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

Submitted By:

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Submitted To:

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Title:

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

Introduction:

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 design is very flexible. In some campus, here is also uses of sub switches. 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.

Tools:

- PCs
- Wireless End Devices
- Switches (Model 2960)
- Routers-PT
- Wireless Routers (Linksys-WRT300N)
- Access Point-PT
- DNS Server
- Web Server
- DHCP Server
- Copper Straight-Through Cable
- Copper Cross-Over Cable
- Serial DCE Cable Design Specifications

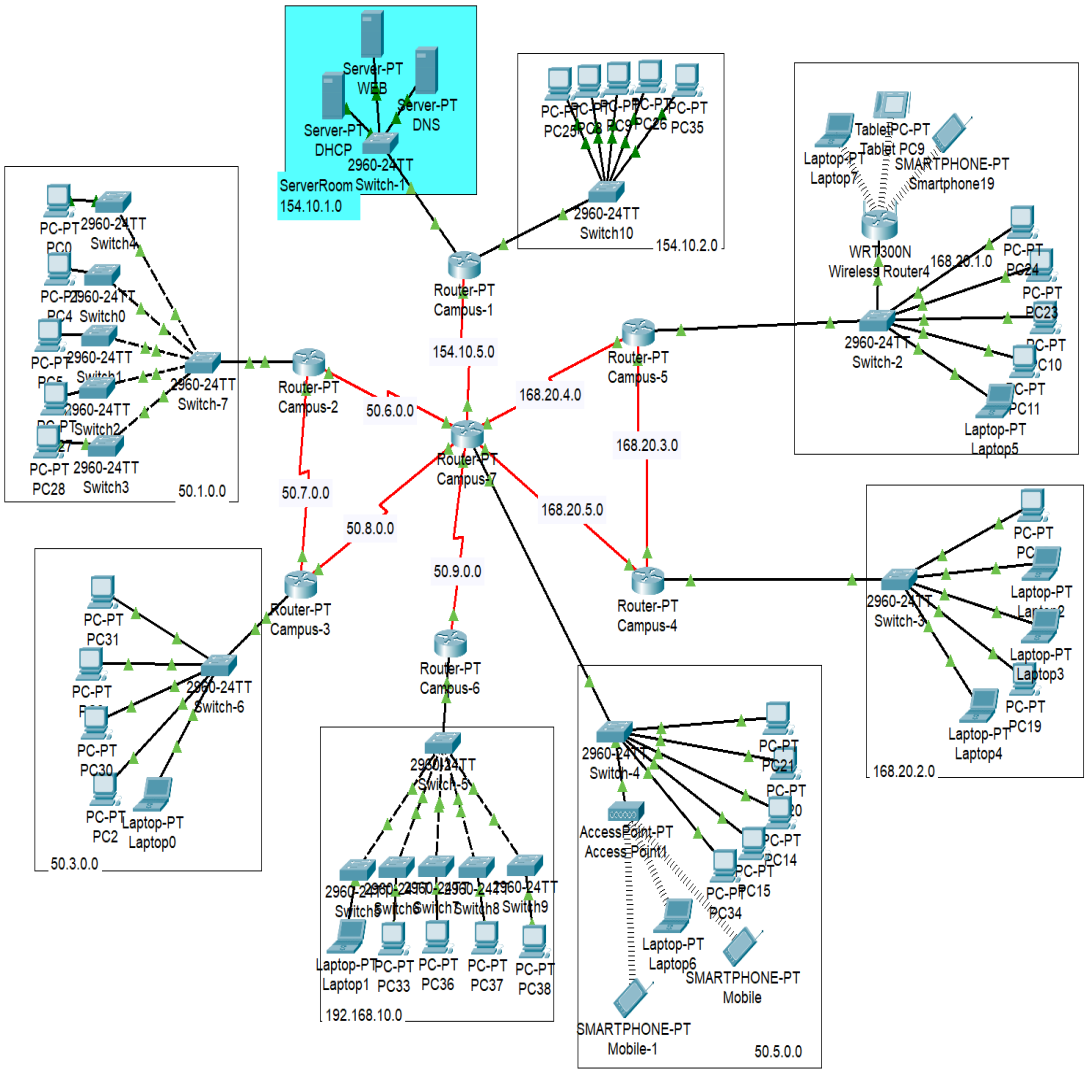
Software:

- Cisco Packet Tracer version 8.2.2

Network Summary:

- 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. HTML code, CSS is use to modify and design the web page.

Physical Diagram:



Design Specifications:

The design comprises seven wired routers, representing each campus, with distinct networks assigned to each. Each campus network follows the A, B, C all the classes of network configuration. Here, Campus-2, 3 and 7 network has class-“A” IP address. Campus-1, 4 and 5 network have class-“B” IP address. Campus-6 network have class-“C” IP address. Every campus is linked to a switch, connecting classrooms, labs, employee PCs, library, and other administrative and academic wings. Additionally, wireless hosts are integrated into the setup.

Campus 1 hosts a server room network, configured as a B class network. This network houses DHCP and Web servers, and a DNS server. A single DHCP server serves the entire network, assigning IPs to each campus. The Web server host the institute's website, encompassing sections such as admissions, advising, results, e-Tender, library management, and accounts. In campus 2 and campus 6 here is also uses of sub switch for more unique design.

The interconnection among routers operates on A and B class network.

Design Issues:

Actually, there is no Design issues all the connection, servers, End devices are working perfectly. There is also a problem of Cisco Packet tracer that we have to send an ICMP packet for 2/3 time or its failed but after that its works perfectly.

Number of Hosts:

Total number of hosts is 41

Number of Networks:

Total number of networks is 16

Limitations:

In this project, no limitations were found. All the tasks are completed successfully including feature tasks to get bonus. Networks have subnets. Here all the hosts can communicated with each other and can access to the web page using URL. A single DHCP server can give IP automatically. All classes of IP address are used and also have wireless links.

Cisco Packet Bugs: Sometimes, if we restart packet tracer and open the project again every pc needs to set DHCP for IP again and requires turning off then again on DHCP Service to get IP otherwise it shows error-requesting IP.

Lines of Code:

Router Configuration Code:

Campus 1/Router 1 :

```
interface fa0/0
ip address 154.10.1.254 255.255.0.0
no shut
do wr
exit

interface se7/0
ip address 154.10.5.1 255.255.0.0
no shut
do wr
exit
```

Campus 2/Router 2 :

```
interface fa0/0
ip address 50.1.0.254 255.0.0.0
no shut
do wr
exit


interface se2/0
ip address 50.6.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit


interface se6/0
ip address 50.7.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit
```

Campus 3/Router 3:

```
interface fa0/0
ip address 50.3.0.254 255.0.0.0
no shut
```

```
do wr
exit

interface se2/0
ip address 50.8.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit

interface se3/0
ip address 50.7.0.1 255.0.0.0
no shut
do wr
exit
```

Campus 4/Router 4:

```
interface fa1/0
ip address 168.20.2.254 255.255.0.0
no shut
do wr
exit

interface se2/0
ip address 168.20.5.1 255.255.0.0
clock rate 64000
no shut
do wr
exit

interface se3/0
ip address 168.20.3.2 255.255.0.0
no shut
do wr
exit
```

Campus 5/Router 5 :

```
interface fa0/0
ip address 168.20.1.254 255.255.0.0
no shut
do wr
exit

interface se2/0
ip address 168.20.4.1 255.255.0.0
clock rate 64000
no shut
do wr
```

exit

interface se6/0
ip address 168.20.3.1 255.255.0.0
clock rate 64000
no shut
do wr
exit

Campus 6/Router6:

interface fa0/0
ip address 192.168.10.254 255.255.255.0
no shut
do wr
exit

interface se2/0
ip address 50.9.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit

Campus 7/Router7:

interface fa0/0
ip address 50.5.0.254 255.0.0.0
no shut
do wr
exit

interface se2/0
ip address 154.10.5.2 255.255.0.0
clock rate 64000
no shut
do wr
exit

interface se2/0
ip address 154.10.5.2 255.255.0.0
clock rate 64000
no shut
do wr
exit

interface se3/0
ip address 50.6.0.2 255.0.0.0
no shut

```
do wr
exit

interface se6/0
ip address 50.8.0.2 255.0.0.0
no shut
do wr
exit

interface se7/0
ip address 50.9.0.2 255.0.0.0
no shut
do wr
exit

interface se8/0
ip address 168.20.5.2 255.255.0.0
no shut
do wr
exit

interface se9/0
ip address 168.20.4.2 255.255.0.0
no shut
do wr
exit
```

Codes For Single DHCP setup for All Routers:

```
Interface fa0/0
ip helper-address 154.10.1.100
do wr
exit
```

Routing Table Code:

Campus 1/Router 1:

```
router OSPF 1
network 154.10.1.0 0.0.255.255 area 1
network 154.10.0.0 0.0.255.255 area 1
network 154.10.5.0 0.0.255.255 area 1
exit
```

Campus 2/Router 2:

```
router OSPF 2
network 50.1.0.0 0.255.255.255 area 1
```

network 50.6.0.0 0.255.255.255 area 1
network 50.7.0.0 0.255.255.255 area 1
exit

Campus 3/Router 3:

router OSPF 3
network 50.3.0.0 0.255.255.255 area 1
network 50.8.0.0 0.255.255.255 area 1
network 50.7.0.0 0.255.255.255 area 1
exit

Campus 4/Router 4:

router OSPF 4
network 168.20.2.0 0.0.255.255 area 1
network 168.20.5.0 0.0.255.255 area 1
network 168.20.3.0 0.0.255.255 area 1
exit

Campus 5/Router 5:

router OSPF 5
network 168.20.1.0 0.0.255.255 area 1
network 168.20.4.0 0.0.255.255 area 1
network 168.20.3.0 0.0.255.255 area 1
exit

Campus 6/Router 6:

router OSPF 6
network 192.168.10.0 0.0.0.255 area 1
network 50.9.0.0 0.255.255.255 area 1
exit

Campus 7/Router 7:

router OSPF 7
network 50.5.0.0 0.255.255.255 area 1
network 154.10.5.0 0.0.255.255 area 1
network 50.6.0.0 0.255.255.255 area 1
network 50.8.0.0 0.255.255.255 area 1
network 50.9.0.0 0.255.255.255 area 1
network 168.20.5.0 0.0.255.255 area 1
network 168.20.4.0 0.0.255.255 area 1
exit

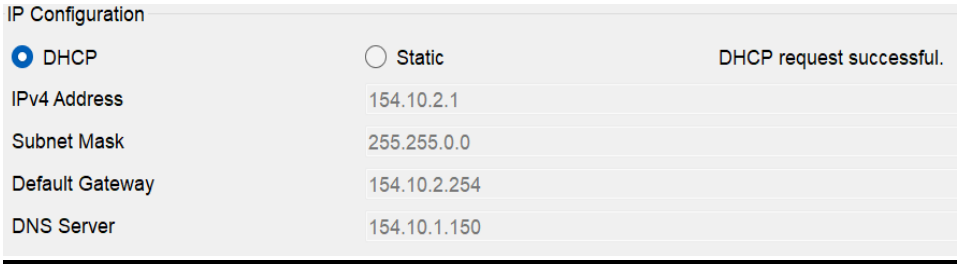
Server Configuration:

DHCP Server: [IP: 154.10.1.100]

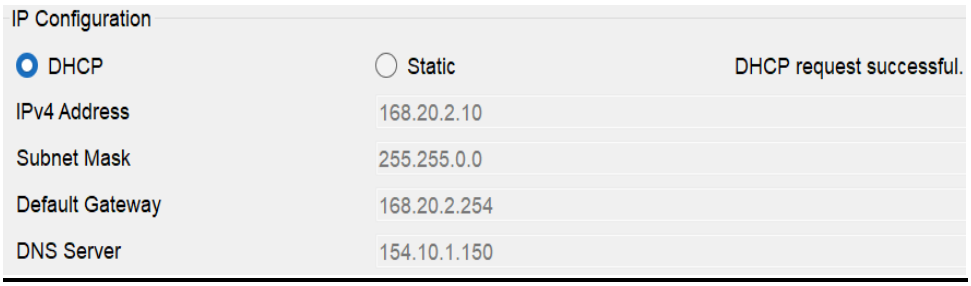
DHCP can serve IP across network automatically. We use 1 DHCP server for 7 campuses. When a device requested DHCP server can serve unique IP address according to their Campus network. That's why there is total 7 pool names in DHCP server configuration.

Example of giving IP address dynamically to hosts of different networks:

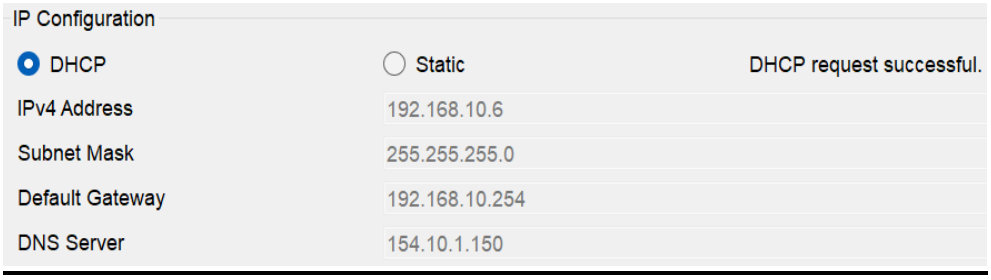
Campus-1:



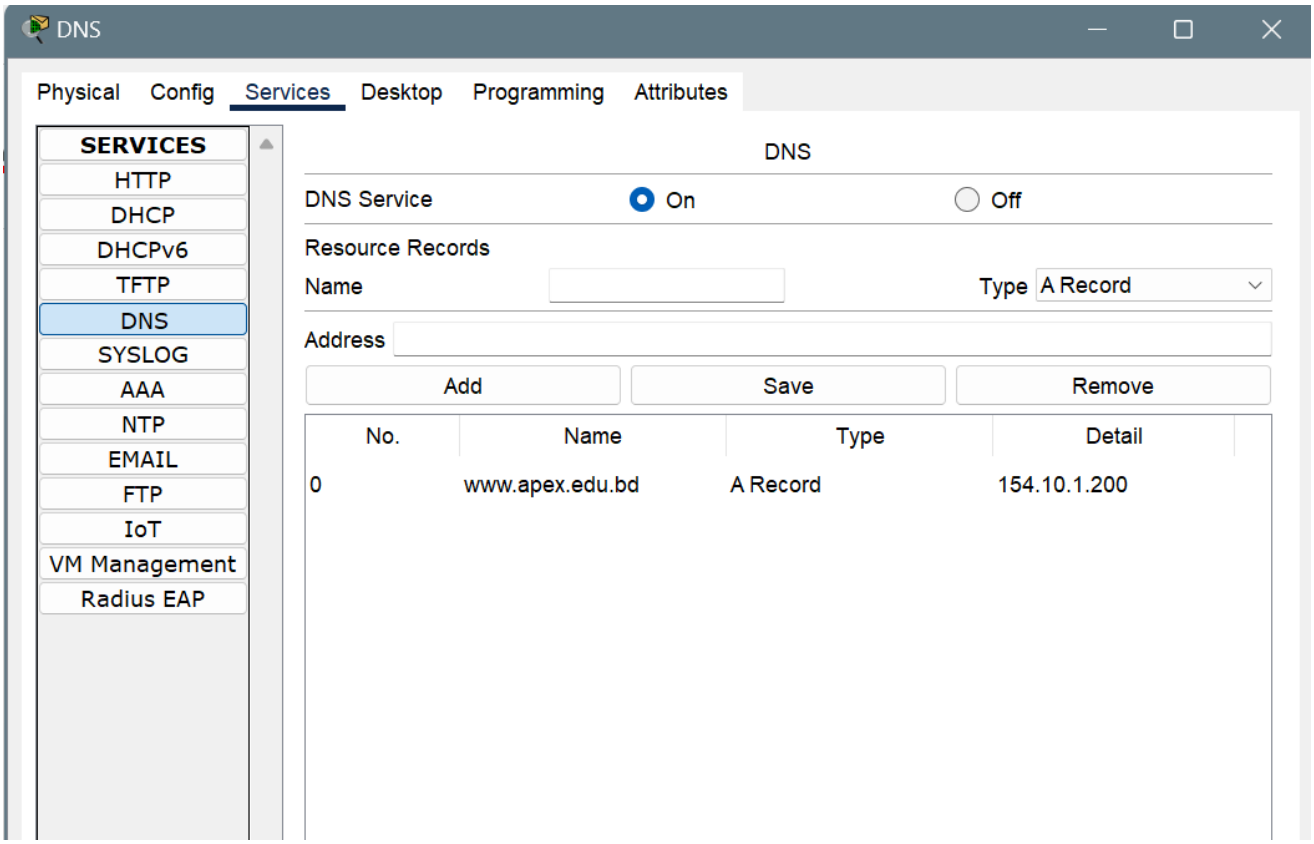
Campus-5:



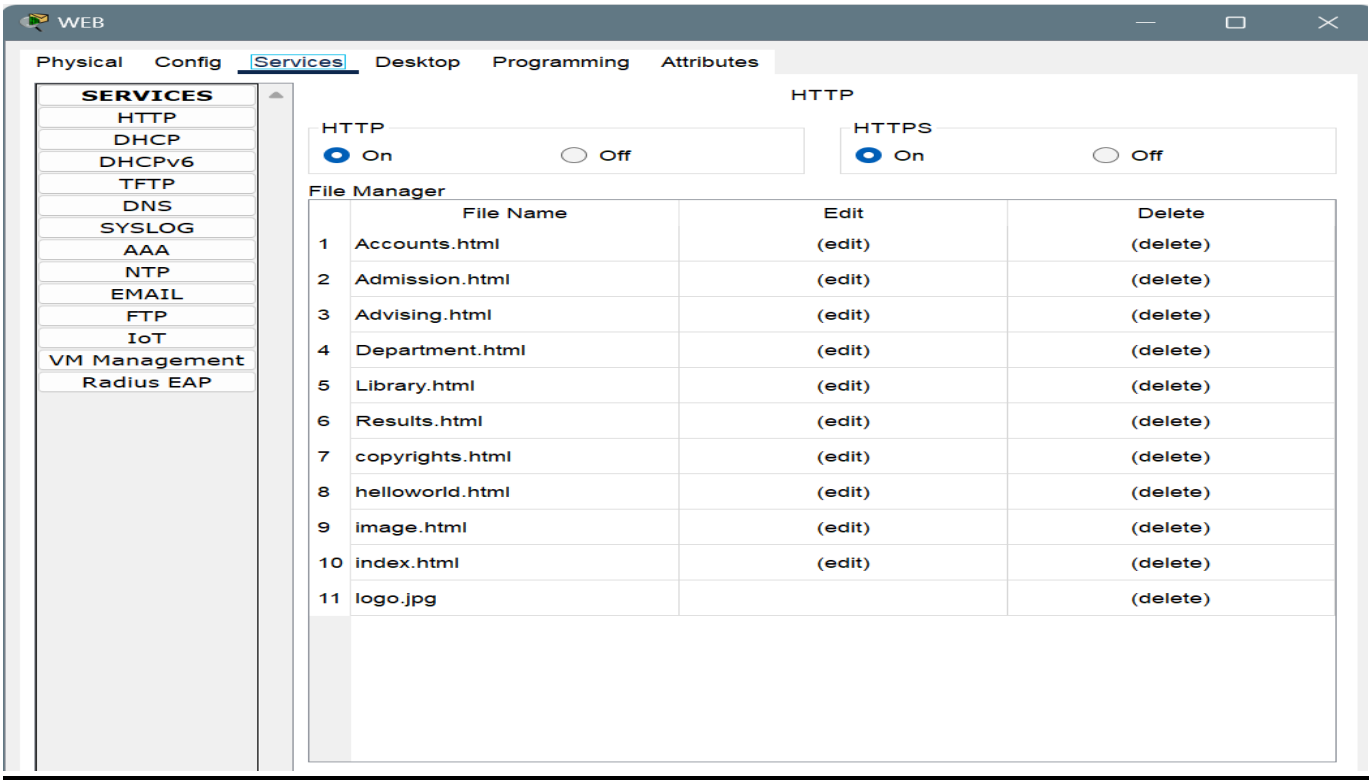
Campus-6:



DNS Server: [IP: 154.10.1.150]



WEB Server:

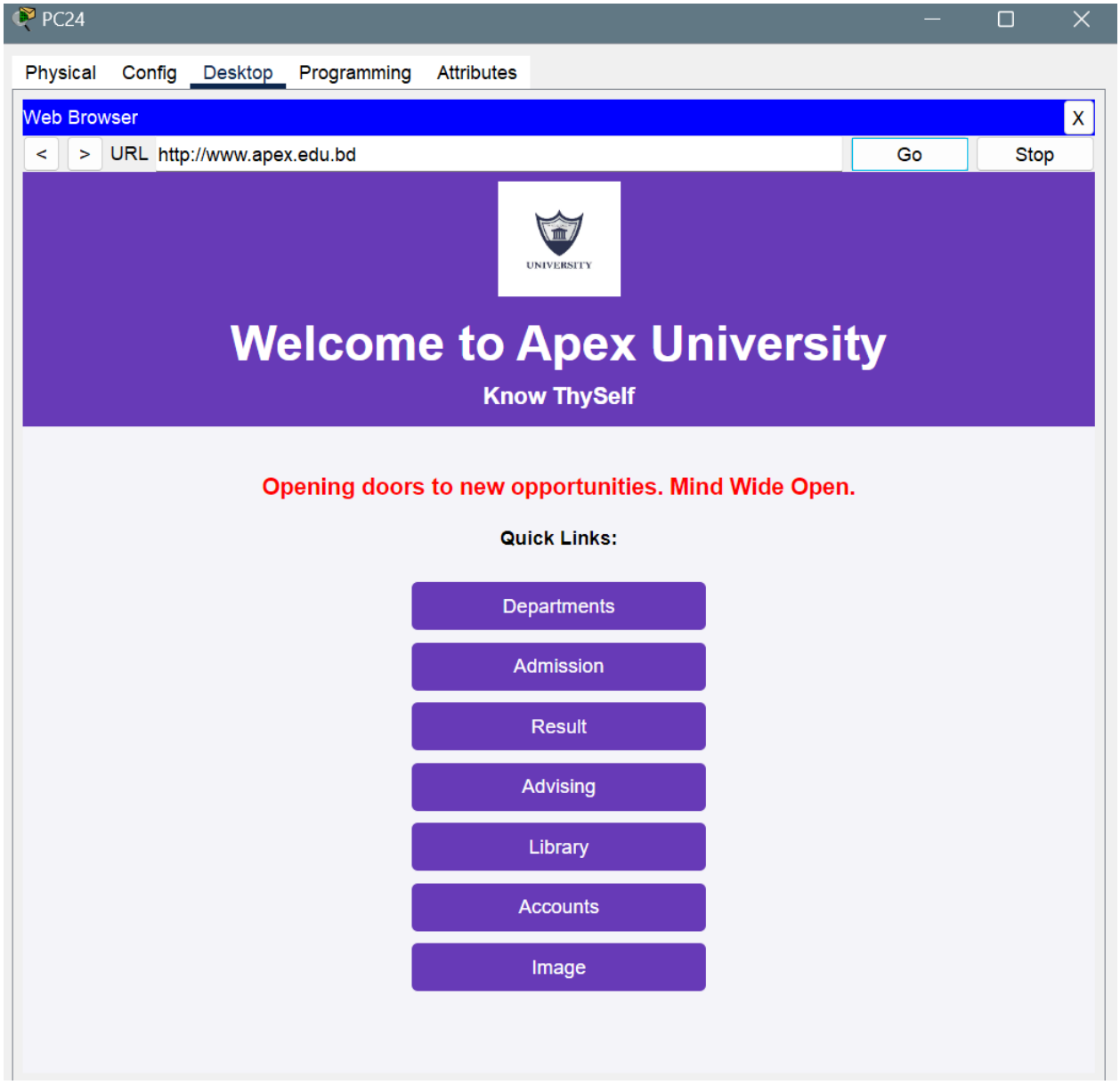


University's Homepage Access :

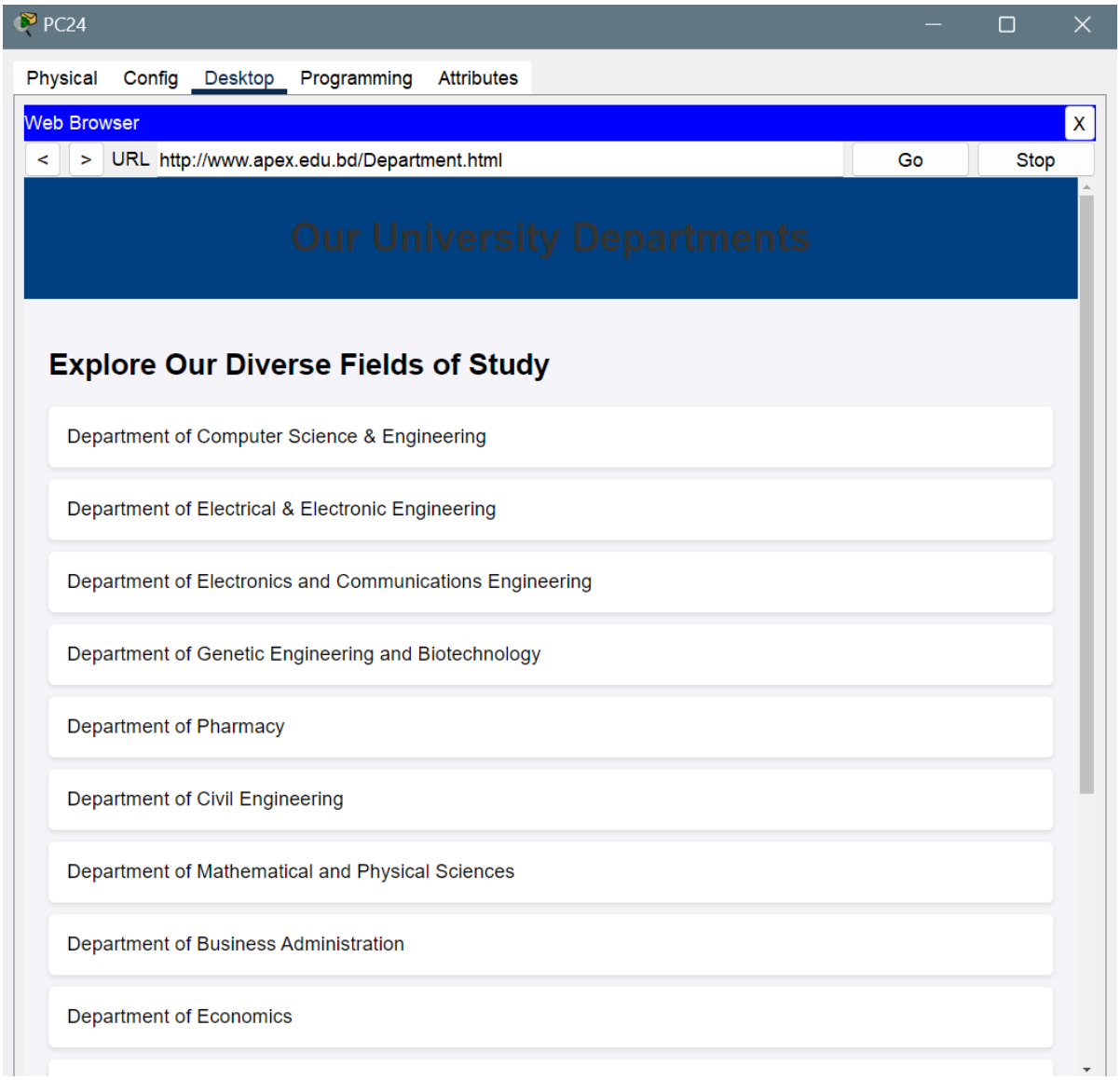
By writing http://www.apex.edu.bd OR 154.10.1.200 in Web browser.

WEB page:

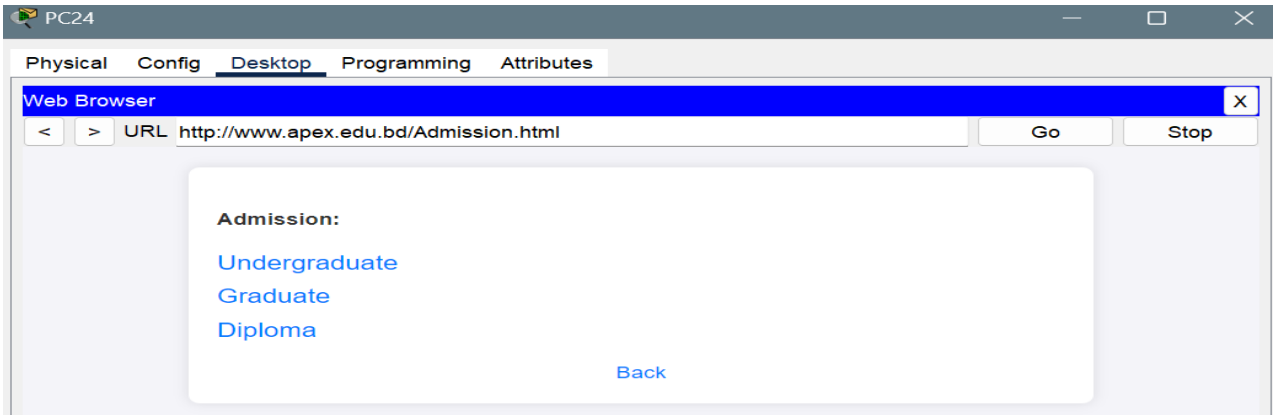
❖ Homepage:



❖ Departments:


PC24
Physical
Config
Desktop
Programming
Attributes
Web Browser
X
<
>
URL
http://www.apex.edu.bd/Department.html
Go
Stop
Our University Departments
Explore Our Diverse Fields of Study
Department of Computer Science & Engineering
Department of Electrical & Electronic Engineering
Department of Electronics and Communications Engineering
Department of Genetic Engineering and Biotechnology
Department of Pharmacy
Department of Civil Engineering
Department of Mathematical and Physical Sciences
Department of Business Administration
Department of Economics

❖ Admissions:


PC24
Physical
Config
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http://www.apex.edu.bd/Admission.html
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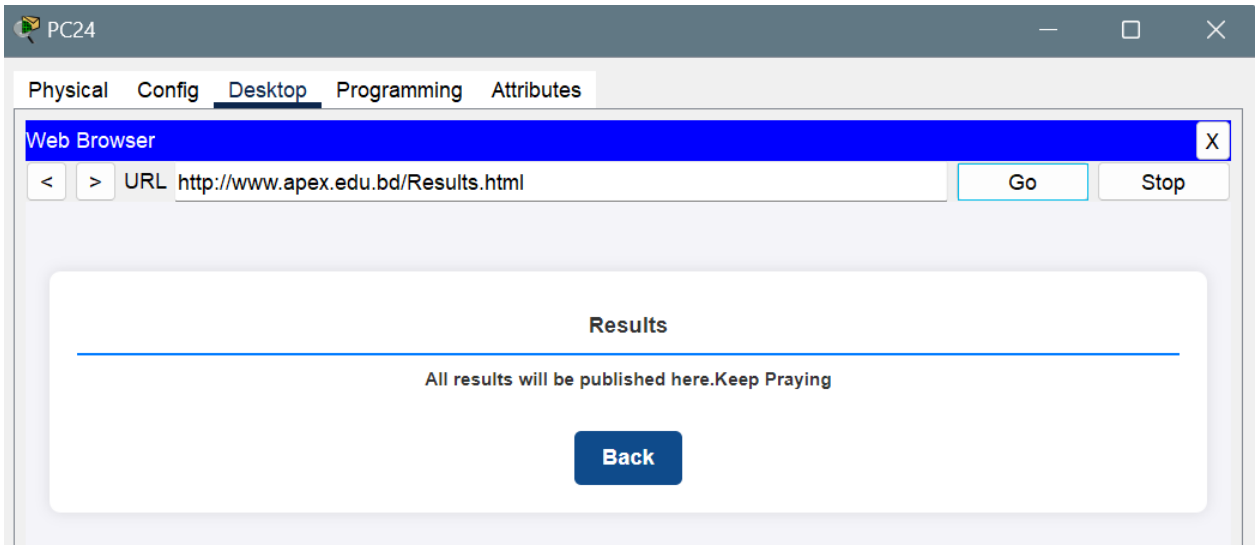
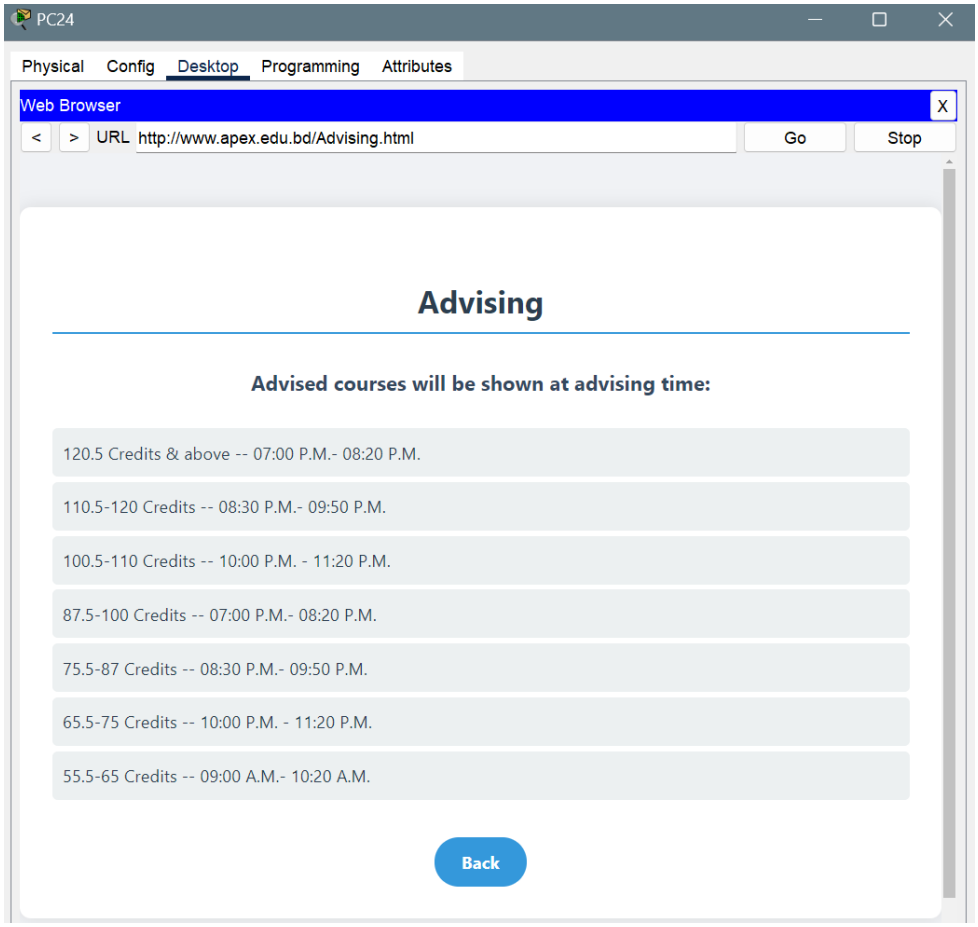
Stop
Admission:
Undergraduate
Graduate
Diploma
Back

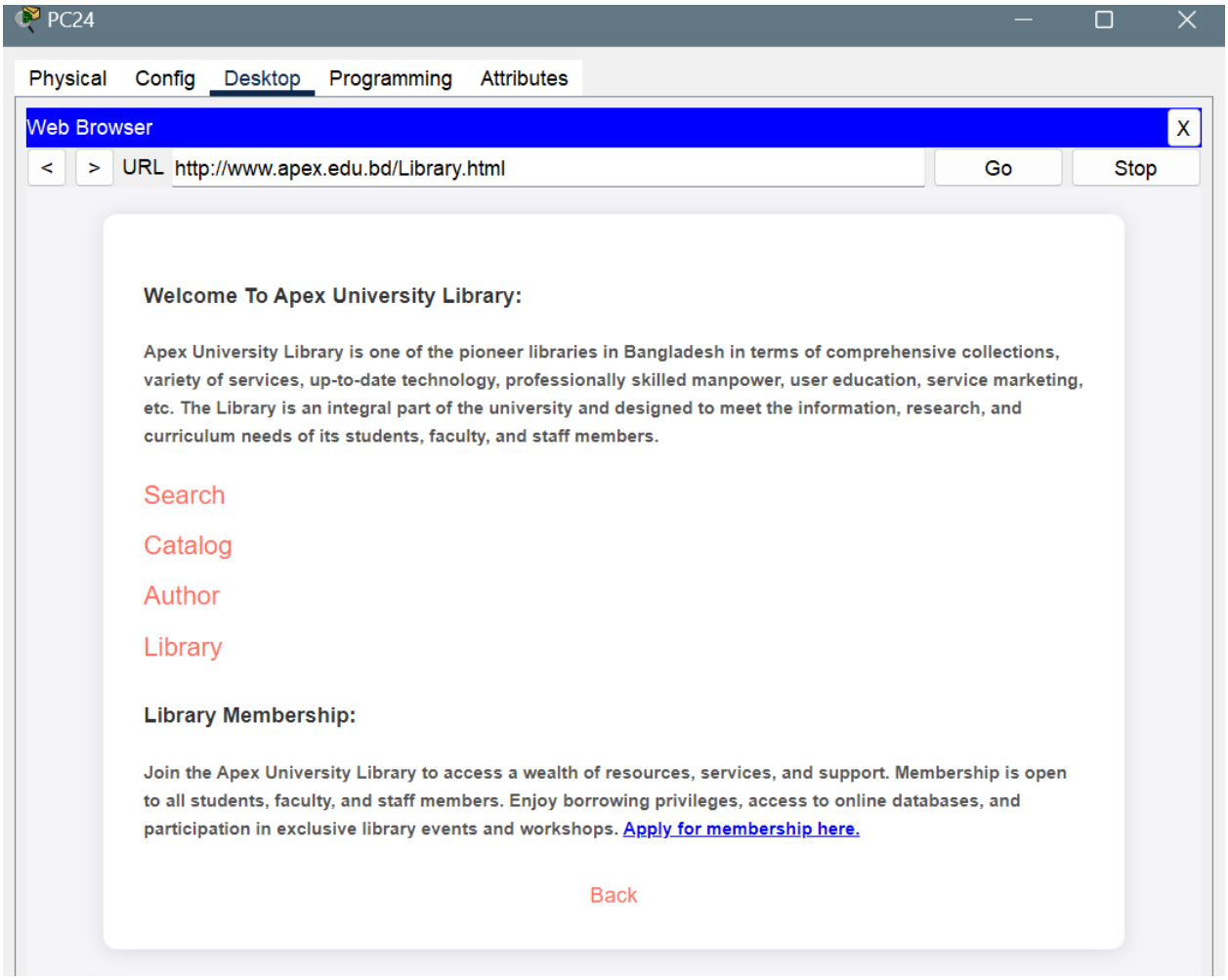
❖ Result:



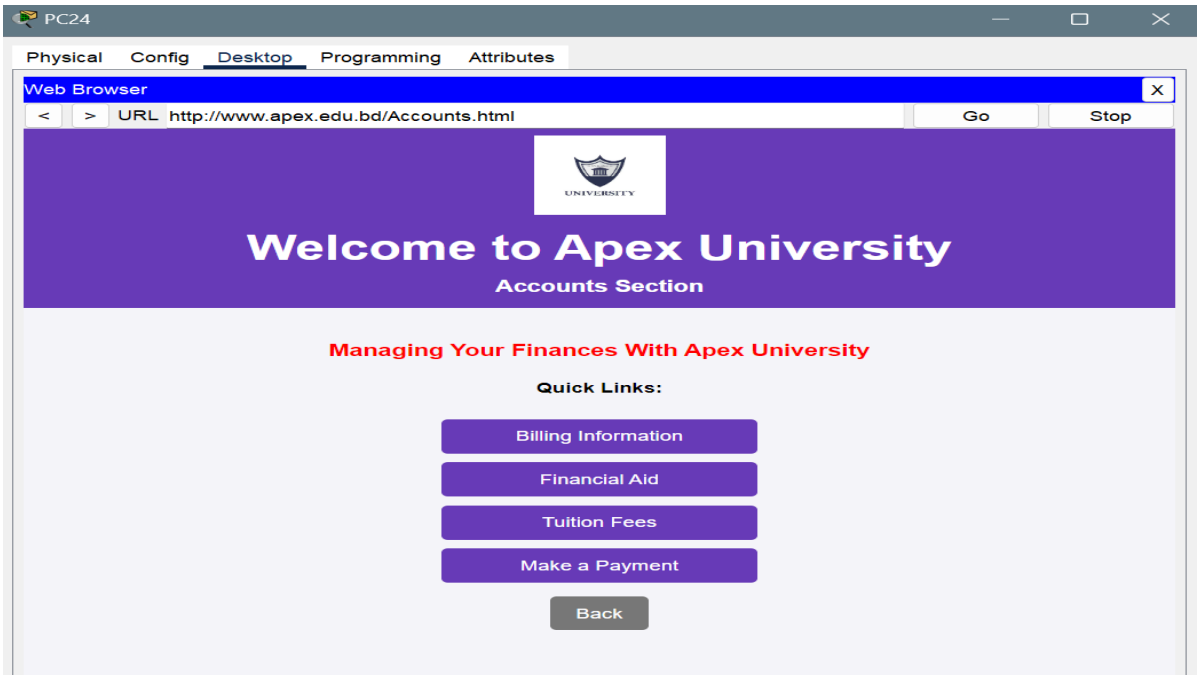
❖ Advising:



❖ Library:



❖ Accounts:



Ping from a pc to another pc:

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(se	Periodic	Num
	Successful	PC16	PC21	ICMP		0.000	N	3
	Successful	PC0	PC35	ICMP		0.000	N	4
	Successful	PC0	PC26	ICMP		0.000	N	5
	Successful	PC4	PC35	ICMP		0.000	N	6
	Successful	PC4	PC8	ICMP		0.000	N	7
	Successful	PC28	Laptop5	ICMP		0.000	N	8

Conclusion:

Despite the fact that I encountered some difficulties, I implemented my plan according to the project description in the end and try my level best to complete this project perfectly. This mini project is a reflection of our gained knowledge from computer networking course. In this project, a complete model of a complex network is designed. End devices, Routers, Switches, and wireless routers which we used to create this network. Communication between all devices all over the network was established perfectly. A web server was configured to display the Apex University's Website web page. By using HTML code with CSS, the website is modified. A DHCP server was incorporated to serve IP to all seven campuses when requested and a DNS server was incorporated for the website. We learned many new terms and got a chance to use our previous knowledge. So this project is so helpful to us.