Topic	FTP Server and Troubleshooting	
Class Description	Students will learn how to create a file transfer server and client in cisco packet tracer.They will also learn about the basic troubleshooting.	
Class	**197**	
Class time	**45 mins**	
Goal	● Creating FTP server and client ● FTP commands ● Troubleshooting.	
Resources Required	● Teacher Resources: ○ Laptop with internet connectivity ○ Earphones with mic ○ Notebook and pen ○ Smartphone ● Student Resources: ○ Laptop with internet connectivity ○ Earphones with mic ○ Notebook and pen	
Class structure	**Warm-Up Slides** **Teacher - led Activity 1** **Student - led Activity 1** **Wrap-Up Slides**	**10 mins** **10 mins** **20 mins** **5 mins**

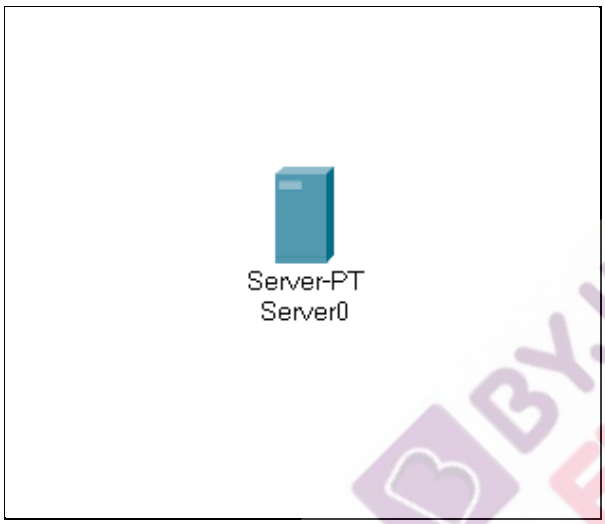
WARM-UP SESSION - 5 mins	
Teacher starts slideshow  **from slides 1 to 12** Refer to speaker notes and follow the instructions on each slide.	
Activity details	**Solution/Guidelines**
Hi, how have you been? Are you excited to learn something new? ***Run the presentation from slide 1 to slide 3.*** **The following are the warm-up session deliverables:** ● Reconnect with previous class topics. ● Warm-Up quiz session.	**ESR**: Varied Response. Click on the slide show tab and present the slides.
QnA Session	
Question	**Answer**
Which is the most common access method of ring topology? a) Ticket passing b) Target passing c) Token passing d) None of the above	**C**
LAN is mostly used in which of the following types of topologies? A. Bus and Ring topology B. Ring and Star topology C. Star and Mesh topology D. Mesh and Bus topology	**A**

Continue the warm-up session	
Activity details	**Solution/Guidelines**
Run the presentation from slide 4 to slide 12 to set the problem statement. **The following are the warm-up session deliverables:** • **Review code from the last class.**	
Teacher ends slideshow 	
TEACHER-LED ACTIVITY - 10mins	
Teacher Initiates Screen Share	
CHALLENGE • **Learn about the File Transfer protocol.** • **Create a FTP server.**	
Teacher starts slideshow  **for slide 13 and slide 15.**	
Teacher Action	**Student Action**
In the last few classes we have seen how to connect networking devices with each other and we also learned how the internet works. We can make a local Area network using Switch and then we can connect multiple LANs using a router. But we still haven't learned about a very important component of the internet. That is the Server. In simple words a server is just a computer, where we	

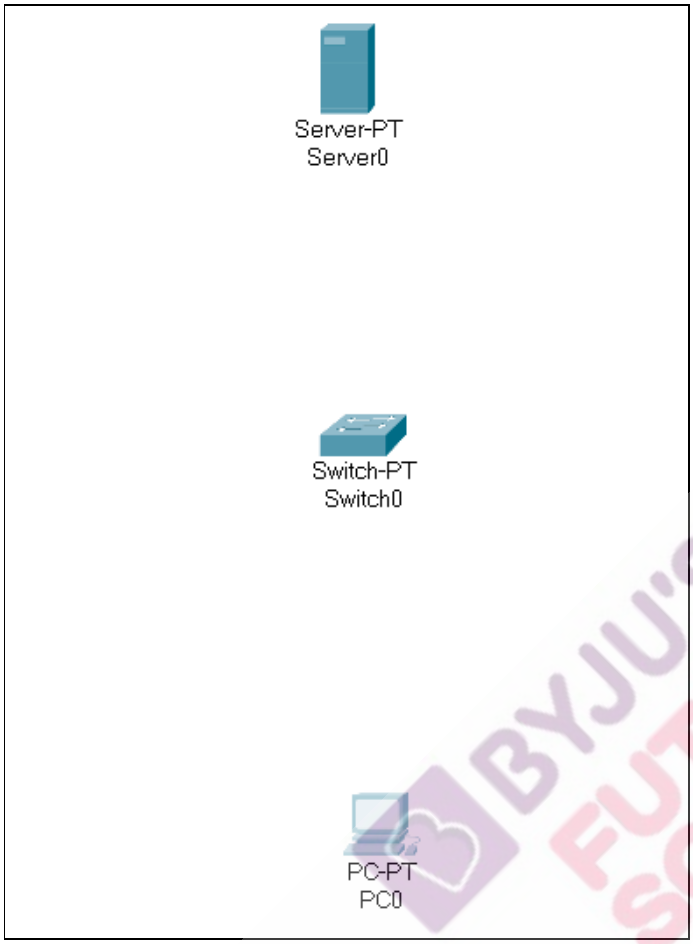
store files, so that multiple users can access these files. For example you tube has billions of videos uploaded and anyone can watch the videos and upload videos on youtube. You just need a google login ID. These videos are stored on a server, servers are designed to have a lot of memory and they are very fast as well. But why are these servers so important and can we make our own server? Answer is yes. We can create our own server. For example you have a function at your home and you took a lot of photos and videos for that. But all of this data is present on your laptop. Now You want to share these with all the members of your family. First option is you can share using pendrive or any storage device. But this method is very time consuming and if you have a lot of data then it will take forever. What you can do is create a server using your computer. This computer will have its IP address and all the people who are on your network will be able to access these files on their devices. Because the server and the devices are connected using a cable connection or Wifi connection they can transfer the files at a very high speed.	**ESR:** Varied
This is possible because all the files are present at a server. Other devices or clients can connect with the server and access files. This happens using FTP or File Transfer protocol.	
The server we just made is a local server. Only those people can access the file which are connected to your wifi or network. No one outside your network can access these files. These types of servers are made in schools, banks, hospitals, govt offices, where security is most important.	

But if you want to make a website and upload videos on the website so that people around the world can see those videos then we need to create a server in a way so that anyone on the internet can see these videos. You must have seen a godaddy ad on youtube or TV, have you seen it? Godaddy provides the hosting for the website, where they basically provide their own server and our website is stored on their server. Our website has an IP address. Using that IP address anyone can access the website. Now we are going to create a very simple Server and client arrangement using Cisco packet tracer and we will see how we can transfer files from a server to a client computer using FTP.	**ESR:** Varied
First we need to open the Cisco Packet Tracer software. *Teacher runs the Cisco packet tracer.* To create a server in CPT(Cisco Packet Tracer). We need 3 components, first we need a server. On the server we will store our files. Then we need a switch. Can you tell me why we need a switch? Because we want to connect multiple devices with the server and switch will provide us ports for that. At last we need clients. Client is nothing but a normal PC or a laptop. We can have multiple clients with the server. But in the beginning we will start with using only 1.	**ESR:** Varied
First of all drag and drop a server on the canvas from the end devices menu.	

Now we have the server on the canvas.

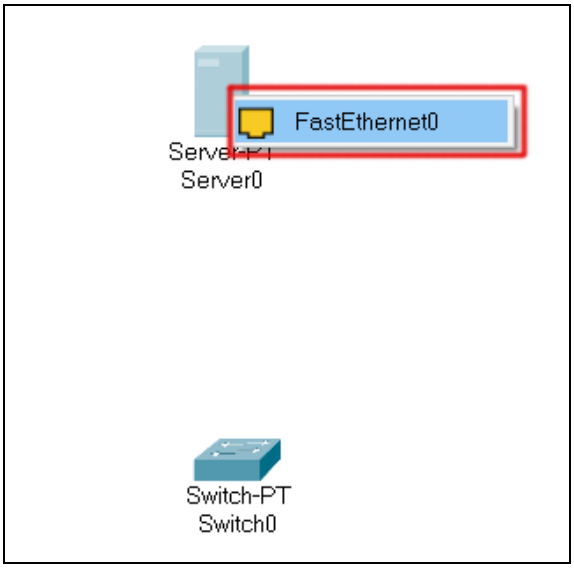


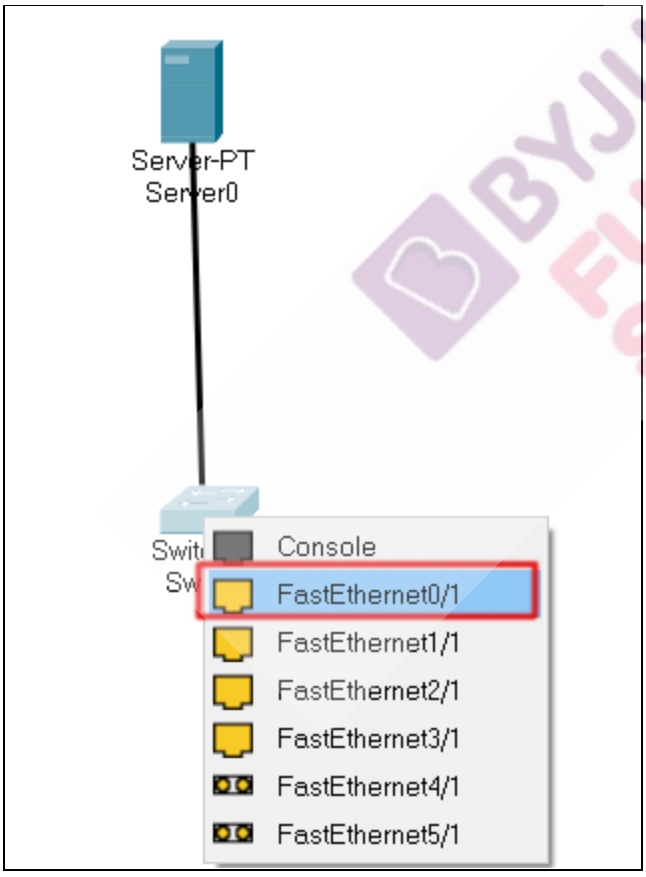
Next we need a switch and a computer.
We will be using a PT-Switch for this Activity
Drag and drop the switch and computer on the canvas.



We got our devices now let's connect them together.
Can you tell me which cable we should choose?
We will use copper straight through cable to connect all 3 devices.
First server and the switch.
Select the copper straight through cable and click on the server and select the fastethernet port then click on the Switch and select the fast ethernet port.

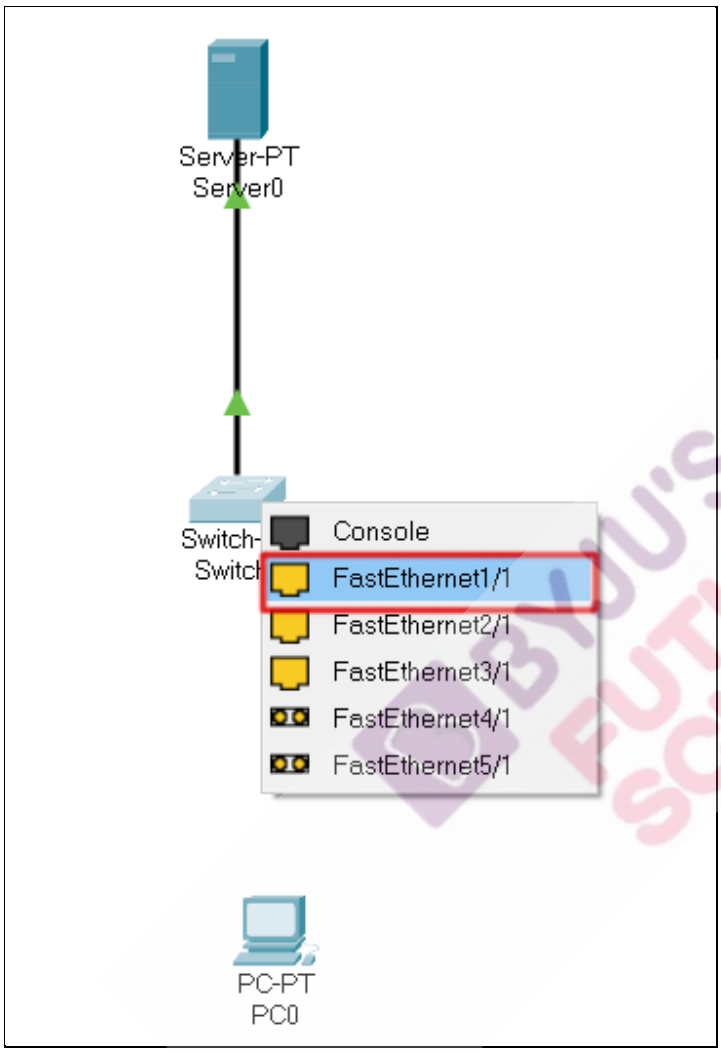
ESR:
Varied

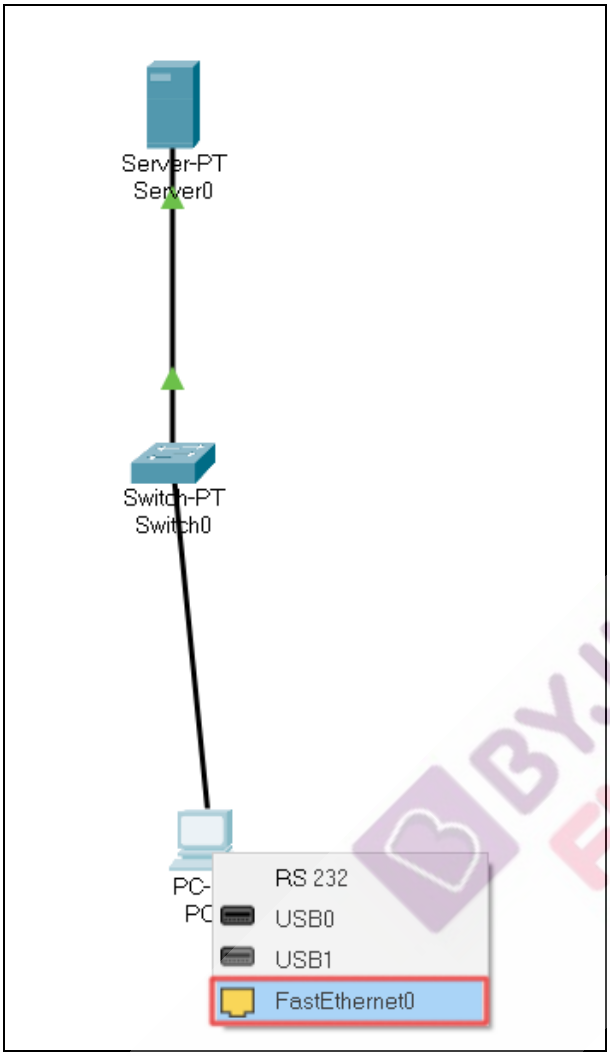




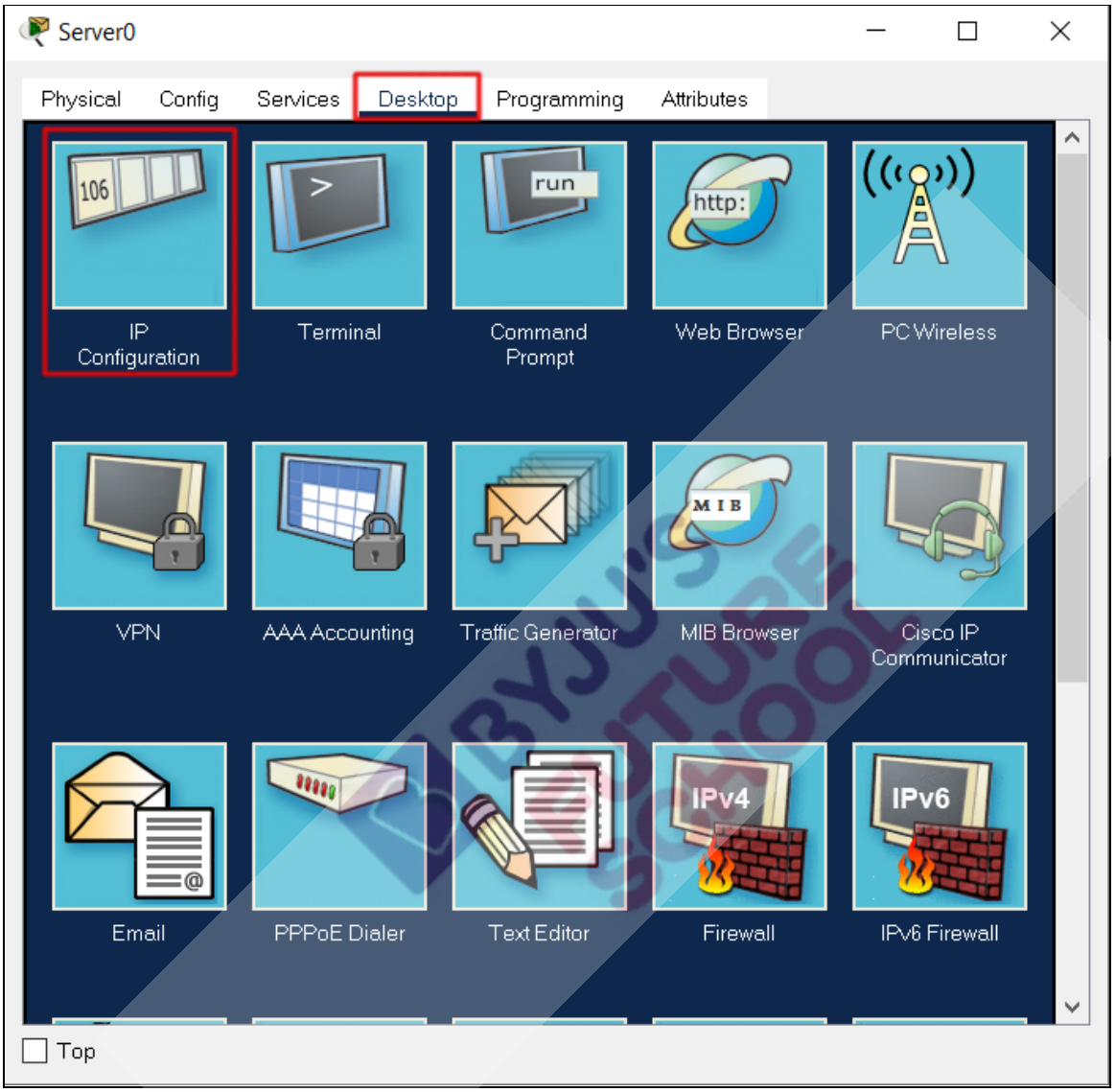
Next step is to connect the switch with the computer.

For this also we are going to use copper straight through cable.	

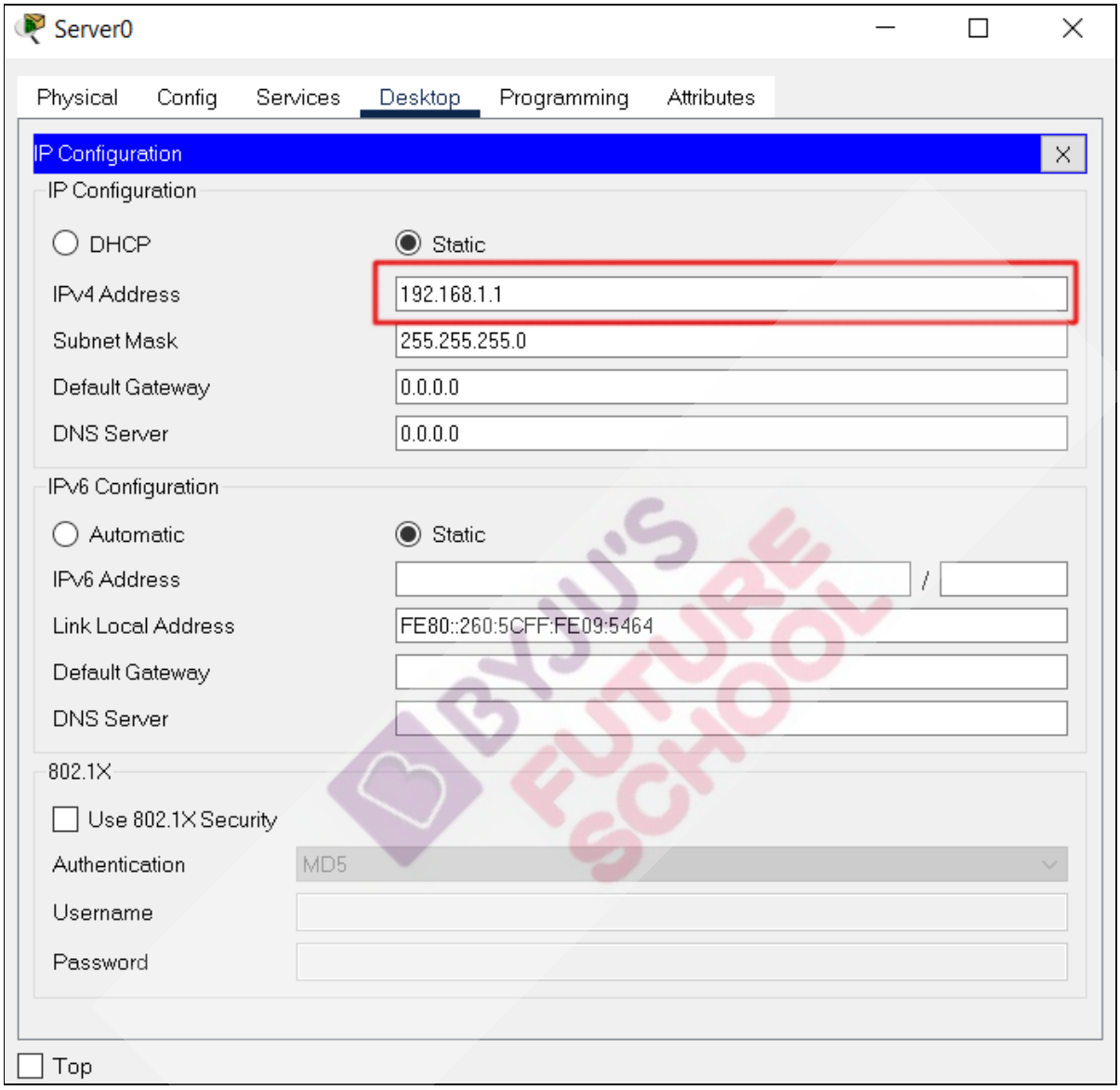




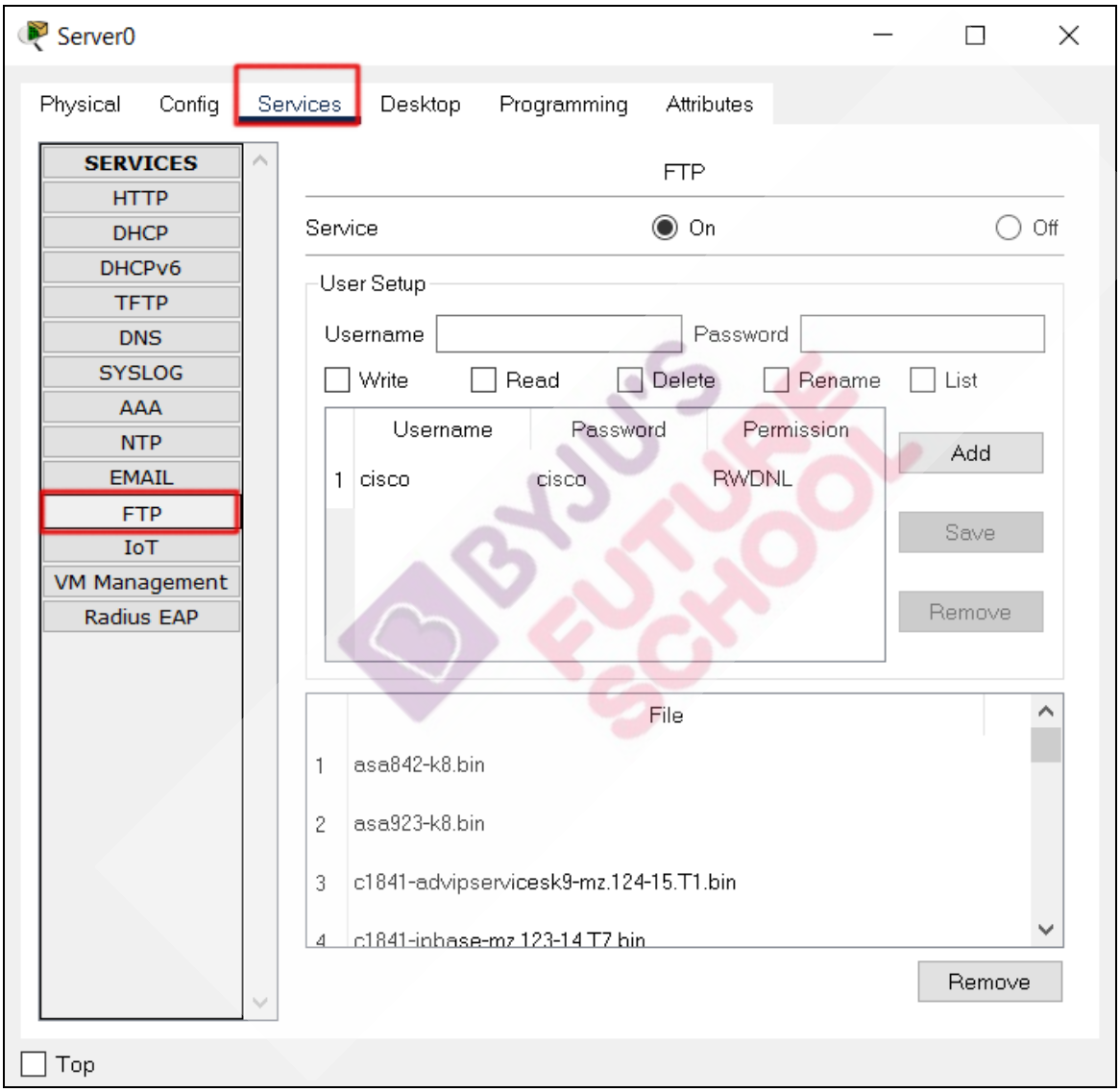
Our cable connections are complete. Now we need to do few important steps such as: ● Assigning IP address to Computer and server. ● Creating user and password for the server. ● Run FTP commands	
First we will assign the IP address to the Server. Which is going to be 192.168.1.1 Click on the server and select the Desktop tab and then click on the IP configuration button.	



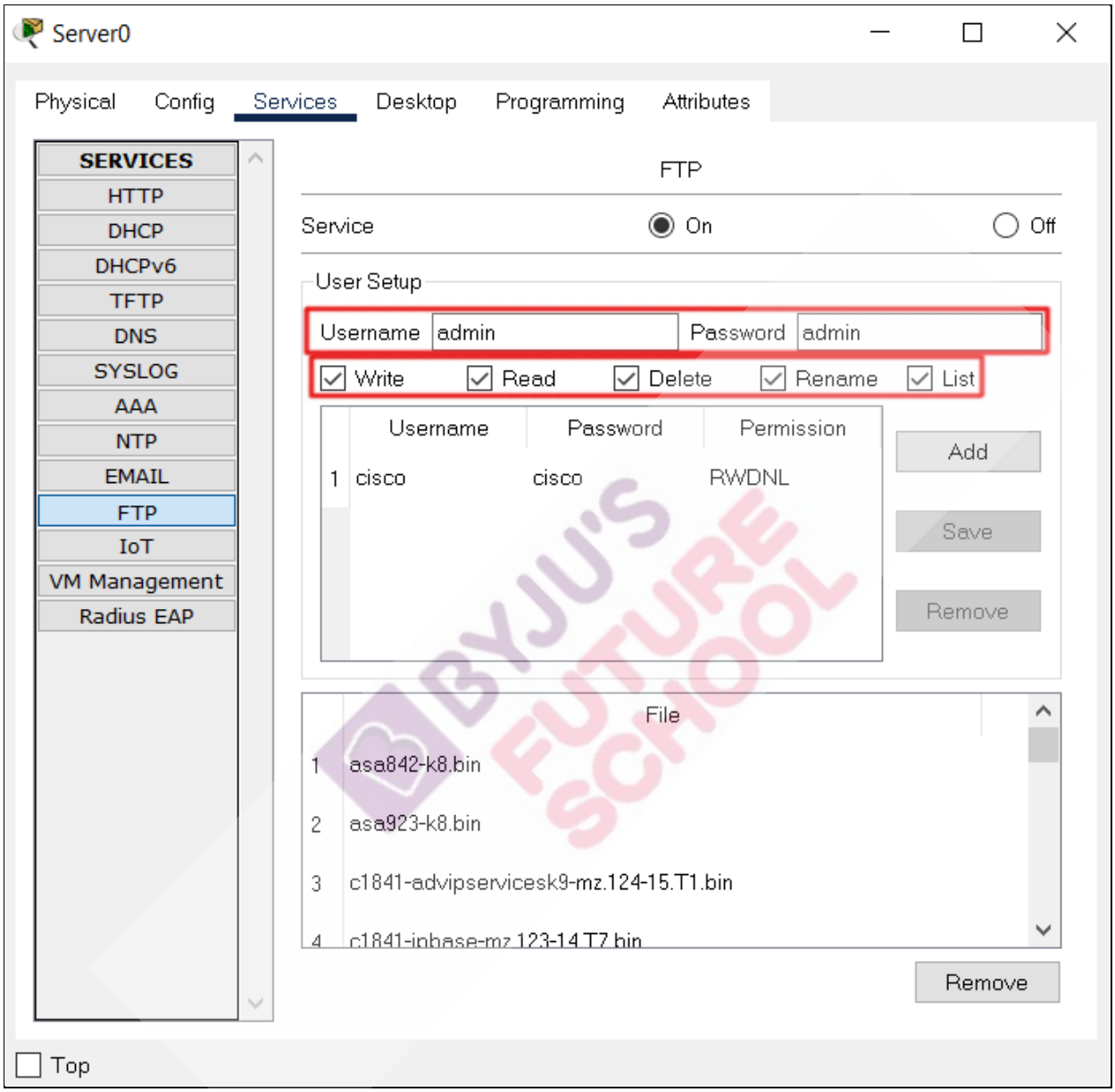
In this tab we can set the iP for the server. This step is the same as we do for a computer.



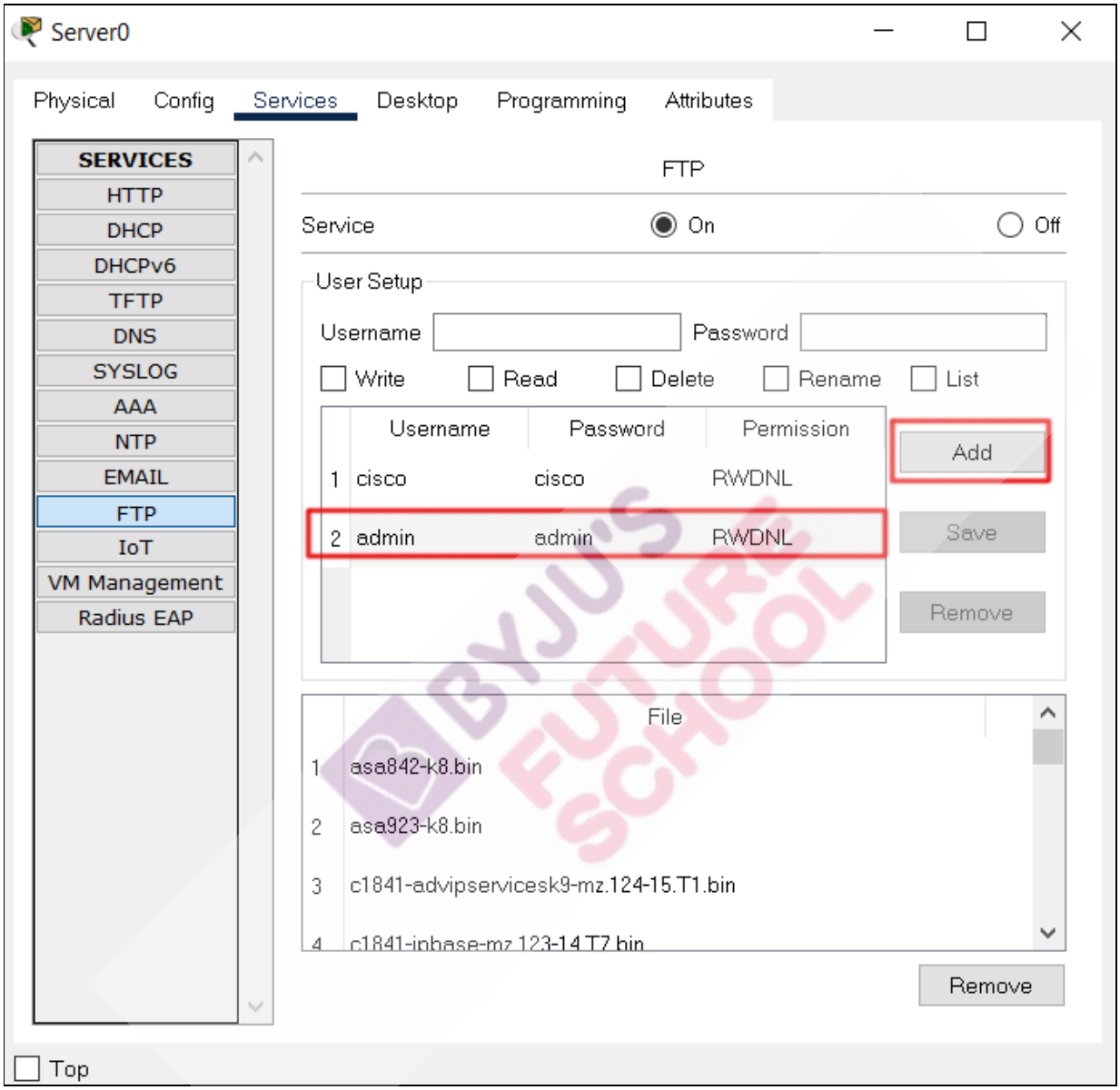
Now the next step is to set the username and password for the server. Because you don't want anyone to login to the server and access the files.
For example if you are creating a server for the school then students have limited access and teachers have access to a lot of things such as exam papers, student records etc.
So we will create a username and password then we will also define what type of access this user will have.

Double click on the server and select the **services** tab. On the left hand menu click on the FTP. here a page will open where we can set username and password.	
	
In the user name section we can use any username but for simplicity let's set the username as **admin** and the password also we will set as **admin.** **Note:** Remember the username and password, because it is going to be used while accessing the files from the	

server. Below this we can choose what kind of access we want to give to this user. Here we have options such as: **write**-user can add the files to the server and create new files. **read**- user can read the files from the server. **delete=** user can delete the files from the server. **rename**- user can rename the file And at last **list**- user can list down or see all the files present in the server. For this user we will select all the options.	

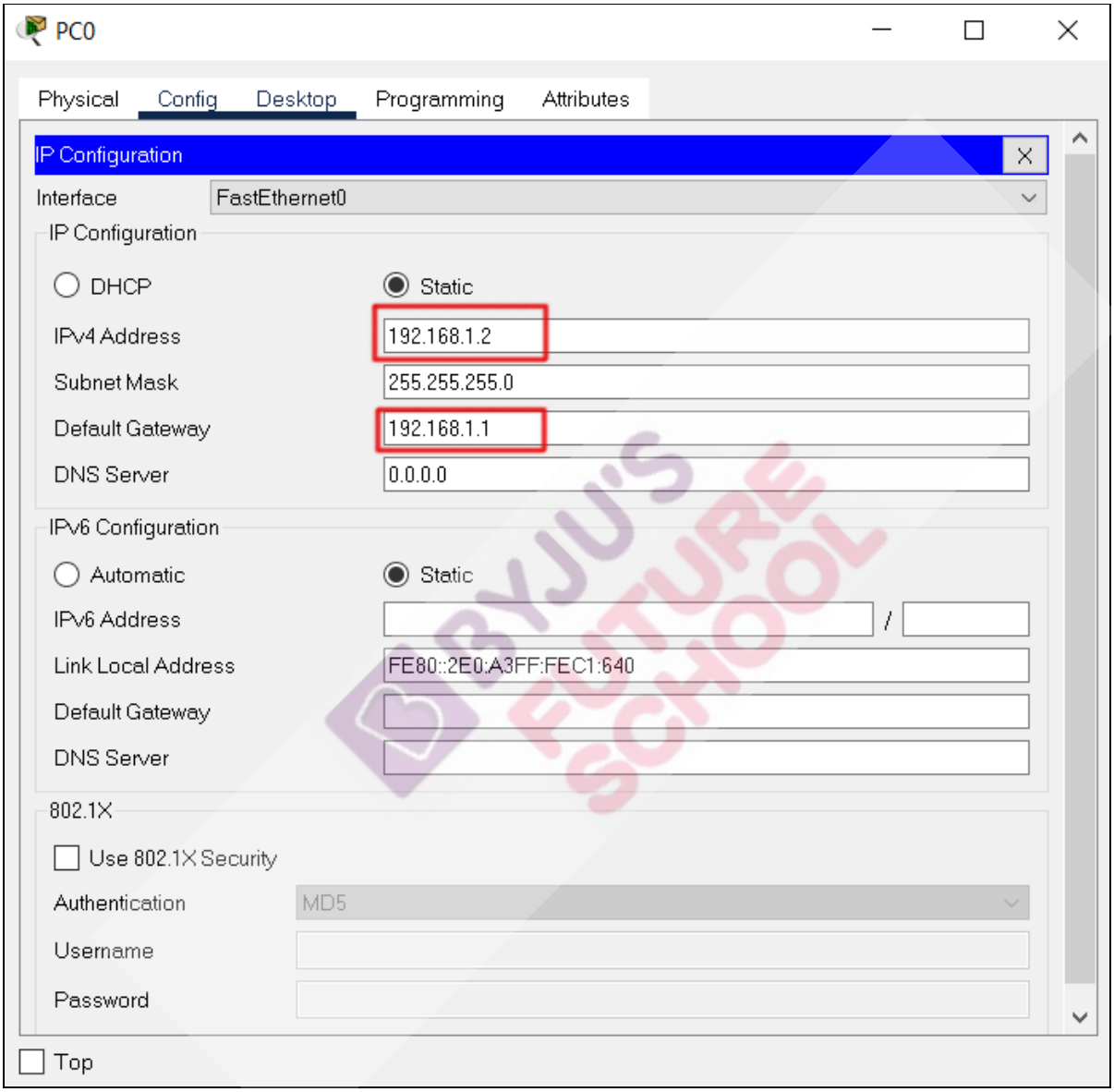


Once all the setup is done. Click on the add button and you will be able to see that the user has been created.

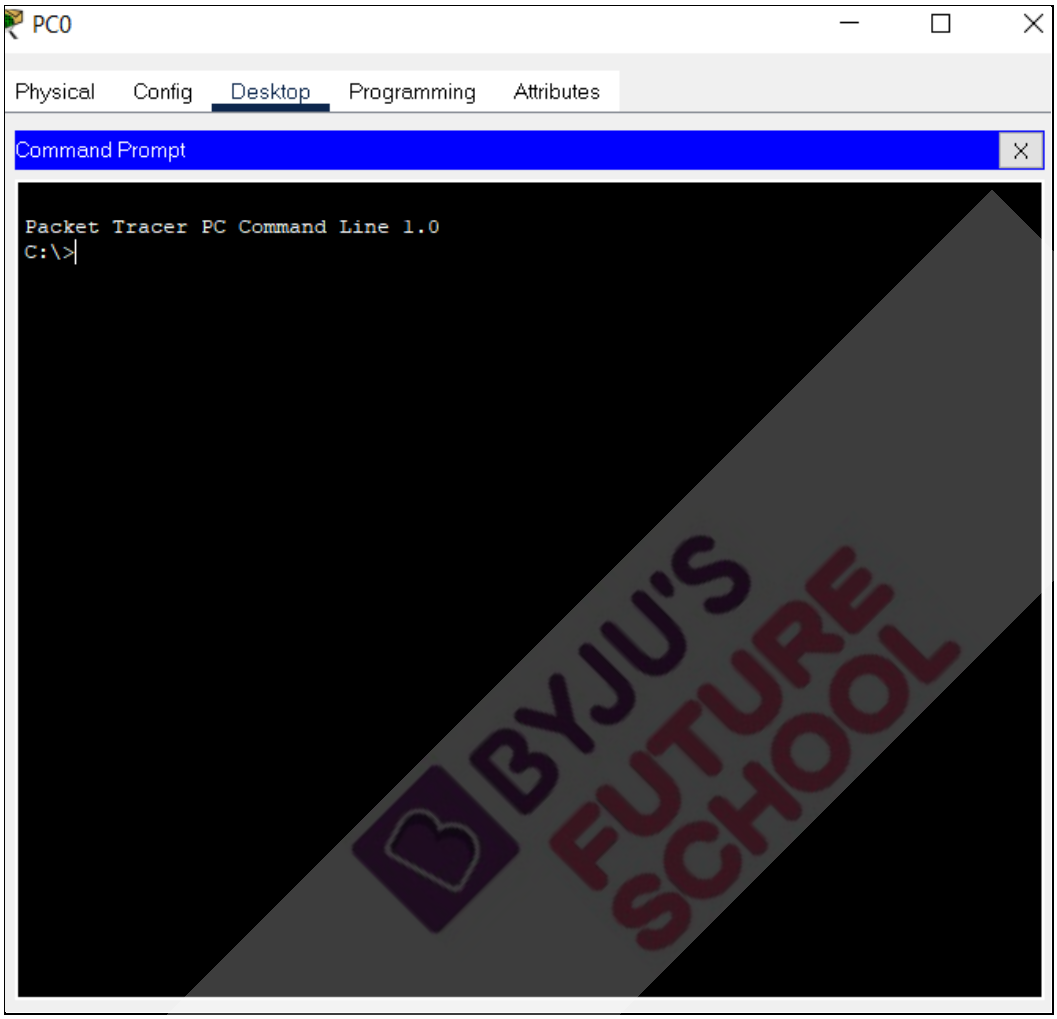


User is created now we need to set the IP for the computer and we will be good to go. Double click on the computer and go to the desktop and select IP configuration.	
Here we need to set 2 things, one is the IP address and then the default gateway. Which is going to be the IP	

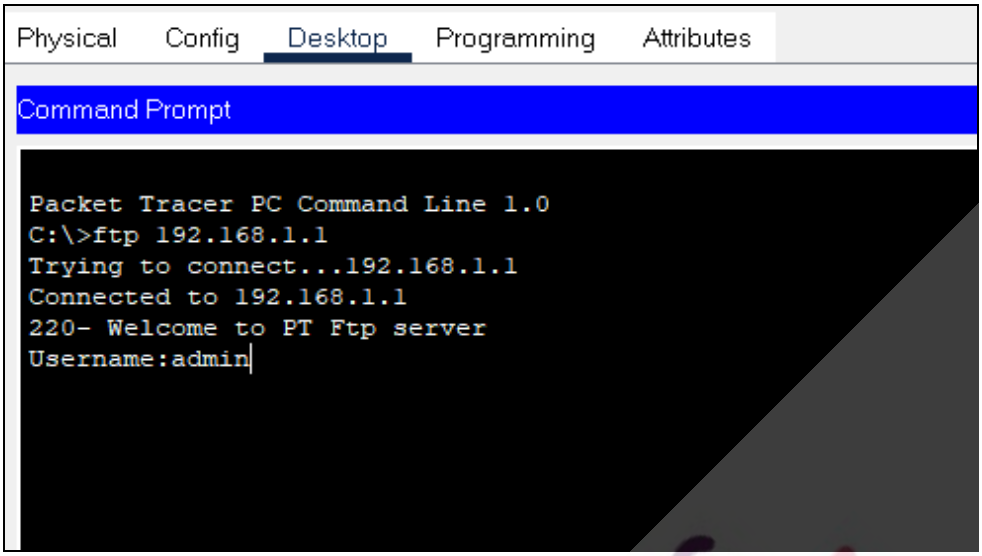
address of the Server.

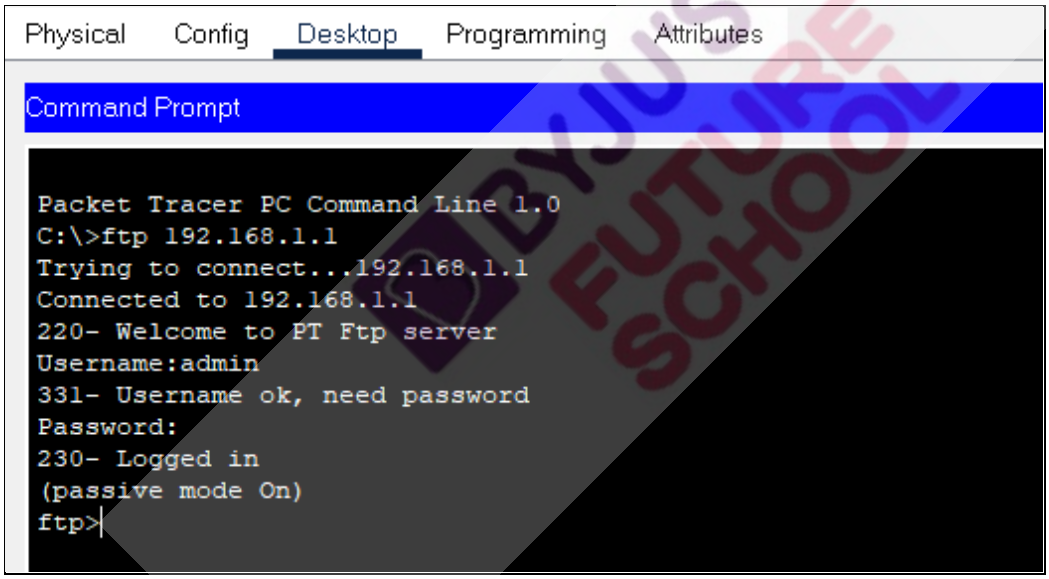


We have our server and client ready.
Now open the terminal of the computer. We are going to run the file transfer commands.
Close the current window and then open the command prompt.



First we will login to the server.
Run the command as **ftp 192.168.1.1**
Ftp is the command and later is the IP address of the server.
Now the computer will ask for the username, so write the username as admin.
Then it will ask for the password.
Note: When we enter the password we won't be able to see the characters but it is getting entered. Once you type the password, then press enter.





Now we are on the server. We can run various commands on this server. Such as copy, move, rename.
But first we need to see what are the files present on this server.This can be done by **dir** command.
Write dir and press enter.this will show the list of all the file on the server.

BYJU'S FUTURE SCHOOL

Physical | Config | Desktop | Programming | Attributes

Command Prompt

```
Packet Tracer PC Command Line 1.0
C:\>ftp 192.168.1.1
Trying to connect...192.168.1.1
Connected to 192.168.1.1
220- Welcome to PT Ftp server
Username:admin
331- Username ok, need password
Password:
230- Logged in
(passive mode On)
ftp>dir

Listing /ftp directory from 192.168.1.1:
0    : asa842-k8.bin                                5571584
1    : asa923-k8.bin                                30468096
2    : c1841-advipservicesk9-mz.124-15.T1.bin       33591768
3    : c1841-ipbase-mz.123-14.T7.bin                13832032
4    : c1841-ipbasek9-mz.124-12.bin                 16599160
5    : c1900-universalk9-mz.SPA.155-3.M4a.bin       33591768
6    : c2600-advipservicesk9-mz.124-15.T1.bin       33591768
7    : c2600-i-mz.122-28.bin                        5571584
8    : c2600-ipbasek9-mz.124-8.bin                  13169700
9    : c2800nm-advipservicesk9-mz.124-15.T1.bin     50938004
10   : c2800nm-advipservicesk9-mz.151-4.M4.bin      33591768
11   : c2800nm-ipbase-mz.123-14.T7.bin              5571584
12   : c2800nm-ipbasek9-mz.124-8.bin                15522644
13   : c2900-universalk9-mz.SPA.155-3.M4a.bin       33591768
14   : c2950-i6q4l2-mz.121-22.EA4.bin               3058048
15   : c2950-i6q4l2-mz.121-22.EA8.bin               3117390
16   : c2960-lanbase-mz.122-25.FX.bin               4414921
17   : c2960-lanbase-mz.122-25.SEE1.bin             4670455
18   : c2960-lanbasek9-mz.150-2.SE4.bin             4670455
19   : c3560-advipservicesk9-mz.122-37.SE1.bin      8662192
20   : c3560-advipservicesk9-mz.122-46.SE.bin       10713279
21   : c800-universalk9-mz.SPA.152-4.M4.bin         33591768
22   : c800-universalk9-mz.SPA.154-3.M6a.bin        83029236
23   : cat3k_caa-universalk9.16.03.02.SPA.bin       505532849
24   : cgr1000-universalk9-mz.SPA.154-2.CG          159487552
25   : cgr1000-universalk9-mz.SPA.156-3.CG          184530138
26   : ir800-universalk9-bundle.SPA.156-3.M.bin     160968869
27   : ir800-universalk9-mz.SPA.155-3.M             61750062
28   : ir800-universalk9-mz.SPA.156-3.M             63753767
29   : ir800_yocto-1.7.2.tar                        2877440
30   : ir800_yocto-1.7.2_python-2.7.3.tar           6912000
31   : pt1000-i-mz.122-28.bin                       5571584
32   : pt3000-i6q4l2-mz.121-22.EA4.bin              3117390
ftp>
```

Here are all the files which are present on our server.
To check which commands are available to us we can type **help** and press enter.
This is the list of commands we can use.

```
ftp>help
          ?
          cd
          delete
          dir
          get
          help
          passive
          put
          pwd
          quit
          rename
ftp>
```

Some of the commands are easy to understand just by their name such as **rename** command is used to rename a file.and **delete** command to delete the files.
Using the get command we can copy the files from the server to our computer.
Let's run the get command to copy the files.
We need to know the file name for that.In the list above we have the files.
To copy any file write **get** 'filename'
After writing the commands press enter and this will start the file transfer.
Note: It may take upto a minute to copy the file.

```
ftp>get asa842-k8.bin

Reading file asa842-k8.bin from 192.168.1.1:
File transfer in progress...
```

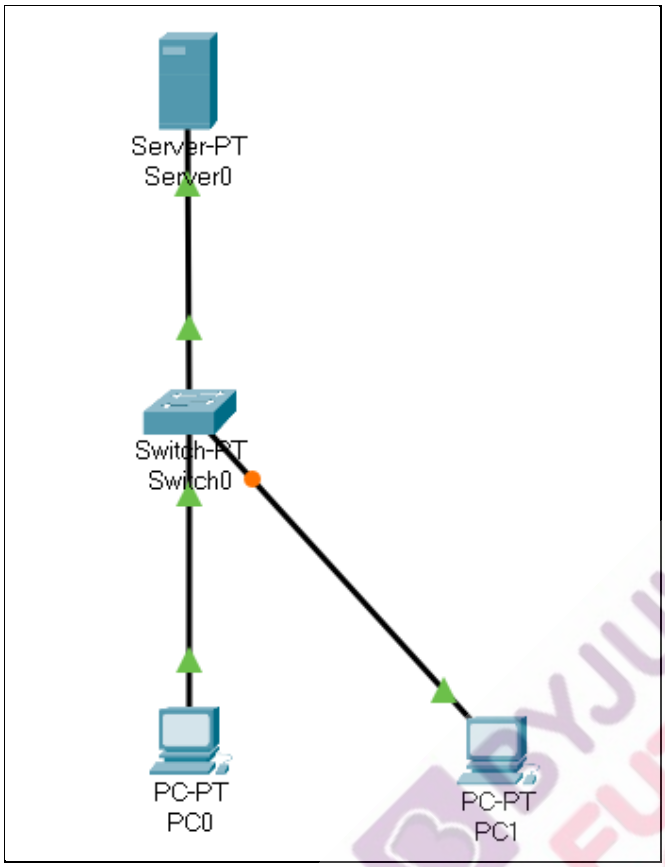
Once the process is complete. This shows us a prompt saying transfer complete.

```
ftp>get asa842-k8.bin

Reading file asa842-k8.bin from 192.168.1.1:
File transfer in progress...

[Transfer complete - 5571584 bytes]

5571584 bytes copied in 37.413 secs (34122 bytes/sec)
ftp>
```

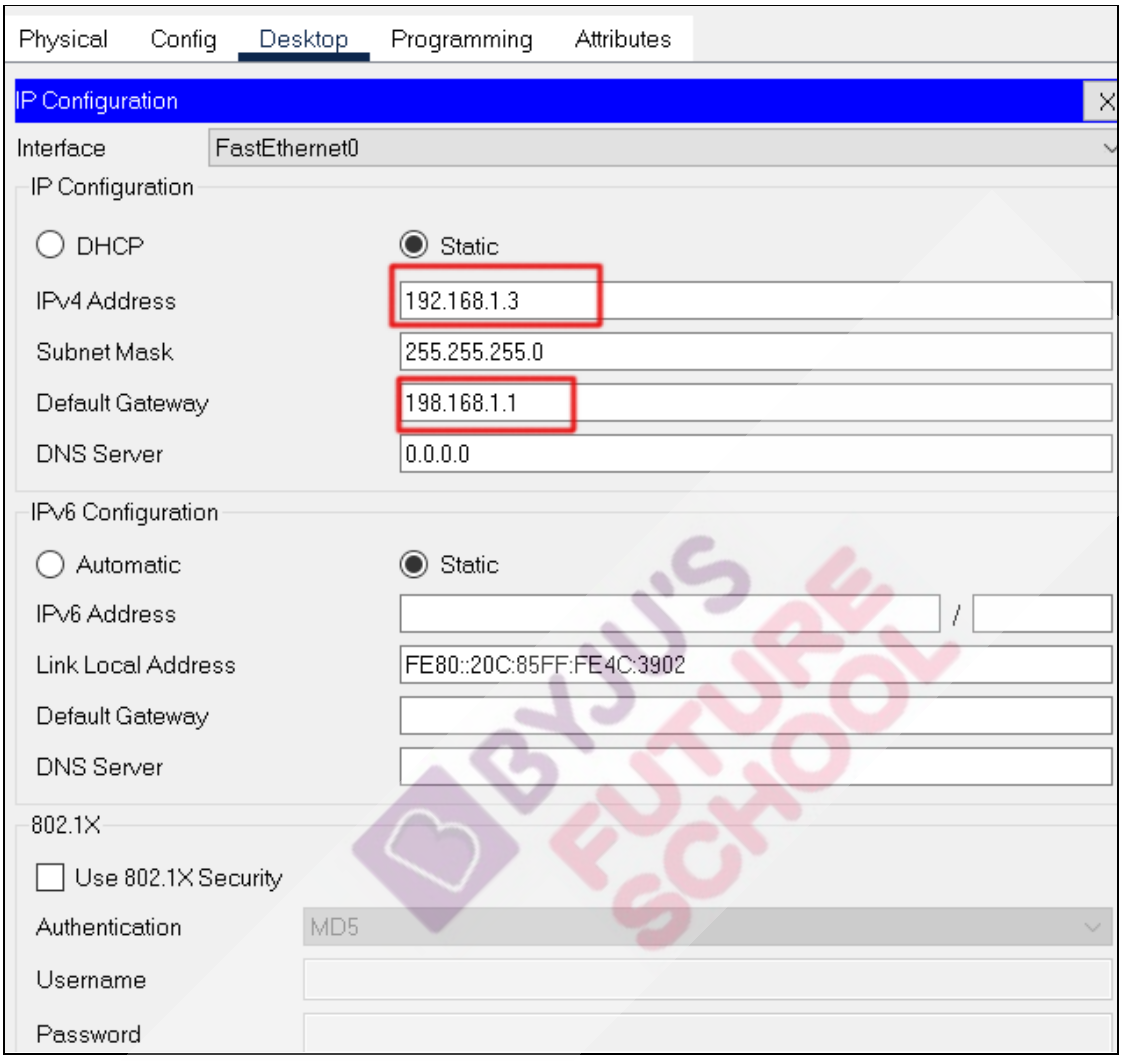
This is how we can copy the files from the server to the computer using the **copy** command. Now you may be wondering why we don't run a lot of commands when we copy from one device to another. And that is true. Commands were used in the early era before the Operating systems were widely adopted. Now there are various softwares are available which can help you transfer files from the serve to the client computer. We have created a server and client configuration. Now let's add one more computer to the setup and run a few commands on that computer. Do you want to do that?	**ESR:** Yes
Greate! Please share your screen with me.	

Teacher Stops Screen Share
STUDENT-LED ACTIVITY - 20mins
• **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.**

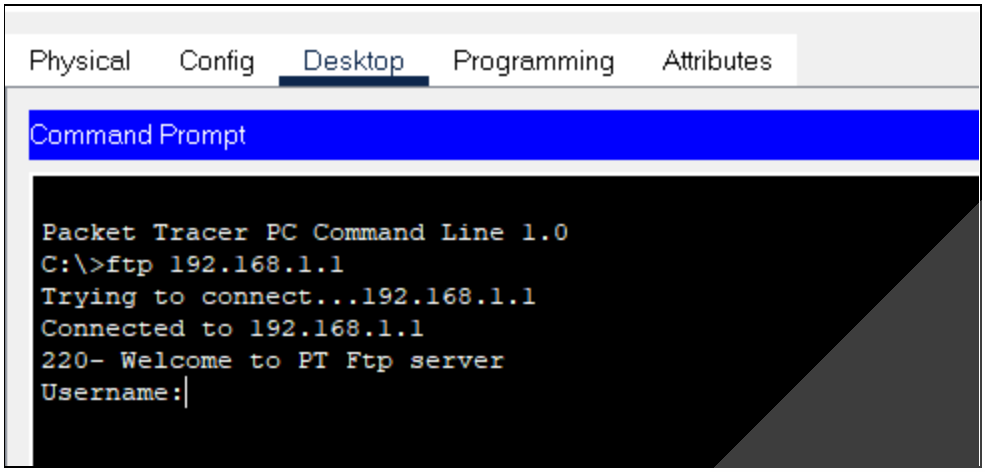
ACTIVITY • **Add 1 more computer to the network.** • **Run FTP commands** • **Troubleshooting the networks**	
Teacher starts slideshow  **for slide 16.**	
Teacher Action	**Student Action**
We have created the network. Now let's add one more client to this network. Do you know how to do it? We need to bring the computer to the canvas, then connect this with the switch and then set up the IP address and default gateway. Here we have our 2nd computer connected with the server via switch. Now let's set up the IP and default gateway.	*Student downloads the Student Activity 1 and open it in the Cisco Packet Tracer.* ESR: Varied



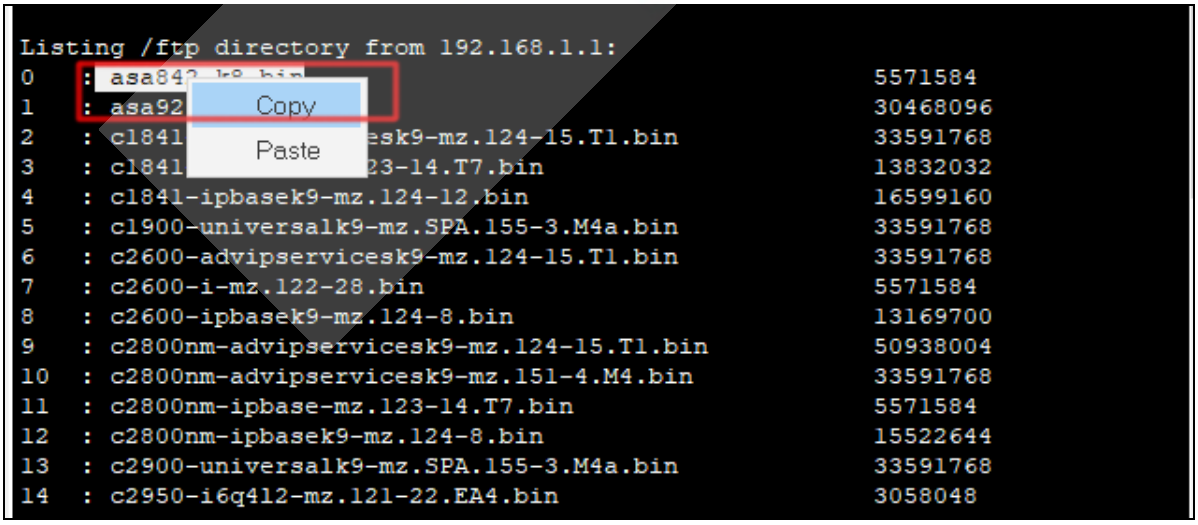
Ip address for this computer we are going to use is **192.168.1.3** and the default gateway is the IP address of the server.

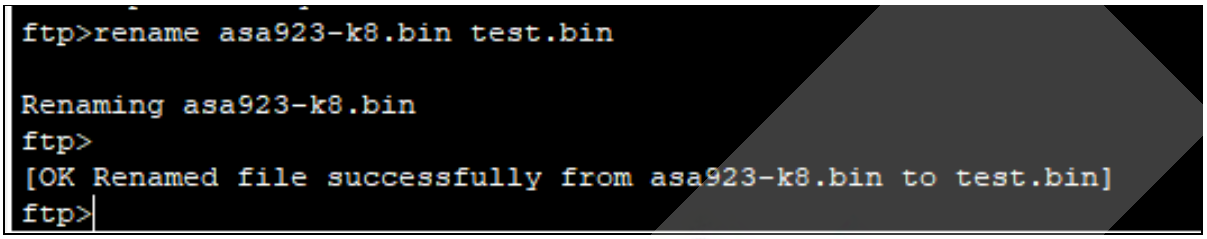
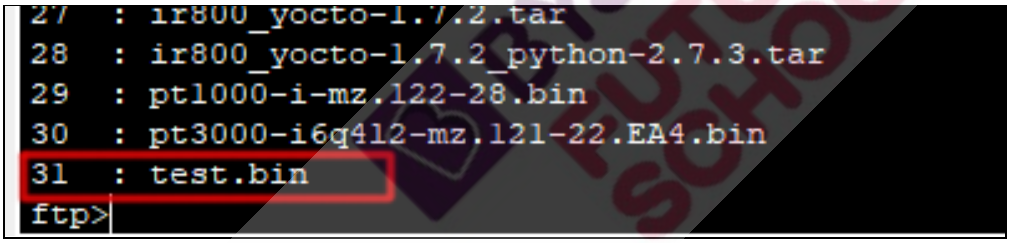


Now go to the commands prompt of this computer and type **ftp 192.168.1.1**
If our step is right it will start the ftp server and ask for login credentials.



Enter the username: **admin** and also the password is **admin**
This will open the ftp command line.
Run the help command to see the list of available commands.
Here we are going to use the rename command to rename a file on the server. First run the dir command to see the list of all the files. Copy the name of the first file along with its extension. **asa842-k8.bin**
Which .bin in this case.



We type the rename command then the original name of the file and then the new name which we want to set. So here it will be **rename asa923-k8.bin test.bin** In both the case extension should be written along with the file name.	
	
Once done run the **dir** command to see the list of files and locate the renamed file. It should be at the bottom.	
	
Now let's copy this file to our computer. Can you tell me which command is used to copy the files? Very good! We will copy the renamed file. Type **get 'name of the file'** and this will copy this file to our client computer. Note: file transfer may take upto 1 minute to complete.	**ESR:** **get**

```
ftp>get pt1000-i-mz.122-28.bin

Reading file pt1000-i-mz.122-28.bin from 192.168.1.1:
File transfer in progress...

[Transfer complete - 5571584 bytes]

5571584 bytes copied in 36.605 secs (34875 bytes/sec)
ftp>
```

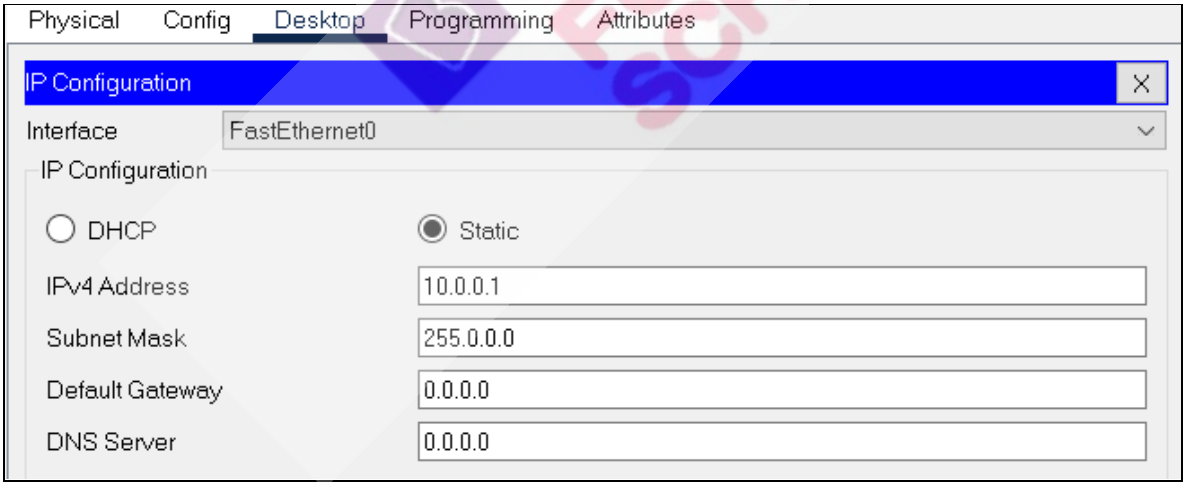
We have copied this file. Now lets exit the ftp server by writing quit command.
This will take us to the C drive of our client computer.

```
ftp>quit

221- Service closing control connection.
C:\>
```

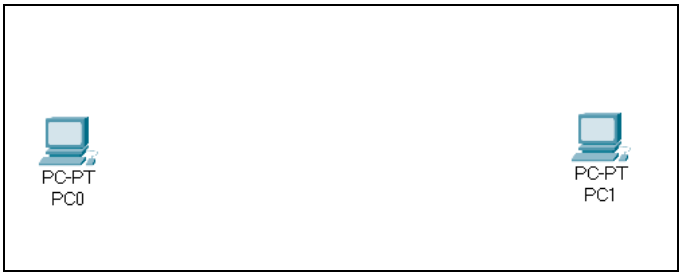
Here also we can run the **dir** command to list all the files.
And here is our file in the client directory.
This way we can run the commands from the ftp server and client computer.

```
C:\>dir

 Volume in drive C has no label.
 Volume Serial Number is 5E12-4AF3
 Directory of C:\

1/1/1970    5:30 PM           5571584   pt1000-i-mz.122-28.bin
1/1/1970    5:30 PM           26        sampleFile.txt
              5571610 bytes       2 File(s)
C:\>
```

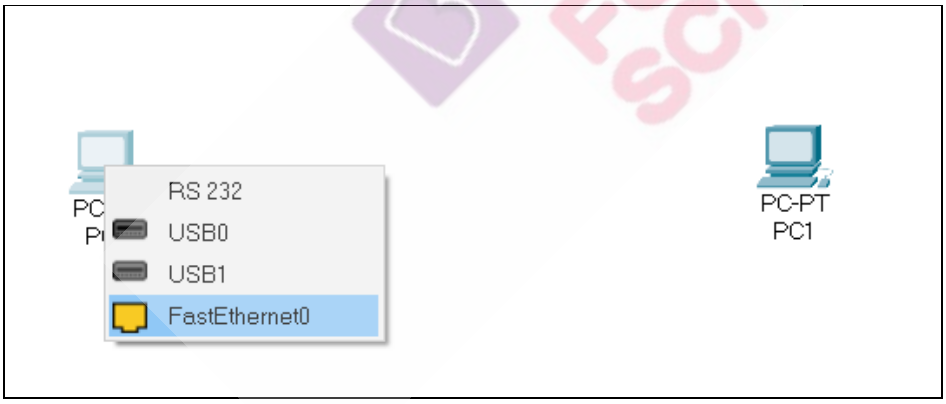
In the last few classes we created various networks and used different networking devices.
While creating a network there are multiple things which can go wrong and our network will not work as expected.
To solve the issues of the network we need to be able to troubleshoot the problem.

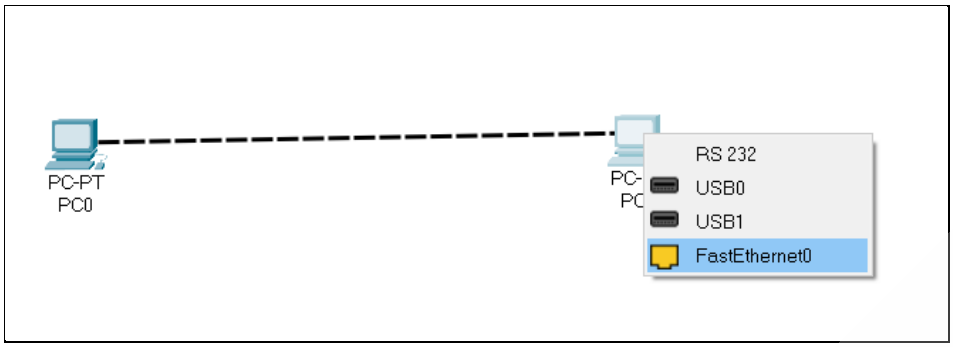
Here we will see few scenarios of problem in the network and how we will rectify the issue.	
The first issue is we have 2 computers connected with each other but we are not able to send or receive a ping and their connection is also showing red triangles Can you sort this issue. *Encourage the student to find and solve the issue on their own.* The First step is to check whether these 2 computers are assigned the IP address or not. Do you know how to check the IP address of a computer? Very good! We also directly go to the IP configuration tab and see if we have assigned the IP properly. We can see that IP is assigned correctly. Now check the other computer as well.	*Student downloads the Student Activity 2 and open in CPT* **ESR:** Ipconfig command in command prompt
	
Both the computers are assigned the IP then why ur connection is not working. Next step is to check the wire. Are we using the correct wire? I don't think so.	

We are using copper straight through cable. But to connect 2 computers directly we need to use crossover cable.
Press the delete button on the keyboard and then click on the wire.
This will remove the wire.

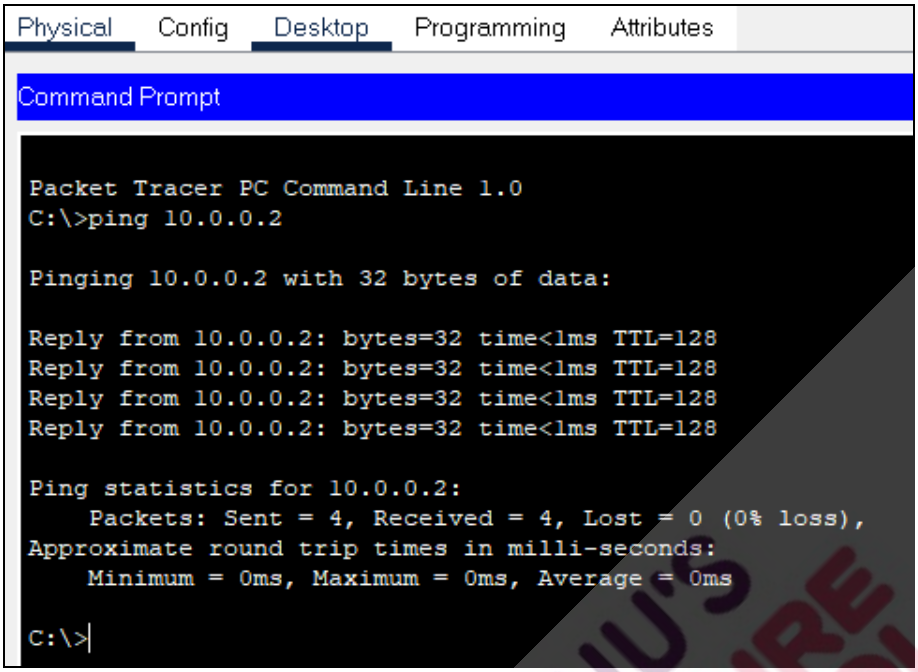


Now select the copper cross over cable, click on the first computer and select the fast ethernet port.
Then click on the second computer and choose the fast ethernet port.
And now you can see that the connection looks good, now we have green triangles.

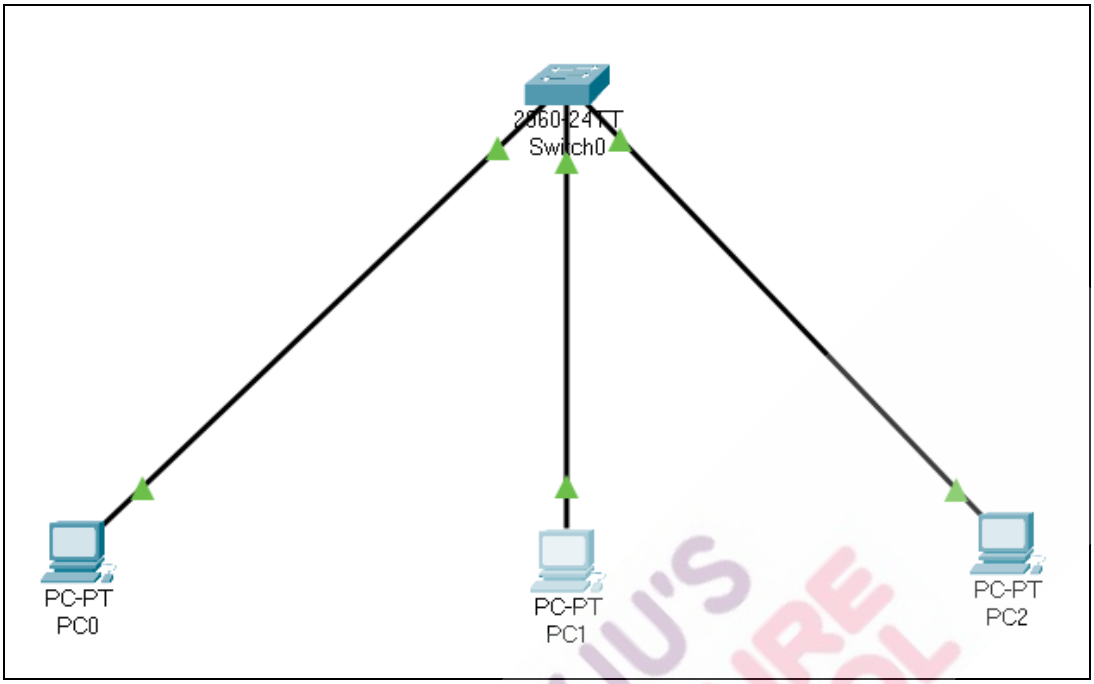




To test if everything is working fine. Double click on any computer and open the command prompt. Then perform the ping with the other computer.
And we got the ping now.



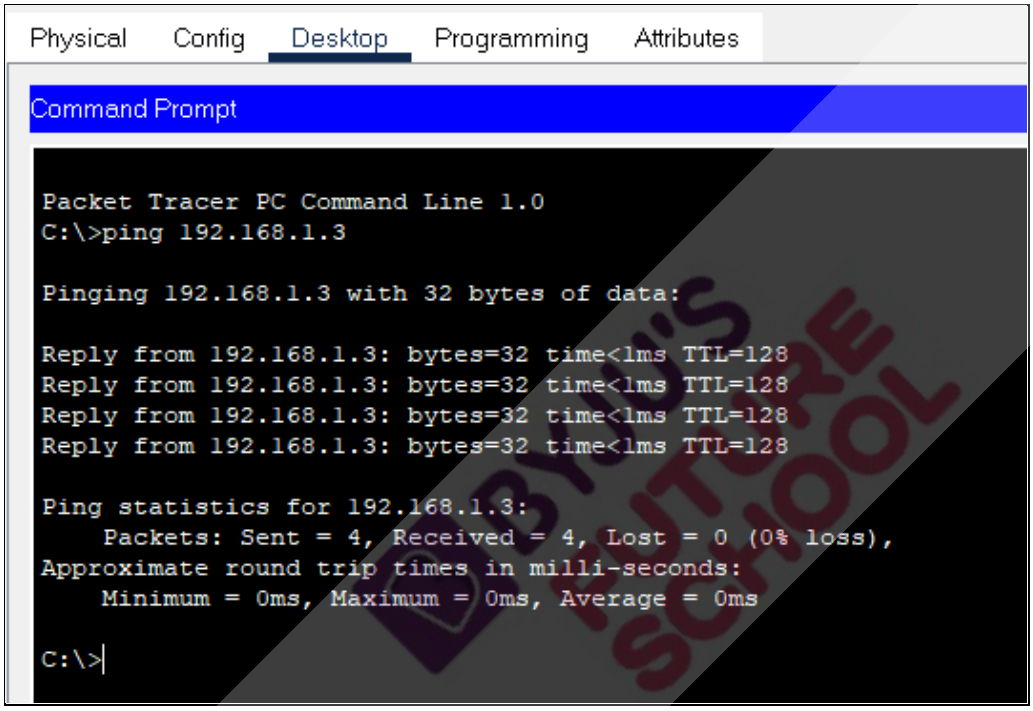
Now let's move to another issue. Here we have a LAN. 4 computers are connected with a switch. But we are not able to see the mac address table in the switch.	*Student downloads the Student activity 3 and open in the CPT*




```
Switch>show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

Switch>
```

Can you solve this issue. We want to see the mac address table in the switch. *Encourage the student to solve the issue on their own.*	
First step is to check the IP address. Go to the each computer and check if the PC is assigned an IP or not. Next step is to check the cable connection. To connect the switch and the PC we use copper straight through cable. The cable looks correct because we can see the green triangles on the connections. When we first perform a ping between 2 computers which	

are connected through a switch. Then the switch stores the mac address of both computers.
You can try to perform a ping and see if our mac address appears in the table.click on the first computer and open the commands prompt and we will ping the last computer.
We are getting a ping.



Now on the switch let's see the mac address table.
And here we can see the Mac addresses of 2 computers.

```
Switch>show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.4266.bd17    DYNAMIC     Fa0/3
   1    00e0.f721.ad08    DYNAMIC     Fa0/1
Switch>
```

We can ping the 2nd computer as well and then we will be able to get it's mac address also in the address table.	

```
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

```
Switch>show mac-address-table
          Mac Address Table
-------------------------------------------

Vlan    Mac Address       Type        Ports
----    -----------       --------    -----

   1    0001.4266.bd17    DYNAMIC     Fa0/3
   1    000d.bd42.393d    DYNAMIC     Fa0/2
   1    00e0.f721.ad08    DYNAMIC     Fa0/1
Switch>
```

Now our issue is resolved we can see the mac address of all the computers here. This is how we can perform troubleshooting in networking.	
You did a really good job today. We have learnt how to configure the Server and client. We also used FTP commands to manipulate the files on the server. And at last we explored 2 scenarios on network troubleshooting. In the next class we are going to create a software server using the socket library of python.	

Teacher Guides Student to Stop Screen Share	
WRAP UP SESSION - 5 Mins	
Teacher starts slideshow  **from slide17 to slide 28**	
Activity details	**Solution/Guidelines**
Run the presentation from slide 17 to slide 28 **Following are the warm up session deliverables:** • **Explain the facts and trivias** • **Next class challenge** • **Project for the day** • **Additional Activity**	Guide the student to develop the project and share with us
Teacher ends slideshow 	
Quiz time - Click on in-class quiz	
Question	**Answer**
What does FTP stand for? a. Firebase Terminal Protocol b. Firestore Terminal Protocol c. File Transfer Protocol d. None of the above	**C**

What command is used to copy the file from the server to the PC? a. send b. get c. copy d. take	**B**
What is a server? a. A server is a computer, where we store files, so that multiple users can access these files. b. A server is a computer, where we edit files, so that multiple users can edit these files. c. Both A & B d. None of the above	**A**
FEEDBACK ● **Appreciate the student for their efforts in the class.** ● **Ask the student to make notes for the reflection journal along with the code they wrote in today's class.**	
You get Hats Off for your excellent work! Awesome!	*Make sure you have given at least 2 Hats Off during the class for:* 

Teacher Clicks ✖ End Class	
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.*
Ask the student to create the server and client setup from scratch. And use the copy and rename commands.	

Links Table

Activity	Description	Link
Teacher Activity 1	Solution file for Reference	https://drive.google.com/file/d/1QWfjAUEoSNXGV5VzWPRZ2DvEX7b8DJeq/view?usp=sharing
Student Activity 1	Template	https://drive.google.com/file/d/13OCy5UgbTYrs2BTvgcfPu

		ztSyeM-MW0Z/view?usp=sharing
Student Activity 2	Template	https://drive.google.com/file/d/1FyUVpelGgd36GJ1pnYrtBJa8NjzUJUSS/view?usp=sharing
Student Activity 3	Template	https://drive.google.com/file/d/1qU42b_ECnxSPCIr3NQk2YO9cJA14VJdx/view?usp=sharing