CEL 51, DCCN, Monsoon 2020

Lab 4: Prototyping a Network

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TE Comps
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Date: 6-09-20

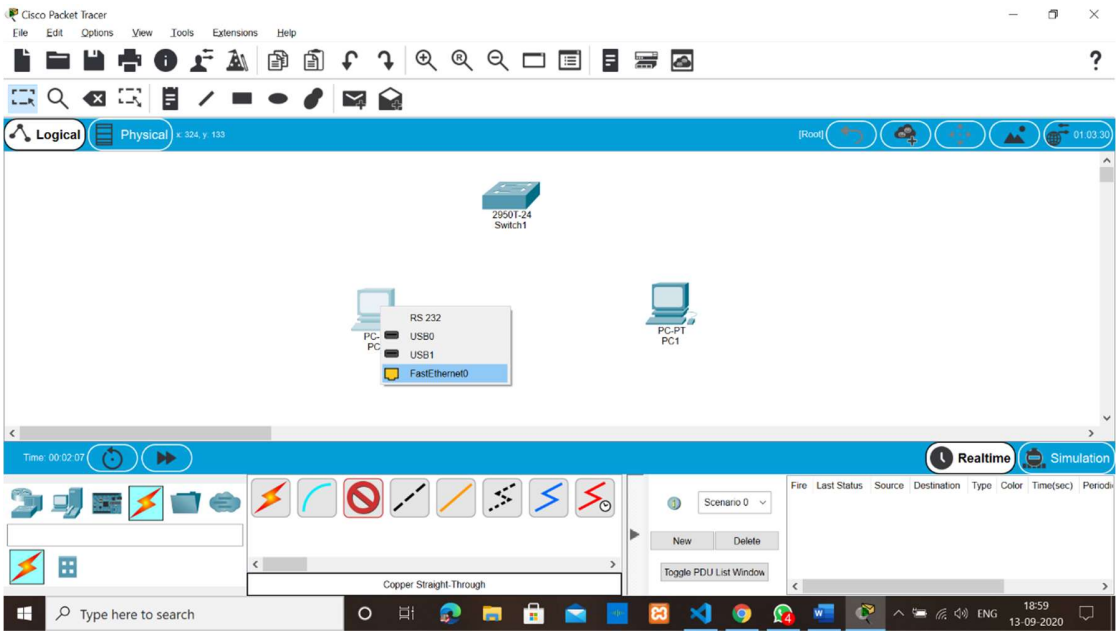
Objective:
Prototype a network using Packet Tracer

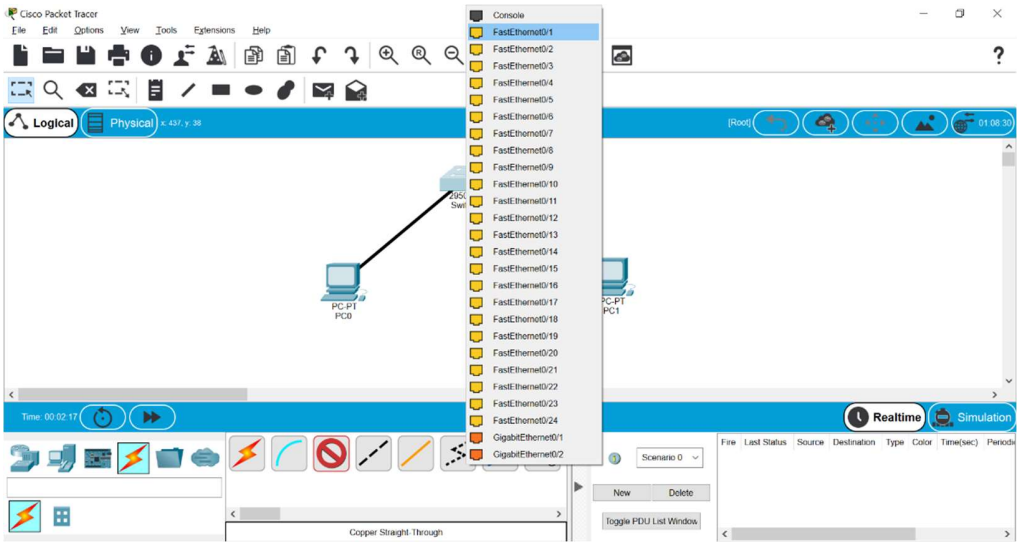
Background
A client has requested that you set up a simple network with two PCs connected to a switch. Verify that the hardware, along with the given configurations, meet the requirements of the client.

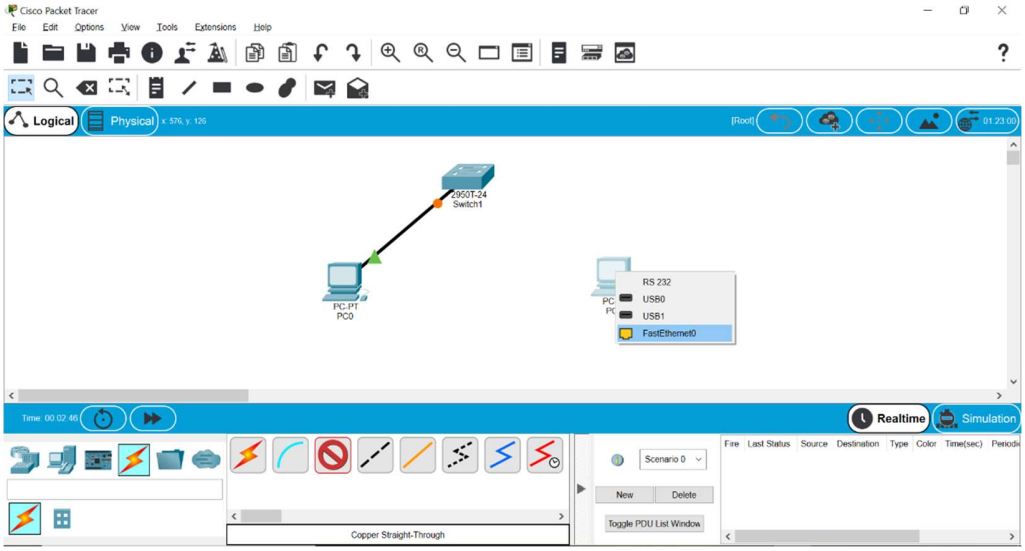
Step 1: Set up the network topology

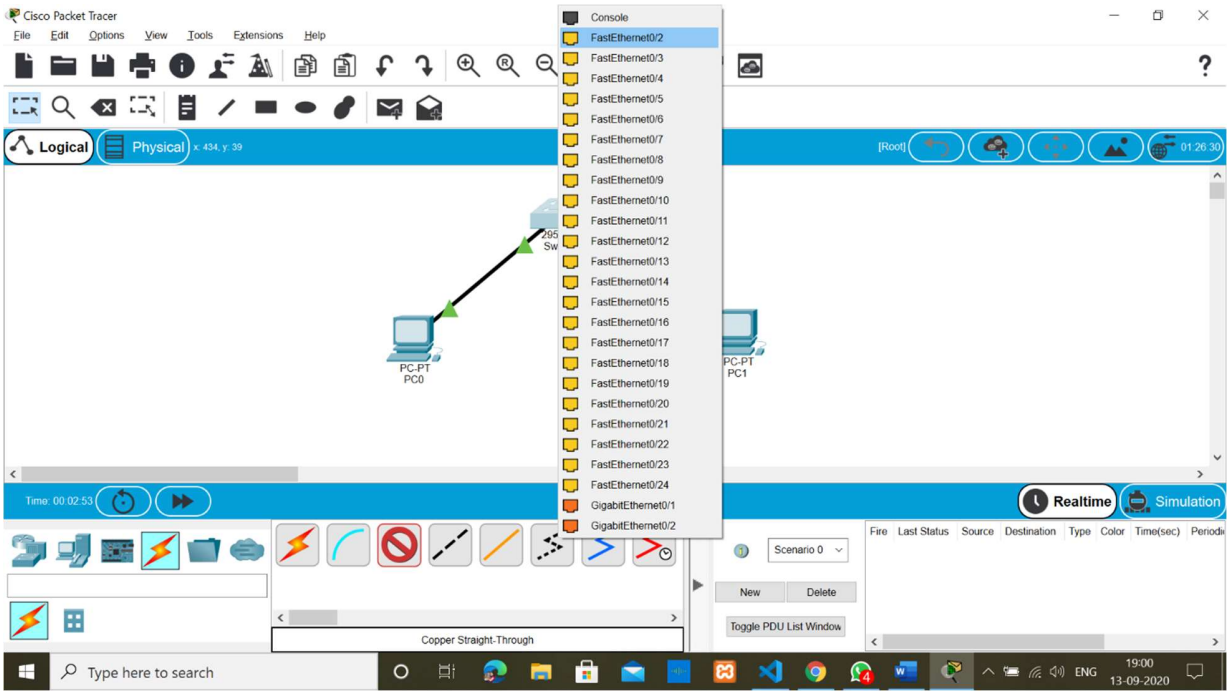
a) Add two PCs and a Cisco 2950T switch

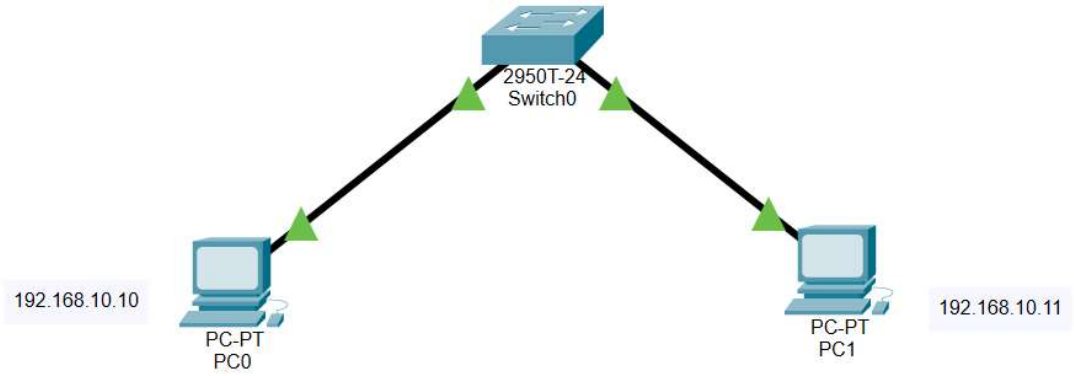
b) Using straight-through cables, connect **PC0** to interface **Fa0/1** on **Switch0** and **PC1** to interface **Fa0/2** on **Switch0**.

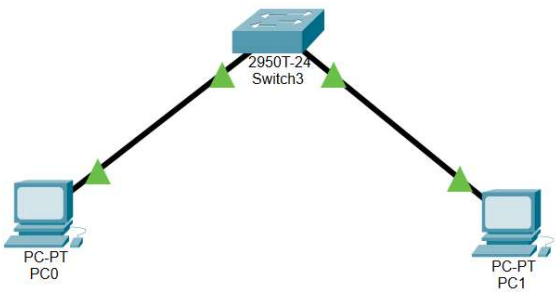



Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
Console
FastEthernet0/1
FastEthernet0/2
FastEthernet0/3
FastEthernet0/4
FastEthernet0/5
FastEthernet0/6
FastEthernet0/7
FastEthernet0/8
FastEthernet0/9
FastEthernet0/10
FastEthernet0/11
FastEthernet0/12
FastEthernet0/13
FastEthernet0/14
FastEthernet0/15
FastEthernet0/16
FastEthernet0/17
FastEthernet0/18
FastEthernet0/19
FastEthernet0/20
FastEthernet0/21
FastEthernet0/22
FastEthernet0/23
FastEthernet0/24
GigabitEthernet0/1
GigabitEthernet0/2
PC-PT PC0
Realtime
Simulation
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
2950T-24 Switch1
PC-PT PC0
RS 232
USB0
USB1
FastEthernet0
Realtime
Simulation
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window

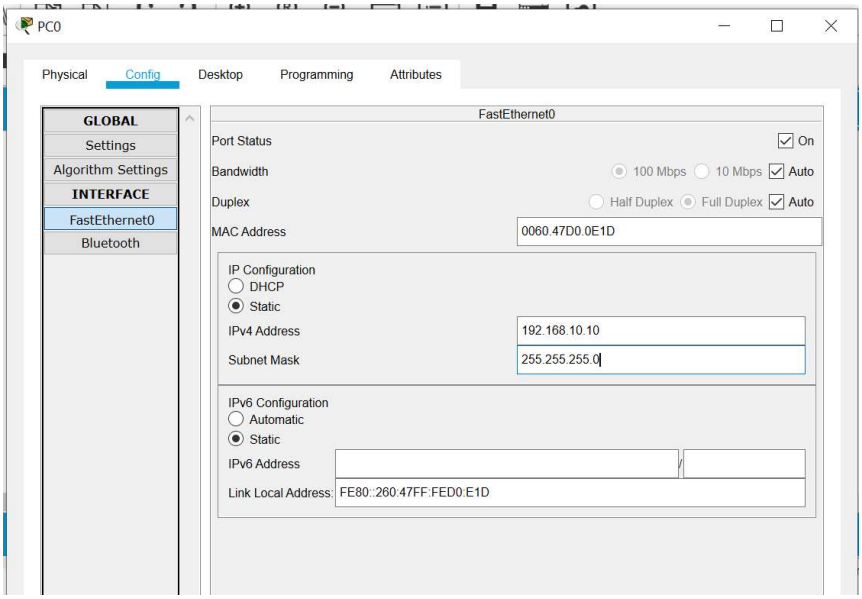

Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
Console
FastEthernet0/2
FastEthernet0/3
FastEthernet0/4
FastEthernet0/5
FastEthernet0/6
FastEthernet0/7
FastEthernet0/8
FastEthernet0/9
FastEthernet0/10
FastEthernet0/11
FastEthernet0/12
FastEthernet0/13
FastEthernet0/14
FastEthernet0/15
FastEthernet0/16
FastEthernet0/17
FastEthernet0/18
FastEthernet0/19
FastEthernet0/20
FastEthernet0/21
FastEthernet0/22
FastEthernet0/23
FastEthernet0/24
GigabitEthernet0/1
GigabitEthernet0/2
PC-PT PC0
PC-PT PC1
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Copper Straight-Through
Type here to search
ENG
19:00
13-09-2020


2950T-24
Switch0
192.168.10.10
PC-PT
PC0
PC-PT
PC1
192.168.10.11


2950T-24
Switch3
PC-PT
PC0
PC-PT
PC1

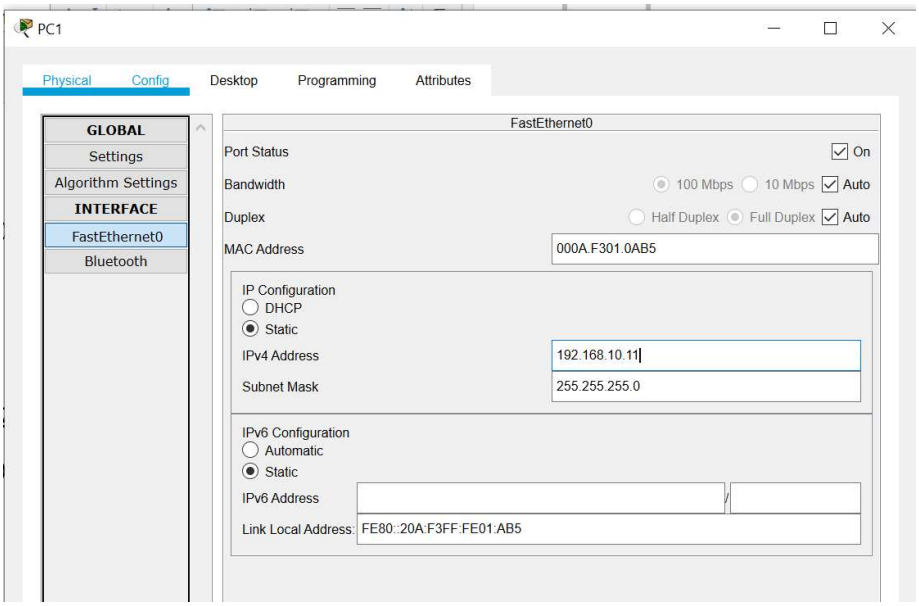
c) Configure PC0 using the **Config** tab in the PC0 configuration window:

a. IP address: 192.168.10.10
b. Subnet Mask 255.255.255.0



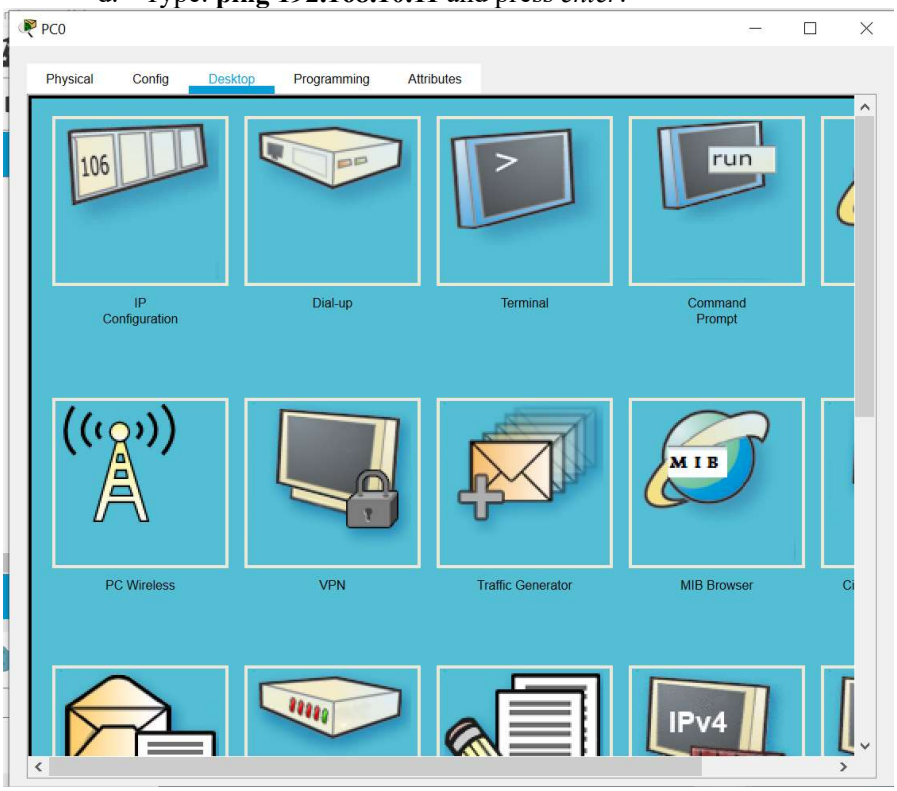
d) Configure PC1 using the **Config** tab in the PC1 configuration window

a. IP address: 192.168.10.11
b. Subnet Mask 255.255.255.0

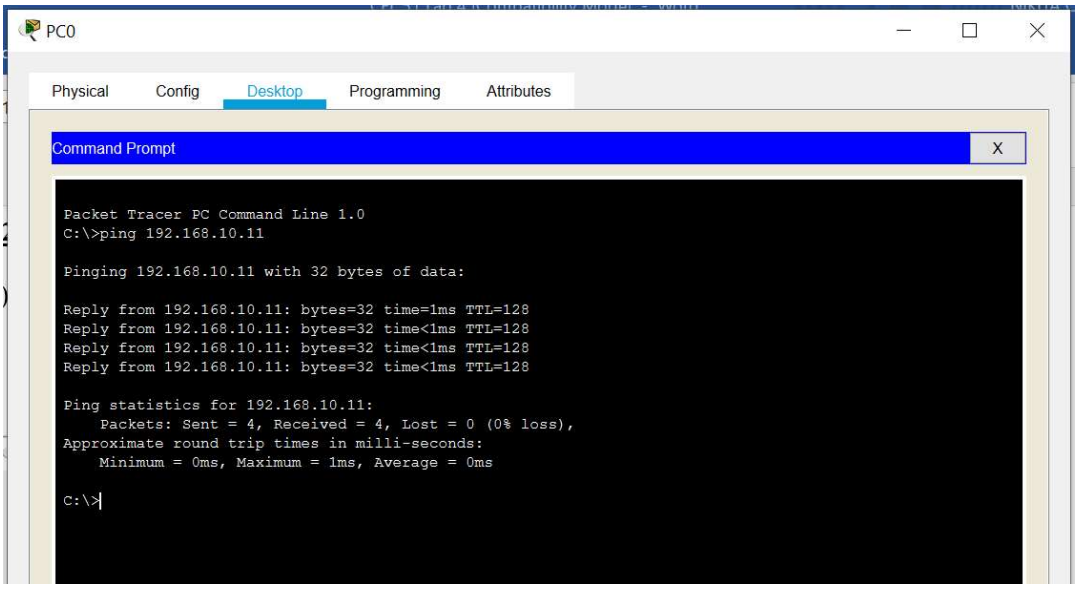


Step 2: Test connectivity from PC0 to PC1

a) Use the **ping** command to test connectivity.
   a. Click PC0.
   b. Choose the **Desktop** tab.
   c. Choose **Command Prompt**.
   d. Type: **ping 192.168.10.11** and press *enter*.

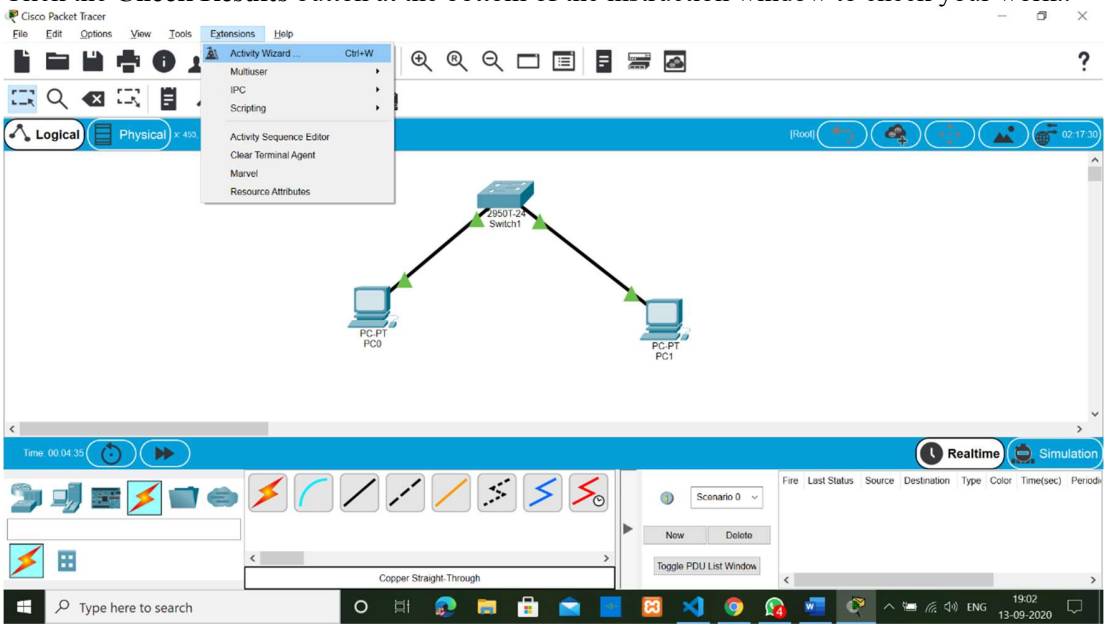


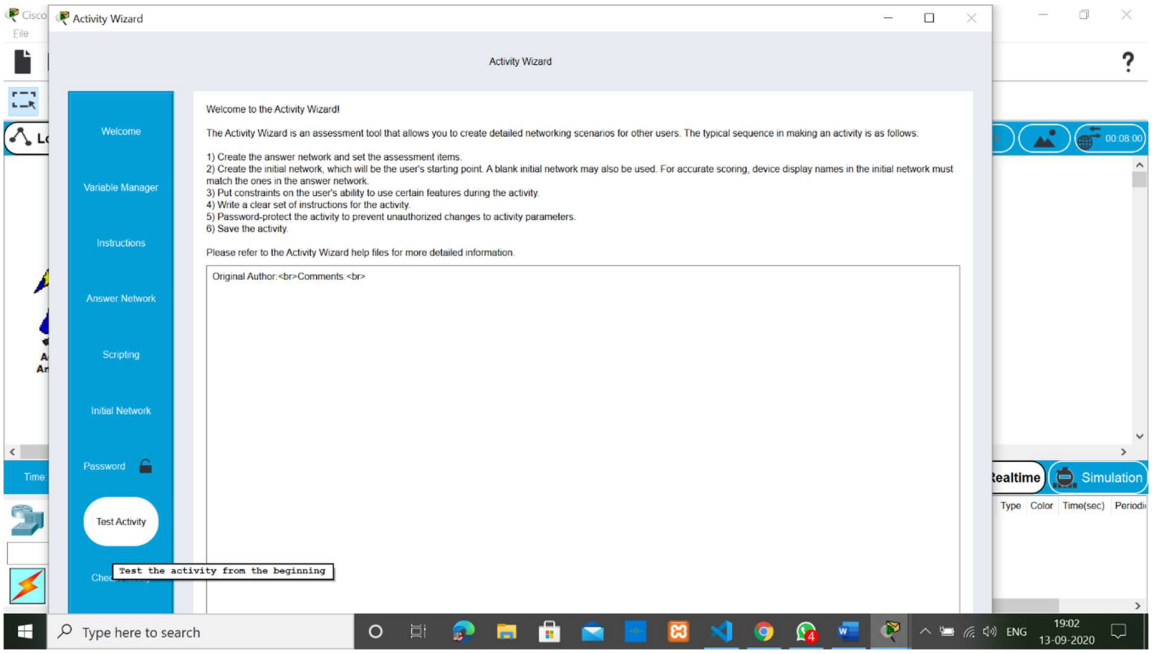
b) A successful **ping** indicates the network was configured correctly and the prototype validates the hardware and software configurations. A successful ping should resemble the below output:

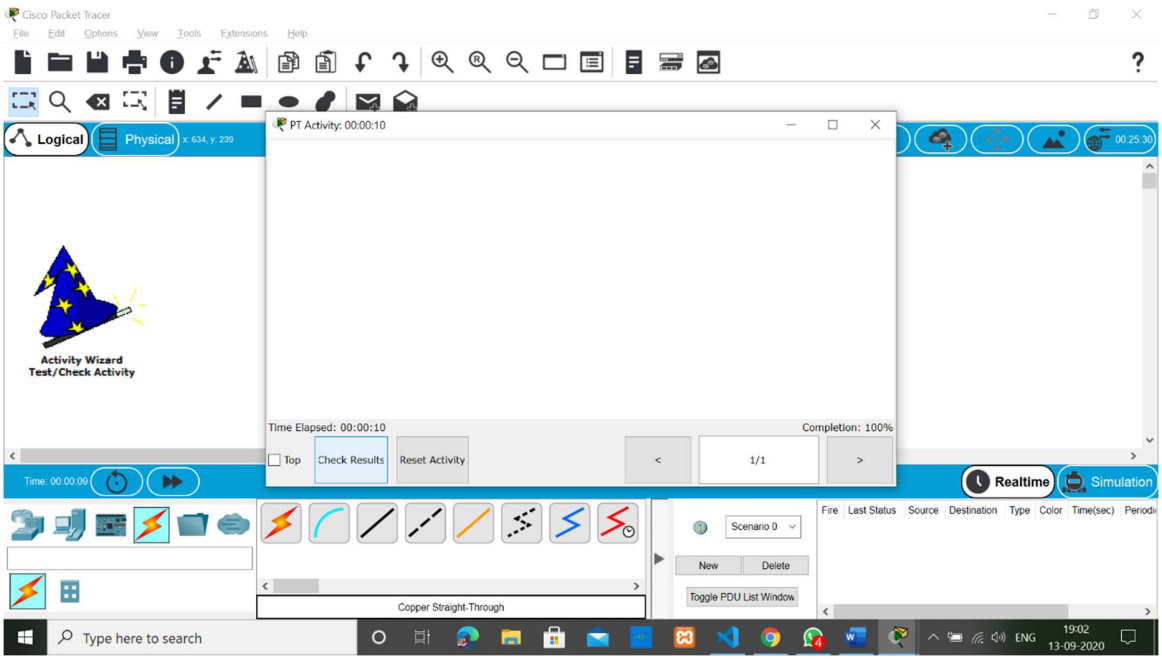


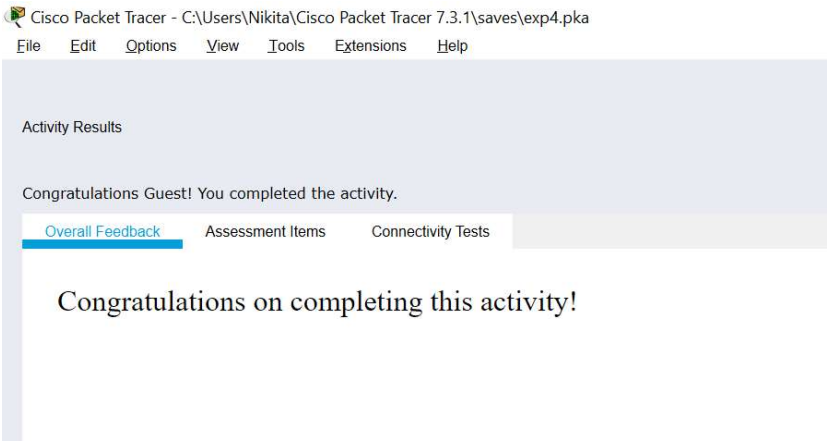
c) Close the configuration window.

d) Click the **Check Results** button at the bottom of the instruction window to check your work..




Activity Wizard
Activity Wizard
Welcome
Variable Manager
Instructions
Answer Network
Scripting
Initial Network
Password
Test Activity
Test the activity from the beginning
Welcome to the Activity Wizard!
The Activity Wizard is an assessment tool that allows you to create detailed networking scenarios for other users. The typical sequence in making an activity is as follows:
1) Create the answer network and set the assessment items.
2) Create the initial network, which will be the user's starting point. A blank initial network may also be used. For accurate scoring, device display names in the initial network must match the ones in the answer network.
3) Put constraints on the user's ability to use certain features during the activity.
4) Write a clear set of instructions for the activity.
5) Password-protect the activity to prevent unauthorized changes to activity parameters.
6) Save the activity.
Please refer to the Activity Wizard help files for more detailed information.
Original Author:
Comments:
Realtime
Simulation
Type here to search
ENG
19:02
13-09-2020

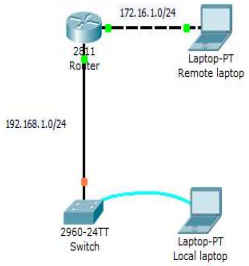

Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
PT Activity: 00:00:10
Activity Wizard
Test/Check Activity
Time Elapsed: 00:00:10
Completion: 100%
Top
Check Results
Reset Activity
1/1
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Copper Straight-Through
Type here to search
ENG
19:02
13-09-2020



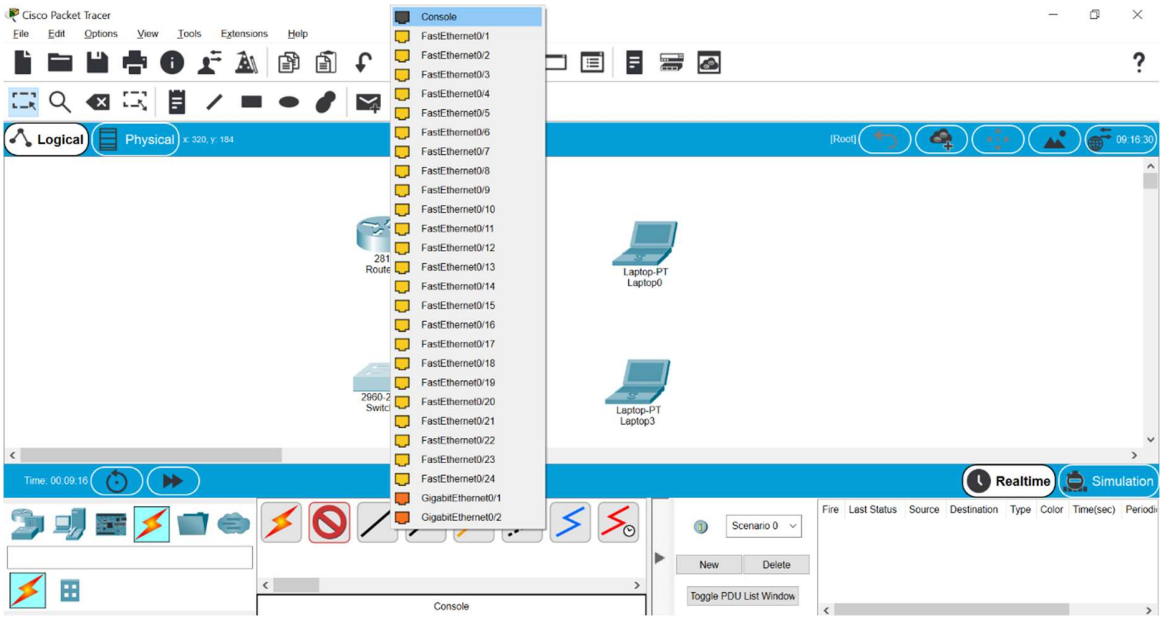
CEL51, DCCN, Monsoon 2020

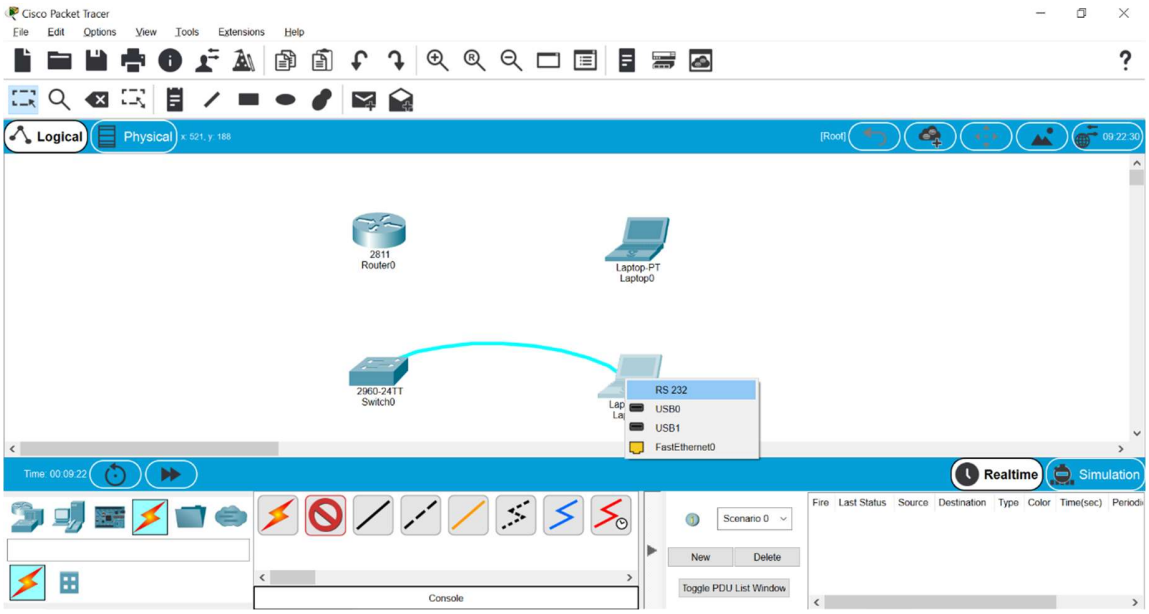
Lab 4.1: Basic configuration - hostname, motd banner, passwd etc

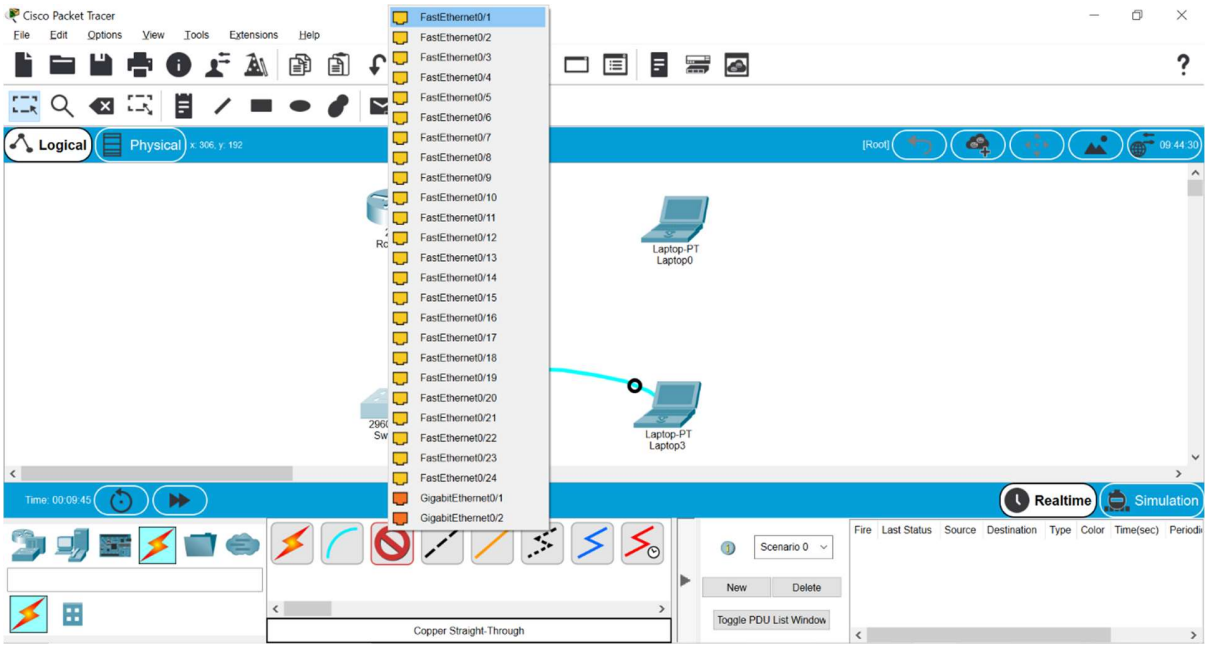
Objective:
This lab will test your ability to configure basic settings such as hostname, motd banner, encrypted passwords, and terminal options on a Packet Tracer 6.2 simulated Cisco Catalyst switch.

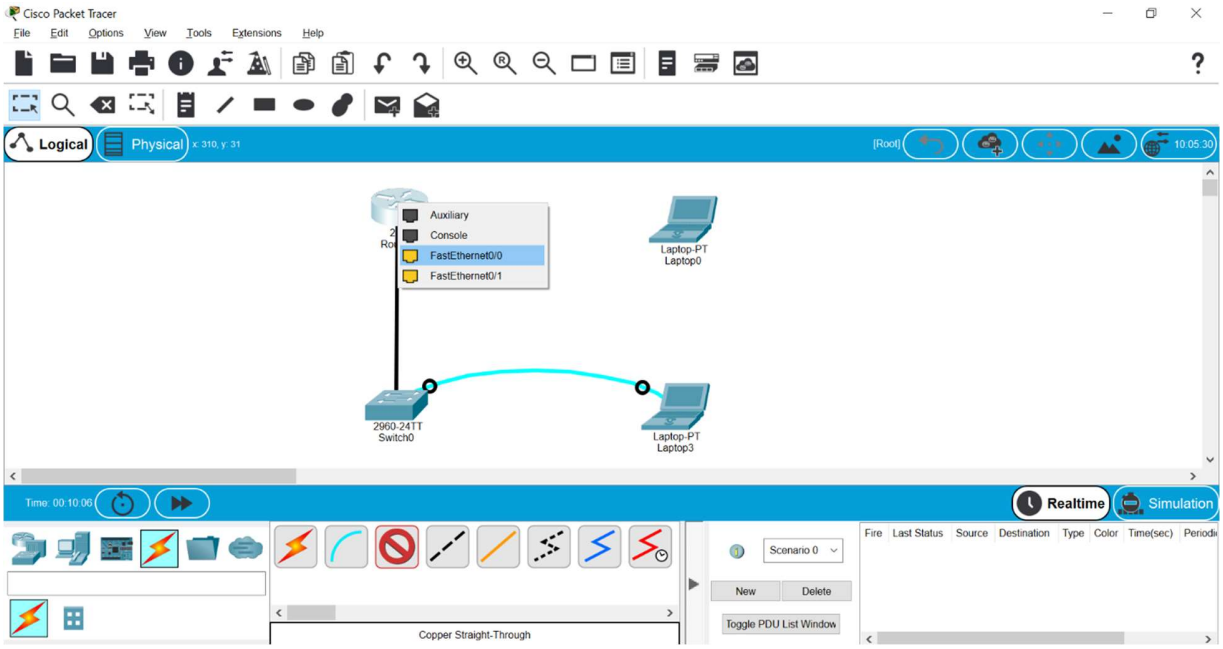


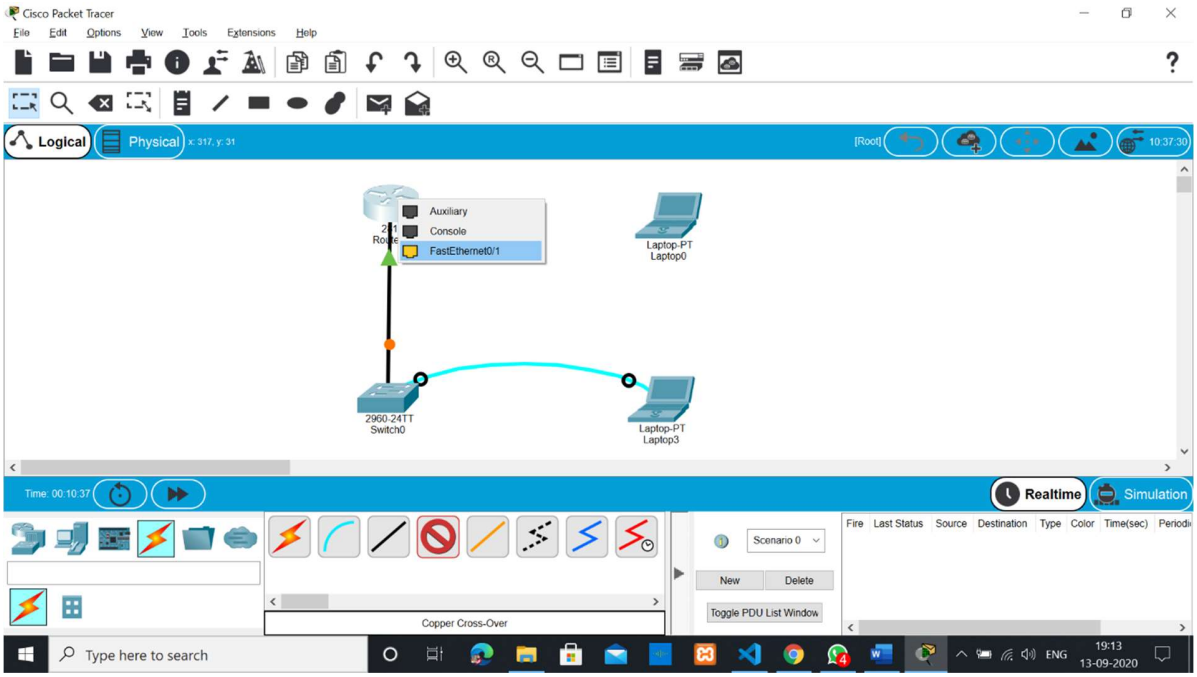
1. Use the local laptop connect to the switch console.

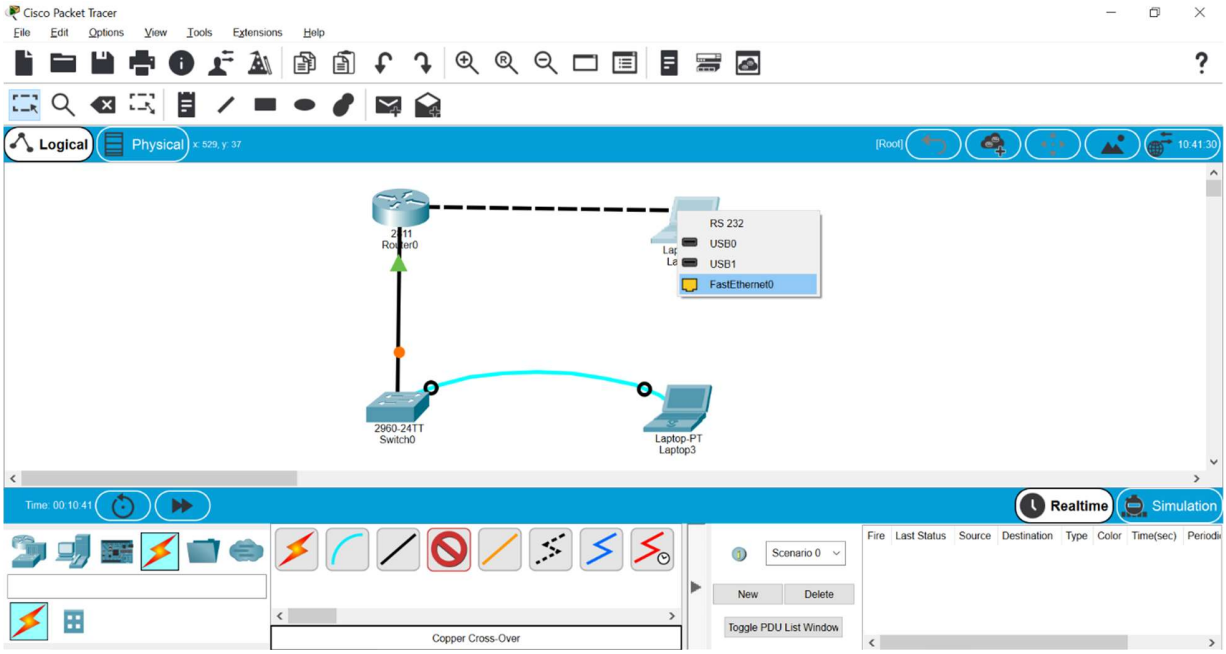

Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical x: 320, y: 184
[Root] 09:16:30
Console
FastEthernet0/1
FastEthernet0/2
FastEthernet0/3
FastEthernet0/4
FastEthernet0/5
FastEthernet0/6
FastEthernet0/7
FastEthernet0/8
FastEthernet0/9
FastEthernet0/10
FastEthernet0/11
FastEthernet0/12
FastEthernet0/13
FastEthernet0/14
FastEthernet0/15
FastEthernet0/16
FastEthernet0/17
FastEthernet0/18
FastEthernet0/19
FastEthernet0/20
FastEthernet0/21
FastEthernet0/22
FastEthernet0/23
FastEthernet0/24
GigabitEthernet0/1
GigabitEthernet0/2
Laptop-PT
Laptop0
Laptop-PT
Laptop3
Time: 00:09:16
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Console

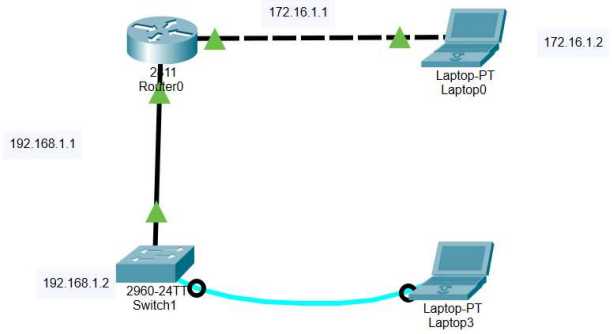

Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical Physical x: 521, y: 188
[Root] 09:22:30
2811
Router0
Laptop-PT
Laptop0
2960-24TT
Switch0
RS 232
USB0
USB1
FastEthernet0
Time: 00:09:22
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Console


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
x: 306, y: 192
[Root]
09:44:30
FastEthernet0/1
FastEthernet0/2
FastEthernet0/3
FastEthernet0/4
FastEthernet0/5
FastEthernet0/6
FastEthernet0/7
FastEthernet0/8
FastEthernet0/9
FastEthernet0/10
FastEthernet0/11
FastEthernet0/12
FastEthernet0/13
FastEthernet0/14
FastEthernet0/15
FastEthernet0/16
FastEthernet0/17
FastEthernet0/18
FastEthernet0/19
FastEthernet0/20
FastEthernet0/21
FastEthernet0/22
FastEthernet0/23
FastEthernet0/24
GigabitEthernet0/1
GigabitEthernet0/2
Laptop-PT
Laptop0
Laptop-PT
Laptop3
Time: 00:09:45
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Copper Straight-Through


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
x: 310, y: 31
[Root]
10:05:30
Auxiliary
Console
FastEthernet0/0
FastEthernet0/1
Laptop-PT
Laptop0
2960-24TT
Switch0
Laptop-PT
Laptop3
Time: 00:10:06
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Copper Straight-Through


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
x: 317, y: 31
[Root]
10:37:30
Auxiliary
Console
FastEthernet0/1
Laptop-PT
Laptop0
2960-24TT
Switch0
Laptop-PT
Laptop3
Time: 00:10:37
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Copper Cross-Over
Type here to search
ENG
19:13
13-09-2020


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
x: 529, y: 37
[Root]
10:41:30
RS 232
USB0
USB1
FastEthernet0
2960-24TT
Switch0
Laptop-PT
Laptop3
Time: 00:10:41
Realtime
Simulation
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Copper Cross-Over



Router0

Physical | Config | CLI | Attributes

GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
FastEthernet0/0
FastEthernet0/1

FastEthernet0/0

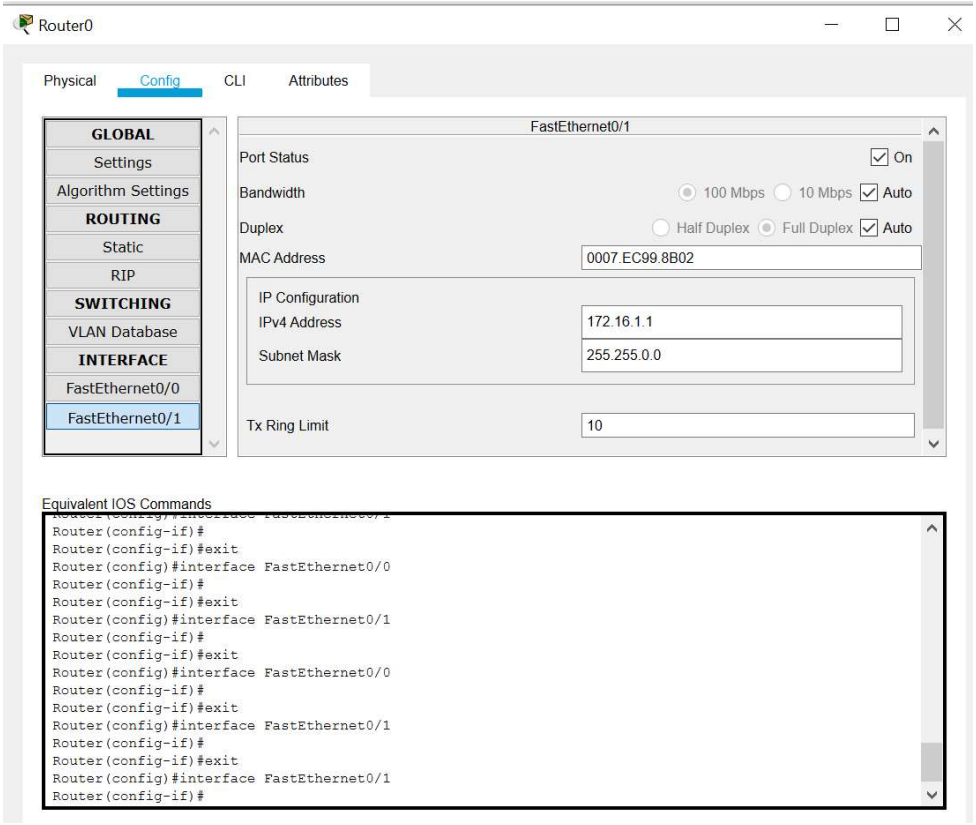
Port Status: On
Bandwidth: 100 Mbps, 10 Mbps, Auto
Duplex: Half Duplex, Full Duplex, Auto
MAC Address: 0007.EC99.8B01

IP Configuration
IPv4 Address: 192.168.1.1
Subnet Mask: 255.255.255.0

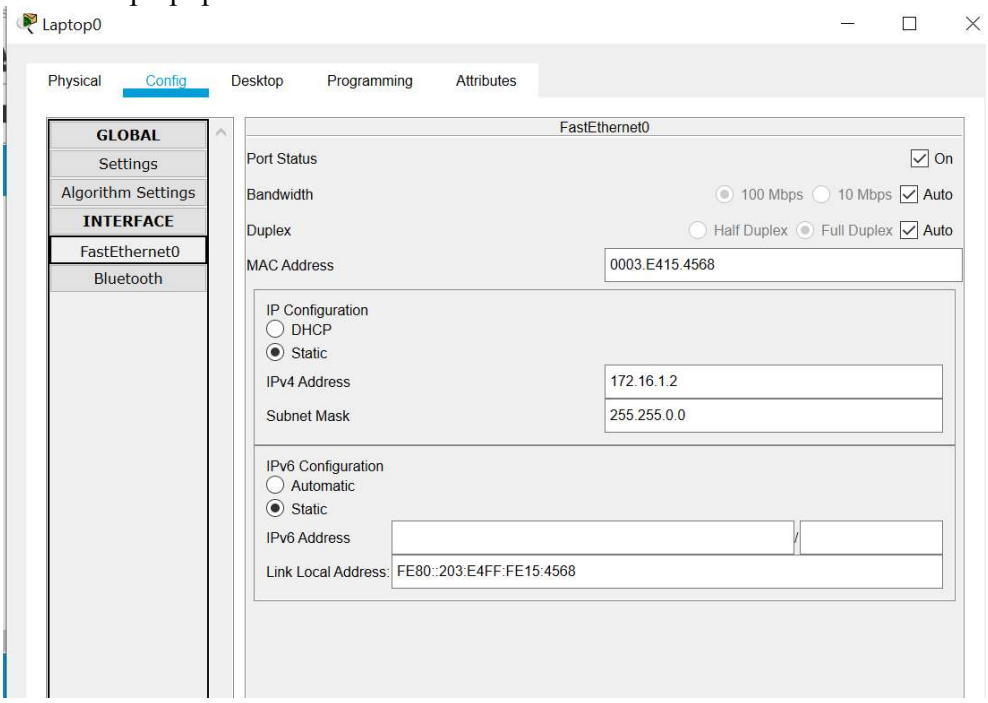
Tx Ring Limit: 10

Equivalent IOS Commands

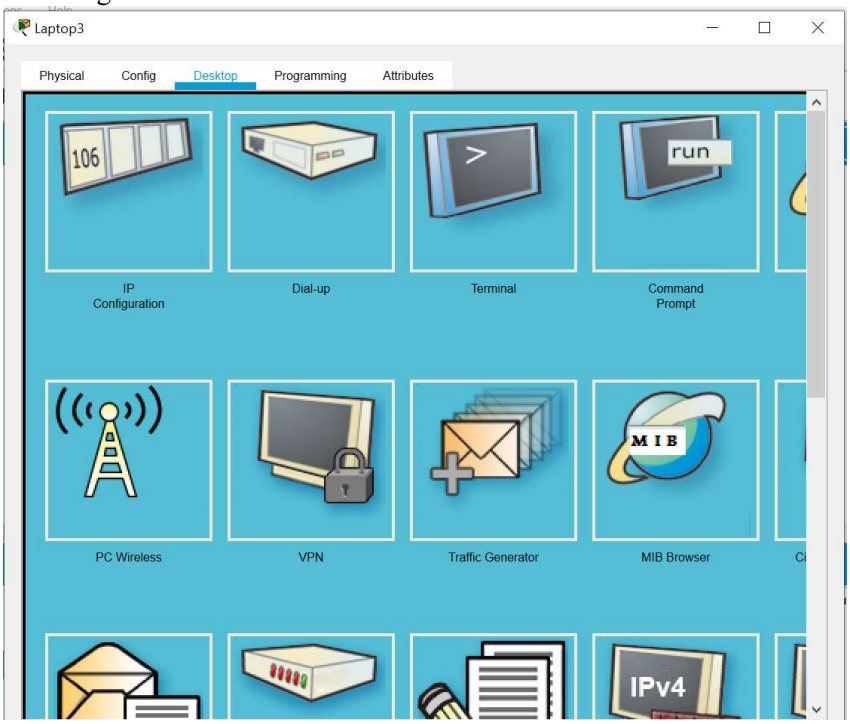
```
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up


Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
```

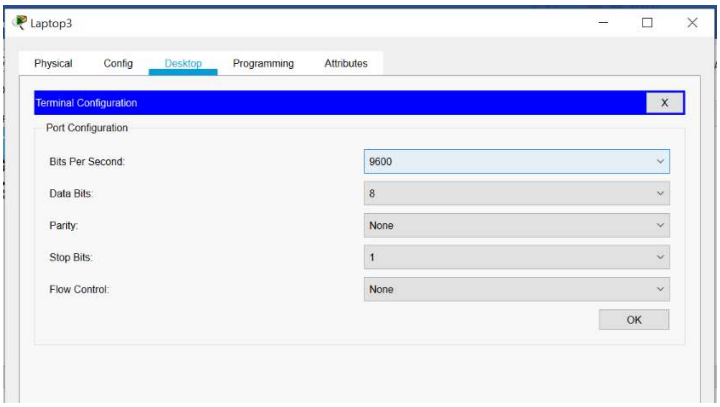


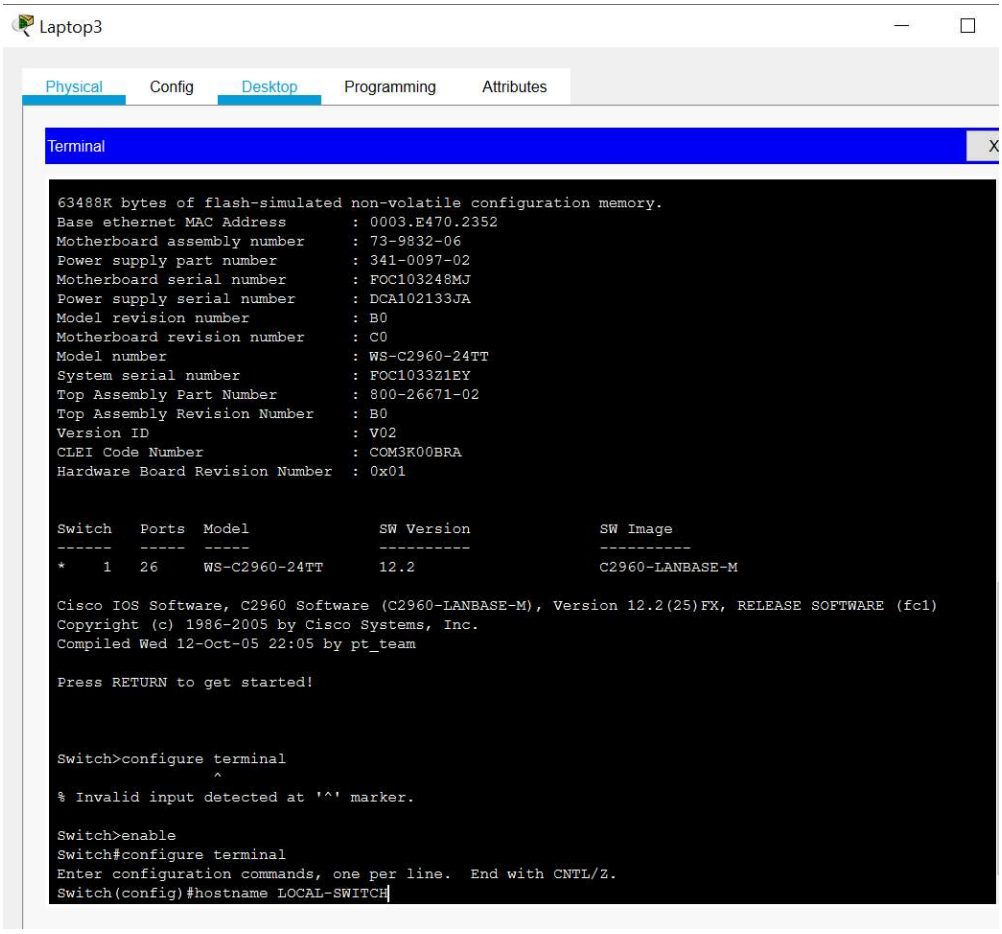
Remote laptop ip address.



2. Configure Switch hostname as LOCAL-SWITCH



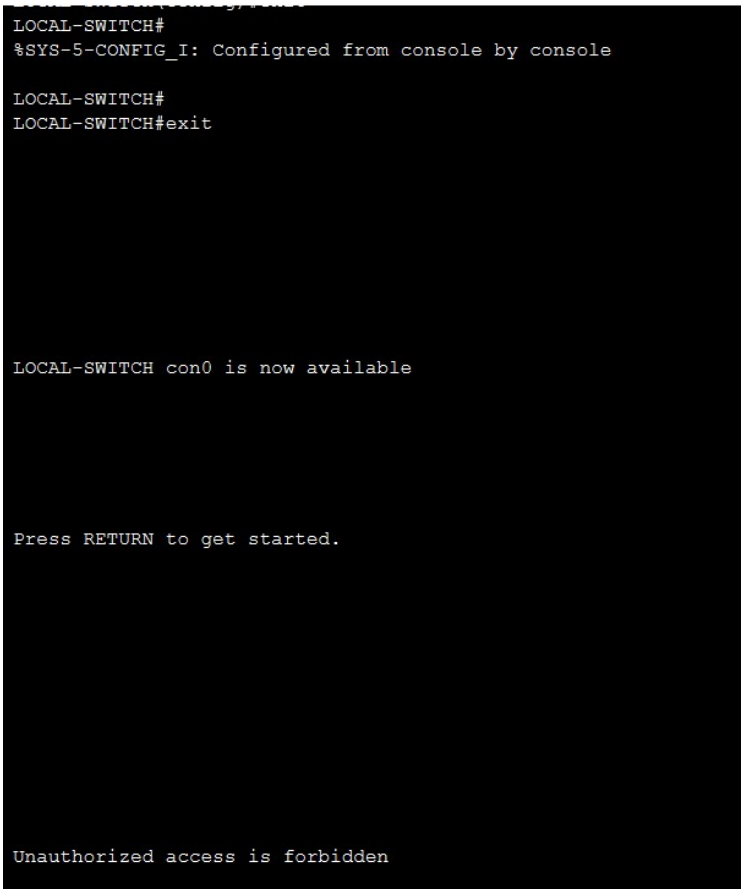



Laptop3
Physical
Config
Desktop
Programming
Attributes
Terminal
63488K bytes of flash-simulated non-volatile configuration memory.
Base ethernet MAC Address : 0003.E470.2352
Motherboard assembly number : 73-9832-06
Power supply part number : 341-0097-02
Motherboard serial number : FOC103248MJ
Power supply serial number : DCA102133JA
Model revision number : B0
Motherboard revision number : C0
Model number : WS-C2960-24TT
System serial number : FOC1033Z1EY
Top Assembly Part Number : 800-26671-02
Top Assembly Revision Number : B0
Version ID : V02
CLEI Code Number : COM3K00BRA
Hardware Board Revision Number : 0x01
Switch Ports Model SW Version SW Image
* 1 26 WS-C2960-24TT 12.2 C2960-LANBASE-M
Cisco IOS Software, C2960 Software (C2960-LANBASE-M), Version 12.2(25)FX, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Wed 12-Oct-05 22:05 by pt_team
Press RETURN to get started!
Switch>configure terminal
^
% Invalid input detected at '^' marker.
Switch>enable
Switch#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#hostname LOCAL-SWITCH

```
LOCAL-SWITCH(config)#exit
LOCAL-SWITCH#
%SYS-5-CONFIG_I: Configured from console by console

LOCAL-SWITCH#show running-config
Building configuration...

Current configuration : 1086 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname LOCAL-SWITCH
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
!
interface FastEthernet0/2
 --More--
```

3. Configure the message of the day as "Unauthorized access is forbidden"

```
LOCAL-SWITCH#enable
LOCAL-SWITCH#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
LOCAL-SWITCH(config)#banner motd #
Enter TEXT message.  End with the character '#'.
Unauthorized access is forbidden#

LOCAL-SWITCH(config)#exit
LOCAL-SWITCH#
%SYS-5-CONFIG_I: Configured from console by console

LOCAL-SWITCH#
LOCAL-SWITCH#exit
```



4. Configure the password for privileged mode access as "cisco". The password must be md5 encrypted

```
LOCAL-SWITCH>enable
LOCAL-SWITCH#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
LOCAL-SWITCH(config)#enable secret cisco
LOCAL-SWITCH(config)#exit
LOCAL-SWITCH#
%SYS-5-CONFIG_I: Configured from console by console
```

```
LOCAL-SWITCH#show running-config
Building configuration...

Current configuration : 1183 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
no service password-encryption
!
hostname LOCAL-SWITCH
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 --More--
```

5. Configure password encryption on the switch using the global configuration command

```
LOCAL-SWITCH#enable
LOCAL-SWITCH#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
LOCAL-SWITCH(config)#service password-encryption
LOCAL-SWITCH(config)#exit
LOCAL-SWITCH#
%SYS-5-CONFIG_I: Configured from console by console

LOCAL-SWITCH#show running-config
Building configuration...

Current configuration : 1180 bytes
!
version 12.2
no service timestamps log datetime msec
no service timestamps debug datetime msec
service password-encryption
!
hostname LOCAL-SWITCH
!
enable secret 5 $1$mERr$hx5rVt7rPNoS4wqbXKX7m0
!
!
!
!
!
!
spanning-tree mode pvst
spanning-tree extend system-id
!
interface FastEthernet0/1
 --More--
```

6. Configure CONSOLE access with the following settings :
- Login enabled
- Password : whatever you like
- History size : 15 commands
- Timeout : 6'45"
- Synchronous logging

```
LOCAL-SWITCH#enable
LOCAL-SWITCH#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
LOCAL-SWITCH(config)#line con 0
LOCAL-SWITCH(config-line)#password ciscopackettracer
LOCAL-SWITCH(config-line)#logging synchronous
LOCAL-SWITCH(config-line)#login
LOCAL-SWITCH(config-line)#history size 15
LOCAL-SWITCH(config-line)#exec-timeout 6 45
LOCAL-SWITCH(config-line)#
```

6. Configure TELNET access with the following settings :
- Login enabled
- Password : whatever you like
- History size : 15 commands
- Timeout : 8'20"
- Synchronous logging

The term "**vty**" stands for **Virtual teletype**. VTY is a virtual port and used to get Telnet or SSH access to the device.VTY is solely used for inbound connections to the device. These connections are all virtual with no hardware associated with them.
The abstract "**0 – 15**" means that the device can allow 16 simultaneous virtual connections which may be Telnet or SSH. In a way, we may say that 16 (0 – 15) are connection ports to the Router or Switch.

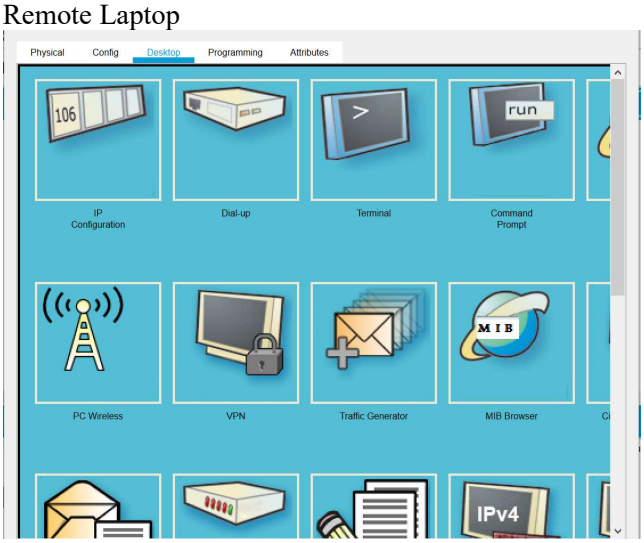
```
LOCAL-SWITCH(config-line)#line vty 0 15
LOCAL-SWITCH(config-line)#exec-timeout 8 20
LOCAL-SWITCH(config-line)#password ciscotelnet
LOCAL-SWITCH(config-line)#logging synchronous
LOCAL-SWITCH(config-line)#login
LOCAL-SWITCH(config-line)#history size 15
LOCAL-SWITCH(config-line)#
```

7. Configure the IP address of the switch as 192.168.1.2/24 and it's default gateway IP (192.168.1.1).

```
LOCAL-SWITCH(config-line)#exit
LOCAL-SWITCH(config)#interface Vlan1
LOCAL-SWITCH(config-if)#ip address 192.168.1.2 255.255.255.0
LOCAL-SWITCH(config-if)#ip default-gateway 192.168.1.1
LOCAL-SWITCH(config)#
```

8. Test telnet connectivity from the Remote Laptop using the telnet client.

Remote Laptop




```
C:\>telnet 192.168.1.2
Trying 192.168.1.2 ...Open
Unauthorized access is forbidden


User Access Verification

Password:
LOCAL-SWITCH>
```

Conclusion:-

Difference Between Router , Switch, Hub[1]:-

Hub :-

- Connects all the devices together on an internal network.
- Hub as no intelligence as to where the data has to be sent. It simply broadcasts data to all the devices connected it its ports.

Switch :-

- Connects all the devices together on an internal network.
- Switch has intelligence. It can actually learn the physical addresses of devices connected to it and stores these MAC addresses in its switch table.
- So when a data packet is sent to a switch it is only directed to the intended destination.

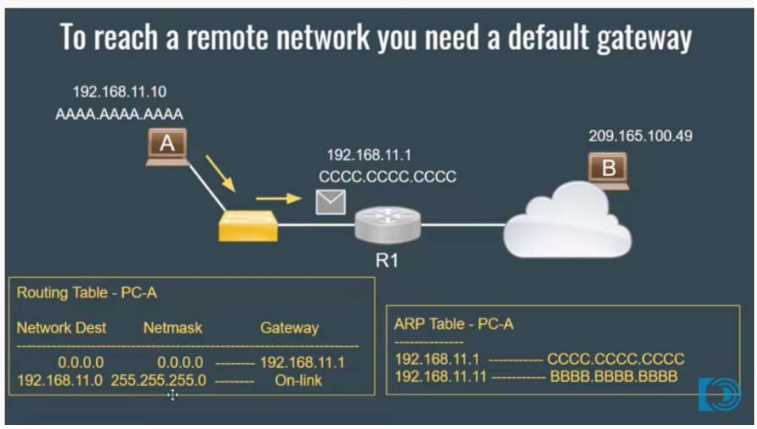
Hubs and Switches exchange data in a Local Area Network. It's not used to exchange data outside their own network because switches do not read IP addresses. That's where Router comes in.

Router:-

- Routes/ forwards data from one network to another based on IP address.
- When data is comes at the router, it inspects its IP address. If the data packet is meant for its own network, the router receives it. If it's meant for an outside network, it sent it off to another network.
- Router is a gateway of a network.

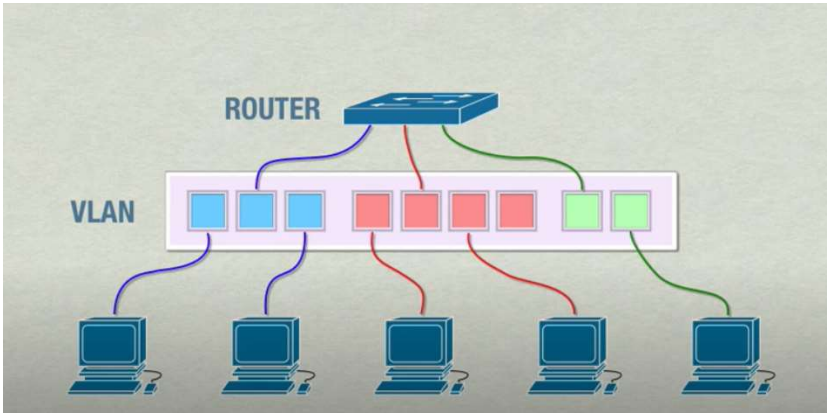
Hubs and Switches are used to create a network.
Router is used to connect a network**.**

Default Gateway [2]:-



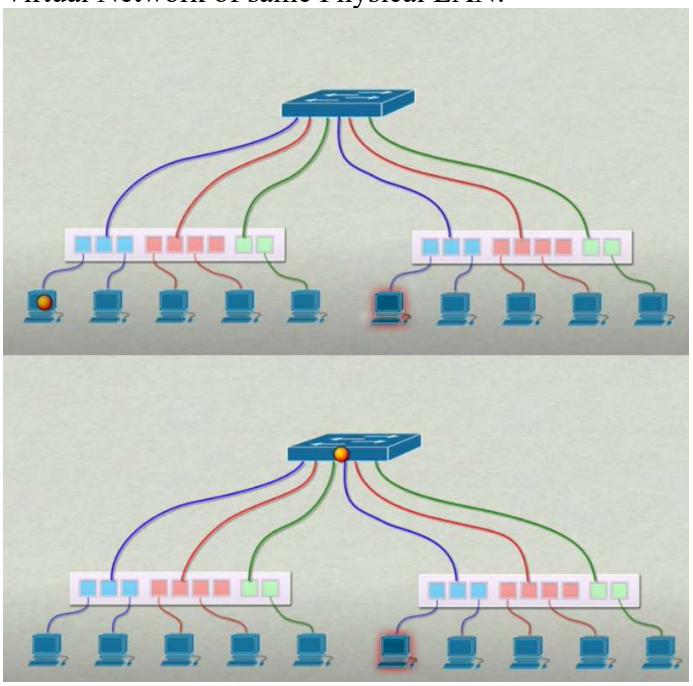
1. Suppose PC A wants to send message to PC B.
2. So PC A looks in its routing table. There is no entry for 209.165.100.49.
3. So it has to send the msg to default gateway i.e 192.168.11.1 which is the ip address of router.
4. For that it looks in its ARP table to find MAC address of 192.168.11.1.
5. Once it gets the mac address, switch sends the msg to the router.
6. Router then finds the best path and sends the msg to 209.165.100.49.

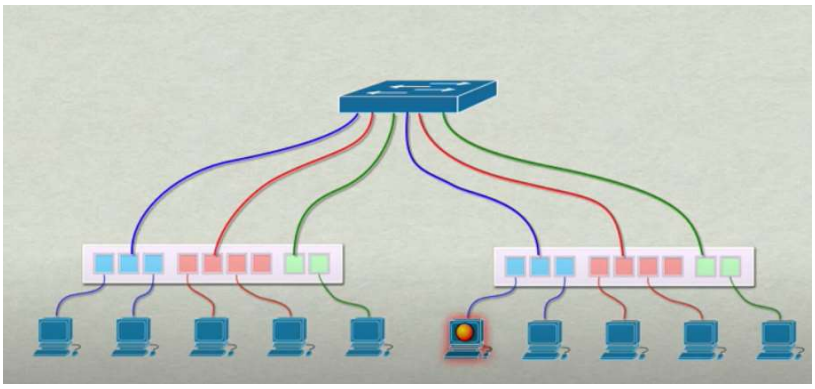
VLAN:-



- VLAN or Virtual LAN is a subnet.
- In above figure, each color represents a different subnet.
- If the first PC from left wants to send msg to second PC from left, the msg will go to the switch and then to second pc
- If the first PC from left wants to send msg to third PC from left, the msg will go to switch, since both the PCs are not on the same subnet, the msg will go to the router and from there it will go the switch and then to third PC.

Virtual Network of same Physical LAN:





References:-

1. https://www.youtube.com/watch?v=1z0ULvg_pW8
2. https://www.youtube.com/watch?v=hI5L5IxqS-Y
3. https://www.youtube.com/watch?v=2hUUaG4o3DA