EAST WEST UNIVERSITY

Department of Computer Science & Engineering

Mini Project Report

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

Course Title: Computer Networks

Course Code: CSE405

Section: 1

Submitted To:

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Title:

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

Required Tools:

- Pcs
- Wireless End Device
- Switches (Model 2960)
- Routers
- Wireless Routers
- DNS Server
- Web Server
- DHCP Server
- Copper Straight-Through Cable
- Copper Cross-over Cable
- Serial DCE Cable

Design Specification:

The design consists of six wired routers denoting each campus. Each campus contains different networks. Every campus network has a different class Ip. Every campus is connected with a switch to their respective router. Classrooms, labs, employee PCs, library and other administrative and academic wings are branched from the main switch. There is also a wireless network for each campus, which creates a subnetwork of its own.

There is a server room located on campus 1. This router contains DHCP, DNS and Web servers. Only a single DHCP server is used for the whole network. The DHCP server provides IP to every campus. The web server contains the website of the institute which includes admissions, advising, results, E-Tender, library management, accounts etc.

The network among routers is of A class network.

The design is very flexible. Since sub-switches are branched from the main switches and sub-switches represent different academic wings, more academic wings can be added for future expansion for each of the subnets by adding sub-switches.

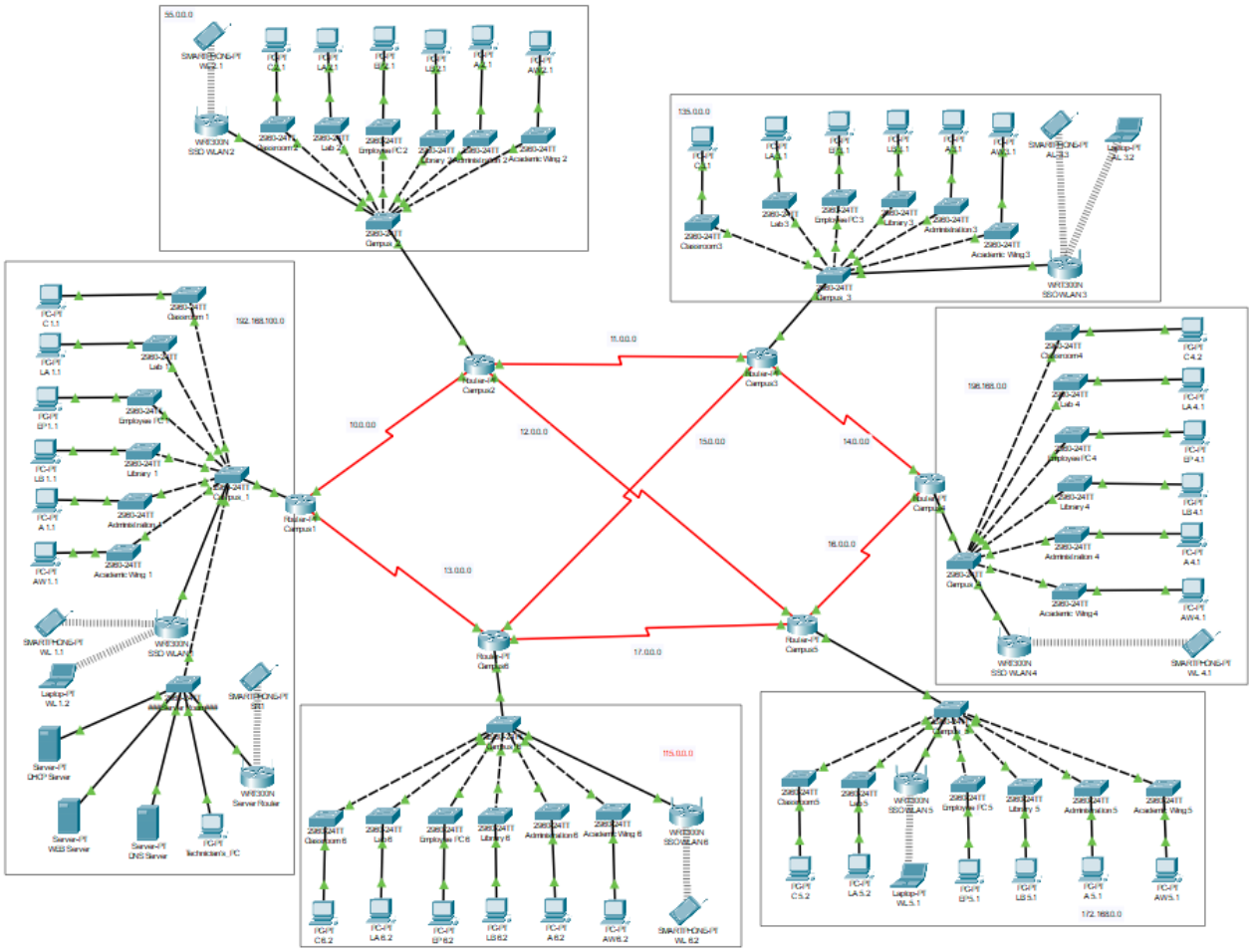

Figure 1: Diagram of the network

Design Issues:

There are no issues, all the connection, servers, End devices are working perfectly, if we use too big network or more connection it will take more time to assign all IP addresses DNS server and getaway address from DHCP server, after opening pkt file the wireless networks DNS no assigned I have tried multiple times to fix this problem but after reviewing previous projects from seniors I assume that this is a bug of cisco packet tracer or everyone's drawback of their designed network.

Number of Hosts:

Total number of hosts is: 45

Number of Networks:

Total number of networks is: 8+6=14

Limitation:

Since this is a very small project, no limitations were found. The network is very complex though Maintaining this network is easy. More campus networks can be added very easily. To add more networks, manual configuration is needed. The network can support a larger number of hosts for future upgrades.

Lines of Code:

Router Configuration code:

Campus 1/Router 1:

```
interface fa0/0
Ip address 192.168.100.254 255.255.255.0
no shut
do wr
exit
interface se2/0
Ip address 10.0.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit
interface se3/0
Ip address 13.0.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit
```

Campus 2/Router 2:

```
interface fa0/0
Ip address 55.0.0.1 255.0.0.0
```

no shut

do wr

exit

interface se2/0

Ip address 10.0.0.2 255.0.0.0

no shut

do wr

exit

interface se3/0

Ip address 11.0.0.1 255.0.0.0

clock rate 64000

no shut

do wr

exit

interface se6/0

Ip address 12.0.0.1 255.0.0.0

clock rate 64000

no shut

do wr

exit

Campus 3/Router 3:

interface fa0/0

Ip address 135.0.0.1 255.255.0.0

no shut

do wr

exit

interface se2/0

Ip address 11.0.0.2 255.0.0.0

no shut

do wr

exit

interface se3/0

Ip address 14.0.0.1 255.0.0.0

clock rate 64000

no shut

do wr

exit

interface se6/0

Ip address 15.0.0.1 255.0.0.0

clock rate 64000

no shut

do wr

exit

Campus 4/Router 4:

interface fa0/0

Ip address 196.168.0.1 255.255.255.0

no shut

do wr

exit

interface se2/0

Ip address 14.0.0.2 255.0.0.0

no shut

do wr

exit

interface se3/0

Ip address 16.0.0.1 255.0.0.0

clock rate 64000

no shut

do wr

exit

Campus 5/Router 5:

interface fa0/0

Ip address 172.168.0.1 255.255.0.0

no shut

do wr

exit

interface se2/0

Ip address 12.0.0.2 255.0.0.0

no shut

do wr

exit

interface se3/0

Ip address 16.0.0.2 255.0.0.0

no shut

do wr

exit

interface se6/0

Ip address 17.0.0.1 255.0.0.0

clock rate 64000

no shut

do wr

exit

Campus 6/Router 6:

interface fa0/0

Ip address 115.0.0.1 255.0.0.0

no shut

do wr

exit

interface se2/0

Ip address 13.0.0.2 255.0.0.0

no shut

do wr

exit

interface se3/0

Ip address 15.0.0.2 255.0.0.0

no shut

do wr

exit

interface se6/0

Ip address 17.0.0.2 255.0.0.0

no shut

do wr

exit

Routing Table Code:

Campus 1/Router 1:

router OSPF 1

network 10.0.0.0 0.255.255.255 area 1

network 13.0.0.0 0.255.255.255 area 1

network 192.168.100.0 0.0.0.255 area 1

exit

Campus 2/Router 2:

router OSPF 2

network 10.0.0.0 0.255.255.255 area 1

network 11.0.0.0 0.255.255.255 area 1

network 12.0.0.0 0.255.255.255 area 1

network 55.0.0.0 0.255.255.255 area 1

exit

Campus 3/Router 3:

router OSPF 3

network 11.0.0.0 0.255.255.255 area 1

network 14.0.0.0 0.255.255.255 area 1

network 15.0.0.0 0.255.255.255 area 1

network 135.0.0.0 0.0.255.255 area 1

exit

Campus 4/Router 4:

router OSPF 4

network 14.0.0.0 0.255.255.255 area 1

network 16.0.0.0 0.255.255.255 area 1

network 196.168.0.0 0.0.0.255 area 1

exit

Campus 5/Router 5:

router OSPF 5

network 12.0.0.0 0.255.255.255 area 1

network 16.0.0.0 0.255.255.255 area 1

network 17.0.0.0 0.255.255.255 area 1

network 172.168.0.0 0.0.255.255 area 1

exit

Campus 6/Router 6:

router OSPF 6

network 13.0.0.0 0.255.255.255 area 1

network 15.0.0.0 0.255.255.255 area 1

network 17.0.0.0 0.255.255.255 area 1

network 115.0.0.0 0.255.255.255 area 1

exit

Config For single DHCP Server:

For all routers:

Enable

config terminal

interface fa0/0

Ip helper-address 192.168.100.3

exit

exit

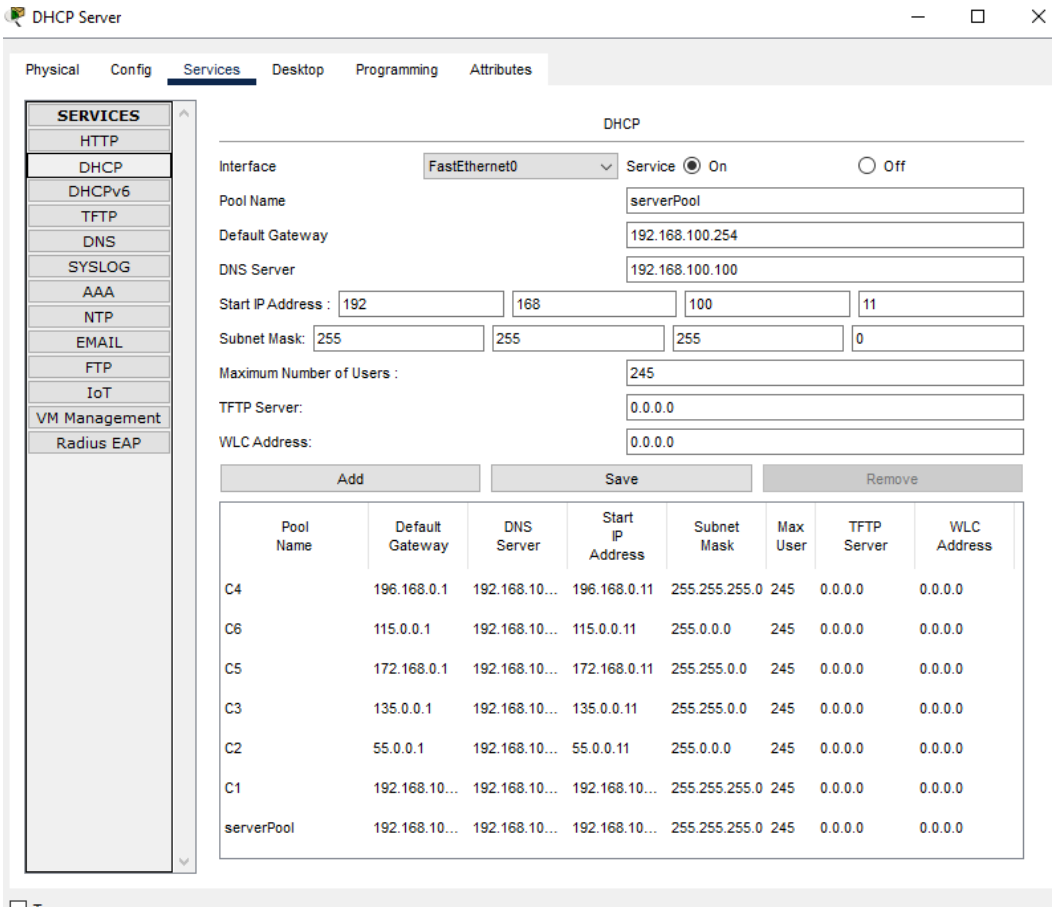

Figure 2: Single DHCP server configuration pool

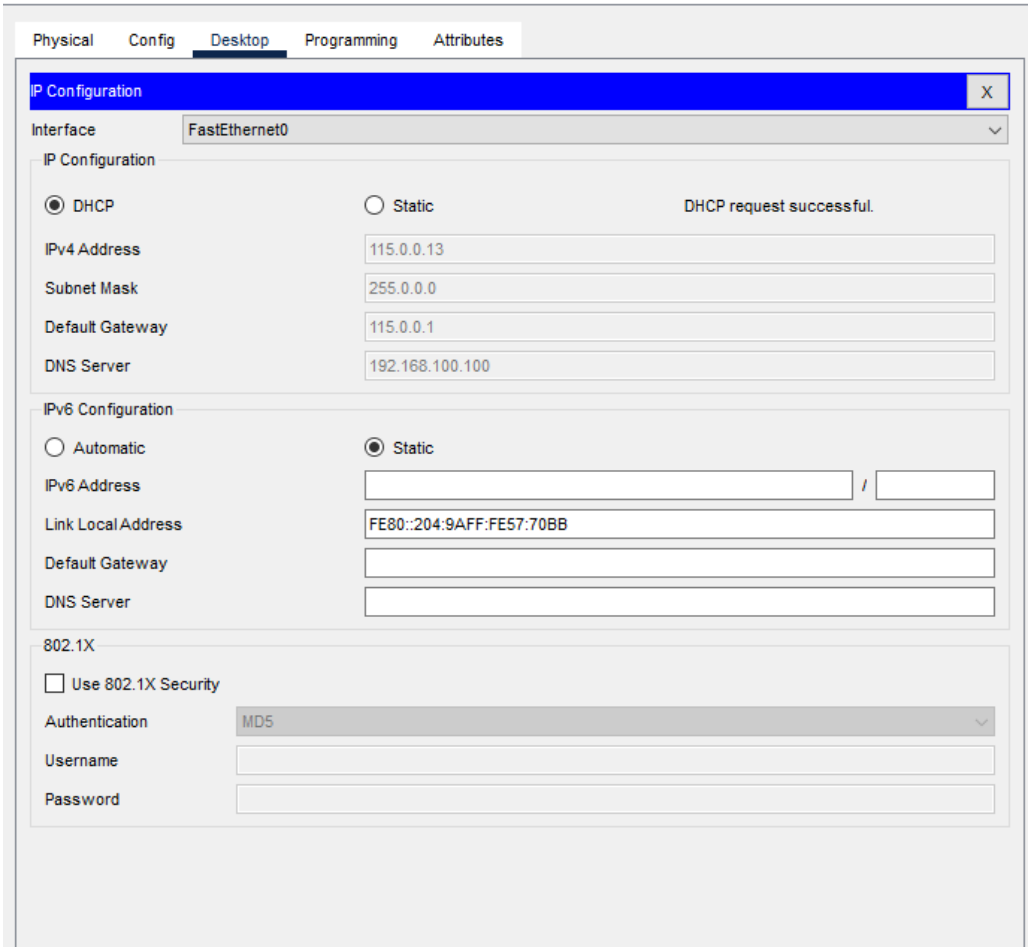

Figure 3: Single DHCP server giving different class Ip

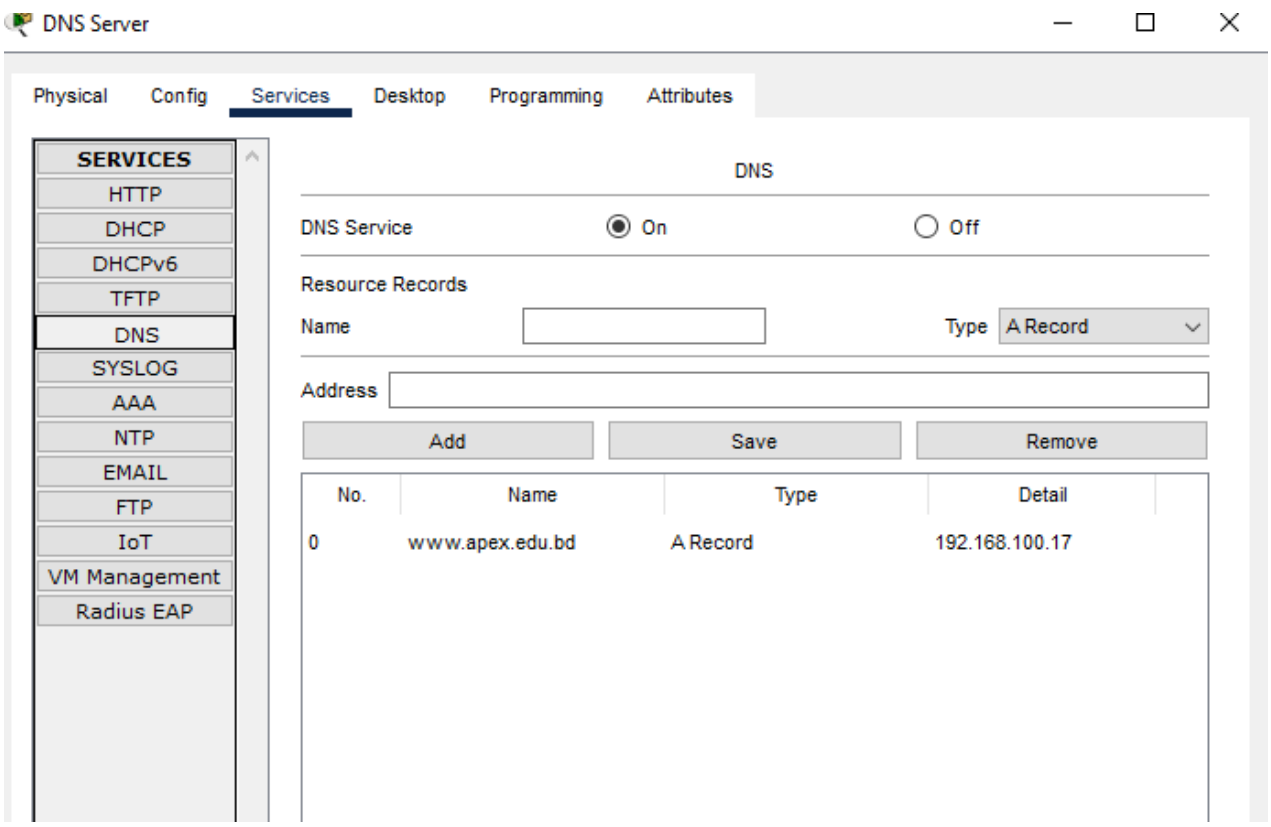

Figure 4: DNS server configuration

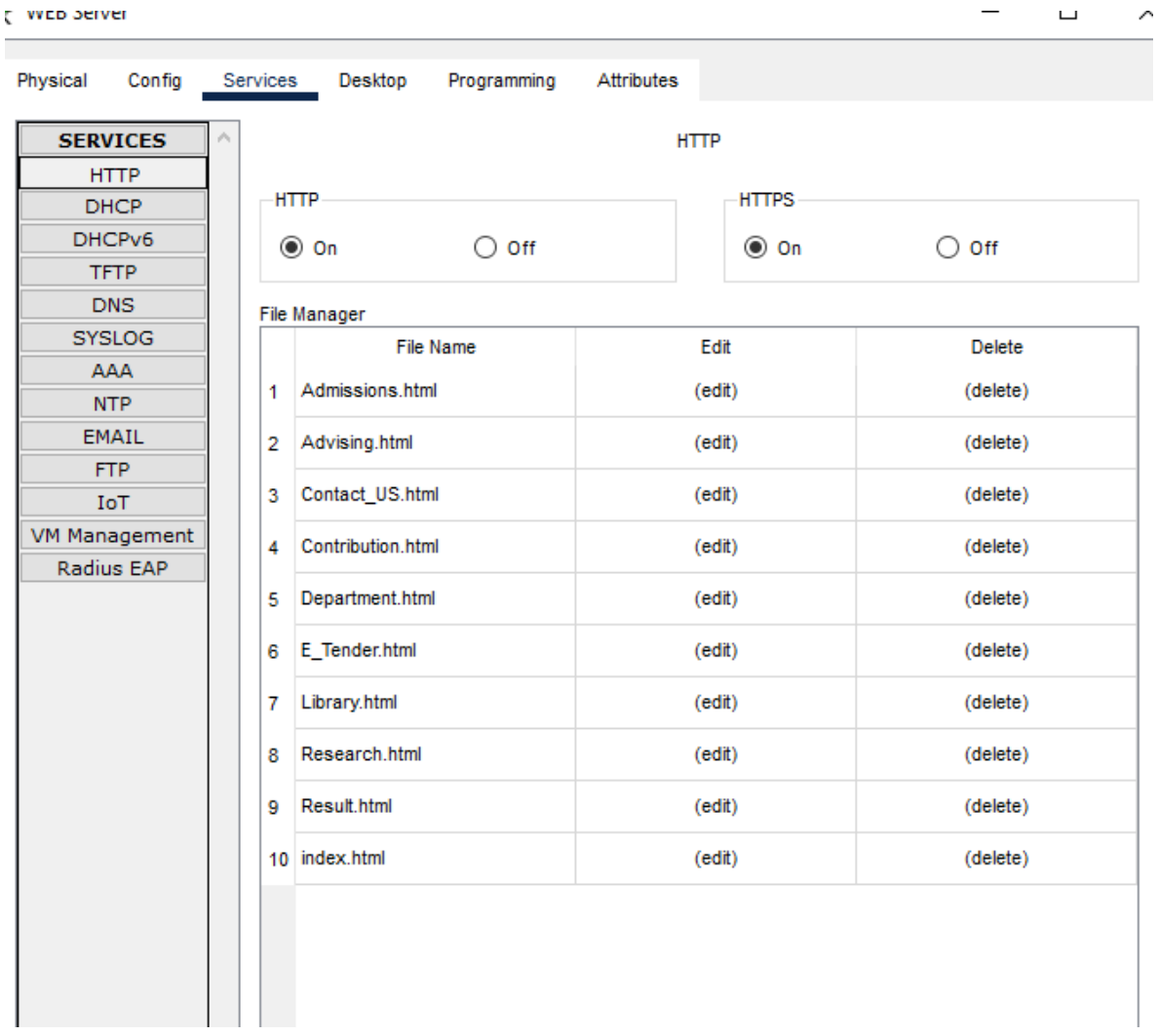

Figure 5: WEB server configuration

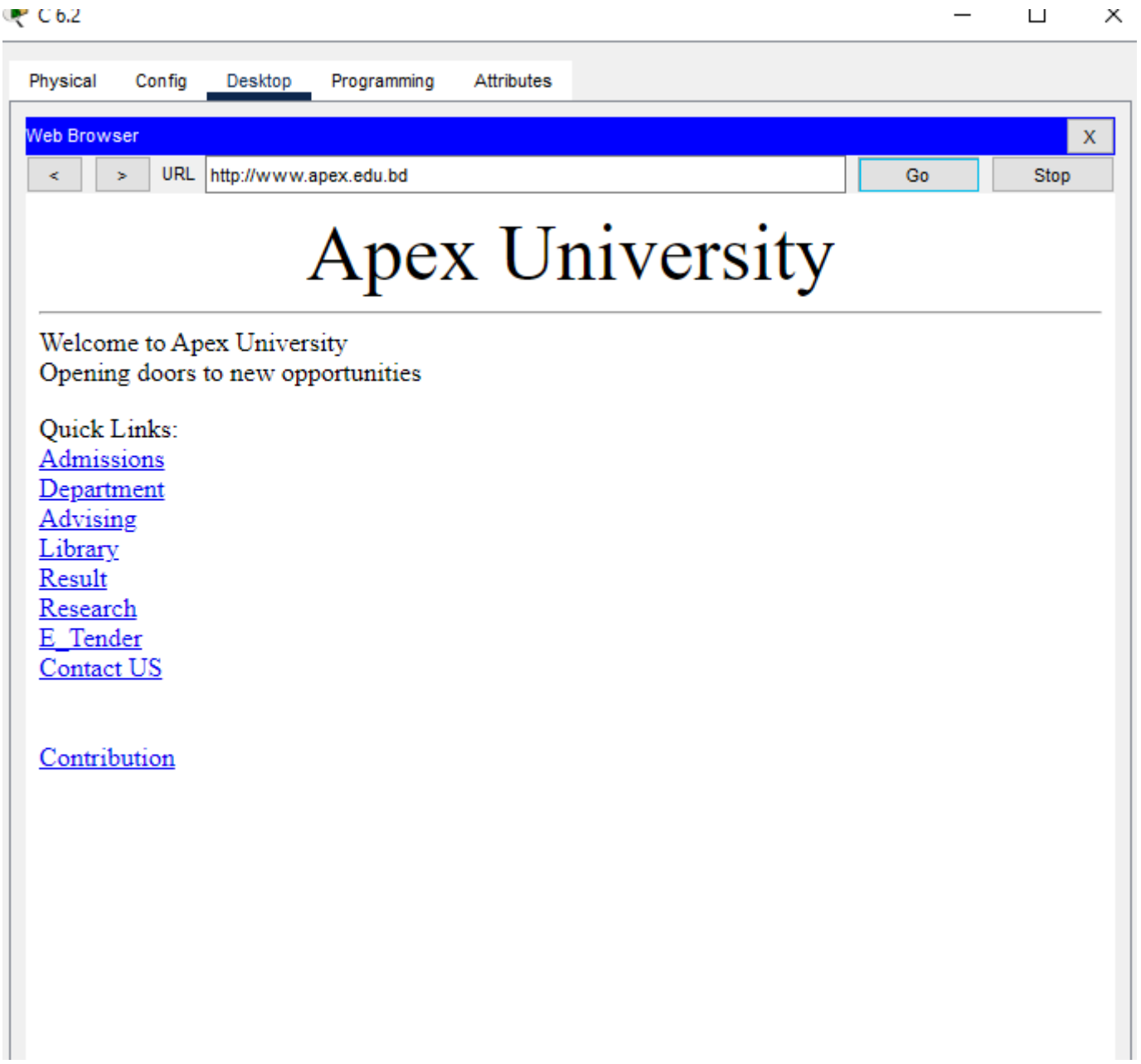

Figure 6: APEX University WEB page

Conclusion:

Despite obstacles, I carried out my plan in line with the project description and gave this project my all to finish it flawlessly. A comprehensive model of a complicated network is created in this project.

This network was built using switches, routers, end devices, and wireless routers. Perfect communication was established between every device connected to the network. The web page for Apex University was set up to be shown on a web server. Also, the website is altered using HTML code. A DNS server was also included for the website, and a DHCP server was integrated to provide IP addresses to each of the six campuses upon request.