



EAST WEST UNIVERSITY

Department of Computer Science and Engineering

Spring-2024

Course Code: CSE405

Course Title: Computer Networks

Section: 02

Project Report on

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

**Submitted by:**

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

### **Description:**

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. This complex network infrastructure is subnetted and switching/routing mechanisms are in practice.

### **Objective:**

Our goal is to create a complete model of a complex network by discovering the interconnectivity of the systems and subnetworks, which will reflect the University's structure and facilities, features within the network will include the followings:

- ➔ Web page of the university will reflect 'Apex University' web page.
- ➔ A single DNS sever needs to be installed to locate webserver - meaning people will browse University's web site with the following address: <http://www.apex.edu.bd>
- ➔ Configure the whole network in such a way that IP for the hosts of different campuses will be automatically assigned by a single DHCP server.
- ➔ Among the hosts in a network make sure some wireless hosts are added in addition to wired hosts.
- ➔ University's full network has covered its seven campuses with seven routers
- ➔ Connectivity between all the hosts will be established.

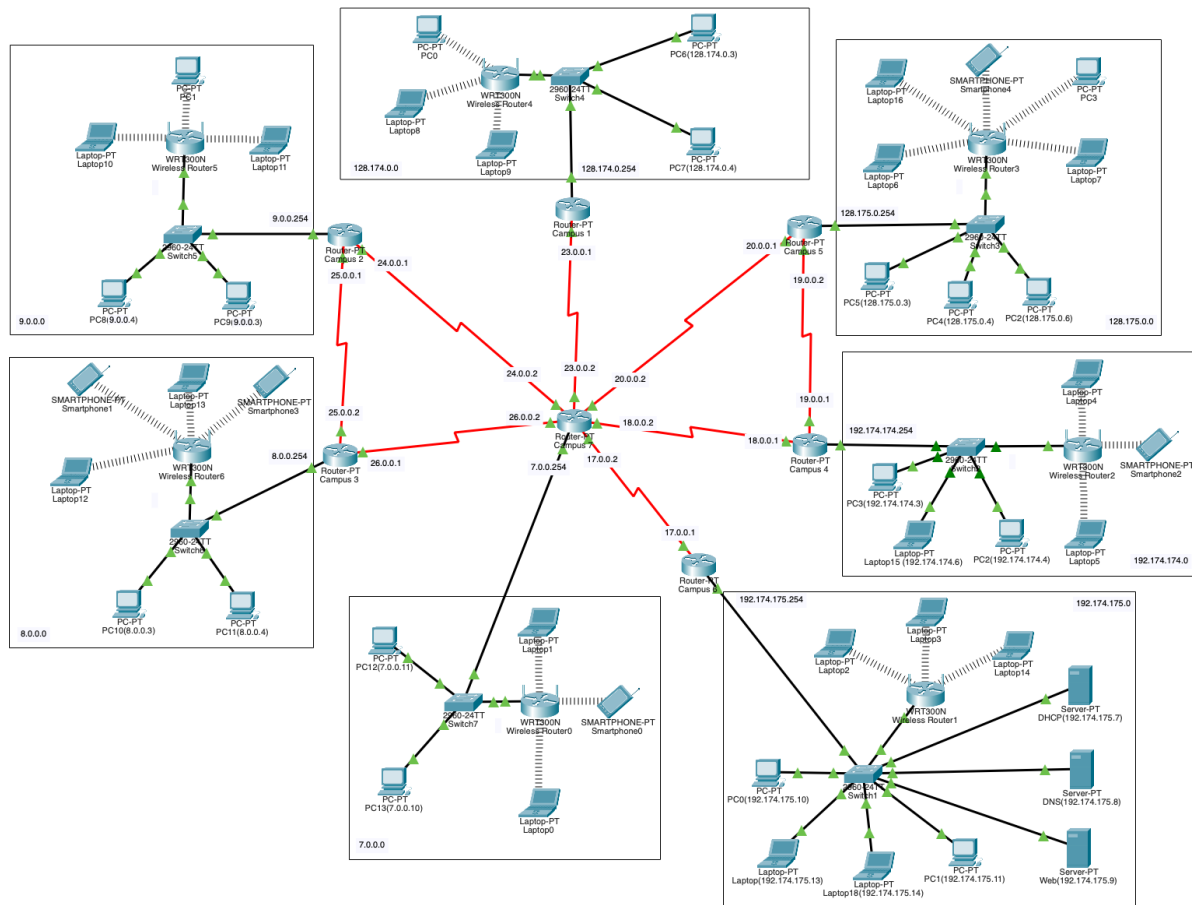
### **Features:**

- Network addresses will be from all 3 classes.
- Incorporation of different subnets.

### **Requirements:**

- I. 7 Router
- II. 7 Switch
- III. PC
- IV. Laptop
- V. Smart phone
- VI. DHCP Server (Dynamic Host Configuration Protocol)
- VII. DNS Server (Domain name System)
- VIII. WEB Server
- IX. Straight Through Cable
- X. Serial DCE Cable

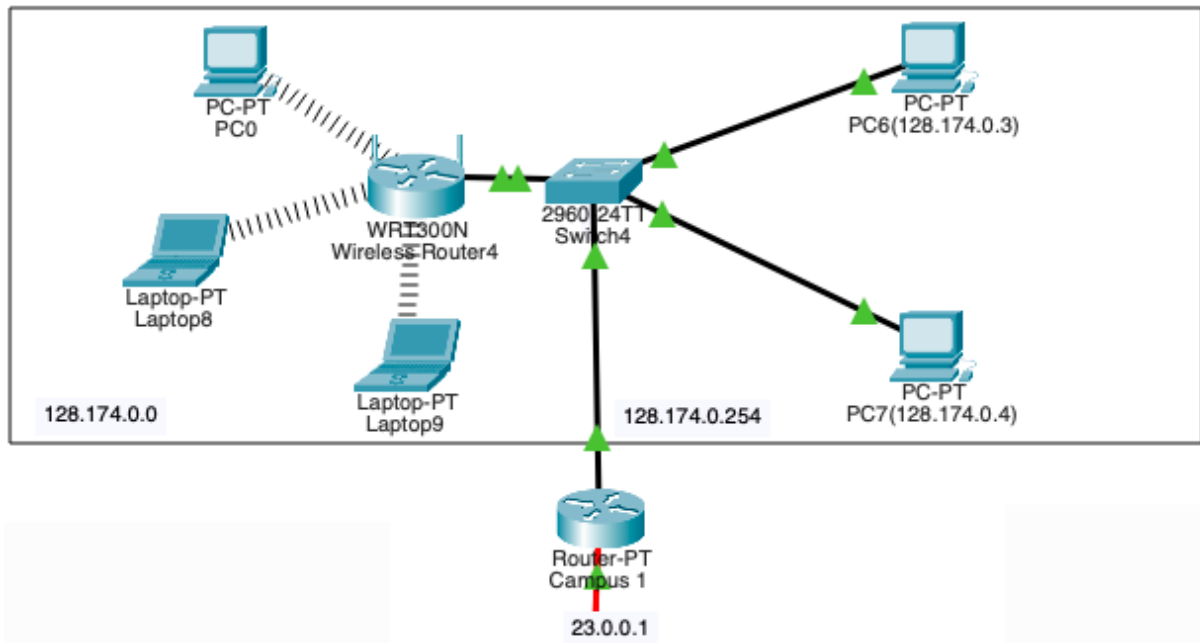
## Diagram:



Apex University Network

## Campus Design and Configurations with Router

### Campus 1:

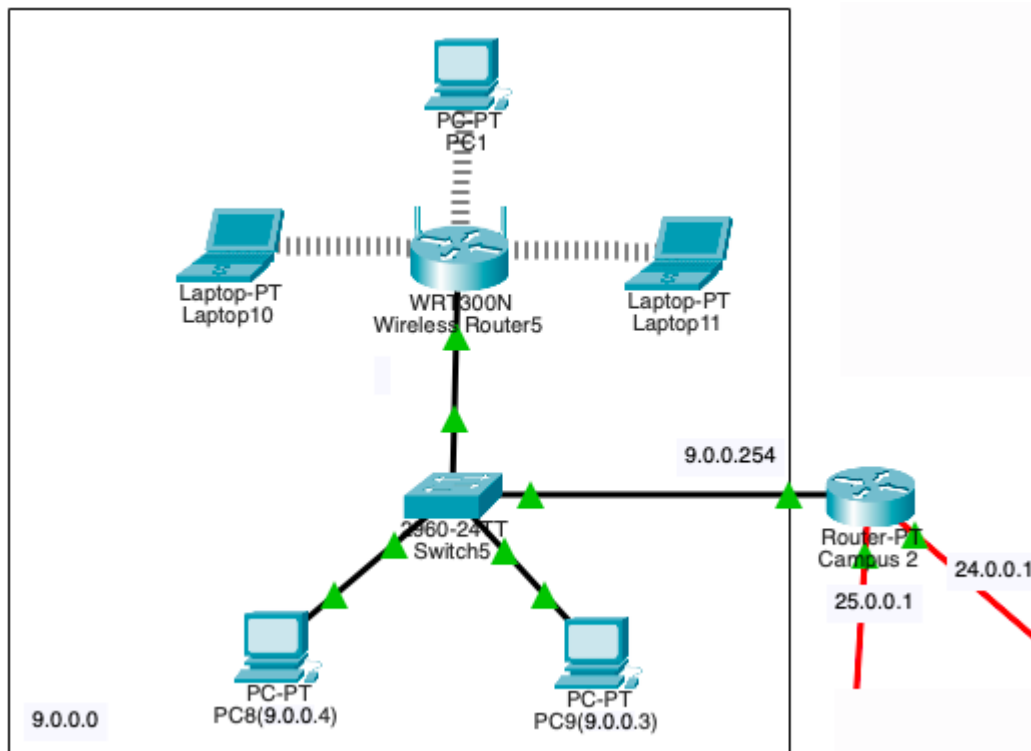


```
interface fa0/0
ip address 128.174.0.254 255.0.0.0
no shut
do wr
exit

interface se2/0
ip address 23.0.0.1 255.0.0.0
no shut
do wr
exit

router OSPF 1
network 23.0.0.0 0.255.255.255 area 1
network 128.174.0.0 0.0.255.255 area 1
exit
```

## Campus 2:



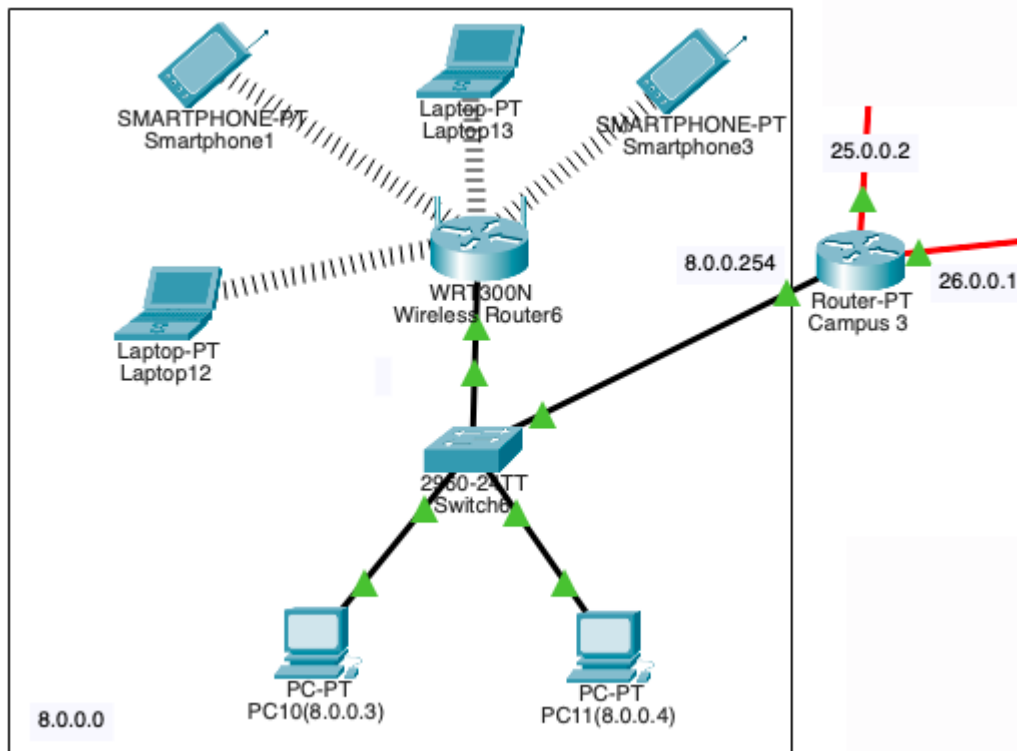
```
interface fa0/0
ip address 9.0.0.254 255.0.0.0
no shut
do wr
exit
```

```
interface se3/0
ip address 24.0.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit
```

```
interface se6/0
ip address 25.0.0.1 255.0.0.0
no shut
do wr
exit
```

```
router OSPF 2
network 24.0.0.0 0.255.255.255 area 1
network 25.0.0.0 0.255.255.255 area 1
network 9.0.0.0 0.0.255.255 area 1
exit
```

### Campus 3:



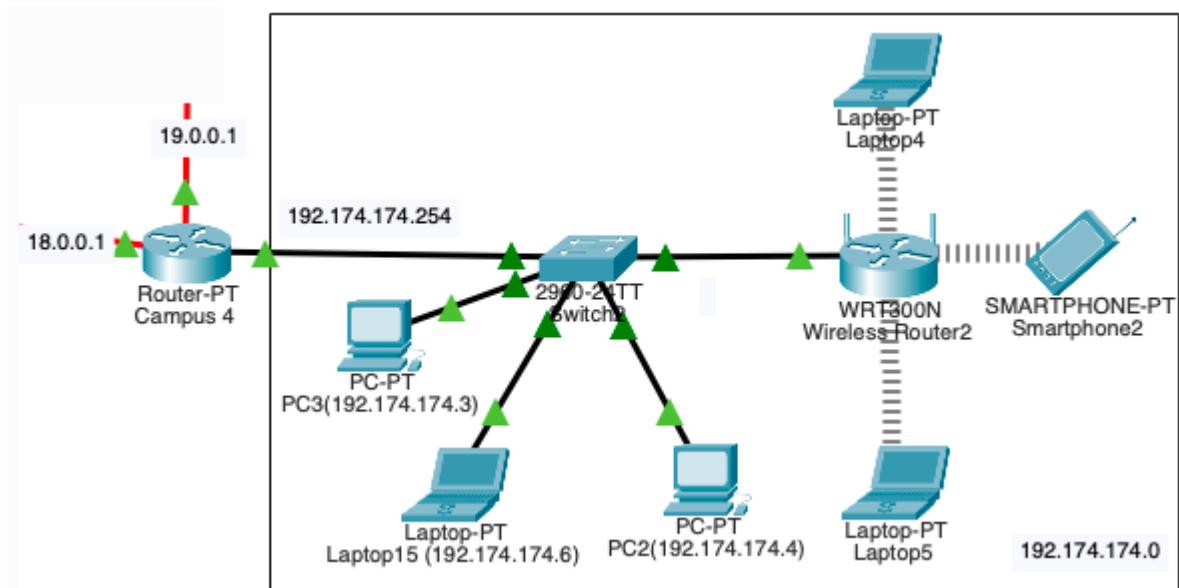
```
interface fa0/0
ip address 8.0.0.254 255.0.0.0
no shut
do wr
exit
```

```
interface se2/0
ip address 26.0.0.1 255.0.0.0
no shut
do wr
exit
```

```
interface se3/0
ip address 25.0.0.2 255.0.0.0
clock rate 64000
no shut
do wr
exit
```

```
router OSPF 3
network 8.0.0.0 0.255.255.255 area 1
network 26.0.0.0 0.255.255.255 area 1
network 25.0.0.0 0.255.255.255 area 1
exit
```

## Campus 4:



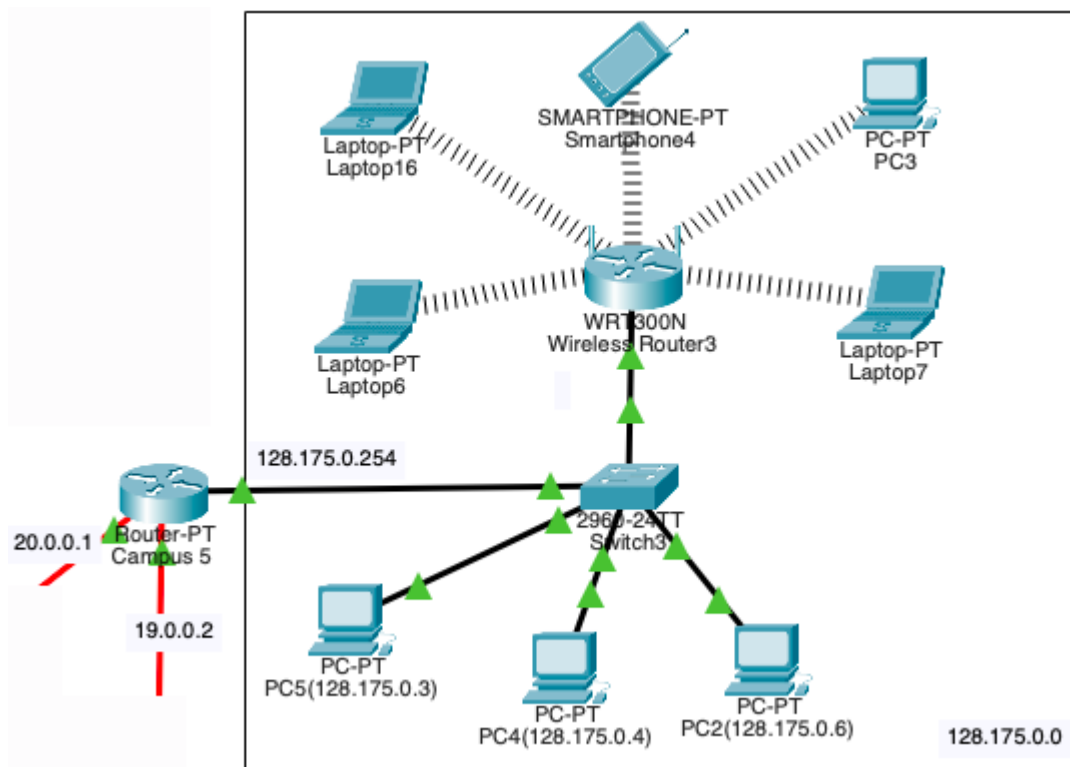
```
interface fa0/0
ip address 192.174.175.254 255.255.255.0
no shut
do wr
exit
```

```
interface se2/0
ip address 19.0.0.1 255.0.0.0
no shut
do wr
exit
```

```
interface se3/0
ip address 18.0.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit
```

```
router OSPF 4
network 18.0.0.0 0.255.255.255 area 1
network 19.0.0.0 0.255.255.255 area 1
network 192.174.175.0 0.0.0.255 area 1
exit
```

## Campus 5:



```
interface fa0/0
ip address 128.175.0.254 255.255.0.0
no shut
do wr
exit
```

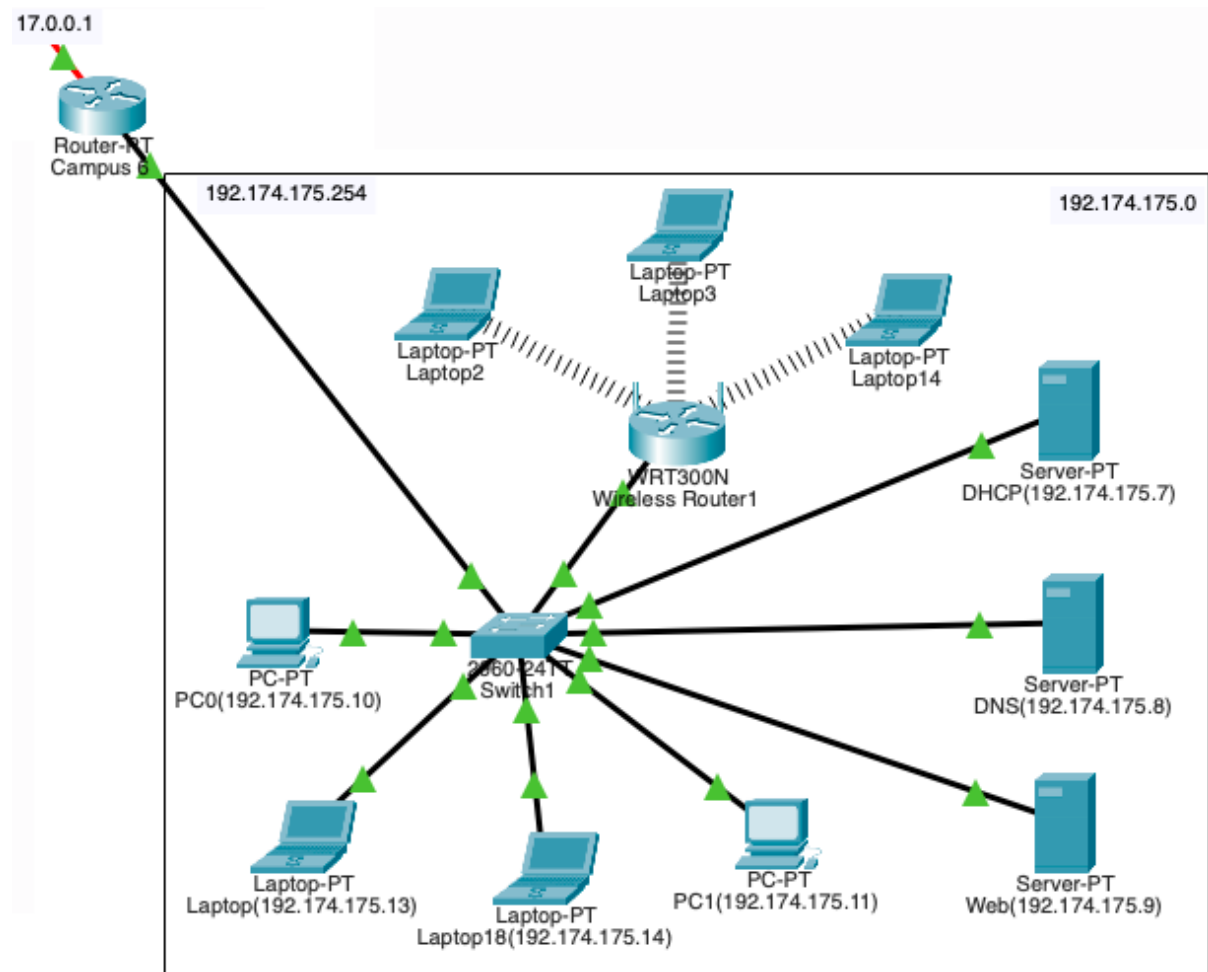
```
interface se3/0
ip address 20.0.0.1 255.0.0.0
clock rate 64000
no shut
do wr
exit
```

```
interface se6/0
ip address 19.0.0.2 255.0.0.0
no shut
do wr
exit
```

```
router OSPF 5
network 19.0.0.0 0.255.255.255 area 1
network 128.175.0.0 0.0.255.255 area 1
network 20.0.0.0 0.0.255.255 area 1
exit
```



## Campus 6:

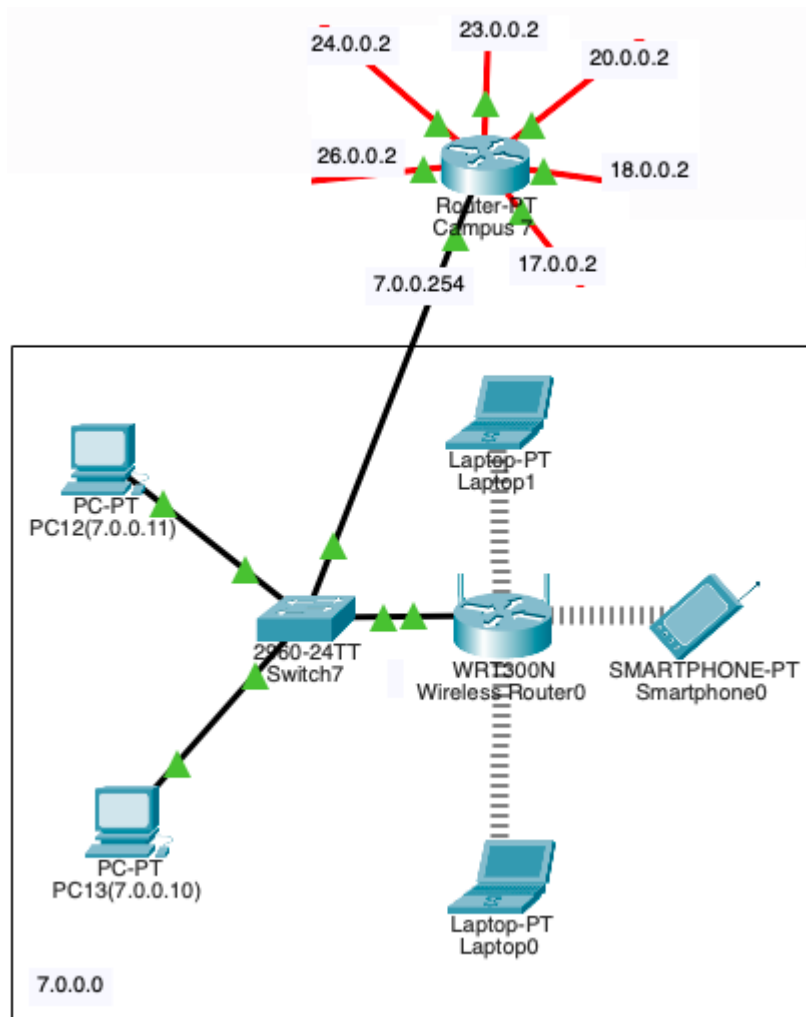


```
interface fa0/0
ip address 192.174.175.254 255.255.255.0
no shut
do wr
exit
```

```
interface se2/0
ip address 17.0.0.1 255.0.0.0
no shut
do wr
exit
```

```
router OSPF 6
network 192.174.175.0 0.0.0.255 area 1
network 17.0.0.0 0.255.255.255 area 1
exit
```

## Campus 7:



```
interface fa0/0
ip address 7.0.0.254 255.0.0.0
no shut
do wr
exit
```

```
interface se2/0
ip address 23.0.0.2 255.0.0.0
no shut
do wr
exit
```

```
interface se3/0
ip address 20.0.0.2 255.0.0.0
clock rate 64000
no shut
do wr
exit
```

```
interface se6/0
ip address 18.0.0.2 255.0.0.0
no shut
do wr
exit
```

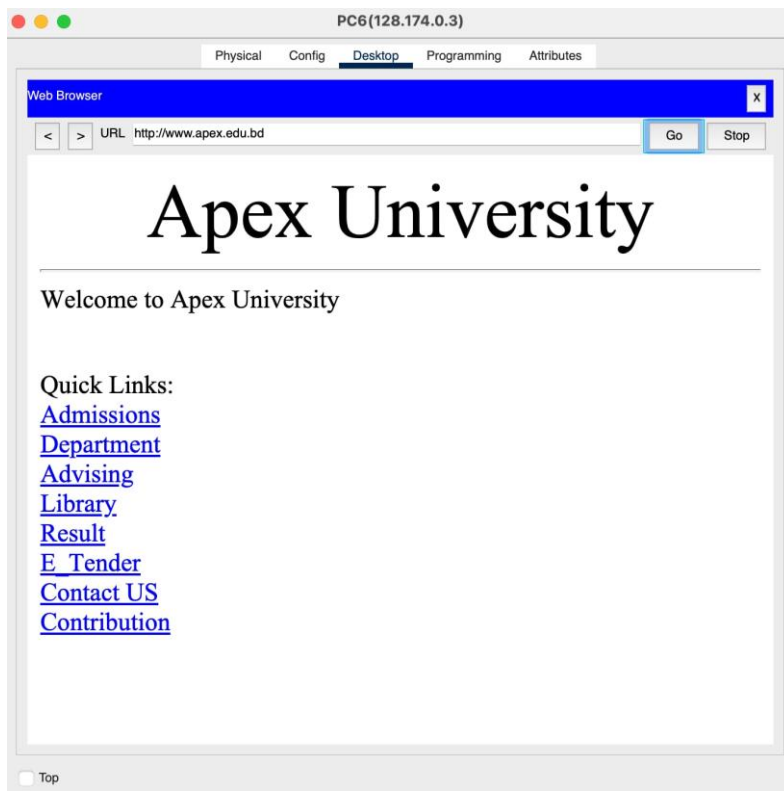
```
interface se7/0
ip address 17.0.0.2 255.0.0.0
no shut
do wr
exit
```

```
interface se8/0
ip address 24.0.0.2 255.0.0.0
no shut
do wr
exit
```

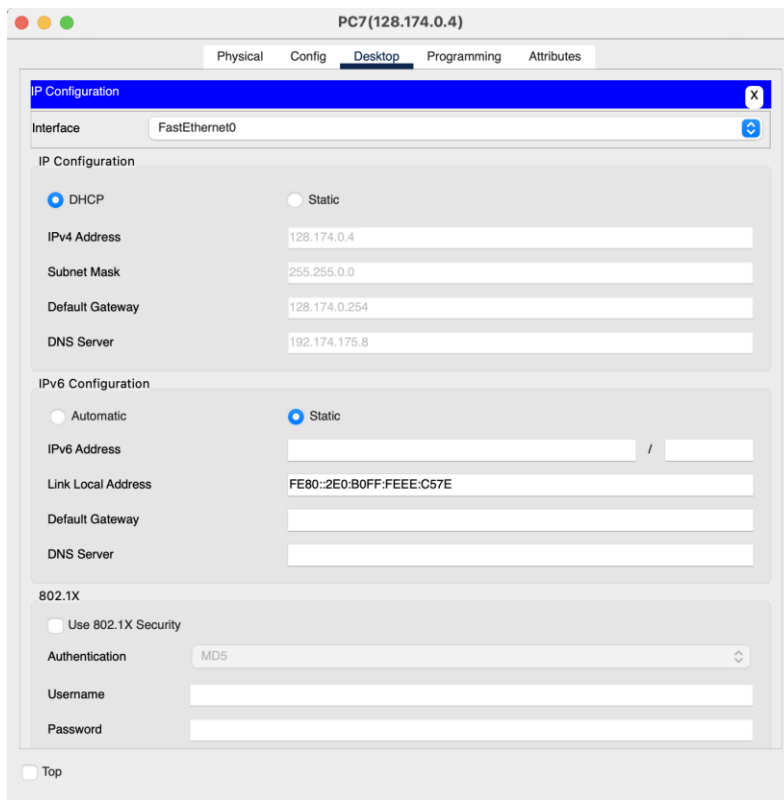
```
interface se9/0
ip address 26.0.0.2 255.0.0.0
no shut
do wr
exit
```

```
router OSPF 7
network 7.0.0.0 0.255.255.255 area 1
network 23.0.0.0 0.255.255.255 area 1
network 20.0.0.0 0.255.255.255 area 1
network 18.0.0.0 0.255.255.255 area 1
network 17.0.0.0 0.255.255.255 area 1
network 24.0.0.0 0.255.255.255 area 1
network 26.0.0.0 0.255.255.255 area 1
exit
```

## Website



## PC:



## DNS:

DNS(192.174.175.8)

PhysicalConfigServicesDesktopProgrammingAttributes

IP Configuration

IP Configuration

☐ DHCP

☒ Static

IPv4 Address

192.174.175.8

Subnet Mask

255.255.255.0

Default Gateway

192.174.175.254

DNS Server

192.174.175.8

IPv6 Configuration

☐ Automatic

☒ Static

IPv6 Address

Link Local Address

FE80::202:17FF:FE91:102A

Default Gateway

DNS Server

802.1X

☐ Use 802.1X Security

Authentication

MD5

Username

Password

☐ Top

DNS(192.174.175.8)

PhysicalConfigServicesDesktopProgrammingAttributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

DNS

DNS Service

☒ On

☐ Off

Resource Records

Name

www.apex.edu.bd

Type

A Record

Address

192.174.175.9

Add

Save

Remove

No.	Name	Type	Detail
0	www.apex.edu.bd	A Record	192.174.175.9

DNS Cache

## DHCP:

Physical

Config

Services

Desktop

Programming

Attributes

IP Configuration

X

IP Configuration

DHCP

Static

IPv4 Address

128.174.0.7

Subnet Mask

255.255.0.0

Default Gateway

128.174.0.254

DNS Server

192.174.175.8

IPv6 Configuration

Automatic

Static

IPv6 Address

Link Local Address

FE80::206:2AFF:FE7E:6ABA

Default Gateway

DNS Server

802.1X

Use 802.1X Security

Authentication

MD5

Username

Password

Top

Physical

Config

Services

Desktop

Programming

Attributes

SERVICES

HTTP

DHCP

DHCPv6

TFTP

DNS

SYSLOG

AAA

NTP

EMAIL

FTP

IoT

VM Management

Radius EAP

DHCP

Interface

FastEthernet0

Service

On

Off

Pool Name

serverPool

Default Gateway

192.174.175.254

DNS Server

192.174.175.8

Start IP Address

192

174

175

10

Subnet Mask

255

255

255

0

Maximum Number of Users

246

TFTP Server

0.0.0.0

WLC Address

0.0.0.0

Add

Save

Remove

Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
C7	7.0.0.254	192.174...	7.0.0.1	255.255...	246	0.0.0.0	0.0.0.0
C5	128.175...	192.174...	128.175...	255.255...	2	0.0.0.0	0.0.0.0
C4	192.174...	192.174...	192.174...	255.255...	246	0.0.0.0	0.0.0.0
C3	8.0.0.254	192.174...	8.0.0.1	255.255...	246	0.0.0.0	0.0.0.0
C1	128.174...	192.174...	128.174...	255.255...	246	0.0.0.0	0.0.0.0
C2	9.0.0.254	192.174...	9.0.0.1	255.255...	246	0.0.0.0	0.0.0.0
serverPool	192.174...	192.174...	192.174...	255.255...	246	0.0.0.0	0.0.0.0

Top

## **WEB:**

The screenshot shows a network configuration window titled "Web(192.174.175.9)". It has tabs for Physical, Config, Services, Desktop, Programming, and Attributes. The "Config" tab is active, showing three configuration sections:

- IP Configuration:** DHCP is unselected, and Static is selected. The fields are: IPv4 Address (192.174.175.9), Subnet Mask (255.255.255.0), Default Gateway (192.174.175.254), and DNS Server (192.174.175.8).
- IPv6 Configuration:** Automatic is unselected, and Static is selected. The fields are: IPv6 Address (empty), Link Local Address (FE80::202:17FF:FE10:5AD1), Default Gateway (empty), and DNS Server (empty).
- 802.1X:** Use 802.1X Security is unselected. The Authentication dropdown is set to MD5. There are empty fields for Username and Password.

## **Conclusion:**

In conclusion, university network systems play a crucial role in the functioning and operation of modern educational institutions. These systems provide students, faculty, and staff with access to important information and resources, such as class schedules, online course materials, and email. They also enable communication and collaboration among members of the university community, as well as facilitate administrative tasks such as grading and record-keeping.

Overall, a well-designed and properly maintained university network system is essential for the success and efficiency of any educational institution.