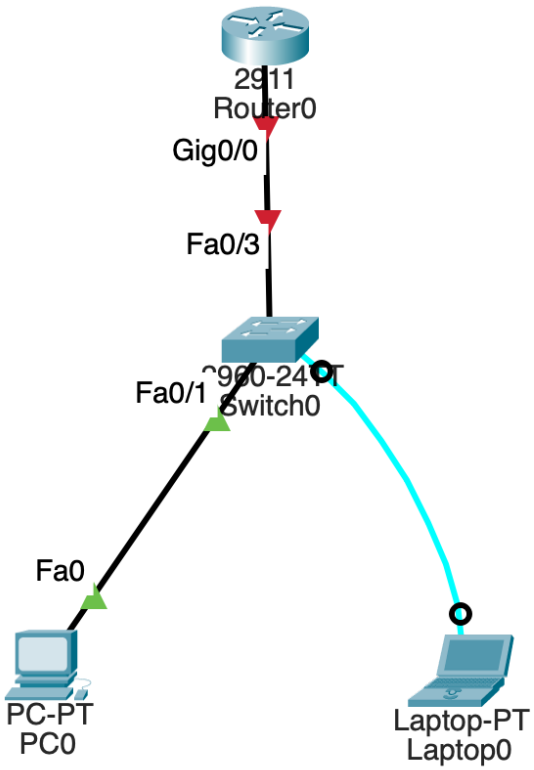
PRACTICE 1

Basics of Working with Cisco Equipment Interfaces. Remote connection to network equipment.

Topology



Requirements

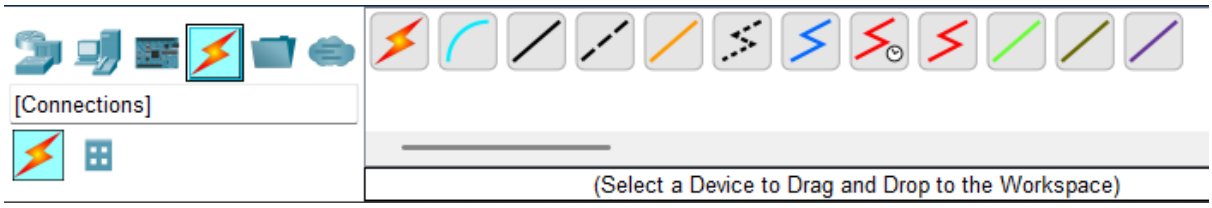
- **Software:** Cisco Packet Tracer installed on your system.
- **Devices:** Ensure you have a PC, a Laptop, a Cisco 2911 Router and a Cisco 2960 Switch in your workspace.
- **Cables:** Use a console cable for a direct connection and straight-through cables.

Background

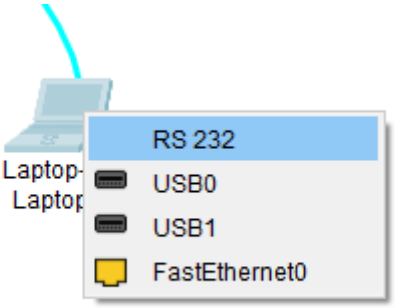
In this activity, you will introduce the Cisco IOS, including different user access modes, various configuration modes, configuring IP addresses, setting up remote connections, and creating users.

Connecting Devices

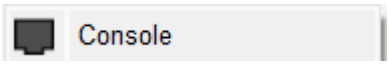
1. Go to the **Connections** section in Packet Tracer.



2. Select the **console cable** (typically blue). 
3. Connect:
    - One end to the **RS-232 port** on the **laptop**.

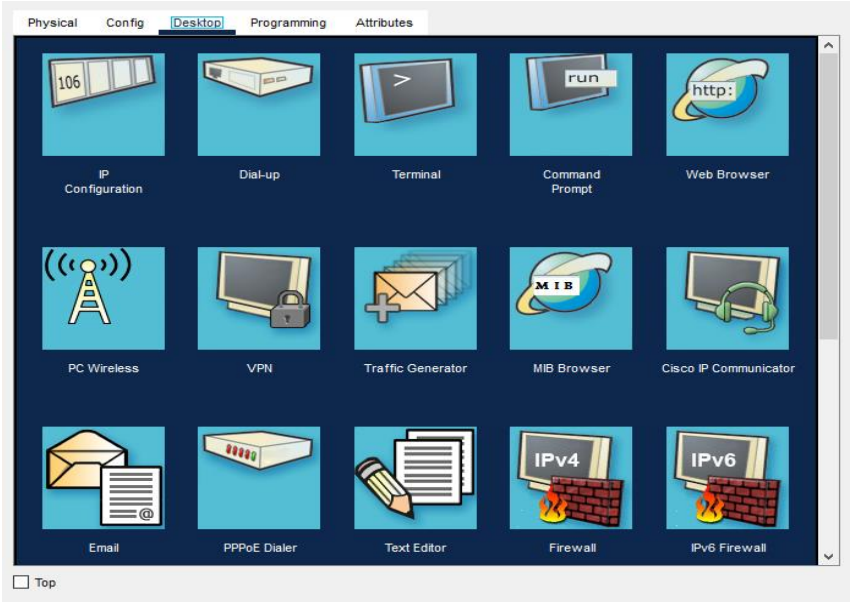


    - The other end to the **console port** on the switch.

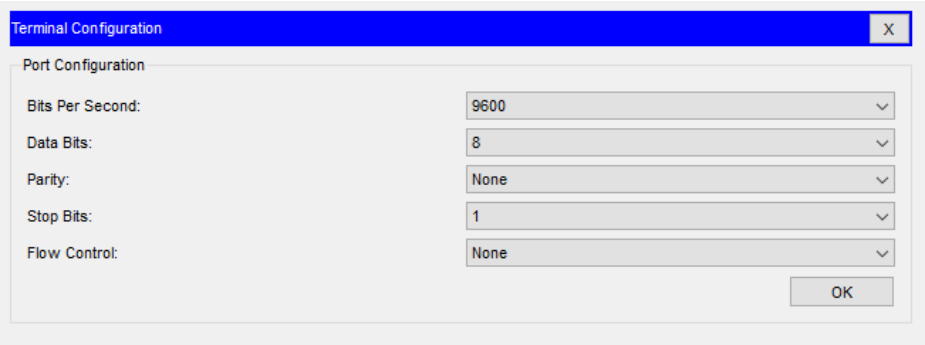


Connecting to the Switch

- Click on the Laptop.
- Go to the **Desktop tab**.

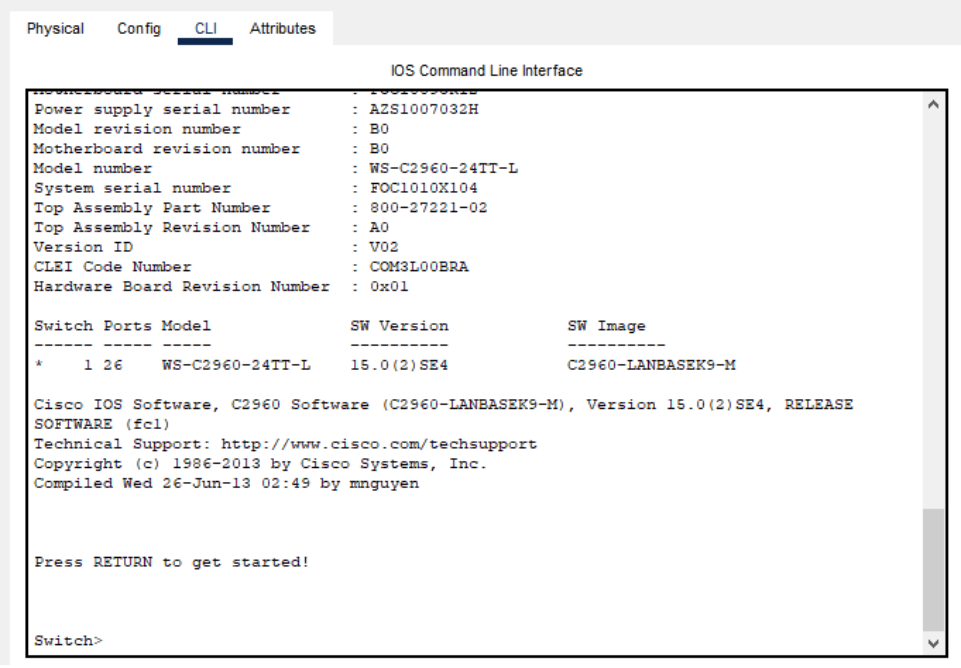


- Select **Terminal**.
- Verify and accept the default COM port settings (usually preconfigured) and click **OK**.



Navigating the Switch Operating System

- After connecting, you'll be in **User Mode** (indicated by >).



- Use the enable command to access **Privileged Mode** (indicated by #).
- Use ? to view available commands at any time.
- To return to **User Mode**, type disable or exit.

```
Switch> enable
Switch#?
Switch#exit
```

Configuring the Switch

Enter **Global Configuration Mode** from **Privileged Mode** using the command: configure terminal

```
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#
```

- **Set a Hostname for the Switch**:

  - To change the default device name: hostname <name of device> (Hostname should be “your name + Switch”, e.g. ViktoriyaSwitch)

- **Set a Banner for the Switch:**

  - To set the Message of the Day (MOTD): banner motd <symbol> <message> <symbol>

```
Switch(config)#hostname YourNameSwitch
YourNameSwitch(config)#banner motd @ This is YourName's
Switch. Unauthorized access is prohibited! @
```

  - Get back to the User Mode and check the banner

- **Set a Password for Privileged Mode:**

- To store the password in clear text: enable password <password> (password should be your student ID)
- For a secure option (higher priority): enable secret <password> (password should be “enc + your student ID”)

```
YourNameSwitch(config)#enable password 20B030109
YourNameSwitch(config)#enable secret enc20B030109
```

- Go back to the Privileged Mode and verify the configurations using show running-config

```
YourNameSwitch#show running-config
Building configuration...

Current configuration : 1163 bytes
!
version 15.0
```

```
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname YourNameSwitch
!
enable secret 5 $1$mERr$xq2U30VGfDEruQqZTUo9f.
enable password 20B030109
!
```

- To encrypt passwords: service password-encryption

```
YourNameSwitch(config)#service password-encryption
```

- Go back to the Privileged Mode again and verify the configuration changes using show running-config

```
YourNameSwitch#show running-config
Building configuration...

Current configuration : 1173 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname YourNameSwitch
!
enable secret 5 $1$mERr$xq2U30VGfDEruQqZTUo9f.
enable password 7 08731C6C594A55464252
!
```

- **Set up authorization to connect to the console.**

- Enter the configuration mode for the console line: line console 0

```
YourNameSwitch(config)#line console 0
```

- Set up password for console line: password <your password>

```
YourNameSwitch(config-line)#password consolePass
```

- Enable password checking: login

```
YourNameSwitch(config-line)#login
```

- **Set up a User Account**

- Create a new user: username <name> privilege <level> password <password> (username should be your surname, e.g. Zhakhayeva)

```
YourNameSwitch(config)#username YourSurname privilege 15
password cisco
YourNameSwitch(config)#
```

! 0 - minimal access, 1 - basic user mode, 15 - full administrative access.

- Set up authorization to connect to the switch using Telnet. Enter the configuration mode for the vty line: line vty 0 4

```
YourNameSwitch(config)#line vty 0 4
```

- Enable local password checking with the use of user database: login local

```
YourNameSwitch(config-line)#login local
```

- Configure remote access through telnet: transport input telnet

```
YourNameSwitch(config-line)#transport input telnet
```

- Verify the configurations using show running-config

```
YourNameSwitch#show running-config
Building configuration...

Current configuration : 1385 bytes
!
version 15.0
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname YourNameSwitch
!
enable secret 5 $1$mERr$xq2U30VGfDEruQqZTUo9f.
enable password 7 08731C6C594A55464252
!
!
!
!
```

```
username YourSurname privilege 15 password 7 0822455D0A16
!
……
!
line con 0
 password 7 082243401A160912220A1F17
 login
!
line vty 0 4
 login local
 transport input telnet
line vty 5 15
 login
!
!
!
!
end
```

- **Configuring IP Address for Remote Access**

  - Enter the VLAN Interface: interface Vlan1

```
YourNameSwitch(config)#interface Vlan1
YourNameSwitch(config-if)#
```

  - Assign an IP address: ip address <IP> <subnet mask>

```
YourNameSwitch(config-if)#ip address 192.168.0.5
255.255.255.0
YourNameSwitch(config-if)#
```

  - Activate the interface: no shutdown

  ! **Important:** Switch Vlan interface is administratively shutdown by default, so you must enable it.

```
YourNameSwitch(config-if)#no shutdown
YourNameSwitch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up
```

Saving Configuration

The `show startup-config` command displays the configuration stored in NVRAM (Non-Volatile RAM) that will be loaded when the device boots up.

- Check startup configurations from Privileged Mode (#) (to go back to Privileged mode, use `exit` command multiple times if needed)

```
YourNameSwitch#show startup-config
```

- Save the configuration to memory: copy running-config startup-config or write memory or shortly wr mem

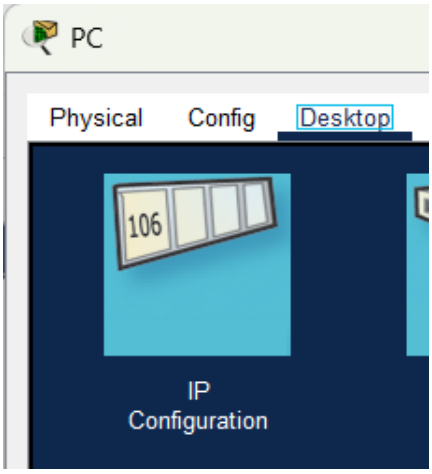
```
YourNameSwitch#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
YourNameSwitch#
```

- After saving your configuration, you can verify what has been stored in NVRAM using the `show startup-config` command.

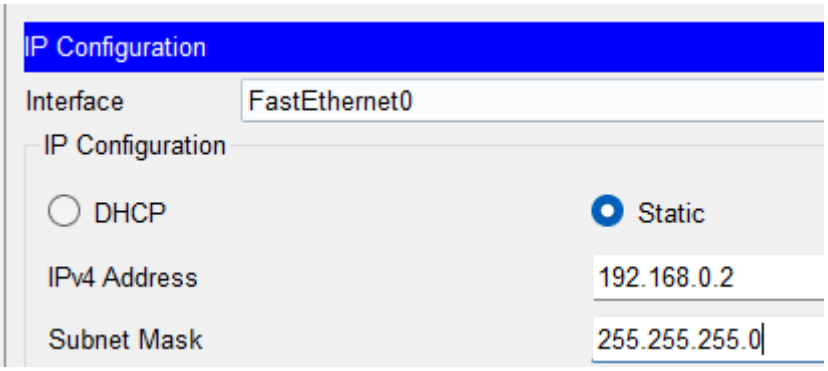
```
YourNameSwitch#show startup-config
```

Set up an IP-address on the PC

- Add PC to your topology.
- On PC open **Desktop**, choose **IP configuration**:

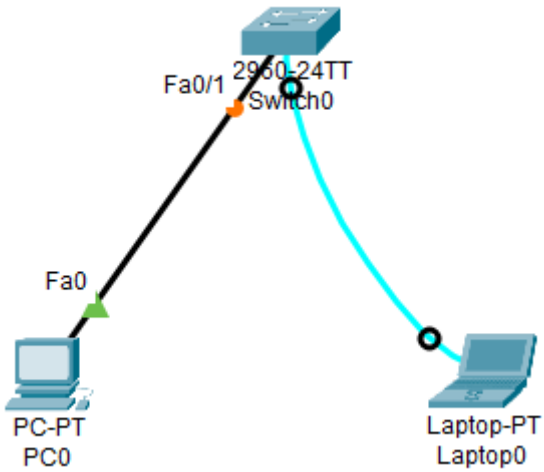


- In **IPv4 Address**, write: 192.168.0.2:



Testing Connection

Ensure the switch's IP is on the same network as the PC and before testing, use copper-cable for checking:



Example:

Switch IP: 192.168.0.5
PC IP: 192.168.0.2

- Use the **ping** command to test connectivity: ping 192.168.0.5

```
C:\>ping 192.168.0.5

Pinging 192.168.0.5 with 32 bytes of data:

Request timed out.
Request timed out.
Reply from 192.168.0.5: bytes=32 time<1ms TTL=255
Reply from 192.168.0.5: bytes=32 time=1ms TTL=255

Ping statistics for 192.168.0.5:
    Packets: Sent = 4, Received = 2, Lost = 2 (50% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms
```

- Use **telnet** command with account credentials created in the section **Set up a User Account**: telnet 192.168.0.5

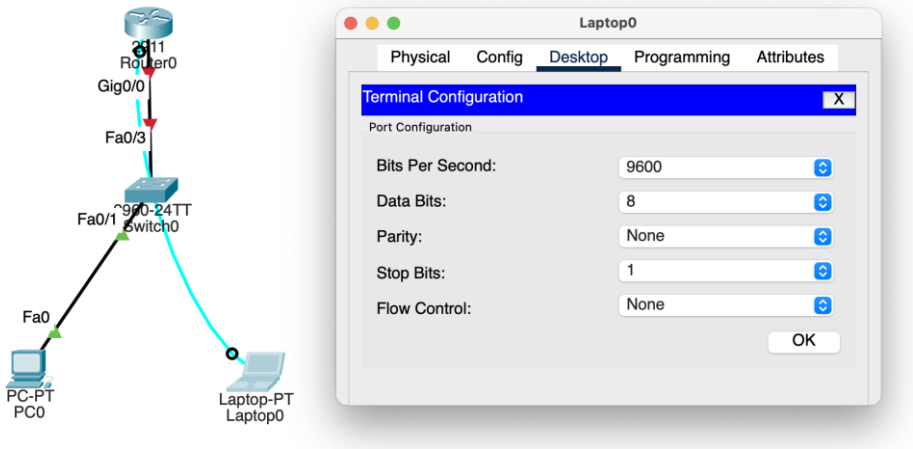
```
C:\>telnet 192.168.0.5
Trying 192.168.0.5 ...Open This is YourName's Switch. Unauthorized access is
prohibited!


User Access Verification

Username: YourSurname
Password:
YourNameSwitch#exit

[Connection to 192.168.0.5 closed by foreign host]
C:\>
```

Configuring the Router

The router configuration process is similar to the switch, with one key difference: IP addresses are assigned to physical interfaces (like GigabitEthernet0/0) instead of VLAN interfaces.

- **Connecting to the Router**

  - Add 2911 Router to your topology and connect it to the Switch.
  - Use a console cable to connect the laptop's RS-232 port to the router's console port (same process as with the switch)
  - Open Terminal from the laptop's Desktop tab
  - Accept default COM port settings and click OK



- **Initial Configuration Dialog**

! **Important:** During the first access to the router's interface, it can ask a question:

```
Would you like to enter the initial configuration dialog? [yes/no]
```

Answer `no`.

- **Router Operating System Navigation**

The navigation is identical to the switch:

- Start in User Mode (indicated by >)
- Use enable to enter Privileged Mode (indicated by #)
- Use configure terminal to enter Global Configuration Mode

```
Router>enable
Router#configure terminal
Router(config)#
```

- **Basic Router Configuration**

Configure hostname and passwords (same commands as switch):
(Hostname should be “your name + Router”, e.g. ViktoriyaRouter)
(password should be your student ID)
(encrypted password should be “enc + your student ID”)

```
Router(config)#hostname R-Floor-1
YourNameRouter(config)#enable password 20B030109
YourNameRouter(config)#banner motd @ This is YourName's
Router. Unauthorized access is prohibited! @
YourNameRouter(config)#service password-encryption
YourNameRouter(config)#enable secret enc20B030109
```

- **Console Line Configuration**

```
YourNameRouter(config)#line console 0
YourNameRouter(config-line)#password consolePass
YourNameRouter(config-line)#login
YourNameRouter(config-line)#exit
```

- **Creating User Account**

(username should be your surname, e.g. Zhakhayeva)

```
YourNameRouter(config)#username YourSurname privilege 15
password cisco
```

- **Configuring IP Address on Router Interface**

  - **Step 1:** View available interfaces

```
YourNameRouter#show ip interface brief
```

```
YourNameRouter#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     unassigned      YES unset  administratively down down
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
YourNameRouter#
```

  - **Step 2:** Enter interface configuration mode

```
YourNameRouter(config)#interface GigabitEthernet0/0
YourNameRouter(config-if)#
```

  - **Step 3:** Assign IP address and subnet mask

```
YourNameRouter(config-if)#ip address 192.168.0.1
255.255.255.0
```

  - **Step 4:** Enable the interface with no shutdown

! **Important:** Router interfaces are administratively shutdown by default, so you must enable them explicitly.

```
YourNameRouter(config-if)#no shutdown
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state
to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface
GigabitEthernet0/0, changed state to up
```

  - **Step 5:** Exit interface configuration mode

```
YourNameRouter(config-if)#exit
YourNameRouter(config)#
```

- **Configuring Remote Access (Telnet)**

```
YourNameRouter(config)#line vty 0 4
YourNameRouter(config-line)#login local
YourNameRouter(config-line)#transport input telnet
YourNameRouter(config-line)#exit
```

- **Verify the configurations using show running-config**

```
YourNameRouter(config)#exit
YourNameRouter#show running-config
```

- **Verify interface status and IP addresses:**

```
YourNameRouter#show ip interface brief
```

```
YourNameRouter#show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
GigabitEthernet0/0     192.168.0.1     YES manual up                    up
GigabitEthernet0/1     unassigned      YES unset  administratively down down
GigabitEthernet0/2     unassigned      YES unset  administratively down down
Vlan1                  unassigned      YES unset  administratively down down
YourNameRouter#
```

- **Saving Router Configuration**

```
YourNameRouter#copy running-config startup-config
```

Or use the short form:

```
YourNameRouter#wr mem
```

- **Testing Router Connectivity**

Test connectivity to Router from PC0 and Laptop0 using ping tool in Command Prompt

1. Test with ping: C:\>ping 192.168.0.1
2. Test Telnet access: C:\>telnet 192.168.0.1

Enter the username and password you created earlier.

```
C:\>telnet 192.168.0.1
Trying 192.168.0.1 ...Open This is YourName's Router. Unauthorized access is
prohibited!


User Access Verification

Username: YourSurname
Password:
YourNameRouter#
```

Answer the key questions and prepare a report.

Key Questions:

1. What steps are required to move from User Mode to Privileged Mode on a Cisco switch?
2. What is the difference between the enable password and enable secret commands when configuring access?
3. Which commands are needed to configure an IP address on the VLAN1 interface and activate it? Provide an example.
4. What is the difference between startup-config and running-config? Which command is used to save the configuration from running-config to startup-config?