Project Report

Design a full-fledged network for an organization with multiple subnets.

Course Title: Computer Networks

Course Code: CSE405

Section: 02

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Title:

Designing a Full-fledged Network for an Organization with Multiple Subnets.

Preface:

Apex University, is an enterprise like East West University, owns many computers, with a complex network infrastructure. Apart from wired internet access to all the classrooms, labs, employee PCs, library and other administrative and academic wings, the university also provides wireless internet access for every campus. On top of that the university runs complex networked systems to support several of its business process like admissions, advising, results, eTender, library management, accounts and so on. The task is to create a complete model of a complex network by discovering the interconnectivity of the systems and subnetworks, which will reflect the University of Scholars structure and facilities, features within the network.

Tools:

Components Used:

1. PT- Router
2. Wireless Routers
3. Wireless access point
4. Straight Through Cable
5. Serial DCE cables
6. PT- Switches
7. PC as end devices
8. DNS Server
9. Web Server
10. DHCP server
11. Laptop, Smart Phone, Tablet

Software Used:

- Cisco Packet Tracer version 8.1.1.0022

Network Summary:

- University's full network has covered with 6 campuses with 6 routers.

- All the Ip address set by one DHCP server automatically & DNS server is use to locate Web server and HTML code is use to modify the web page.

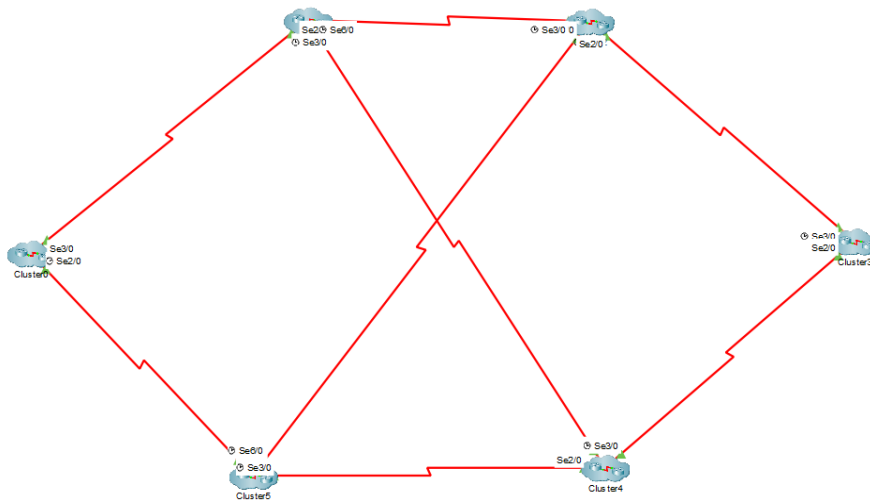## Physical Diagram: ALL Campus.

Figure 1: Network Model created in Cisco Packet Tracer
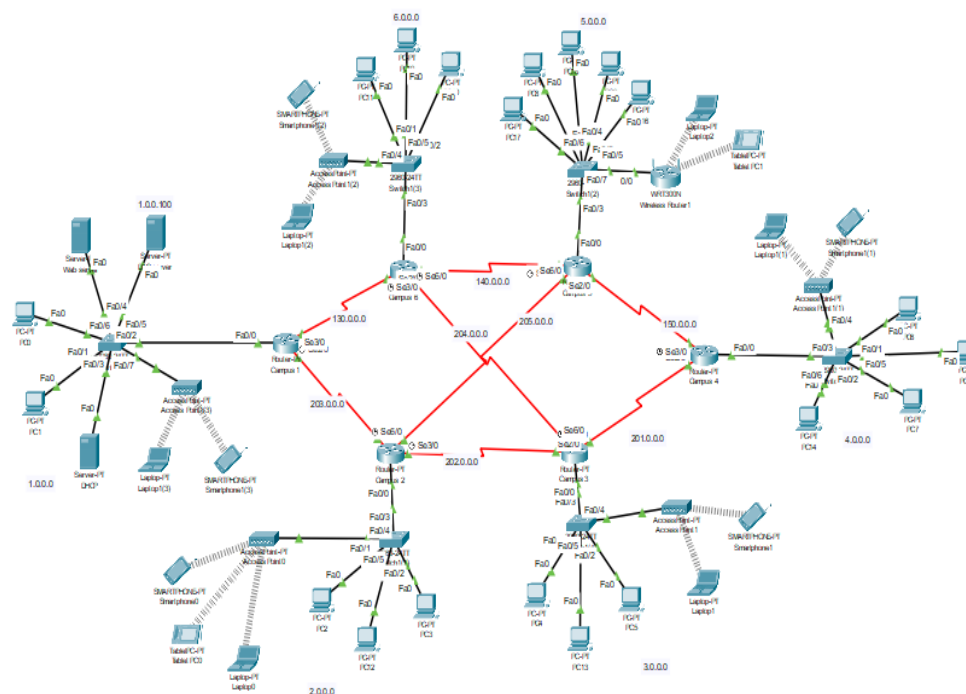

Figure 2: Network Model created in Cisco Packet Tracer

Design Issues:

Actually, there are no Design issues all the connections, servers, and End devices are working perfectly.

The classes that are used:

1. Class A: It is used for all end device networks.
2. Class B & Class C: It is used for router to router connection networks.

Limitations:

The network is very complex. Maintaining this network can create problems. More campus networks cannot be added very easily. To add more networks, manual configuration is needed. The network can support a limited number of hosts.

Lines of Code:

Router Configuration Code:

Campus 1:

```
interface fa0/0
ip address 1.0.0.254  255.0.0.0
no shut
do wr
exit
ip dhcp pool campus1
network 1.0.0.0 255.0.0.0
default-router 1.0.0.254
dns-server 1.0.0.100
exit
ip dhcp excluded-address 1.0.0.254
interface se2/0
```

```
ip address 203.0.0.1 255.255.255.0
clock rate 64000
no shut
do wr
exit
interface se3/0
ip address 130.0.0.2 255.255.0.0
no shut
do wr
exit
```

Campus 2:

```
interface fa0/0
ip address 2.0.0.254  255.0.0.0
no shut
do wr
exit
ip dhcp pool campus2
network 2.0.0.0 255.0.0.0
default-router 2.0.0.254
dns-server 1.0.0.100
exit
ip dhcp excluded-address 2.0.0.254
interface se3/0
ip address 202.0.0.1 255.255.255.0
clock rate 64000
no shut
do wr
exit
interface se6/0
ip address 205.0.0.1 255.255.255.0
clock rate 64000
no shut
do wr
```

exit
interface se2/0
ip address 203.0.0.2 255.255.255.0
no shut
do wr
exit

Campus 3:

interface fa0/0
ip address 3.0.0.254 255.0.0.0
no shut
do wr
exit
ip dhcp pool campus3
network 3.0.0.0 255.0.0.0
default-router 3.0.0.254
dns-server 1.0.0.100
exit
ip dhcp excluded-address 3.0.0.254
interface se3/0
ip address 201.0.0.1 255.255.255.0
clock rate 64000
no shut
do wr
exit
interface se6/0
ip address 204.0.0.2 255.255.255.0
no shut
do wr
exit
interface se2/0
ip address 202.0.0.2 255.255.255.0
no shut
do wr

exit

<u>Campus 4:</u>

interface fa0/0
ip address 4.0.0.254 255.0.0.0
no shut
do wr
exit
ip dhcp pool campus4
network 4.0.0.0 255.0.0.0
default-router 4.0.0.254
dns-server 1.0.0.100
exit
ip dhcp excluded-address 4.0.0.254
interface se2/0
ip address 201.0.0.2 255.255.255.0
no shut
do wr
exit
interface se3/0
ip address 150.0.0.1 255.255.0.0
clock rate 64000
no shut
do wr
exit

<u>Campus 5:</u>

interface fa0/0
ip address 5.0.0.254 255.0.0.0
no shut
do wr
exit
ip dhcp pool campus5

```
network 5.0.0.0  255.0.0.0
default-router 5.0.0.254
dns-server 1.0.0.100
exit
ip dhcp excluded-address 5.0.0.254
interface se3/0
ip address 140.30.0.1 255.255.0.0
clock rate 64000
no shut
do wr
exit
interface se6/0
ip address 205.0.0.2 255.255.255.0
no shut
do wr
exit
interface se2/0
ip address 150.0.0.2 255.255.0.0
no shut
do wr
exit
```

Campus 6:

```
interface fa0/0
ip address 6.0.0.254  255.0.0.0
no shut
do wr
exit
ip dhcp pool campus6
network 6.0.0.0  255.0.0.0
default-router 6.0.0.254
dns-server 1.0.0.100
exit
ip dhcp excluded-address 6.0.0.254
```

interface se2/0
ip address 140.10.0.2 255.255.0.0
no shut
do wr
exit
interface se3/0
ip address 130.0.0.1 255.255.0.0
clock rate 64000
no shut
do wr
exit
interface se6/0
ip address 204.0.0.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

Routing Table:

Campus 1:
router ospf 1
network 1.0.0.0 0.255.255.255 area 1
network 130.0.0.0 0.0.255.255 area 1
network 203.0.0.0 0.0.0.255 area 1
exit

Campus 2:
router ospf 2
network 2.0.0.0 0.255.255.255 area 1
network 202.0.0.0 0.0.0.255 area 1
network 203.0.0.0 0.0.0.255 area 1
network 205.0.0.0 0.0.0.255 area 1
exit

Campus 3:
router ospf 3
network 3.0.0.0 0.255.255.255 area 1
network 201.0.0.0 0.0.0.255 area 1
network 202.0.0.0 0.0.0.255 area 1
network 204.0.0.0 0.0.0.255 area 1
exit

Campus 4:
router ospf 4
network 4.0.0.0 0.255.255.255 area 1
network 201.0.0.0 0.0.0.255 area 1
network 150.0.0.0 0.0.255.255 area 1
exit

Campus 5:
router ospf 5
network 5.0.0.0 0.255.255.255 area 1
network 140.0.0.0 0.0.255.255 area 1
network 150.0.0.0 0.0.255.255 area 1
network 205.0.0.0 0.0.0.255 area 1
exit

Campus 6:
router ospf 6
network 6.0.0.0 0.255.255.255 area 1
network 130.0.0.0 0.0.255.255 area 1
network 140.0.0.0 0.0.255.255 area 1
network 204.0.0.0 0.0.0.255 area 1
exit

Campus 1: Campus 1 is for Server Room.
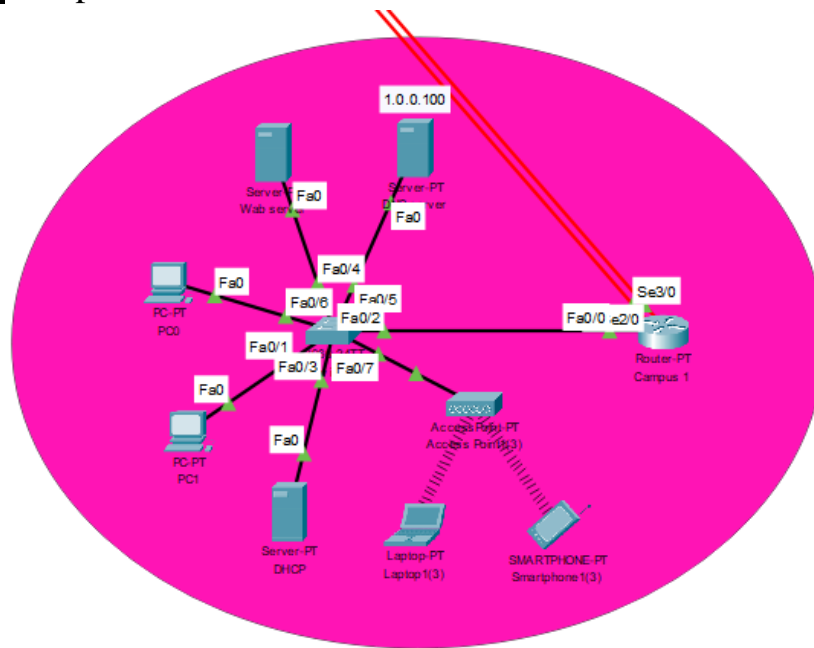
Figure 3: Campus 1

Campus 2: Campus 2 is for the Employee's Room.
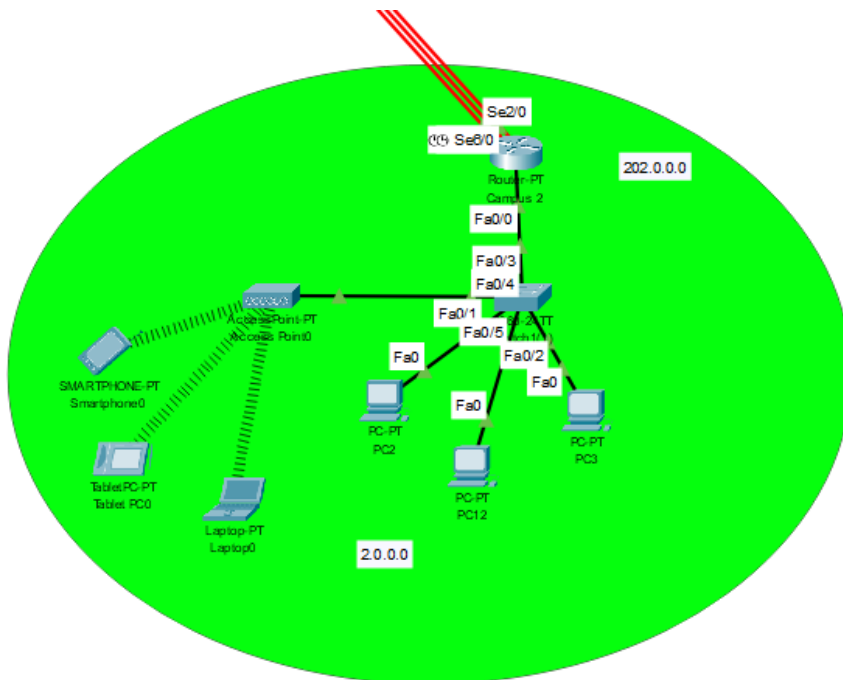
Figure 4: Campus 2

Campus 3: Campus 3 is for Library.
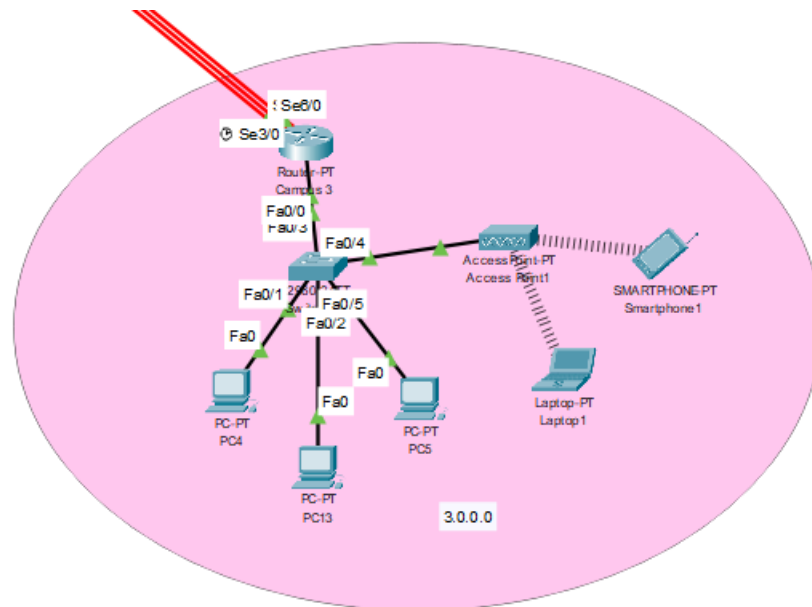
Figure 5: Campus 3

Campus 4: Campus 4 is for Labs.
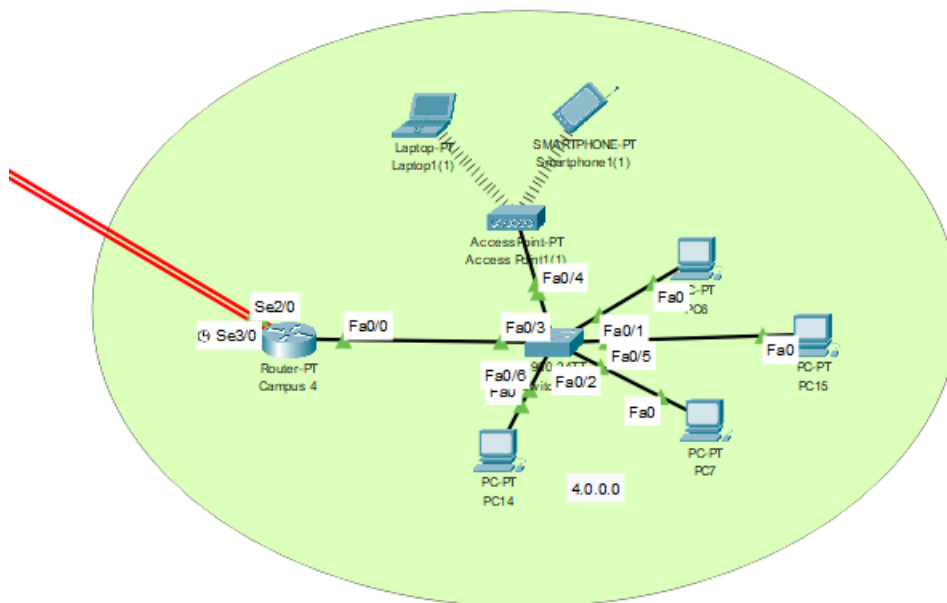
Figure 6: Campus 4

Campus 5: Campus 5 is for Faculty & Department Rooms.
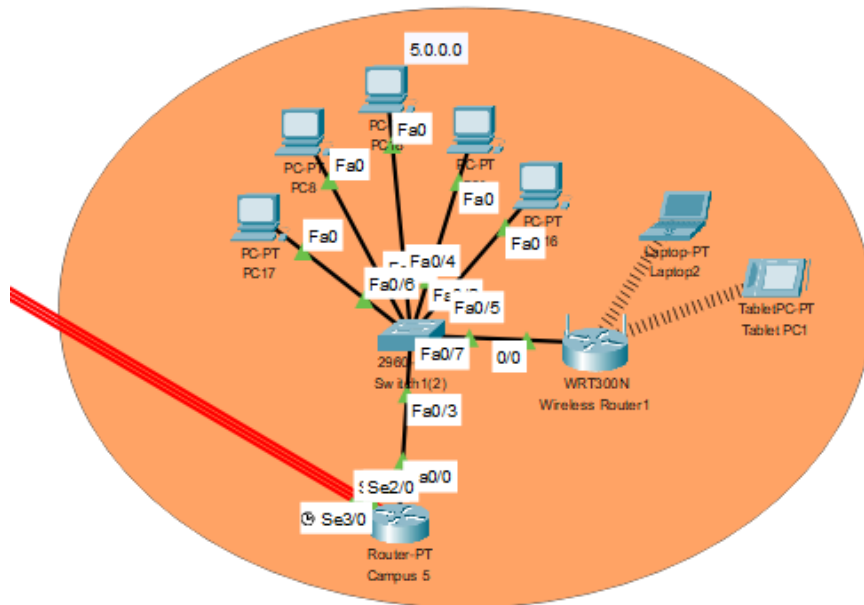
Figure 7: Campus 5

Campus 6: Campus 6 is for Classrooms
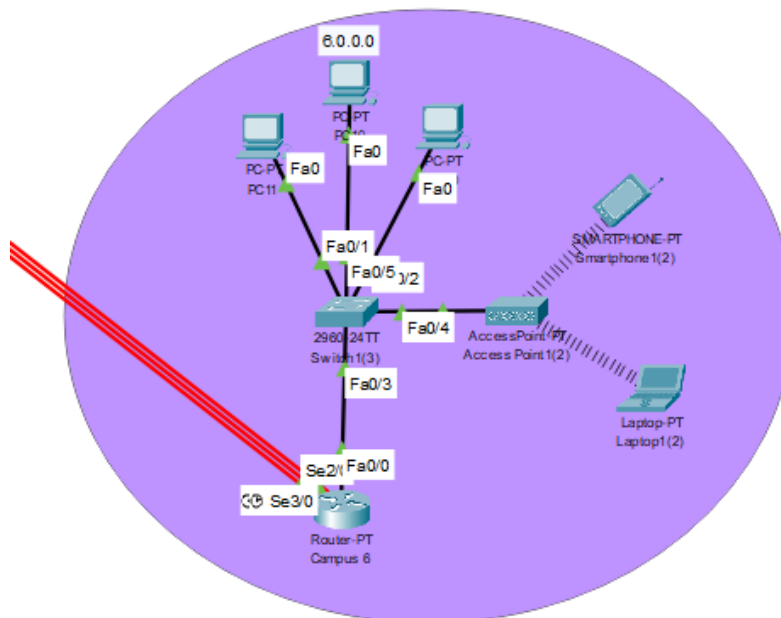
Figure 8: Campus 6

Server Configuration:

DHCP Server: [IP: 1.0.0.50]

DHCP can serve IP across the network automatically. We use 1 DHCP server for 6 campuses. When a device is requested DHCP server can serve a unique IP address according to their Campus network.

Figure 10: DHCP Server

Figure 11: DHCP successfully giving Ip

DNS Server: [IP: 1.0.0.100]
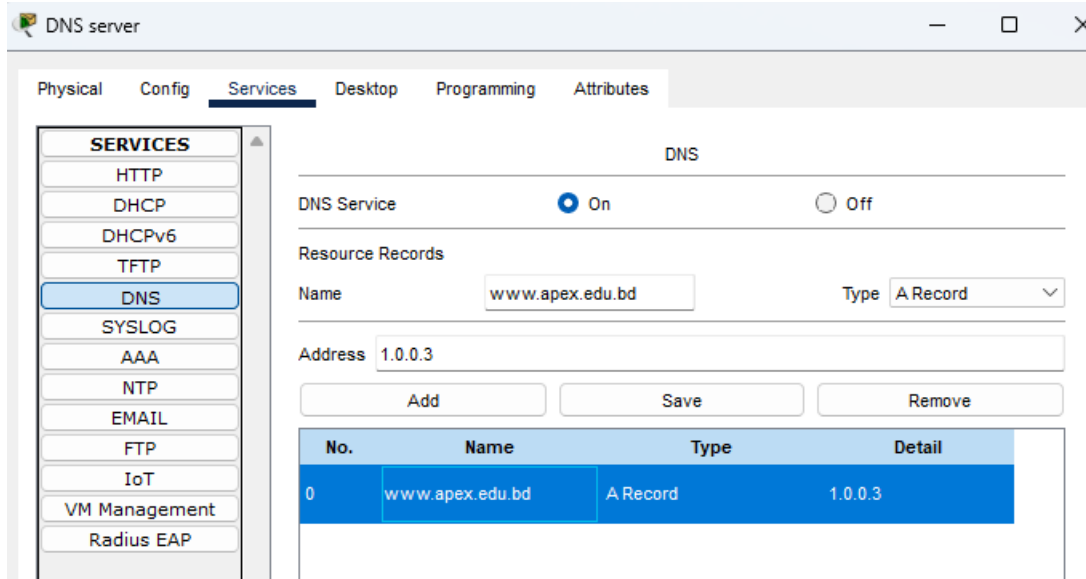
Figure 12: Config DNS Server

WEB Server: [IP: 1.0.0.3]
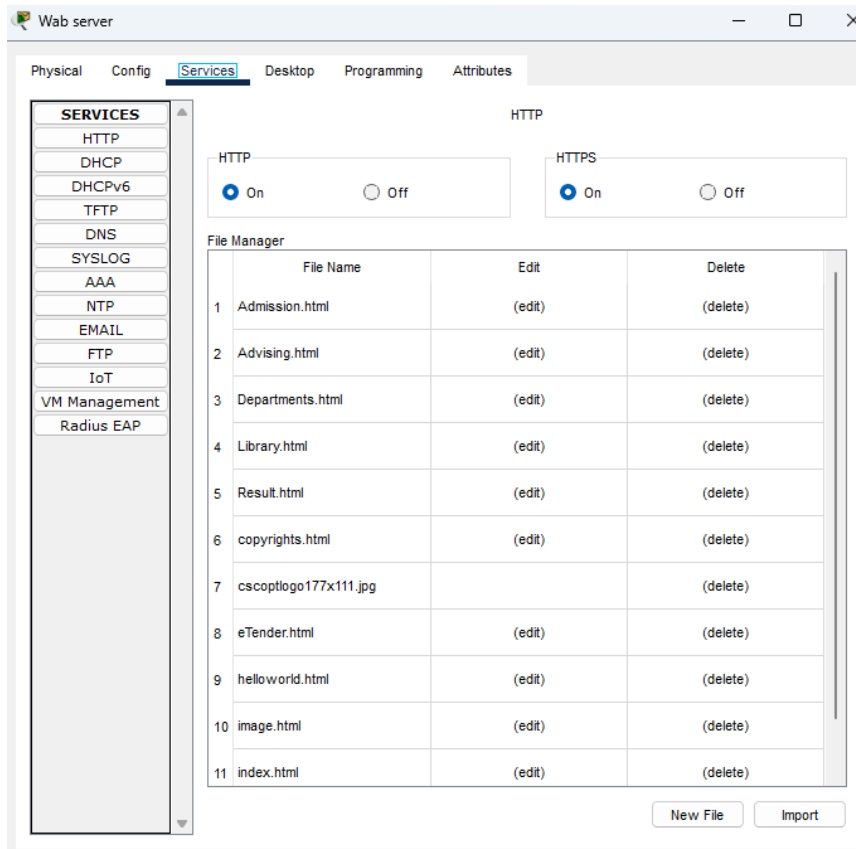
Figure 13: Config WEB server
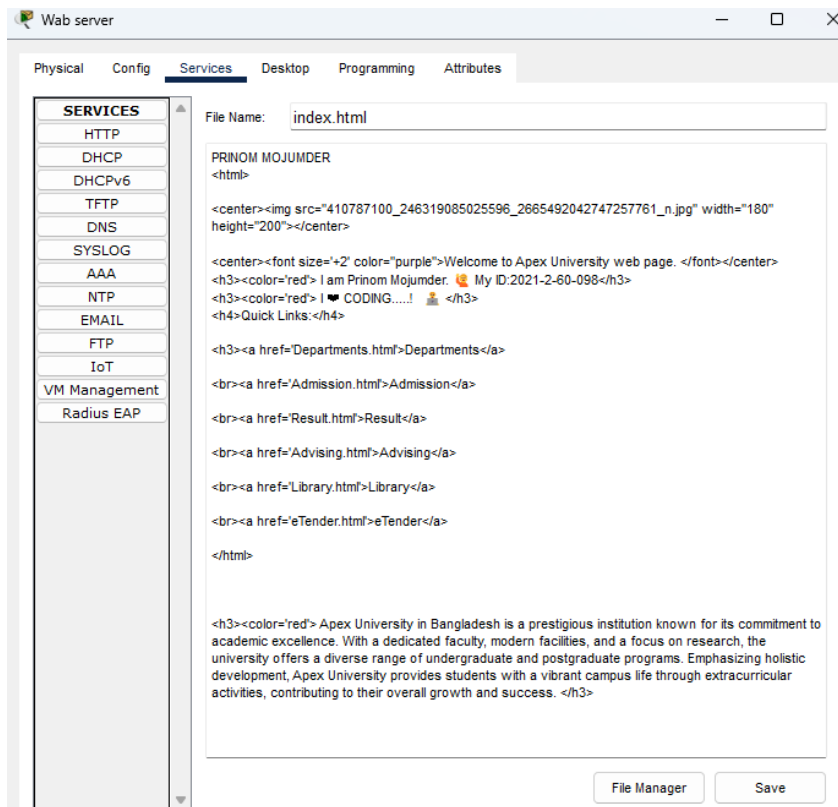
Figure 14: HTML code to Edit Home page
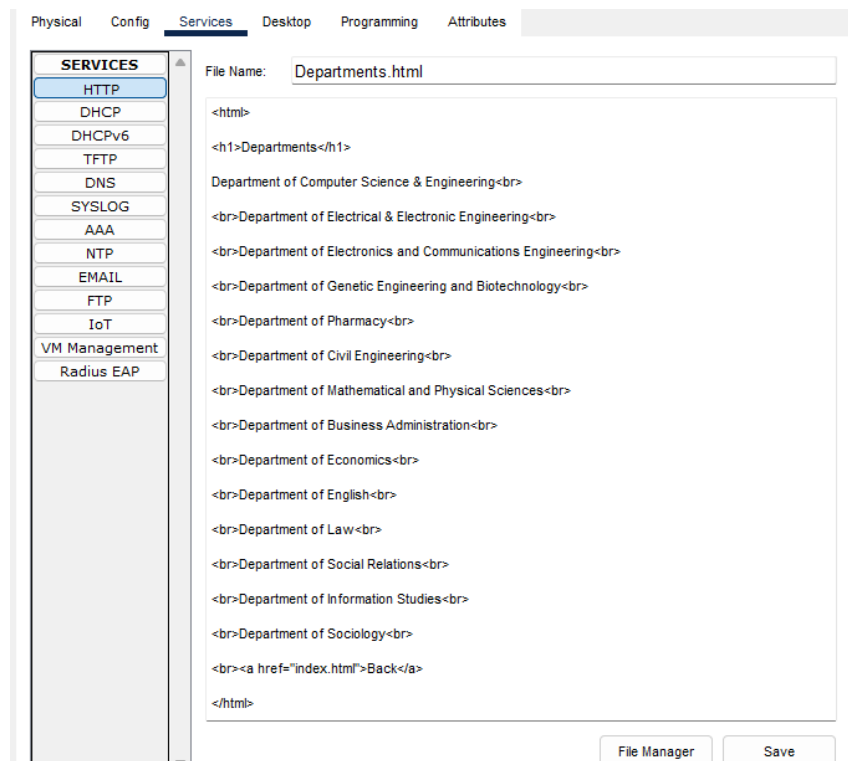
Figure 15: HTML code to Edit Department page

University's Homepage Access

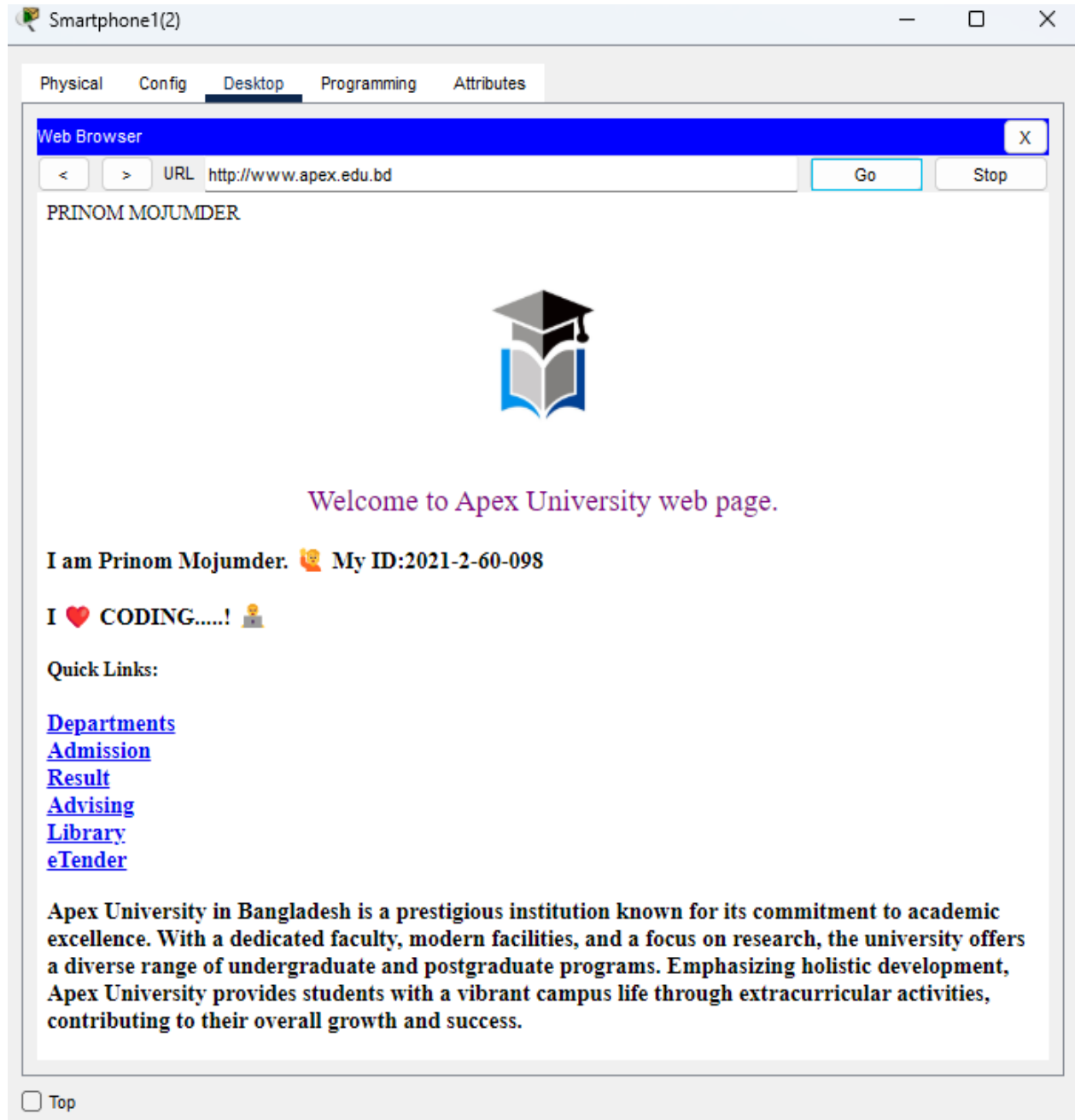By writing   http://www.apex.edu.bd   OR 1.0.0.3 in Web browser.
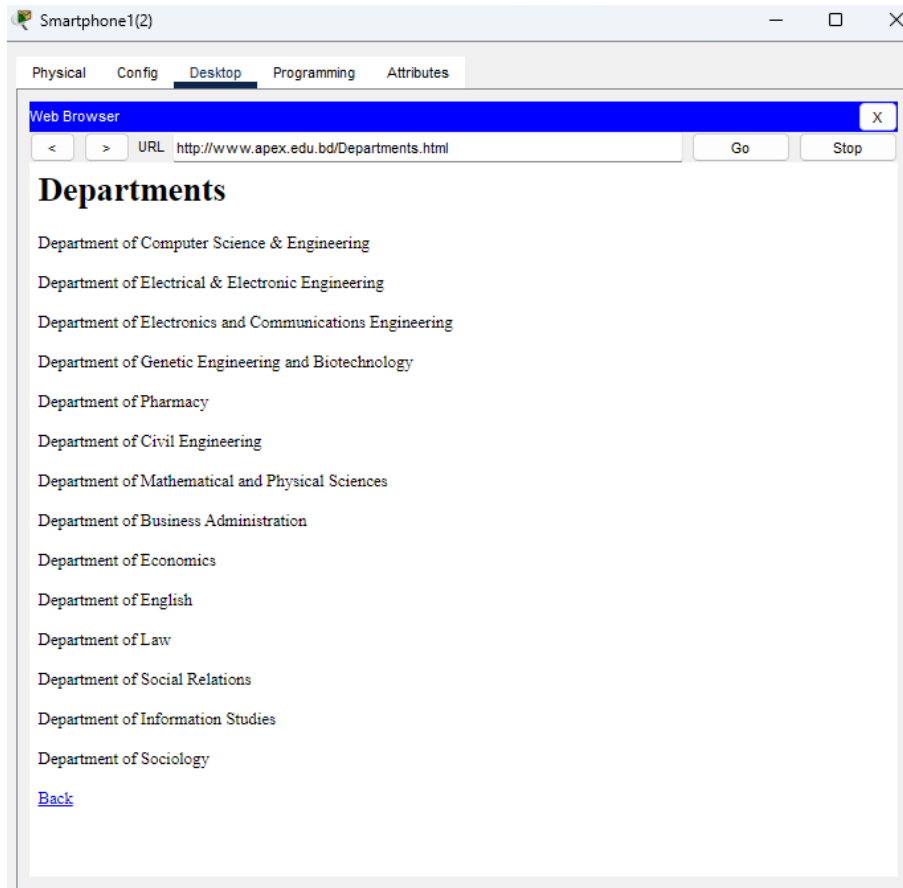

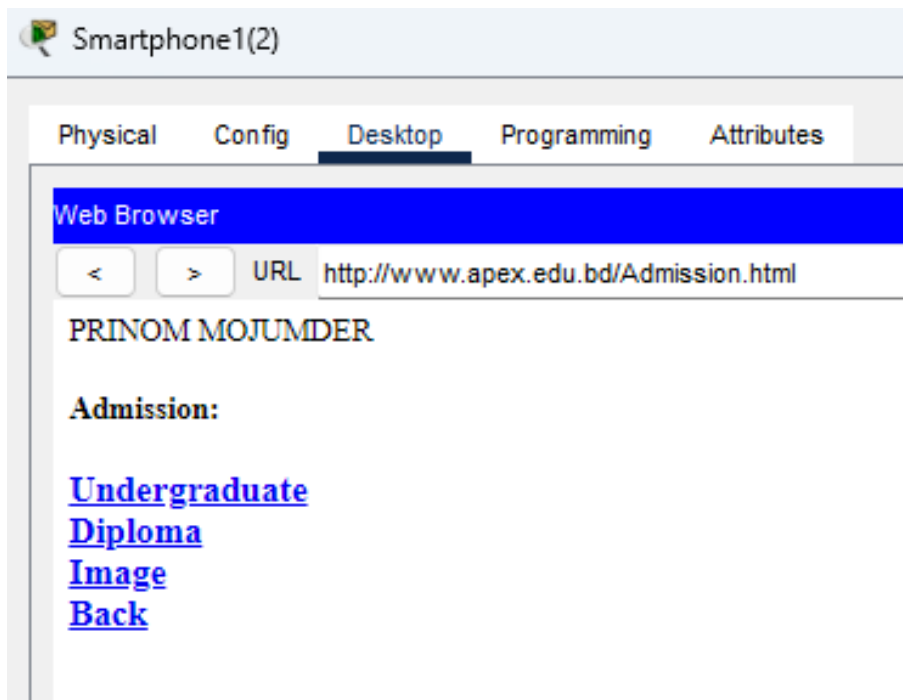Figure 16: University's Home page

Figure 17: University's Department page
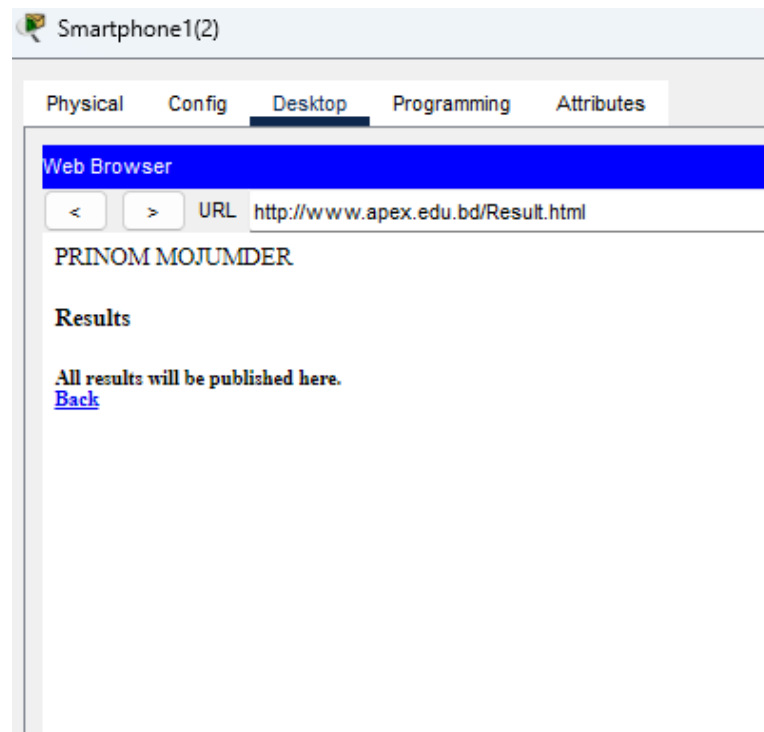

Figure 18: University's Admission page
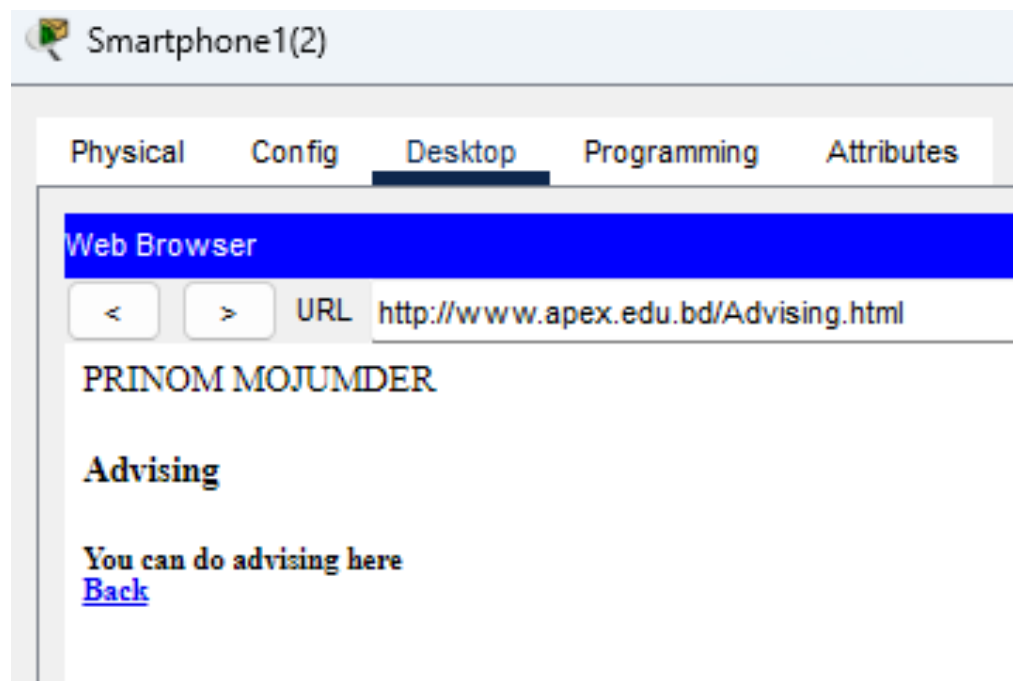
Figure 19: University's Result page

Figure 20: University's Advising page

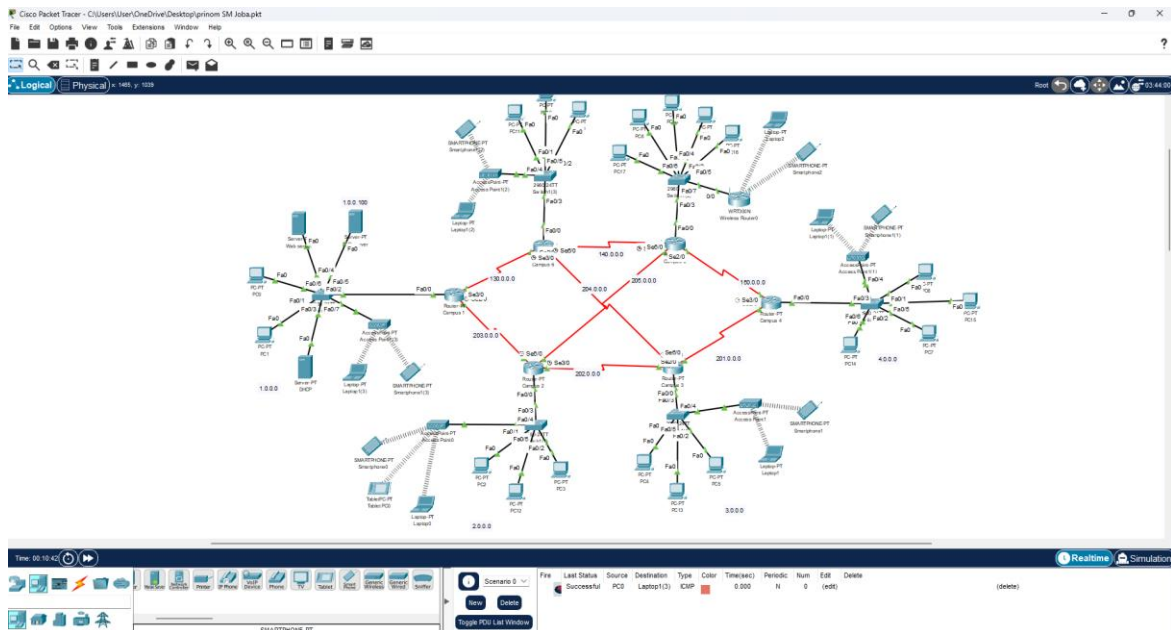## Ping from a pc to another pc (Same network):

Figure 21: Sending ICMP packet in same network
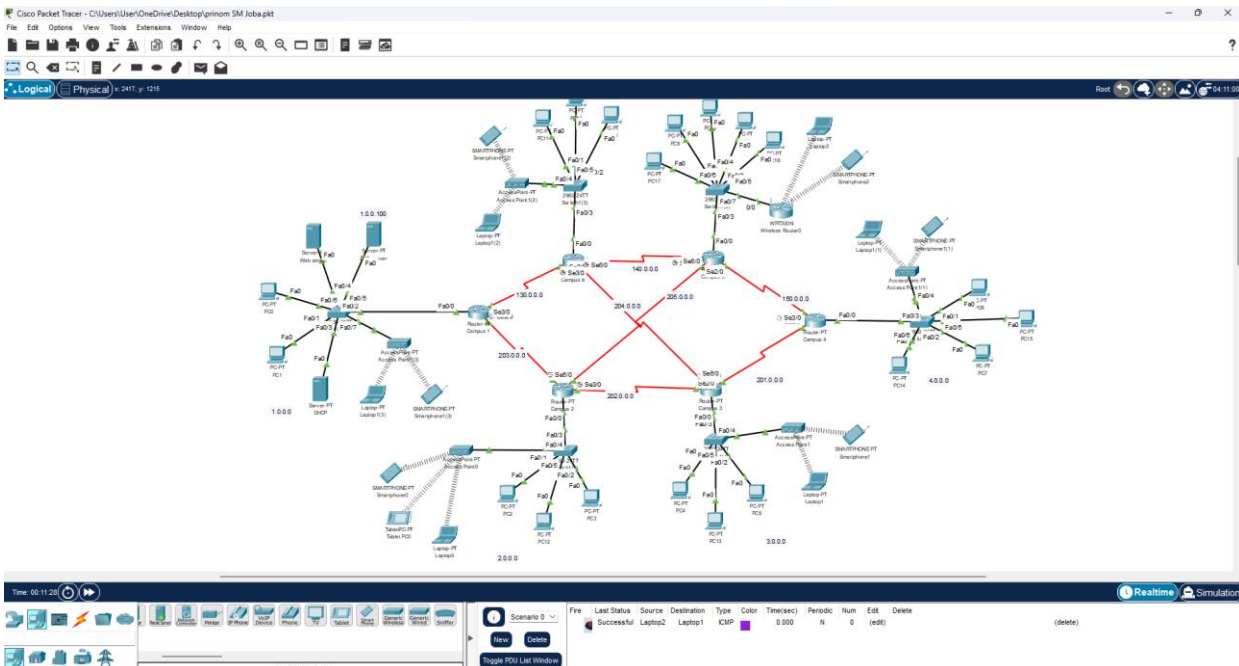
Ping from a pc to another pc (Different Network):

Figure 22: Sending ICMP packet in different network
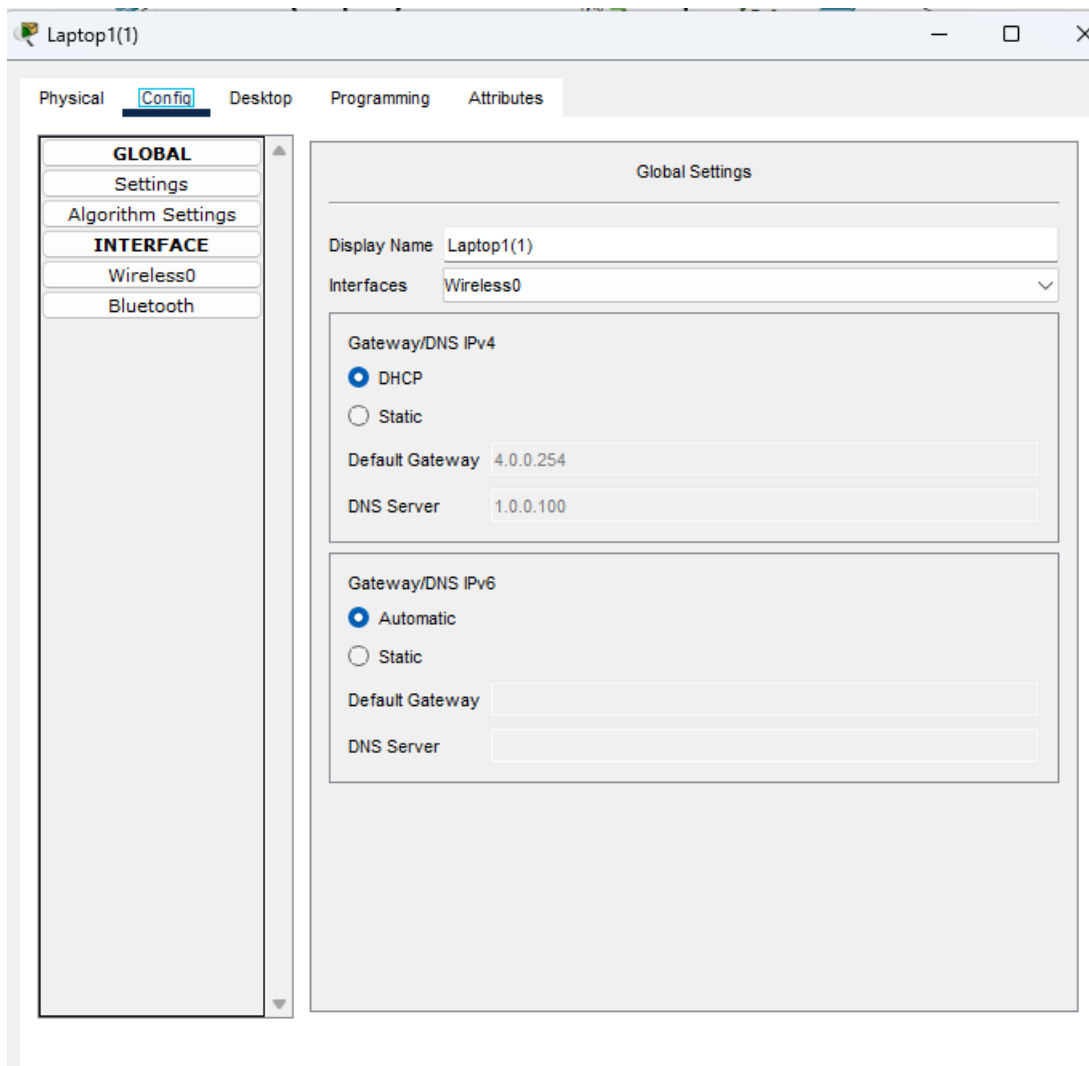
Wireless Device:

Figure 23: Config wireless device Laptop

Conclusion:

I did my best to finish the project perfectly. In this project, I created a complete model of a complicated network using things like computers, routers, switches, and wireless routers. All these devices could talk to each other across the network without any problems. I also set up a special server to show the University's website page. I even changed how the website looks using a special code called HTML. I added a system that gives out unique numbers to all the computers when they need one (that's called an IP address).

I learned a lot from this course & project.