EAST WEST UNIVERSITY

Project Report

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

Course Title: Computer Networks

Course Code: CSE405

Section: 03

Semester: Spring-24

Submitted by:

Al-Imam Uddin

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Submitted to:

Dr. Anisur Rahman (MAR)

Associate Professor

Department of Computer Science and Engineering

Proctor

East West University

Submission Date: 8/6/2024

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.

Now, 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:

- 2811- Router
- Wireless access point
- Straight Through Cable
- Serial DCE cables
- 2960-24TT Switches
- PC as end devices
- DNS Server
- Web Server
- DHCP server
- Smart Phone, Tablet

Software Used:

- Cisco Packet Tracer version 8.1.1.0022

- ## <u>**Network Summary:**</u>

- University's full network has covered with 7 campuses with 7 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.
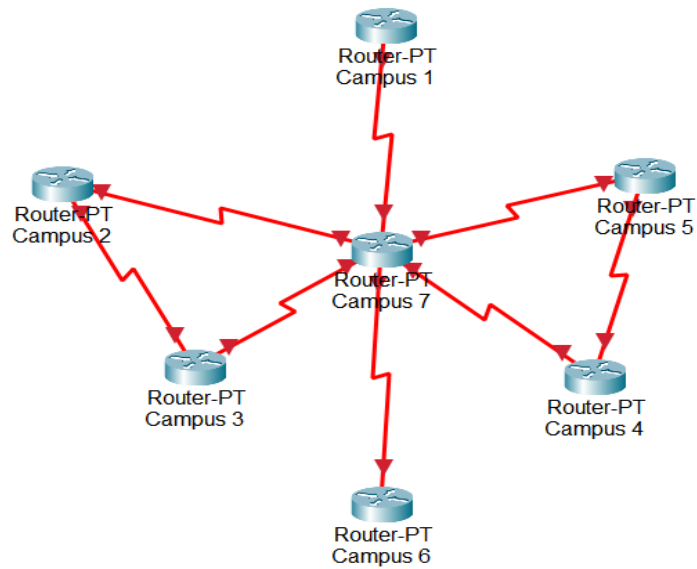
Physical Diagram: ALL Campus.

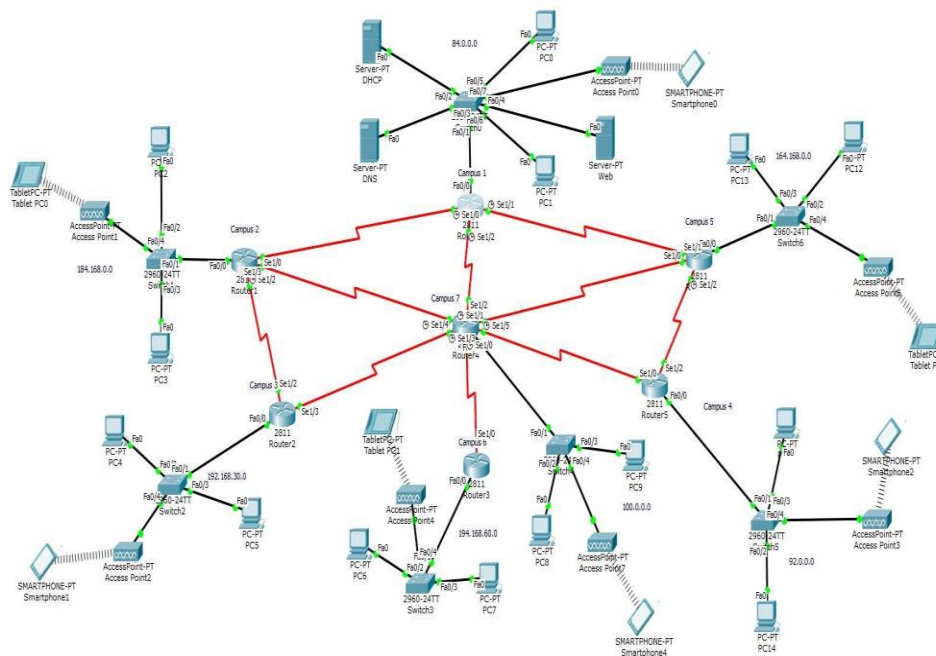Figure 1: Network Model created in Cisco Packet Tracer

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:

It's quite a complicated network. It may be difficult to maintain this network. It is difficult to add more university networks quickly. Hands-on configuration is required for additional networks. A maximum amount of hosts can be supported by the network.

Lines of Code:

Router configuration and inserting routing table:

Campus 1:

interface fa0/0
ip address 84.0.0.254 255.0.0.0
no shut
do wr
exit

ip dhcp pool campus1

network 84.0.0.0 255.0.0.0
default-router 84.0.0.254
dns-server 84.0.0.252
exit
ip dhcp excluded-address 84.0.0.254

interface se1/0
ip address 192.168.80.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se1/1
ip address 192.168.90.1 255.255.255.0
clock rate 64000
no shut
do wr
exit
interface se1/2
ip address 192.168.100.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

Campus 2:

interface fa0/0
ip address 184.168.0.254 255.255.0.0
no shut
do wr
exit

ip dhcp pool campus2

network 184.168.0.0 255.255.0.0
default-router 184.168.0.254
dns-server 84.0.0.252
exit
ip dhcp excluded-address 184.168.0.254

interface se1/2
ip address 192.168.130.1 255.255.255.0
clock rate 64000
no shut
do wr
exit
interface se1/0
ip address 192.168.80.2 255.255.255.0
no shut
do wr
exit

interface se1/3
ip address 192.168.170.2 255.255.255.0
no shut
do wr
exit

Campus 3:

interface fa0/0
ip address 192.168.30.254 255.255.255.0
no shut
do wr
exit

ip dhcp pool campus3

network 192.168.30.0 255.255.255.0
default-router 192.168.30.254
dns-server 84.0.0.252
exit
ip dhcp excluded-address 192.168.30.254

interface se1/2
ip address 192.168.130.2 255.255.255.0
no shut
do wr
exit

interface se1/3
ip address 192.168.140.2 255.255.255.0
no shut
do wr
exit

Campus 4:

interface fa0/0
ip address 92.0.0.254 255.0.0.0
no shut
do wr
exit

ip dhcp pool campus4

```
network 92 0.0.0  255.0.0.0
default-router 92.0.0.254
dns-server 84.0.0.252
exit
ip dhcp excluded-address 92.0.0.254


interface se1/0
ip address 192.168.150.2 255.255.255.0
no shut
do wr
exit

interface se1/2
ip address 192.168.160.2 255.255.255.0
no shut
do wr
exit

interface se1/0
ip address 192.168.150.2 255.255.255.0
no shut
do wr
exit

interface se1/2
ip address 192.168.160.2 255.255.255.0
no shut
do wr
exit

interface se1/1
ip address 192.168.90.2 255.255.255.0
```

no shut
do wr
exit

interface se1/0
ip address 192.168.120.2 255.255.255.0
no shut
do wr
exit

interface se1/2
ip address 192.168.160.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

Campus 6:

interface fa0/0
ip address 194.168.60.254 255.255.255.0
no shut
do wr
exit

ip dhcp pool campus6

network 194.168.60.0 255.255.255.0
default-router 194.168.60.254
dns-server 84.0.0.252
exit
ip dhcp excluded-address 194.168.60.254

interface se1/0
ip address 192.168.110.2 255.255.255.0
no shut
do wr
exit

Campus 7:

interface fa0/0
ip address 100.0.0.254 255.0.0.0
no shut
do wr
exit

ip dhcp pool campus7

network 100.0.0.0 255.0.0.0
default-router 100.0.0.254
dns-server 84.0.0.252
exit
ip dhcp excluded-address 100.0.0.254

interface se1/2
ip address 192.168.100.2 255.255.255.0
no shut
do wr
exit

interface se1/0
ip address 192.168.110.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se1/1
ip address 192.168.120.1 255.255.255.0
clock rate 64000
no shut
do wr
exit

interface se1/3
ip address 192.168.140.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se1/5

ip address 192.168.150.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se1/2

ip address 192.168.160.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se1/4

ip address 192.168.170.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

Routing Table:

Campus 1:

router ospf 1

network 84.0.0.0 0.255.255.255 area 1

network 192.168.80.0 0.0.0.255 area 1

network 192.168.90.0 0.0.0.255 area 1

network 192.168.100.0 0.0.0.255 area 1

exit

Campus 2:

router ospf 2
network 184.168.0.0 0.0.255.255 area 1
network 192.168.80.0 0.0.0.255 area 1
network 192.168.130.0 0.0.0.255 area 1
network 192.168.170.0 0.0.0.255 area 1

exit

Campus 3:

router ospf 3
network 192.168.30.0 0.0.0.255 area 1
network 192.168.130.0 0.0.0.255 area 1
network 192.168.140.0 0.0.0.255 area 1

exit

Campus 4:

router ospf 4
network 92.0.0.0 0.0.0.255 area 1
network 192.168.150.0 0.0.0.255 area 1
network 192.168.160.0 0.0.0.255 area 1

exit

Campus 5:

router ospf 5
network 164.168.0.0 0.0.255.255 area 1
network 192.168.90.0 0.0.0.255 area 1
network 192.168.120.0 0.0.0.255 area 1
exit

Campus 6:

```
router ospf 6
network 194.168.60.0 0.0.0.255 area 1
network 192.168.110.0 0.0.0.255 area 1

exit
```

Campus 7:

```
router ospf 7
network 100.0.0.0 0.255.255.255 area 1
network 192.168.100.0 0.0.0.255 area 1
network 192.168.110.0 0.0.0.255 area 1
network 192.168.120.0 0.0.0.255 area 1
network 192.168.140.0 0.0.0.255 area 1
network 192.168.150.0 0.0.0.255 area 1
network 192.168.170.0 0.0.0.255 area
```

Campus 1: Campus 1 is for Server Room.
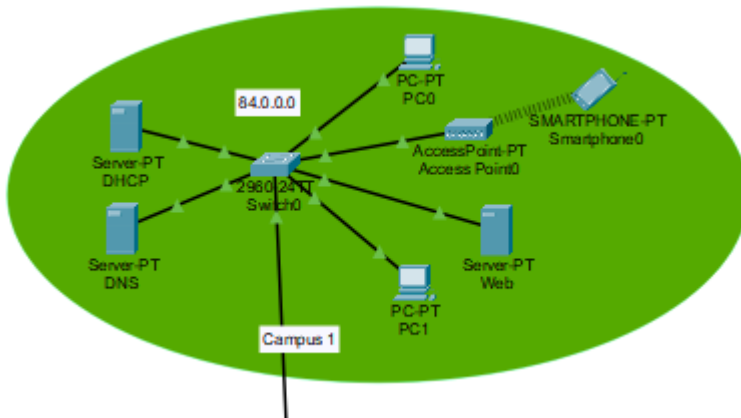
Campus 2: Campus 2 is for the Employee's Room.
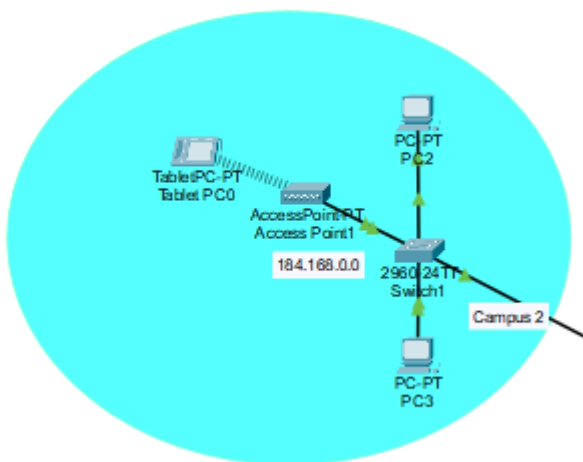
Campus 3: Campus 3 is for Library.
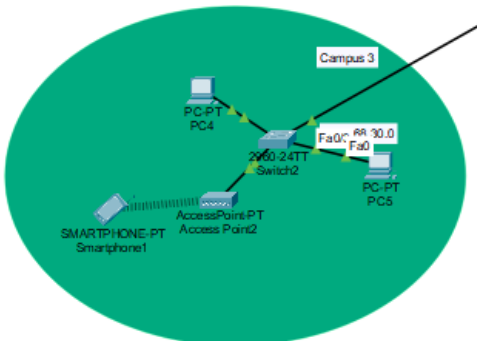
Campus 4: Campus 4 is for Labs.
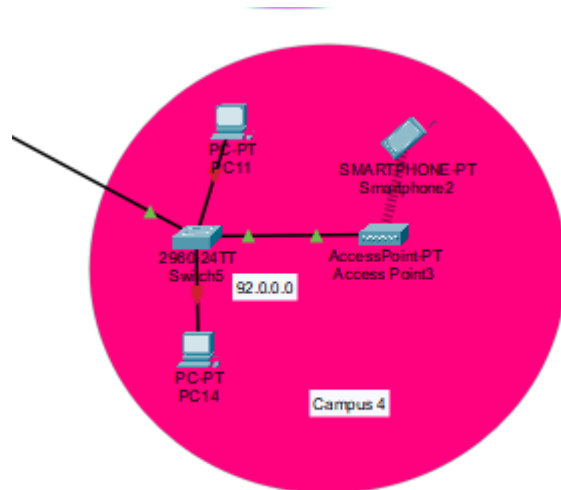
Campus 5: Campus 5 Faculty & Department Rooms.
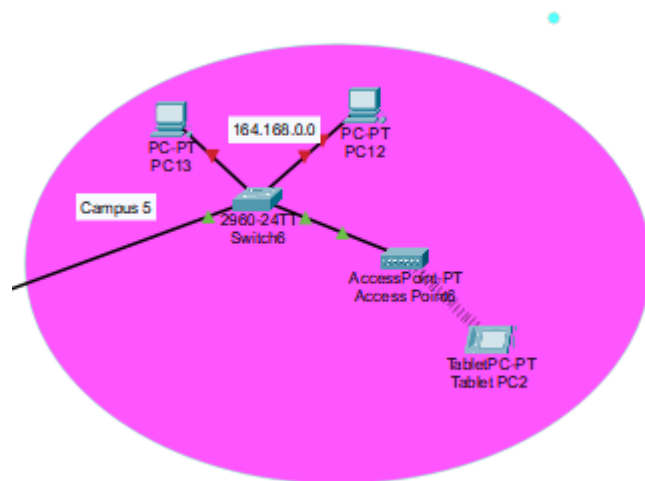
Campus 6: Campus 6 is for Classrooms
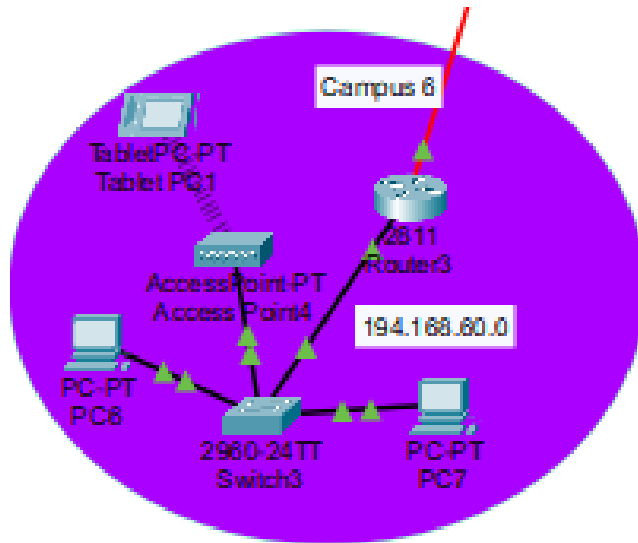
Campus 7: Campus 7 is for Admission Office.
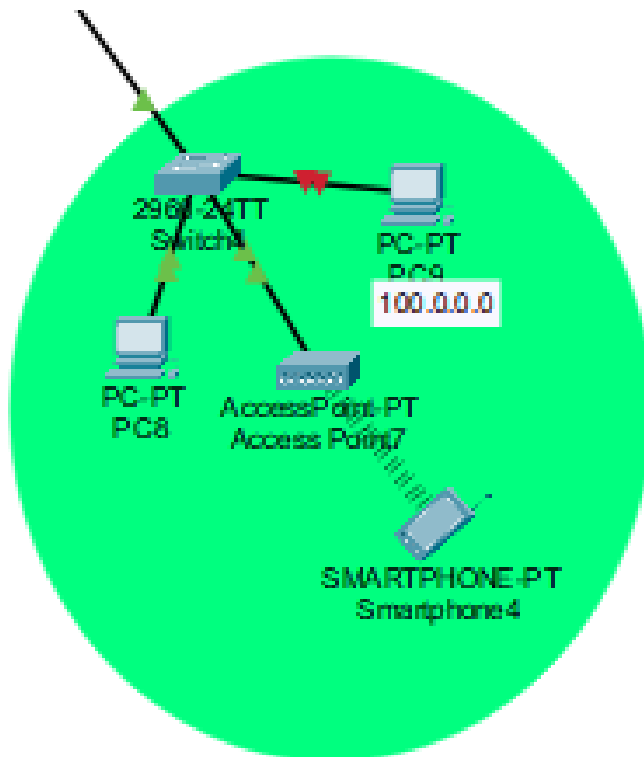
Server Configuration:

DHCP Server: [IP: 84.0.0.254]

DHCP can serve IP across the network automatically. We use 1 DHCP server for 7 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: 84.0.0.253]

Figure 12: Config DNS Server

WEB Server: [IP: 84.0.0.253]
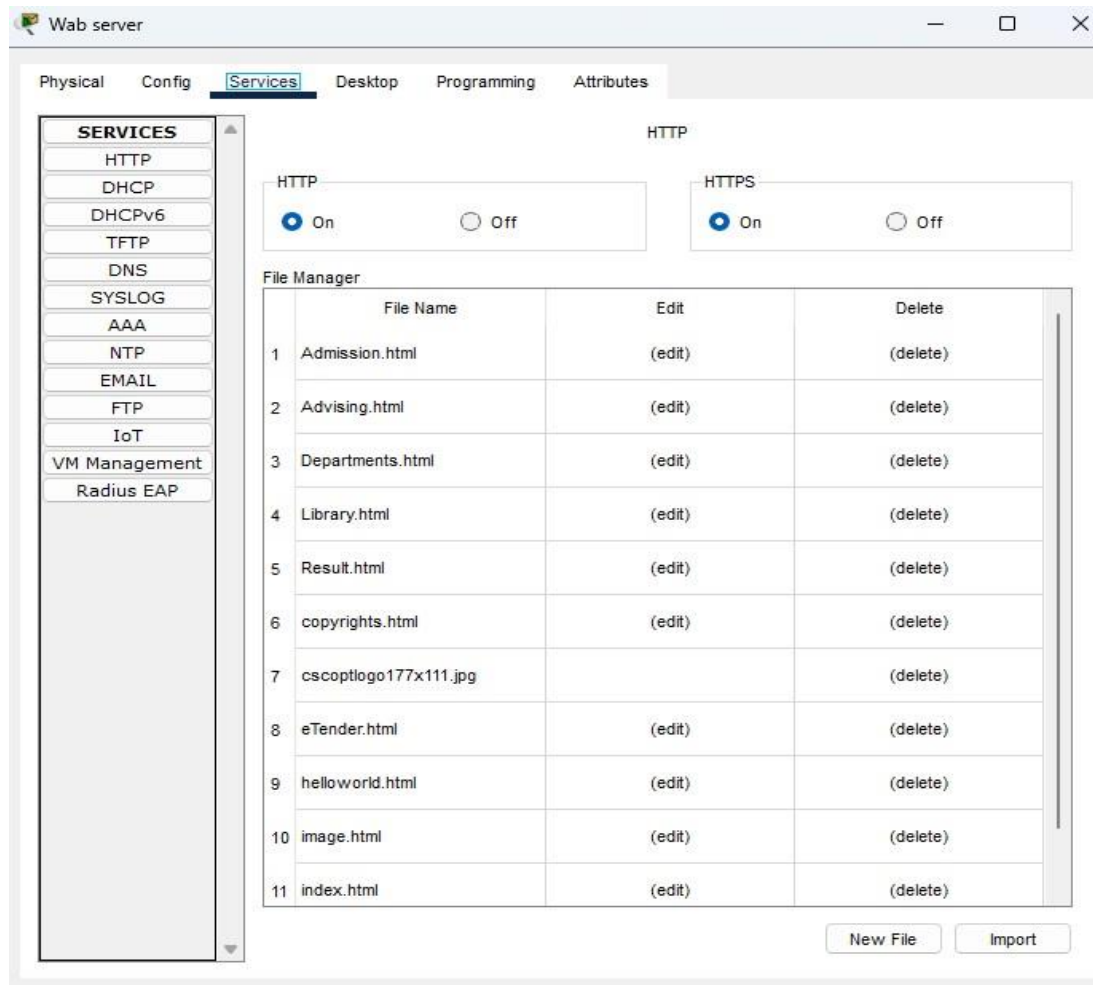
Figure 13: Config WEB server

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.
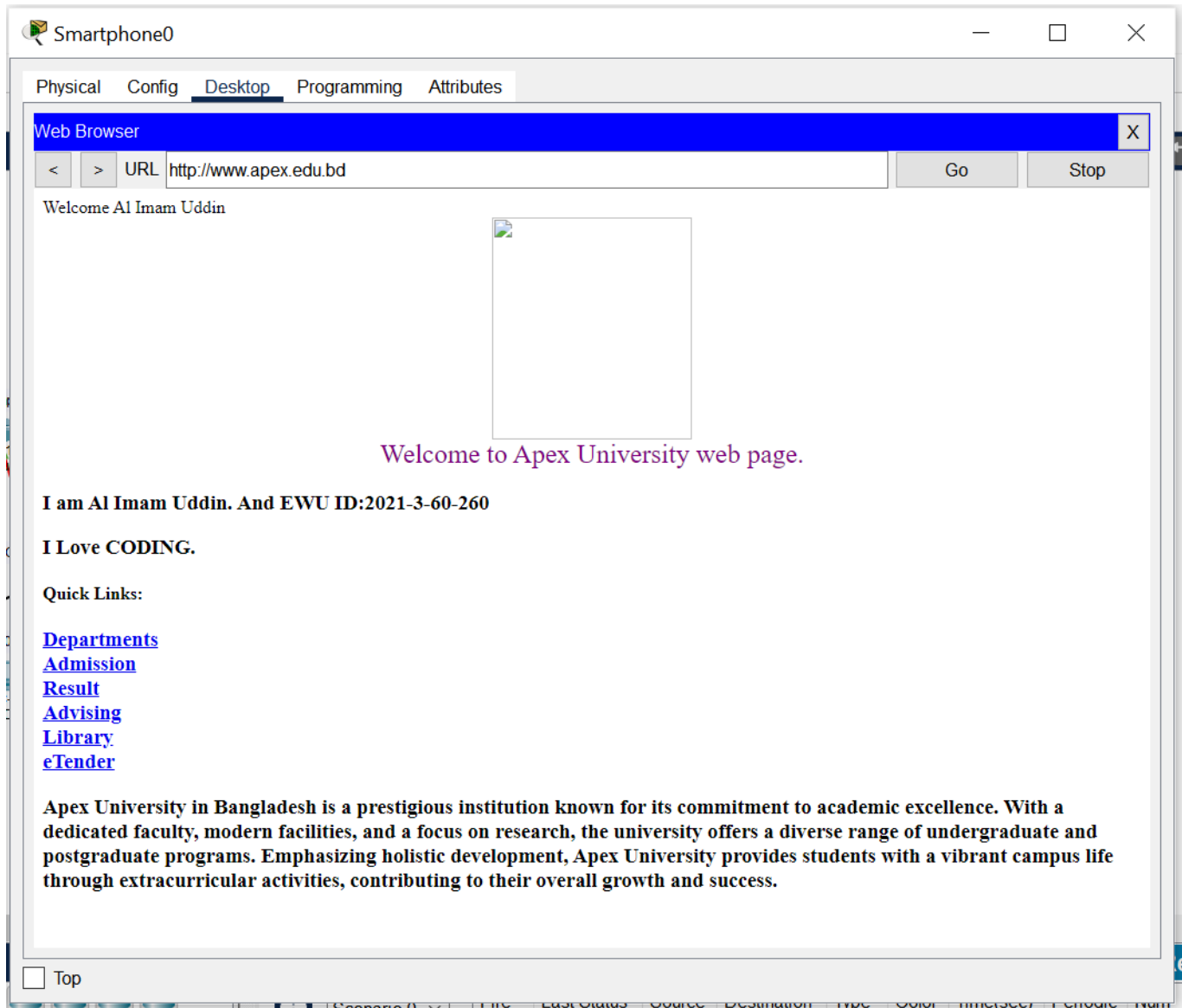
Figure 16: University's Home page
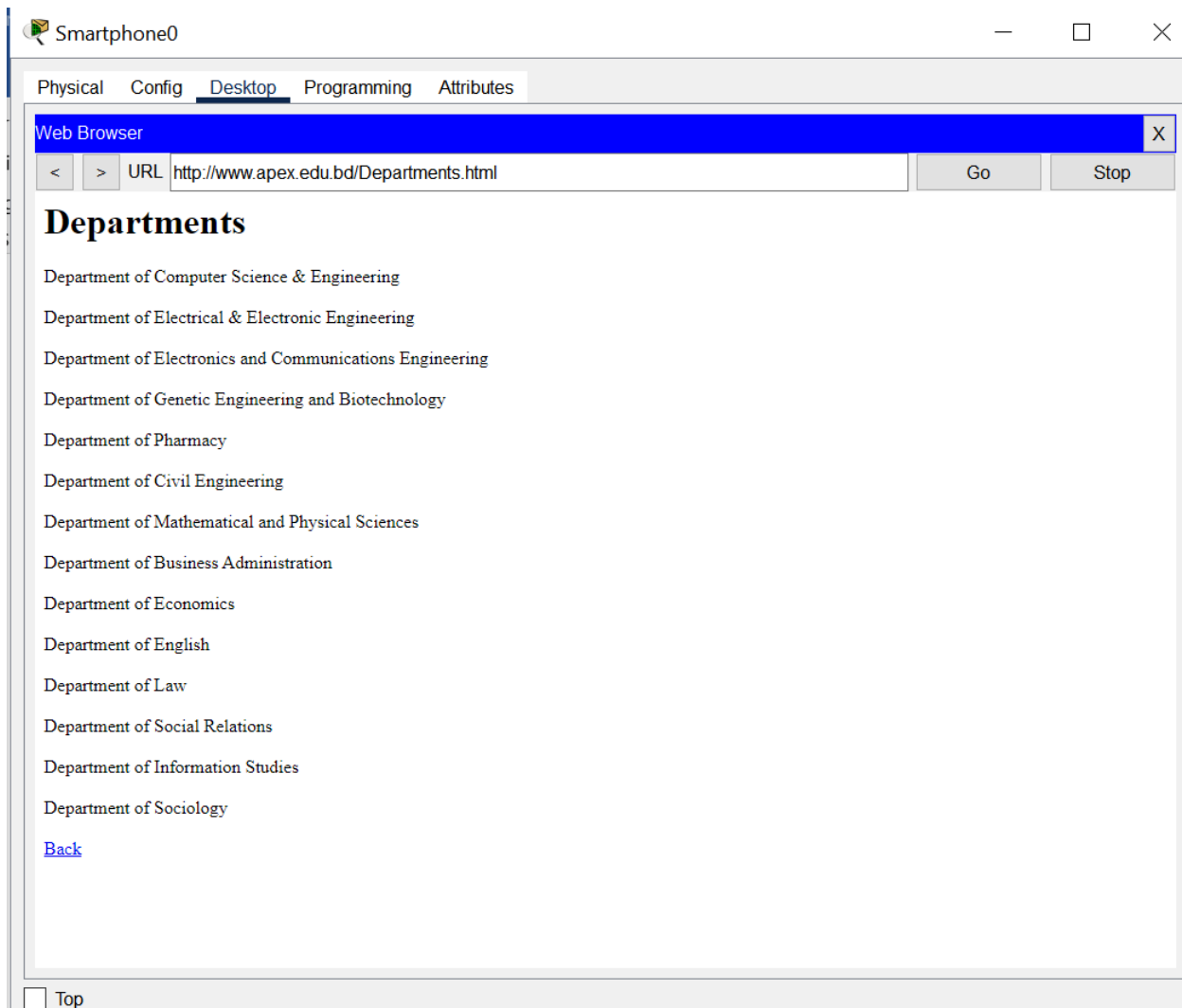
Figure 17: University's Department page

Physical   Config   Desktop   Programming   Attributes

Web Browser   X

< | > | URL | http://www.apex.edu.bd/Admission.html | Go | Stop

Al Imam Uddin

Admission:

Undergraduate
Diploma
Image
Back

☐ Top
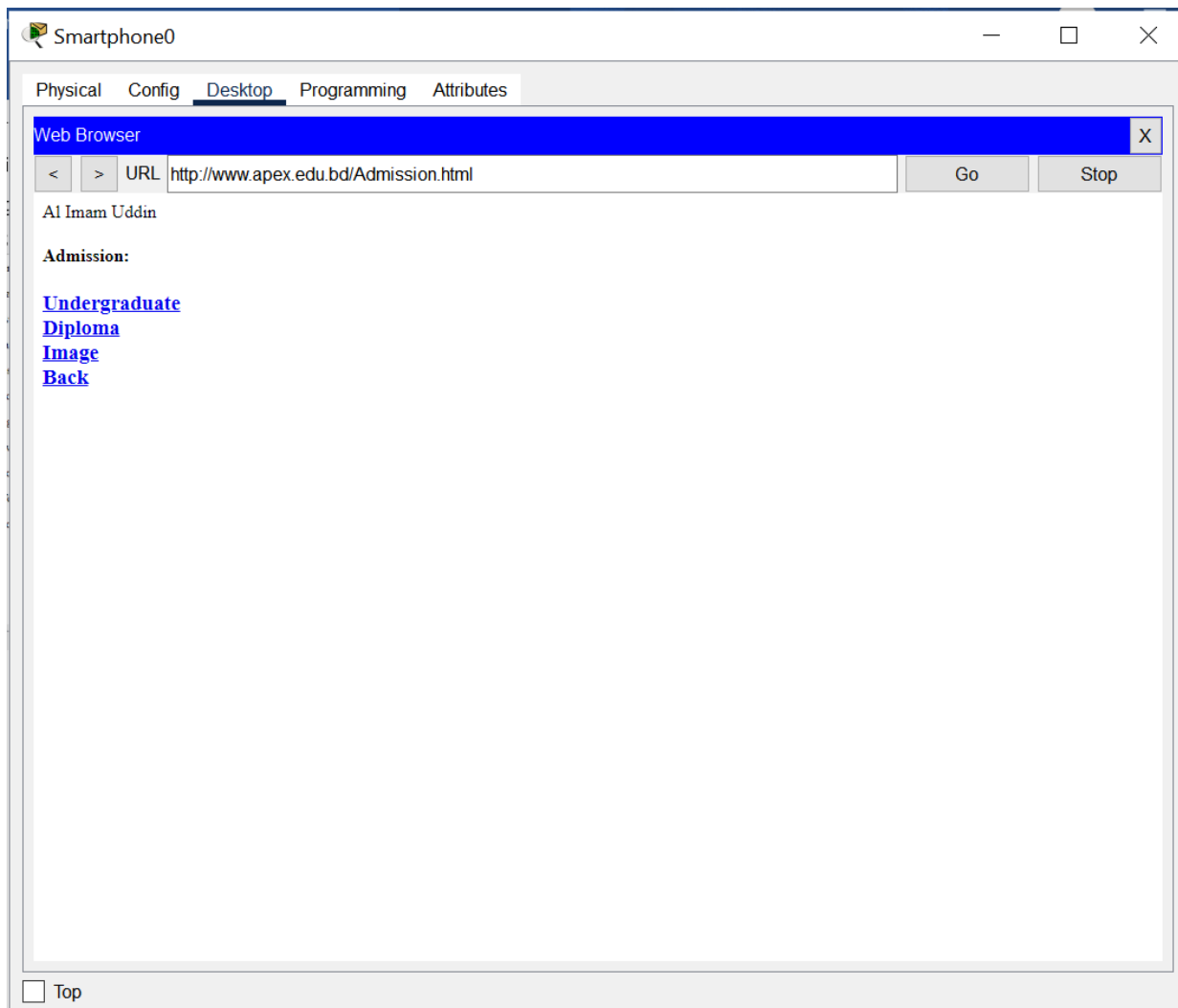
Figure 18: University's Admission page

Smartphone0

Physical | Config | Desktop | Programming | Attributes

Web Browser   X

< | > | URL | http://www.apex.edu.bd/Result.html | Go | Stop

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Results

All results will be published here.
Back

☐ Top
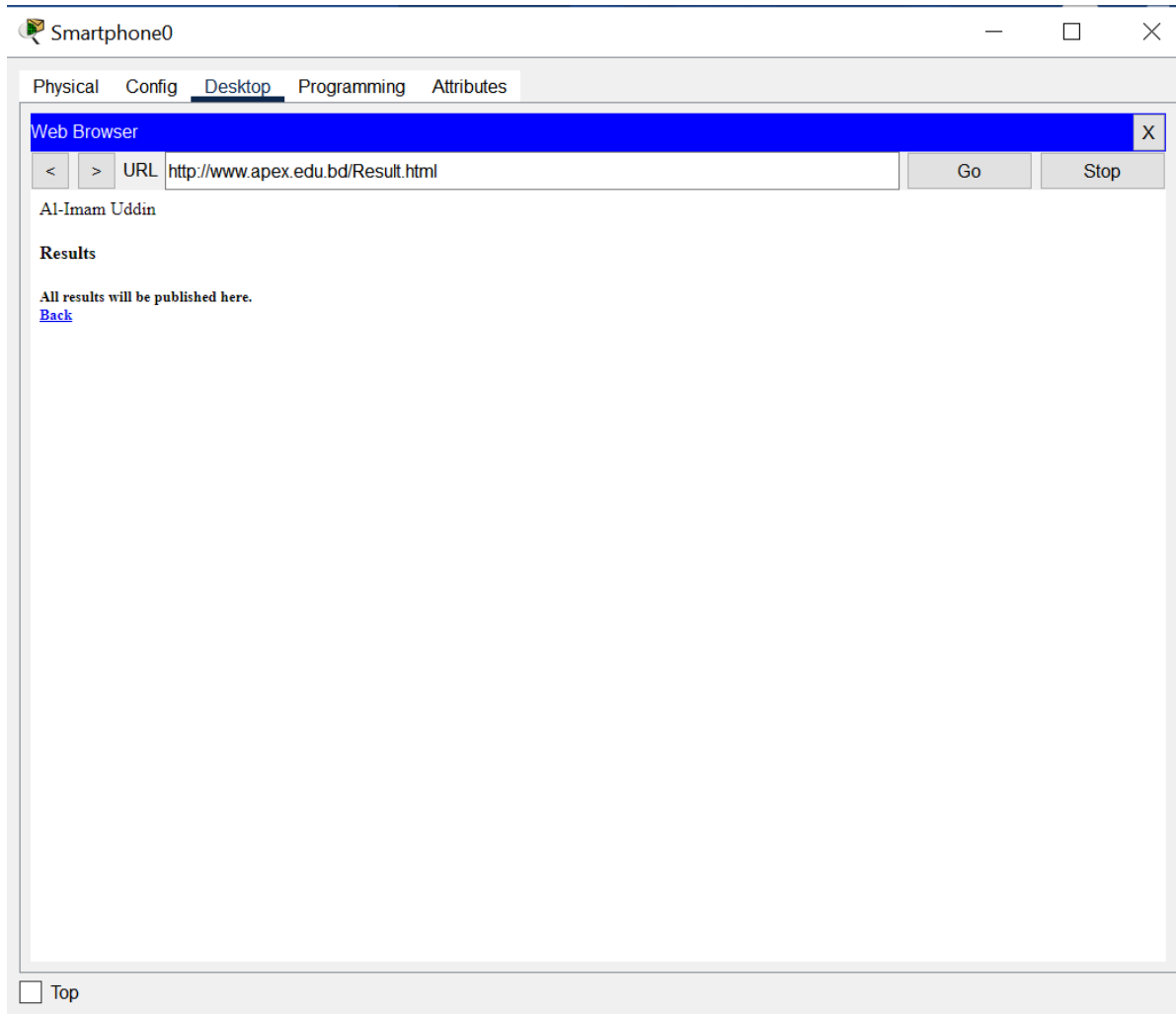
Figure 19: University's Result page

Physical   Config   Desktop   Programming   Attributes

Web Browser   X

<   >   URL http://www.apex.edu.bd/Advising.html   Go   Stop

Al-Imam Uddin

Advising

You can do advising here
Back

☐ Top
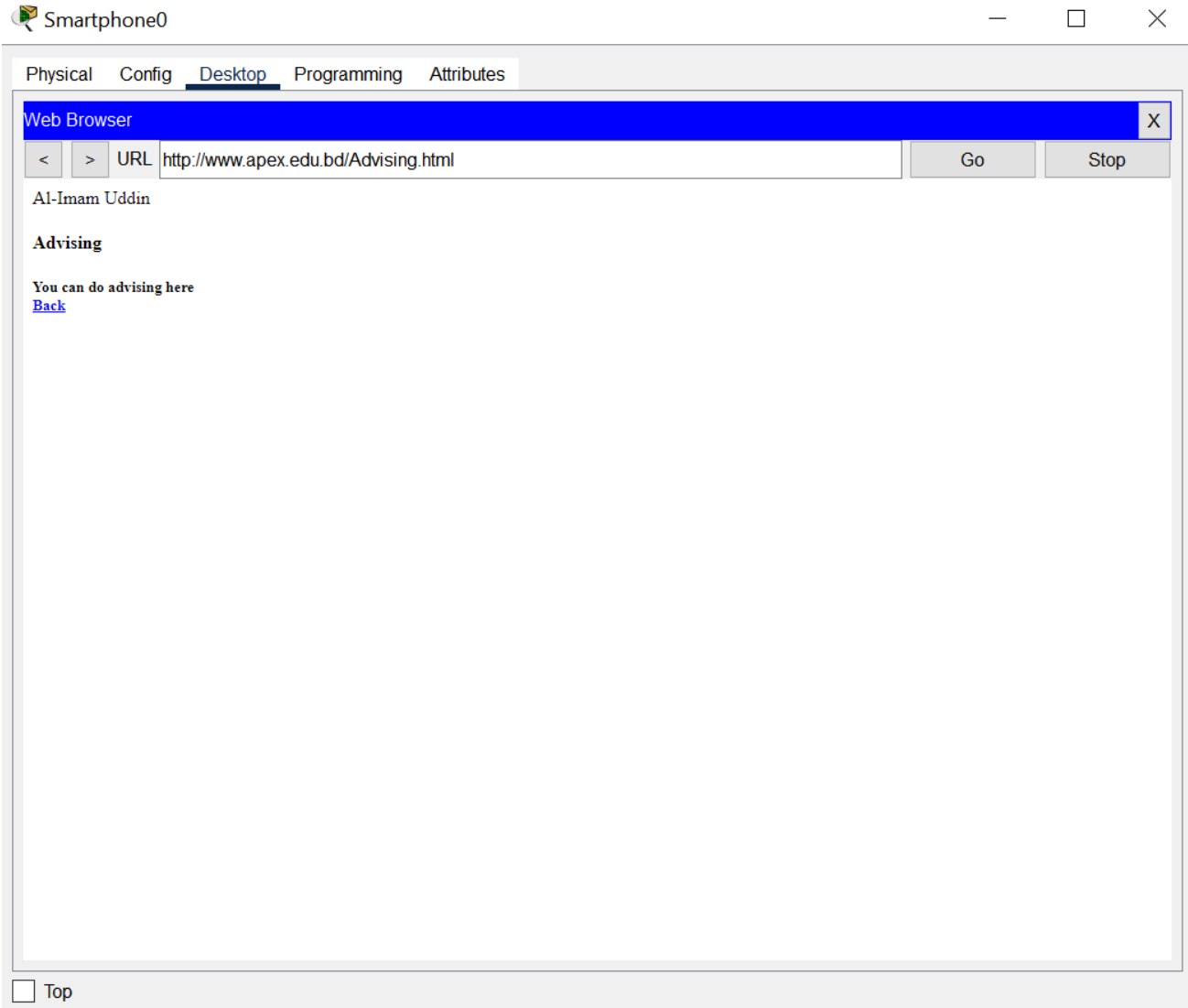
Figure 20: University's Advising page

Smartphone0 — Physical | Config | Desktop | Programming | Attributes

Web Browser   X

< | > | URL | http://www.apex.edu.bd/eTender.html | Go | Stop

Al-Imam Uddin

eTender

eTender Information..........!
Back
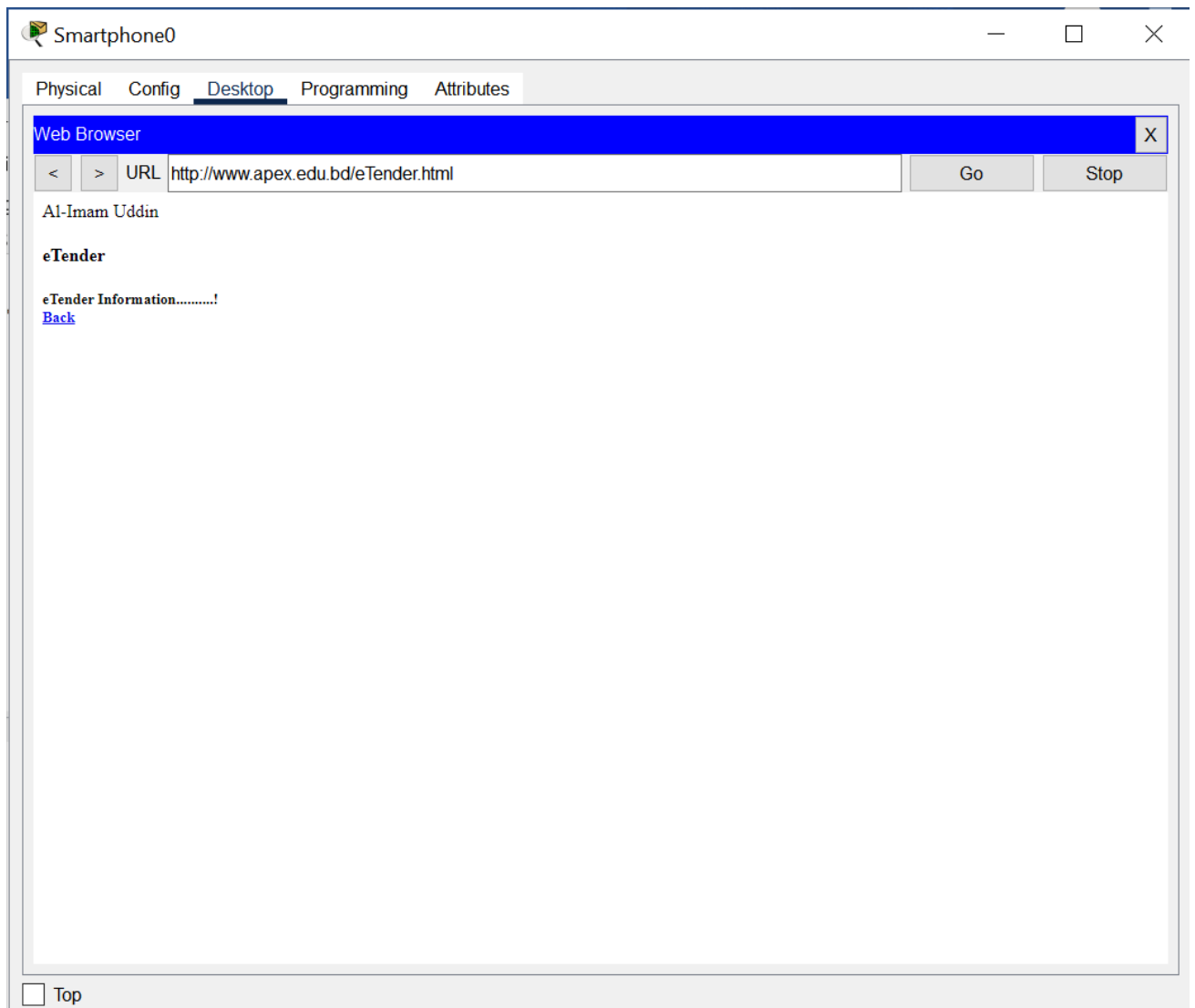
Top

Figure 21: eTender page
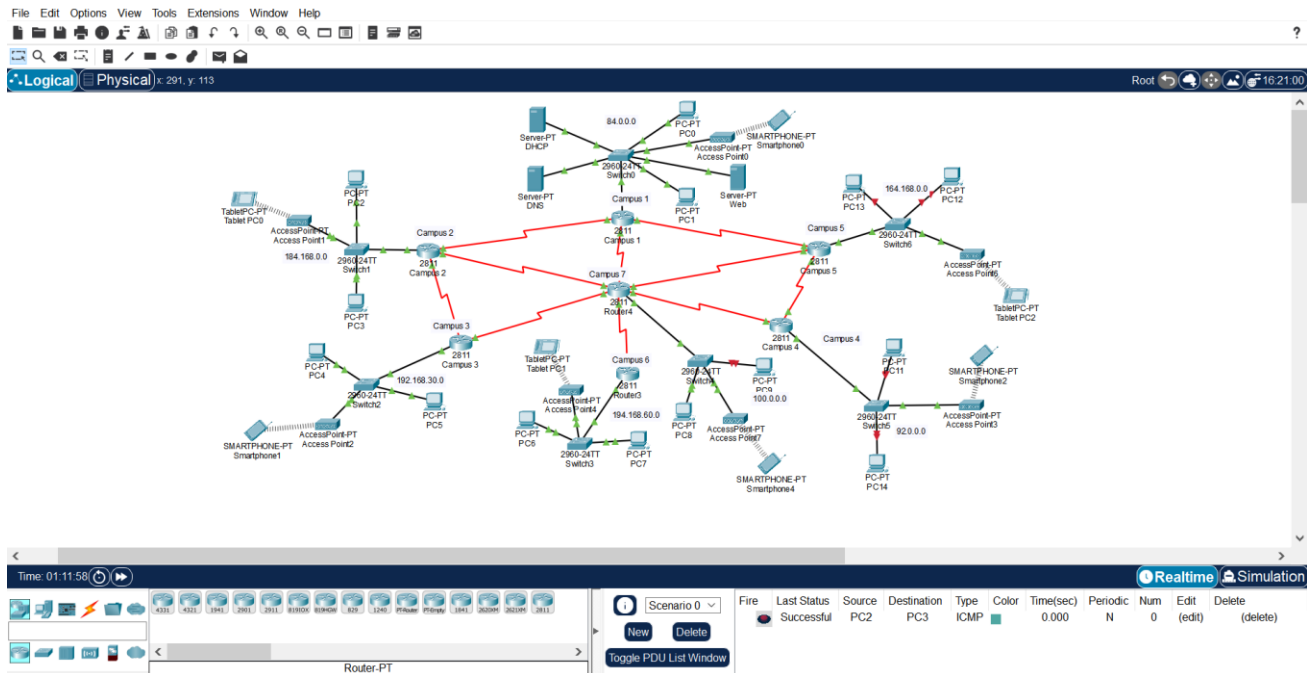
Ping between 2 PC (Same network):

Figure 22: Sending ICMP packet in same network

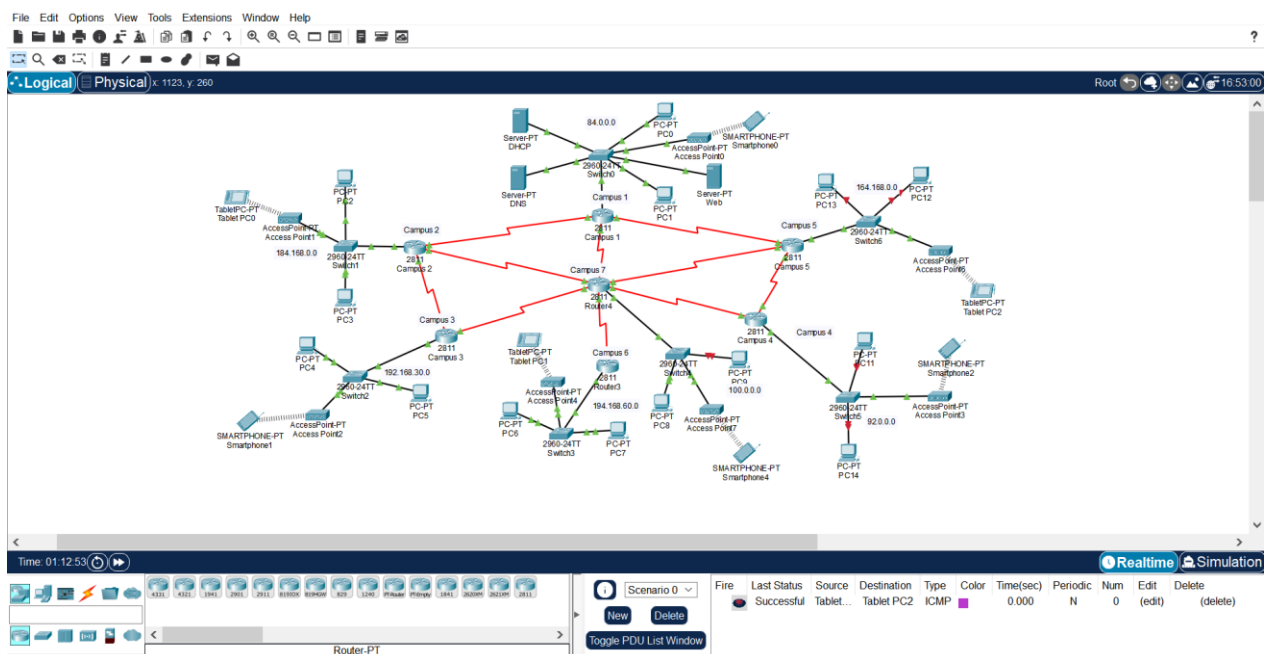## Ping between 2PC (Different Network):

Figure 23: Sending ICMP packet in different network
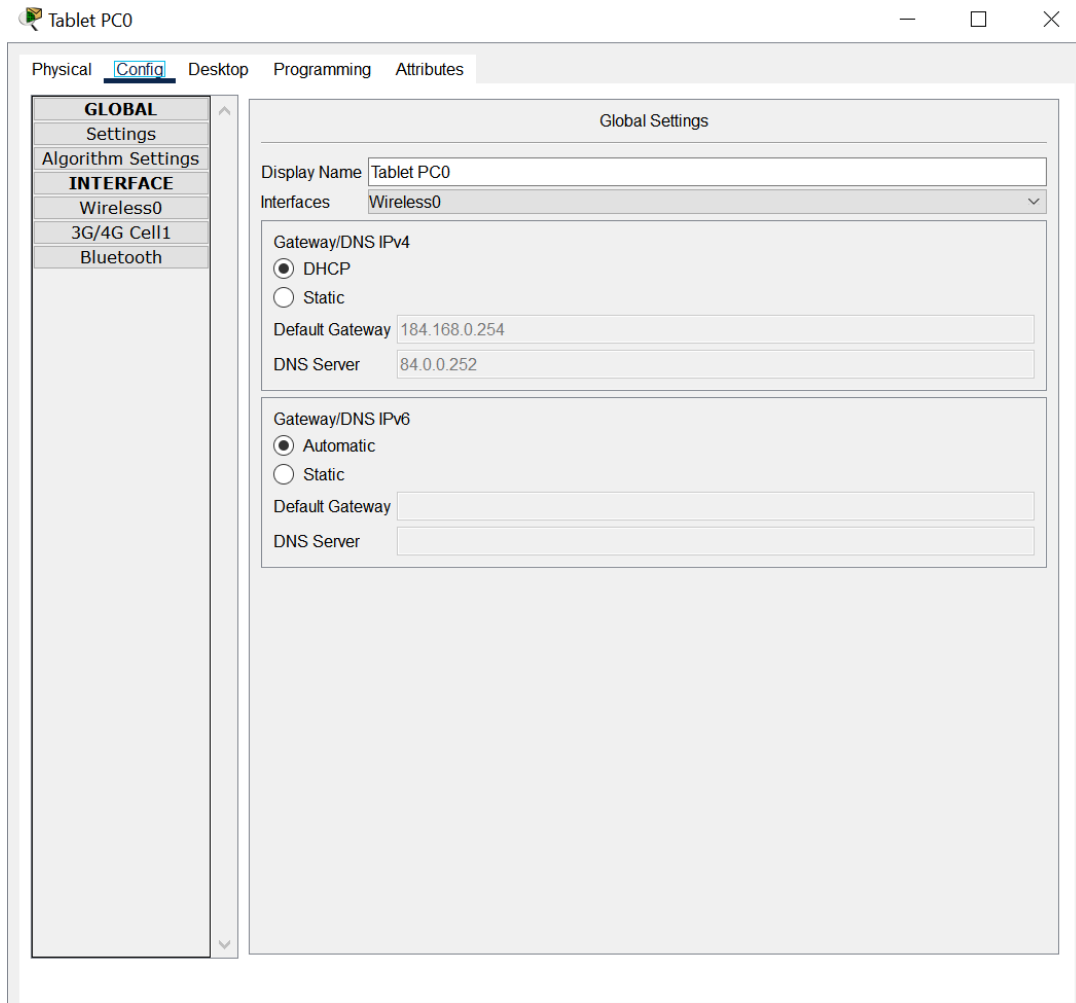
<u>Wireless Device:</u>

Figure 24: Config wireless device Laptop

<u>Conclusion:</u>

To complete the project flawlessly, I tried my best. Through the use of devices including computers, switches, routers, and wireless routers, I was able to fully simulate an intricate network for this assignment. Without any issues, all of these devices were able to communicate with one another via the network. To display the University's internet page, I also configured a dedicated server. With HTML, a unique type of code, I even altered the website's appearance. When a computer needs an IP address, I added a system that assigns them all a unique number. From this course and assignment, I gained a lot of knowledge.