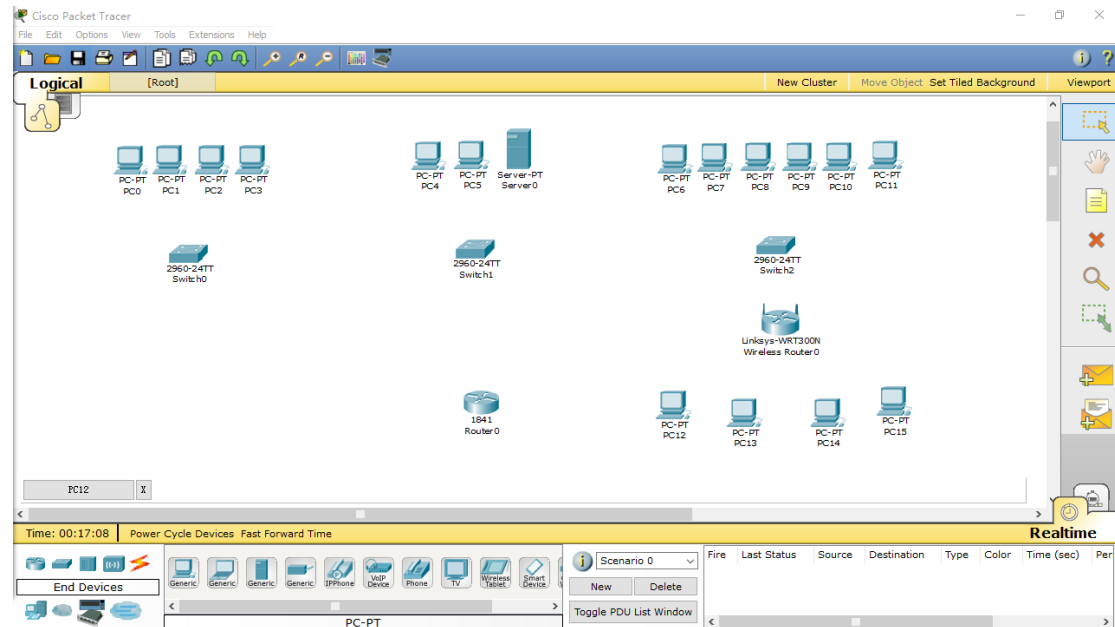


Computer Networks Lab 4

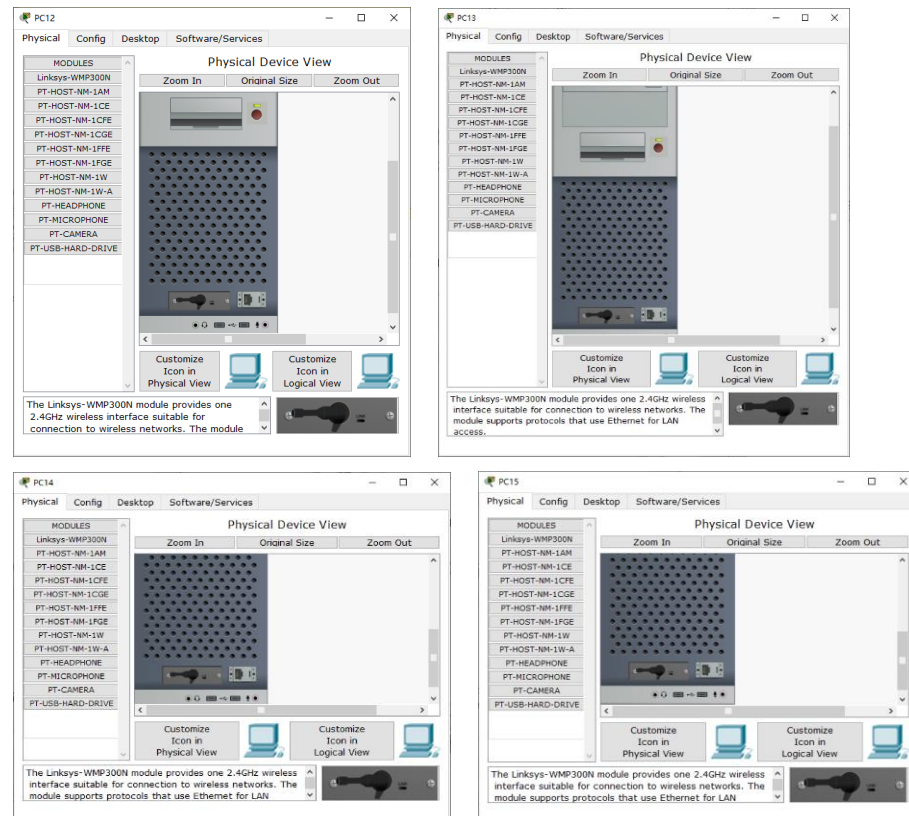
Name: CAO Xinyang

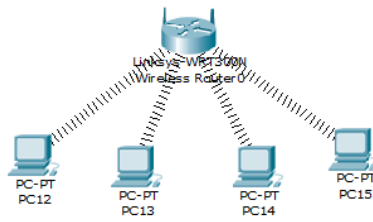
HDU ID: 20321308

1. Adding equipment.

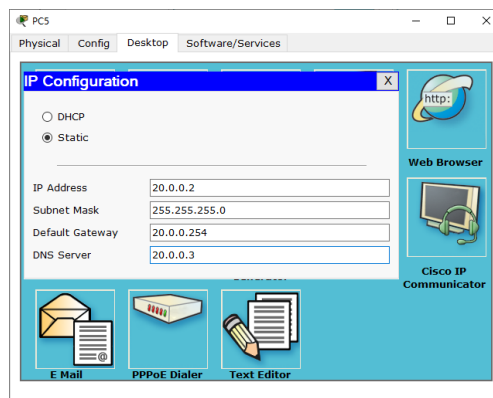
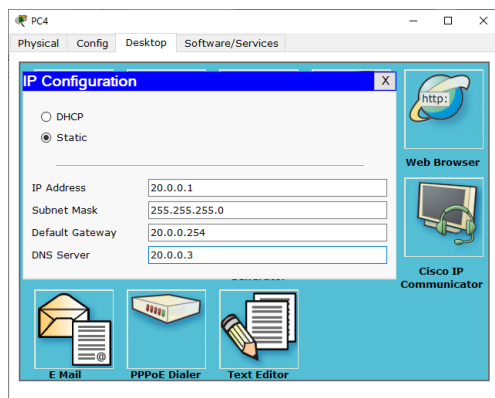
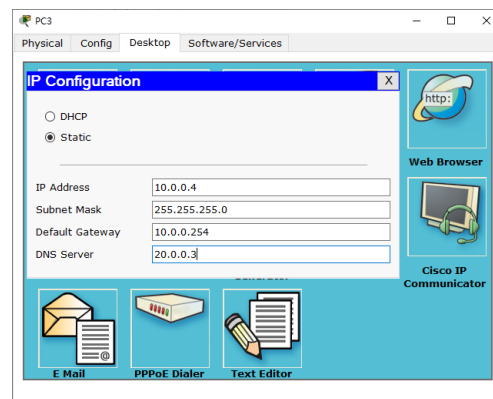
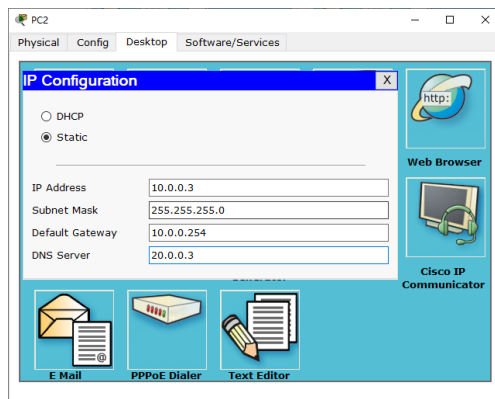
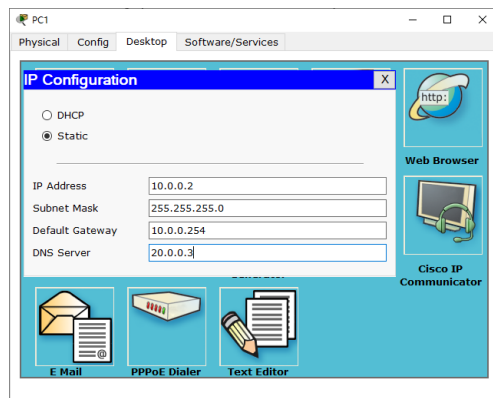
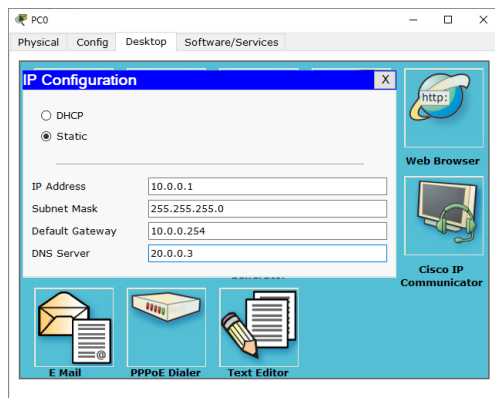


2. Installing the Wi-Fi module in the PC.

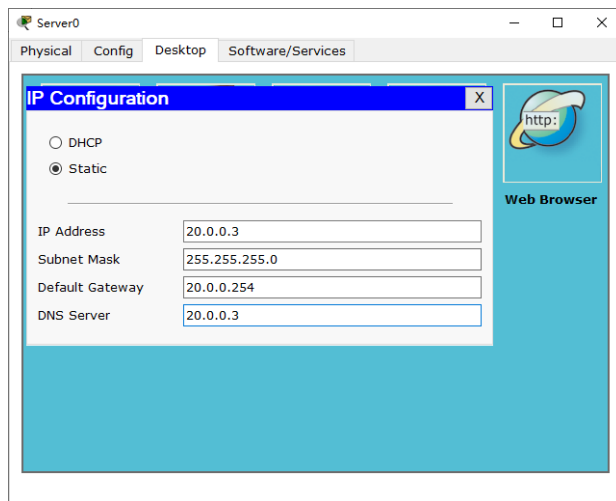




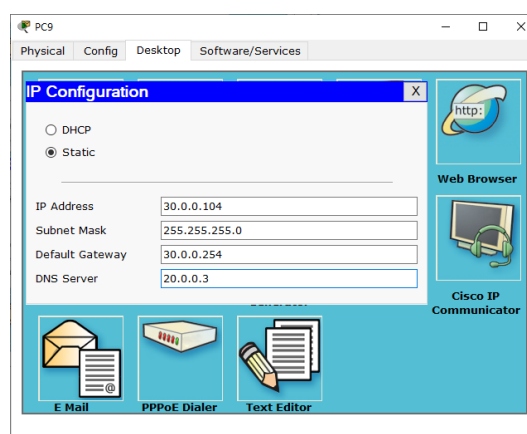
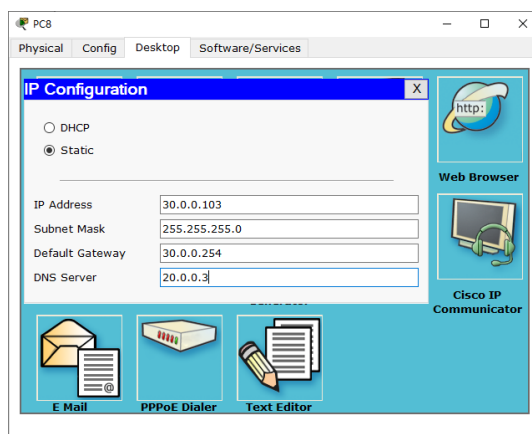
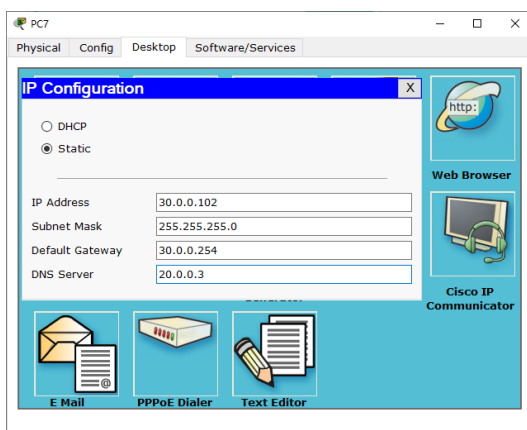
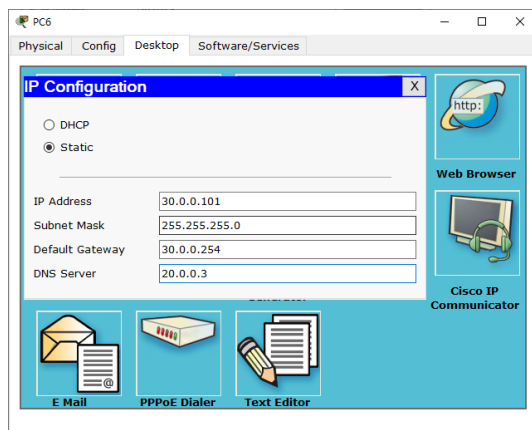
3. Setting up the PCs of the first and second departments.

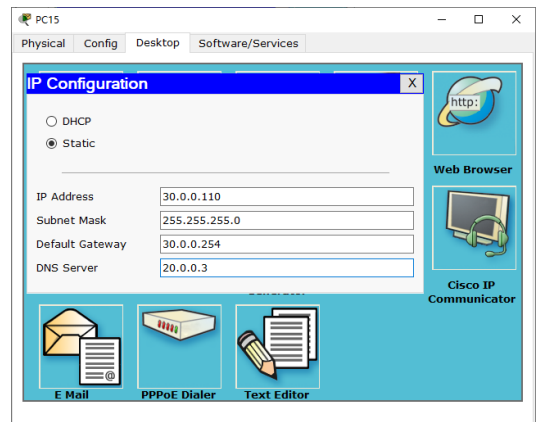
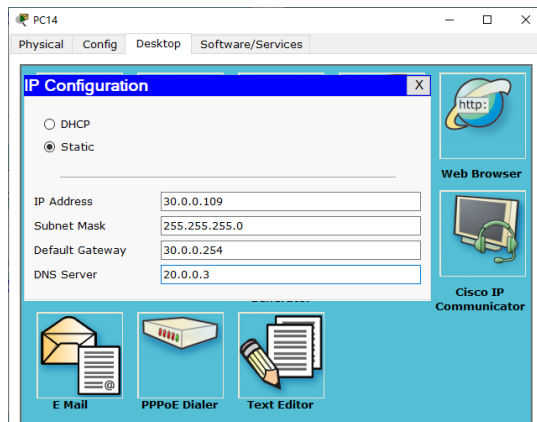
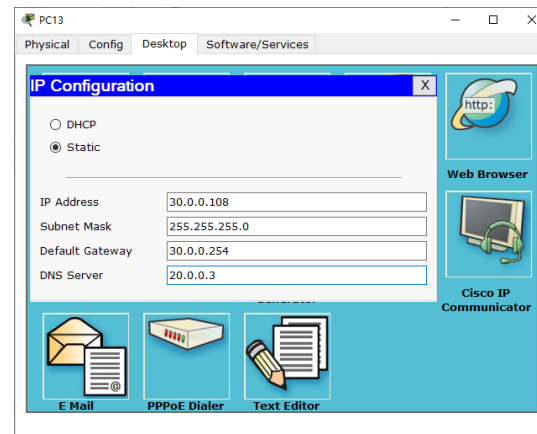
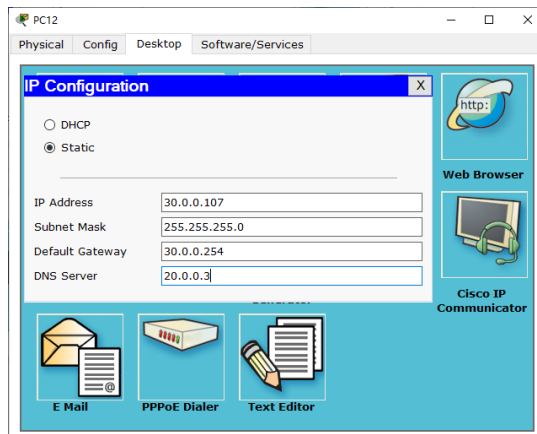
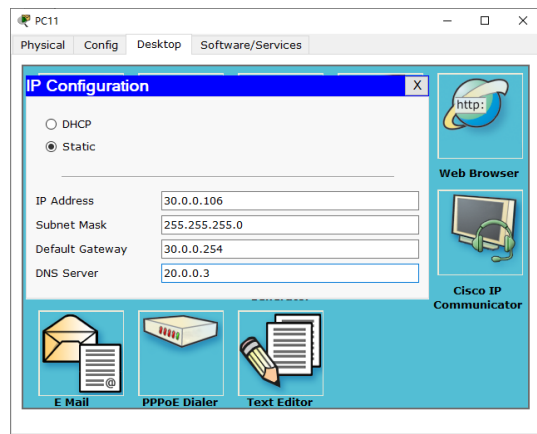
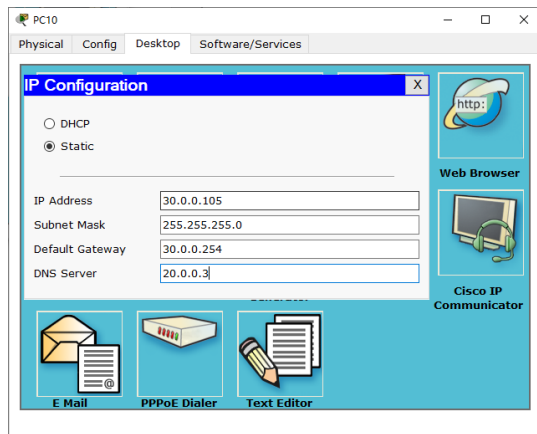


set the following settings on the server:



4. Setting up the third department.





5. Configuring the router.

Wireless Router0

Physical Config GUI

LINKSYS®
A Division of Cisco Systems, Inc.

Firmware Version: v0.93.3
Wireless-N Broadband Router WRT300N

Setup Wireless Security Access Applications Administration Status
Basic Setup DNS Restrictions MAC Address Clone Advanced Routing

Internet Setup

Internet Connection type: Automatic Configuration - DHCP

Optional Settings (required by some internet service providers):

Host Name:
Domain Name:
MTU: Size: 1500

Network Setup

Router IP: IP Address: 30.0.0.253 Subnet Mask: 255.255.255.0

DHCP Server Settings

DHCP Server: ☒ Enabled ☐ Disabled DHCP Reservation

Start IP Address: 30.0.0.1
Maximum number of Users: 20
IP Address Range: 30.0.0.1 - 20
Client Lease Time: 0 minutes (0 means one day)
Static DNS 1: 20.0.0.3
Static DNS 2: 0.0.0.0
Static DNS 3: 0.0.0.0
WINS: 0.0.0.0

Wireless Router0

Physical Config GUI

LINKSYS®
A Division of Cisco Systems, Inc.

Firmware Version: v0.93.3
Wireless-N Broadband Router WRT300N

Wireless Setup Wireless Security Access Applications Administration Status
Basic Wireless Settings Wireless Security Wireless MAC Filter Advanced Wireless Settings

Basic Wireless Settings

Network Mode: Mixed
Network Name (SSID): Cisco2107
Radio Band: Auto
Wide Channel: Auto
Standard Channel: 1 - 2.412GHz
SSID Broadcast: ☐ Enabled ☒ Disabled

Save Settings Cancel Changes

Wireless Router0

Physical Config GUI

LINKSYS®
A Division of Cisco Systems, Inc.

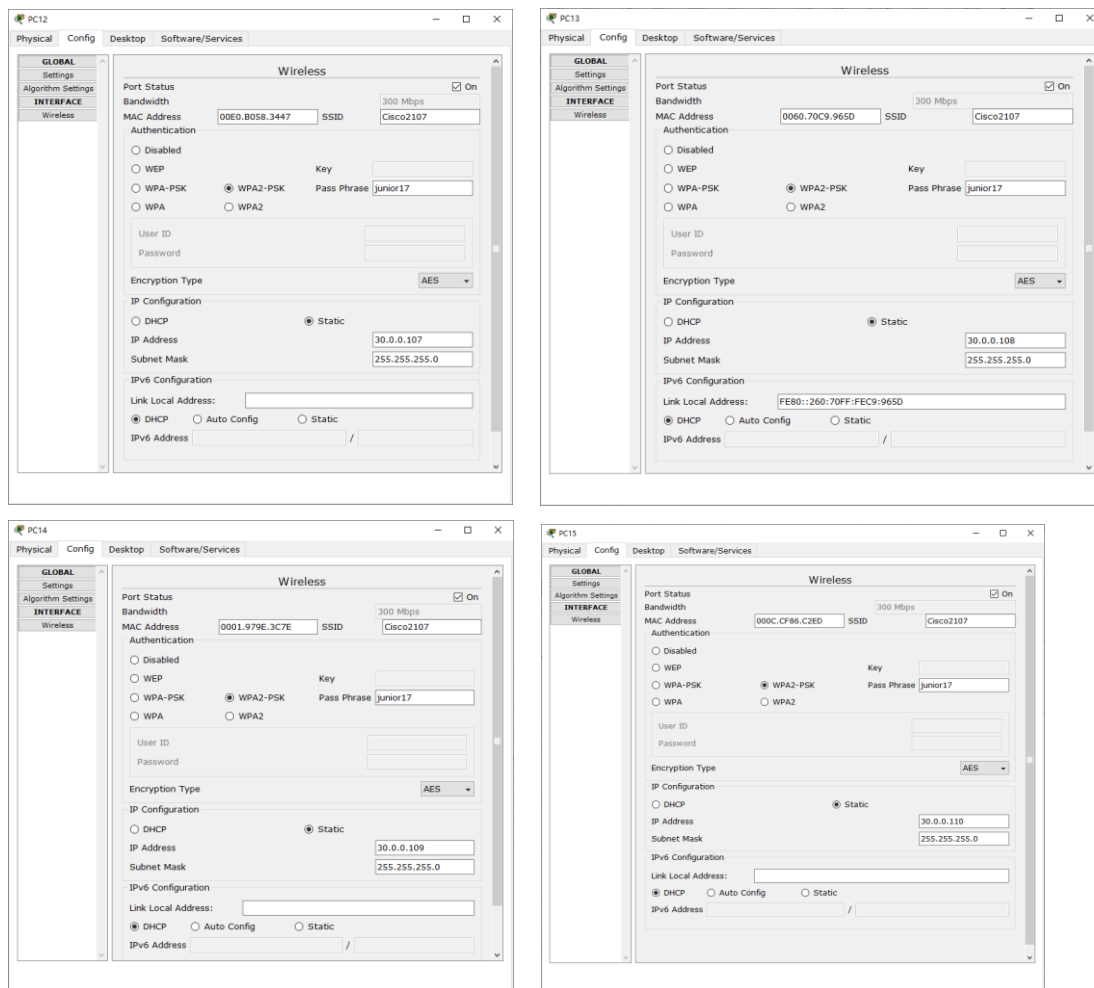
Firmware Version: v0.93.3
Wireless-N Broadband Router WRT300N

Wireless Setup Wireless Security Access Applications Administration Status
Basic Wireless Settings Wireless Security Wireless MAC Filter Advanced Wireless Settings

Wireless Security

Security Mode: WPA2 Personal
Encryption: AES
Passphrase: junior17
Key Renewal: 3600 seconds

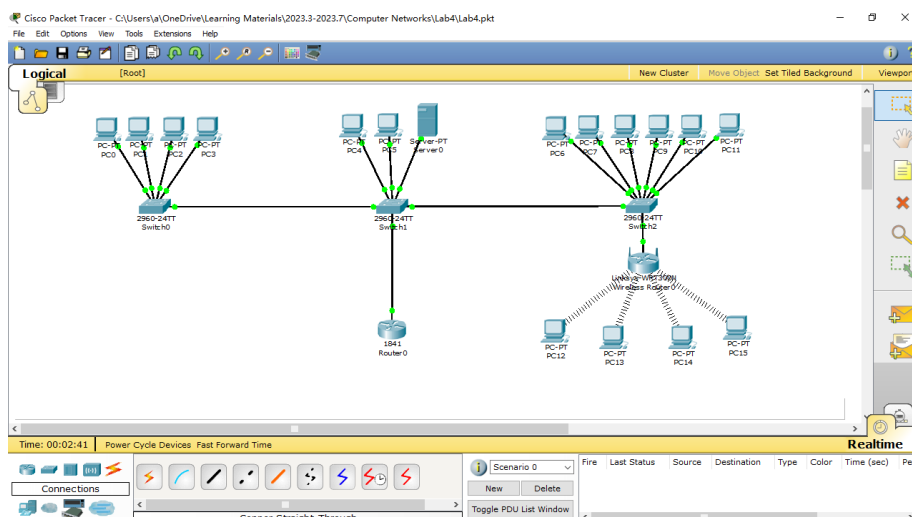
Setting up wireless PCs.



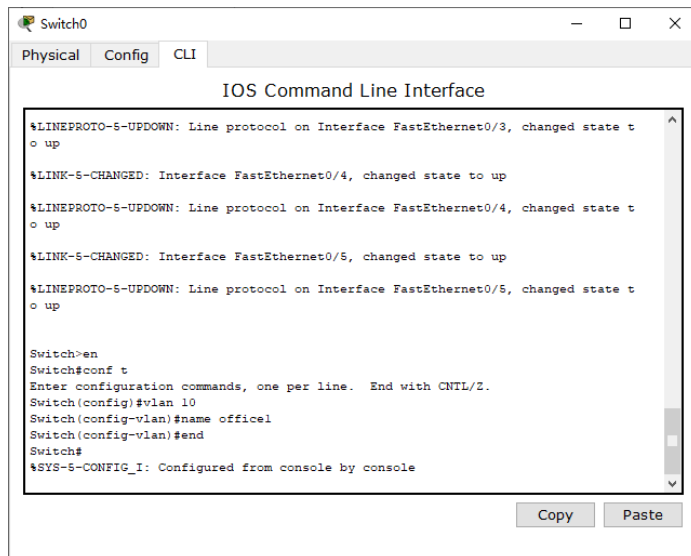
6. Connect the cables and connect the departments.

Connect the PC with a twisted pair.

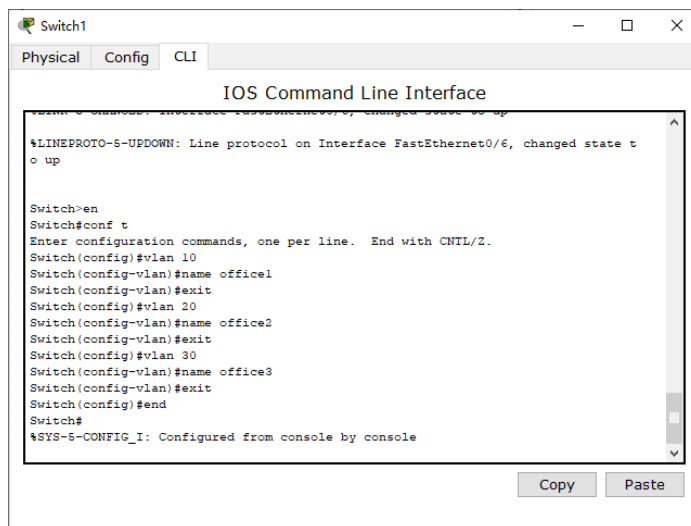
In all switches, connect the cables to FastEthernet clockwise. In the router, connect to the gigabit connector, having previously turned it on.



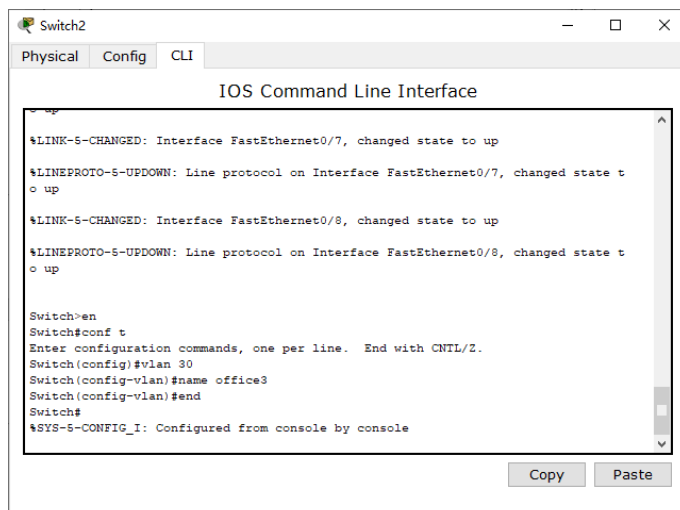
configure VLANs on all switches



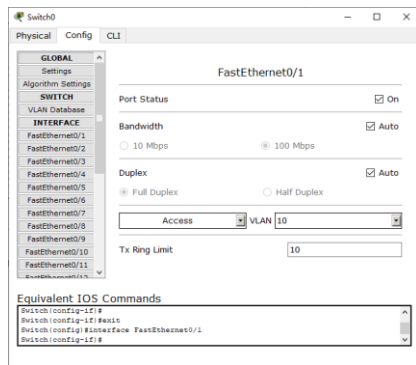
Open the switchboard in the second department and write the following commands:



Open the switchboard in the third department and write the following commands:

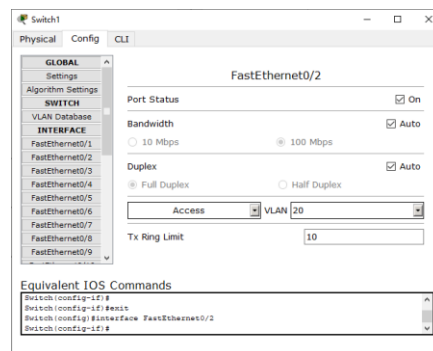
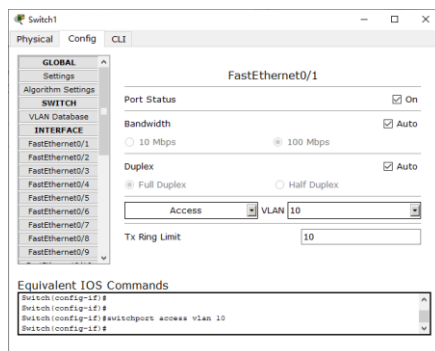


set VLAN 10 on the first switch for all ports to which there is a connection



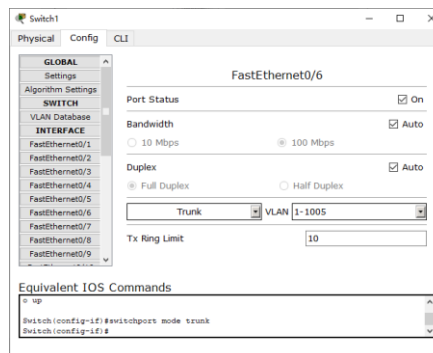
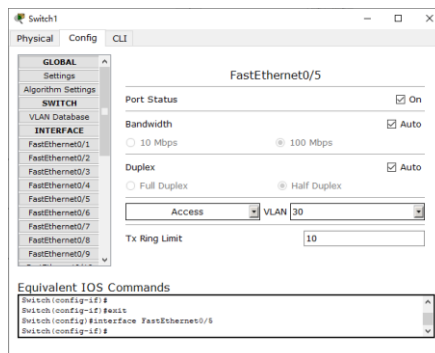
...(Fa0/2-Fa0/5 is the same as Fa0/1)

On the second switch, you need to set the port to which the switch from the first department of VLAN – 10 is connected, from the third VLAN – 30, and 2 PCs and the server of the second department of VLAN – 20. That is, Fa0/1 – VLAN 10, Fa0/2- Fa0/4 – VLAN 20, Fa0/5 – VLAN 30. Fa0/6, connecting the switch and the router are set to Trunk mode.

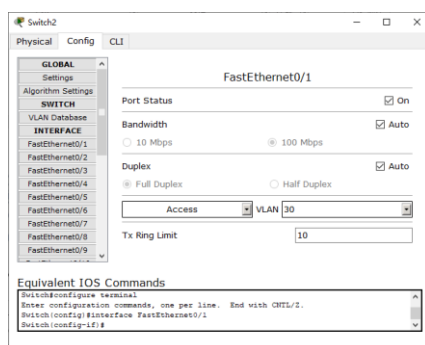


...(Fa0/3- Fa0/4

are as same as Fa0/2)

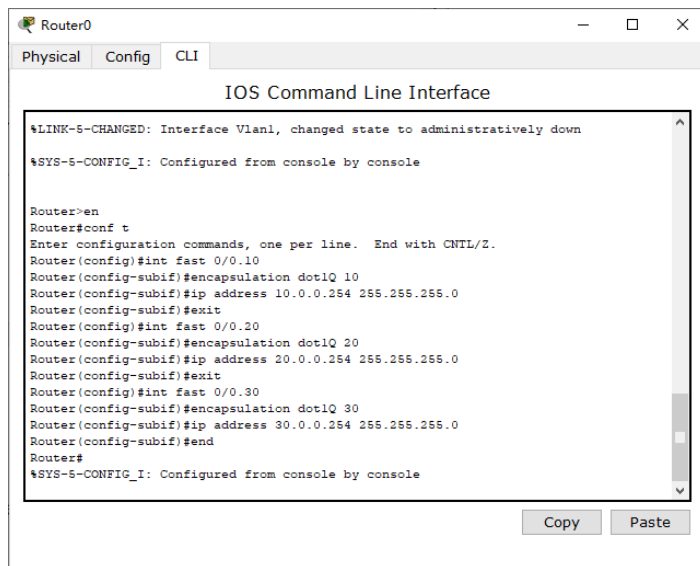


On the third switch, set VLAN 30 (Fa0/1-Fa0/8) to all ports.



...(Fa0/2-Fa0/8 are as same as Fa0/1)

configure the router to work with the VLAN, go to the CLI tab and prescribes commands there:



The screenshot shows the CLI window of Router0. The 'CLI' tab is selected. The window title is 'Router0'. The main area is titled 'IOS Command Line Interface'. It displays the following text:

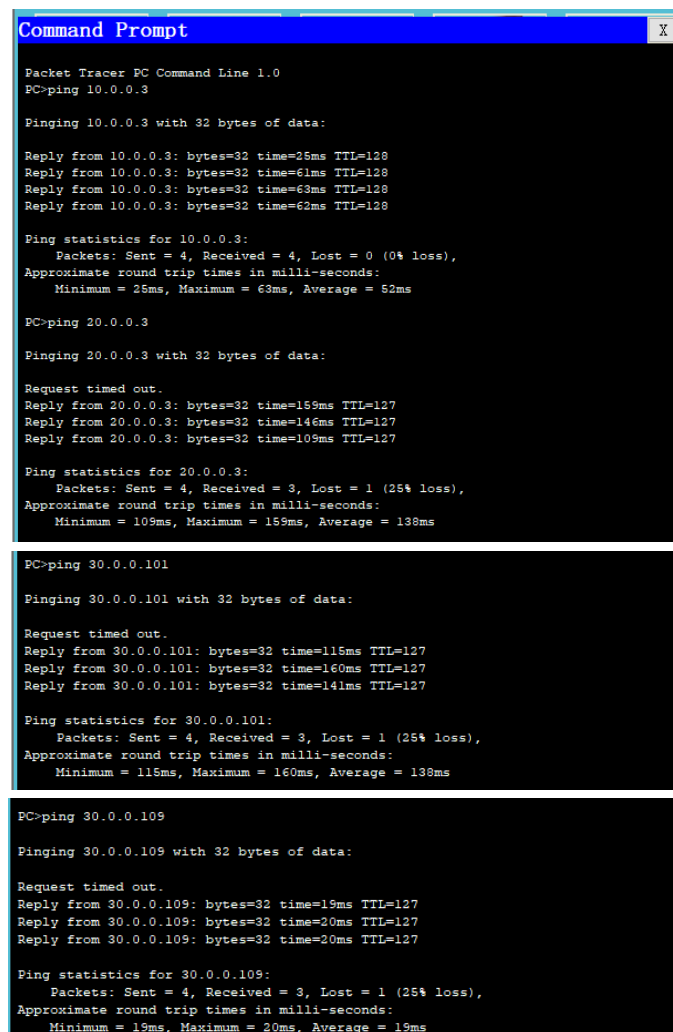
```
%LINK-5-CHANGED: Interface Vlan1, changed state to administratively down
%SYS-5-CONFIG_I: Configured from console by console

Router>en
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#int fast 0/0.10
Router(config-subif)#encapsulation dot1Q 10
Router(config-subif)#ip address 10.0.0.254 255.255.255.0
Router(config-subif)#exit
Router(config)#int fast 0/0.20
Router(config-subif)#encapsulation dot1Q 20
Router(config-subif)#ip address 20.0.0.254 255.255.255.0
Router(config-subif)#exit
Router(config)#int fast 0/0.30
Router(config-subif)#encapsulation dot1Q 30
Router(config-subif)#ip address 30.0.0.254 255.255.255.0
Router(config-subif)#end
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

At the bottom right, there are 'Copy' and 'Paste' buttons.

test the network with the ping command.

The first department:



The first screenshot shows a 'Command Prompt' window with the following text:

```
Packet Tracer PC Command Line 1.0
PC>ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time=26ms TTL=128
Reply from 10.0.0.3: bytes=32 time=61ms TTL=128
Reply from 10.0.0.3: bytes=32 time=63ms TTL=128
Reply from 10.0.0.3: bytes=32 time=62ms TTL=128

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 26ms, Maximum = 63ms, Average = 52ms

PC>ping 20.0.0.3

Pinging 20.0.0.3 with 32 bytes of data:

Request timed out.
Reply from 20.0.0.3: bytes=32 time=159ms TTL=127
Reply from 20.0.0.3: bytes=32 time=146ms TTL=127
Reply from 20.0.0.3: bytes=32 time=109ms TTL=127

Ping statistics for 20.0.0.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 109ms, Maximum = 159ms, Average = 138ms
```

The second screenshot shows the following text:

```
PC>ping 30.0.0.101

Pinging 30.0.0.101 with 32 bytes of data:

Request timed out.
Reply from 30.0.0.101: bytes=32 time=115ms TTL=127
Reply from 30.0.0.101: bytes=32 time=160ms TTL=127
Reply from 30.0.0.101: bytes=32 time=141ms TTL=127

Ping statistics for 30.0.0.101:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 115ms, Maximum = 160ms, Average = 138ms
```

The third screenshot shows the following text:

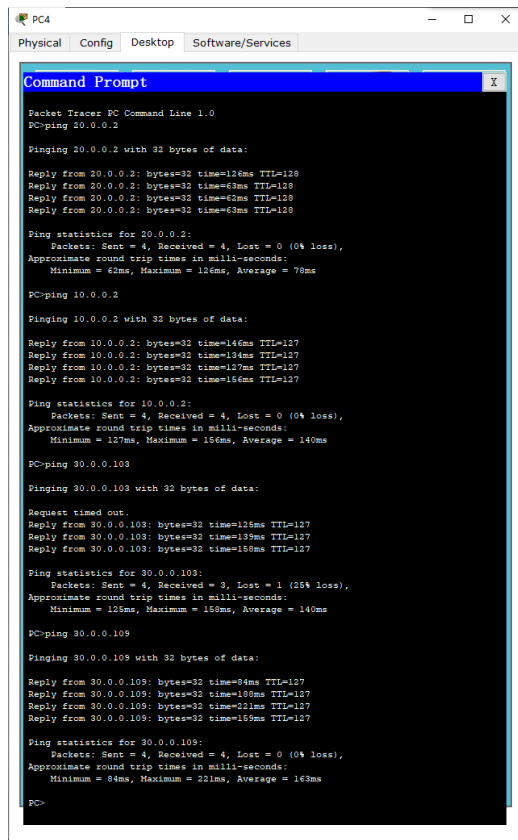
```
PC>ping 30.0.0.109

Pinging 30.0.0.109 with 32 bytes of data:

Request timed out.
Reply from 30.0.0.109: bytes=32 time=19ms TTL=127
Reply from 30.0.0.109: bytes=32 time=20ms TTL=127
Reply from 30.0.0.109: bytes=32 time=20ms TTL=127

Ping statistics for 30.0.0.109:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 19ms, Maximum = 20ms, Average = 19ms
```

Second department:



```
PC4
Physical Config Desktop Software/Services

Command Prompt

Packet Tracer PC Command Line 1.0
PC>ping 20.0.0.2

Pinging 20.0.0.2 with 32 bytes of data:

Reply from 20.0.0.2: bytes=32 time=16ms TTL=128
Reply from 20.0.0.2: bytes=32 time=63ms TTL=128
Reply from 20.0.0.2: bytes=32 time=62ms TTL=128
Reply from 20.0.0.2: bytes=32 time=63ms TTL=128

Ping statistics for 20.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 62ms, Maximum = 16ms, Average = 78ms

PC>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=146ms TTL=127
Reply from 10.0.0.2: bytes=32 time=194ms TTL=127
Reply from 10.0.0.2: bytes=32 time=197ms TTL=127
Reply from 10.0.0.2: bytes=32 time=166ms TTL=127

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 127ms, Maximum = 196ms, Average = 140ms

PC>ping 30.0.0.103

Pinging 30.0.0.103 with 32 bytes of data:

Request timed out.
Reply from 30.0.0.103: bytes=32 time=126ms TTL=127
Reply from 30.0.0.103: bytes=32 time=139ms TTL=127
Reply from 30.0.0.103: bytes=32 time=158ms TTL=127

Ping statistics for 30.0.0.103:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 126ms, Maximum = 158ms, Average = 140ms

PC>ping 30.0.0.109

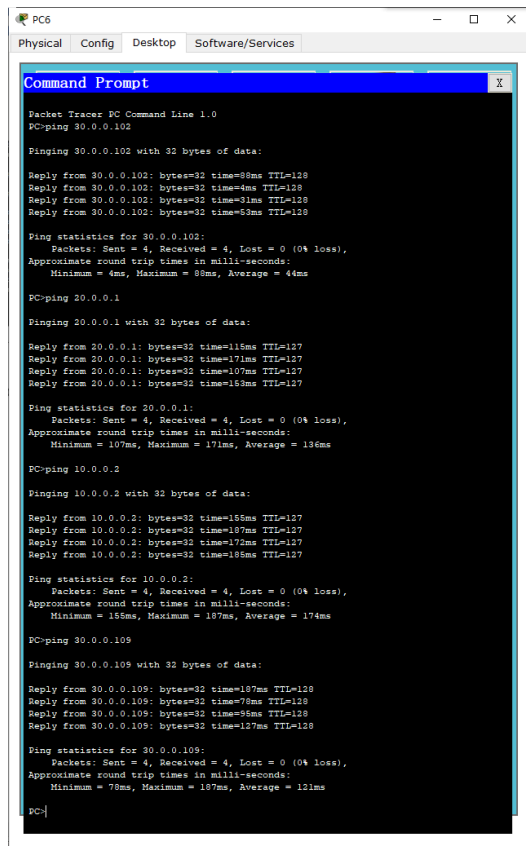
Pinging 30.0.0.109 with 32 bytes of data:

Reply from 30.0.0.109: bytes=32 time=84ms TTL=127
Reply from 30.0.0.109: bytes=32 time=108ms TTL=127
Reply from 30.0.0.109: bytes=32 time=211ms TTL=127
Reply from 30.0.0.109: bytes=32 time=156ms TTL=127

Ping statistics for 30.0.0.109:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 84ms, Maximum = 211ms, Average = 163ms

PC>
```

Third department (cable):



```
PC6
Physical Config Desktop Software/Services

Command Prompt

Packet Tracer PC Command Line 1.0
PC>ping 30.0.0.102

Pinging 30.0.0.102 with 32 bytes of data:

Reply from 30.0.0.102: bytes=32 time=88ms TTL=128
Reply from 30.0.0.102: bytes=32 time=4ms TTL=128
Reply from 30.0.0.102: bytes=32 time=31ms TTL=128
Reply from 30.0.0.102: bytes=32 time=53ms TTL=128

Ping statistics for 30.0.0.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 4ms, Maximum = 88ms, Average = 44ms

PC>ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1: bytes=32 time=15ms TTL=127
Reply from 20.0.0.1: bytes=32 time=171ms TTL=127
Reply from 20.0.0.1: bytes=32 time=107ms TTL=127
Reply from 20.0.0.1: bytes=32 time=153ms TTL=127

Ping statistics for 20.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 107ms, Maximum = 171ms, Average = 136ms

PC>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time=155ms TTL=127
Reply from 10.0.0.2: bytes=32 time=197ms TTL=127
Reply from 10.0.0.2: bytes=32 time=172ms TTL=127
Reply from 10.0.0.2: bytes=32 time=185ms TTL=127

Ping statistics for 10.0.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 155ms, Maximum = 197ms, Average = 174ms

PC>ping 30.0.0.109

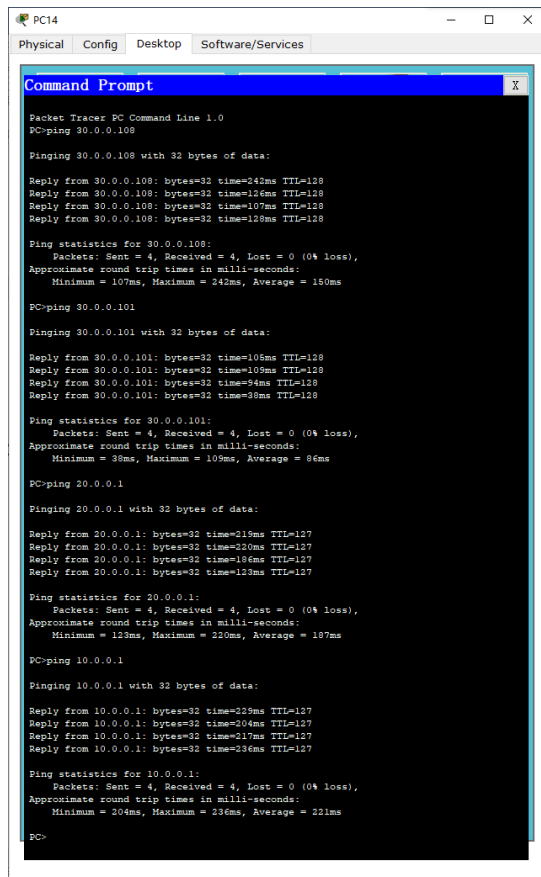
Pinging 30.0.0.109 with 32 bytes of data:

Reply from 30.0.0.109: bytes=32 time=197ms TTL=128
Reply from 30.0.0.109: bytes=32 time=78ms TTL=128
Reply from 30.0.0.109: bytes=32 time=95ms TTL=128
Reply from 30.0.0.109: bytes=32 time=127ms TTL=128

Ping statistics for 30.0.0.109:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 78ms, Maximum = 197ms, Average = 121ms

PC>
```

Third Department (Wi-Fi):



```
PC14
Physical Config Desktop Software/Services

Command Prompt

Packet Tracer PC Command Line 1.0
PC>ping 30.0.0.108

Pinging 30.0.0.108 with 32 bytes of data:

Reply from 30.0.0.108: bytes=32 time=242ms TTL=128
Reply from 30.0.0.108: bytes=32 time=126ms TTL=128
Reply from 30.0.0.108: bytes=32 time=107ms TTL=128
Reply from 30.0.0.108: bytes=32 time=128ms TTL=128

Ping statistics for 30.0.0.108:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 107ms, Maximum = 242ms, Average = 150ms

PC>ping 30.0.0.101

Pinging 30.0.0.101 with 32 bytes of data:

Reply from 30.0.0.101: bytes=32 time=105ms TTL=128
Reply from 30.0.0.101: bytes=32 time=105ms TTL=128
Reply from 30.0.0.101: bytes=32 time=94ms TTL=128
Reply from 30.0.0.101: bytes=32 time=98ms TTL=128

Ping statistics for 30.0.0.101:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 98ms, Maximum = 105ms, Average = 86ms

PC>ping 20.0.0.1

Pinging 20.0.0.1 with 32 bytes of data:

Reply from 20.0.0.1: bytes=32 time=215ms TTL=127
Reply from 20.0.0.1: bytes=32 time=220ms TTL=127
Reply from 20.0.0.1: bytes=32 time=186ms TTL=127
Reply from 20.0.0.1: bytes=32 time=133ms TTL=127

Ping statistics for 20.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 133ms, Maximum = 220ms, Average = 187ms

PC>ping 10.0.0.1

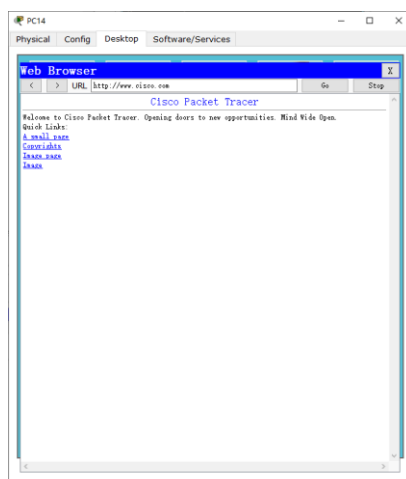
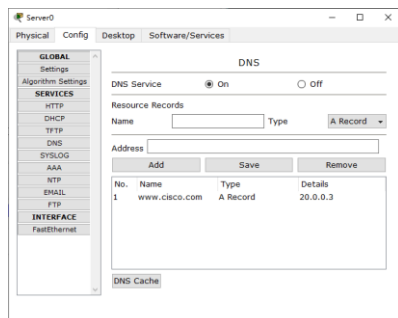
Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=225ms TTL=127
Reply from 10.0.0.1: bytes=32 time=204ms TTL=127
Reply from 10.0.0.1: bytes=32 time=217ms TTL=127
Reply from 10.0.0.1: bytes=32 time=236ms TTL=127

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 204ms, Maximum = 236ms, Average = 221ms

PC>
```

7. Server setup.



8. (Done) Configure SSH.

go into the router and write commands:

```
Router>en
Router#clock set 10:10:00 13 Oct 2017
Router#conf t
Router(config)#ip domain name ssh.dom
Router(config)#crypto key generate rsa
Router(config)#service password-encryption
Router(config)#username Valery privilege 15 password 8 junior17
Router(config)#aaa new-model
Router(config)#line vty 0 4
Router(config-line)#transport input ssh
Router(config-line)#logging synchronous
Router(config-line)#exec-timeout 60 0
Router(config-line)#exit
Router(config)#exit
Router#copy running-config startup-config
```

9. (Done) Configure the protection against on each switch.

open the switch and write commands:

```
Switch>en
Switch#conf t
Switch(config)#interface range fastEthernet 0/X-Y
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport port-security
Switch(config-if-range)#switchport port-security maximum K
Switch(config-if-range)#switchport port-security mac-address sticky
Switch(config-if-range)#switchport port-security violation shutdown
Switch(config-if-range)#end
```

As a result , the work was done as follows:

