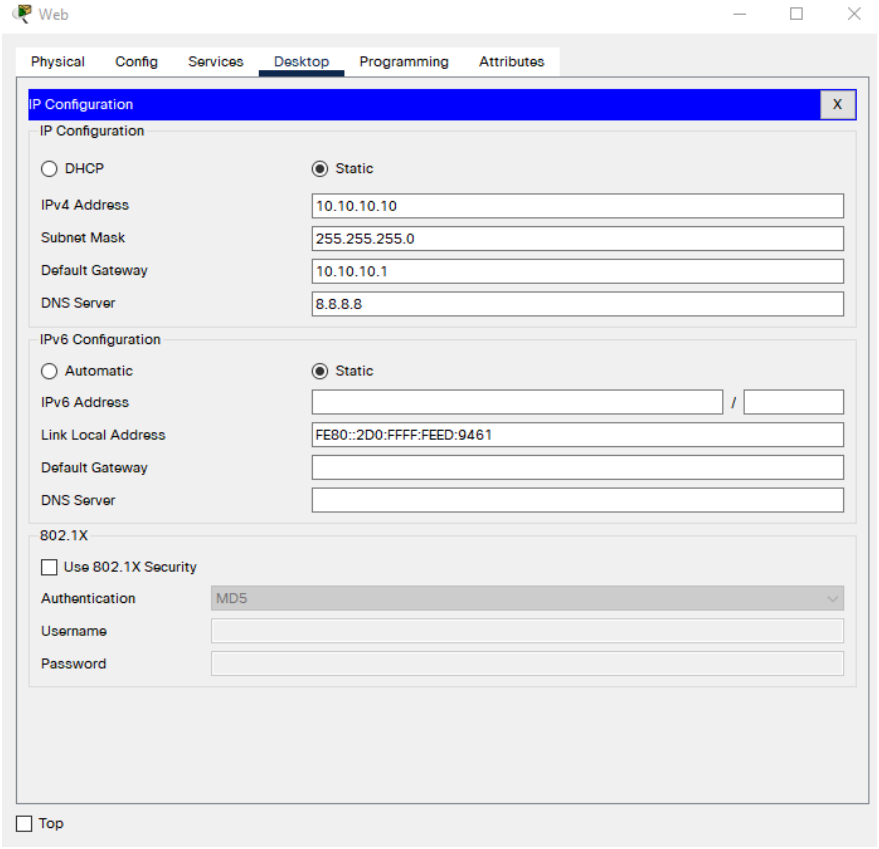
PC BB:



Server DNS:



Server Web:



3. Configure routers with IP addresses shown in the following table. [**2.5 mark**s]

Device Type	**# of devices**	**Device name**	**Port #**	**IP address**	**Subnet mask**
Router	2	SOHO	F0/1	Auto from DHCP	255.255.255.0
			F0/0.20	192.168.20.1	255.255.255.0
			F0/0.40	192.168.40.1	255.255.255.0
		ISP	F0/0	203.34.1.1	255.255.255.0
			F1/9	10.10.10.1	255.255.255.0
			F1/3	8.8.8.1	255.255.255.0

SOHO F0/1:

```
SOHO#enable
SOHO#config t
Enter configuration commands, one per line.  End with CNTL/Z.
SOHO(config)#interface FastEthernet 0/1
SOHO(config-if)#ip address dhcp
SOHO(config-if)#
```

SOHO F0/0.20 :

```
SOHO(config)#interface FastEthernet 0/0.20
SOHO(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.20, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.20, changed state to up

SOHO(config-subif)#ip address 192.168.20.1 255.255.255.0

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

SOHO(config-subif)#encapsulation dot1Q 20
SOHO(config-subif)#ip address 192.168.20.1 255.255.255.0
```

SOHO FA0/0.40 :

```
SOHO(config)#interface FastEthernet 0/0.40
SOHO(config-subif)#
%LINK-5-CHANGED: Interface FastEthernet0/0.40, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.40, changed state to up

SOHO(config-subif)#ip address 192.168.40.1 255.255.255.0

% Configuring IP routing on a LAN subinterface is only allowed if that
subinterface is already configured as part of an IEEE 802.10, IEEE 802.1Q,
or ISL vLAN.

SOHO(config-subif)#encapsulation dot1Q 40
SOHO(config-subif)#ip address 192.168.40.1 255.255.255.0
SOHO(config-subif)#
```

ISP F0/0:

```
ISP#
ISP#config t
Enter configuration commands, one per line.  End with CNTL/Z.
ISP(config)#interface FastEthernet 0/0
ISP(config-if)#ip address 203.34.1.1 255.255.255.0
ISP(config-if)#exit
```

ISP F1/9:

```
ISP(config-if)#interface vlan 9
ISP(config-if)#ip address 10.10.10.1 255.255.255.0
ISP(config-if)#
```

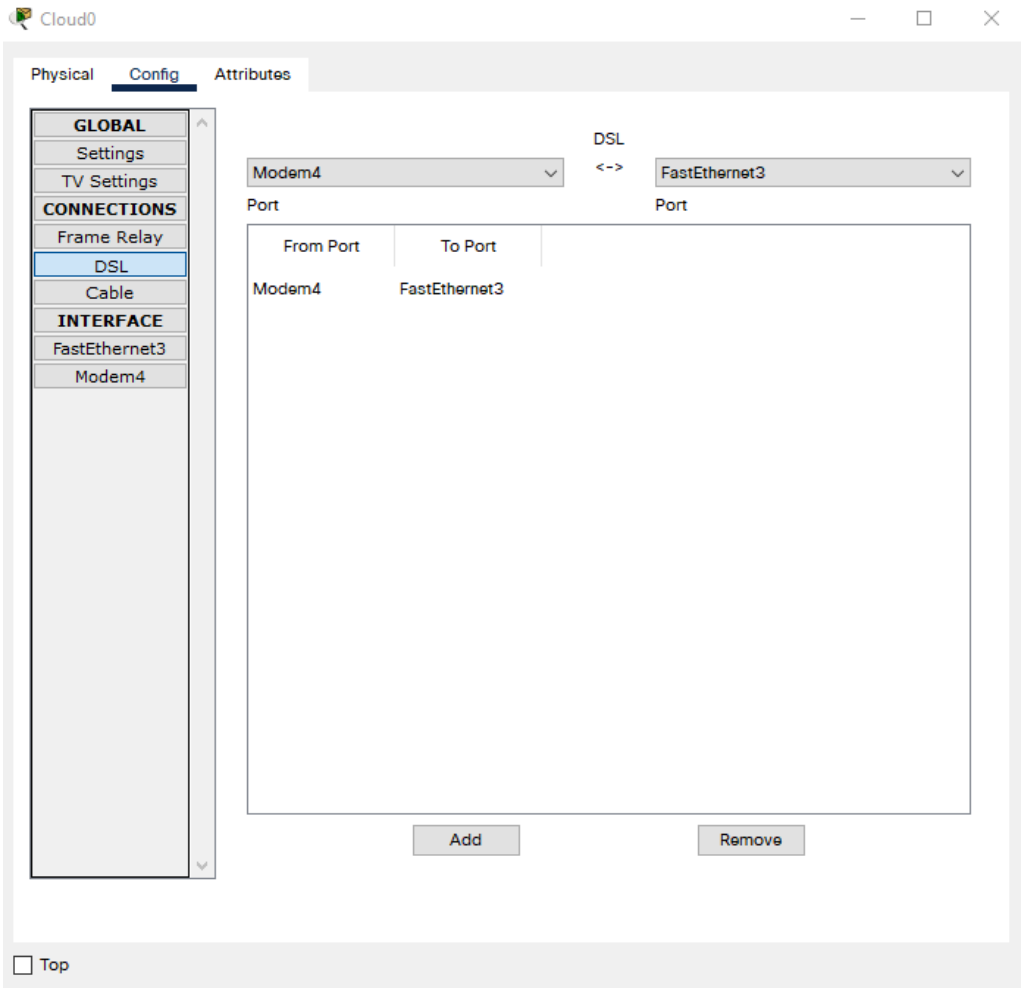
Ctrl+F6 to exit CLI focus

ISP F1/3:

```
ISP(config)#interface vlan 3
ISP(config-if)#ip address 8.8.8.1 255.255.255.0
ISP(config-if)#
```

Ctrl+F6 to exit CLI focus

4. Configure cloud using a technology of digital subscriber line (DSL) to connect the LAN network with the ISP network. [**2.5 mark**s]



5. In LAN network connected to the SOHO router, create **two** vlans as described in the following table. [**2.5 mark**s]

Vlan name	Vlan #	IP address	Subnet mask	Port#	Devices in vlan	Gateway
IT	20	192.168.20.0	255.255.255.0	F0/5	A	192.168.20.1
				F0/6	AA	
SC	40	192.168.40.0	255.255.255.0	F0/11	B	192.168.40.1
				F0/12	BB	

IT vlan#20:

```
Switch(config)#vlan 20
Switch(config-vlan)#name IT
```

Ctrl+F6 to exit CLI focus

```
Switch(config)#interface FastEthernet 0/5
Switch(config-if)#switchport access vlan 20
Switch(config-if)#exit
Switch(config)#interface FastEthernet 0/6
Switch(config-if)#switchport access vlan 20
```

SC vlan#40:

```
Switch(config-if)#vlan 40
Switch(config-vlan)#name SC
```

Ctrl+F6 to exit CLI focus

```
Switch(config)#interface FastEthernet 0/11
Switch(config-if)#switchport access vlan 40
Switch(config-if)#exit
Switch(config)#interface FastEthernet 0/12
Switch(config-if)#switchport access vlan 40
```

6. In ISP network connected to the ISP router, create **two** vlans as described in the following table. [**2.5 mark**s]

Vlan name	Vlan #	IP address	Subnet mask	Port#	Devices in vlan	Gateway
SZ1	3	8.8.8.0	255.255.255.0	F1/3	DNS	8.8.8.1
SZ2	9	10.10.10.0	255.255.255.0	F1/9	Web	10.10.10.1

```
ISP>enable
ISP#
ISP#vlan database
% Warning: It is recommended to configure VLAN from config mode,
  as VLAN database mode is being deprecated. Please consult user
  documentation for configuring VTP/VLAN in config mode.

ISP(vlan)#vlan 3 name SZ1
VLAN 3 modified:
    Name: SZ1
ISP(vlan)#vlan 9 name SZ2
VLAN 9 modified:
    Name: SZ2
ISP(vlan)#
```

SZ1:

```
ISP(config)#interface FastEthernet 1/3
ISP(config-if)#switchport access vlan 3
```

Ctrl+F6 to exit CLI focus

SZ2:

```
ISP(config)#interface FastEthernet 1/9
ISP(config-if)#switchport access vlan 9
ISP(config-if)#
```

Ctrl+F6 to exit CLI focus

7. Configure DNS, Web, DHCP, Dynamic NAT services as described in the following table. [**2.5 mark**s]

Service	Where?	IP address	Subnet mask	Gateway	Comments
DNS	DNS server	8.8.8.8	255.255.255.0	8.8.8.1	DNS server in Vlan 3
Web	Web server	10.10.10.10	255.255.255.0	10.10.10.1	Web server in Vlan 9
DHCP	ISP	203.34.1.1	255.255.255.0	203.34.1.1	On ISP router, port # f0/0, newrok id 203.34.1.0
Dynamic NAT	SOHO	203.34.1.5 to 203.34.1.13	255.255.255.0	N/A	203.34.1.5 to 203.34.1.13 + Access list with number 77

DNS and Web:

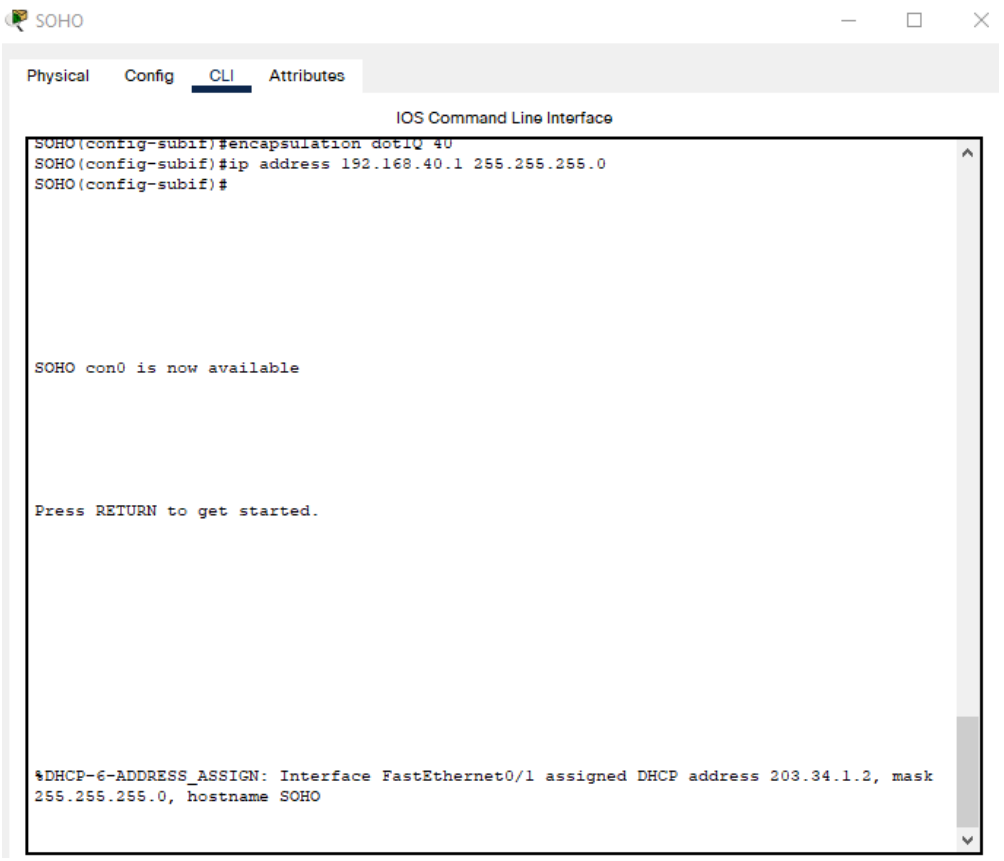
We confirmed that through the steps in question number 3 and question number 6.

DHCP:

```
ip dhcp excluded-address 203.34.1.1
!
ip dhcp pool ISPdhcp
 network 203.34.1.0 255.255.255.0
 dns-server 8.8.8.8
!
!
!
 --More--
```

Ctrl+F6 to exit CLI focus

Moving to SOHO router to check that we found it started distribute ip addresses from 203.34.1.2



Dynamic NAT:

```
SOHO(config)#access-list 77 permit 192.168.20.0 0.0.0.255
SOHO(config)#access-list 77 permit 192.168.40.0 0.0.0.255
SOHO(config)#access-list 77 deny any
SOHO(config)#ip nat pool dynamicPool 203.34.1.5 203.34.1.13 netmask 255.255.255.0
SOHO(config)#ip nat inside source list 77 pool dynamicPool
SOHO(config)#interface FastEthernet 0/0.20
SOHO(config-subif)#ip nat inside
SOHO(config-subif)#exit
SOHO(config)#interface FastEthernet 0/0.40
SOHO(config-subif)#ip nat inside
SOHO(config-subif)#exit
SOHO(config)#interface FastEthernet 0/1
SOHO(config-if)#ip nat outside
SOHO(config-if)#
```

8. Testing [**2.5 mark**s]

a. From the PC called "A" use ping to check connectivity with ISP' F0/0. **(**the screenshots should be clear and small**)**

Scenario	**Success / Failed**	**Screenshot (client)**

b. From the PC called "B" use browser to access "www.target.com". **(**the screenshots should be clear and small**)**

Scenario	**Success / Failed**	**Screenshot (client)**

Required for submission:

Submit a softcopy via blackboard on Saturday (11th December 2021) at 11:59 PM; of your work that contains the following:

1- **Full connected network** as specified in the requirements (Cisco Packet Tracer file)
2- Create a **report** that must include the cover page (use the project cover page) and add the sscreenshots for each step you performed in order to build the full network (Word file).
3- You are required to give an oral explanation **(discussion)** for your work. The discussion time will be scheduled with your instructor.