

Objective

The goal of this exercise is to create a simple network composing of a router and a host end device using the Cisco Packet Tracer software.

Constructing the topology

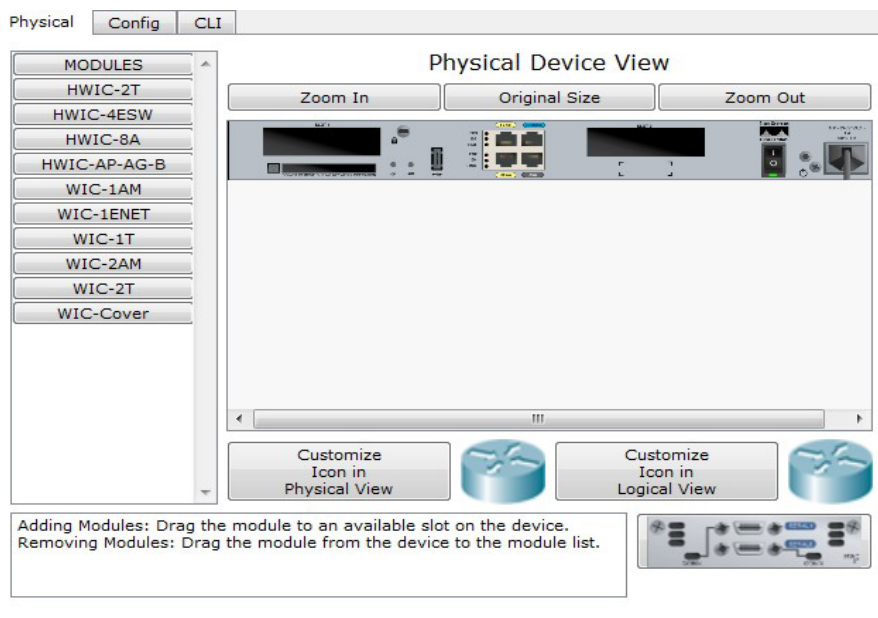
Before we can begin constructing our network, we are going to have to learn the basic principles of our router's IOS. Once you have loaded up the Packet tracer, observe the panel in the lower-left section of the screen.



This panel is used to add devices to the network. In this task, we shall only use a router, an end device and one type of connection.

Select the router icon, then select the 1841 router model. Place the router anywhere on the network.

The router we just added to the network is labeled Router0. **Double click on it.**



This opens up the configuration panel for this router. It is divided into three sections:

- **Physical:** here you can add and remove physical interfaces on the router
- **Config:** this is an overview of the router's active configurations. We will not be using this panel in this task
- **CLI:** this is the router's command line interface. Used to give commands to the router's IOS.

In the physical panel of the router you can see all the physical interfaces this router has at its disposal. It will most likely have two FastEthernet interfaces, a console interface and an auxiliary interface.

Click on the CLI button in the top of the router's configuration panel.

This is the Command Line Interface of our router. Here you can type commands which the IOS will then execute, very similar to a command prompt of other operating systems. The IOS is divided into three primary modes. If you enter the CLI for the first time, you will find yourself in the **User Executive mode**.

```
Cisco 1841 (revision 5.0) with 114688K/16384K bytes of memory.
Processor board ID FTX0947218E
M860 processor: part number 0, mask 49
2 FastEthernet/IEEE 802.3 interface(s)
2 Low-speed serial(sync/async) network interface(s)
191K bytes of NVRAM.
63488K bytes of ATA CompactFlash (Read/Write)
Cisco IOS Software, 1841 Software (C1841-ADVIPSERVICESK9-M), Version 12.4(15)T1,
  RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 18-Jul-07 04:52 by pt_team
```

```
--- System Configuration Dialog ---
```

```
Continue with configuration dialog? [yes/no]: no
```

```
Press RETURN to get started!
```

```
Router>
```

The User Executive mode is the first mode of the IOS. It is identified by the ">" symbol which shows up at the end of the CLI prompt:

Router>

The User Executive mode has very limited capabilities. Only a few commands can be entered in this mode and none of them have the power to invoke a change in the router's configuration. In this task, we won't be using the User Executive mode at all.

Once you are in the User Executive Mode, type "enable" (no quotes) to move to the Privileged Executive mode.

```
Cisco 1841 (revision 5.0) with 114688K/16384K bytes of memory.
Processor board ID FTX0947Z18E
M860 processor: part number 0, mask 49
2 FastEthernet/IEEE 802.3 interface(s)
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```

```
--- System Configuration Dialog ---
```

```
Continue with configuration dialog? [yes/no]: no
```

```
Press RETURN to get started!
```

```
Router>enable
Router#|
```

You are now in the **Privileged Executive mode**. This mode is identified by the “#” symbol at the end of the command prompt. The Privileged Executive is primarily used to view the various configurations of the router. Typing “**disable**” or “**exit**” will move you back to the User Executive mode. One of the most useful commands of the Privileged Executive mode is the “**show**” command. This command allows you to view almost any configuration of the router. For example, typing “**show ip interface brief**” will display a short list of the router’s physical interfaces.

```
Router>enable
Router#show ip interface brief
```

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	unassigned	YES	unset	administratively down	down
FastEthernet0/1	unassigned	YES	unset	administratively down	down
Serial0/1/0	unassigned	YES	unset	administratively down	down
Serial0/1/1	unassigned	YES	unset	administratively down	down
Vlan1	unassigned	YES	unset	administratively down	down

```
Router#
```

Since we haven’t yet configured any of the interfaces, the list will not tell us anything useful. You can also enter the show command using other parameters. The symbol “?” is used as a help command in the CLI. Typing “**show ?**” will display all possible parameters for the show command. Similarly, typing only the “?” command in the Privileged executive mode will display all commands supported in this mode. Do not worry though, we will only be using a very limited number of them.

Now, use the “configure terminal” command to enter the Global Configuration mode.

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

You are now in the **Global Configuration mode**, as shown by the “**Router(config)#**” prompt. The Global Configuration mode is used to change the configuration of the router. You can leave the Global Configuration mode with the “**exit**” command. Let’s start however by changing the name of the router to Router-A. For this, use the “hostname” command followed by the name you wish to apply to the router.

Type in “hostname Router-A” to change the router’s name to Router-A

As you can see, the command prompt also changed to reflect the router’s new name. This router is going to serve as the Router A in our topology. As you can see in the exhibit at the start of this task, Router A serves as the gateway for the LAN 172.16.23.0 on which Host 1 is located. We will use the FastEthernet0/0 interface to connect the router to this LAN.

Type in “interface FastEthernet0/0” to access the FastEthernet0/0 interface.

You are now in the Interface Configuration mode for this interface. Every interface has its own independent configuration mode which can be accessed by using the “interface” command followed by the name of the interface you wish to access.

Now that we are in this interface, we need to change its IP address so that it becomes a part of the 172.16.23.0 network.

Change the IP address of the interface using the following command:
“IP address 172.16.23.1 255.255.255.0”

Use the “no shutdown” command to activate the interface.

```
Router-A(config)#interface FastEthernet0/0
Router-A(config-if)#ip address 172.16.23.1 255.255.255.0
Router-A(config-if)#no shutdown

Router-A(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
```

```
Router-A(config-if)#no shutdown
Router-A(config-if)#|
```

The **“IP address”** is an Interface Configuration mode command used to assign an IP address for that interface. This command has two parameters. The first one is the actual IP address we wish to use. Here we used the 172.16.23.1 address, which is the first address on the 172.16.23.0 network. Gateways of a network are usually assigned the first address of that network.

The second parameter is the subnet mask. The 255.255.255.0 mask means that the first 24 bits of an IP address are used to identify the network portion. So this network can use the addresses 172.16.23.1 to 172.16.23.254. Remember that the last address of a network is always used as the broadcast address and cannot be used as a host address.

Lastly, we used the **“no shutdown”** command to turn the interface on. On a router, all interfaces are off by default. If you want to use an interface, you need to activate it by using this command.

Note that the following line was displayed:

%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

This is also a result of the “no shutdown” command. The IOS informed us that the interface is now active. If you return to the Privileged Executive mode and use the “show ip interface brief” command, you can see that the FastEthernet0/0 interface now has its IP address and its status is marked as up. Its protocol is still marked as down, because there are no other devices connected to the 172.16.23.0 network. This is going to change in a moment.

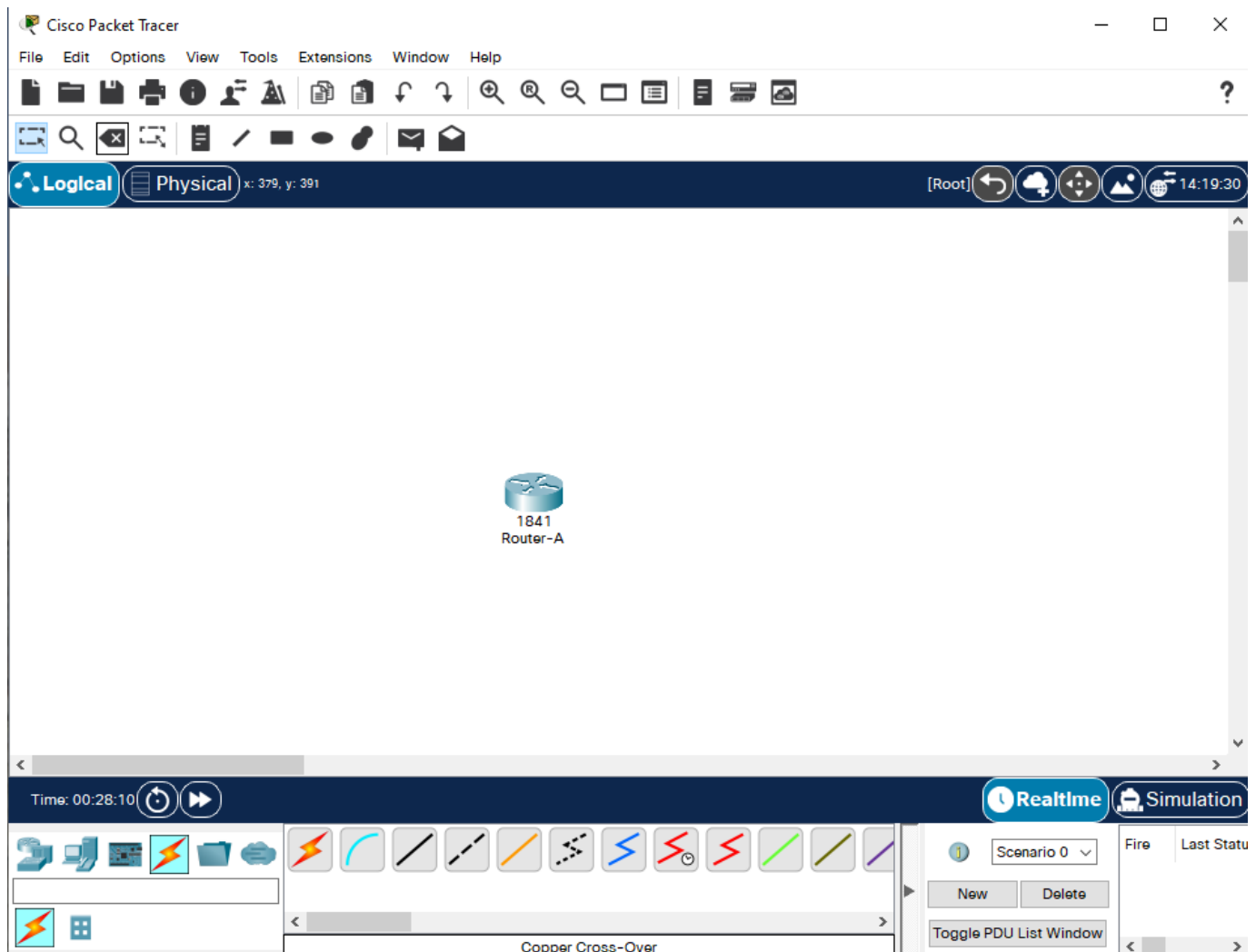
```
Router-A#show ip interface brief
```

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	172.16.23.1	YES	manual	up	down
FastEthernet0/1	unassigned	YES	unset	administratively down	down
Serial0/1/0	unassigned	YES	unset	administratively down	down
Serial0/1/1	unassigned	YES	unset	administratively down	down
Vlan1	unassigned	YES	unset	administratively down	down

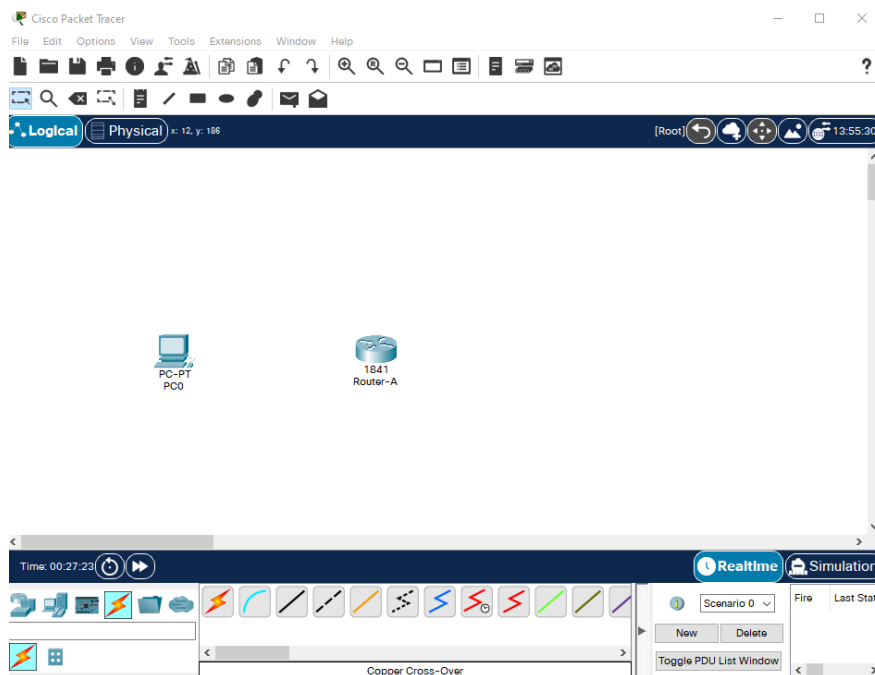
```
Router-A#
```

You can leave the Interface Configuration mode of interface FastEthernet0/0 by typing **“exit”**. Remember that this command will always throw you one mode

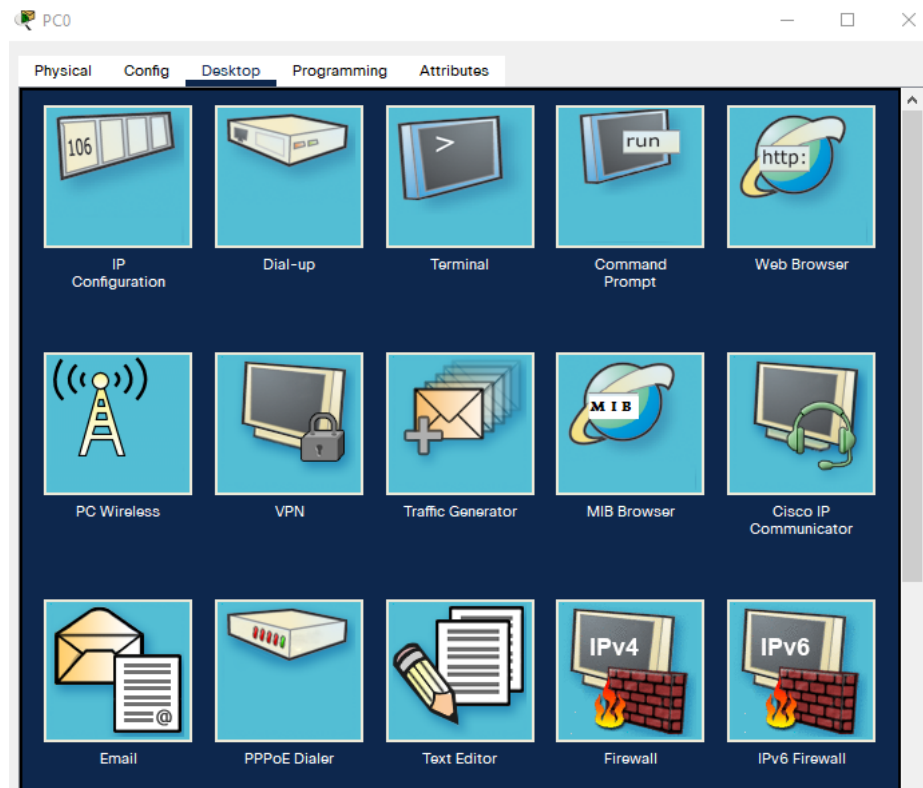
backward. So, from Interface Configuration mode to Global Configuration mode, from Global Configuration mode to Privileged Executive mode, etc. You can exit the CLI of the router for now.



Now, add an end device to the network, specifically a generic PC. Place it next to the router. Double click on the PC.



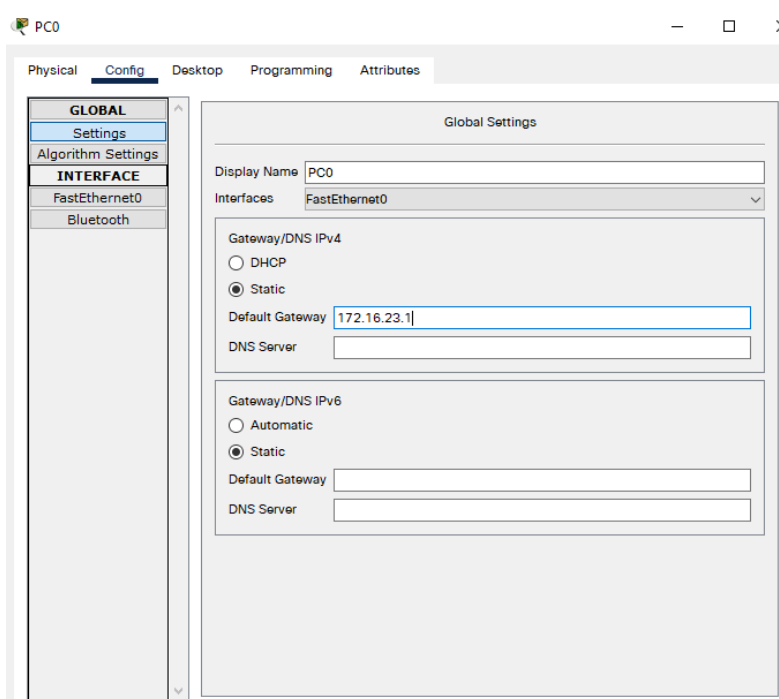
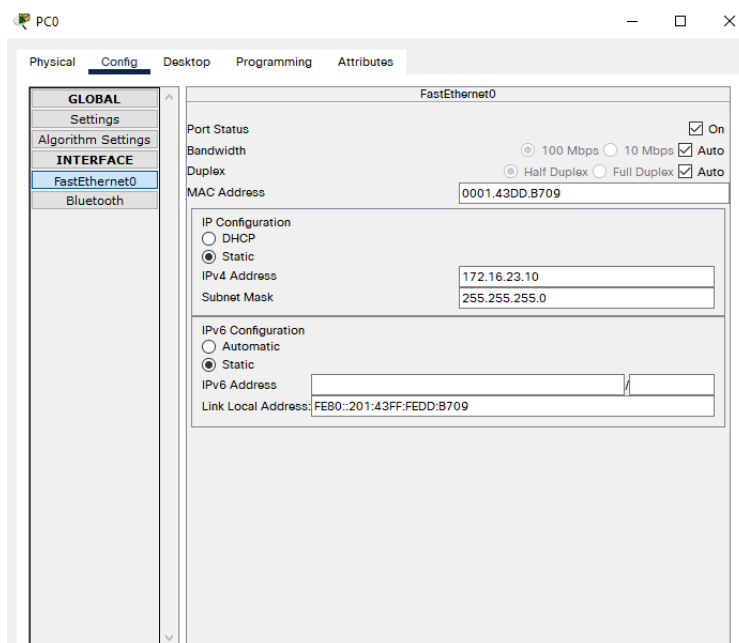
Click on the Desktop tab, then the IP Configuration button.



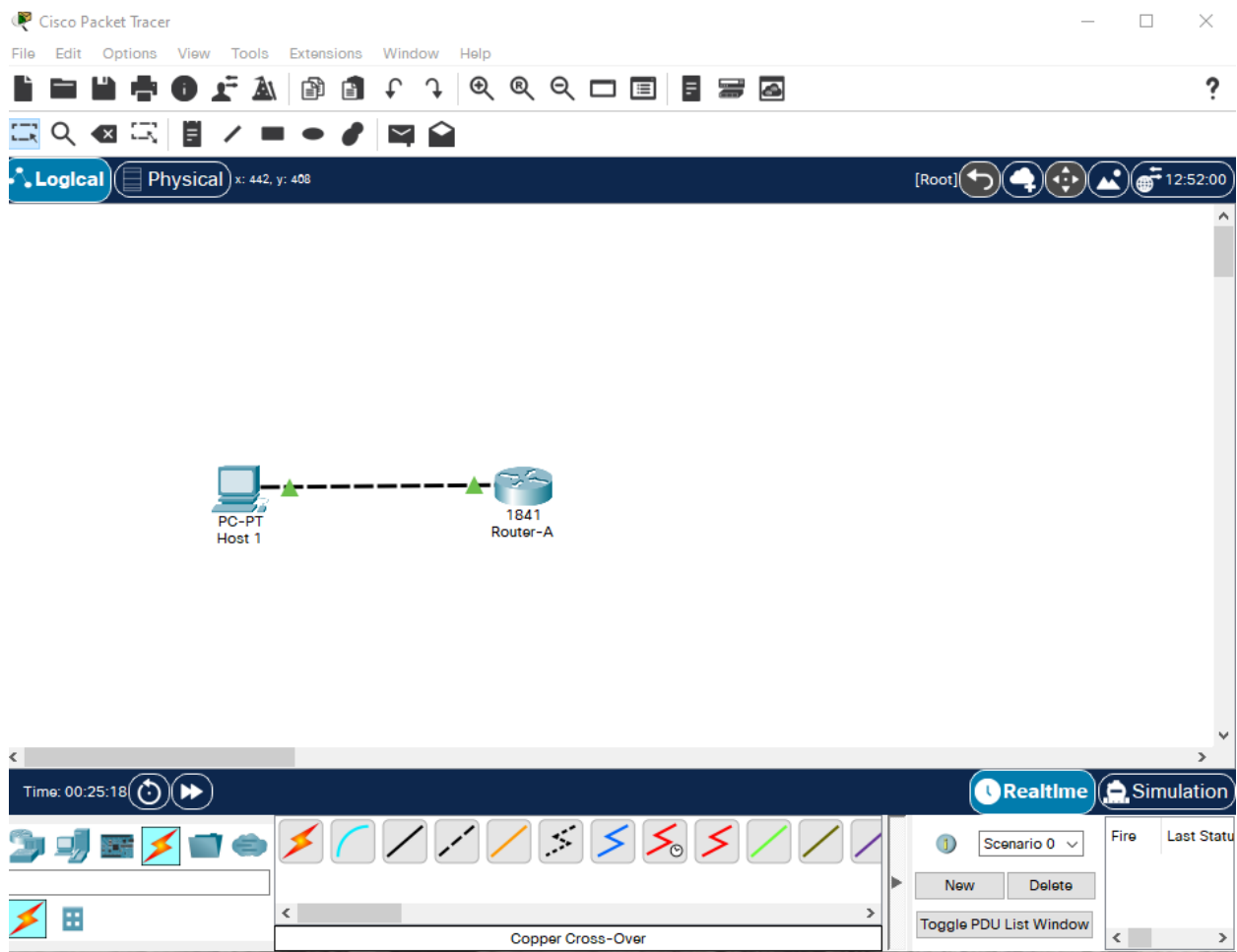
A PC has similar configuration options to those of a router. However, we only need to change the PC's IP address so that it becomes part of the 172.16.23.0 network. And its default gateway, so that it recognizes the FastEthernet0/0 interface of Router-A as its gateway.

Assign the 172.16.23.10 IP address to the PC and 172.16.23.1 as its default gateway. The subnet mask remains is naturally 255.255.255.0.

The PC is now part of the 172.16.23.0 network, with an IP address of 172.16.23.10. The FastEthernet0/0 of Router-A serves as its gateway. Now we only need to connect the PC to the router.



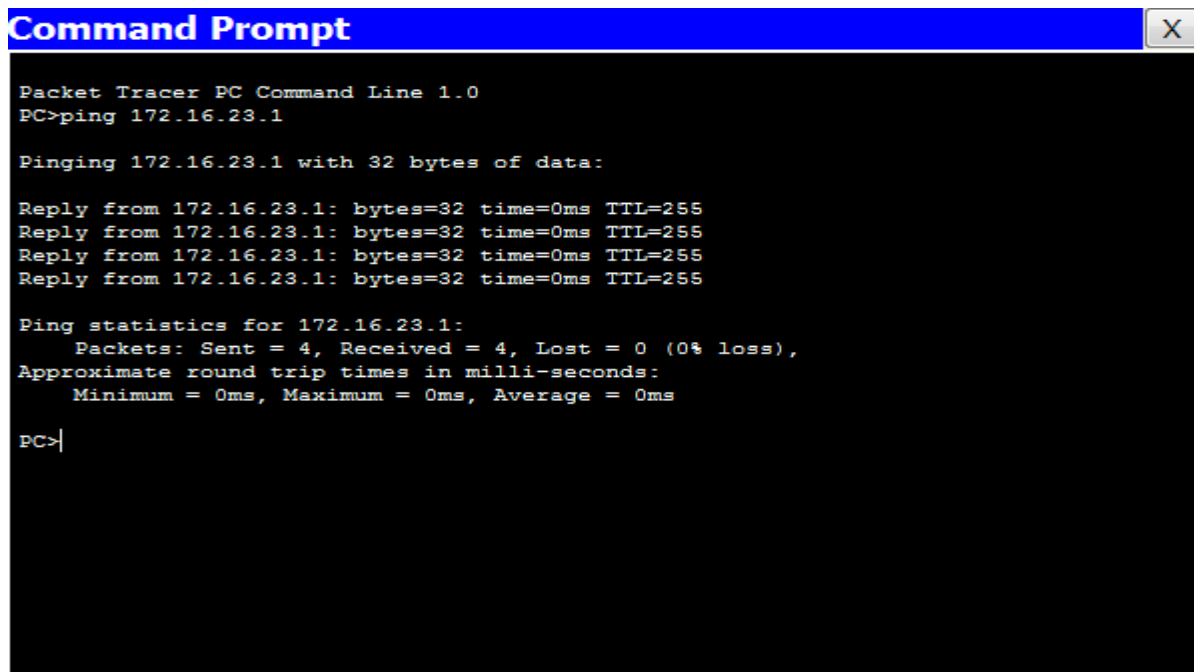
Connect the FastEthernet0/0 interface of the router to the FastEthernet0 interface of the PC using a Copper cross-over cable.



Note that you can also rename the devices in your topology by clicking on their names. Thus, we have renamed PC0 to Host 1 and Router0 to Router-A, to better reflect our desired topology.

Host 1 is now a part of the 172.16.23.0 network. To verify this, you can enter the command prompt of the pc (found under the desktop tab) and send a ping to the FastEthernet0/0 interface of Router A. A ping is a simple data packet used to verify the connectivity of devices. If the other device replies to the ping, you can be sure that the connection between them is in working order.

As you can see, the PC received a reply from Router A, which means that they have been connected successfully.



```
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 172.16.23.1

Pinging 172.16.23.1 with 32 bytes of data:

Reply from 172.16.23.1: bytes=32 time=0ms TTL=255
Reply from 172.16.23.1: bytes=32 time=0ms TTL=255
Reply from 172.16.23.1: bytes=32 time=0ms TTL=255
Reply from 172.16.23.1: bytes=32 time=0ms TTL=255

Ping statistics for 172.16.23.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

PC>
```