ASSUMPTION UNIVERSITY

FACULTY OF ENGINEERING

COMPUTER ENGINEERING DEPARTMENT

CE4224 Telecommunication Network Laboratory

Section 641

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Project Report: Dormitory Networking

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Introduction

University dormitory networking is essential to ensure reliable and secure internet connectivity for male and female dorms, study rooms, and administration offices. A good network infrastructure is crucial to facilitate communication, collaboration, and administrative tasks. The network needs to be reliable, secure, and able to cater to the needs of different users and areas of the building.
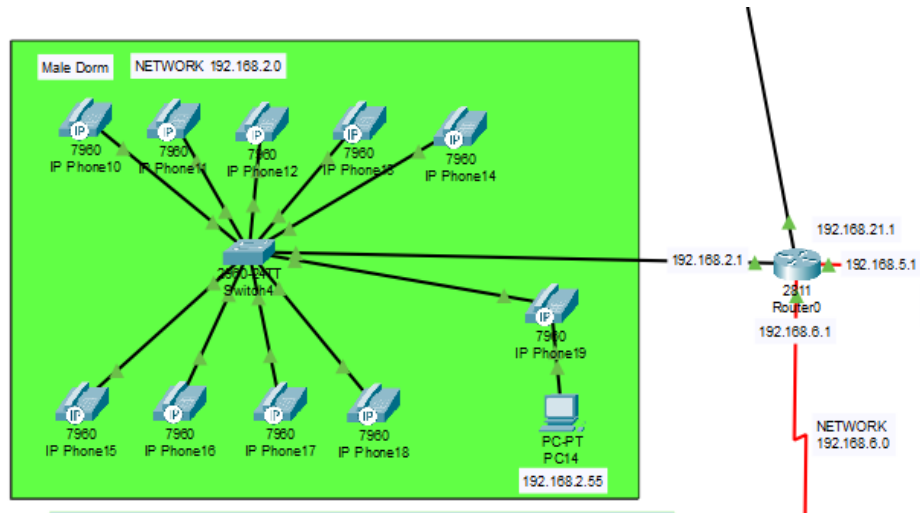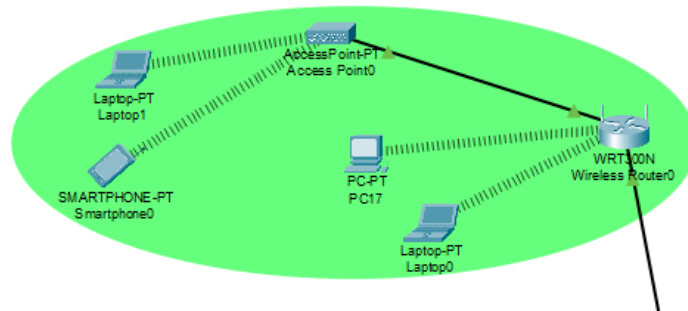
Network Topology
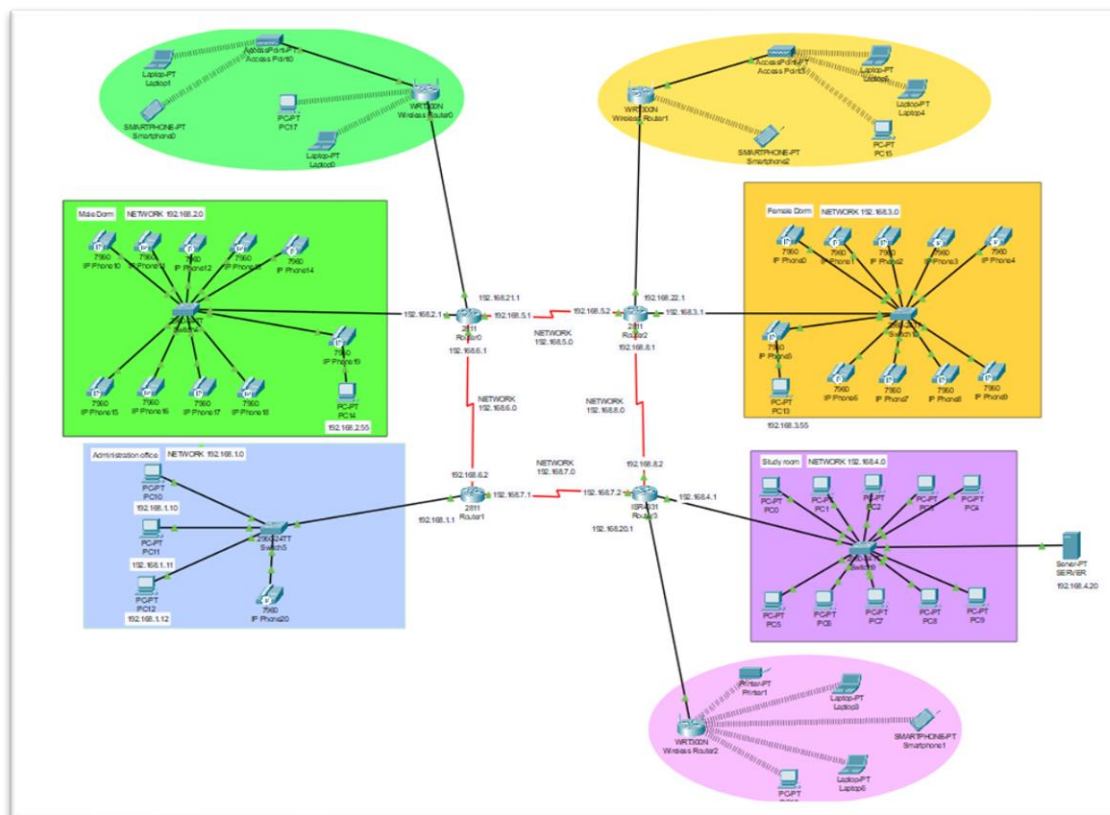
Procedure

- **Male Dorm**

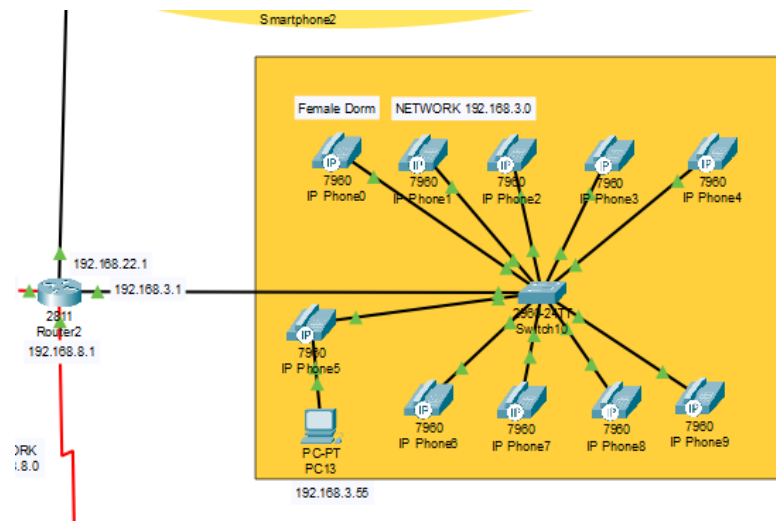 Each floor has 1 IP phone. The front counter has 1 IP phone and a PC.

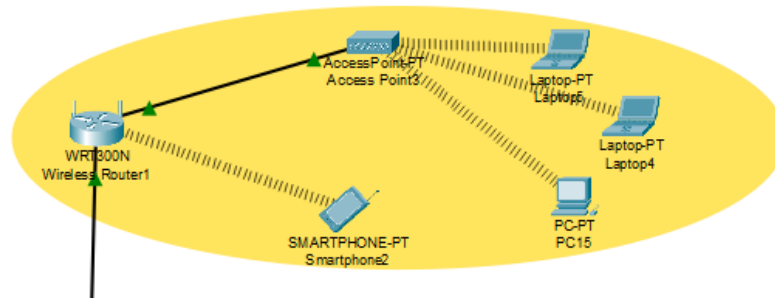 Other network devices using wireless Wi-Fi in the male dorm.

Device	Interface	IP Address	Subnet Mask	Default Gateway
PC	Wireless0	DHCP		192.168.21.1
Smartphone	Wireless0	DHCP		192.168.21.1
Laptop	Wireless0	DHCP		192.168.21.1

- **Female Dorm**

    Each floor has 1 IP phone. The front counter has 1 IP phone and a PC.

    Other network devices use wireless Wi-Fi in the female dorm.

Device	Interface	IP Address	Subnet Mask	Default Gateway
PC	Wireless0	DHCP		192.168.22.1
Smartphone	Wireless0	DHCP		192.168.22.1
Laptop	Wireless0	DHCP		192.168.22.1

- **Wireless device configuration for the male dorm.**

    Set up the default gateway, limit the range of IP addresses for DHCP, and the DNS server IP address.

    Set the default gateway in LAN.

- **Wireless device configuration for the female dorm.**

    Set up the default gateway, limit the range of IP addresses for DHCP, and the DNS server IP address.

Set the default gateway in LAN.

- **Study Room**

    In the study room, there are many PCs provided for students. The IP addresses are assigned by the server use DHCP. There's a dorm website support by the server as well.
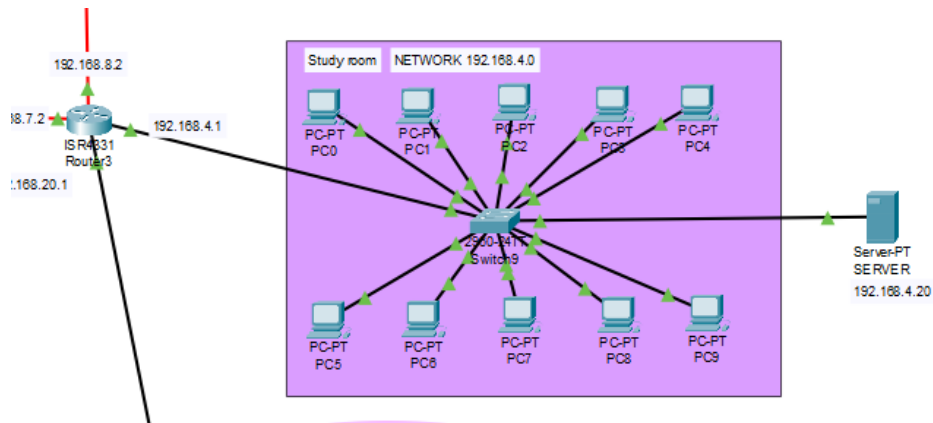
- **SERVER configuration**

    -Set up IP address, subnet mask, default gateway, and DNS Server.
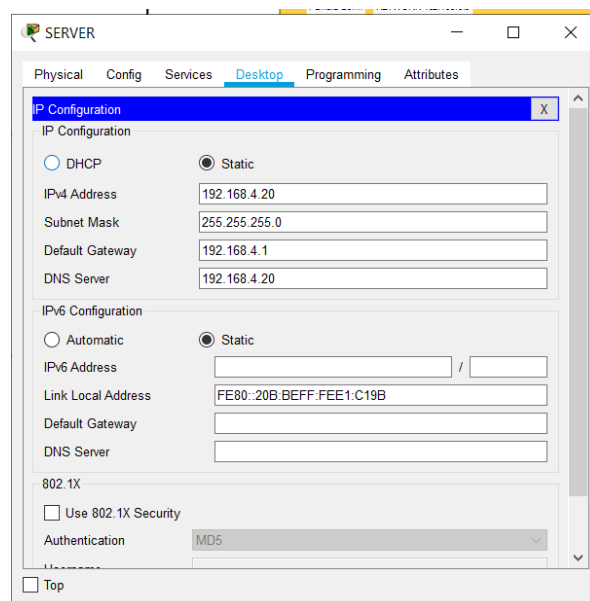
-Set up DHCP pool for the PCs in the study room.

Set up DNS Server by given the domain name of the dorm website and the server IP address.

Set up the content of the dorm website.
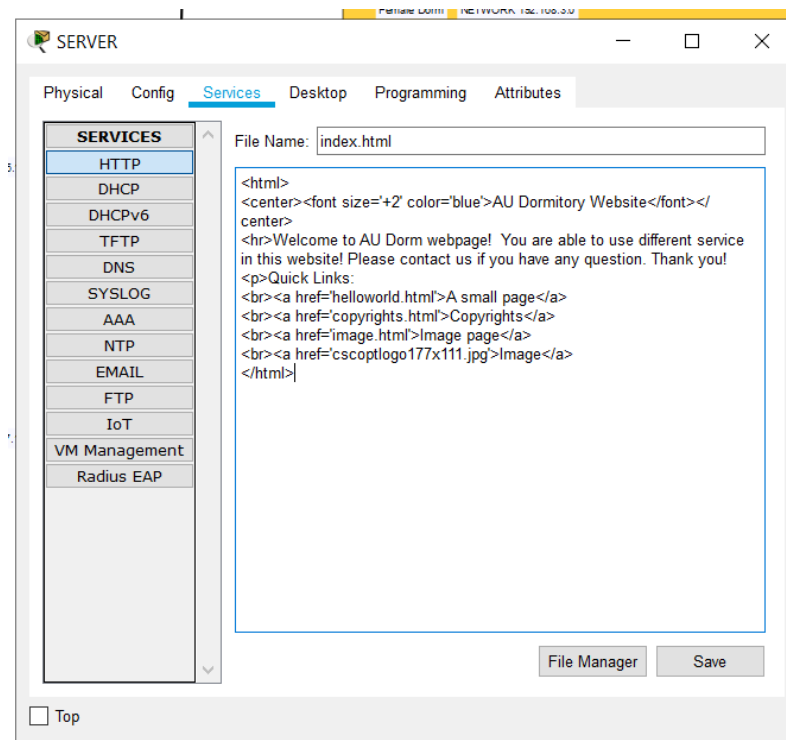
Other network devices use wireless Wi-Fi in the study room.
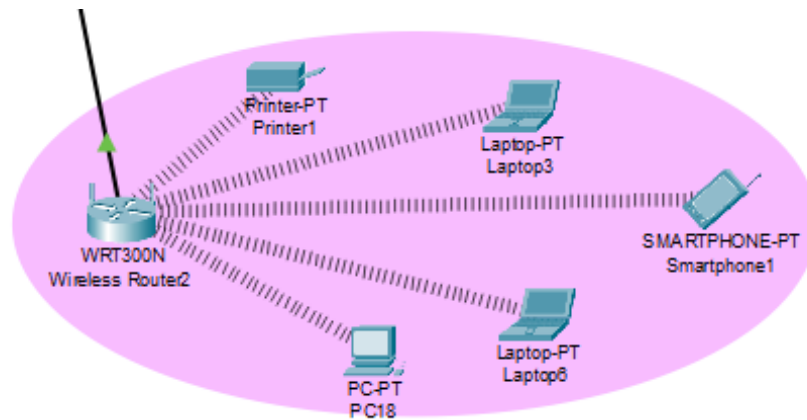
Device	Interface	IP Address	Subnet Mask	Default Gateway
PC	Wireless0	DHCP		192.168.20.1
Smartphone	Wireless0	DHCP		192.168.20.1
Laptop	Wireless0	DHCP		192.168.20.1
Printer	Wireless0	DHCP		192.168.20.1

- **Wireless device configuration for the study room.**

  Set up the default gateway, limit the range of IP addresses for DHCP, and the DNS server IP address.

  Set the default gateway in LAN.

- **Administration Office**

  There are three PCs and one IP phone in the administration room.

  For the IP phone, all IP phones from the male and female dorm are able to call to the administration office. In terms of PCs, only the front counter of male and female dorm can connect to the PCs in administration office. The PCs in the study room are not allowed to connect to the admin's PCs.
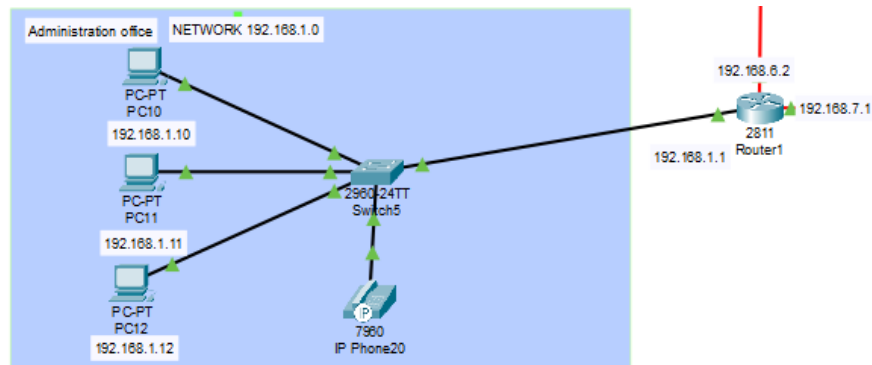
Device	Interface	IP Address	Subnet Mask	Default Gateway
PC10	FastEthernet	192.168.1.10	255.255.255.0	192.168.1.1
PC11	FastEthernet	192.168.1.11	255.255.255.0	192.168.1.1
PC11	FastEthernet	192.168.1.11	255.255.255.0	192.168.1.1

- **Firewall setting**

    Set up the firewall for PCs in the administration office.

    Allow only other PCs in the same office and the front counter of male and female dorm.
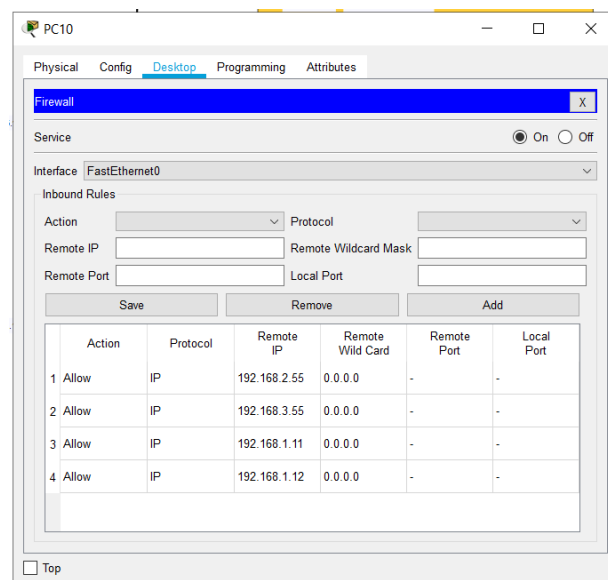
Result

- **IP phone from 205 (male dorm) to 303 (female dorm)**
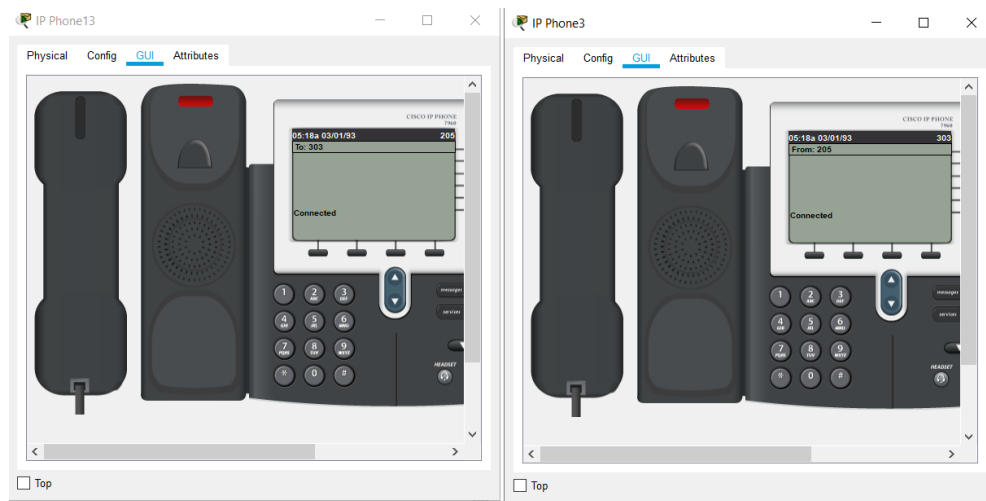
- **IP phone from 210 (male dorm) to 101 (Admin)**
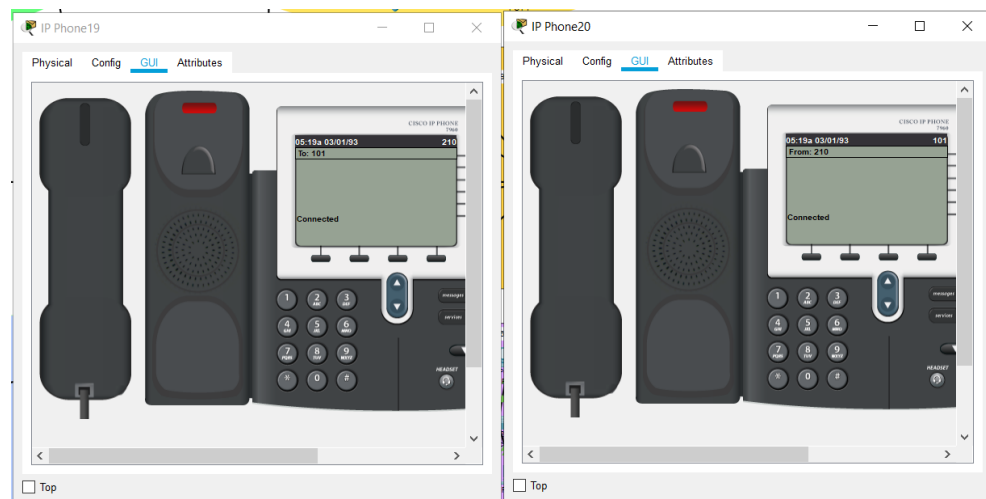
- **IP phone from 101 (Admin) to 307 (female dorm)**
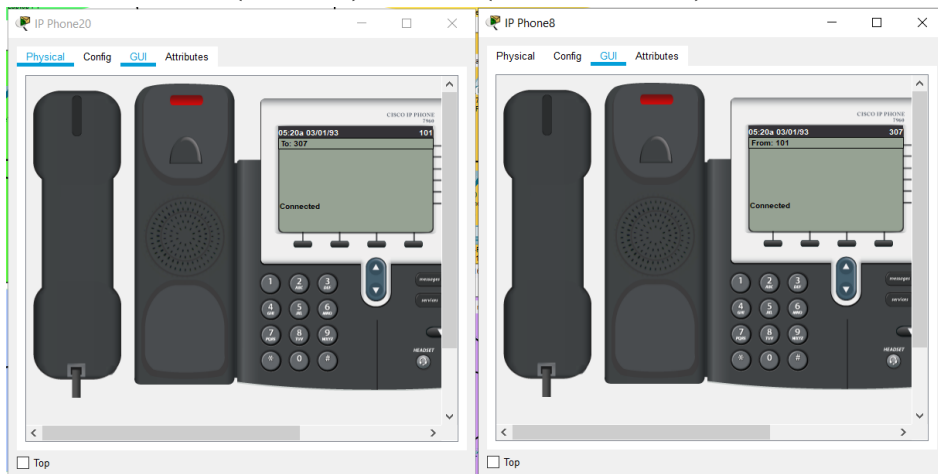
- **Wireless network is working, the device connect to it are able to connect to other networks.**

- **Male front counter PC ping other device from other networks**


```
C:\>ping 192.168.1.11

Pinging 192.168.1.11 with 32 bytes of data:

Reply from 192.168.1.11: bytes=32 time=1ms TTL=253
Reply from 192.168.1.11: bytes=32 time=1ms TTL=253
Reply from 192.168.1.11: bytes=32 time=1ms TTL=253
Reply from 192.168.1.11: bytes=32 time=1ms TTL=253

Ping statistics for 192.168.1.11:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\>ping 192.168.3.55

Pinging 192.168.3.55 with 32 bytes of data:

Reply from 192.168.3.55: bytes=32 time=1ms TTL=126
Reply from 192.168.3.55: bytes=32 time=21ms TTL=126
Reply from 192.168.3.55: bytes=32 time=1ms TTL=126
Reply from 192.168.3.55: bytes=32 time=13ms TTL=126

Ping statistics for 192.168.3.55:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 21ms, Average = 9ms

C:\>ping 192.168.4.26

Pinging 192.168.4.26 with 32 bytes of data:

Reply from 192.168.4.26: bytes=32 time=2ms TTL=125
Reply from 192.168.4.26: bytes=32 time=2ms TTL=125
Reply from 192.168.4.26: bytes=32 time=3ms TTL=125
Reply from 192.168.4.26: bytes=32 time=2ms TTL=125

Ping statistics for 192.168.4.26:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 2ms, Maximum = 3ms, Average = 2ms
```

```
C:\>ping 192.168.20.103

Pinging 192.168.20.103 with 32 bytes of data:

Reply from 192.168.20.103: bytes=32 time=34ms TTL=125
Reply from 192.168.20.103: bytes=32 time=17ms TTL=125
Reply from 192.168.20.103: bytes=32 time=34ms TTL=125
Reply from 192.168.20.103: bytes=32 time=24ms TTL=125

Ping statistics for 192.168.20.103:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 17ms, Maximum = 34ms, Average = 27ms

C:\>ping 192.168.21.102

Pinging 192.168.21.102 with 32 bytes of data:

Reply from 192.168.21.102: bytes=32 time=14ms TTL=127
Reply from 192.168.21.102: bytes=32 time=21ms TTL=127
Reply from 192.168.21.102: bytes=32 time=21ms TTL=127
Reply from 192.168.21.102: bytes=32 time=22ms TTL=127

Ping statistics for 192.168.21.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 14ms, Maximum = 22ms, Average = 19ms

C:\>ping 192.168.22.101

Pinging 192.168.22.101 with 32 bytes of data:

Reply from 192.168.22.101: bytes=32 time=4ms TTL=126
Reply from 192.168.22.101: bytes=32 time=23ms TTL=126
Reply from 192.168.22.101: bytes=32 time=14ms TTL=126
Reply from 192.168.22.101: bytes=32 time=37ms TTL=126

Ping statistics for 192.168.22.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 4ms, Maximum = 37ms, Average = 19ms
```

- **Female dorm laptop which connect to Wi-Fi ping other device from other networks except the PCs in administration.**

```
C:\>ping 192.168.21.102

Pinging 192.168.21.102 with 32 bytes of data:

Reply from 192.168.21.102: bytes=32 time=14ms TTL=126
Reply from 192.168.21.102: bytes=32 time=18ms TTL=126
Reply from 192.168.21.102: bytes=32 time=58ms TTL=126
Reply from 192.168.21.102: bytes=32 time=33ms TTL=126

Ping statistics for 192.168.21.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 14ms, Maximum = 58ms, Average = 30ms

C:\>ping 192.168.20.103

Pinging 192.168.20.103 with 32 bytes of data:

Reply from 192.168.20.103: bytes=32 time=13ms TTL=126
Reply from 192.168.20.103: bytes=32 time=51ms TTL=126
Reply from 192.168.20.103: bytes=32 time=35ms TTL=126
Reply from 192.168.20.103: bytes=32 time=44ms TTL=126

Ping statistics for 192.168.20.103:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 13ms, Maximum = 51ms, Average = 35ms

C:\>ping 192.168.4.28

Pinging 192.168.4.28 with 32 bytes of data:

Reply from 192.168.4.28: bytes=32 time=19ms TTL=126
Reply from 192.168.4.28: bytes=32 time=9ms TTL=126
Reply from 192.168.4.28: bytes=32 time=15ms TTL=126
Reply from 192.168.4.28: bytes=32 time=15ms TTL=126

Ping statistics for 192.168.4.28:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 9ms, Maximum = 19ms, Average = 14ms
```

```
C:\>ping 192.168.2.55

Pinging 192.168.2.55 with 32 bytes of data:

Reply from 192.168.2.55: bytes=32 time=21ms TTL=126
Reply from 192.168.2.55: bytes=32 time=10ms TTL=126
Reply from 192.168.2.55: bytes=32 time=14ms TTL=126
Reply from 192.168.2.55: bytes=32 time=16ms TTL=126

Ping statistics for 192.168.2.55:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 21ms, Average = 15ms

C:\>ping 192.168.3.55

Pinging 192.168.3.55 with 32 bytes of data:

Reply from 192.168.3.55: bytes=32 time=19ms TTL=127
Reply from 192.168.3.55: bytes=32 time=28ms TTL=127
Reply from 192.168.3.55: bytes=32 time=10ms TTL=127
Reply from 192.168.3.55: bytes=32 time=38ms TTL=127

Ping statistics for 192.168.3.55:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 10ms, Maximum = 38ms, Average = 23ms

C:\>ping 192.168.1.12

Pinging 192.168.1.12 with 32 bytes of data:

Reply from 192.168.22.1: Destination host unreachable.
Reply from 192.168.22.1: Destination host unreachable.
Reply from 192.168.22.1: Destination host unreachable.
Reply from 192.168.22.1: Destination host unreachable.

Ping statistics for 192.168.1.12:
    Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
```

- **The server services are available.**

  DHCP request successfully. There's also has the DNS server which is the server's IP address.
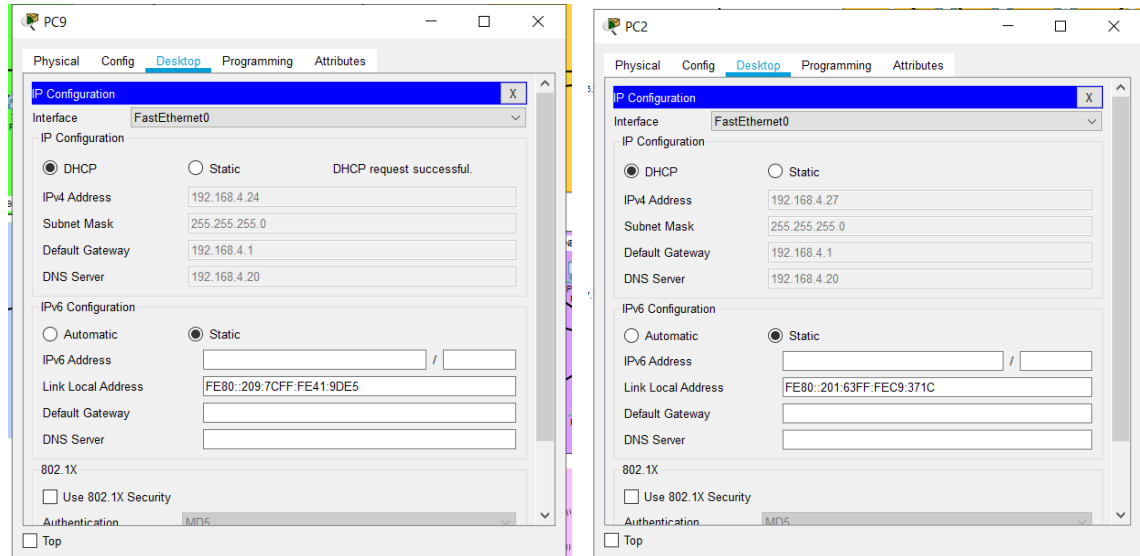
  DNS is working. This is the PC from the front counter of female dorm. It can access the website by entering the domain name.
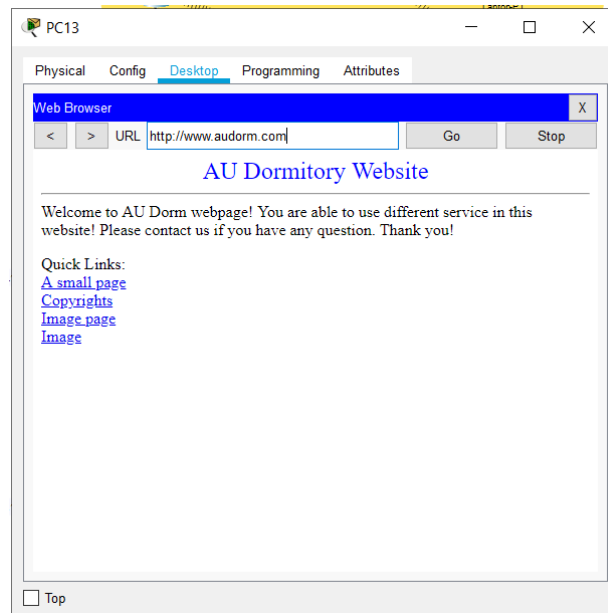
- **The firewall service is on in the administration office.**

  The PCs in the office can connect to outside devices. But outside device only has the front counter of male and female dorm can connect to the administration.

Conclusion

In the final project, I configured the simple dormitory networking including male dorm, female dorm, study room, and administration office. Different devices are used to complete this project. The difficulty I met is to configure the firewall. At the end, I still cannot finish the firewall part. Other parts are fine. IP phones can connect to each other. The wireless WIFI is also working well. Server provides DHCP, DNS and HTTP services. I really learn a lot from this project, and it is interesting to learn this class.