

Topic	THE INTERNET	
<b>Class Description</b>	Students will learn how information travels on the internet as well as about important devices which make it possible. Students will also create a virtual network using Cisco Packet Tracer.	
<b>Class</b>	<b>C-193</b>	
<b>Class time</b>	<b>50 mins</b>	
<b>Goal</b>	<ul style="list-style-type: none"> <li>● Learn about the internet.</li> <li>● Download and Install Cisco Packet Tracer.</li> <li>● Create network simulation.</li> </ul>	
<b>Resources Required</b>	<ul style="list-style-type: none"> <li>● Teacher Resources:           <ul style="list-style-type: none"> <li>○ Laptop with internet connectivity</li> <li>○ Earphones with mic</li> <li>○ Notebook and pen</li> <li>○ Smartphone</li> </ul> </li> <li>● Student Resources:           <ul style="list-style-type: none"> <li>○ Laptop with internet connectivity</li> <li>○ Earphones with mic</li> <li>○ Notebook and pen</li> </ul> </li> </ul>	
<b>Class structure</b>	<b>Warm-Up Slides</b> <b>Teacher-led Activity 1</b> <b>Student-led Activity 1</b> <b>Teacher-led Activity 2</b> <b>Student-led Activity 2</b> <b>Wrap-Up Slides</b>	<b>5 mins</b> <b>10 mins</b> <b>10 mins</b> <b>10 mins</b> <b>10 mins</b> <b>5 mins</b>
<b>WARM UP SESSION - 10 mins</b>		



### Teacher Starts Slideshow

#### Slide 1 to 4

Refer to speaker notes and follow the instructions on each slide.

Hey <student's name>. How are you? It's great to see you! Are you excited to learn something new today?

**ESR:** Hi, thanks!  
Yes I am excited about it!

#### Following are the WARM-UP session deliverables:

- Greet the student.
- Revision of previous class activities.
- Quizzes.

Click on the slide show tab and present the slides

### WARM-UP QUIZ

Click on In-Class Quiz



#### Continue WARM-UP Session

#### Slide 5 to 12

#### Following are the session deliverables:

- Appreciate the student.
- Narrate the story by using hand gestures and voice modulation methods to bring in more interest in students.



### Teacher ends slideshow

### TEACHER-LED ACTIVITY-1 - 10 mins

#### Teacher Initiates Screen Share

#### ACTIVITY

- **Introduction to the internet.**
- **Overview of the internet devices such as routers, servers etc.**

Teacher Action	Student Action
<p>Hello and welcome to this new module.</p> <p>Here we are going to learn about internet</p> <p>After this module you will be able to answer the questions such as what is a internet, how the internet works and what are the key components of a internet. You will also be able to build apps and software which rely on communicating with other devices.</p>	
<p>To understand internet Let's assume a situation. You are sitting in a room with your friend and you made a very cool program and you wanted to run that on your friend's computer.</p> <p>But you do not have any internet and any storage device with you.</p> <p>So how would you transfer the files to the other computer?</p> <p>Any ideas?</p> <p><i>Encourage the student to think about different ways.</i></p>	<p><b>ESR:</b> Varied.</p>
<p>Have you seen USB ports where you connect the USB cable with the other computer and transfer the files.</p> <p>This is the very basic type of a network where two computers are connected with each other and sharing the data.</p> <p>Let's just assume one more situation; now instead of sharing the file with only 1 computer, you want to share the</p>	

files with your entire class.

In your school's computer lab, you have 20 computers and you want to share your project with all the other students as well.

How can we do this?

The main issue is that each computer has only 1 port with which you can connect the wire which means you cannot connect more than 2 computers directly..

So what would be the solution here?

There is a need for a device that can function as an extension device, providing us with a lot of USB ports for connecting to other computers.

Fortunately, we have such a device. It is known as the **Switch**.

**Switch:** Switch is a device that is used to connect multiple computer devices

**ESR:** Varied.

**ESR:** Varied.

With the help of the switch, we can connect more than two computers with each other.

One problem is solved, we are able to connect all the computers in our lab.

How would you choose the computer onto which you want to send the data?

One option is that you can send the data to all the computers. But this is not an ideal way; we should have the ability to send data to a particular computer as well.

**ESR:** Varied.

The question here is how would you identify a computer on a network of multiple computers?

This is very similar to finding the home of your friend in a city or society. You need an address for it.

In the real world, to find the house you would need a house number, name of the society, etc. But to identify a computer on a network you need an IP address.

The IP address is a unique set of numbers assigned to a computer on a network.

Here IP stands for Internet Protocol which simply means a set of rules which govern the internet.

The IP address is a set of 4 numbers separated by a . dot.

- Each number can range from 0-255.
- A special number 255 is used in some computing tasks. It is the maximum value that can be represented by an eight-digit binary number.
- 192.168.1.1 is an example of an IP address.

We will learn more about the IP address in the upcoming classes. Here it is important to understand that on a network of computers, two computers can not have the same IP address.

So with the help of a networking device we can connect multiple computers and using an IP address we can identify the computer.

Once you know the IP address of the computer you will be

**ESR:** Varied.

able to share the information with that computer.

This is called a Local Area Network or LAN because all the computers are on the same network.

**Local Area Network:** A local area network (LAN) consists of a group of devices connected in one physical location, such as a building, office, or home. The computers in a LAN connection to each other via the Internet and using IP address we will find the exact address of the computer.

Here we cannot communicate with the outside world. By outside world, we mean with other LANs.

If a school has two labs, each lab can have its own Local Area Network, but you cannot share the information between them.

But let's say you have one school in one city and another school in a different city. How can we transmit the data now?

That is where we can use a different set of devices. First, we need a place where we can send all the information; this is usually called a server.

**Server:** It is a computer that provides data of many kinds to a user or client. Typically, a server will only perform a few actions for many clients. Every action taken by a server is called a service. Services are used by computers called clients.

But what if we want to communicate with two or more servers?

**ESR:** Varied.

**ESR:** Varied.

For that we need a different device called **Routers**

**Routers:** Routers are computers that are specialized to move data between servers and computers. They ensure that data transfers between computers take place where they should.

So we connect our computer with the router and the router connects us to the server.

Now we can send the information to the server and through that server the information will reach the other lab.

So basically when all devices combined they form a network which is called Internet network

Basically, all devices combine to form a network, which is called the Internet.

So we discussed the Internet and the devices combined with the Internet, but don't you want to see something live which will give a clear picture of the internet and how it works.

So let's download very famous network

Please share your screen and we will install the software.

**Teacher Stops Screen Share**



**Teacher Starts Slideshow**

**Slide 13 to 15**

Refer to speaker notes and follow the instructions on each slide.

We have one more class challenge for you.

Can you solve it?

Let's try. I will guide you through it.



Teacher Ends Slideshow

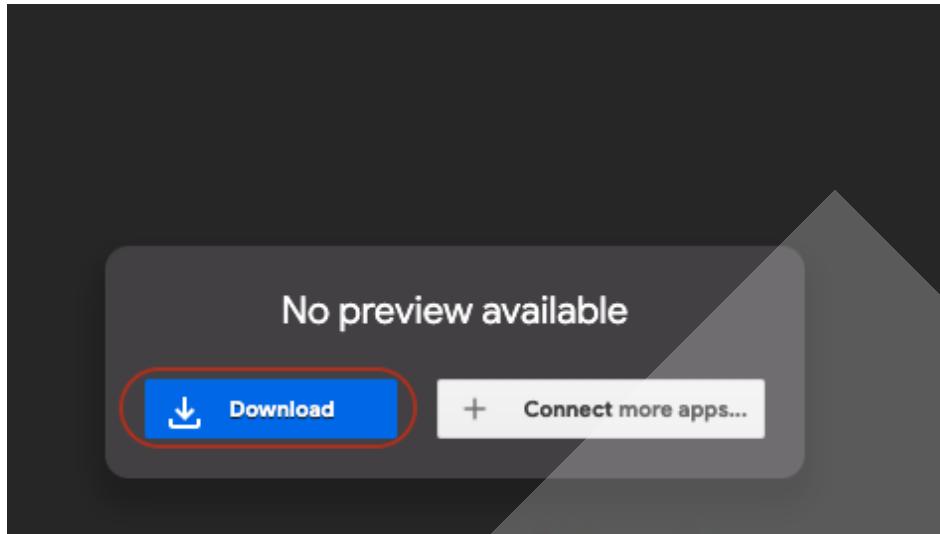
### STUDENT-LED ACTIVITY-1 - 20 mins

- Ask the student to press the ESC key to come back to the panel.
- Guide the student to start Screen Share.
- The teacher gets into Fullscreen.

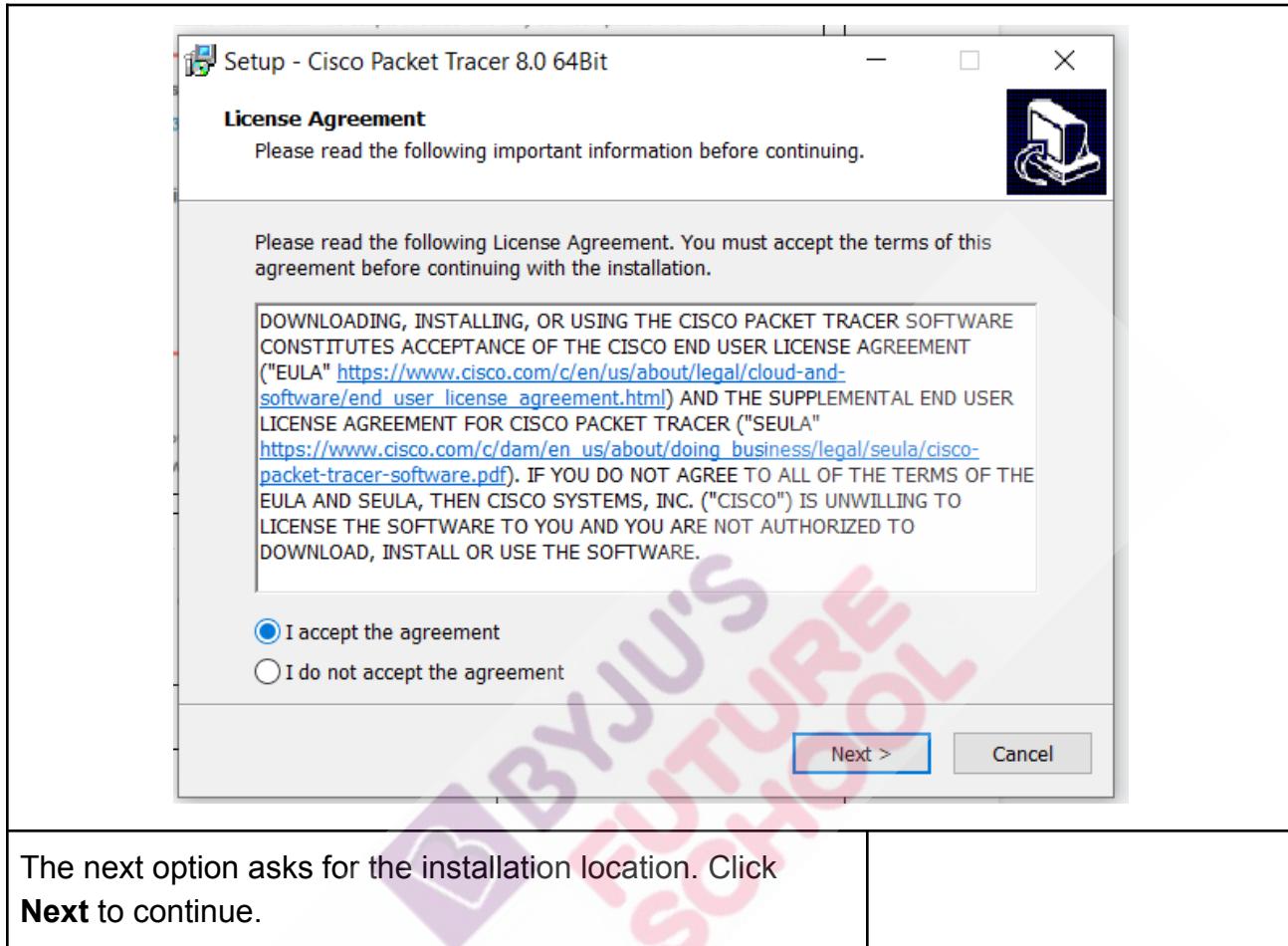
#### ACTIVITY

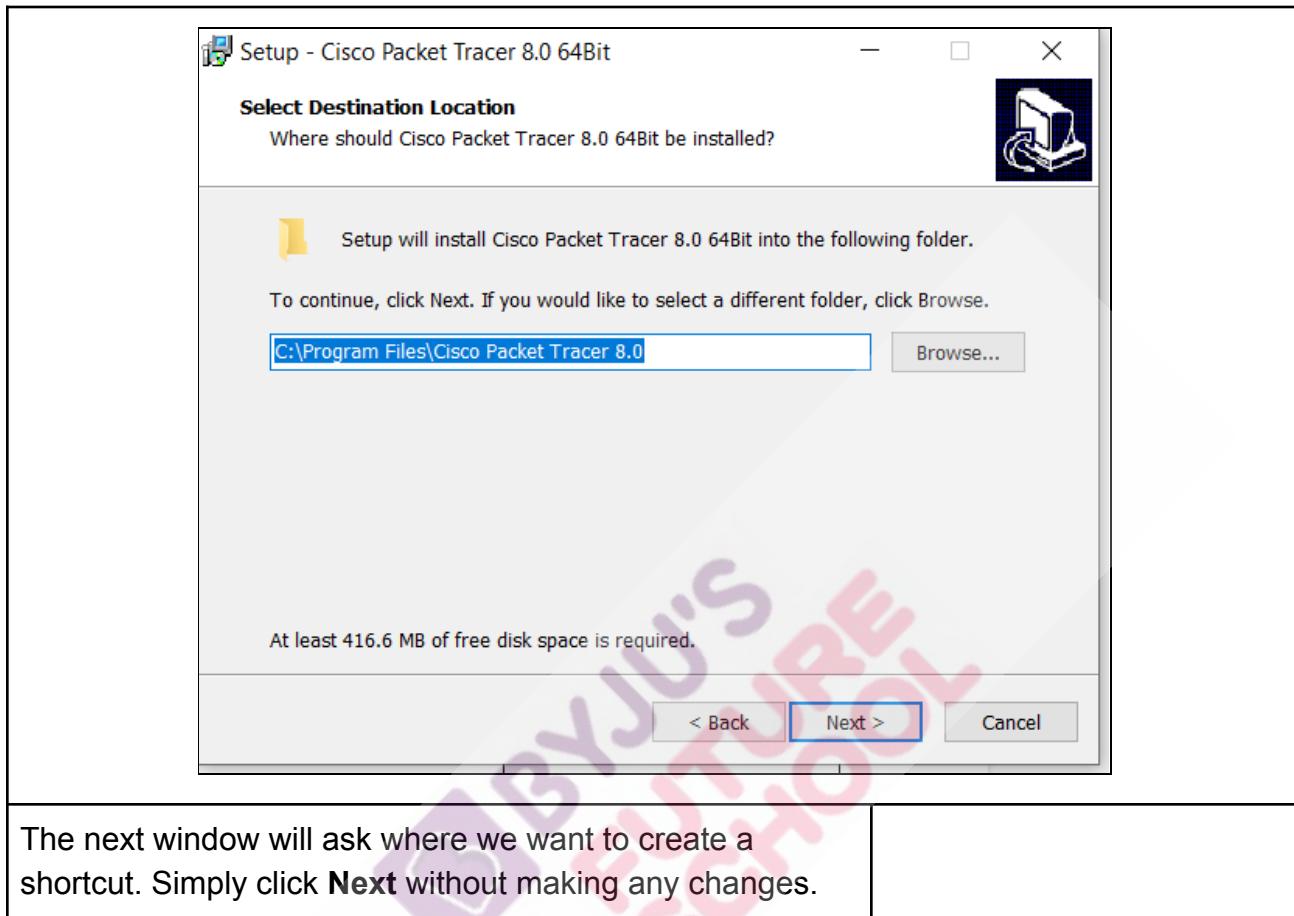
- Install the Cisco Packet Tracer.

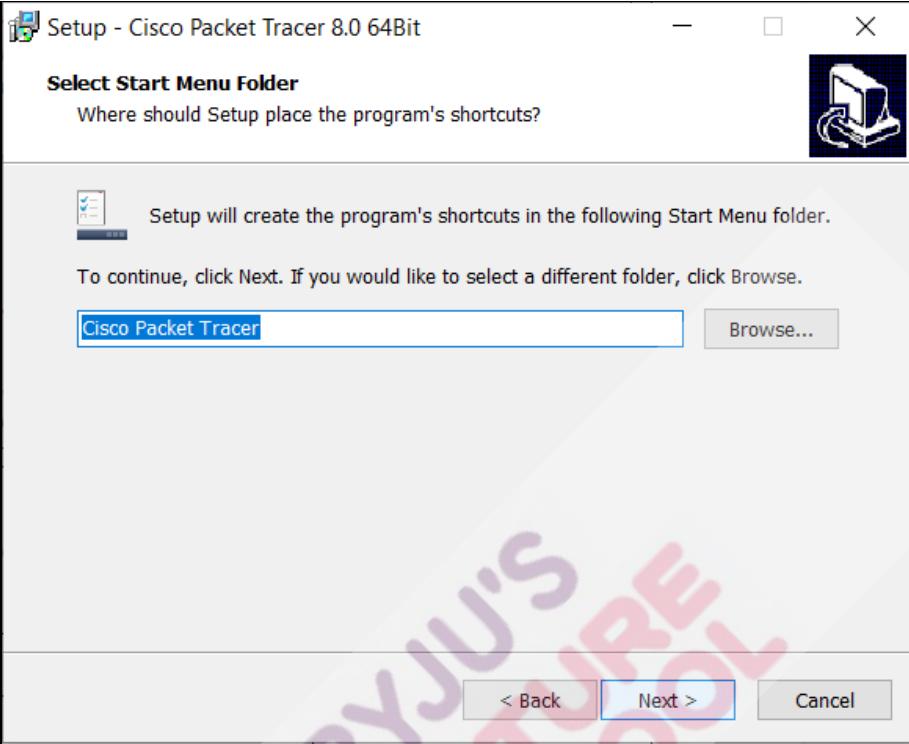
Teacher Action	Student Action
<p>Cisco Packet tracer is a free software from Cisco. We will download this software</p> <p>Open the Download link and download the software for your operating system</p>	<p>Student will download the software for their operating system.</p>
<p><i>Teacher clicks on Teacher Activity1</i></p> <p><i>Note : Click on the download button to download the Cisco Packet Tracer as per operating system configuration</i></p>	<p><i>Student clicks on Student Activity1</i></p> <p><a href="#">Download for Windows</a>  <a href="#">Download for Mac.</a></p>



1. Once the download is complete.
2. Go to the **Downloads** folder and double-click on the downloaded file.
3. It will open the installer window.
4. First check the “**accept the license agreement**” and then click on **Next**.



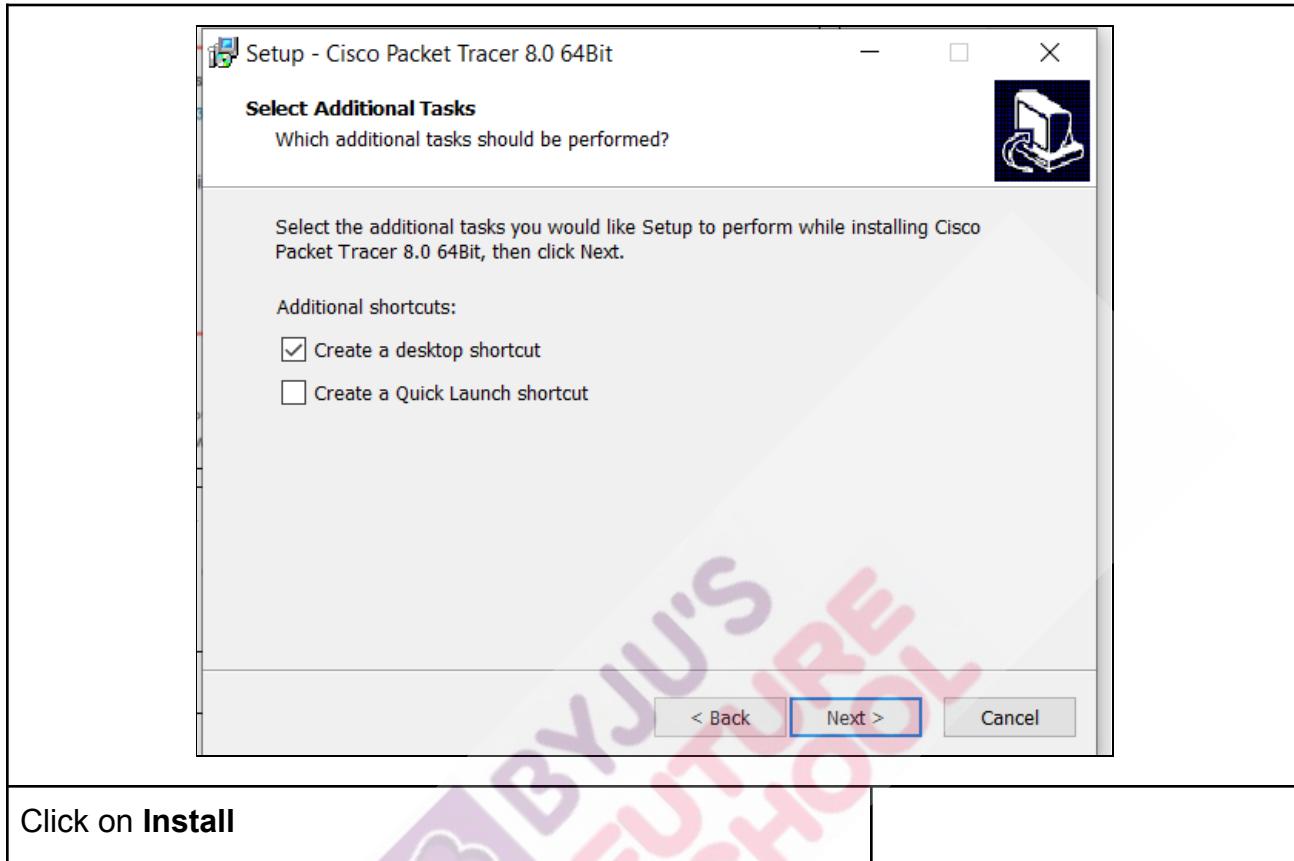


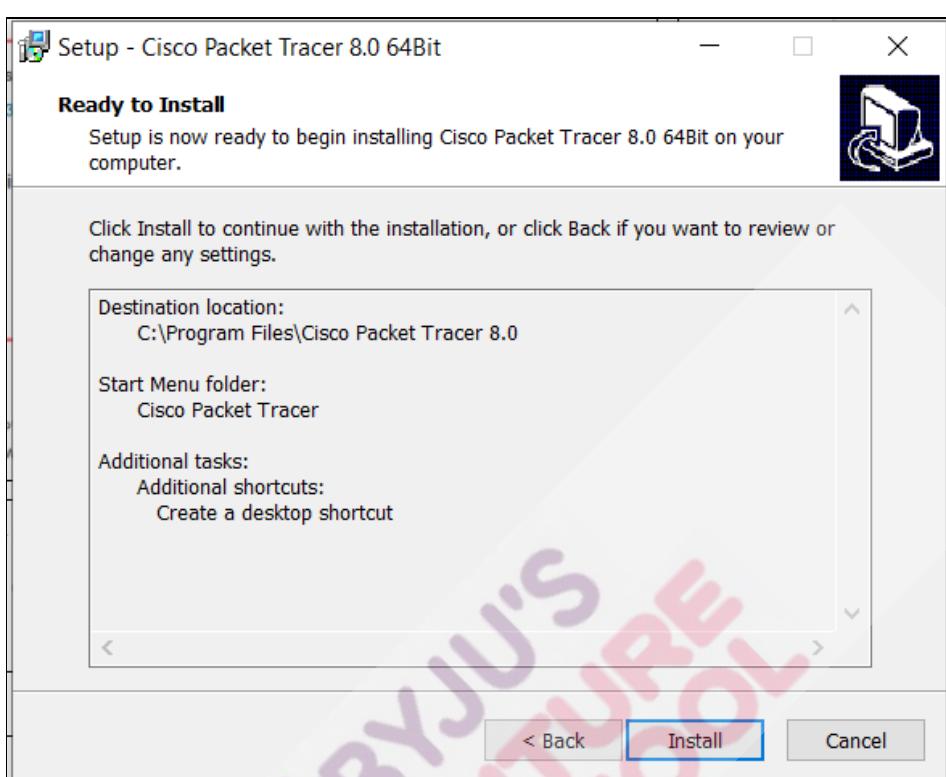


The screenshot shows the 'Select Start Menu Folder' step of the Cisco Packet Tracer setup. The window title is 'Setup - Cisco Packet Tracer 8.0 64Bit'. The main instruction reads: 'Where should Setup place the program's shortcuts?' with an icon of a computer monitor. Below it, a note says: 'Setup will create the program's shortcuts in the following Start Menu folder.' A text input field contains 'Cisco Packet Tracer' with a 'Browse...' button next to it. At the bottom are buttons for '< Back', 'Next >', and 'Cancel'.

Next, it will ask what type of shortcut icons we want to create. We are only going to create desktop shortcuts.

1. Select that option and click **Next**.



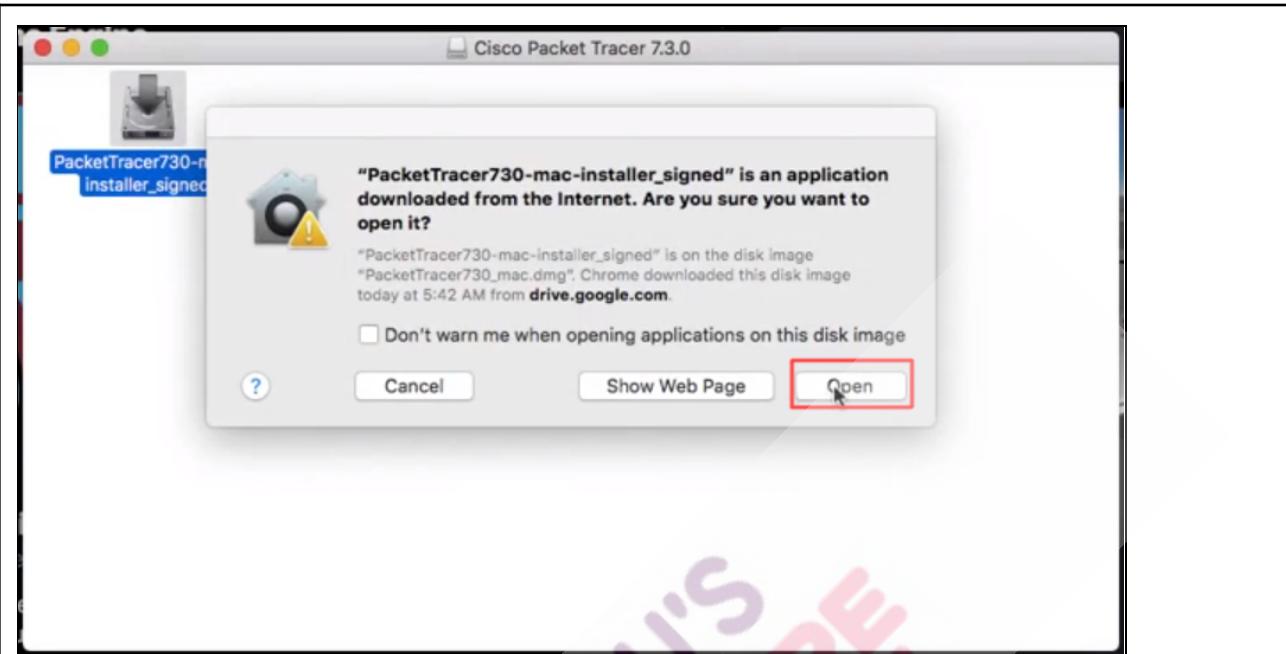


**Mac installation:**

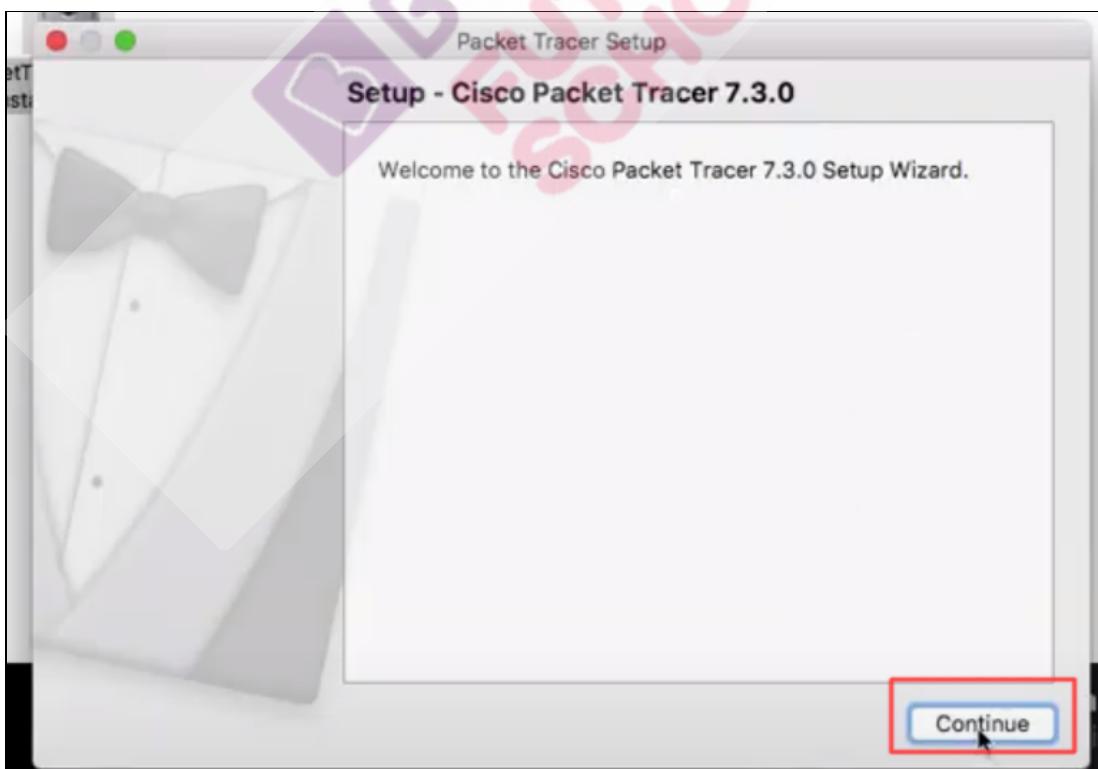
It is the same process;

1. **Double-click** on the downloaded file

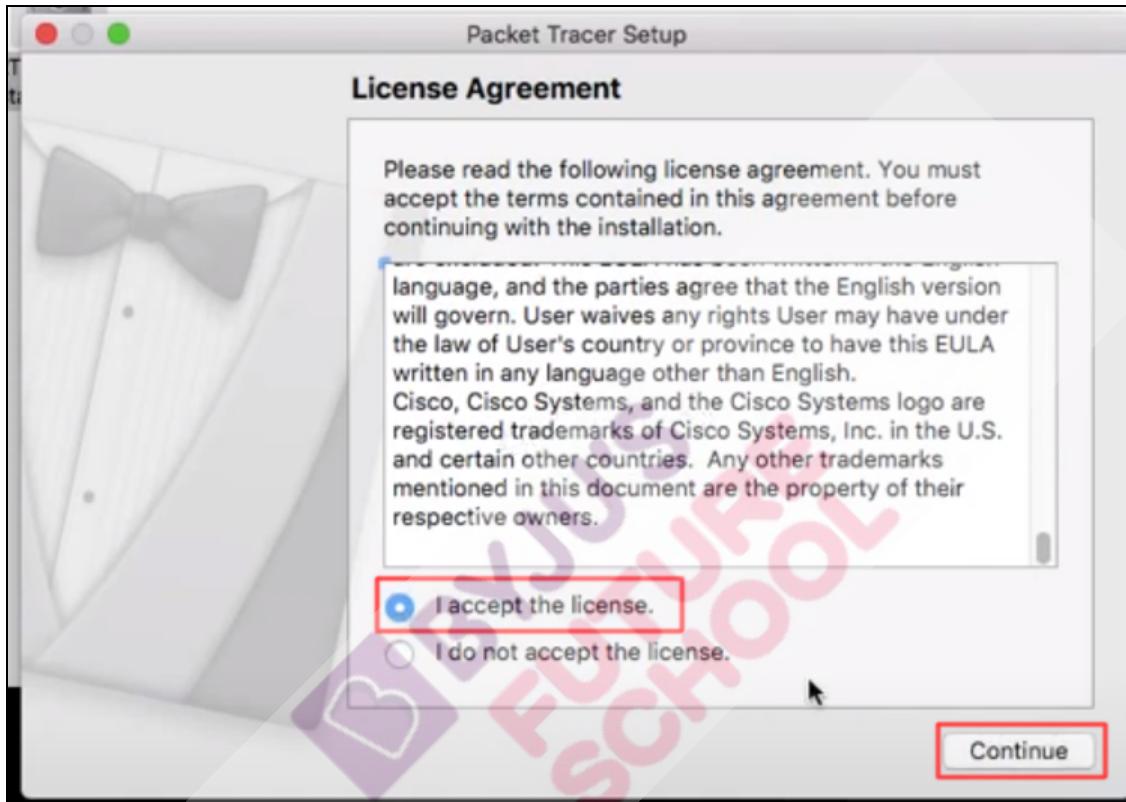
2. click on **open**.



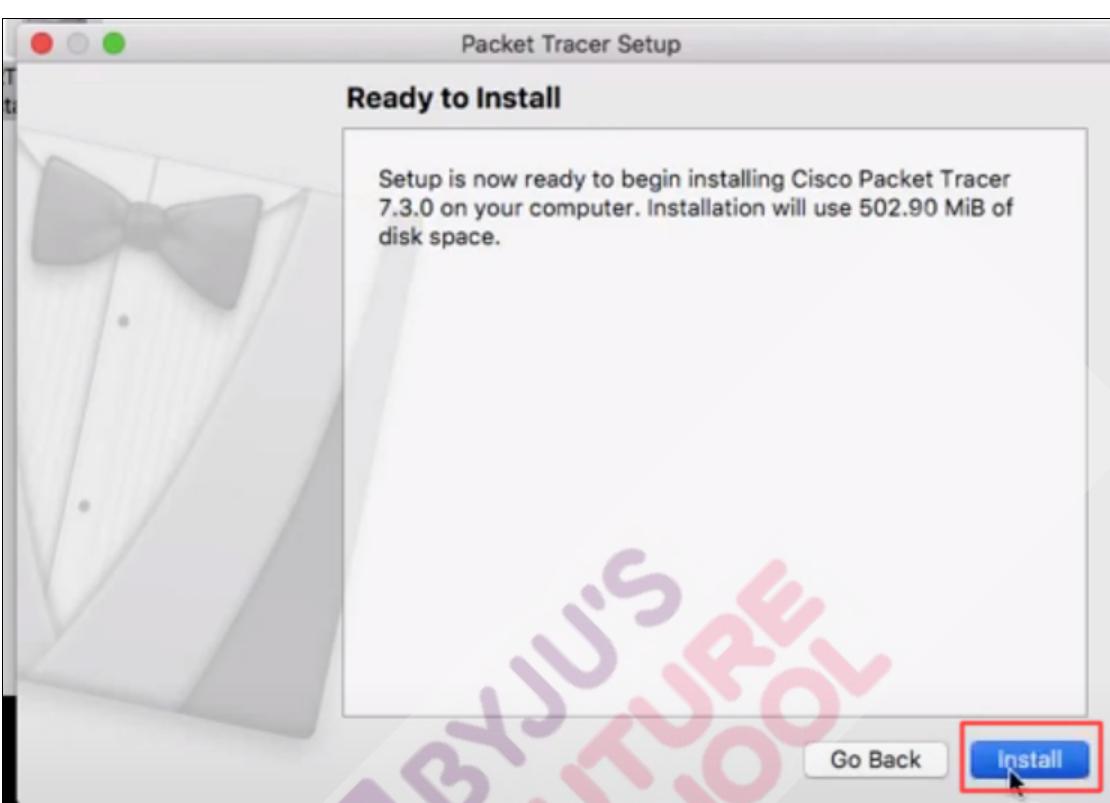
3. Click **continue**.



4. By accepting the license agreement, click "Continue"



5. After clicking on the **Install** button, CPT will be installed on your system.

	
<p>Once the installation is complete.</p> <ul style="list-style-type: none"><li>• Double-click the shortcut icon on the desktop to open Cisco Packet Tracer.</li><li>• For the first time. It will ask for our username and password, which we created when creating an account.</li><li>• Simply enter those details and you're ready to go.</li><li>• In the next activity, we will learn how to create different networking scenarios in this software</li></ul>	
<p>Once the installation is complete. Open the Cisco Packet Tracer.  This will open up a screen with login options. Click on the</p>	

**Skill for all button.**



## Cisco Packet Tracer

Sign in using one of the following options:

 Networking  
Academy

Learn more about [Networking Academy](#)

 Skills For All

Learn more about [Skills For All](#)

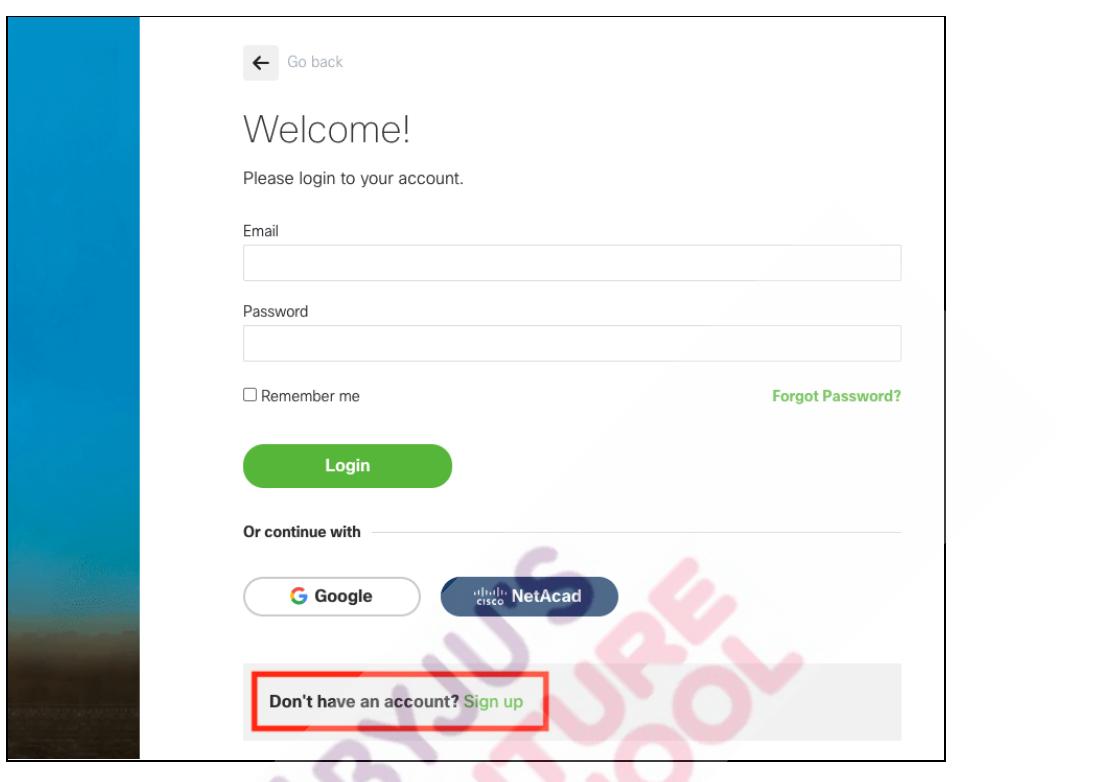
Keep me logged in (for 3 months)

Not recommended for public or shared computers

By using Cisco Packet Tracer you accept the Terms Of Service ([EULA & SEULA](#)) and [The Privacy Statement](#)

This will take us to a webpage where we can make an account on “**skill for all**” website.

On this page click on the **signup** button.



← Go back

## Welcome!

Please login to your account.

Email

Password

Remember me [Forgot Password?](#)

[Login](#)

Or continue with

[Google](#) [NetAcad](#)

[Don't have an account? Sign up](#)

This will open the page to select the country and date of birth. After filling your details click on the **Continue** button.

# Sign Up

You'll be able to start classes as soon as you sign up.

Sign up with

 Google

 Cisco NetAcad

## Create New Account

Your country or region of residence

Select country

Year of Birth

Select year

Month of Birth

Select month

**Continue**

Add the details like First Name, Last Name, Email, Password and click on **Continue**

Sign up with

 Google

 Cisco NetAcad

Create New Account

First name

Last name

Email

Password

 Password requirements:

Confirm password

 Create account

After adding details, Check mark the conditions and then click on **Accept & Continue**

## Terms & Conditions

11. **Costs and Fees.** Except where you are expressly advised otherwise during the course of your use of the Websites and Services, the Websites and Services are provided at no charge. You are solely responsible for any costs and expenses you incur as a result of your use of the Websites or the Services. You agree that Cisco may later require users to pay a fee to continue to use the Services or to use the Websites.
12. **General.** Subject to that, this Agreement constitutes the entire agreement between you and Cisco regarding the use of the Services and the Websites. The failure of Cisco to exercise or enforce any right or provision of this Agreement shall not operate as a waiver of such right or provision. The section titles in this Agreement are for convenience only and have no legal or contractual effect. This Agreement operates to the fullest extent permissible by law. If any provision of this Agreement is unlawful, void or unenforceable, that provision is deemed severable from this Agreement and does not affect the validity and enforceability of any remaining provisions. The parties are independent contractors under this Agreement and no other relationship is intended, including a partnership, franchise, joint venture, agency, employer/employee, fiduciary, master/servant relationship, or other special relationship. Neither party shall act in a manner which expresses or implies a relationship other than that of independent contractor, nor bind the other party.

- I have read and agreed to the terms & conditions. \*
- I agree to receive future promotions, offers and communication from Skills for All.

**Accept & Continue**

**Cancel**

Now use the same **Skill for all ID** to login **cisco packet tracer**



## Cisco Packet Tracer

Sign in using one of the following options:



[Learn more about Networking Academy](#)



[Learn more about Skills For All](#)

Keep me logged in (for 3 months)

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Now open the cisco packet tracer

### Teacher Guides Student to Stop Screen Share

### TEACHER-LED ACTIVITY - 2 10mins

#### Teacher Initiates Screen Share

#### ACTIVITY

- Introduction to Cisco Packet Tracer.
- Creation of computer networks
- Network Commands

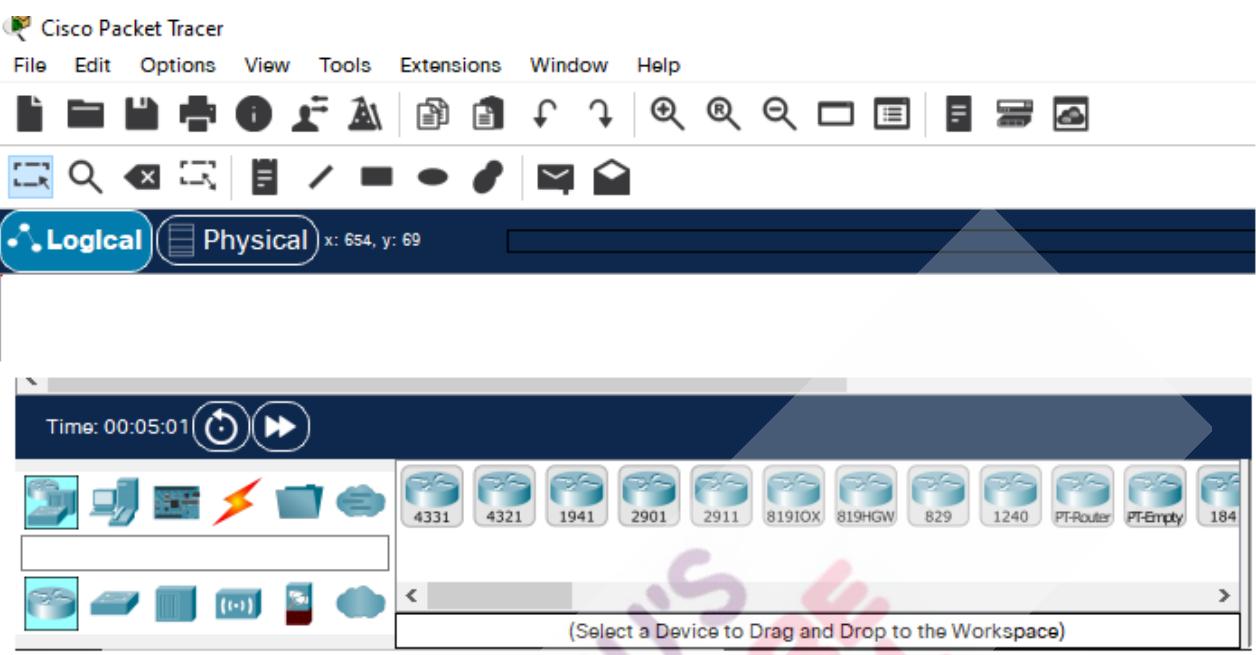
Teacher Action	Student Action
<p>CiscoPacket Tracer or CPT is a very powerful software we can create and simulate various networks.</p> <p>The screen interface is very simple. At the top we have all the menu options and at the bottom we have networking</p>	

devices such as computers, servers, routers etc.

We will explore these devices in upcoming classes.

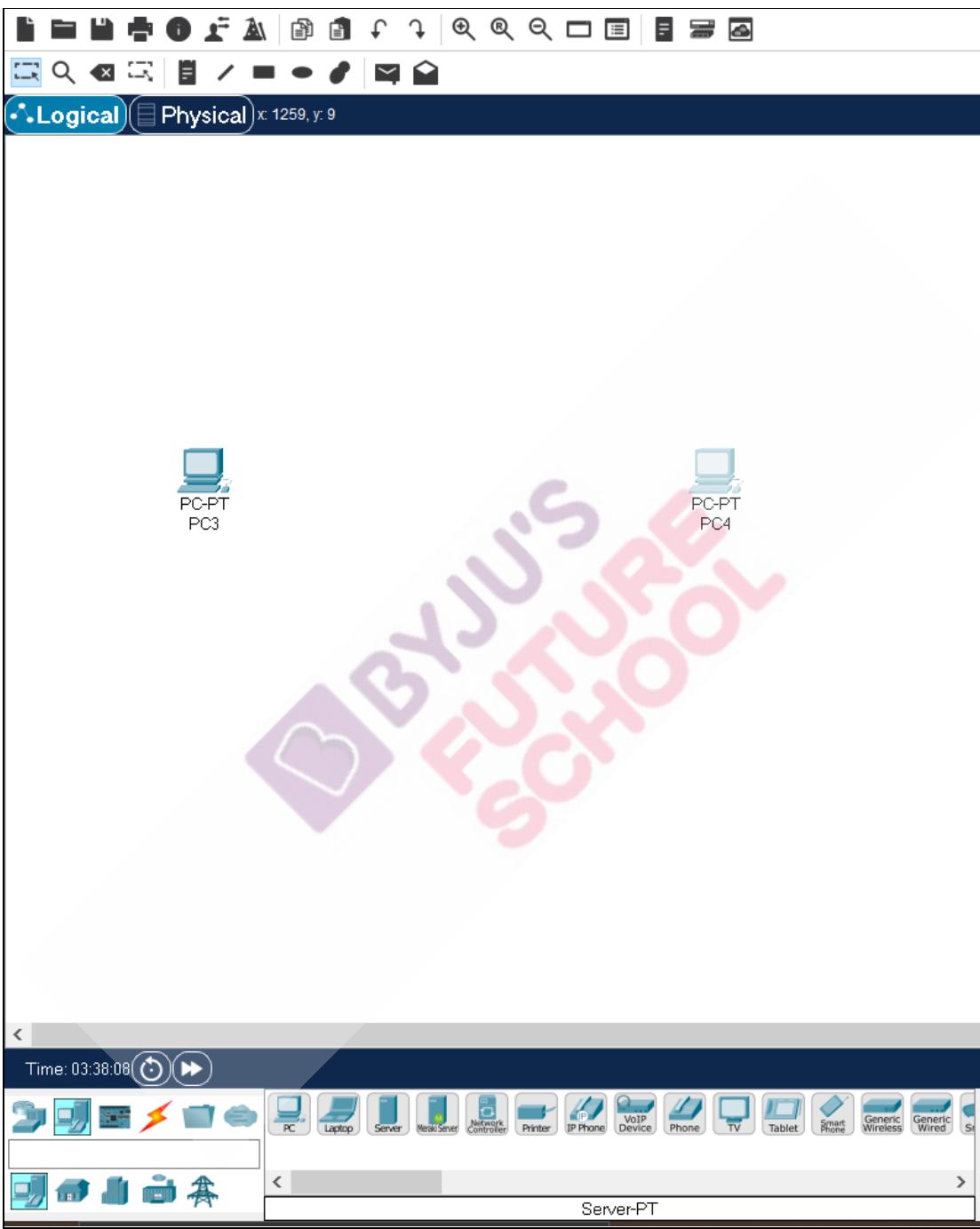
In this session we will focus mainly on the networking devices menu at the bottom left corner.

1. You can see devices such as routers, PCs, and laptops in the menu. You can also find home appliances like fans, bulbs, humidifiers and so forth.
2. We also have different cables for connecting these devices.



The screenshot shows the Cisco Packet Tracer application window. At the top is a menu bar with File, Edit, Options, View, Tools, Extensions, Window, and Help. Below the menu is a toolbar with various icons for file operations like Open, Save, Print, and search. A status bar at the bottom shows "x: 654, y: 69". The main area is divided into two tabs: "Logical" and "Physical", with "Logical" selected. Below the tabs is a workspace with a blue background. On the left side of the workspace is a toolbar with icons for different network components. In the center, there is a "Device Library" window titled "Time: 00:05:01" with a play/pause button. It displays a grid of icons representing network devices, each with a number and a name: 4331, 4321, 1941, 2901, 2911, 819IOX, 819HGW, 829, 1240, PT-Router, PT-Empty, and 184. Below the library is a message: "(Select a Device to Drag and Drop to the Workspace)". To the right of the library is a large empty workspace area.

1. The first network we are going to make is connecting two computers together with the help of a cable.  
2. Choosing the end device tab and then selecting the PC option will be our first step.  
3. Drag the computer to the empty area of the software.  
4. We must perform this twice since we need two computers.



**Alignment & Connections:**

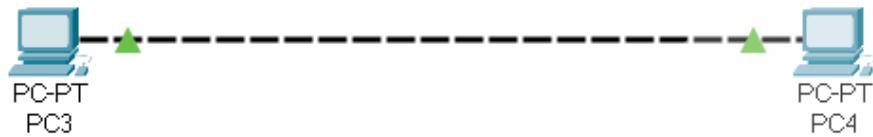
1. We will place both the computers in a line.
2. Now we will connect them with a cable.

3. We have an electric spark sign on the device menu, which has the different cable options.



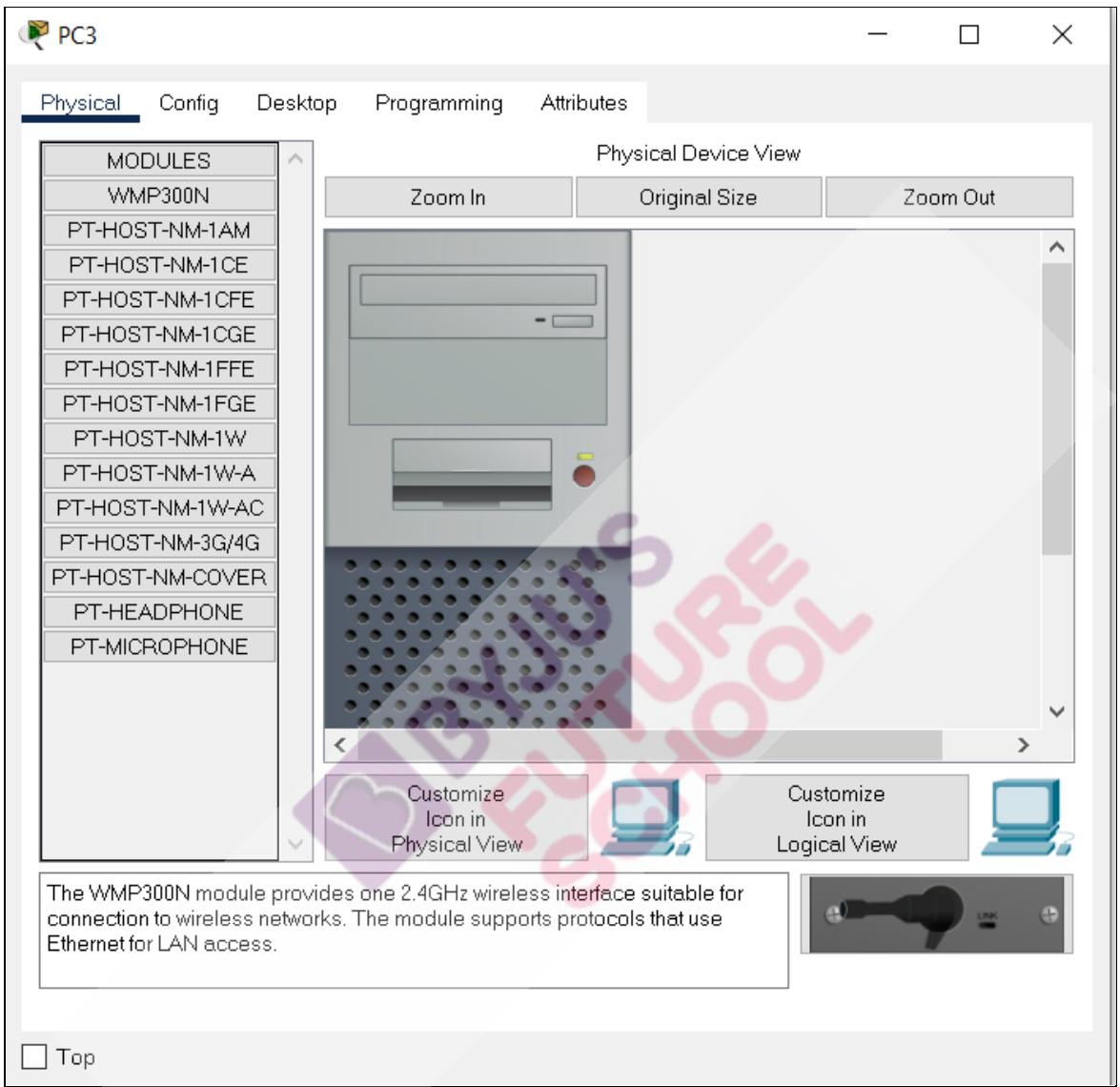
Each cable is suitable for a specific device. If we connect the two devices with the wrong cable type, it won't work.

1. We have a spark logo in the connections menu that will automatically choose the correct cable for the device.
2. Thus, select this option and then click on the first PC, then click on the second PC.
3. The cable connection between the computers is shown here, and we can see two green triangles, which indicates that our connection is working.



. Let's see what we can do with it now.

1. Computers like these are just like real computers.
2. Double clicking on any computer will open a window. It shows the various options we have for the PC.

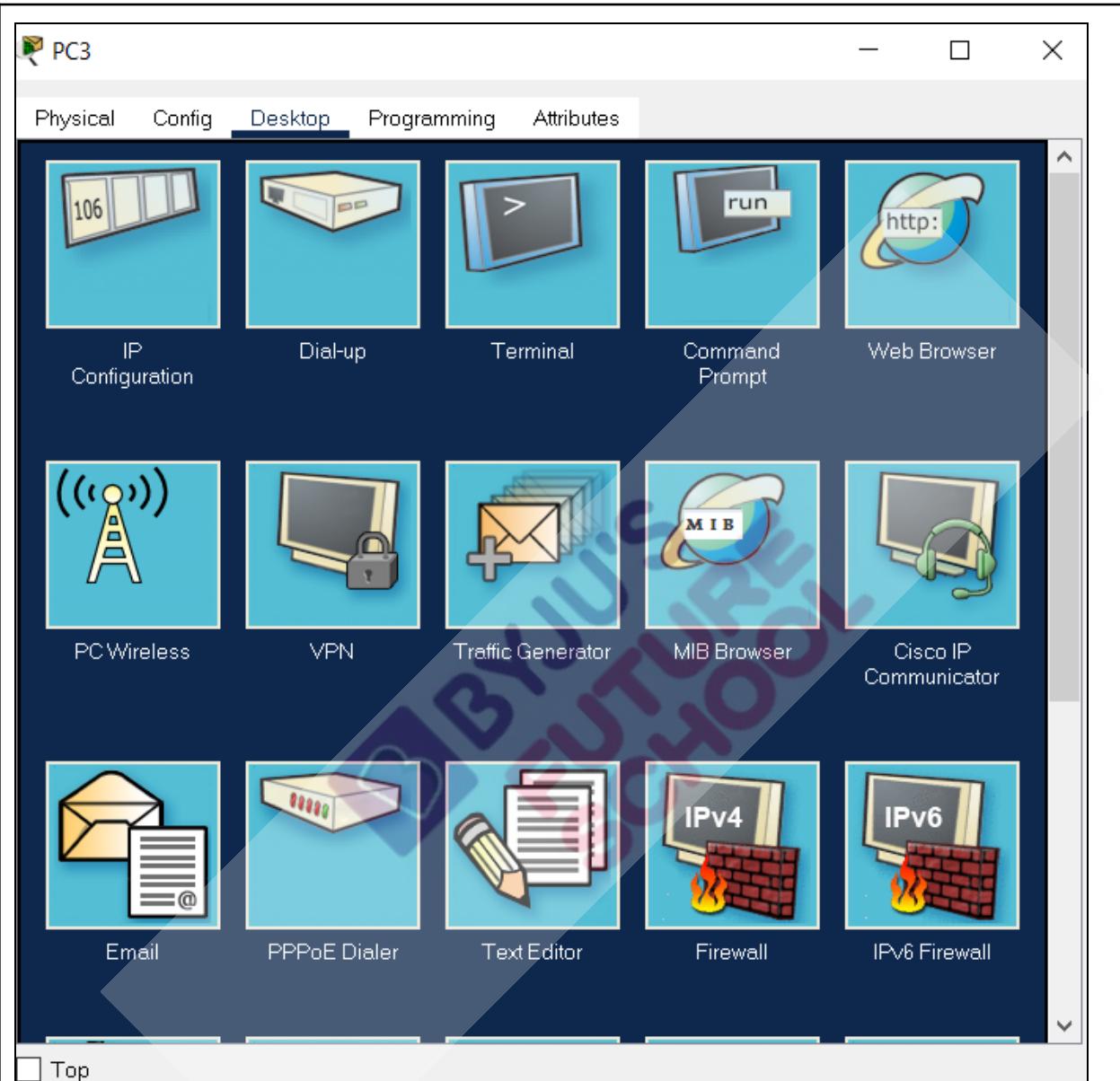


This window contains options such as physical, config, Desktop, Programming, Attributes.

These options can be used to perform a variety of tasks.

In this case, we are interested in the Desktop option.

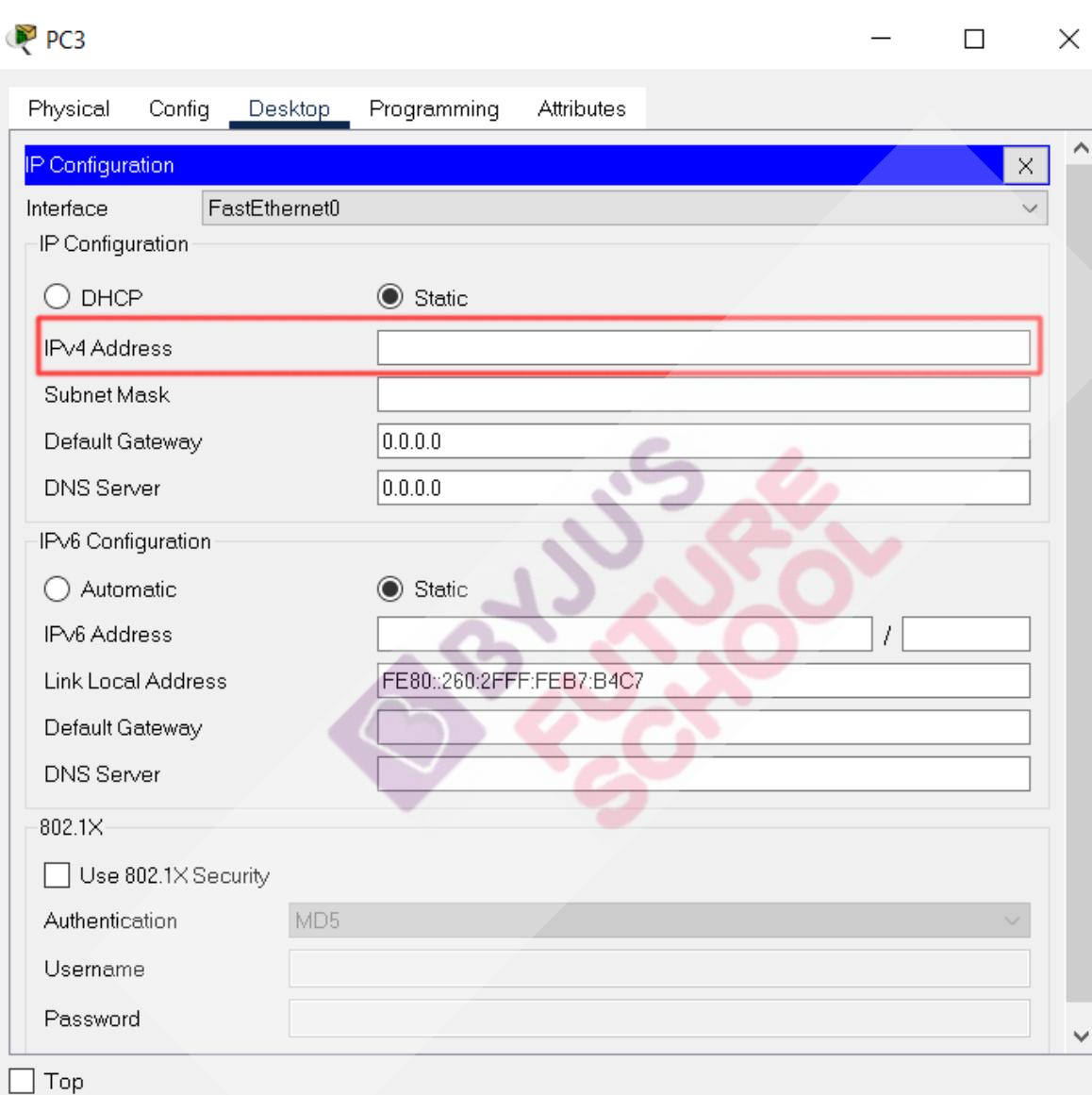
If we select the **desktop**, we will see various options.



Both computers will not be able to communicate yet. IP addresses must be assigned to both computers so that they can communicate with each other

1. The IP address of the computer can be set by clicking on the IP configuration option.
2. This will open a new tab where we can set the IP

address for this computer.



The screenshot shows a network configuration interface for a computer named 'PC3'. The 'Desktop' tab is active. In the 'IP Configuration' section for 'FastEthernet0', the 'Static' radio button is selected. The 'IPv4 Address' field is highlighted with a red border. Other static configuration fields are present: Subnet Mask, Default Gateway (0.0.0.0), and DNS Server (0.0.0.0). Below this, the 'IPv6 Configuration' section shows the 'Static' radio button selected, with a Link Local Address of FE80::260:2FFF:FEB7:B4C7. The '802.1X' section includes fields for security, authentication (set to MD5), and user credentials. A 'Top' checkbox is located at the bottom of this section.

In the tab IPv4 address we will write our IP address we can assign the IP address of our choice.

IP address is a string of binary numbers.

The most basic format includes a simple set of 4 blocks of numbers with a minimum of 0.0.0.0 and a maximum of

255.255.255.255

- IPv4: IPv4 is 32-bit binary number.
- IPv4 address are separated by periods or dots.
- IPv4 addresses are written in four parts separated by dots like this:
- IPv4 is a numeric address.
- Example :12.244.233.165

### Types of Address

1. Public IP Address
2. Private IP Address

**Public IP Address:** All websites on the Internet use public IP addresses.

**EXAMPLE:**

google.com, Amazon.com, gmail.com

Whitehatjr.com, Flipkart.com, Myntra.com

**Private IP Address:** A private IP address is used within a private network to connect securely to other devices within that same network.

**Example:** Your home devices, residential, office, and enterprise environments.

Phone, Laptop, Tablet, Desktop inside your home or office use private IP Address.

We have reserved IP for Private network:

Address ranges to be use by private networks are:

Class A: 10.0.0.0 to 10.255.255.255

Class B: 172.16.0.0 to 172.31.255.255

Class C: 192.168.0.0 to 192.168.255.255

For your cisco packet tracer PC let's assign 10.0.0.1

Once we assign the IP address, this will automatically set the subnet mask as 255.0.0.0

Subnetting is the act of dividing a network into two or smaller networks. By increasing routing efficiency, it enhances the security of the network as well as divides a network into smaller subnets.

It also helps you to reduce the size of the routing tables, which is stored in routers. This method also helps you to extend the existing IP address base & restructures the IP address.

Once this is done click on the **cross** button above to close this window.

PC0

Physical Config Desktop Programming Attributes

**IP Configuration**

Interface FastEthernet0

IP Configuration

DHCP  Static

IPv4 Address 10.0.0.1  
Subnet Mask 255.0.0.0

Default Gateway 0.0.0.0  
DNS Server 0.0.0.0

IPv6 Configuration

Automatic  Static

IPv6 Address /  
Link Local Address FE80::290:CFF:FE92:9121  
Default Gateway  
DNS Server

802.1X

Use 802.1X Security  
Authentication MD5  
Username  
Password

Top

Then we will do the same thing with the other computer.  
Click on the computer and select the IP configuration option. Set the IP address to 10.0.0.2 and click on the cross to close the window.

We have now assigned IP addresses to both computers.

PC1

Physical Config Desktop Programming Attributes

**IP Configuration** X

Interface FastEthernet0

IP Configuration

DHCP  Static

IPv4 Address	10.0.0.2
Subnet Mask	255.0.0.0
Default Gateway	0.0.0.0
DNS Server	0.0.0.0

IPv6 Configuration

Automatic  Static

IPv6 Address	/
Link Local Address	FE80::201:C9FF:FE85:AE76
Default Gateway	
DNS Server	

802.1X

Use 802.1X Security

Authentication MD5

Username

Password

Top

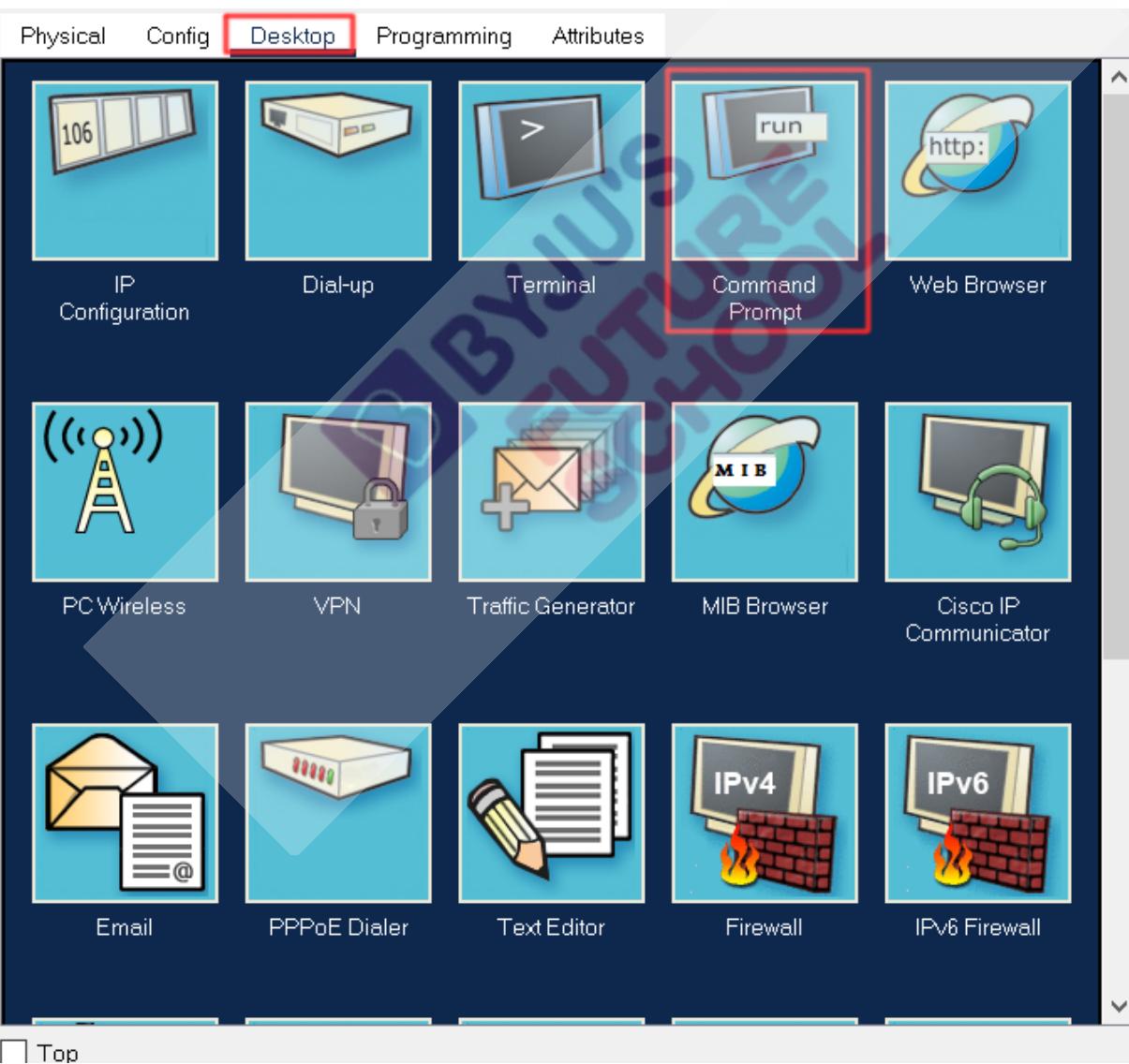
We now need to test whether both computers can able to communicate with each other or not?

1. To do that, we need to open the computer's Command prompt and run a command.
2. The command is called ping.
3. By using the ping command, you can send data to a computer and receive some data back.

4. It means that both computers are connected if you are able to send and receive data from them.

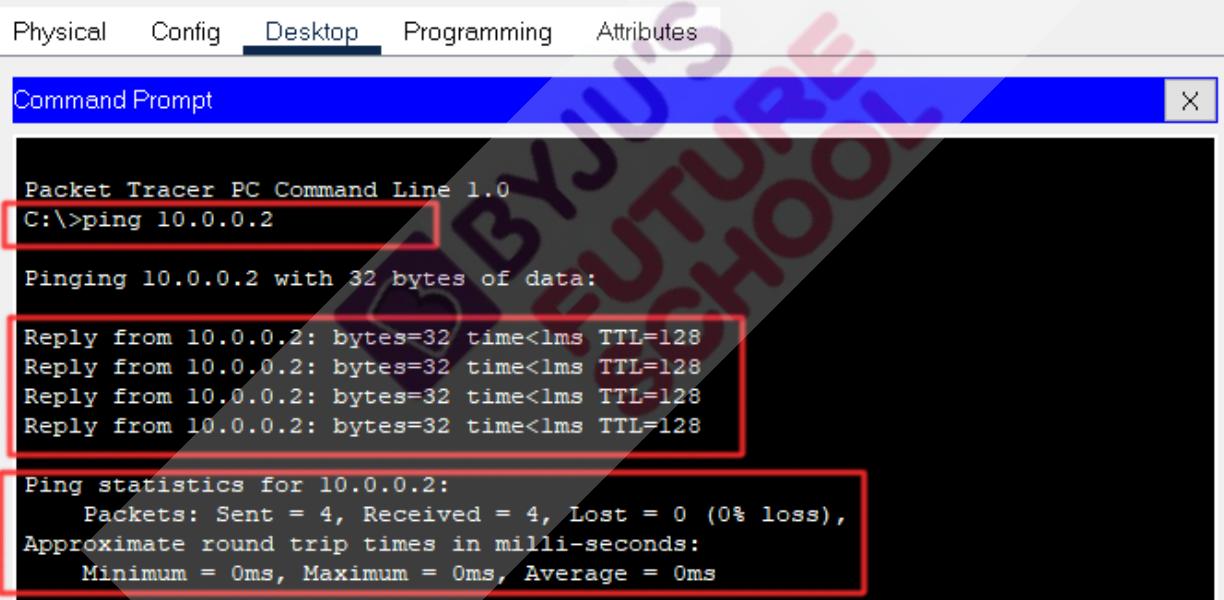
Let's see how to use the ping command.

First double click on the **PC** and go to **Desktop** option, and select the **Command Prompt**.



This will open a terminal, there we can run our commands. So first write ping and then the IP address of the second computer.

1. Such as **ping 10.0.0.2**
2. This will send data to the other computer and then receive some data. This will also give the information about how fast our network is.
3. When we receive data it shows the time taken to receive the data in milliseconds.
4. The faster the connection, the less time it takes.



```
Physical Config Desktop Programming Attributes

Command Prompt X

Packet Tracer PC Command Line 1.0
C:\>ping 10.0.0.2

Pinging 10.0.0.2 with 32 bytes of data:

Reply from 10.0.0.2: bytes=32 time<1ms TTL=128

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

### Teacher Stops Screen Share

Now it's your turn. Please share your screen with me.



### Teacher Starts Slideshow

#### Slide 13 to 15

Refer to speaker notes and follow the instructions on each slide.

We have one more class challenge for you.  
Can you solve it?

Let's try. I will guide you through it.



**Teacher Ends Slideshow**

### STUDENT-LED ACTIVITY -2 - 10mins

- Ask the student to press the ESC key to come back to the panel.
- Guide the student to start Screen Share.
- The teacher gets into Fullscreen.

#### ACTIVITY

- Simulate the connection of 2 computers on Cisco Packet Tracer.

Teacher Action	Student Action
<p>Students will create a network of two or three computers in Cisco Packet tracer.</p> <p>This activity is the same as the above teacher activity to strengthen the basic concepts of Cisco Packet tracer to students.</p>	

### Teacher Guides Student to Stop Screen Share

### WRAP UP SESSION - 5 mins



**Teacher Starts Slideshow**

Slide 16 to 19

#### Activity details

Following are the WRAP-UP session deliverables:

- Appreciate the student.
- Revise the current class activities.

- Discuss the quizzes.

## WRAP-UP QUIZ

Click on In-Class Quiz

Continue WRAP-UP Session



Slide 20 to 25

### Activity Details

#### Following are the session deliverables:

- Explain the facts and trivia
- Next class challenge
- Project for the day
- Additional Activity (Optional)

#### FEEDBACK

- Compliment the student for her/his effort in the class.
- Encourage the student to think and come up with their own solutions.

You get a “hats-off”.

Alright. See you in the next class.

*Make sure you have given at least 2 Hats Off during the class for:*



## PROJECT OVERVIEW DISCUSSION

Refer the document below in Activity Links Sections

× End Class

**Teacher Clicks**
**Additional Activities**

*Encourage the student to write reflection notes in their reflection journal using markdown.*

Use these as guiding questions:

- What happened today?
  - Describe what happened.
  - The code I wrote.
- How did I feel after the class?
- What have I learned about programming and developing games?
- What aspects of the class helped me? What did I find difficult?

*The student uses the markdown editor to write her/his reflections in the reflection journal.*

Activity Name	Description	Link
Teacher Activity 1	Cisco Packet Tracer Installation	<a href="#">Download for Windows</a> <a href="#">Download for Mac.</a>
Account login ID	CPT Account setup Page	<a href="https://skillsforall.com/">https://skillsforall.com/</a>
Student Activity 1	Computer Ports	<a href="#">Download for Windows</a> <a href="#">Download for Mac.</a>
Teacher Reference 1	Project Document	<a href="https://s3-whjr-curriculum-uploads.whjr.online/1c451250-ea5a-42e5-8898-80ee51afc0e3.docx">https://s3-whjr-curriculum-uploads.whjr.online/1c451250-ea5a-42e5-8898-80ee51afc0e3.docx</a>
Teacher Reference 2	Visual-Aid	<a href="https://s3-whjr-curriculum-uploads.whjr.online/357184c3-0f20-4593-b7b3-c78a76486e7f.html">https://s3-whjr-curriculum-uploads.whjr.online/357184c3-0f20-4593-b7b3-c78a76486e7f.html</a>
Teacher Reference 3	In-Class Quiz	<a href="https://s3-whjr-curriculum-uploads.">https://s3-whjr-curriculum-uploads.</a>

		<a href="http://whjr.online/962ddbde-a18c-4b4e-a44a-099ad6f1343e.pdf">whjr.online/962ddbde-a18c-4b4e-a44a-099ad6f1343e.pdf</a>
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