



EAST WEST UNIVERSITY

East West University

Mini Project

CSE 405

Computer Networking

Submitted To:

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Contents

Title:	2
Introduction:	2
Tools:	2
Network Summary:	2
Physical Diagram:	3
Design Issues:	4
Number Of Hosts:	4
Number of Networks:	4
Limitations:	4
Line of Codes:	4
Conclusion:	17

Title:

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

Introduction:

This report provides a comprehensive design of a network infrastructure of Apex University along with the implementation, in order to support several administrative and academic functions across seven campuses. This network consists of both wired and wireless devices and has a centralized DHCP and DNS server for IP management. We have used OSPF for dynamic routing algorithm.

Tools:

Software Used:

- Cisco Packet Tracer Version 8.2.2
- Draw.io

Components Used:

1. PT-Router (Generic)
2. Wireless Router
3. Straight Through Cable
4. Serial DCE Cable
5. PT-Switches (2960)
6. PC as end Devices
7. DNS Server (Generic)
8. WEB and DHCP Server (Generic)
9. Laptop and Smartphone

Network Summary:

The full network for the university has been covered using 7 routers representing 7 campuses. All the IP addresses are set automatically using one DHCP server and a DNS server is used to locate the Web server and HTML code is used to customize the web page.

Physical Diagram:

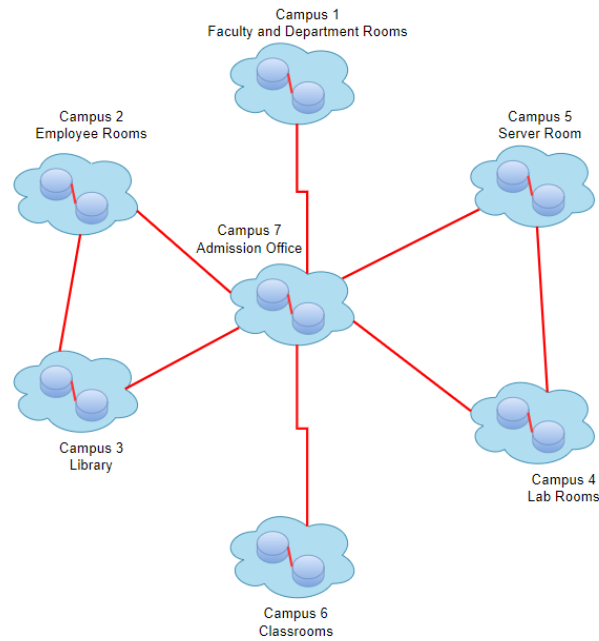


Fig1: Network Design created in draw.io

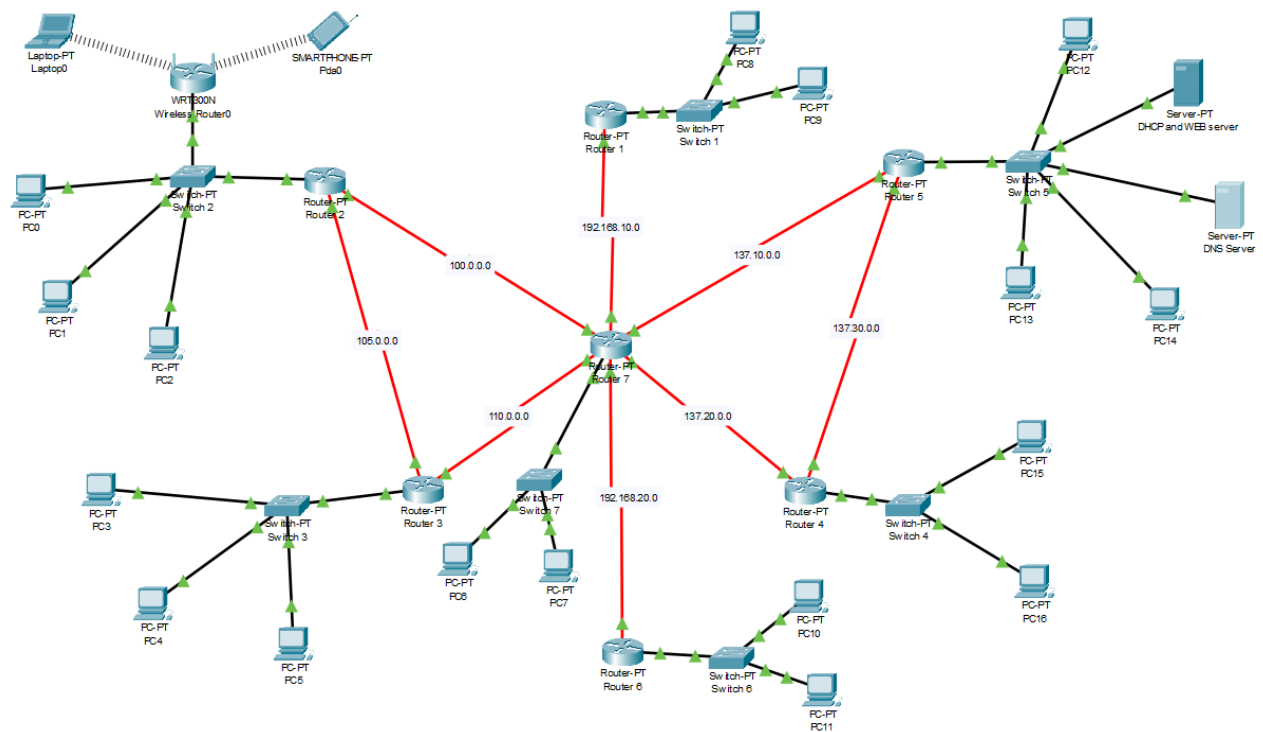


Fig2: Network Model created in Cisco Packet Tracer

Design Issues:

There are almost negligible issues since all the connections, servers and end devices are working perfectly. The only faceable problem is that when we try to ping PCs in cisco packet tracer, initially it fails about ½ times and then works properly.

Number Of Hosts:

Total number of hosts is: 40

Number of Networks:

Total number of networks is: 15

Limitations:

- Complex network.
- High maintenance.
- More costly.
- More networks cannot be added easily.
- Manual configuration needed to add more network.

Line of Codes:

Router Configuration code:

Campus 1/Router 1

```
interface fa0/0
ip address 192.168.11.1 255.255.255.0
no shut
do wr
exit
interface se2/0
ip address 192.168.10.1 255.255.255.0
no shut
```

do wr

exit

Campus 2/Router 2

interface fa0/0

ip address 101.0.0.1 255.255.255.0

no shut

do wr

exit

interface se3/0

ip address 100.0.0.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

interface se2/0

ip address 105.0.0.1 255.255.255.0

clock rate 64000

no shut

do wr

exit

Campus 3/Router 3

interface fa0/0

ip address 111.0.0.1 255.255.255.0

no shut

do wr

exit

interface se2/0

ip address 105.0.0.2 255.255.255.0

no shut

do wr

exit

interface se3/0

```
ip address 110.0.0.1 255.255.255.0
clock rate 64000
no shut
do wr
exit
```

Campus 4/Router 4

```
interface fa0/0
ip address 137.22.0.1 255.255.255.0
no shut
do wr
exit
interface se2/0
ip address 137.20.0.1 255.255.255.0
no shut
do wr
exit
interface se3/0
ip address 137.30.0.2 255.255.255.0
clock rate 64000
no shut
do wr
exit
```

Campus 5/Router 5

```
interface fa0/0
ip address 137.11.0.1 255.255.255.0
no shut
do wr
exit
interface se2/0
ip address 137.10.0.1 255.255.255.0
no shut
do wr
```

```
exit
interface se3/0
ip address 137.30.0.1 255.255.255.0
no shut
do wr
exit
```

Campus 6/Router 6

```
interface fa0/0
ip address 192.168.22.1 255.255.255.0
no shut
do wr
exit
interface se2/0
ip address 192.168.20.1 255.255.255.0
no shut
do wr
exit
```

Campus 7/Router 7

```
interface fa0/0
ip address 192.168.33.1 255.255.255.0
no shut
do wr
exit
interface se2/0
ip address 100.0.0.2 255.255.255.0
no shut
do wr
exit
interface se3/0
ip address 110.0.0.2 255.255.255.0
no shut
do wr
```



```
exit
interface se6/0
ip address 192.168.20.2 255.255.255.0
clock rate 64000
no shut
do wr
exit
interface se7/0
ip address 137.20.0.2 255.255.255.0
clock rate 64000
no shut
do wr
exit
interface se8/0
ip address 137.10.0.2 255.255.255.0
clock rate 64000
no shut
do wr
exit
interface se9/0
ip address 192.168.10.2 255.255.255.0
clock rate 64000
no shut
do wr
exit
```

Routing Table code:

Campus 1/Router 1

```
router ospf 1
network 192.168.10.0 0.0.0.255 area 1
network 192.168.11.0 0.0.0.255 area 1
```

Campus 2/Router 2

```
router ospf 2
```

network 100.0.0.0 0.0.0.255 area 1

network 105.0.0.0 0.0.0.255 area 1

network 101.0.0.0 0.0.0.255 area 1

Campus 3/Router 3

router ospf 3

network 111.0.0.0 0.0.0.255 area 1

network 105.0.0.0 0.0.0.255 area 1

network 110.0.0.0 0.0.0.255 area 1

Campus 4/Router 4

router ospf 4

network 137.20.0.0 0.0.0.255 area 1

network 137.30.0.0 0.0.0.255 area 1

network 137.22.0.0 0.0.0.255 area 1

Campus 5/Router 5

router ospf 5

network 137.10.0.0 0.0.0.255 area 1

network 137.30.0.0 0.0.0.255 area 1

network 137.11.0.0 0.0.0.255 area 1

Campus 6/Router 6

router ospf 6

network 192.168.20.0 0.0.0.255 area 1

network 192.168.22.0 0.0.0.255 area 1

Campus 7/Router 7

router ospf 7

network 192.168.10.0 0.0.0.255 area 1

network 137.10.0.0 0.0.0.255 area 1

network 137.20.0.0 0.0.0.255 area 1

network 192.168.20.0 0.0.0.255 area 1

network 192.168.33.0 0.0.0.255 area 1

network 110.0.0.0 0.0.0.255 area 1

network 100.0.0.0 0.0.0.255 area 1

Campus1: It is for Faculty and Department Rooms.

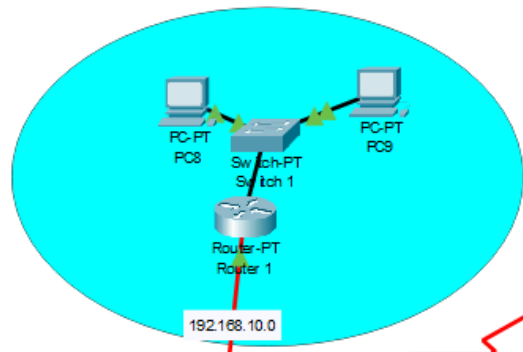


Fig3: Campus1

Campus2: It is for Employee's Rooms.

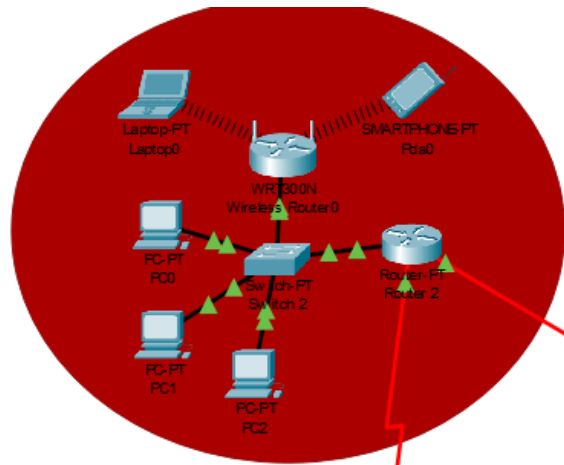


Fig4: Campus2

Campus3: It is for Library.

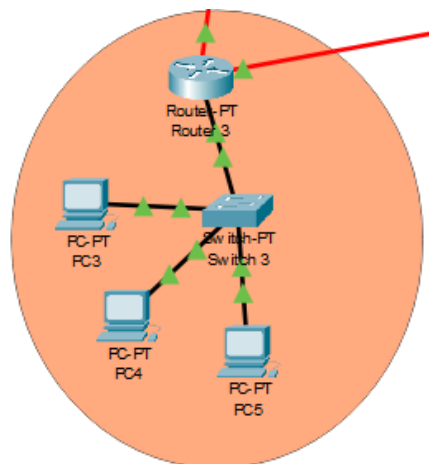


Fig5: Campus3

Campus4: It is for Lab Rooms.

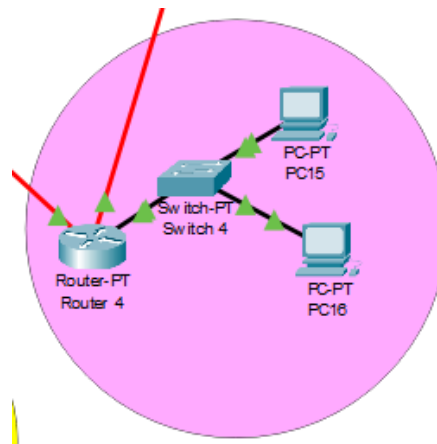


Fig6: Campus4

Campus5: It is for Server Room.

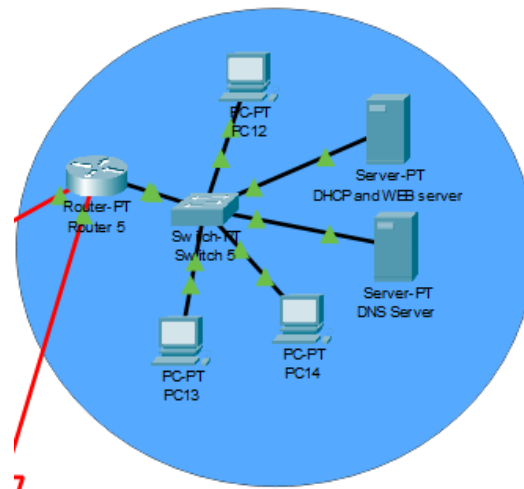
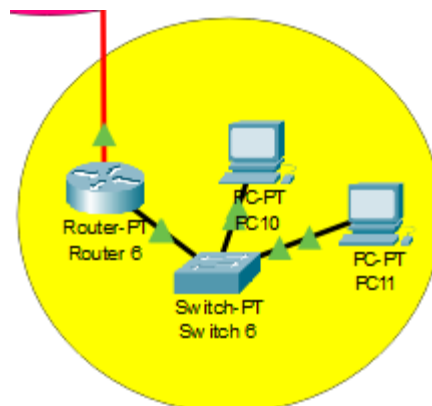


Fig7: Campus5

Campus6: It is for classrooms.



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Fig8: Campus6

Campus7: It is for Admission Office.

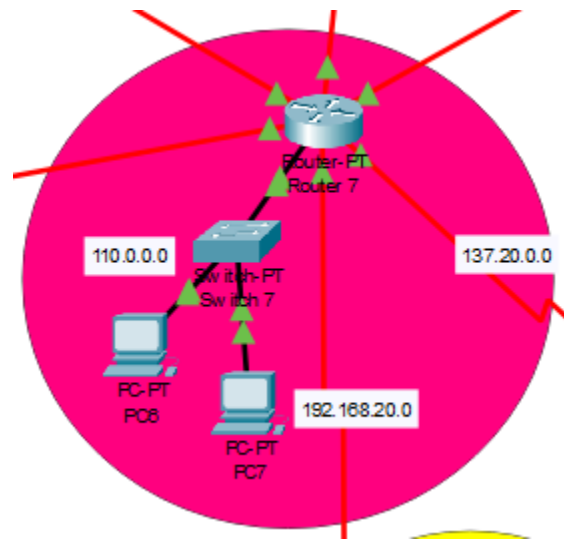


Fig9: Campus7

Server Configuration:

DHCP Server: [IP:137.11.0.3]

DHCP can serve IP across networks automatically and in this design we have used 1 DHCP server for all 7 campuses. When a device requests, DHCP can serve the unique address according to their Campus network. That's the reason we created 7 different pool names in DHCP server configuration.

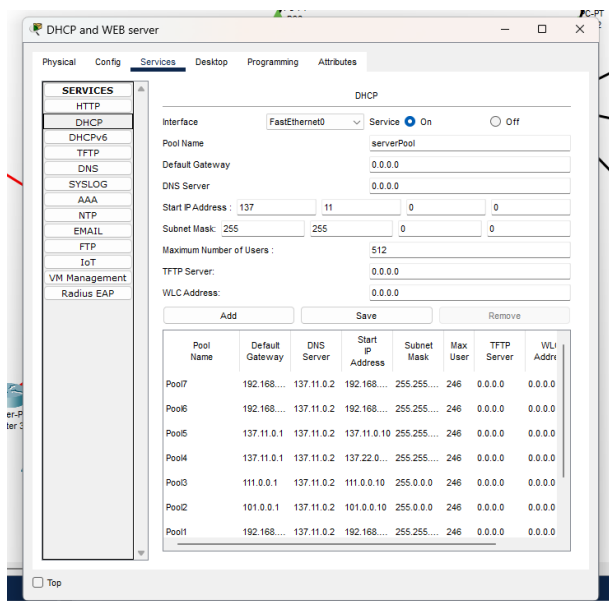


Fig10: Creating ServerPool

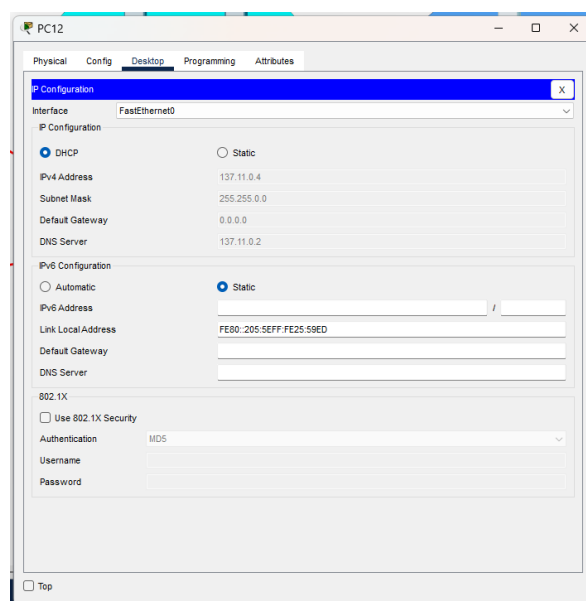


Fig11: DHCP server giving IP successfully

DNS Server: [IP:137.11.0.2]

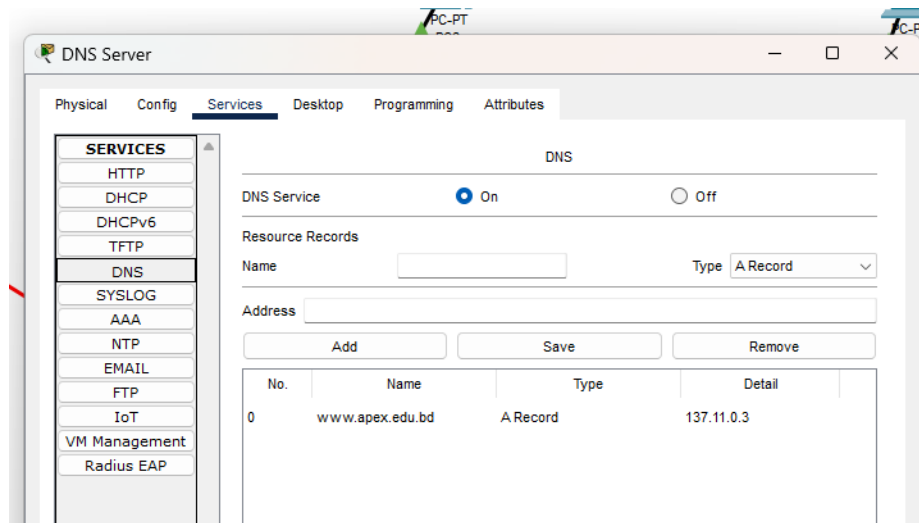


Fig12: Configure DNS

WEB Server:

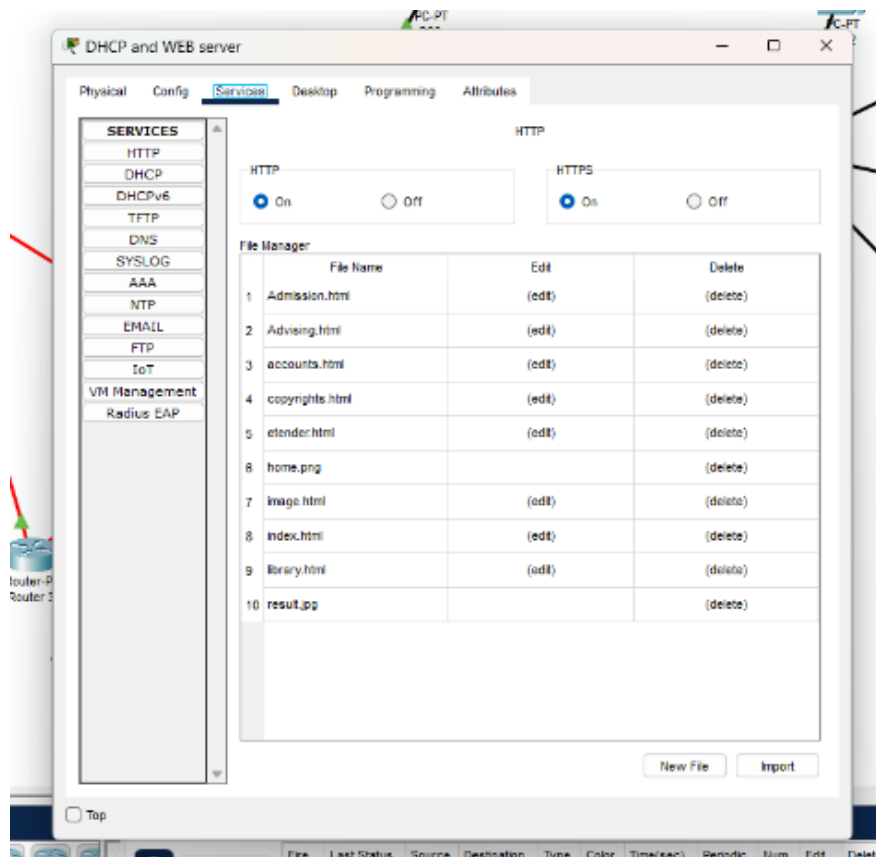


Fig13:Config Web Server

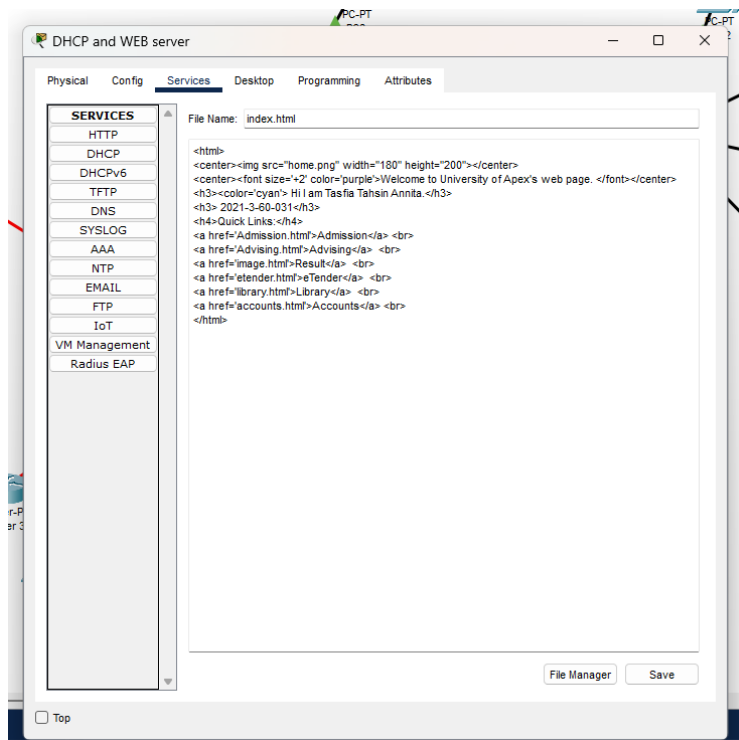


Fig14: HTML code for Home Page

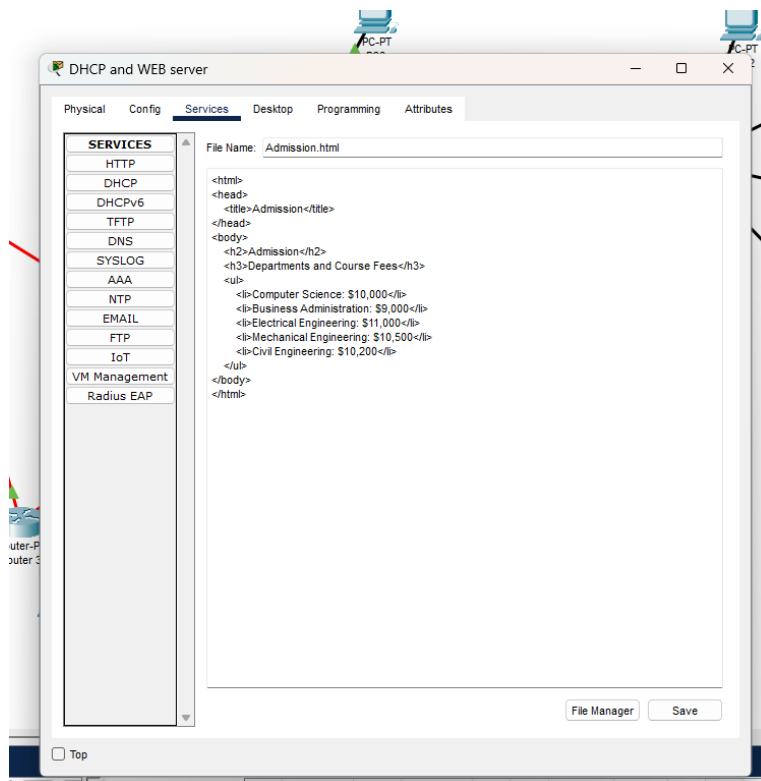
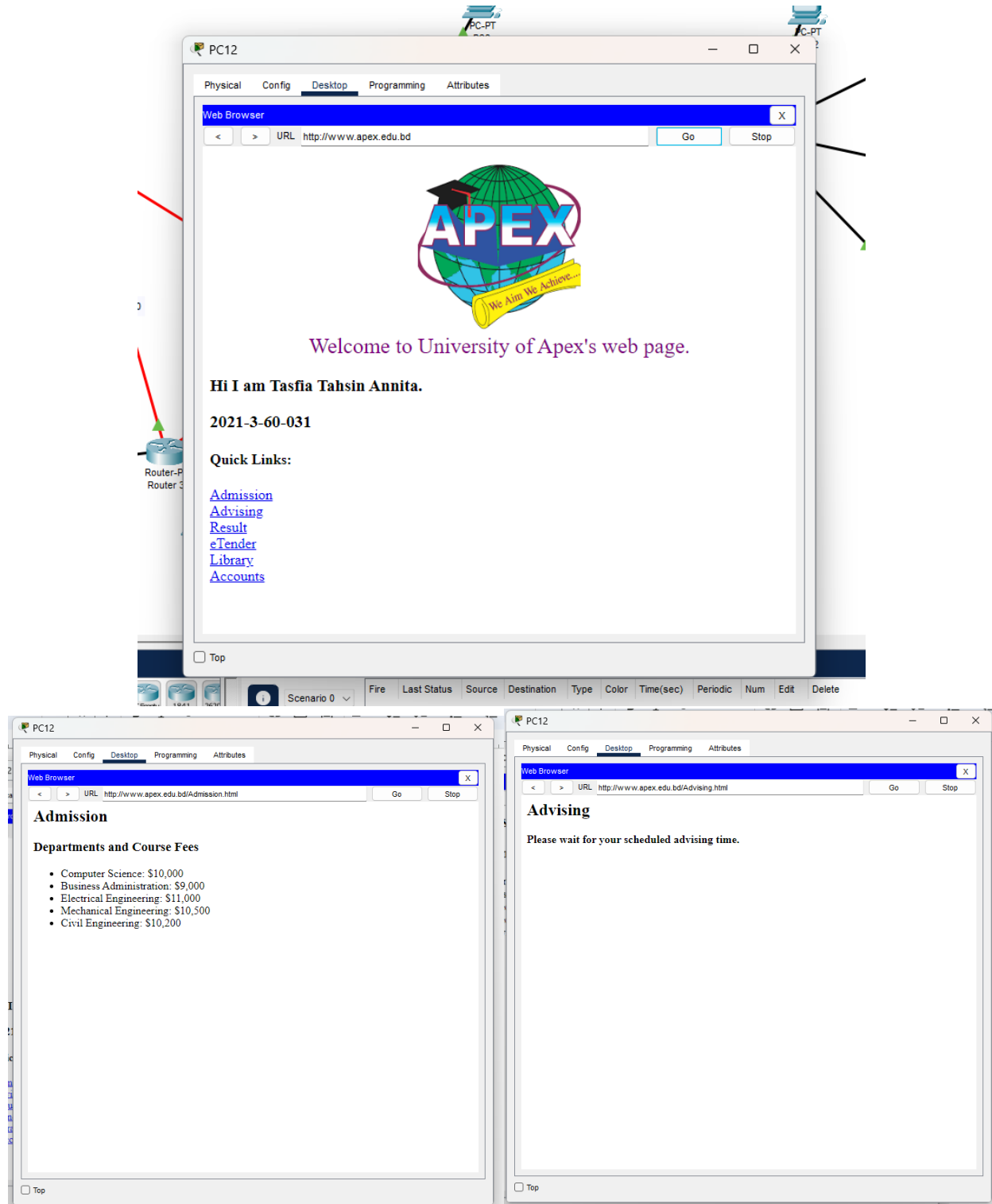


Fig15: HTML code for Admission Page

University's Homepage Access:

Can access the university website by writing <http://www.apex.edu.bd> OR 137.11.0.3 in web browser.



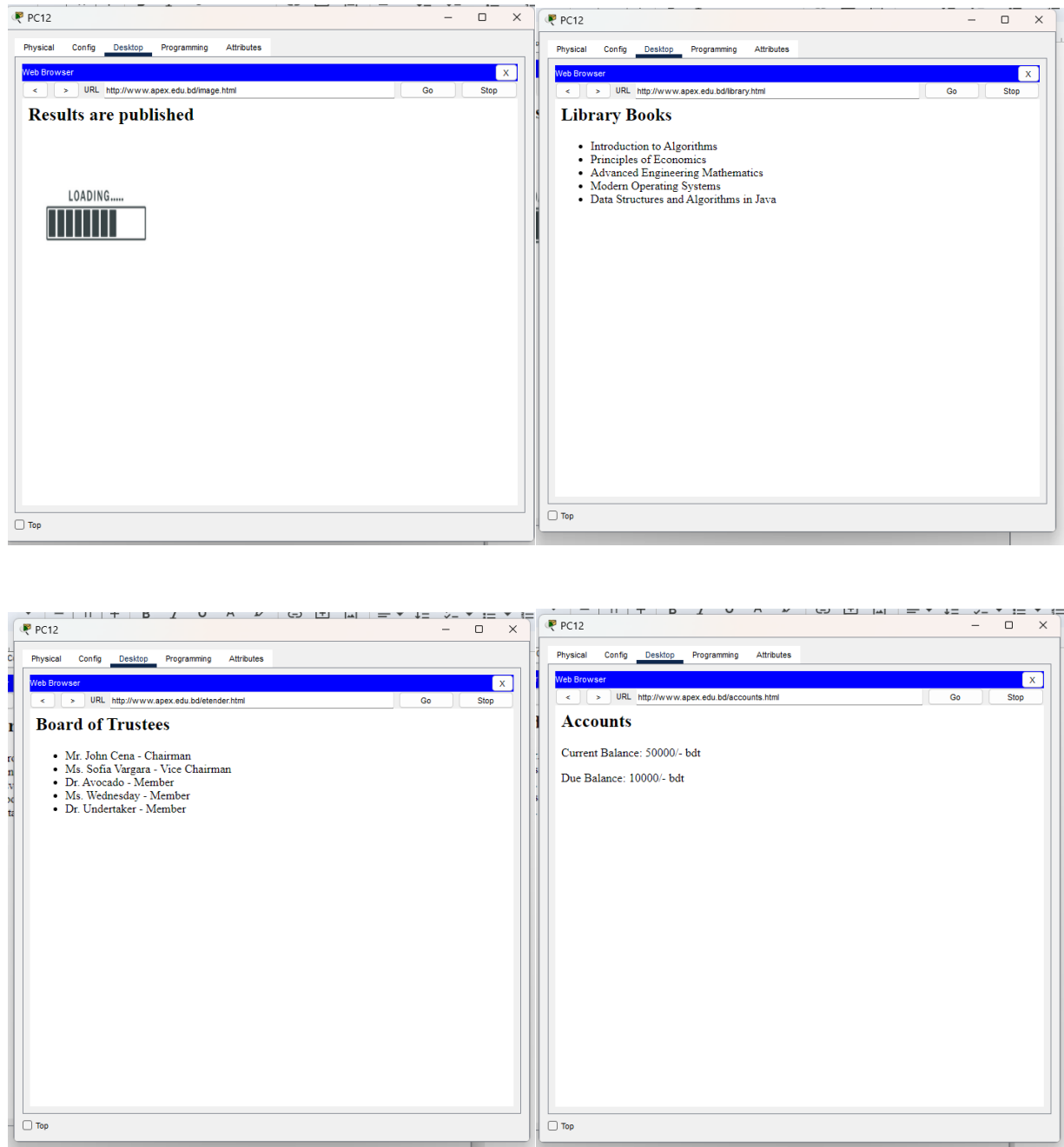


Fig16: University Home page and all the available pages

Pinging in the model:

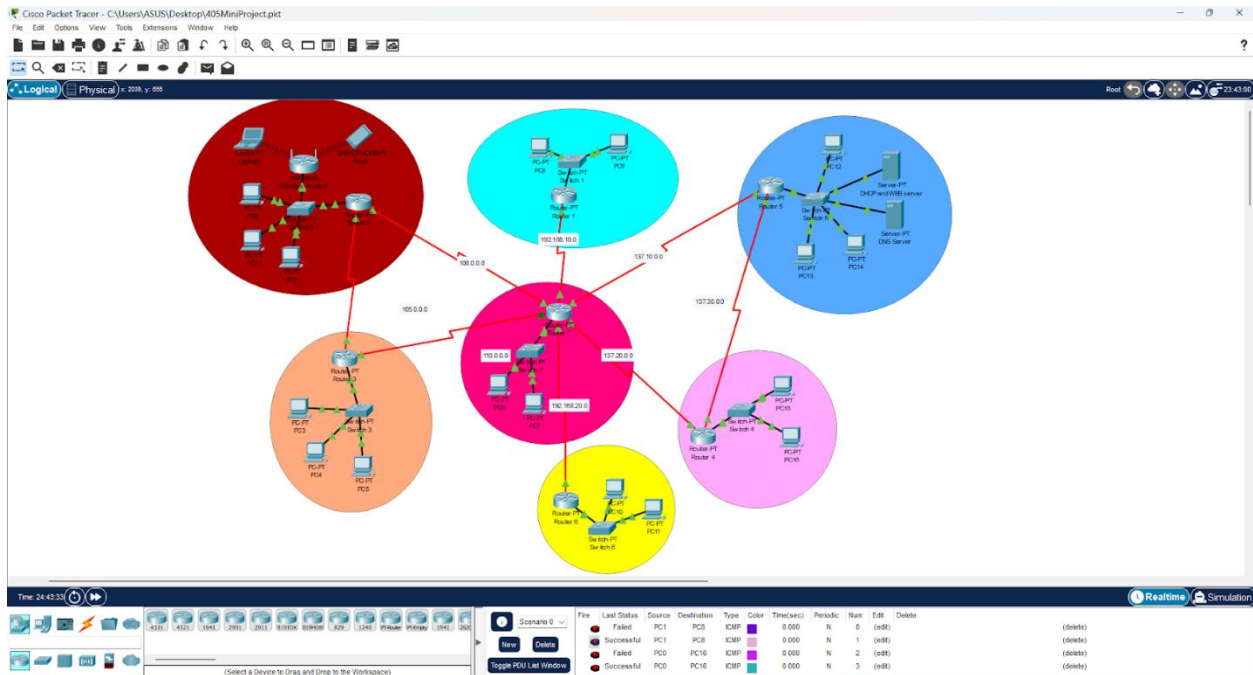


Fig17: Sending ICMP packet to different PC of different networks.

Conclusion:

Tackling all sorts of complications, I tried my best to perfectly implement my idea with the project description.

In this project, I created a proper complex network model with End Devices, routers, switches and wireless routers. Communication between all devices were established perfectly and a web server was configured to display the Apex University's web pages. Also, by using HTML code the website is customized. A DHCP server is incorporated to serve IP to all seven campuses when requested and a DNS server was incorporated for the website.