UNIVERSITY OF TABUK

FACULTY OF COMPUTERS AND INFORMATION TECHNOLOGY

Department of Computer Engineering

MANUAL OF

CEN 431- COMPUTER NETWORKS LAB (2017/2018)

Dr.S.Manimurugan M.E.,Ph.D., MISTE.,

Assistant Professor

CEN 431 Computer Networks Lab

Experiments of the Lab cover: Local Area Networks and Installation of NOS Configuration, Administration and Troubleshooting of various Network Servers and TCP/IP. Installation and Configuration of Wireless Local Area Networks, Installation and Configuration Of Dual Boot System Connecting Windows and Linux Machines and Linux Advanced Commands, Configuration of Static Route, RIP, EIGRP, OSPF Protocol, Advanced Router Configuration, Network switch Configuration VLANs and TRUNKING, Build standard and extended IP access-lists to filter traffic coming inbound, Practice Cisco Discovery Protocol commands and configure as TFTP server, course Project

EX.	NAME OF THE EXERCISE	
1.	The Networking Devices	
2.	The Physical Layer	
3.	Installation of Network Operating System (NOS)	
4.	Design a Local Area Network (LAN)	
5.	Networking Commands	
6.	Basic Router Configuration	
7.	Troubleshoot the Local Area Network (LAN)	
8.	Installation and Configuration of Wireless Local Area Networks	
9.	The Routing Information Protocol Version 1 (RIP-V1)	
10.	The Routing Information Protocol Version 2 (RIP-V2)	
11.	Configuration of OSPF protocol	
12.	Configuration of VLANs and TRUNKING	
13.	Project-1	

EX.1. NETWORK DEVICES

AIM:

Study and identify roles and functions of different network devices.

APPARATUS REQUIRED:

- Network Devices

PROCEDURES/DESCRIPTIONS

There are many devices doing important role in network for transferring data. We have listed few devices and it functions in this experiment.

1. **ROUTERS**

A router (including a wireless router) is a specialized networking device connected to two or more networks running software that allows the router to move data from one network to another. Router functions in an Internet protocol based network operate at the network layer (OSI Model's layer 3). The primary function of a router is to connect networks together and keep certain kinds of broadcast traffic under control.

HOW DO ROUTERS WORK?

Let's use a home wireless router connected to a cable provider's internet network in a very simplified example.

1. The router powers on and loads it's OS from flash
2. The router loads the configuration file last saved to NVRAM and sets up the network interfaces and routing protocols it will run.
3. The router adds the network address and subnet for each interface to it's routing table along with the name of the interface itself.
4. The router has a simple static default route to send all non-local data out the network port connected to the cable company.
5. When the router receives a web page request from your computer, it checks the destination IP address against its routing table.

6. The bits forming the destination IP address in the IP packet are used as a hash key to point to the correct route, which in turn points to the correct network interface that the packet should be forwarded out of.
7. The router transmits the packet out the correct interface, to the next router, which repeats the process until the packet reaches the destination.

ROUTER COMPONENTS & PARTS

Since routers are just specialized computers, the have the same "parts" as other computers:

- Central Processing Unit (CPU)
- Flash Memory
- Non-Volatile RAM
- RAM
- Network Interfaces
- Console

Central Processing Unit: Runs special software called an "operating system" such as JunOS on Juniper routers, or Cisco IOS (Nexus OS) for Cisco routers. The operating system manages the router's components and provies all the logical networking functions of the router.

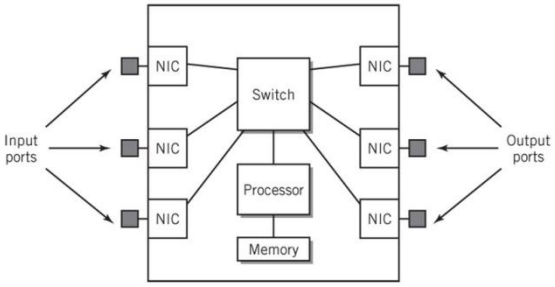
Flash Memory is where the operating system is stored, and in this respect, is like the hard disk drive in your computer. If you use a Solid State Disk Drive (SSD), then your computer uses Flash RAM, just like the router does.

Non-Volatile RAM: This is additional memory for storing the backup or startup version of the operating system being used. The router will boot from this memory and load all it's programs from here.

RAM: When the router starts up, the operating system is loaded into RAM. Once the router finishes starting up, it begins to calculate its own routes and, if configured to do so, learns network routes from other routers via RIP (v1 and v2), OSPF, EIGRP, IS-IS or BGP. RAM is also used for caching ARP tables, routing tables, routing metrics and other data that can speed up the process of forwarding of packets.

Network Interfaces: Routers always have lots of network interfaces. The operating system contains 'drivers' that allow the operating sytem to access the network hardware in the interface modules. Routers will learn which networks are configured on which ports as they start up. After that, they will 'learn' routes from other routers they are connected to, and learn which interface to transmit packets on to reach a remote network destination.

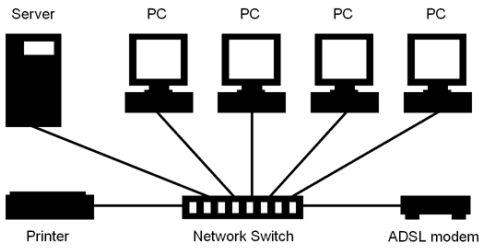
Console: Last, but not least, is the console. In "Ye Olden Days" managing and configuring a router was performed at the console of individual devices, as was most troubleshooting and diagnostics. Network certification exams will contain a large selection of questions on the configuration and troubleshooting commands you can issue from the console. However, manufacturers are rapidly doing away with a console on each device and building management systems for managing large numbers of network devices from a centralized location.



Block Diagram of Router

2. NETWORK SWITCH

A Network Switch is a constituent of computer network that connects two network slices and/or two network devices (switches or routers) together. Switch can be termed as a network bridge with multiple ports which helps to process and route packets at data link layer of the OSI reference model. There are some switches which have capabilities to process data at the upper layers (network layer and above). Those switches are often termed as *multilayer switches.*



FUNCTIONS OF SWITCH

The basic function that any switch is supposed to perform is to receive information from any source connected to it and dispatch that information to the appropriate destination only. This thing differentiates switches from hubs. Hub gets the information and forwards that to every other device in the network. This is the reason why switches are called intelligent devices.

The network switch has become a crucial part of present local area networks (LANs). LANs with medium to large sizes are established using a number of inter-linked network switches. SOHO (Small Office/Home office) networks generally consist of a single switch, or sometimes a multi-purpose device like a residential gateway to utilize small office/home broadband services such as Digital subscriber line (DSL) and cable Internet. Nowadays, we have been using router-like components which interface to the particular physical broadband technology. We may see some people using telephone technology on internet using Voice over IP (VoIP).

As mentioned above, a switch is operated at the data link layer to develop a distinct collision domain for each port of the switch. Let us consider, there are four computers - A, B, C, and D connected to four ports of the switch, then any pair , say A and B, may transfer data in either directions, at the same time, the other pair, C and D, can exchange their information simultaneously, and these two communications will not interrupt each other. Using full duplex mode, pairs may get overlapped (A communicating with B, B with C, and so on). Whereas in hubs, all of them have to share the same bandwidth by running in half duplex mode, causing collisions, which will result in unnecessary packet retransmissions.

LAYER 2 FUNCTIONALITY

- **Store and Forward:** The switch stores and verifies each packet before routing it.
- **Cut through:** The switch verifies the portion of the packet header up to the hardware address of frame before it is forwarded. They may have to stick to the store and forward procedure if the outgoing port is engaged when the packet enters.
- **Fragment free:** It is the methodology that tries to preserve the advantages of both cut through and store and forward functionalities. Fragment free verifies the first 64 bytes of the packet, wherein addressing details are saved. This is because; collisions should be determined within the first 64 bytes of the packet frame, so erroneous packet frames will not be routed.

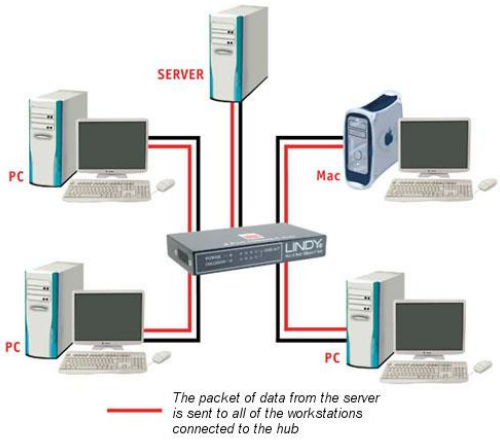
- **Adaptive switching:** This method automatically selects one of the above three methods depending upon traffic situation.

3. HUB

A hub functions as the central connection point of a network. It joins together the workstations, printers, and servers on a network, so they can communicate with each other. Each hub has a number of ports that connect it to the other devices via a network cable.

HOW DOES A HUB WORK?

A hub is an inexpensive way to connect devices on a network. Data travels around a network in 'packets' and a hub forwards these data packets out to all the devices connected to its ports.



As a hub distributes packets to every device on the network, when a packet is destined for only one device, every other device connected to the hub receives that packet. Because all the devices connected to the hub are contending for transmission of data the individual members of a shared network will only get a percentage of the available network bandwidth. This process can slow down a busy network.

A 10Base-T hub Ethernet Hub provides a total of 10 Mbit/sec of bandwidth, which all users share. If one person on the network is downloading a very large file, for example, little or no

bandwidth is available for other users. These users will experience very slow network performance.

4. NETWORK INTERFACE CARD

A network interface card connects your computer to a local data network or the Internet. The card translates computer data into electrical signals it sends through the network; the signals are compatible with the network so computers can reliably exchange information. Because of the popularity of the Internet and networks in general, virtually all desktop and notebook PCs have some form of interface card included. You can add a network card to bare-bones computers which don't have one.

FUNCTION OF NIC

A network card functions as a middleman between your computer and the data network. For example, when you log in to a website, the PC passes the site information to the network card, which converts the address into electrical impulses. Network cables carry these impulses to a Web server somewhere on the Internet, which responds by sending a Web page back to you, once again in the form of electronic signals. The card receives these signals and turns them into data that your PC displays.

INSTALLING A NETWORK INTERFACE CARD (DESKTOP COMPUTER)

If you have a desktop computer, you'll need to open its chassis to install a NIC. Before doing this, confirm that opening your computer won't void the warranty and check the instruction manual for information relevant to your computer's model. In most cases, a computer's chassis has a release lever or screw that must be removed for entry. Upon opening the chassis, locate an open expansion port and push the NIC into it. After you have installed the NIC and closed the

computer's chassis, start the computer and wait for the message "Installing device driver software" to appear in the corner of the screen. Windows-based and Mac computers include the device drivers for most NICs and can install the device drivers automatically. In this case, you can begin using the NIC as soon as the "Installing" message disappears. If your computer prompts you to install a device driver manually, insert the disc included with the NIC and follow the instructions to install the required support software.

OUTCOME:

The students can identify the roles and functions of the network devises from this experiment.

EX.2. PHYSICAL LAYER

AIM:

Study and install different cables in physical layer.

APPARATUS REQUIRED:

- Twisted pair Cable
- Coaxial Cable
- Fiber Optics Cable

PROCEDURES/DESCRIPTIONS

1. TWISTED PAIR CABLE

If you want to create TP cables yourself, be sure your cable pairs match the color coding of any existing cable or the color coding of any prebuilt cabling you want to add to your new network. Because there are eight wires in TP cables, many incorrect combinations are possible. Several standards exist for UTP cabling.

Tip: The key is to be consistent. Use the same scheme for all your cables, and ensure that anyone else working on your network understands this scheme.

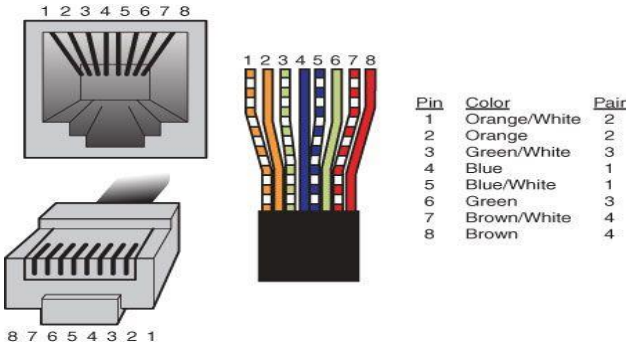
The most common standard is the AT&T 258A configuration (also called EIA/TIA 568B). The following table lists the wire pairing and placement within the standard 8P8C (RJ45) connector.

8P8C (RJ45) Connector Wire Pairing and Placement for AT&T 258A/EIA 568B Standard		
Pin	Color	Pair
1	Orange/White	2
2	Orange	2
3	Green/White	3
4	Blue	1
5	Blue/White	1

6	Green	3
7	Brown/White	4
8	Brown	4

*This pair is not used with 10BASE-T or Fast Ethernet 100BASE-TX, but all four pairs are used with Fast Ethernet 100BASE-T4 and gigabit Ethernet 1000BASE-TX standards.

In the following image, an 8P8C (RJ45) cable connector is wired to the AT&T 258A/EIA 568B standard.



8P8C (RJ45) cable connector is wired to the AT&T 258A/EIA 568B standard.

Note: You also might encounter the similar EIA 568A standard. It reverses the position of the orange and green pairs listed previously.

CROSSOVER UTP CABLES

Crossover cables, which change the wiring at one end of the cable, connect two (and only two) computers when no hub or switch is available or connect a hub or switch without an uplink port to another hub or switch**.** The pinout for a crossover cable is shown in the table below. This pinout is for one end of the cable only; the other end of the cable should correspond to the standard EIA 568B pinout, as shown in the previous table.

8P8C (RJ45) Connector Wire Pairing and Placement for EIA 568A Standard		
Pin	Color	Pair
1	Green/White	3
2	Green	3

3	Orange/White	2
4	Blue	1
5	Blue/White	1
6	Orange	2
7	Brown/White	4
8	Brown	4

Note: Most standard cables have both ends wired using the EIA 568B standard, however it is also possible to wire them with both ends using the EIA 568A standard. As long as both ends are wired the same in a straight-through configuration, the cable will work. Crossover cables should have one end in an EIA 568B configuration, while the other end is in an EIA 568A configuration, thus crossing pairs 2 and 3. It should be noted that other wiring schemes exist for connecting UTP cables with 8P8C (RJ45) connectors. The ones listed in this chapter are the most common.

Most newer switches are designed so as to automatically detect whether a crossover connection is required and configure the connection appropriately. This feature is called Auto-MDIX (automatic medium-dependent interface crossover) and essentially negates the need for having dedicated “uplink” ports or using crossover cables when connecting devices together.

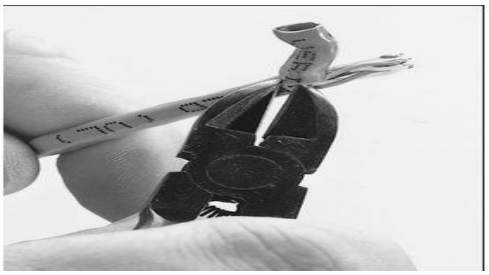
CONSTRUCTING THE CABLE

Making your own network cables requires a few tools that aren’t found in a typical toolbox. Those items that you might not already have you can typically purchase for a single price from many network-products vendors. You need the following tools and supplies to build your own Ethernet cables:

- UTP cable (Category 5 or better)
- 8P8C (RJ45) connectors
- Wire stripper
- 8P8C (RJ45) crimping tool

Before you make a “real” cable of any length, you should practice on a short length of cable. 8P8C (RJ45) connectors and bulk cable are cheap; network failures are not. Follow these steps for creating your own twisted-pair cables:

1. Determine how long your cable should be. You should allow adequate slack for moving the computer and for avoiding strong interference sources. Keep the maximum distances for UTP cables of about 100 meters in mind.
2. Roll out the appropriate length of cable.
3. Cut the cable cleanly from the box of wire.
4. Use the wire stripper to strip only the insulation jacket off the cable, exposing the TP wires (see the figure below); you’ll need to rotate the wire about one and a quarter turns to strip away all the jacket. If you turn it too far, you’ll damage the wires inside the cable.



Use the wire stripper to strip only the insulation jacket off the cable.

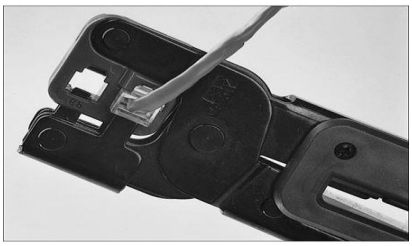
5. Check the outer jacket and inner TP wires for nicks; adjust the stripper tool, and repeat steps 3 and 4 if you see damage.
6. As shown in the image below, arrange the wires according to the EIA 568B standard. This arrangement is listed previously, in the section “TP Wiring Standards.”

Arrange the wires according to the EIA 568B standard.

7. Trim the wire edges so the eight wires are even with one another and are slightly less than 1/2-inch past the end of the jacket. If the wires are too long, crosstalk (wire-to-wire interference) can result; if the wires are too short, they can't make a good connection with the 8P8C (RJ45) plug.
8. With the clip side of the 8P8C (RJ45) plug facing away from you, push the cable into place (see the image below). Verify that the wires are arranged according to the EIA/TIA 568B standard before you crimp the plug onto the wires (refer to the previous table further up this page). Adjust the connection as necessary.

With the clip side of the 8P8C (RJ45) plug facing away from you, push the cable into place.

9. Use the crimping tool to squeeze the 8P8C (RJ45) plug onto the cable (see the image below). The end of the cable should be tight enough to resist being removed by hand.



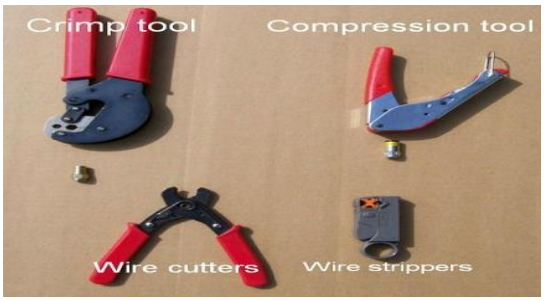
Use the crimping tool to squeeze the 8P8C (RJ-45) plug onto the cable

10. Repeat steps 4–9 for the other end of the cable. Recut the end of the cable if necessary before stripping it.

2. COAXIAL CABLE

Installing coaxial cable end fittings is not very difficult. It may take a little practice but it is a simple process once you get the hang of it. I suggest that when purchasing coaxial cable end connectors buy a few extra. Once you crimp or compress a coax cable end it can't be used again.

TOOLS REQUIRED FOR COAXIAL CABLE INSTALLATION



Top Left: A crimp tool is used with crimp type fittings.

Top Right: A compression tool is used with compression fittings.

Bottom Left: A quality set of wire cutters is a must when cutting cable. It's important that the cable isn't crushed out of shape and the cut is clean.

Bottom Right: Wire strippers make the job of preparing the cable much easier.

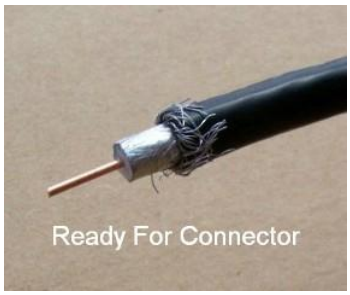
PROCEDURE OF COAXIAL CABLE INSTALLATIONS

1. Adjust the coaxial cable wire strippers so the first cut is down to the center copper wire. Adjust the second cut so it cuts through the rubber jacket only but not through the wire braiding just below the rubber jacket. This may take several attempts to get the tool adjusted just right.

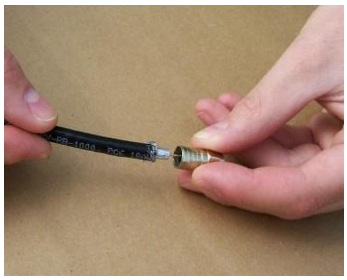
2. With the stripper properly adjusted insert the cable into the strippers so the end of the cable is flush with the edge of the stripper. Spin the stripper around the cable until it turns

freely. Pull the stripper away from the cable while lightly squeezing the jaws of the stripper onto the cable. You should now have a cable ready to install a connector.

3. At below is a properly prepared coaxial cable. Be sure to fold the wire braid back over the rubber jacket as shown



4. Crimp Fitting



5. Slide the proper coaxial cable connector onto the cable. This sometimes requires a pair of pliers to grip the connector if the fitting is stubborn is does not want to slide on easily.

6. This is how a crimp connector should look when you're ready to crimp the connector.

7. The white insulation surrounding the center copper wire should come flush with the hole in the inside center of the connector. This is how a compression fitting should look when you're ready to compress the connector

8. Crimp Fitting: With the coaxial cable connector properly fitted to the cable insert it into the crimp tool as shown at right. When the connector is properly in place squeeze the handle to crimp the connector onto the cable. The first slot of the tool is for RG 59 cable and the second slot (as shown) is for RG 6 coax cable.

9. Compression Fitting: With the compression connector properly fitted to the cable insert the fitting into the compression tool copper wire first as shown at below. When the connector is in place squeeze the handle to compress the connector onto the cable. Use the "F" adapter when crimping coax cable for TV.

3. HOW TO INSTALL FIBER OPTIC CABLES ON A COMPUTER NETWORK

Installing fiber optic cables on a computer network is not as simple as plugging everything in, but it's manageable for the average person. First, there are two different types of fiber optic cables, and users have to determine which one is right for their network. Next, they can follow the step-by-step instructions for installing a fiber optic cable network.

CHOOSE THE TYPE OF FIBER OPTIC CABLE

There are two main types of fiber optic cables. First is the multi-mode fiber optic cable, which is used for short distances, up to 1800 feet. It has the capacity to transfer up to 10 gigabits of data per second. The second type is the single-mode fiber optic cable. This type of cable is more expensive, but it can transmit 10 gigabits per second up to 37 miles. For most office or home networks, the multi-mode fiber optic cable is preferable, since there's really no need to cover very long distances.

STEPS TO INSTALLING FIBER OPTIC CABLES ON A COMPUTER NETWORK

- Position all the devices that will be included in the network. The hubs and switches should be placed near the main computer and the wall outlet (for integrated fiber in the loop, IFITL connections). Connect the computer to the wall outlet using the cable and connect the hubs and routers to the computer.
- Add a fiber optic cable to the hub or router and connect it to a second computer to be added to the network. Ensure that there's enough slack in the cable so it's not too tight and easily unplugged. Secure the cables with ties.
- A media converter is necessary for devices that have no fiber optic outlet. This converter changes the light pulses into electricity. Plug this into the computer with a

USB or Ethernet cable. Plug in any workstation without a fiber optic outlet into the converter.

- Turn on all the devices and computers on the network.
- Install additional software and drivers on devices if needed.

OUTCOME

The students can understand the concept of different cables installation from this experiment.

EX.3. NETWORK OPERATING SYSTEM

AIM:

Install a Windows Network Operating System.

APPARATUS REQUIRED

- Network Operating System

PROCEDURES/DESCRIPTIONS

Network operating systems can be based on a client–server model (architecture) in which a server enables multiple clients to share resources. Client-server network operating systems allow networks to centralize functions and applications in one or more dedicated file servers. The server is the center of the system, allowing access to resources and instituting security. The network operating system provides the mechanism to integrate all the components on a network to allow multiple users to simultaneously share the same resources regardless of physical location.

Examples:

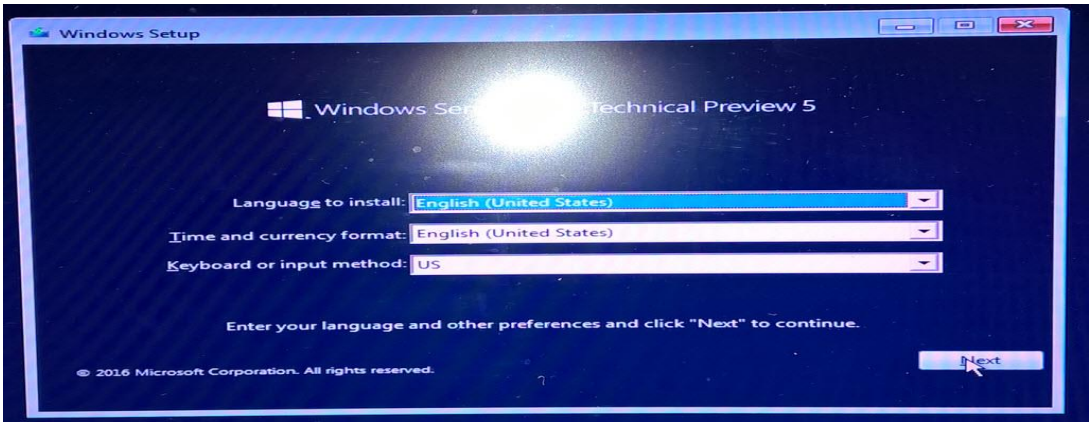
- Novell NetWare
- Windows Server
- Banyan VINES

GENERATION OF WINDOWS NETWORK OPERATING SYSTEMS:

- Windows Server 2003 (April 2003)
- Windows Server 2003 R2 (December 2005)
- Windows Server 2008 (February 2008)
- Windows Server 2008 R2 (July 2009)
- Windows Server 2012 (August 2012)
- Windows Server 2012 R2 (October 2013)
- Windows Server 2016 (September 2016)

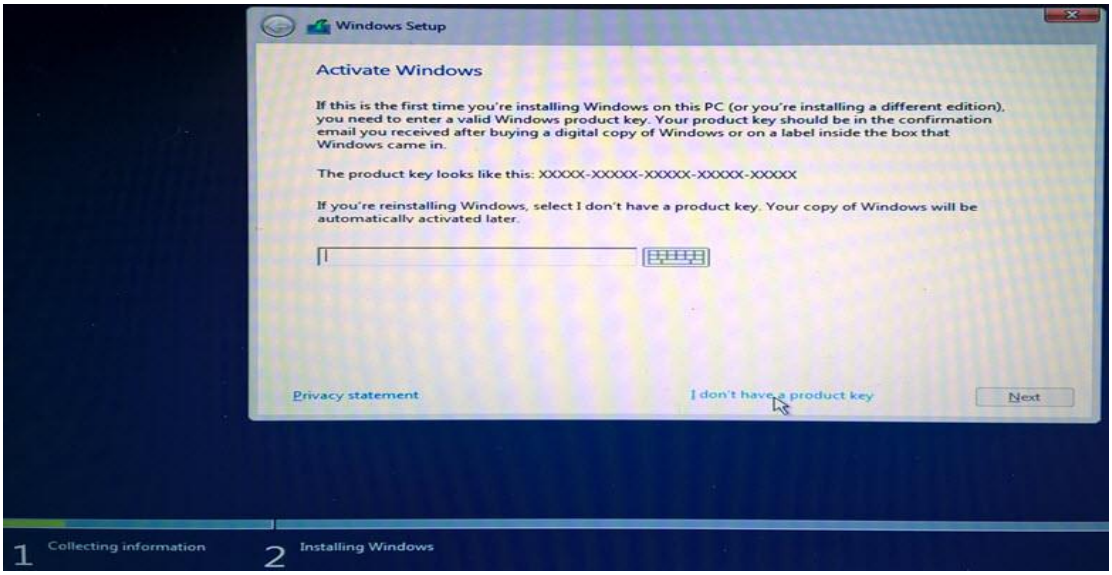
STEPS TO INSTALL THE WINDOWS SERVER 2016

1. Insert Windows Server 2016 DVD and boot your computer from the DVD. Boot to the DVD/USB ISO (you may have to go into bios or interrupt boot to boot from external media). Click the Next Button

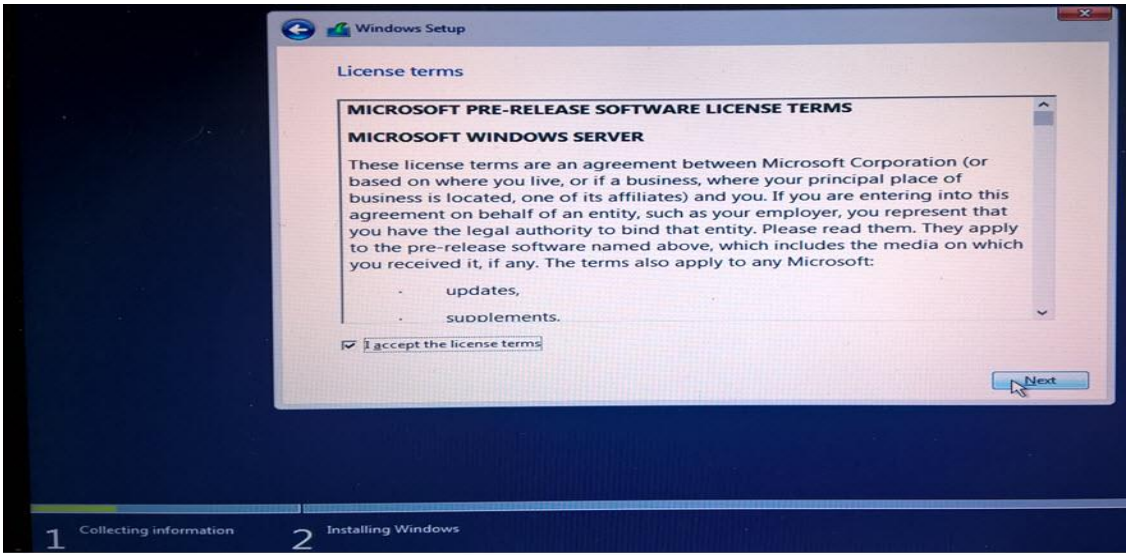


2. Click the Install now Button

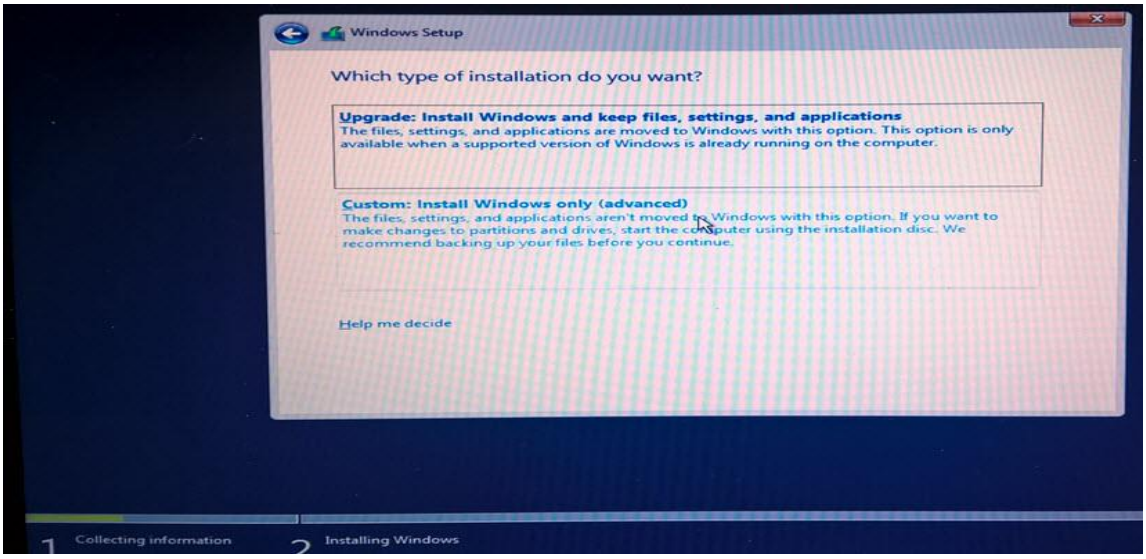
3. Optionally, enter your product key then Next or click I don't have a product key



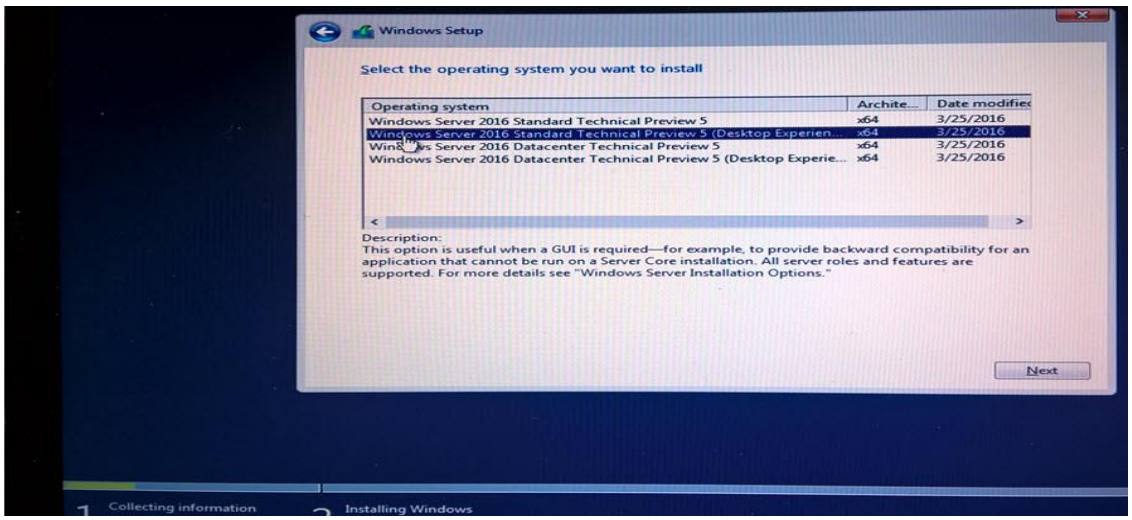
4. READ the license terms. Click on I accept the license terms then Click the Next button.



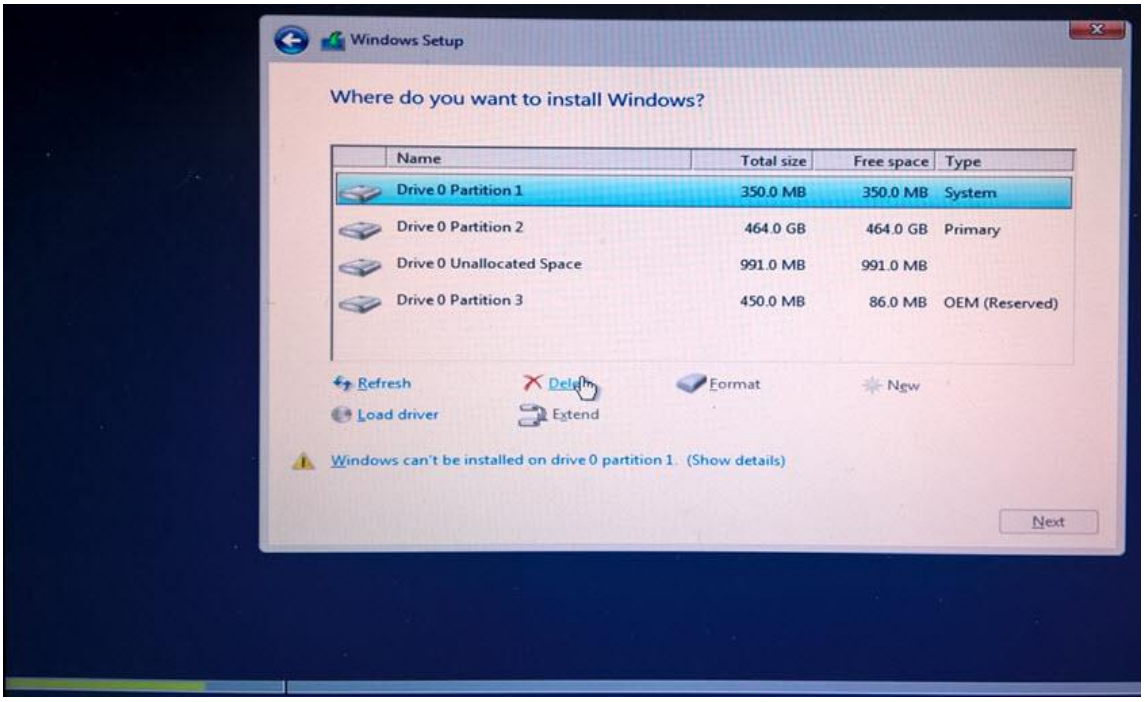
5. The Evaluation DVD may have more options than TechNet/MSDN DVD. Make sure you choose “Windows Server 2016 Standard/or/Datacenter (Desktop Experience). NOTE: DEFAULTS TO “Server core Installation” (no Desktop Experience)Click the Next Button



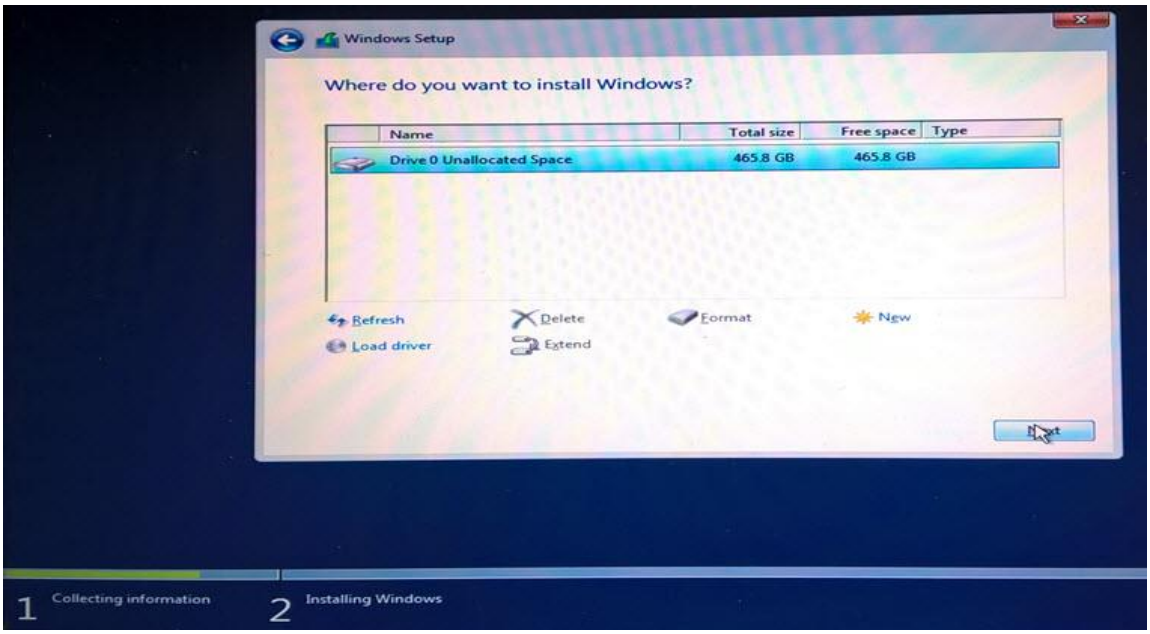
6. The Evaluation DVD may have more options than TechNet/MSDN DVD. Make sure you choose Windows Server 2016 Standard/or/Datacenter (Desktop Experience) NOTE: DEFAULTS TO “Server core Installation” (no Desktop Experience)Click the Next Button



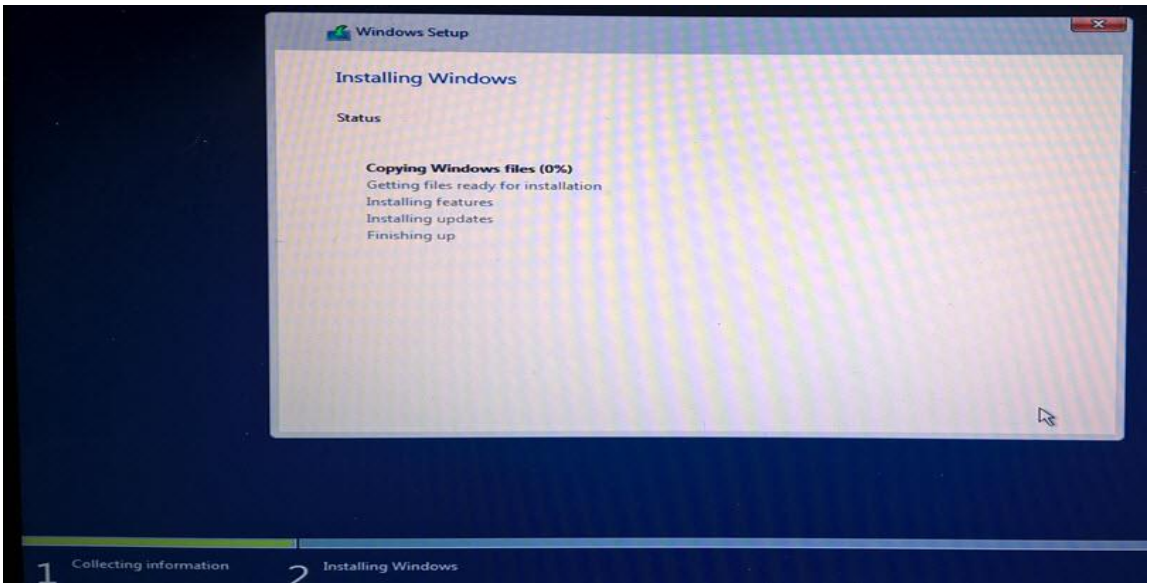
7. You should remove any secondary or external drives to prevent accidental deletion of data. Click each of the listed Drive 0 drives then click the delete button. IM prompted that “this partition might contain important files or applications from your computer manufacturer. If you delete this partition, any data stored on it will be lost” If you are sure you want to wipe this drive, click OK.



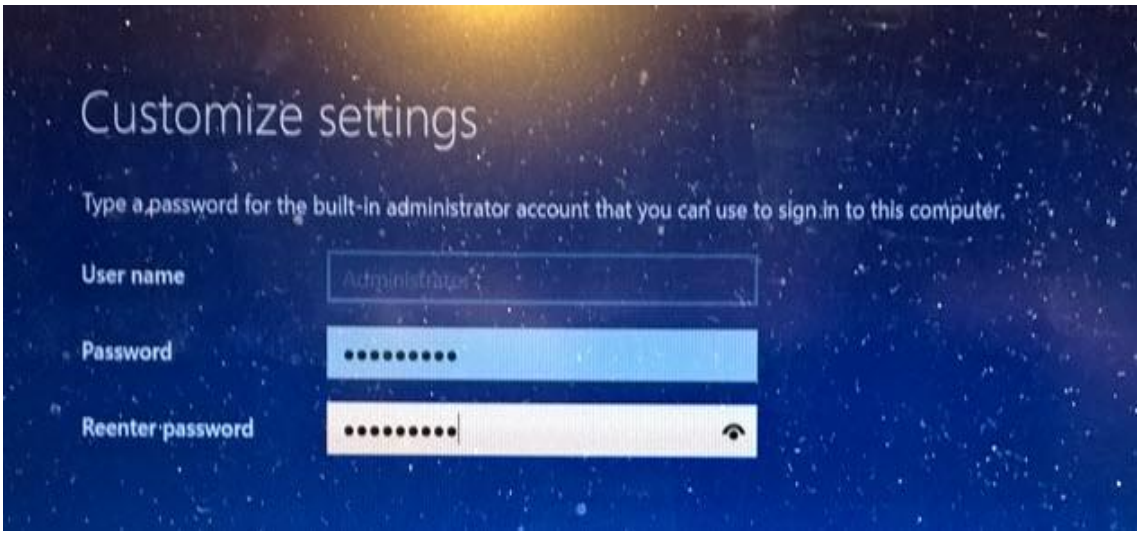
8. Click Drive 0 Unallocated Space then click Next



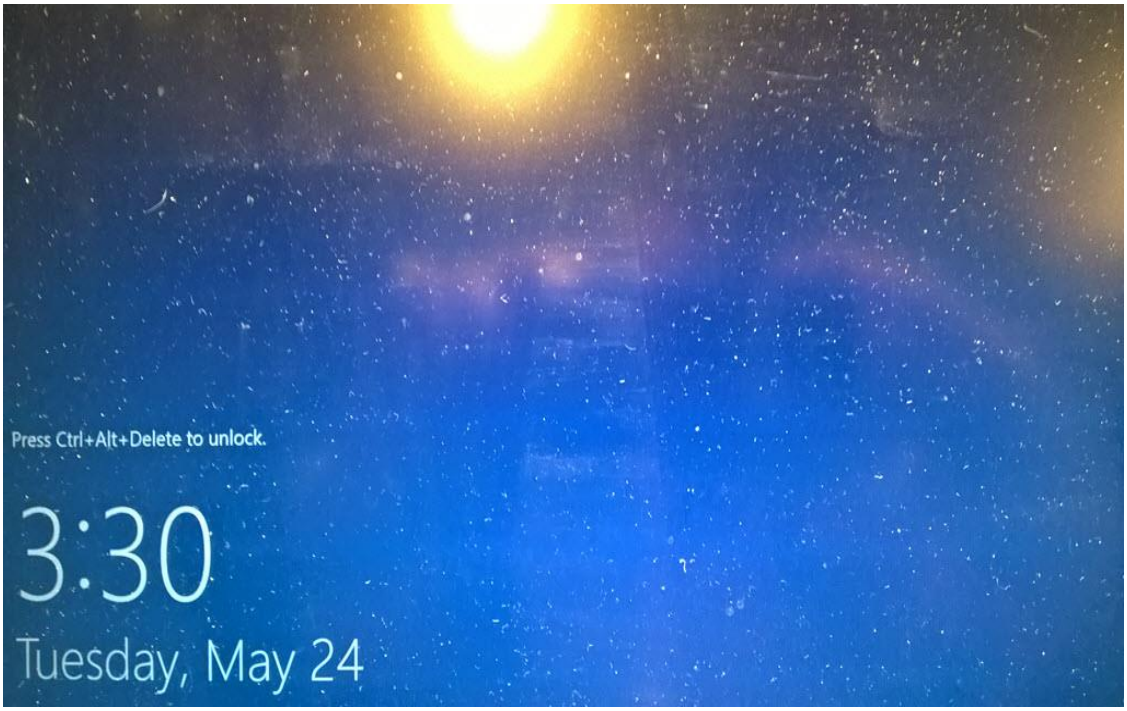
9. Give it some time to finish. The system will automatically reboot when finished. If you walk away, you may have to remove the USB or DVD and reboot so it boots to the hard drive instead of the installation media.



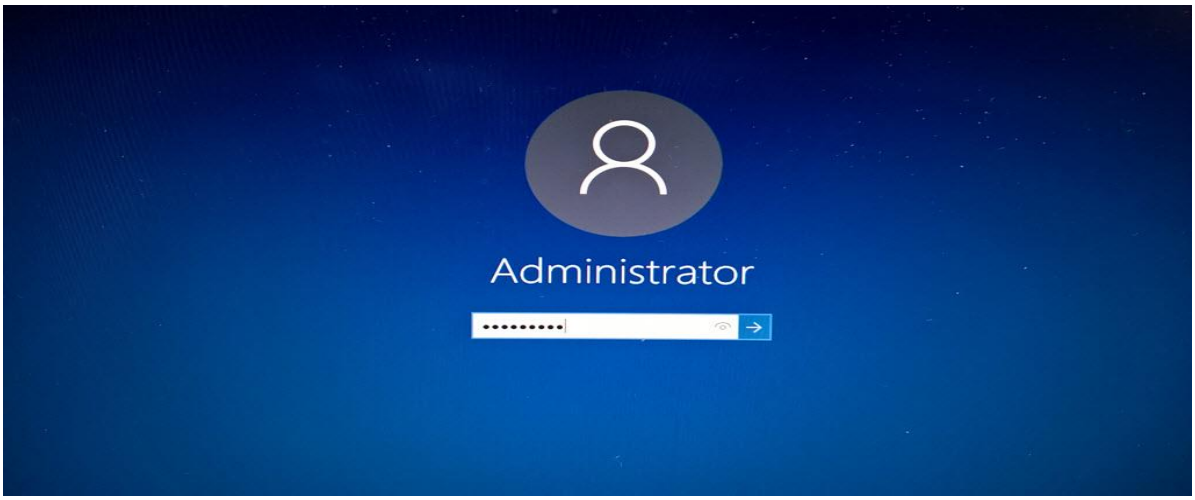
10. Enter a password for the administrator account into the password and Reenter password fields then click Finish.



11. Press [CTRL-ALT-DEL] to bring up the login screen



12. Type in your password and press [ENTER] to login if you are on a wired network, you will be asked Do you want to allow your PC to be discoverable by other PCs and devices on this network? If you are on a private network you should select Yes. Notice server manager is automatically opened for you. In the video we also cover creating a new administrator user



OUTCOME

The students can understand the importance and installation steps of Network Operating System (NOS) (Windows Server 2016) from this experiment.

Ex.4. DESIGN A LOCAL AREA NETWORK (LAN)

AIM:

Design a Local Area Network (LAN) using a packet tracer.

APPARATUS REQUIRED:

- Cisco Packet Tracer
- Switch
- Routers
- Personal Computers
- Cables

PROCEDURE TO INSTALL THE LAN CONNECTION:

1. Select the routers, switches and PC's from devices option.
2. Connect the PCs with a switch-0 using copper straight through cable as shown in the figure.
3. Follow the step-2 to design a LAN-2
4. Connect the switch-0 with router-0 using a copper straight through cable as shown in the figure.
5. Select the serial DEC cable for connecting two routers as shown in the figure.
6. Set the IP unique IP address for all PC's based on the step-7
7. Click PC->desktop-> select IP configuration and set the unique IP address for PC
8. Set the subnet mask as 255.255.255.0 for all PC
9. See the router configuration diagrams for configure the router 0 and router 1.

ROUTER-0 CONFIGURATION:

```
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
Image text-base: 0x60080608, data-base: 0x6270CD50


This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.


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)
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]: System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Initializing memory for ECC
..
c2811 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

Readonly ROMMON initialized

Self decompressing the image :
############################################################################ [OK]
Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706



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
Image text-base: 0x60080608, data-base: 0x6270CD50


This product contains cryptographic features and is subject to United
```

```
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.


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)
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]: n


Press RETURN to get started!



Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 10.1.2.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 10.1.2.1 255.255.255.0
```

```
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#ip address 198.168.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown

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

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

Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up

Router#
%SYS-5-CONFIG_I: Configured from console by console
```

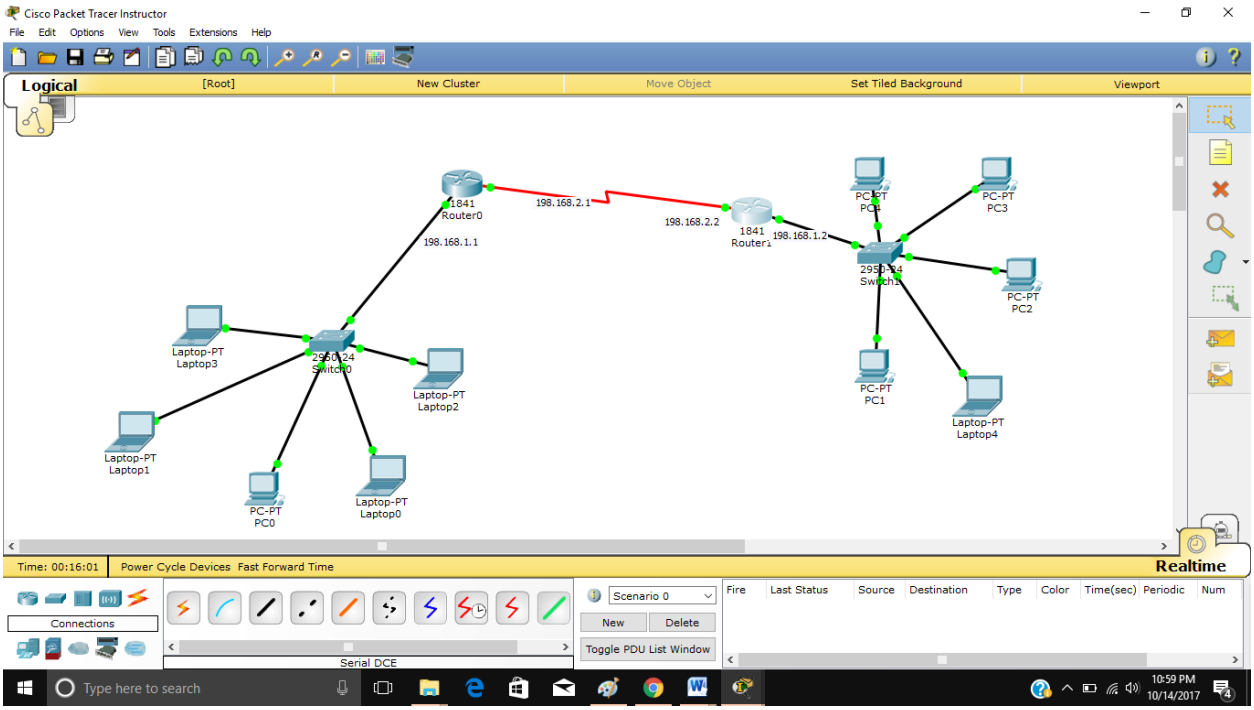
ROUTER -1 CONFIGURATION

```
System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Cisco 1841 (revision 5.0) with 114688K/16384K bytes of memory.

Readonly ROMMON initialized

Self decompressing the image :
######################################################################## [OK]
Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.
```

```
cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706


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
Image text-base: 0x60080608, data-base: 0x6270CD50


This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.


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)
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]: System Bootstrap, Version 12.3(8r)T8, RELEASE SOFTWARE (fc1)
Initializing memory for ECC
..
c2811 processor with 524288 Kbytes of main memory
Main memory is configured to 64 bit mode with ECC enabled

Readonly ROMMON initialized

Self decompressing the image :
######################################################################## [OK]
Restricted Rights Legend

Use, duplication, or disclosure by the Government is
subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

cisco Systems, Inc.
170 West Tasman Drive
San Jose, California 95134-1706


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
Image text-base: 0x60080608, data-base: 0x6270CD50


This product contains cryptographic features and is subject to United
States and local country laws governing import, export, transfer and
use. Delivery of Cisco cryptographic products does not imply
third-party authority to import, export, distribute or use encryption.
Importers, exporters, distributors and users are responsible for
compliance with U.S. and local country laws. By using this product you
agree to comply with applicable laws and regulations. If you are unable
to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:
http://www.cisco.com/wwl/export/crypto/tool/stqrg.html

If you require further assistance please contact us by sending email to
export@cisco.com.


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)
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]: n


Press RETURN to get started!



Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 198.168.1.2 255.255.255.0
Router(config-if)#no shutdown

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

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

Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#ip address 198.168.2.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
```

OUTPUT:



OUTCOME:

The students can understand the concept of LAN installation with routers, switches, PC's and cables.

EX.5: NETWORKING COMMANDS

AIM:

Study and identify the different network commands in Windows Operating System.

APPARATUS:

1. Personal Computer
2. Windows operating System

DESCRIPTION:

Windows has a number of command line programs and GUI programs that can be used to view and alter network configuration. To see all, type **hh ntcmds.chm** in your terminal window, and to see all options for a command line, type **–h**, **/?**, **-help**, or **?**

To get started with the lab activities, some basic terms to be familiarized with:

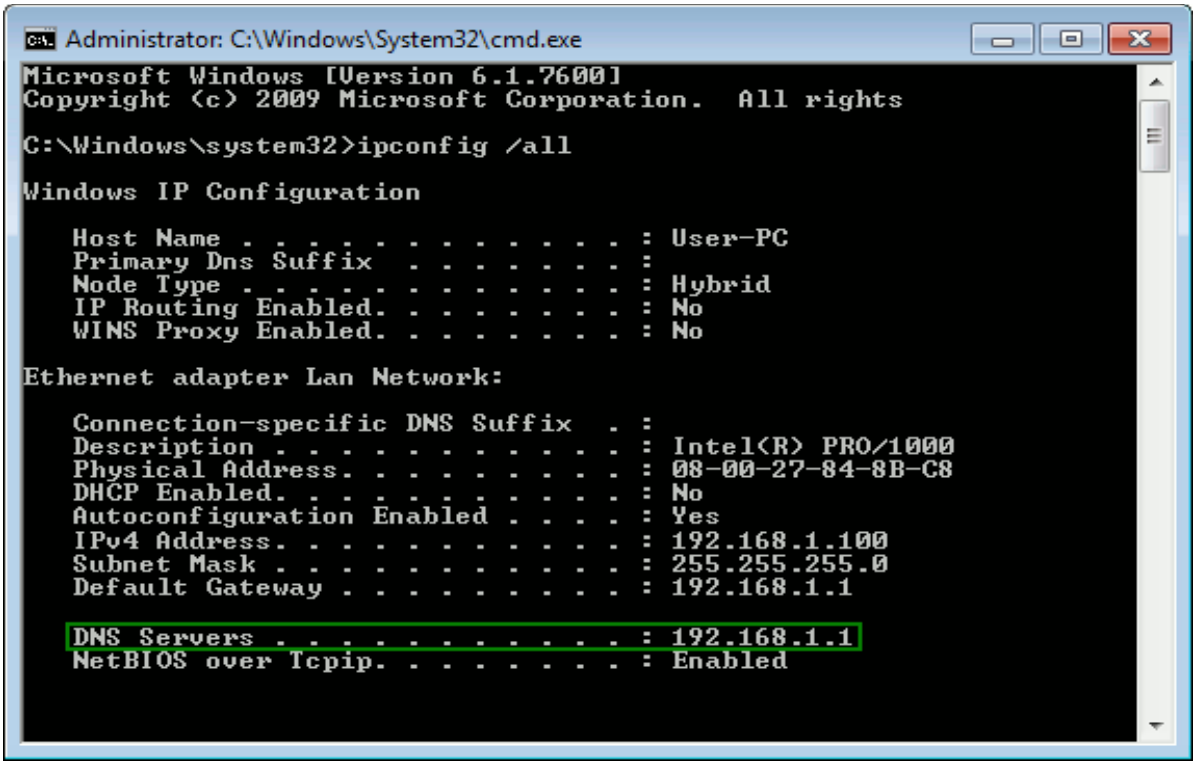
- **Host** : computer to be connected to a network.
- **Network** : a collection of hosts connected together where each host can communicate with other hosts on the network without having to go through a router (though a switch or hub is allowed).
- **NIC** : Network Interface Card. The hardware interface from a host to the network.
- **MAC**: Medium Access Control is a six hexit number that uniquely defines the NIC in the entire world. For example: 00:C0:9F:9B:D5:46
- **Router**: A device that decides where a packet should be sent in order to get to a destination outside a network. Routers range from simple gateways between your home PC and backbone routers of the Internet proper.
- **IP address**: All hosts and routers have an IP address consisting of four decimal numbers. For example: 192.168.0.1 and 131.170.40.33
- **Port address**: every host has 65,535 ports each of which can be connected to a specific application that sends and receives data packets from the network.
- **Gateway address**: every host needs to know the address of the router which connects a network to other networks and the Internet.

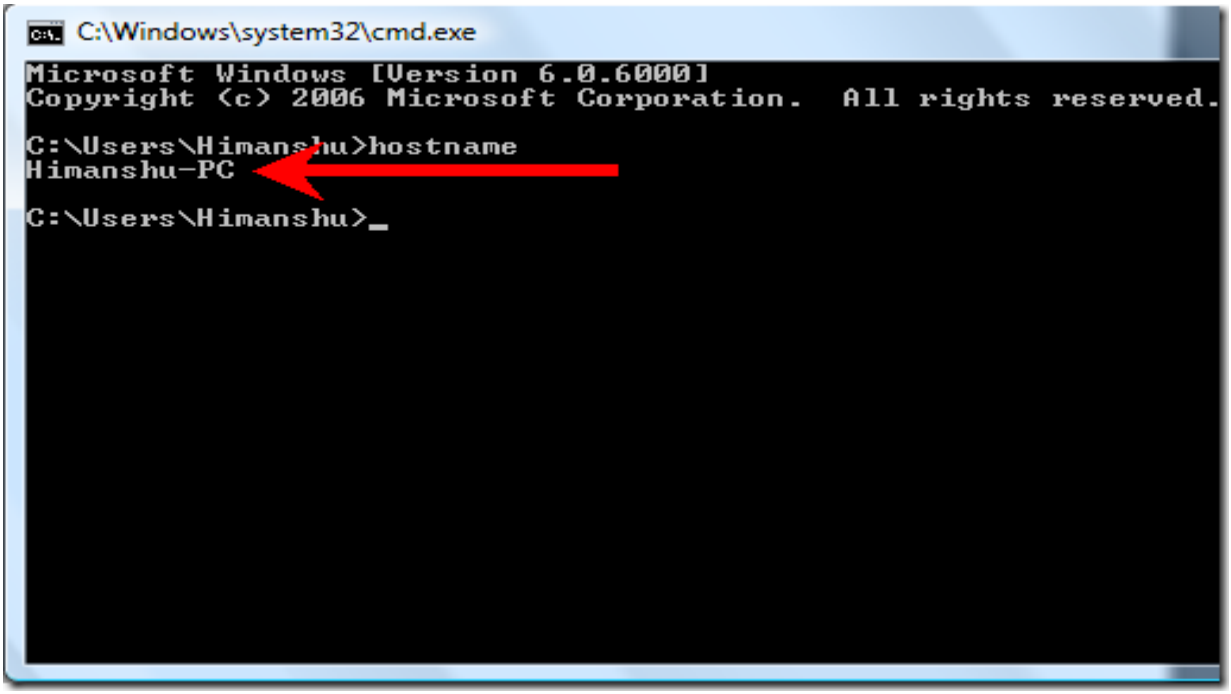
- **Domain name**: hosts may have a domain name which maps onto an IP address. For example, www.google.com is mapped to IP address 66.102.7.104.
- **DNS Server**: Domain Name System Server. Every host needs access to a DNS server so it can convert between IP address and domain name.
- **DHCP**: Dynamic Host Configuration Protocol. A DHCP can give a host a unique IP address whenever the host restarts thus saving IP addresses. A DNS address is also provided.

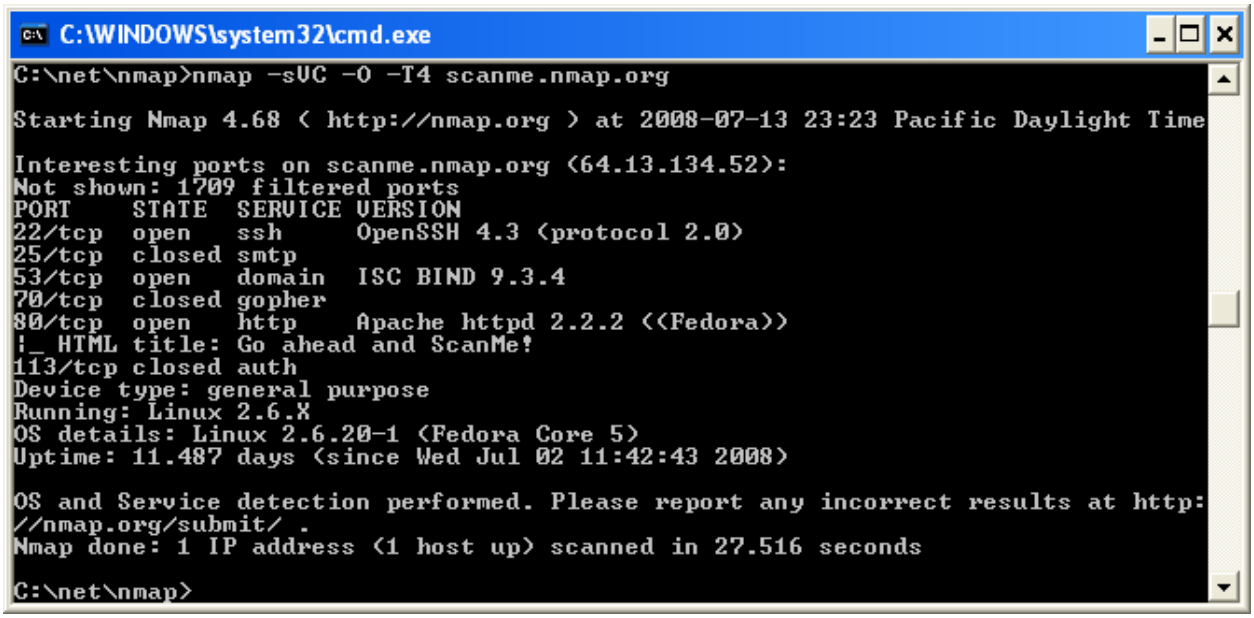
COMMANDS USED IN WINDOWS:

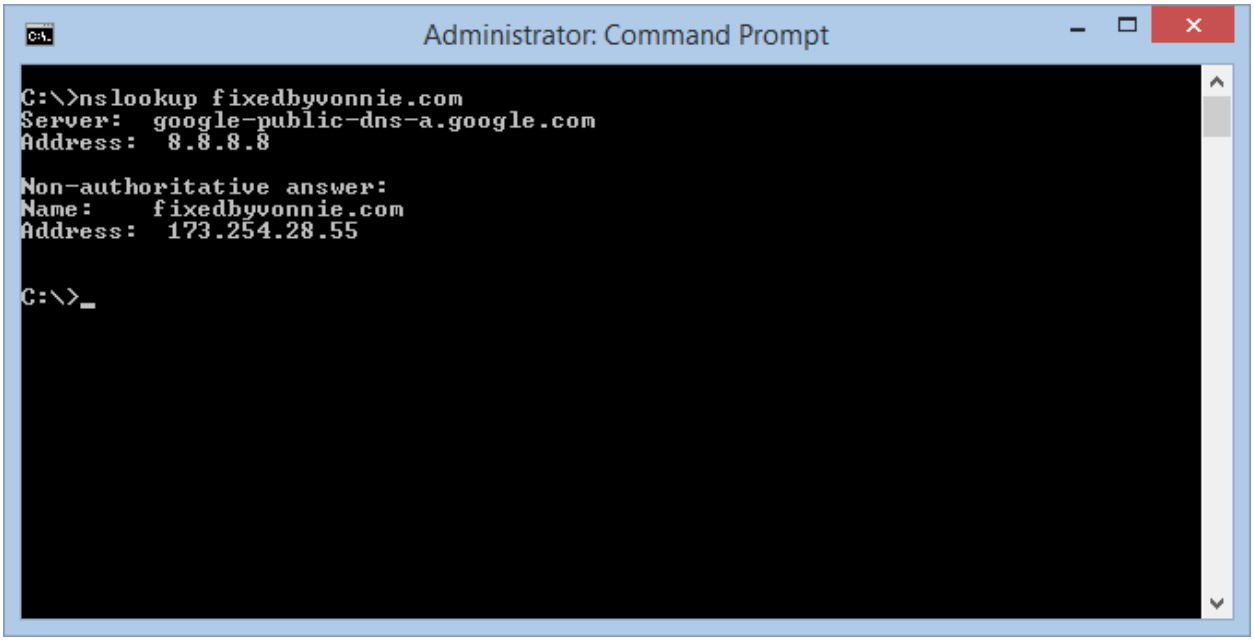
S.No	Windows Command	Usage / Effect
1	ipconfig	To find IP address of the computer
2	hostname	To display host name
3	nmap	To scan what hosts are available on a network and what ports they have open.
4	nslookup	To list variety of info about DNS and the computers that have joined the domain
5	ping	To check if a host can be accessed (by ip or name)
6	tracert	To trace route from a host through internet router to a destination. Useful to discover why a network cannot get access to internet, and internet routing problems.
7	netstat	To print status of network ports, routing tables and more

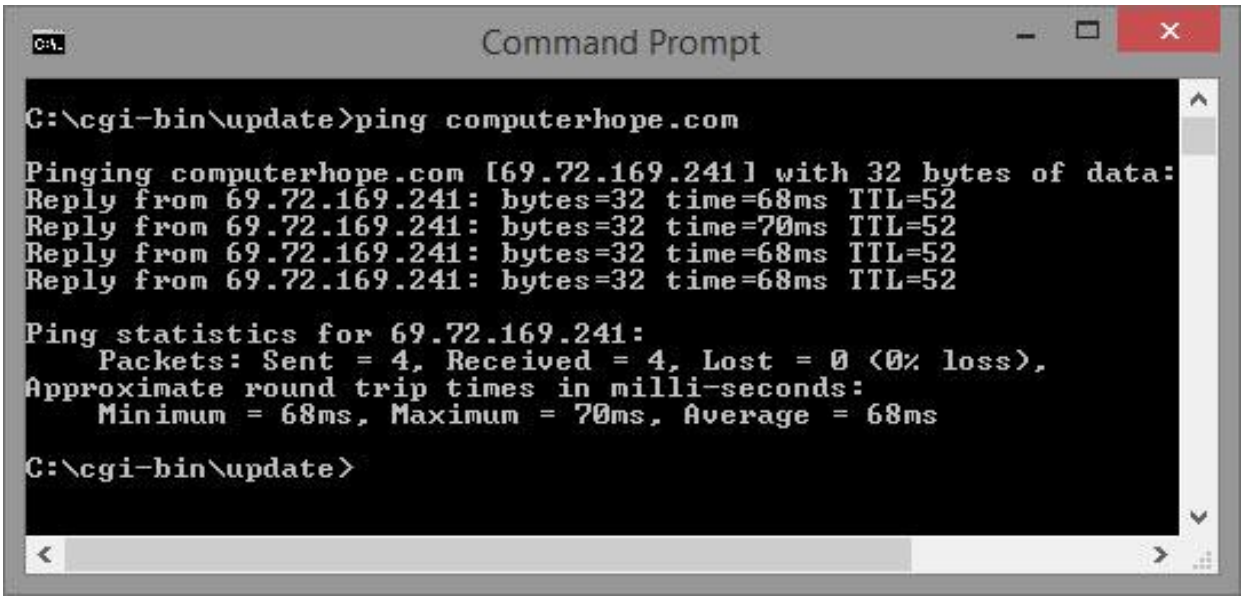
OUTPUT:

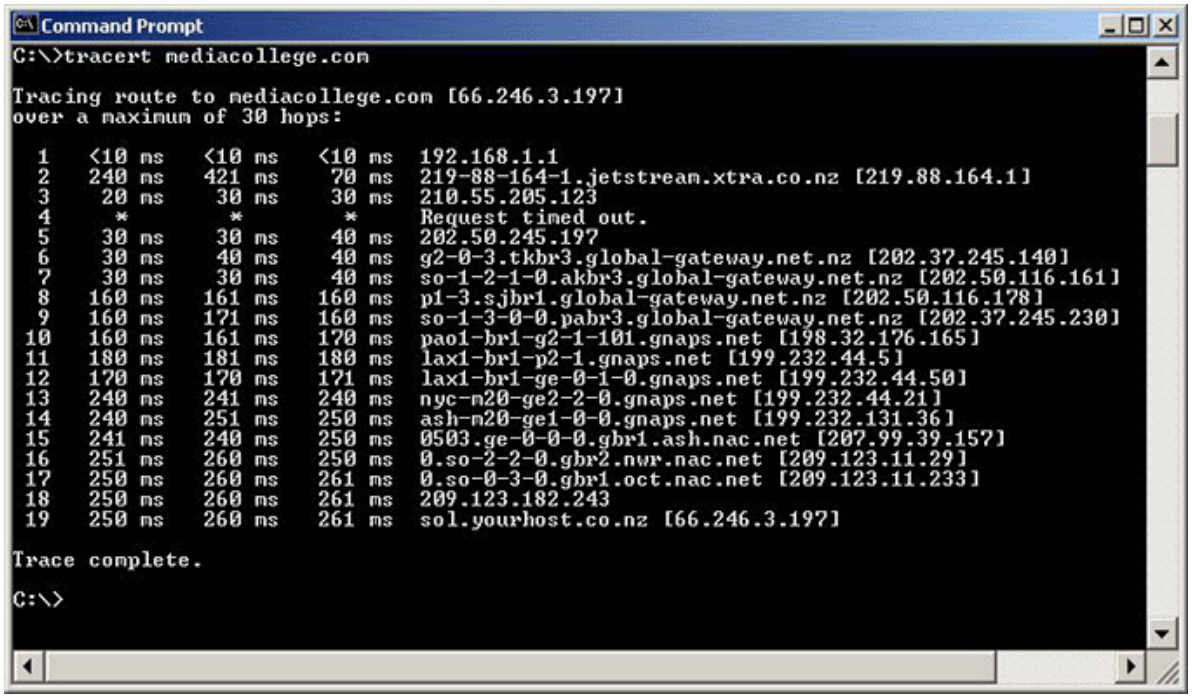

Administrator: C:\Windows\System32\cmd.exe
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation. All rights
C:\Windows\system32>ipconfig /all
Windows IP Configuration
Host Name . . . . . : User-PC
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
Ethernet adapter Lan Network:
Connection-specific DNS Suffix . :
Description . . . . . : Intel(R) PRO/1000
Physical Address. . . . . : 08-00-27-84-8B-C8
DHCP Enabled. . . . . : No
Autoconfiguration Enabled . . . . : Yes
IPv4 Address. . . . . : 192.168.1.100
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.1.1
DNS Servers . . . . . : 192.168.1.1
NetBIOS over Tcpip. . . . . : Enabled

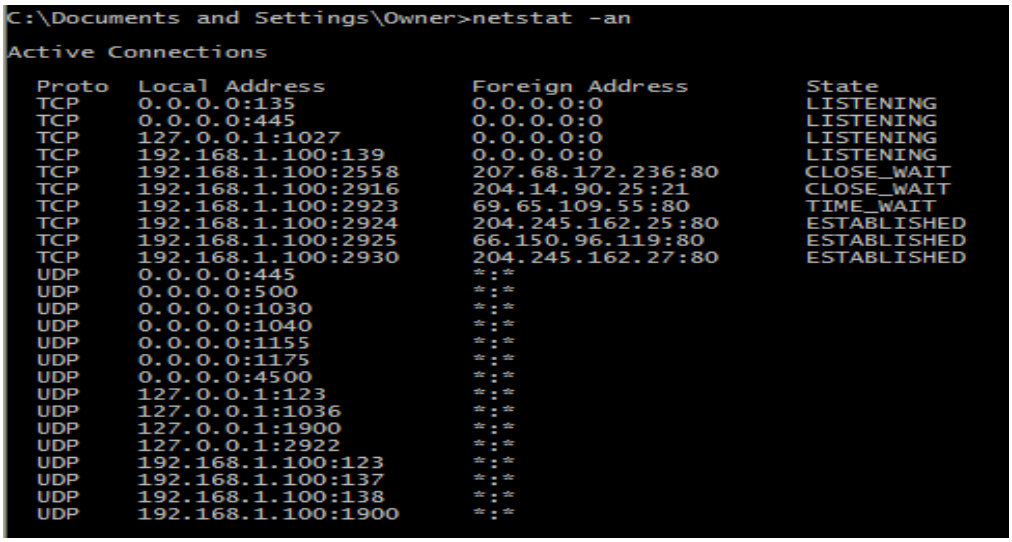

C:\Windows\system32\cmd.exe
Microsoft Windows [Version 6.0.6000]
Copyright (c) 2006 Microsoft Corporation. All rights reserved.
C:\Users\Himanshu>hostname
Himanshu-PC
C:\Users\Himanshu>


C:\WINDOWS\system32\cmd.exe
C:\net\nmap>nmap -sVC -O -T4 scanme.nmap.org
Starting Nmap 4.68 (http://nmap.org) at 2008-07-13 23:23 Pacific Daylight Time
Interesting ports on scanme.nmap.org (64.13.134.52):
Not shown: 1709 filtered ports
PORT STATE SERVICE VERSION
22/tcp open ssh OpenSSH 4.3 (protocol 2.0)
25/tcp closed smtp
53/tcp open domain ISC BIND 9.3.4
70/tcp closed gopher
80/tcp open http Apache httpd 2.2.2 ((Fedora))
|_ HTML title: Go ahead and ScanMe!
113/tcp closed auth
Device type: general purpose
Running: Linux 2.6.X
OS details: Linux 2.6.20-1 (Fedora Core 5)
Uptime: 11.487 days (since Wed Jul 02 11:42:43 2008)
OS and Service detection performed. Please report any incorrect results at http://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 27.516 seconds
C:\net\nmap>


Administrator: Command Prompt
C:\>nslookup fixedbyvonnie.com
Server: google-public-dns-a.google.com
Address: 8.8.8.8
Non-authoritative answer:
Name: fixedbyvonnie.com
Address: 173.254.28.55
C:\>


Command Prompt
C:\cgi-bin\update>ping computerhope.com
Pinging computerhope.com [69.72.169.241] with 32 bytes of data:
Reply from 69.72.169.241: bytes=32 time=68ms TTL=52
Reply from 69.72.169.241: bytes=32 time=70ms TTL=52
Reply from 69.72.169.241: bytes=32 time=68ms TTL=52
Reply from 69.72.169.241: bytes=32 time=68ms TTL=52
Ping statistics for 69.72.169.241:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 68ms, Maximum = 70ms, Average = 68ms
C:\cgi-bin\update>


Command Prompt
C:\>tracert mediacollege.com
Tracing route to mediacollege.com [66.246.3.197]
over a maximum of 30 hops:
1 <10 ms <10 ms <10 ms 192.168.1.1
2 240 ms 421 ms 70 ms 219-88-164-1.jetstream.xtra.co.nz [219.88.164.1]
3 20 ms 30 ms 30 ms 210.55.205.123
4 * * * Request timed out.
5 30 ms 30 ms 40 ms 202.50.245.197
6 30 ms 40 ms 40 ms g2-0-3.tkbr3.global-gateway.net.nz [202.37.245.140]
7 30 ms 30 ms 40 ms so-1-2-1-0.akbr3.global-gateway.net.nz [202.50.116.161]
8 160 ms 161 ms 160 ms p1-3.sjbr1.global-gateway.net.nz [202.50.116.178]
9 160 ms 171 ms 160 ms so-1-3-0-0.pabr3.global-gateway.net.nz [202.37.245.230]
10 160 ms 161 ms 170 ms pao1-br1-g2-1-101.gnaps.net [198.32.176.165]
11 180 ms 181 ms 180 ms lax1-br1-p2-1.gnaps.net [199.232.44.5]
12 170 ms 170 ms 171 ms lax1-br1-ge-0-1-0.gnaps.net [199.232.44.50]
13 240 ms 241 ms 240 ms nyc-m20-ge2-2-0.gnaps.net [199.232.44.21]
14 240 ms 251 ms 250 ms ash-m20-ge1-0-0.gnaps.net [199.232.131.36]
15 241 ms 240 ms 250 ms 0503.ge-0-0-0.gbr1.ash.nac.net [207.99.39.157]
16 251 ms 260 ms 250 ms 0.so-2-2-0.gbr2.nwr.nac.net [209.123.11.29]
17 250 ms 260 ms 261 ms 0.so-0-3-0.gbr1.oct.nac.net [209.123.11.233]
18 250 ms 260 ms 261 ms 209.123.182.243
19 250 ms 260 ms 261 ms sol.yourhost.co.nz [66.246.3.197]
Trace complete.
C:\>



```
C:\Documents and Settings\Owner>netstat -an

Active Connections

  Proto  Local Address          Foreign Address        State
  TCP    0.0.0.0:135            0.0.0.0:0              LISTENING
  TCP    0.0.0.0:445            0.0.0.0:0              LISTENING
  TCP    127.0.0.1:1027         0.0.0.0:0              LISTENING
  TCP    192.168.1.100:139      0.0.0.0:0              LISTENING
  TCP    192.168.1.100:2558     207.68.172.236:80      CLOSE_WAIT
  TCP    192.168.1.100:2916     204.14.90.25:21        CLOSE_WAIT
  TCP    192.168.1.100:2923     69.65.109.55:80        TIME_WAIT
  TCP    192.168.1.100:2924     204.245.162.25:80      ESTABLISHED
  TCP    192.168.1.100:2925     66.150.96.119:80       ESTABLISHED
  TCP    192.168.1.100:2930     204.245.162.27:80      ESTABLISHED
  UDP    0.0.0.0:445            *:*
  UDP    0.0.0.0:500            *:*
  UDP    0.0.0.0:1030           *:*
  UDP    0.0.0.0:1040           *:*
  UDP    0.0.0.0:1155           *:*
  UDP    0.0.0.0:1175           *:*
  UDP    0.0.0.0:4500           *:*
  UDP    127.0.0.1:123          *:*
  UDP    127.0.0.1:1036         *:*
  UDP    127.0.0.1:1900         *:*
  UDP    127.0.0.1:2922         *:*
  UDP    192.168.1.100:123      *:*
  UDP    192.168.1.100:137      *:*
  UDP    192.168.1.100:138      *:*
  UDP    192.168.1.100:1900     *:*
```

OUTCOMES:

The students can understand different networking commands and it’s role from this experiment.

EX.6. ROUTER CONFIGURATION

AIM:

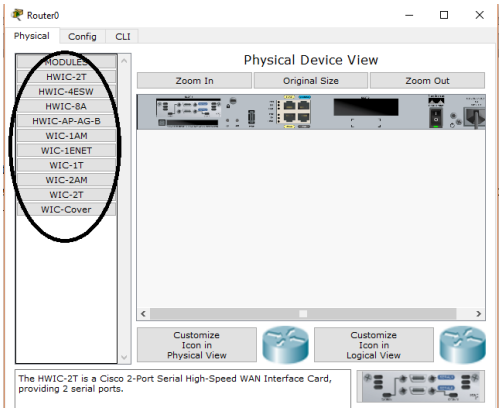
Design Local Area Networks using routers and show the configuration of router to connect two LAN's.

APPARATUS REQUIRED:

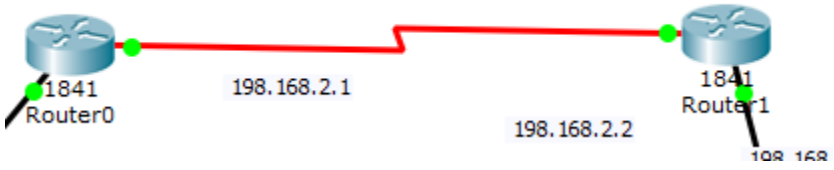
- Cisco Packet Tracer
- Switch
- Routers
- Personal Computers
- Cables

PROCEDURE TO INSTALL THE LAN CONNECTION:

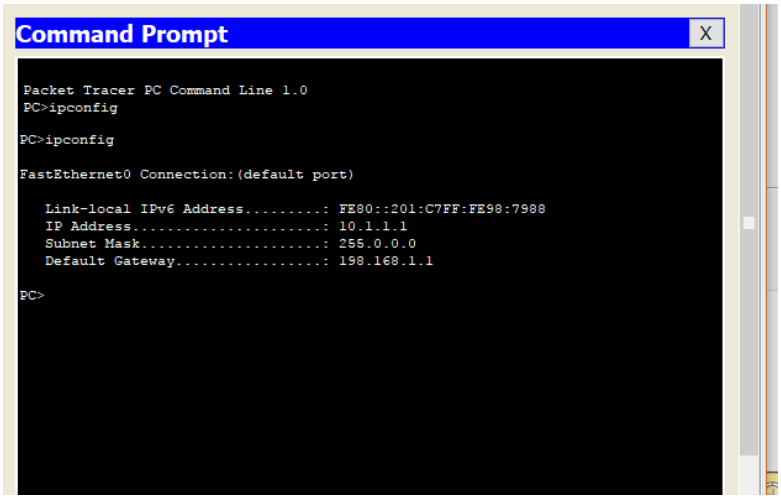
1. Click the router0 and select physical option.
2. There are many devices listed in the physical. Select any one and connect with the router0 for making a serial port.



3. Select the serial DEC cable for connecting two routers as shown in the figure.



4. Click CLI from the router0 window
5. Set the IP Address and Subnet mask of FastEthernet 0/0 as per the down instruction
    - Press RETURN to get started!
    - %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
    - %LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
    - %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
    - Router>enable
    - Router#configure terminal
    - Enter configuration commands, one per line. End with CNTL/Z.
    - Router(config)#interface FastEthernet0/0
    - Router(config-if)#ip address 198.162.1.1 255.255.255.0
    - Router#configure terminal
    - Enter configuration commands, one per line. End with CNTL/Z.
    - Router(config)#interface FastEthernet0/0
    - Router(config-if)#no shutdown
6. Set the IP Address and Subnet mask of serial port 0/0 as per the down instruction
    - Press RETURN to get started!
    - %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed state to up
    - %LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
    - %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
    - Router>enable
    - Router#configure terminal
    - Enter configuration commands, one per line. End with CNTL/Z.
    - Router(config)#interface Serial0/1/0
    - Router(config-if)#ip address 198.168.2.1 255.255.255.0
    - Router(config-if)#no shutdown
7. Follow the step 5 and 6 for configuring Router1.
8. Click the PC and set the IP address, subnet mask and default gateway IP Address.
9. Select the command prompt of the same PC and type the ipconfig for identifying the IP address and getaway.



10. Ping the same PC with the corresponding Gateway (Router) IP address.

ROUTER CONFIGURATION:

ROUTER-0

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

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

Press RETURN to get started!

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 10.1.2.1 255.0.0.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
```

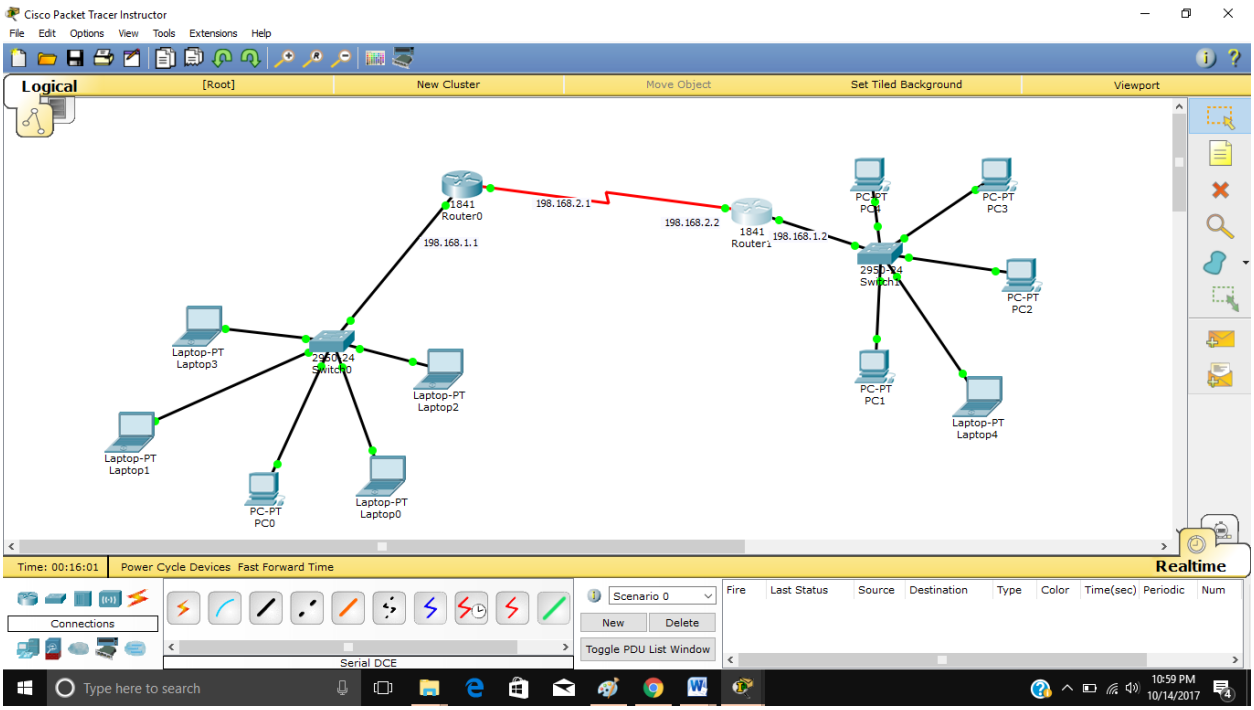
```
Router(config-if)#ip address 10.1.2.1 255.255.255.0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#ip address 198.168.2.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#no shutdown

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

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

Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up

Router#
%SYS-5-CONFIG_I: Configured from console by console
```

ROUTER -1:

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

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

Press RETURN to get started!
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 198.168.1.2 255.255.255.0
Router(config-if)#no shutdown

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

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

Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#ip address 198.168.2.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
```

OUTPUT:



OUTCOME:

The students can understand the concept of router configuration from this experiment.

EX.7: TROUBLESHOOT THE LOCAL AREA NETWORK (LAN)

AIM:

Study and troubleshoot the different problems in Local Area Network.

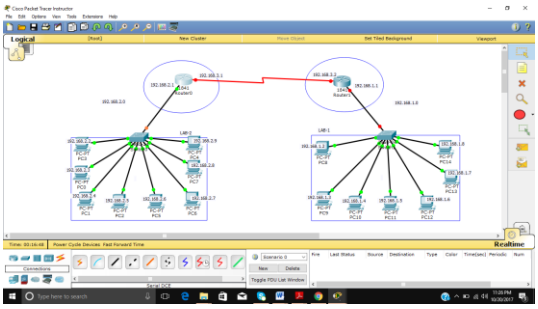
APPARATUS:

1. Personal Computer
2. Cisco Packet Tracer

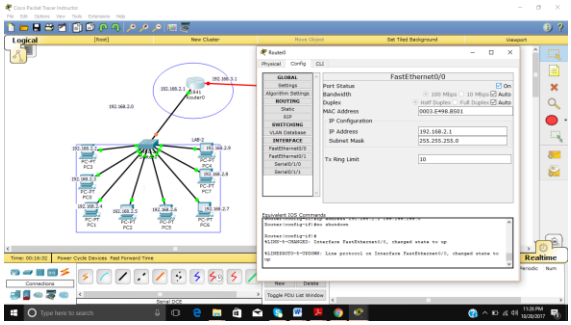
DESCRIPTION:

The problems/error may occur due the improper configuration in the network. This experiment explains how to identify and troubleshoot the problems/errors in the network.

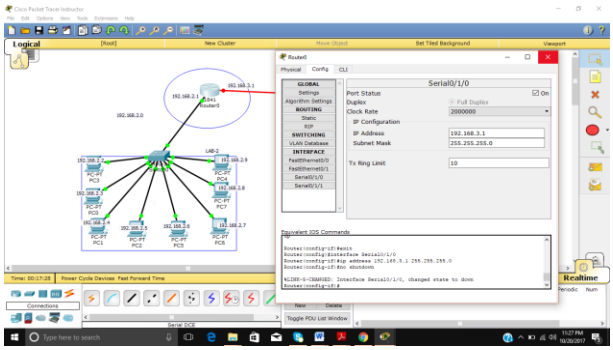
1. Make sure that the cable which is connected between pcs and switches status should be in green color.



2. Check the router configuration as follows
    a. Fast Ethernet interface, IP address and subnet mask are configured perfectly.

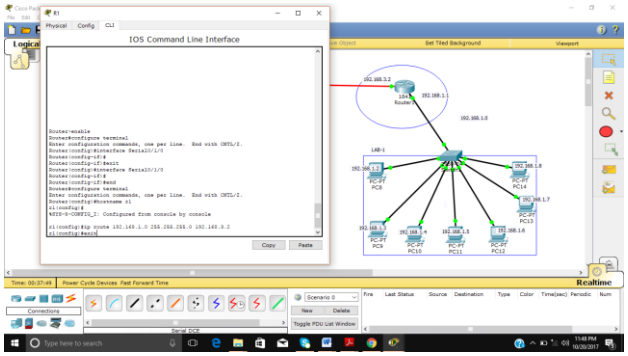


    b. Serial port interface, IP address and subnet mask are configured perfectly.

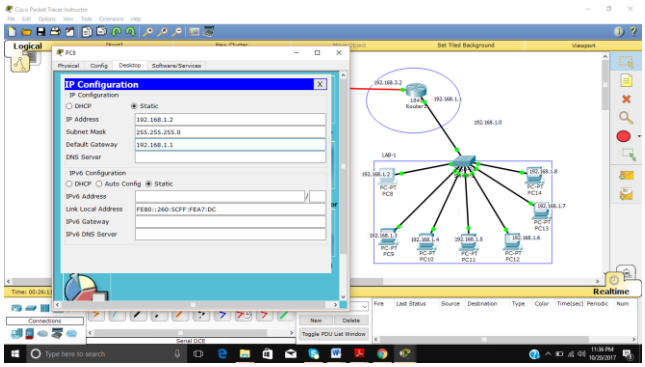


c. Clock rate should be defined and all port options must be enabled.

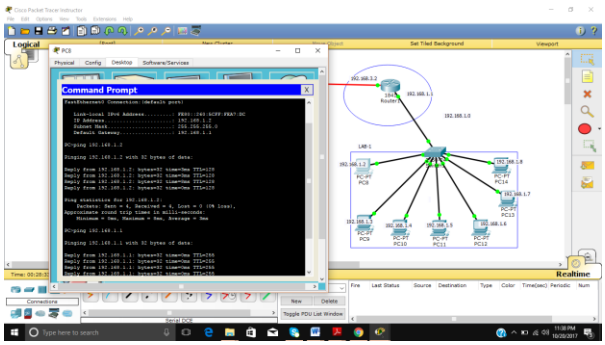
d. Set the rout IP route destination serial IP subnet mask and nearest router IP



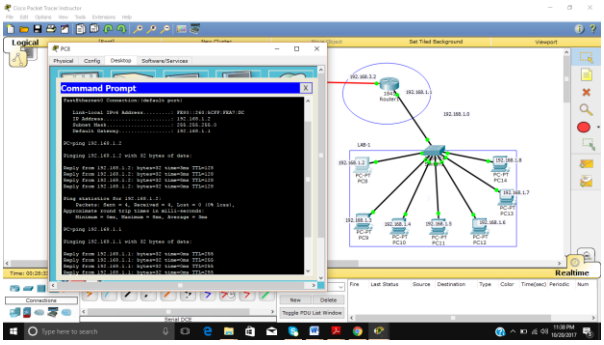
3. Check every PC IP address, subnet mask and gateway are defined or not.



4. The Gateway must be the router Fast Ethernet port IP.
5. Go the cmd in pc setting and check all IP and gateway are correct or not. Use the ipconfig command for checking.



6. Ping the same pc with its IP address.



7. Ping the nearest Router with router IP address.
8. If the step 6 and 7 are ok then ping the other LAN router and remote PC.
9. If you have completed the all steps in a perfect manner, the created LAN works perfectly.

OUTCOMES:

- The students can identify the different errors from the created LAN.
- They can troubleshoot the different problems or errors.

EX.8: INSTALLATION AND CONFIGURATION OF WIRELESS LOCAL AREA NETWORKS

AIM:

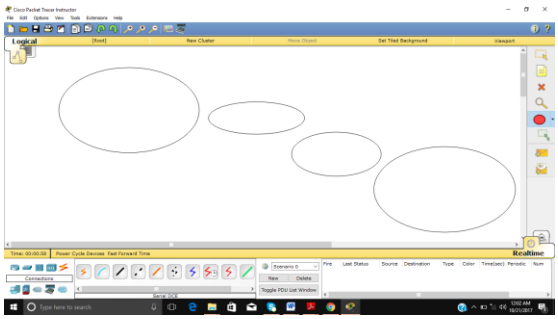
Create a wireless LAN connection in between two floors.

APPARATUS:

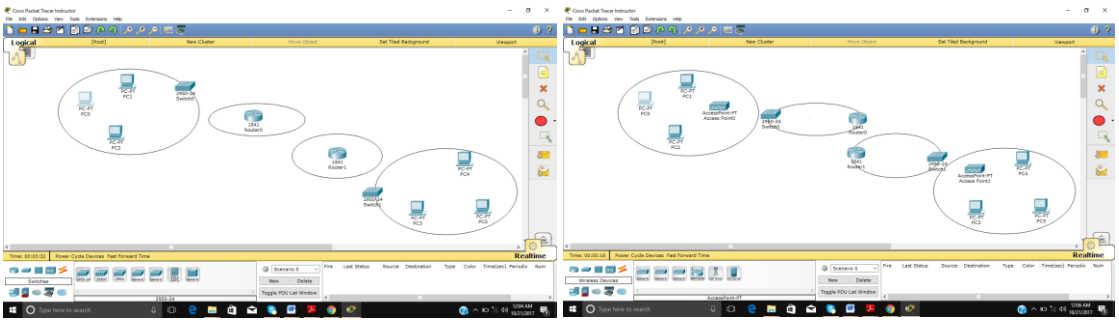
1. Personal Computer
2. Cisco Packet Tracer

DESCRIPTION:

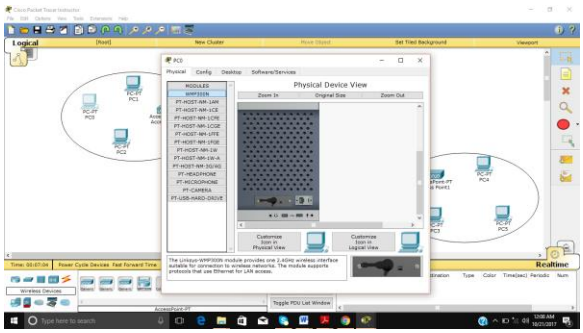
1. Define the area as shown in the figure.



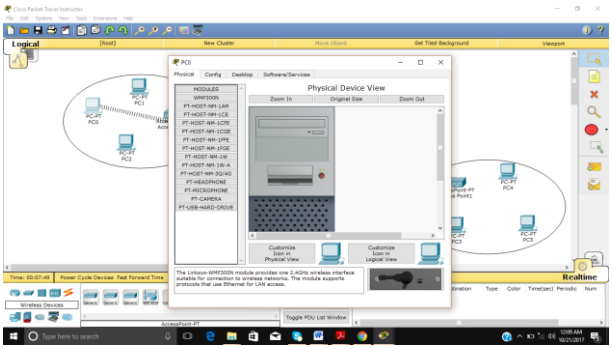
2. Collect the different devices of routers, switches, wireless adapters and PCs as shown in the figure.



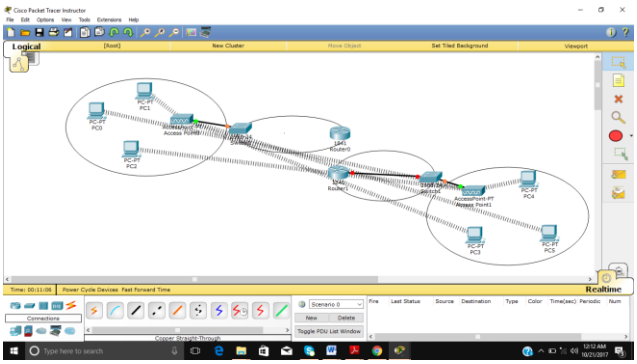
3. All PCs are wired in default. Do follow the step which is shown in the figure for converting from wired to wireless. Make sure that the PC should be switched off.



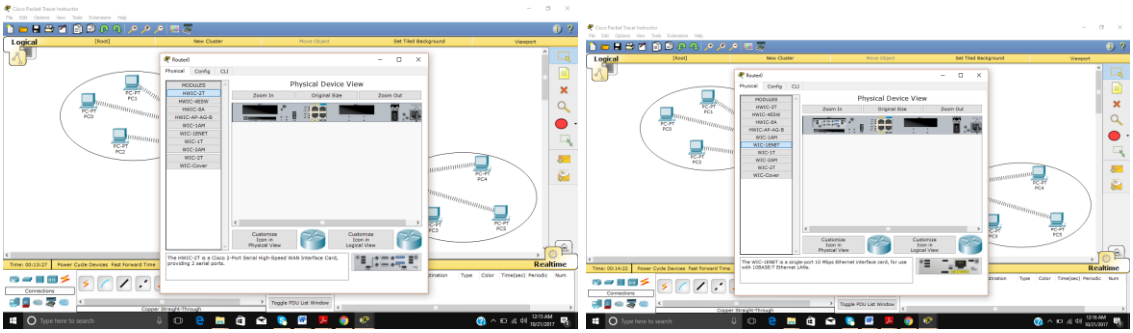
4. Switch on the PC.



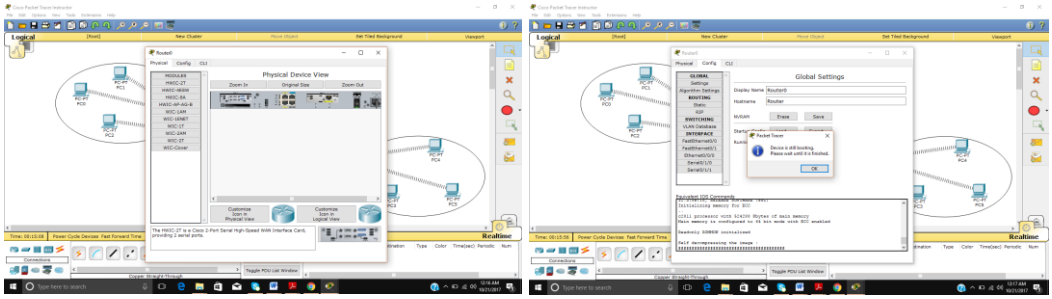
5. Do the same setup to all PCs for converting from wired to wireless, connect the wireless adapter and switch by copper straight through cable.



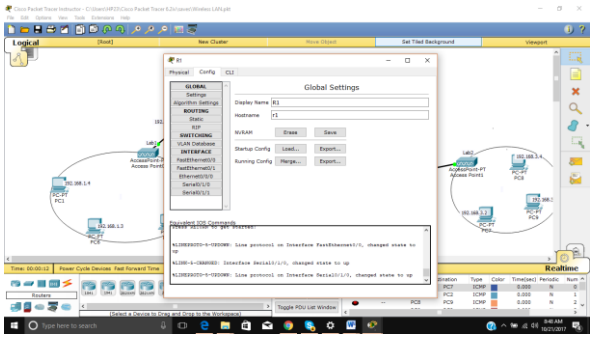
6. Connect the switches with routers by copper straight through cables, set the serial and Ethernet port in router as shown in the figure. Make sure that the router should be switched off for these configurations.



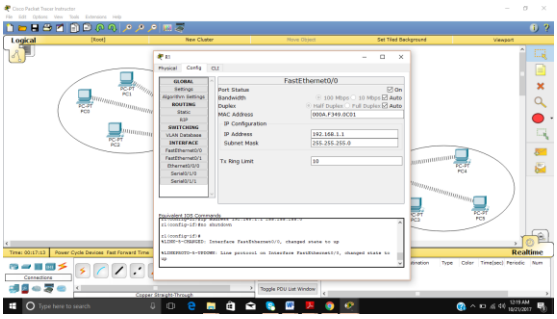
7. Switch on the router.



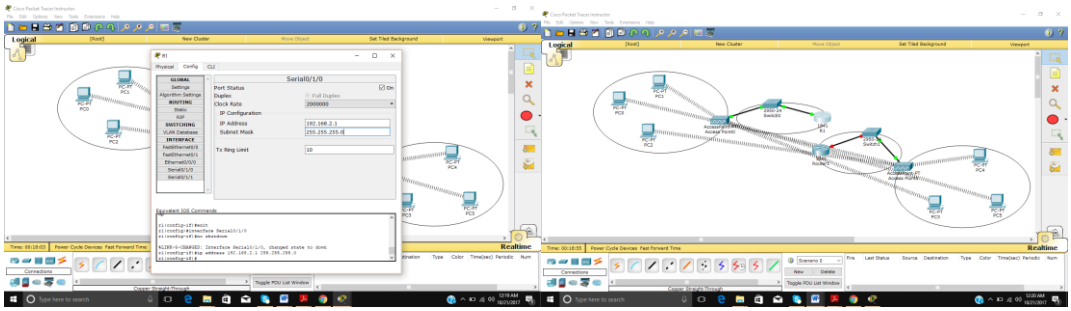
8. Set the host name as shown in the figure.



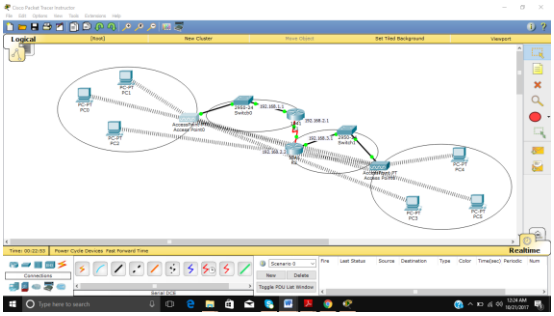
9. Set the IP address and subnet mask for the Fast Ethernet port and make sure all ports must be switched on. Click auto option for bandwidth and duplex.



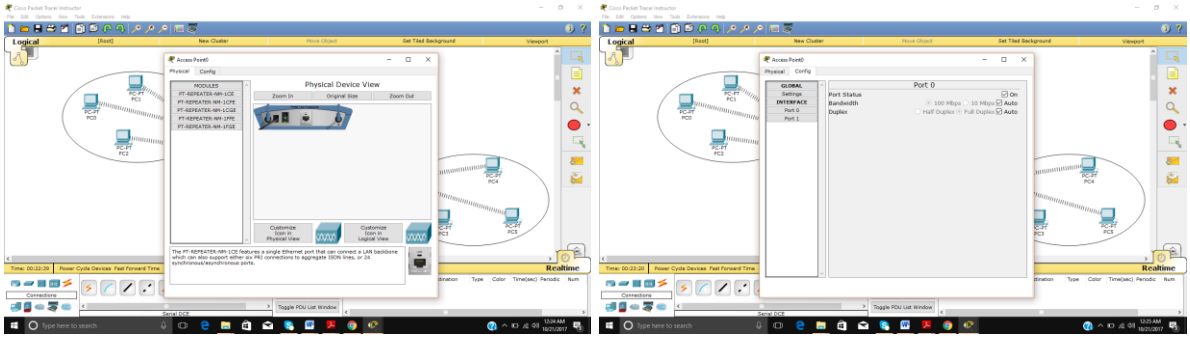
10. Do the same to the serial port and set the clock rate.



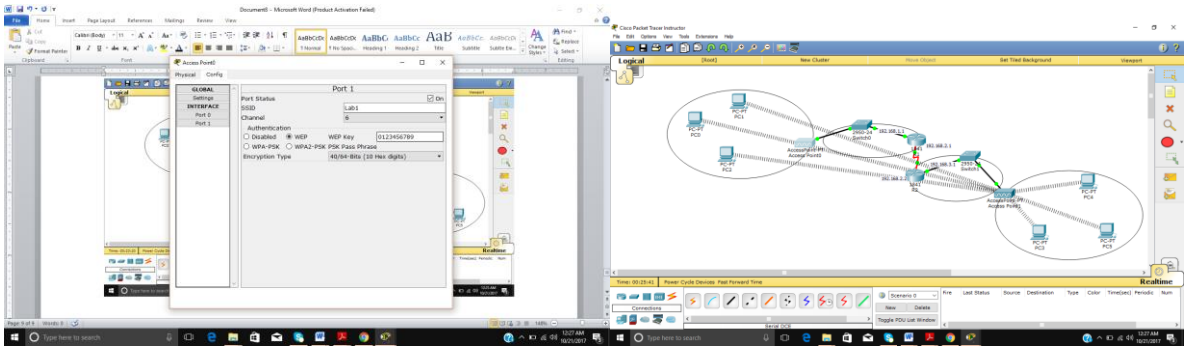
11. Do the same setup in other routers. Now routers are ready for connecting each other by serial DCE cable.



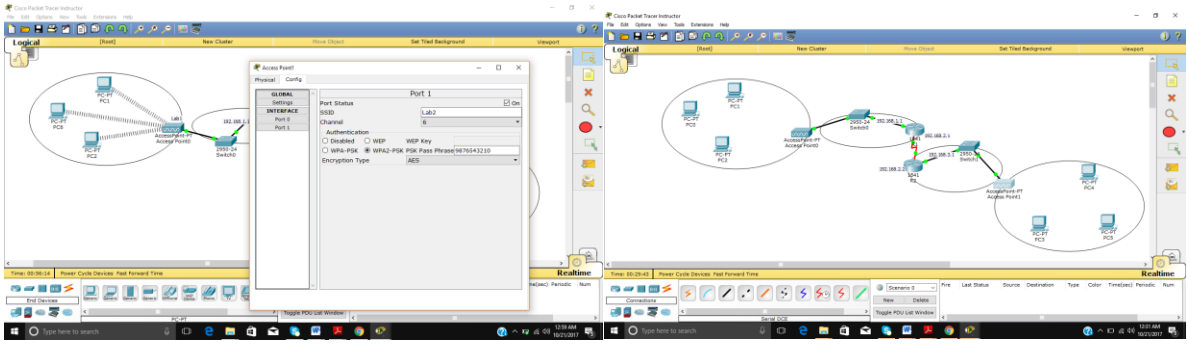
12. Check the color stauts of each connection. It should be in green color.
13. Click port0 in wireless adapter and make sure that the port should be on , bandwidth and duplex must be auto.



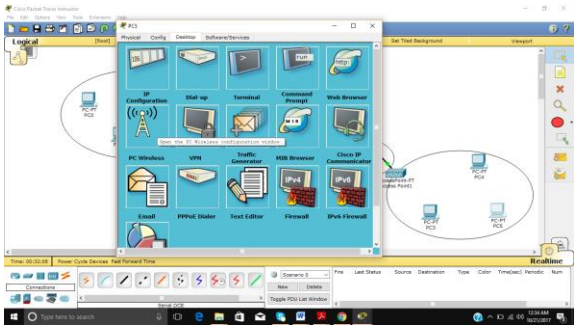
14. The port1 status should be on, set the name for devies in SSID text box and click WEP option for setting the password as shown in the figure.



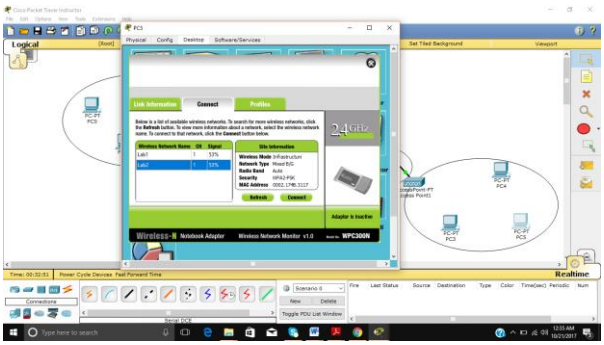
15. Do the same setup in other wireless adapters.



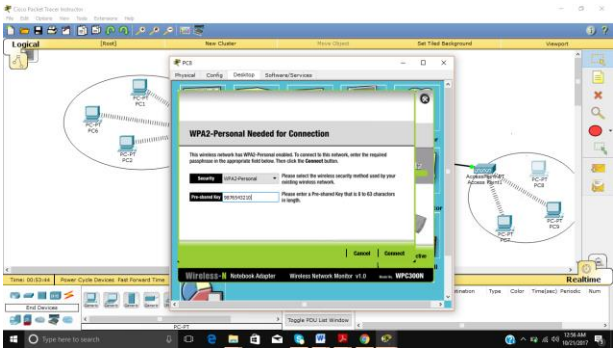
16. Click the PC and select the wireless option in desktop.



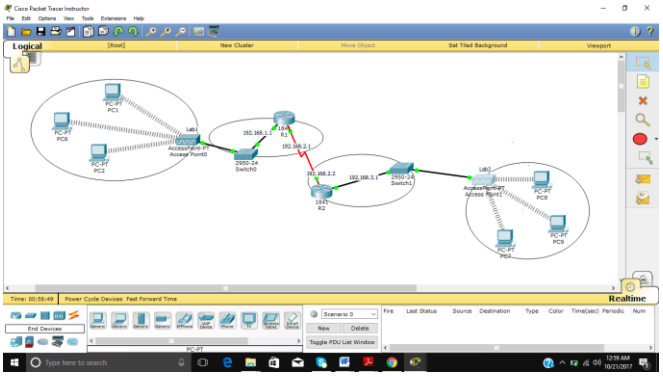
17. Select the connect option. Now, you can find the nearest wireless adapters in the same screen.



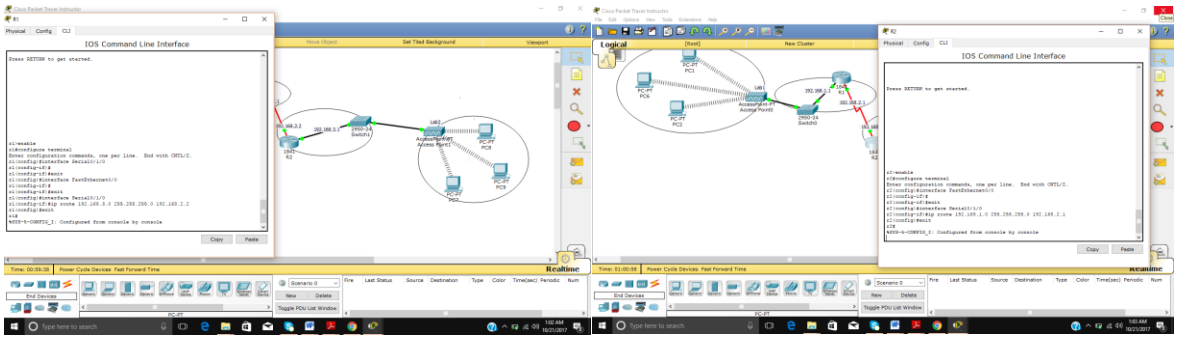
18. Choose the nearest device and enter the password as shown in the figure.



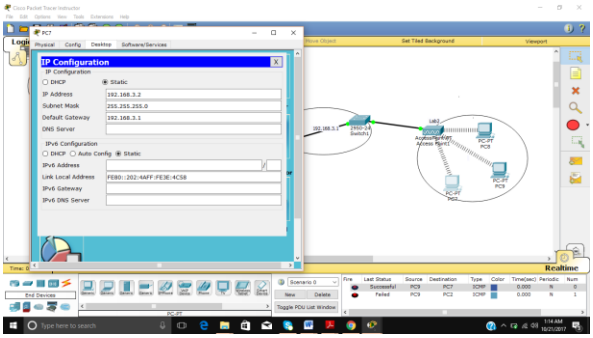
19. Do the same setup to all PCs.



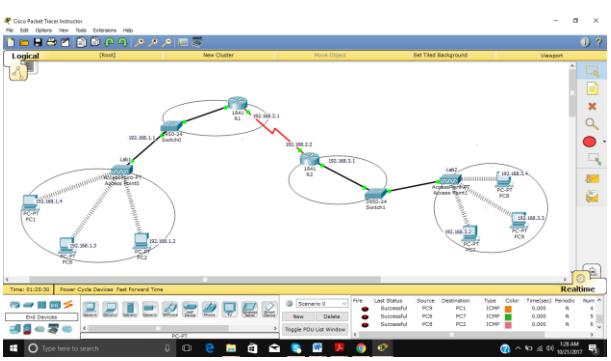
20. Configure the routers as mentioned in previous experiments.

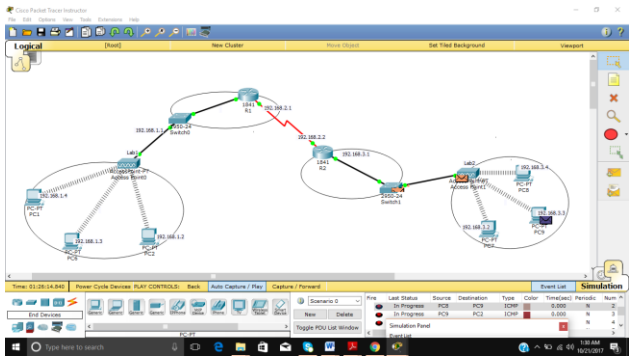


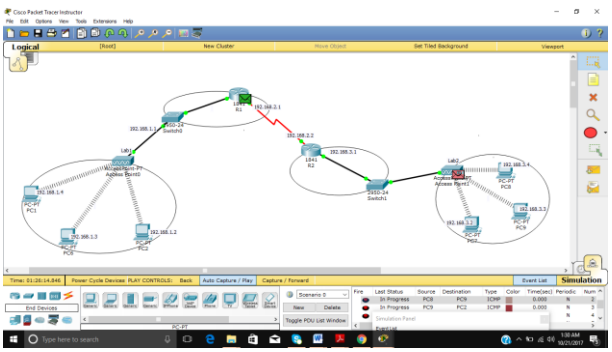
21. Set the static IP address, subnet mask and getway to all PCs as mentioned in pervious experiment.

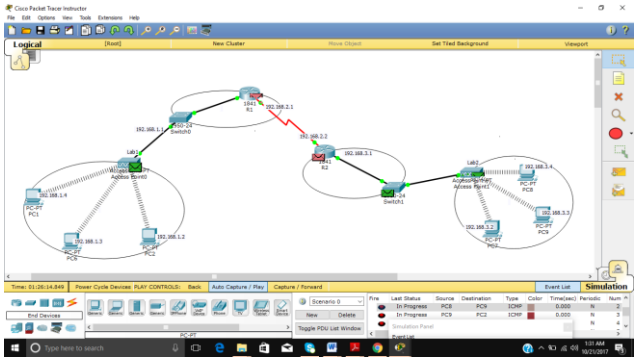


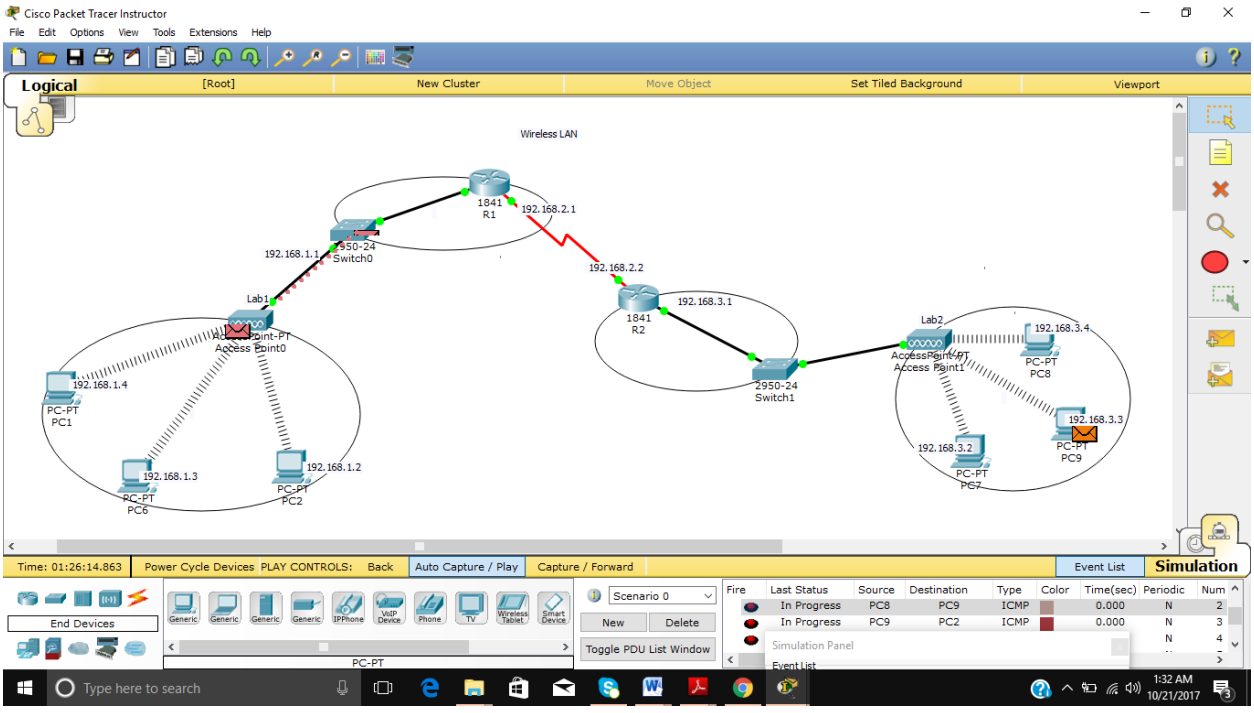
22. Define the soure and destination for transferring the packets as shown in the figures.



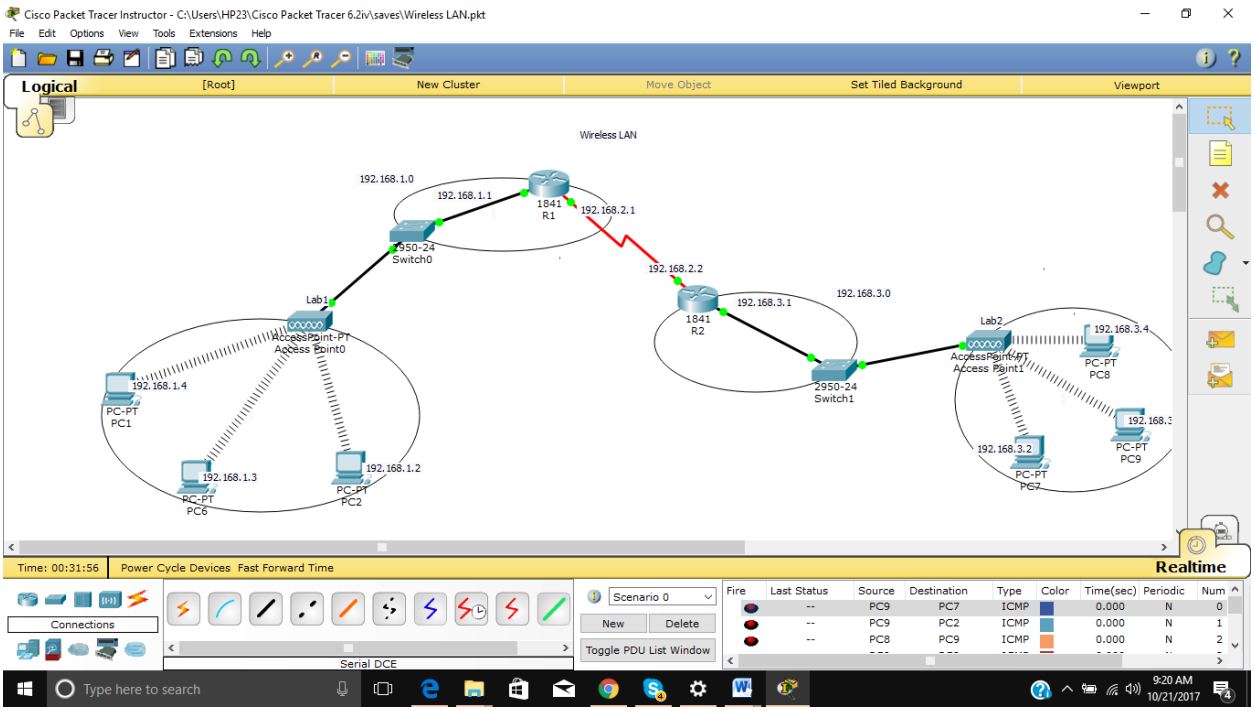







Cisco Packet Tracer Instructor
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
Wireless LAN
1841 R1
192.168.2.1
2950-24 Switch0
192.168.1.1
192.168.2.2
Lab1
Access Point-PT Access Point0
1841 R2
192.168.3.1
Lab2
AccessPoint-PT Access Point1
2950-24 Switch1
192.168.3.4
PC-PT PC8
192.168.3.3
PC-PT PC9
192.168.3.2
PC-PT PC7
192.168.1.4
PC-PT PC1
192.168.1.3
PC-PT PC6
192.168.1.2
PC-PT PC2
Time: 01:26:14.863 Power Cycle Devices PLAY CONTROLS: Back Auto Capture / Play Capture / Forward Event List Simulation
End Devices
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num
In Progress PC8 PC9 ICMP 0.000 N 2
In Progress PC9 PC2 ICMP 0.000 N 3
Simulation Panel
Event List
Type here to search
1:32 AM 10/21/2017

OUTPUT:



OUTCOMES:

The students can understand the concept of wireless LAN creation using packet tracer.

EX.9: THE ROUTING INFORMATION PROTOCOL VERSION-1 (RIP-V1)

AIM:

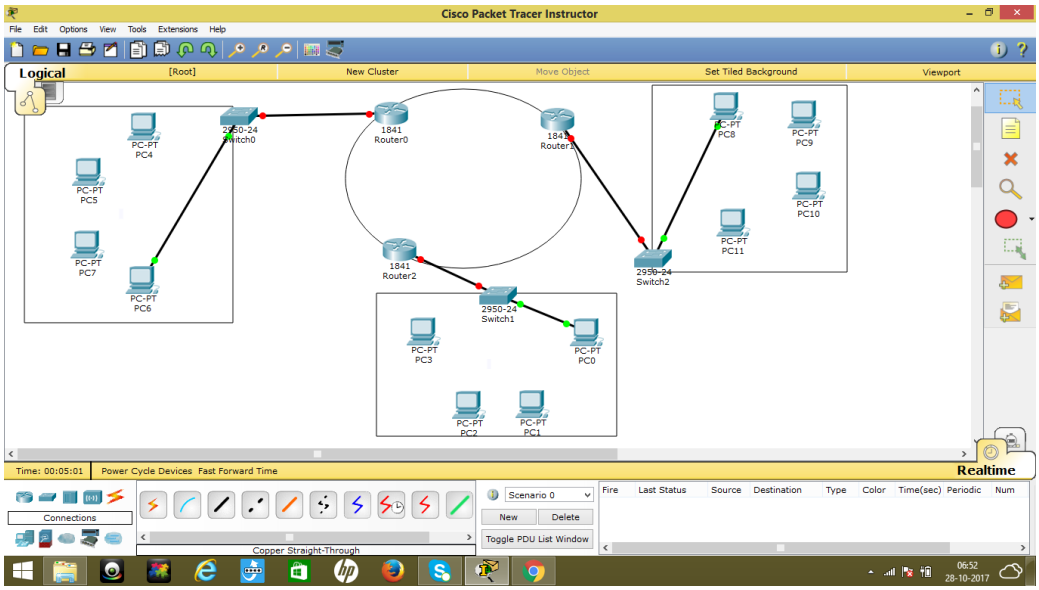
Create a network connection between two different LANs using RIP –V1.

APPARATUS:

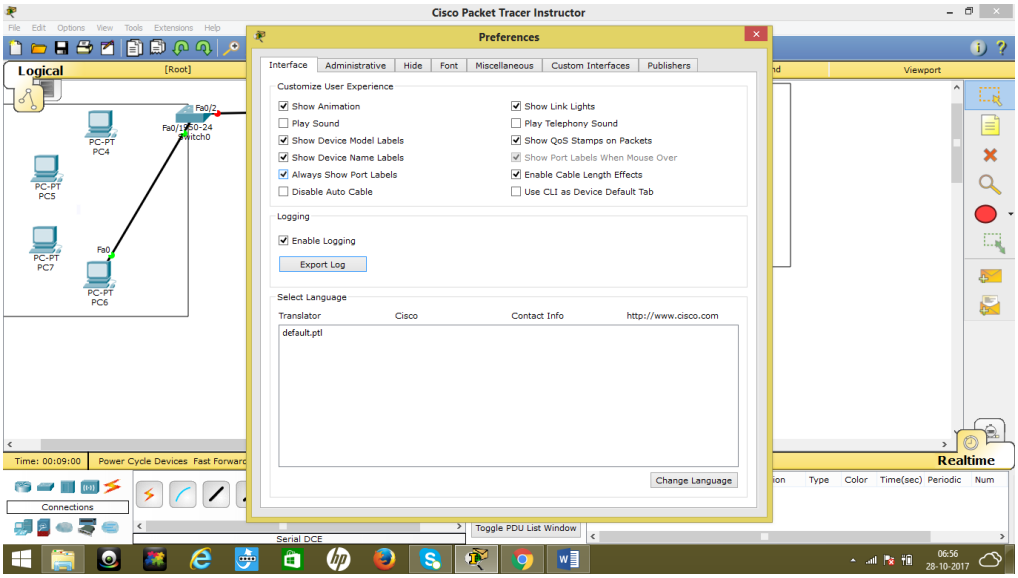
1. Personal Computer
2. Cisco Packet Tracer

DESCRIPTION/PROCEDURE

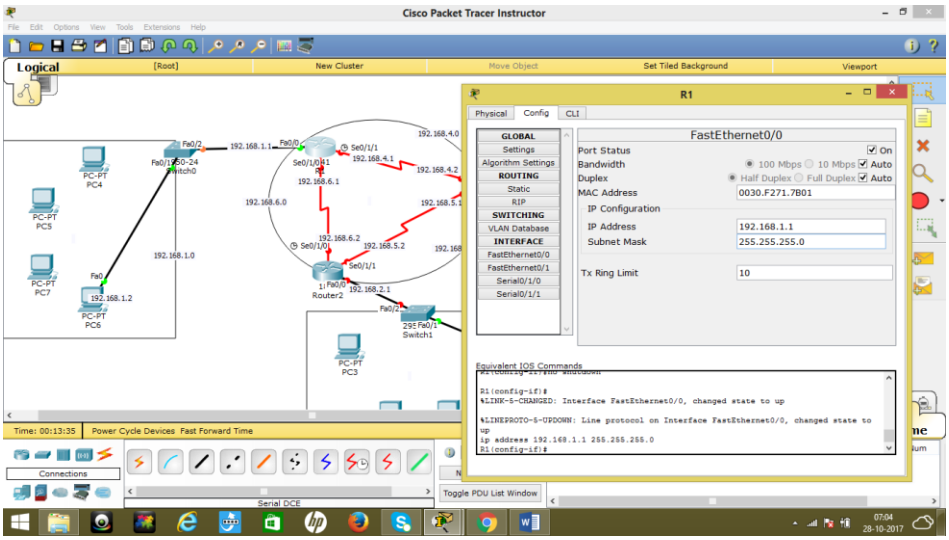
1. Design the LAN as shown in the below figure



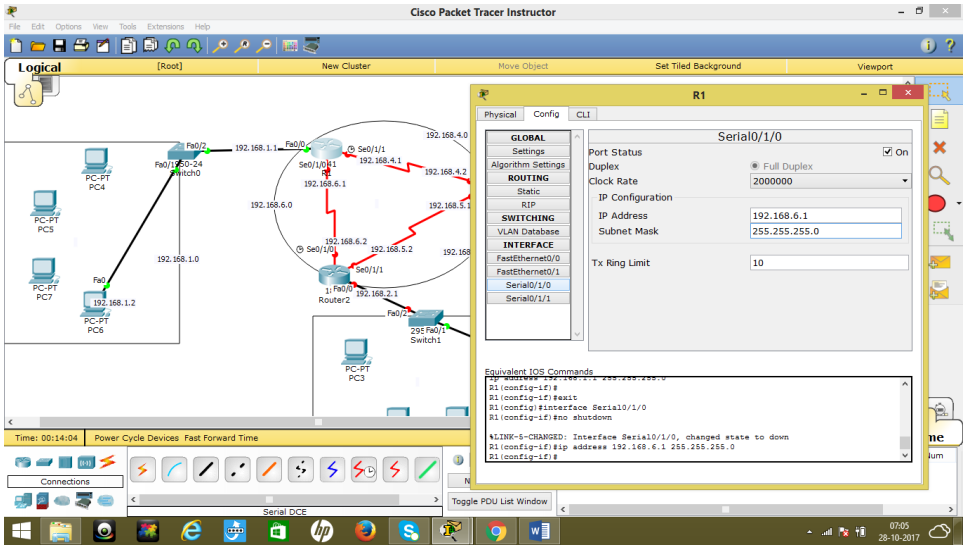
2. Enable “Always Show port Labels” from the preference option for identifying the port information.



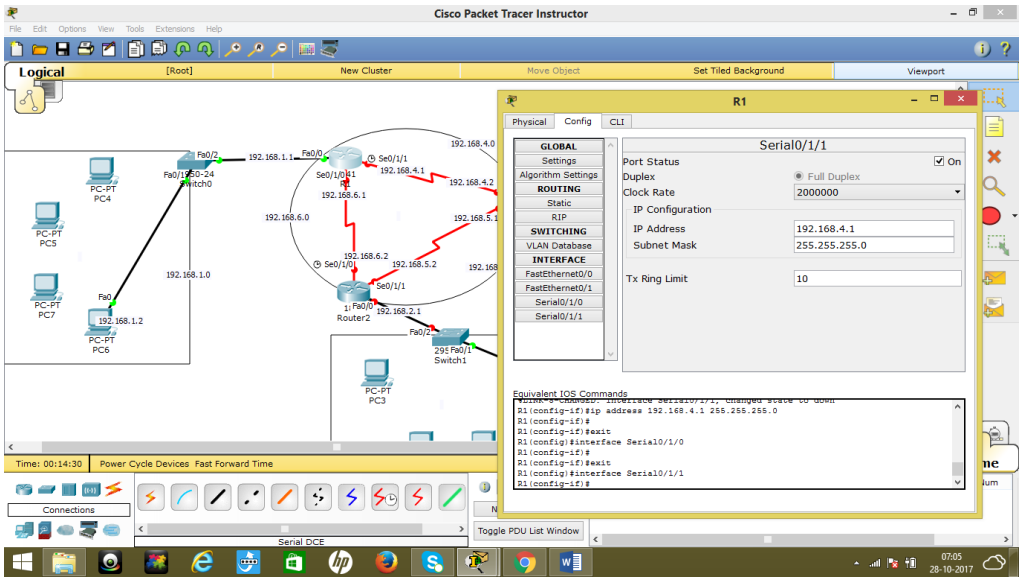
3. Set the IP address for the Fast Ethernet in router as shown in the figure



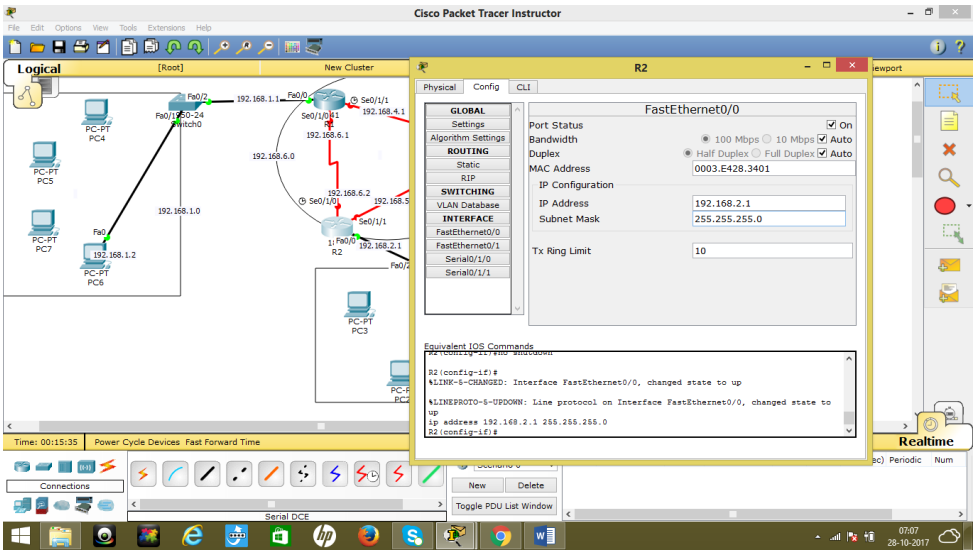
4. Set the IP address for the serial in router as shown in the figure



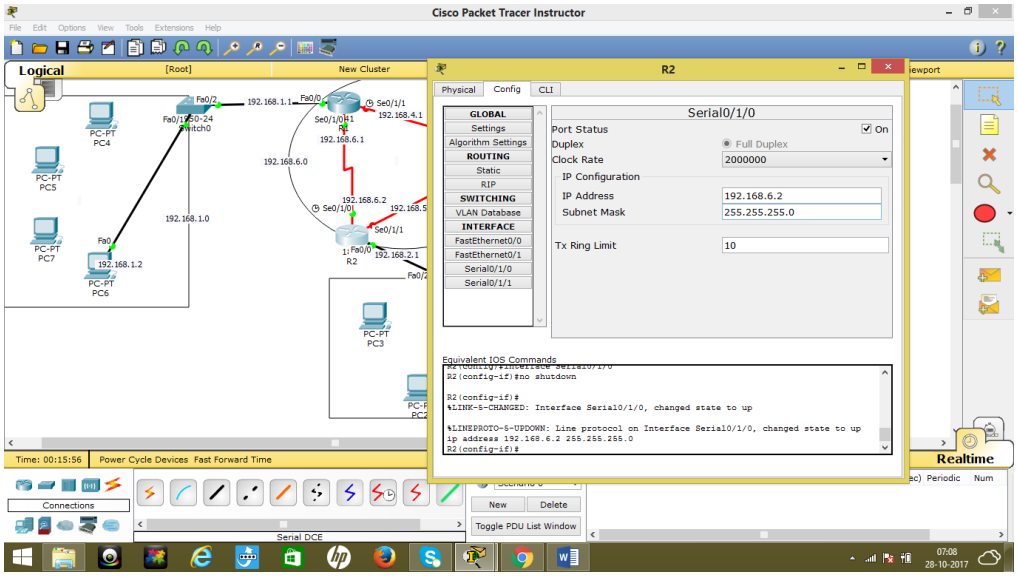
5. Set the IP address for the serial in router as shown in the figure

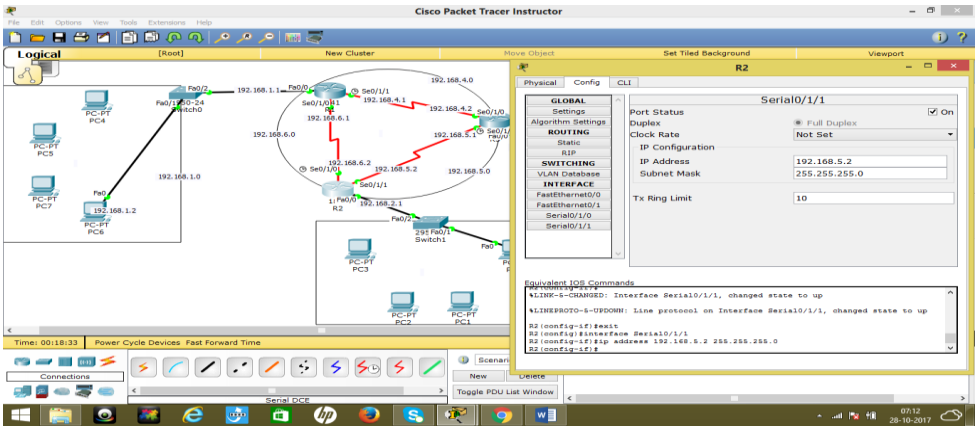


6. Set the IP address for the Fast Ethernet in next router as shown in the figure

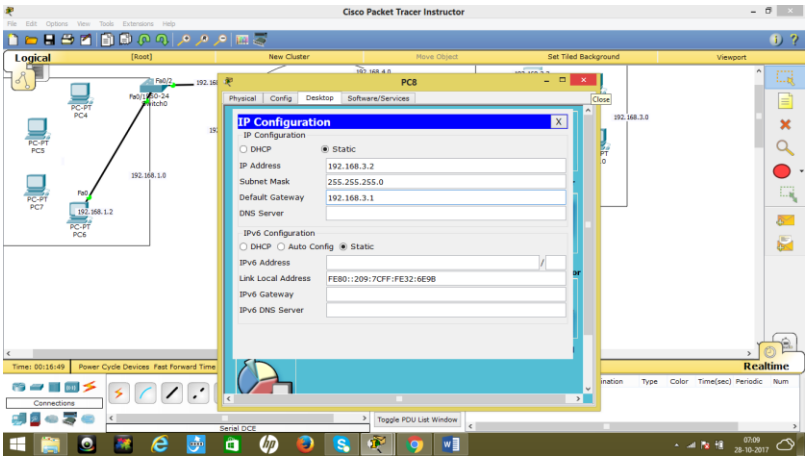


7. Set the IP address for the serial in next router as shown in the figure

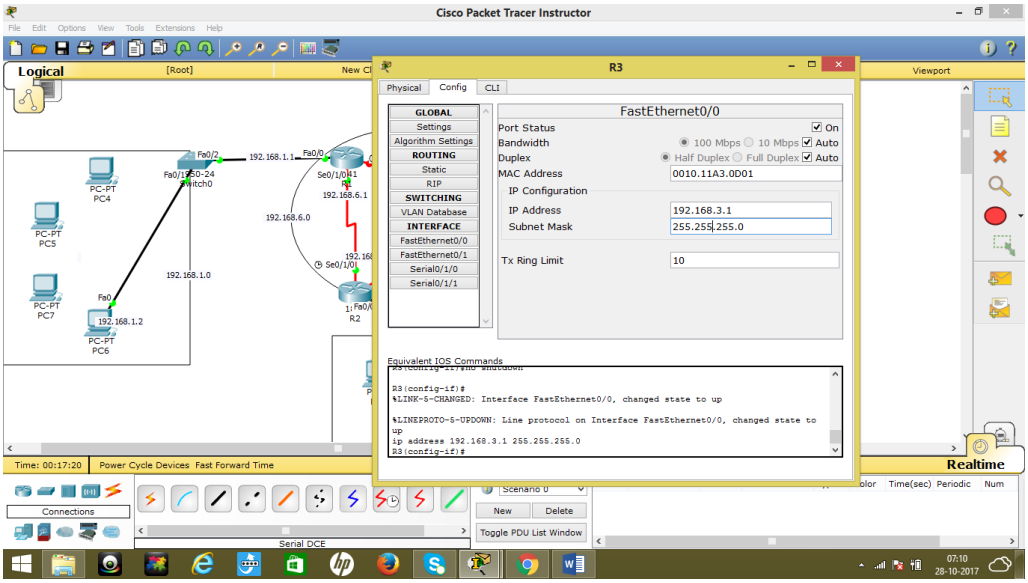




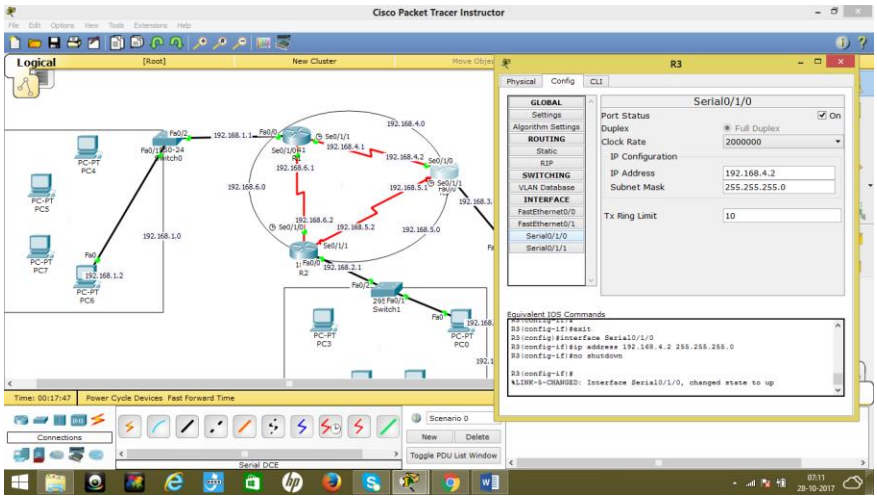
8. Set the IP address for the PC as shown in the figure . Do the same for all PCS



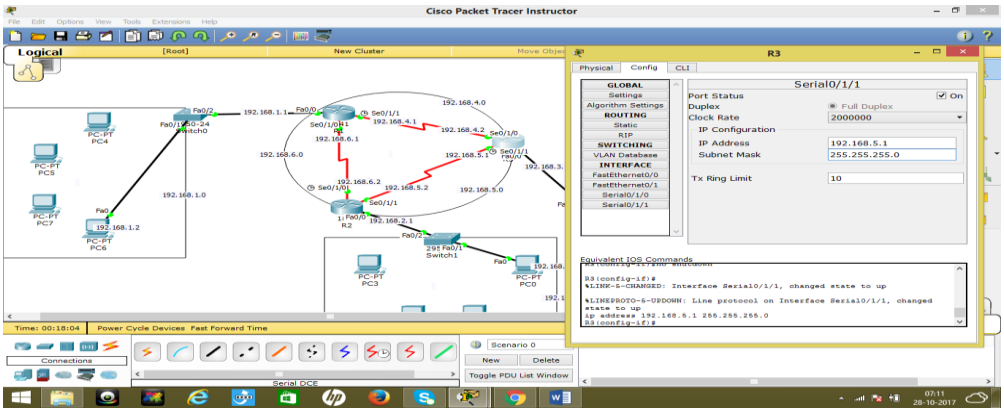
9. Set the IP address for the Fast Ethernet in next router as shown in the figure



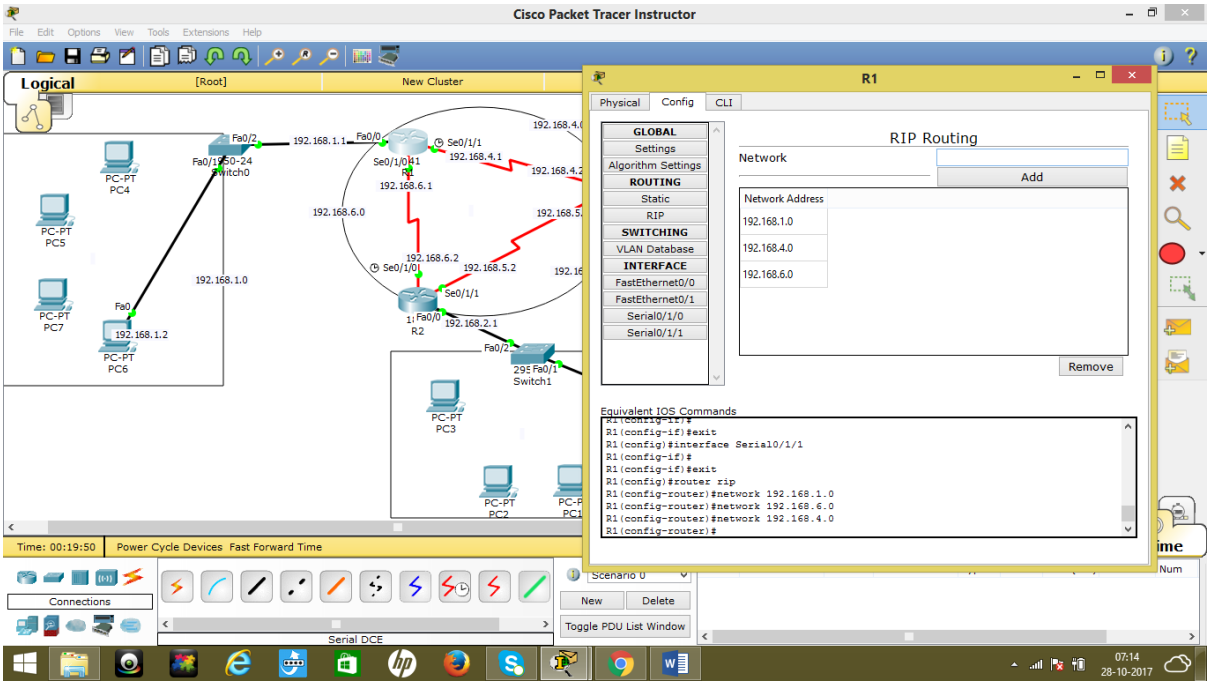
10. Set the IP address for the serial in next router as shown in the figure



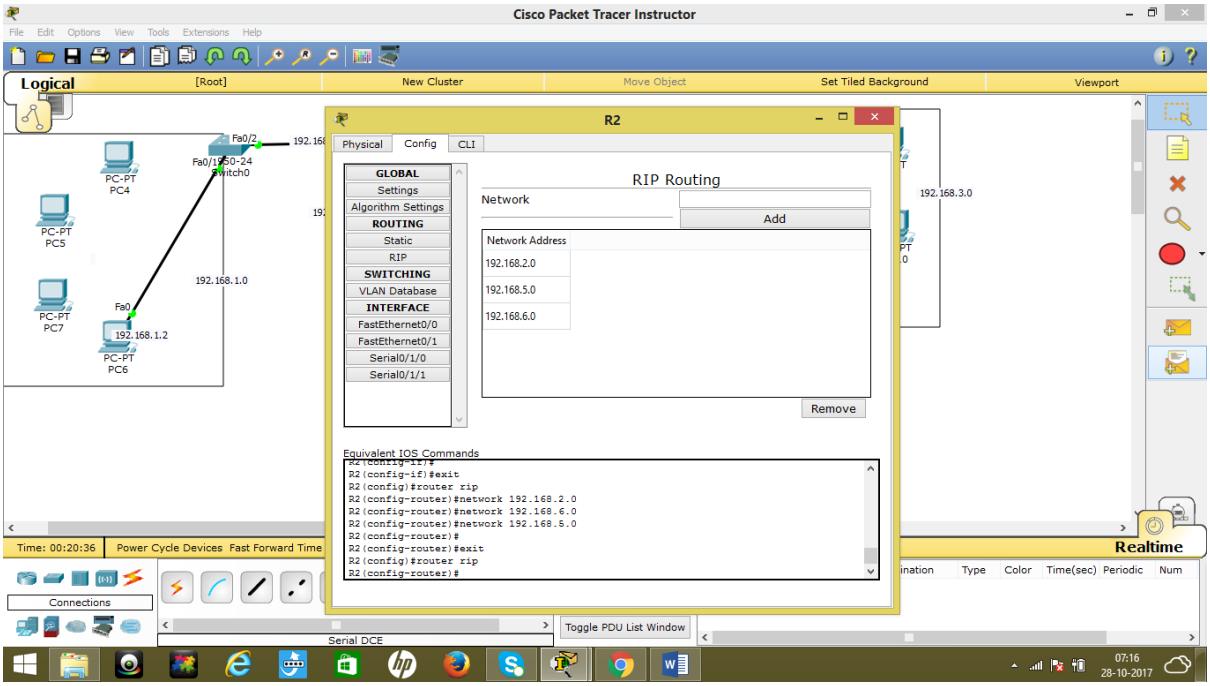
11. Set the IP address for the serial in next router as shown in the figure



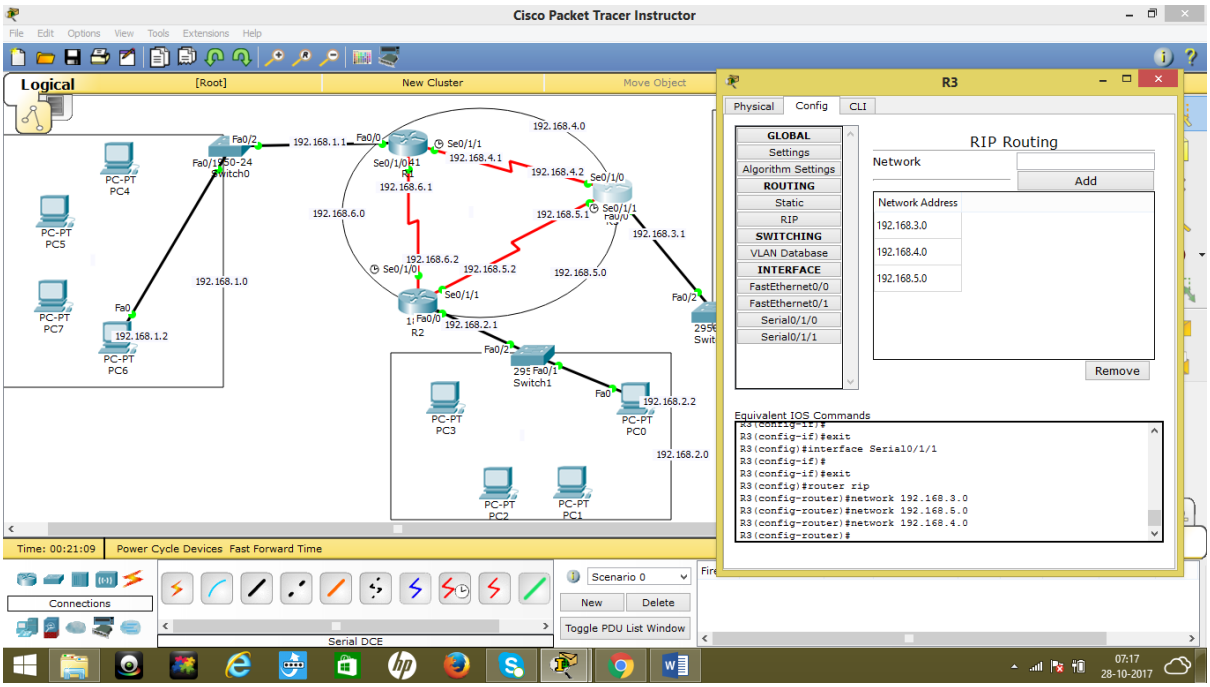
12. Click the router R1-> click the config -> click the RIP and enter the nearest network IP address one by one and press the Add button as shown in the figure.



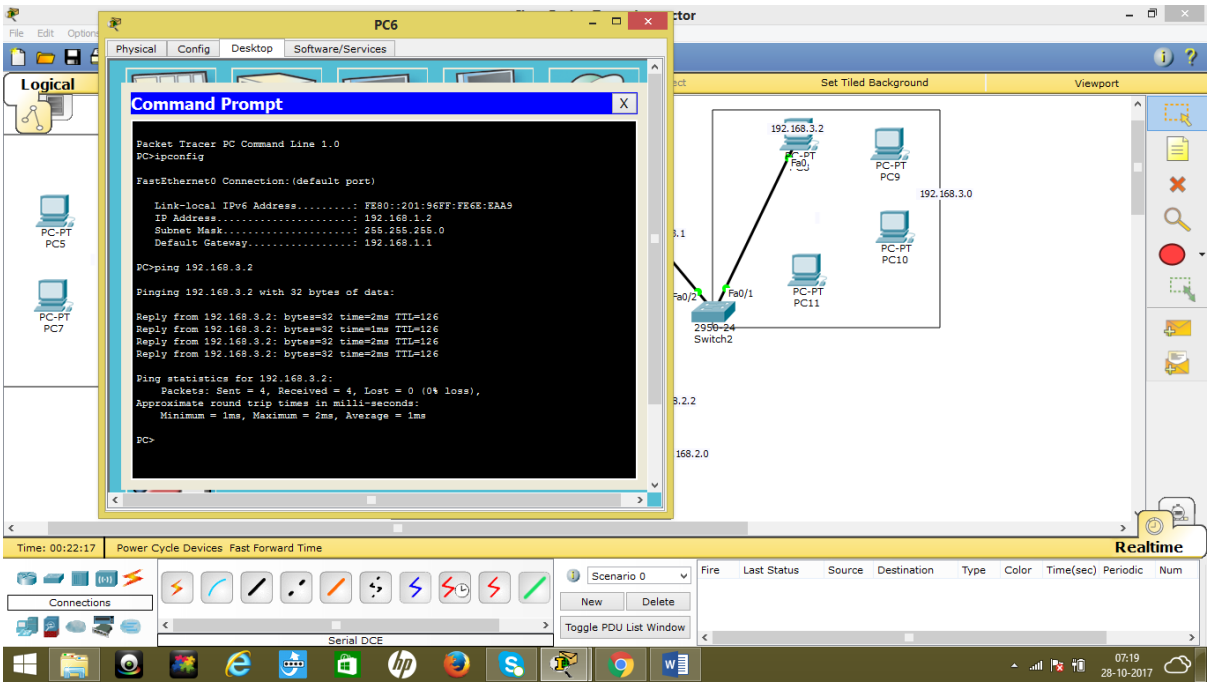
13. Click the router R2-> click the config -> click the RIP and enter the nearest network IP address one by one and press the Add button as shown in the figure.

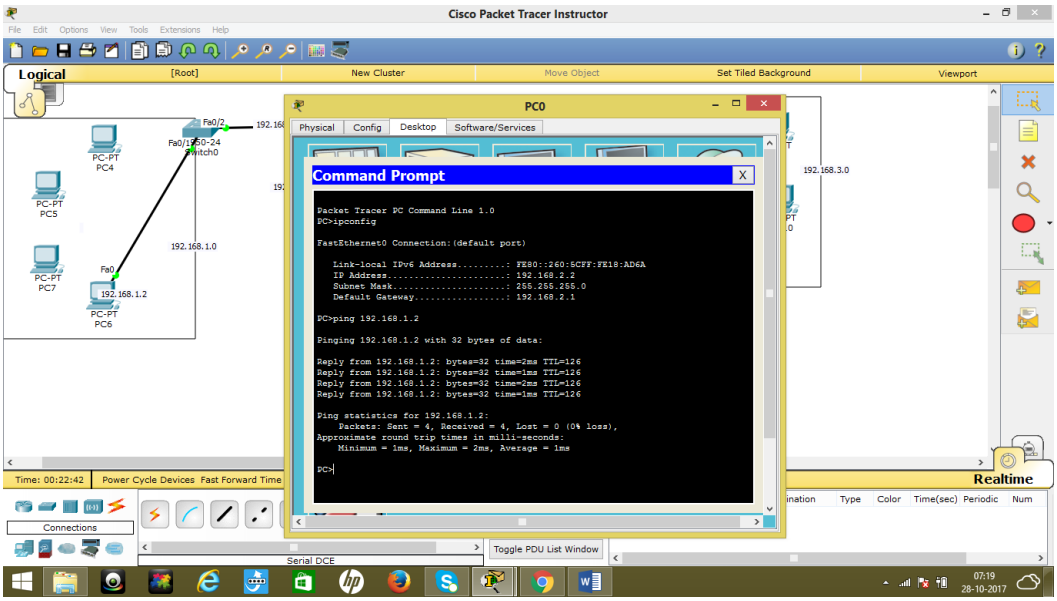


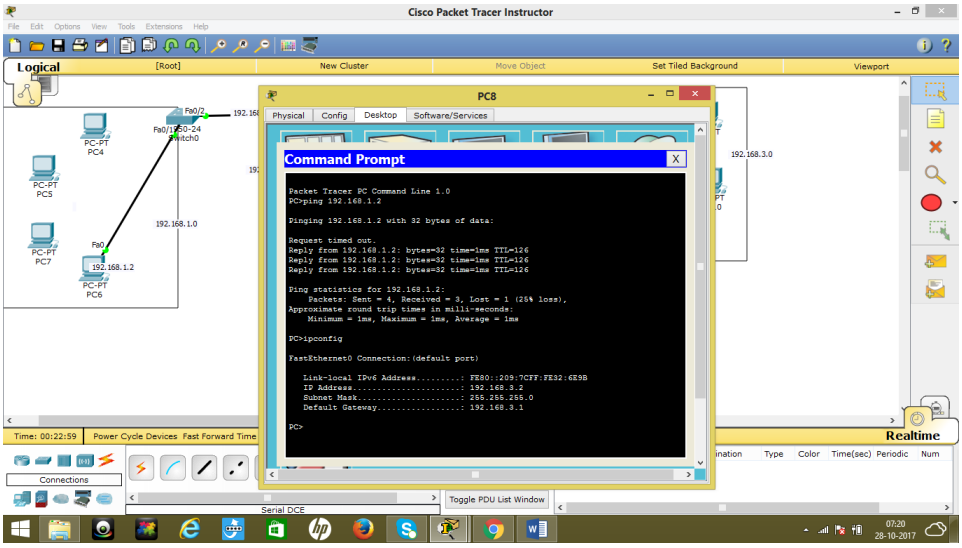
14. Click the router R3-> click the config -> click the RIP and enter the nearest network IP address one by one and press the Add button as shown in the figure.



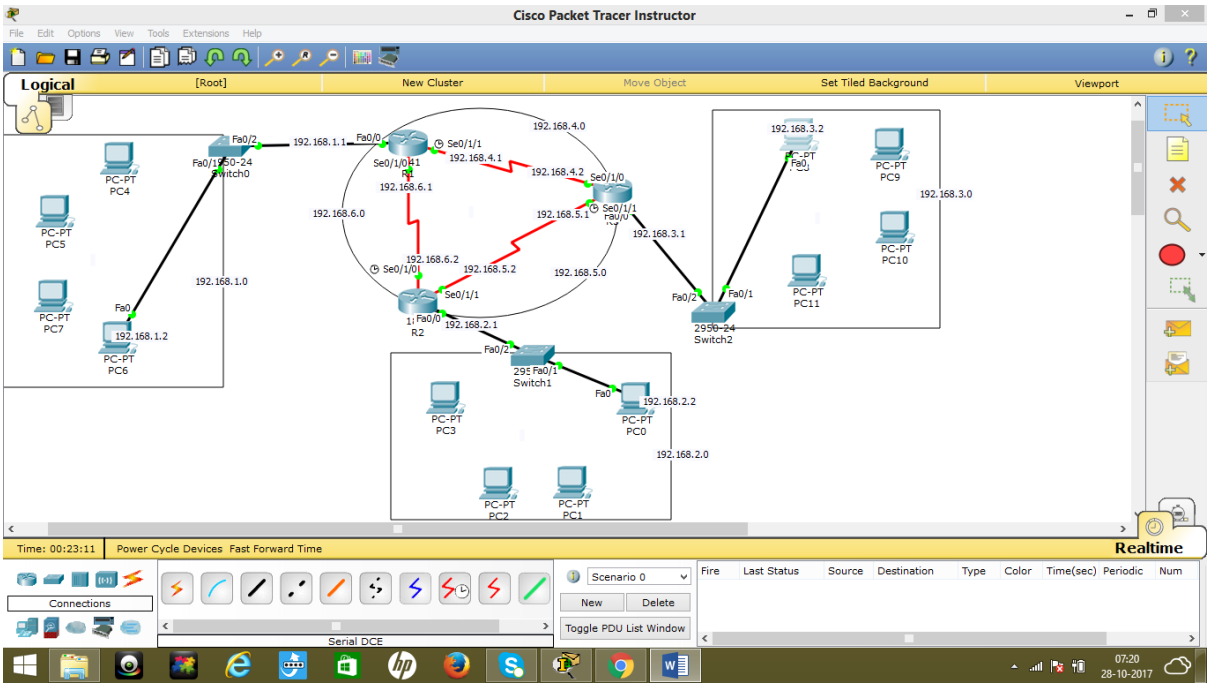
15. Check the connection status using a PING command in source PC and Destination PC as shown in figure

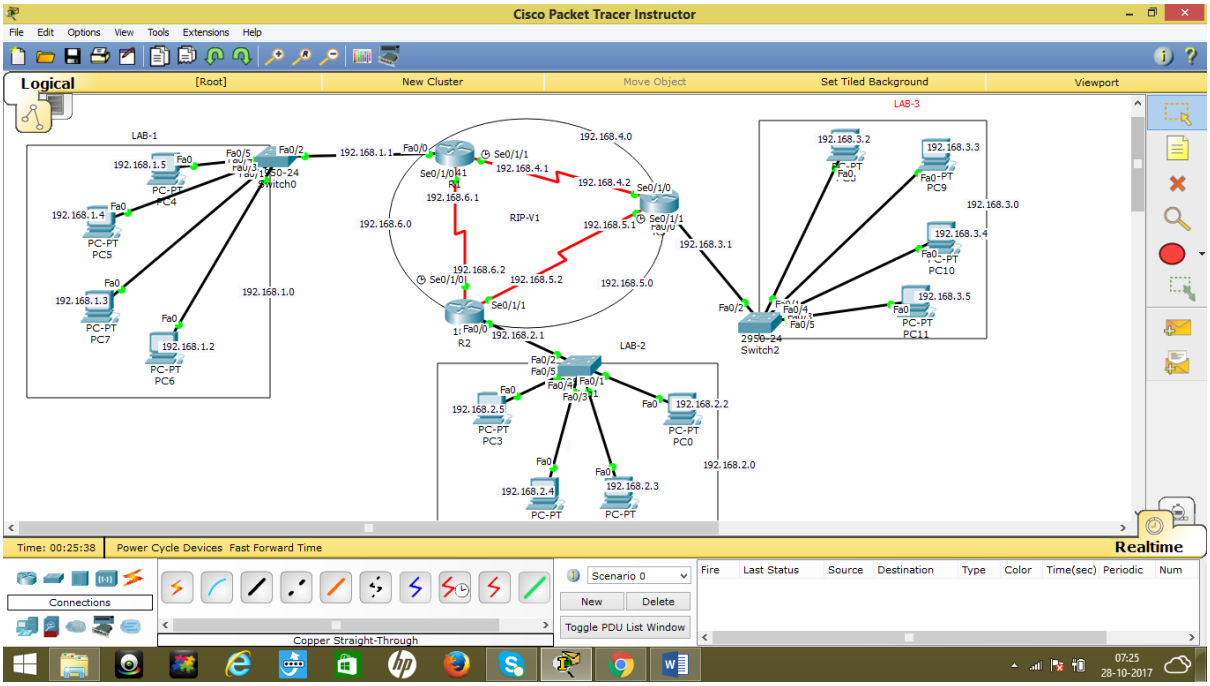

PC6
Physical
Config
Desktop
Software/Services
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ipconfig
FastEthernet0 Connection:(default port)
Link-local IPv6 Address.....: FE80::201:96FF:FE6E:EAA9
IP Address.....: 192.168.1.2
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 192.168.1.1
PC>ping 192.168.3.2
Pinging 192.168.3.2 with 32 bytes of data:
Reply from 192.168.3.2: bytes=32 time=2ms TTL=126
Reply from 192.168.3.2: bytes=32 time=1ms TTL=126
Reply from 192.168.3.2: bytes=32 time=2ms TTL=126
Reply from 192.168.3.2: bytes=32 time=2ms TTL=126
Ping statistics for 192.168.3.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 2ms, Average = 1ms
PC>
Logical
Set Tiled Background
Viewport
192.168.3.2
PC-PT PC9
192.168.3.0
PC-PT PC10
PC-PT PC11
Fa0/1
2950-24 Switch2
PC-PT PC5
PC-PT PC7
Time: 00:22:17
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
07:19
28-10-2017

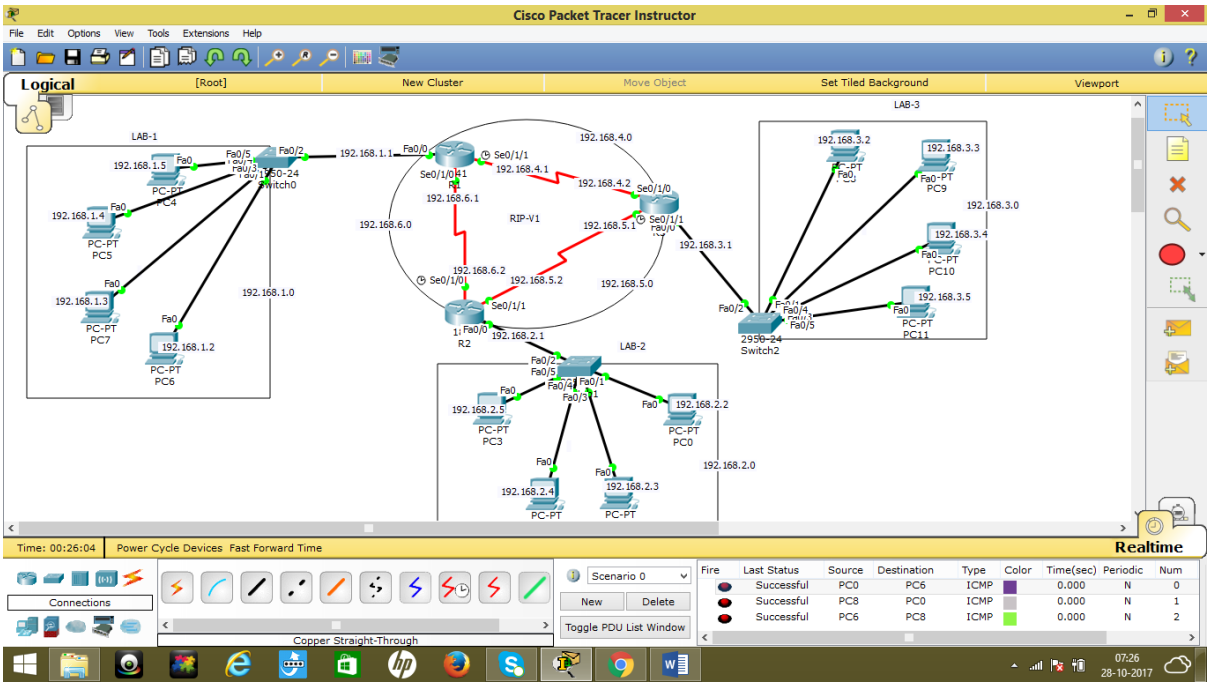

Cisco Packet Tracer Instructor
PC0
Physical
Config
Desktop
Software/Services
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ipconfig
FastEthernet0 Connection:(default port)
Link-local IPv6 Address.....: FE80::260:5CFF:FE18:AD6A
IP Address.....: 192.168.2.2
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 192.168.2.1
PC>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time=2ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=2ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 2ms, Average = 1ms
PC>
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC-PT PC4
PC-PT PC5
PC-PT PC7
PC-PT PC6
192.168.1.0
192.168.1.2
192.168.3.0
Time: 00:22:42
Power Cycle Devices Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type
Color
Time(sec)
Periodic
Num
07:19
28-10-2017

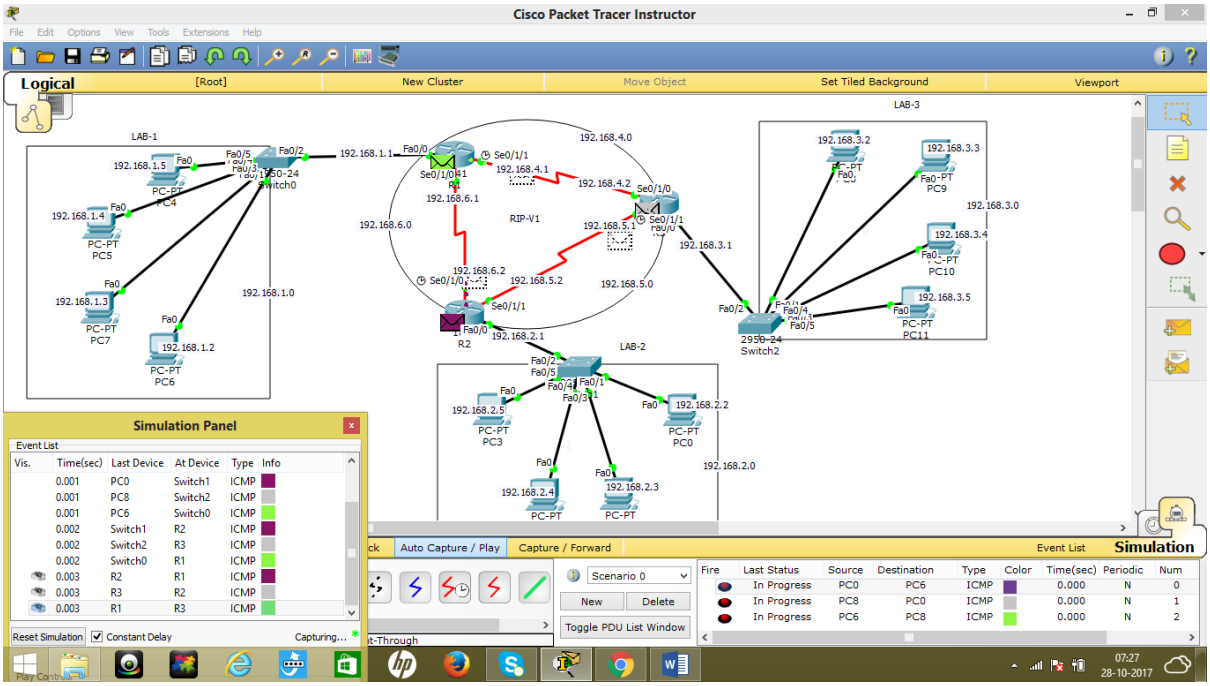

Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC8
Physical
Config
Desktop
Software/Services
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Request timed out.
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Reply from 192.168.1.2: bytes=32 time=1ms TTL=126
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
PC>ipconfig
FastEthernet0 Connection:(default port)
Link-local IPv6 Address.....: FE80::209:7CFF:FE32:6E9B
IP Address.....: 192.168.3.2
Subnet Mask.....: 255.255.255.0
Default Gateway.....: 192.168.3.1
PC>
192.168.1.0
192.168.3.0
Time: 00:22:59
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window

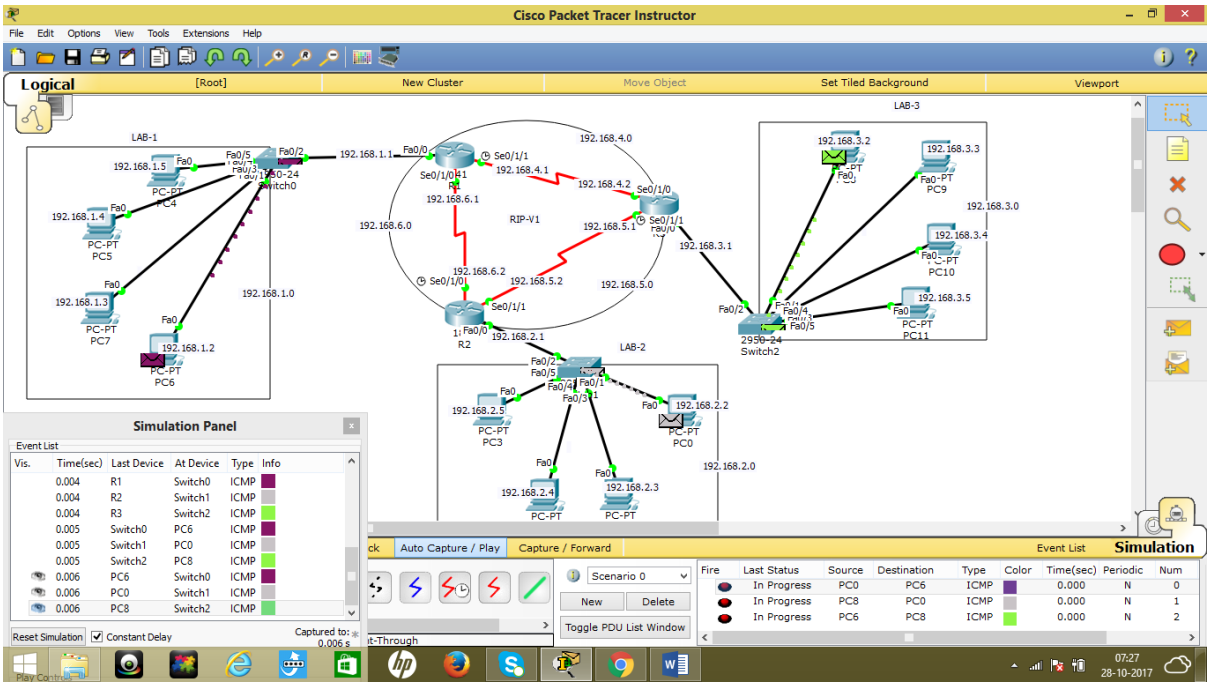
OUTPUT:


Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
192.168.1.0
192.168.2.0
192.168.3.0
192.168.4.0
192.168.6.0
192.168.1.1
192.168.4.1
192.168.4.2
192.168.6.1
192.168.5.1
192.168.6.2
192.168.5.2
192.168.5.0
192.168.3.1
192.168.2.1
192.168.1.2
192.168.2.2
192.168.3.2
Switch0
Switch1
Switch2
R1
R2
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC9
PC10
PC11
Time: 00:23:11
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num


Cisco Packet Tracer Instructor
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
LAB-1
LAB-2
LAB-3
192.168.1.0
192.168.2.0
192.168.3.0
192.168.4.0
192.168.6.0
RIP-V1
R1
R2
Switch0
Switch2
PC0
PC3
PC4
PC5
PC6
PC7
PC9
PC10
PC11
Time: 00:25:38 Power Cycle Devices Fast Forward Time Realtime
Connections
Copper Straight-Through
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num
07:25
28-10-2017


Cisco Packet Tracer Instructor
File Edit Options View Tools Extensions Help
Logical [Root] New Cluster Move Object Set Tiled Background Viewport
LAB-1
LAB-2
LAB-3
192.168.1.0
192.168.2.0
192.168.3.0
192.168.4.0
192.168.6.0
RIP-V1
R1
R2
Switch0
Switch2
PC0
PC3
PC4
PC5
PC6
PC7
PC9
PC10
PC11
Time: 00:26:04 Power Cycle Devices Fast Forward Time Realtime
Connections
Copper Straight-Through
Scenario 0
New Delete
Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(sec) Periodic Num
Successful PC0 PC6 ICMP 0.000 N 0
Successful PC8 PC0 ICMP 0.000 N 1
Successful PC6 PC8 ICMP 0.000 N 2
07:26
28-10-2017





OUTCOMES:

The students can understand the concept of RIP V1 using packet tracer.

EX.10: THE ROUTING INFORMATION PROTOCOL VERSION-2 (RIP-V2)

AIM:

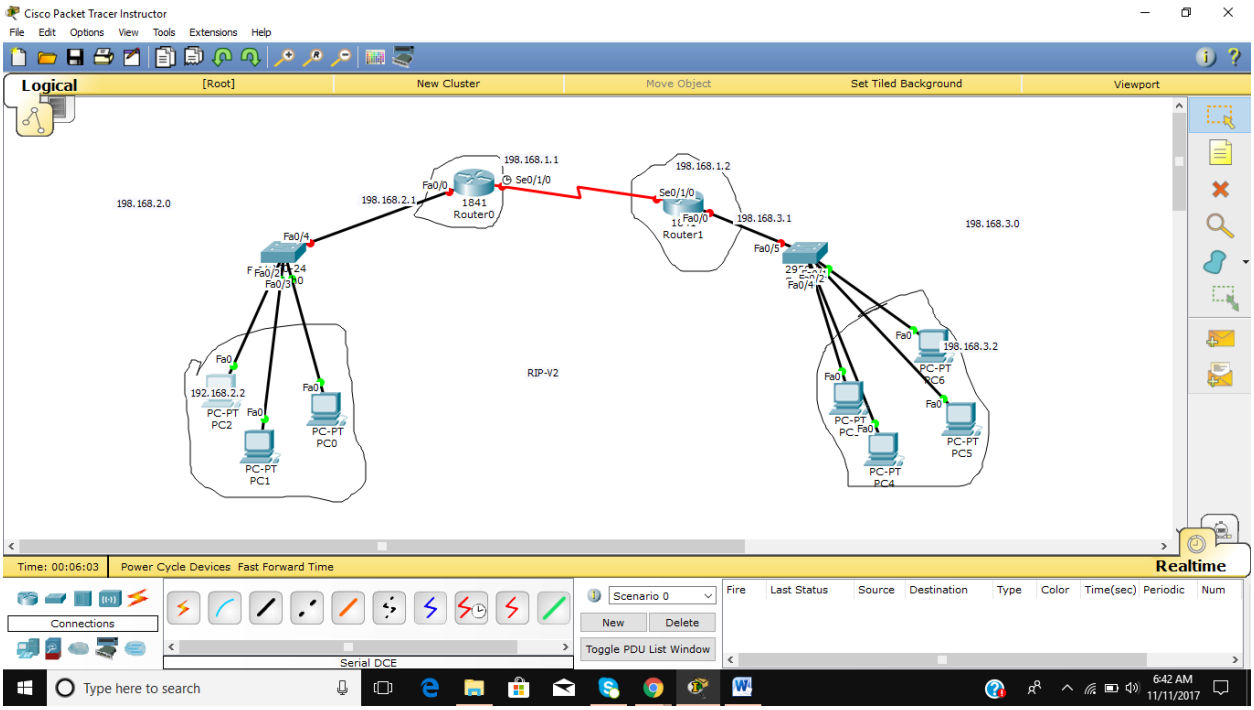
Create a network connection between two different LANs using RIP –V2.

APPARATUS:

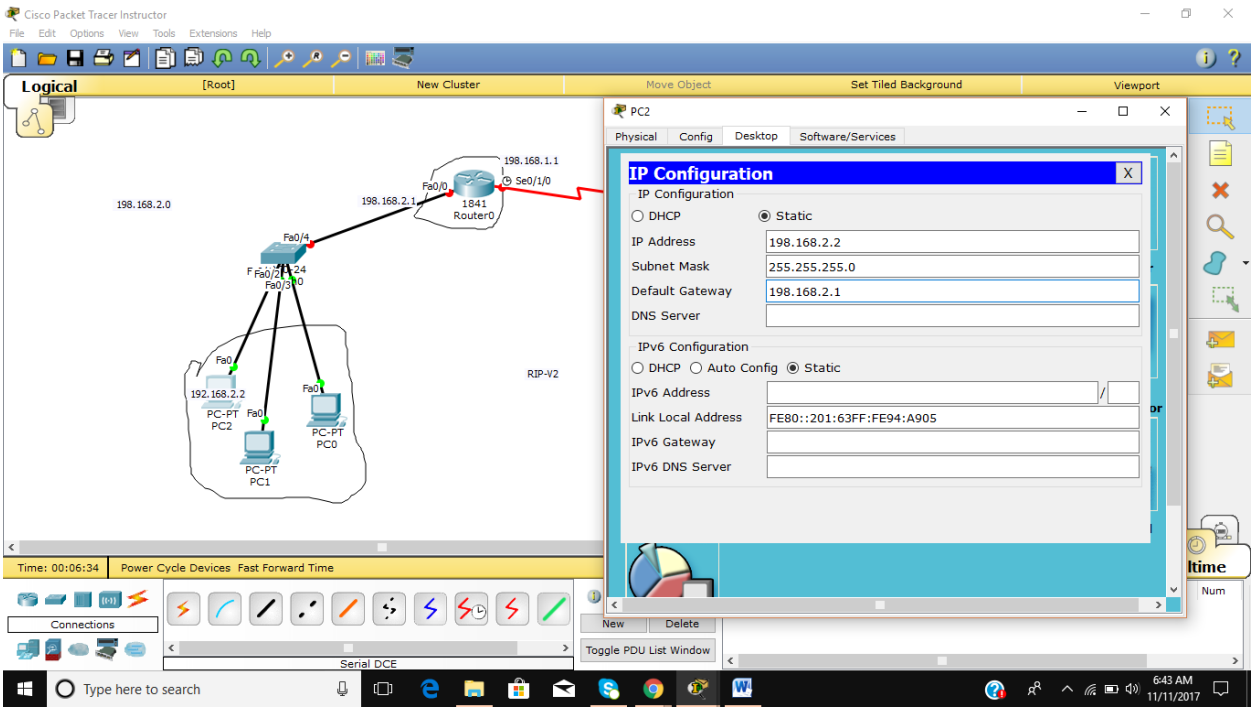
1. Personal Computer
2. Cisco Packet Tracer

DESCRIPTION/PROCEDURE

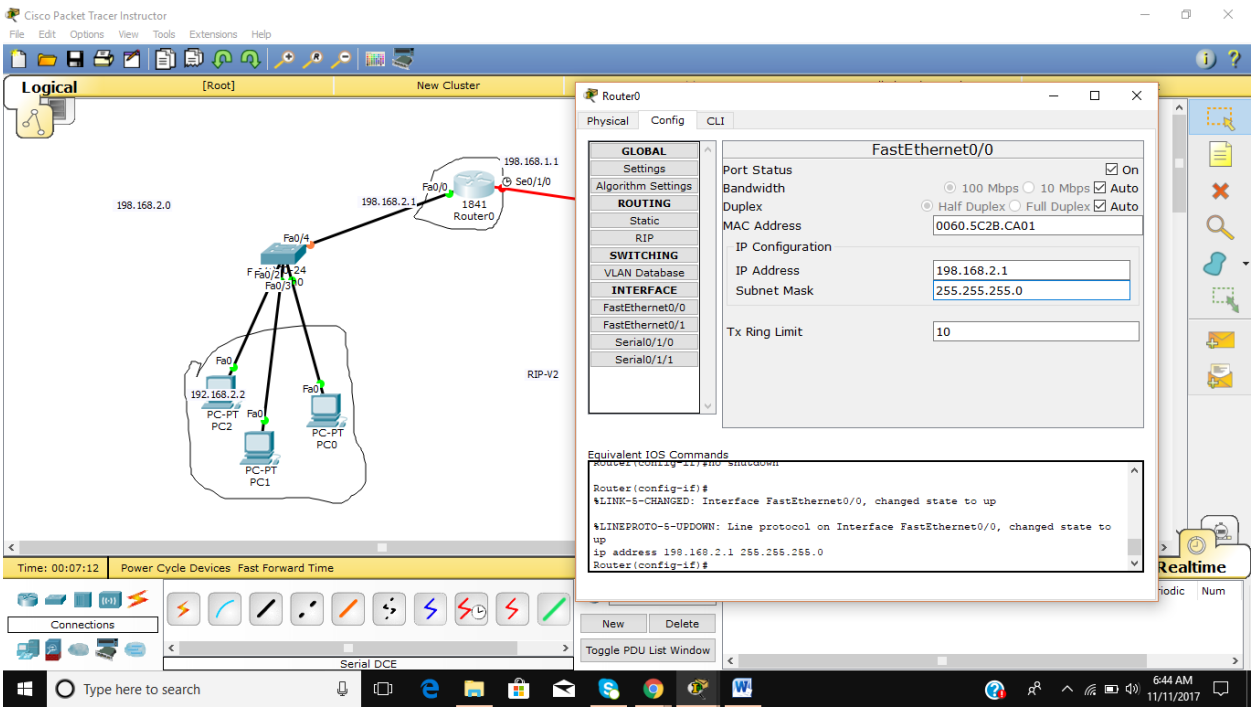
1. Create the LAN connections as shown in the figure



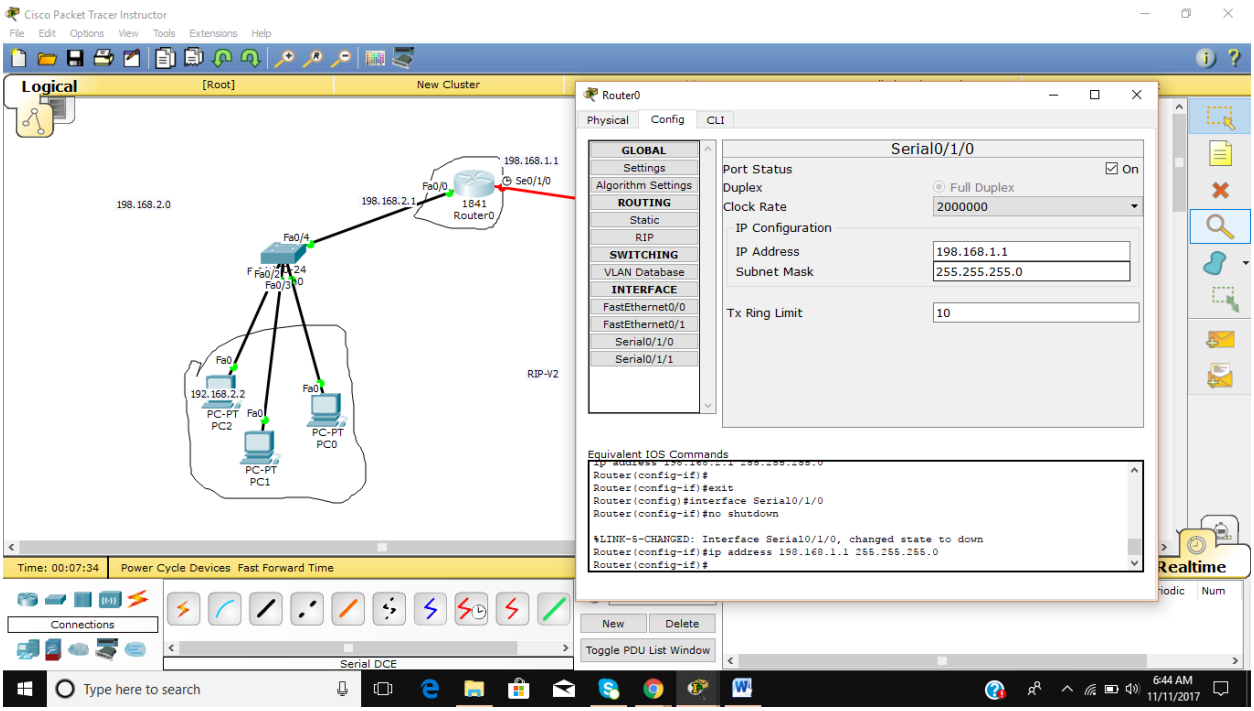
2. Set the IP address for the PC as shown in the figure



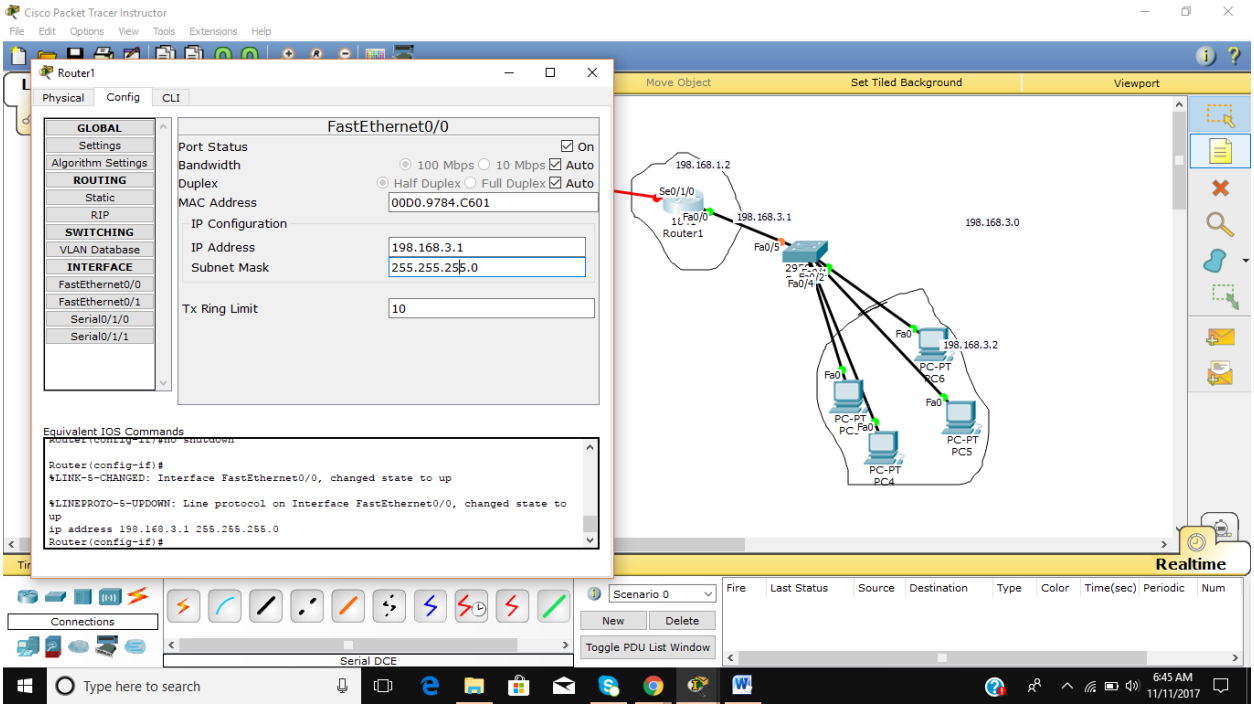
3. Open the router0 and set the IP address for the Fast Ethernet port as shown in the figure



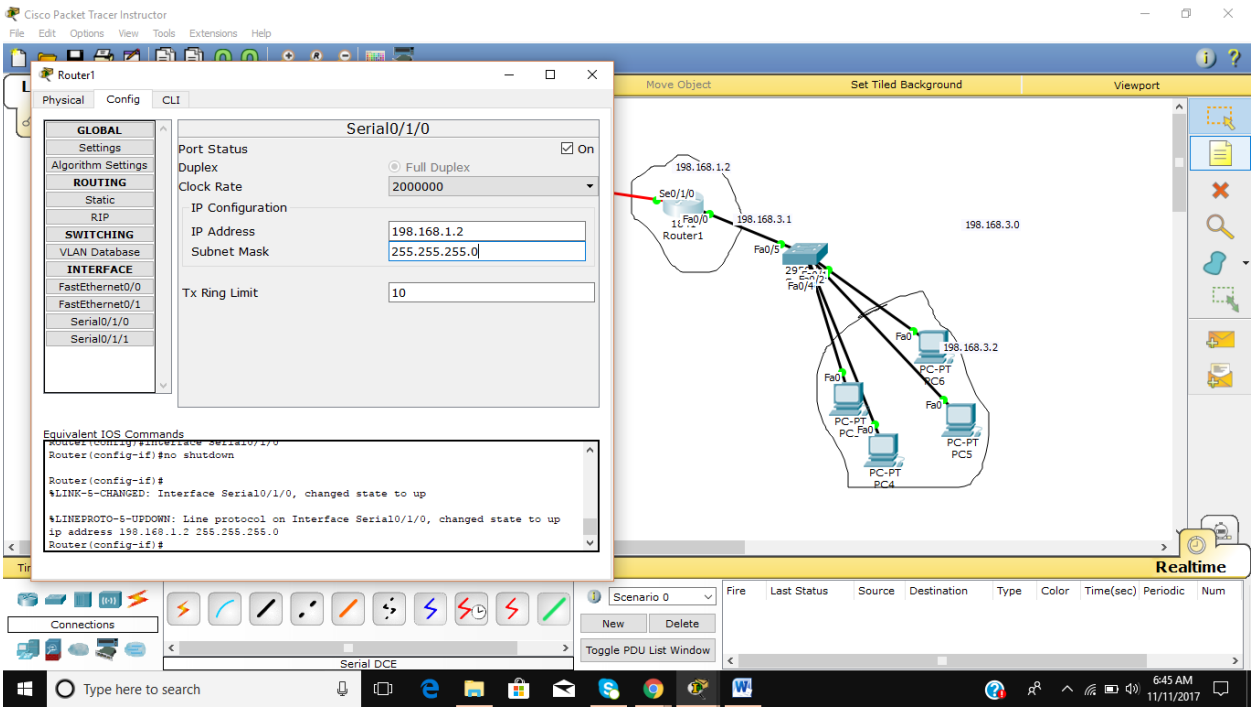
4. Open the router0 and set the IP address for the Serial port as shown in the figure



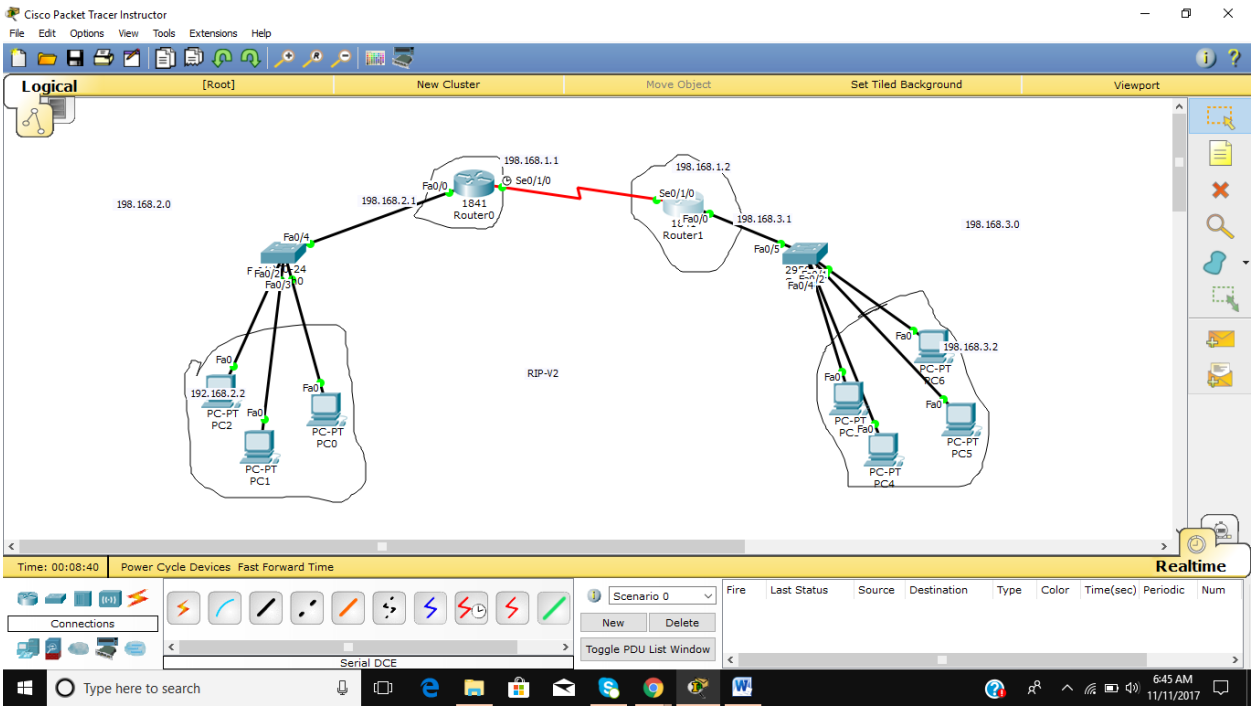
5. Open the router1 and set the IP address for the Fast Ethernet port as shown in the figure



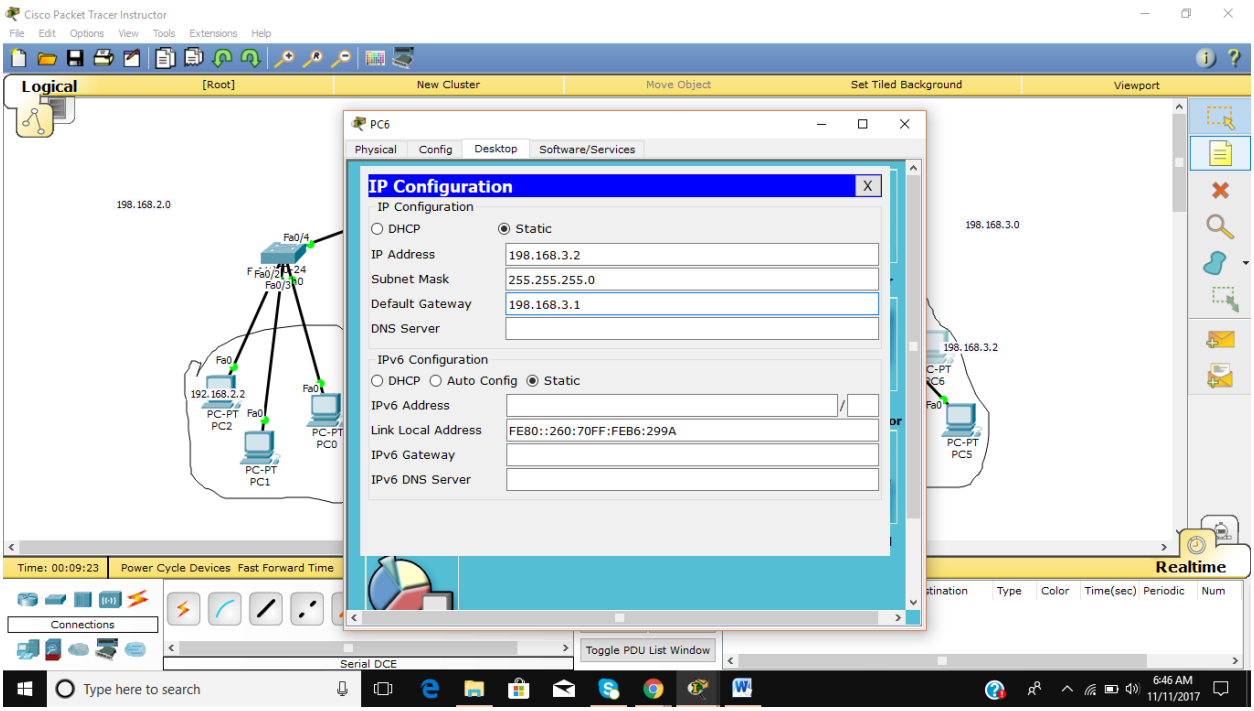
6. Open the router1 and set the IP address for the serial port as shown in the figure



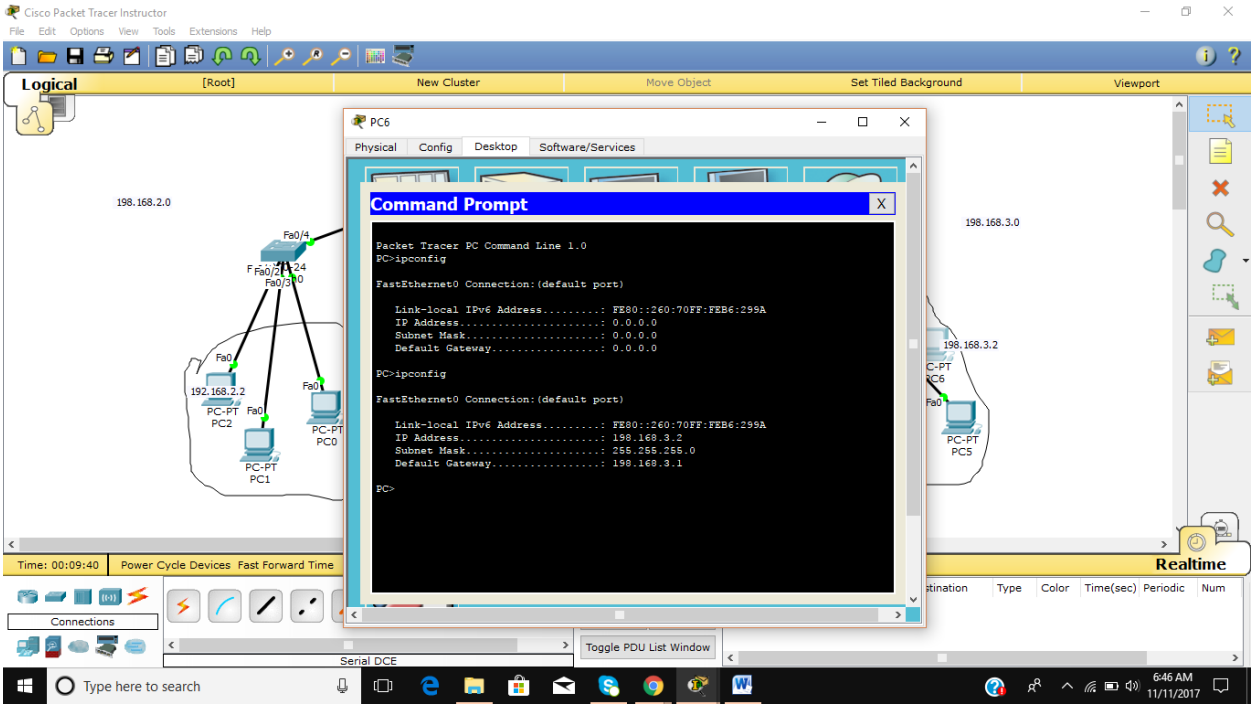
7. Check the status of the connections

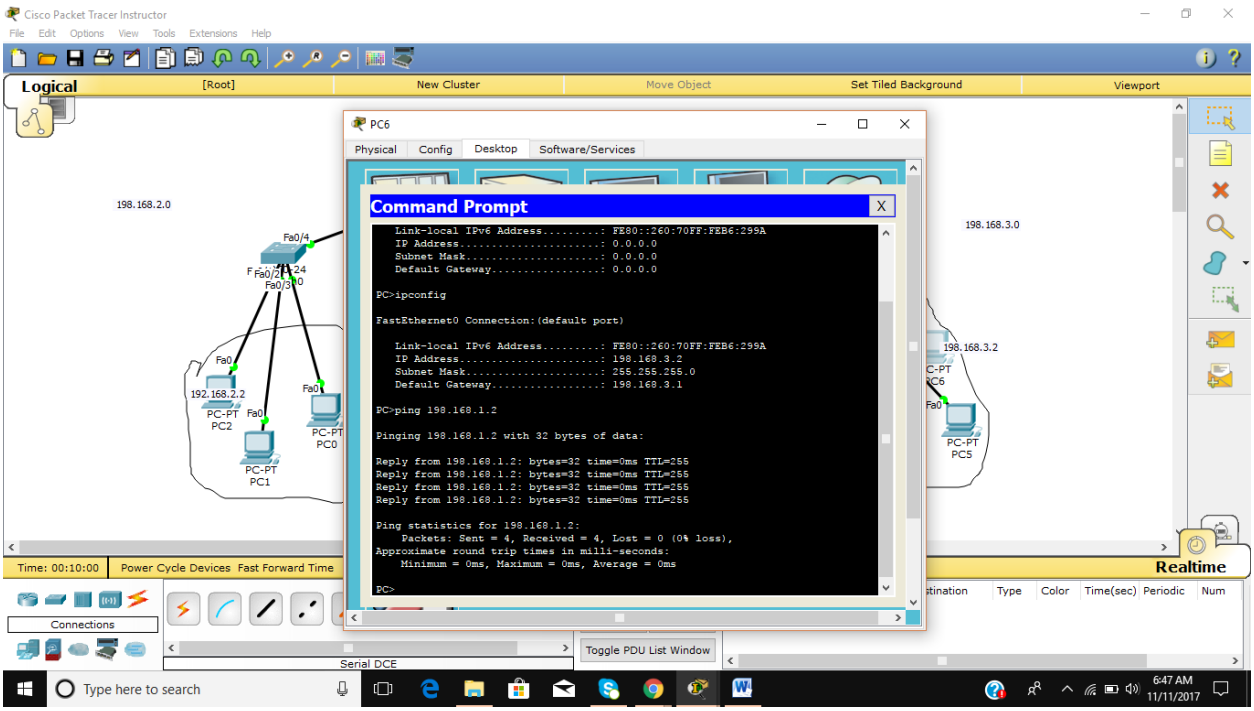


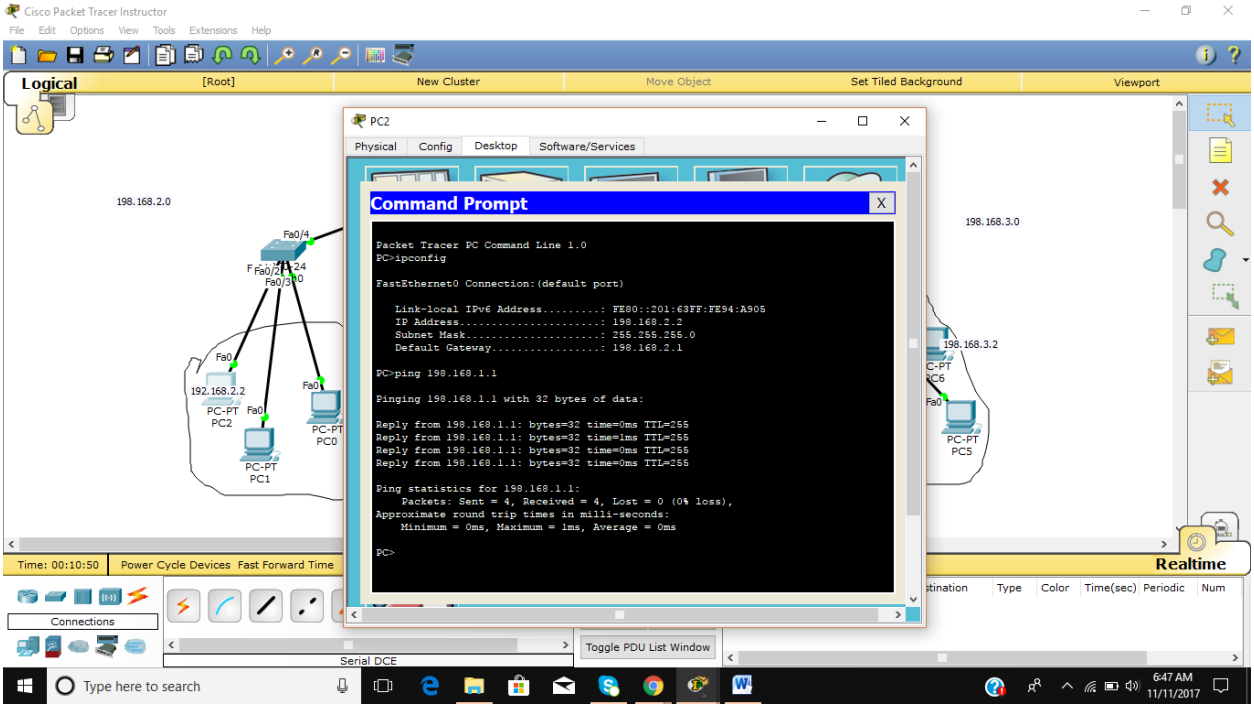
8. Set the IP address for the PC as shown in the figure.



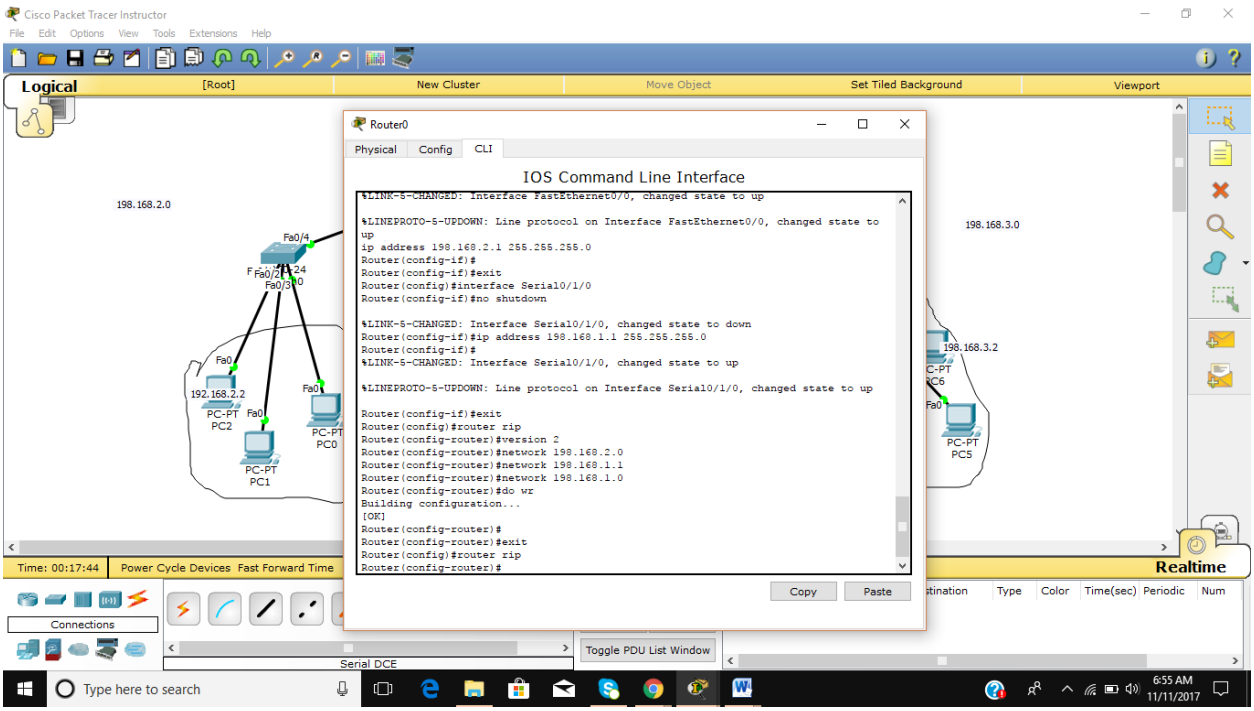
9. Check the status of the connections in source and destination PCs using network commands as shown in the figure



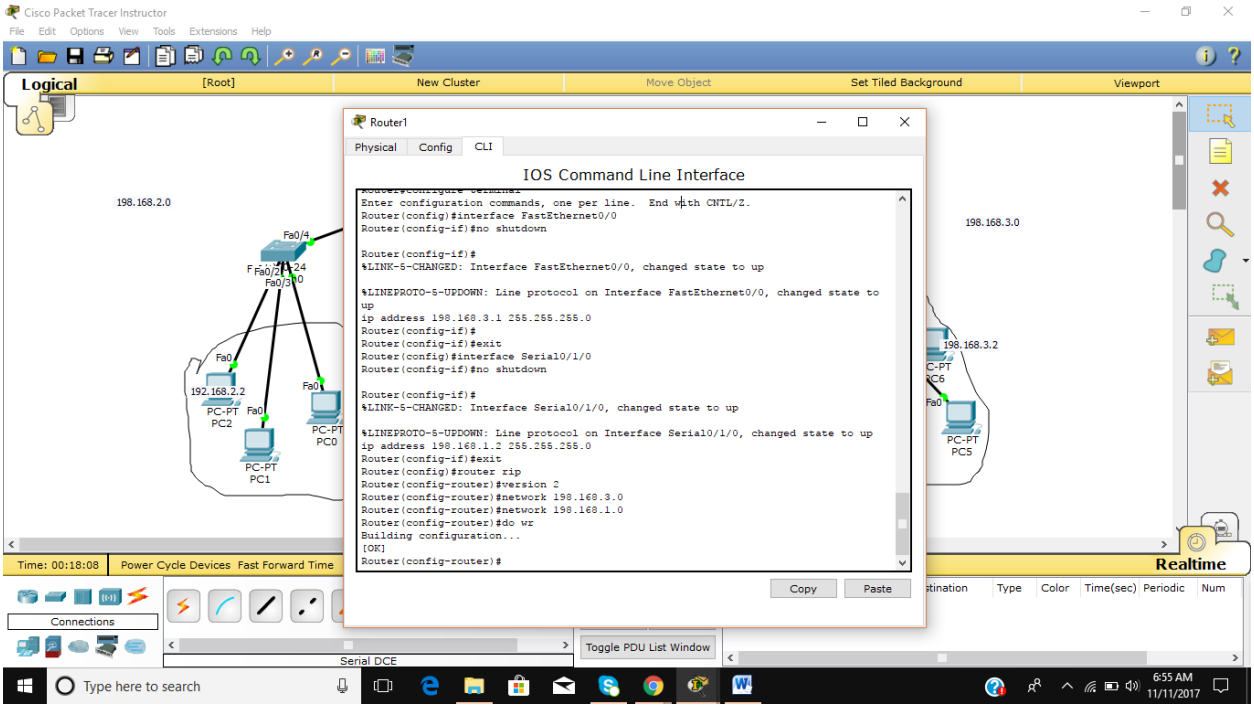




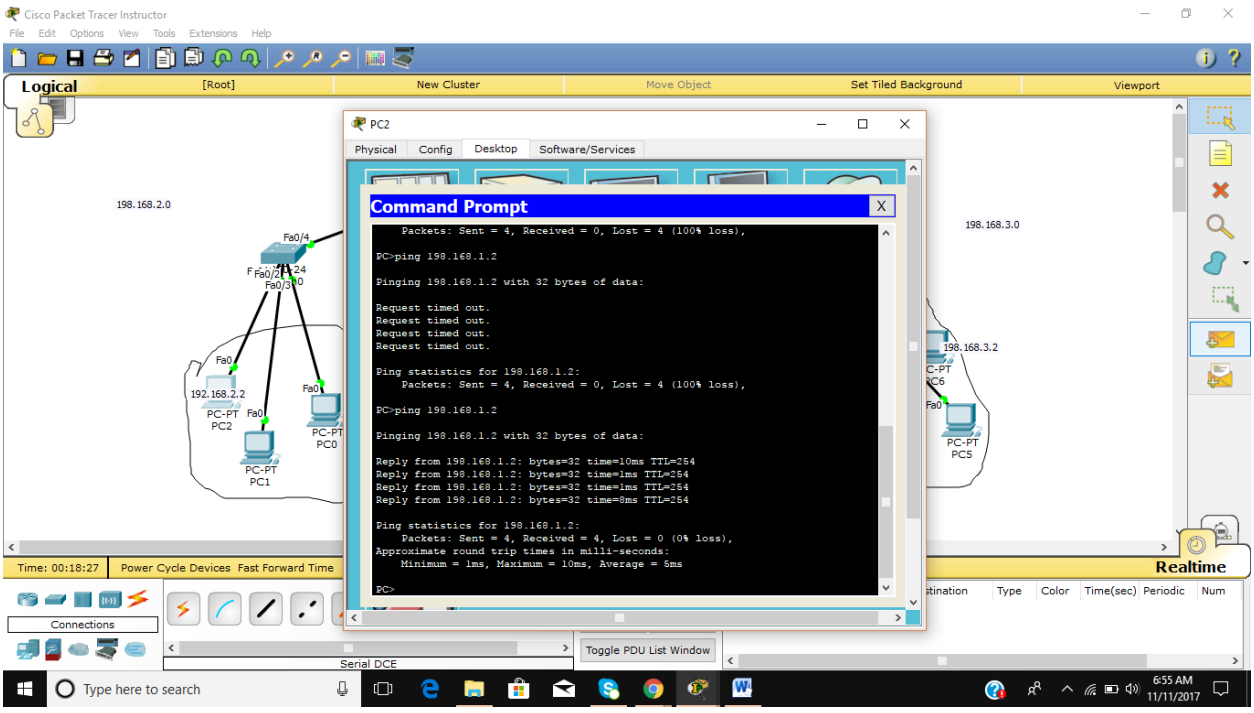
10. Configure the RIP-V2 in router0 as shown in the figure

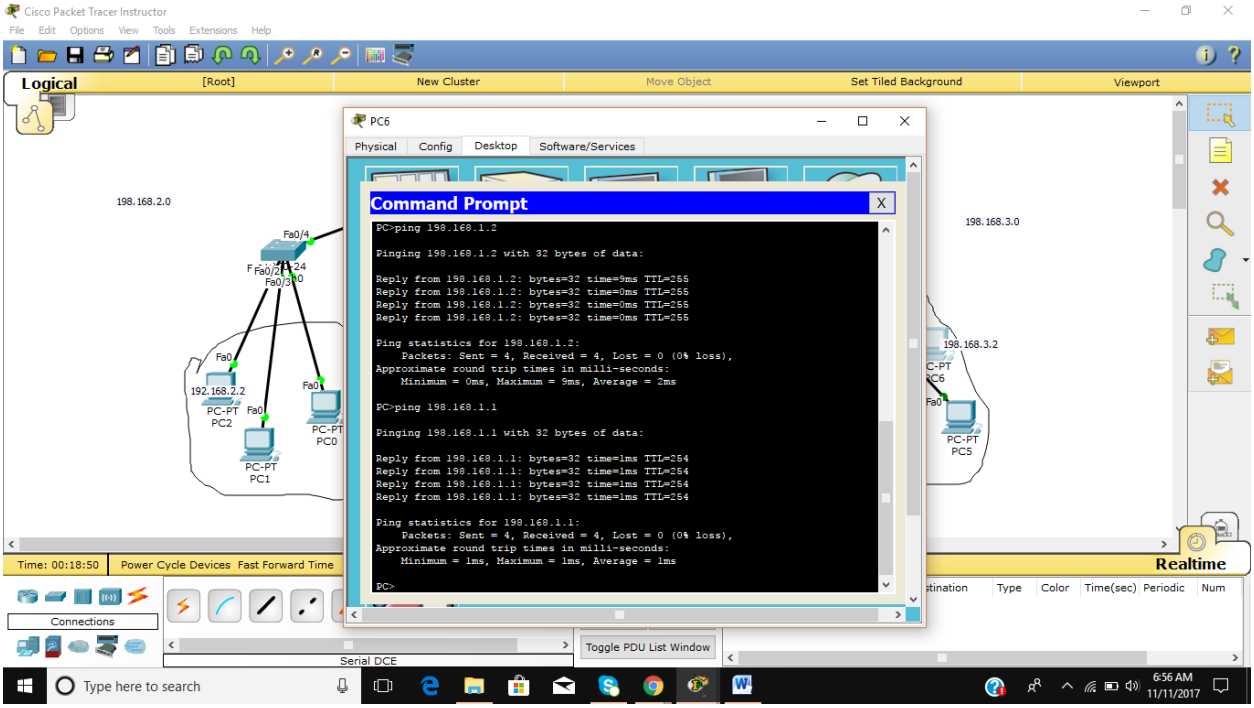


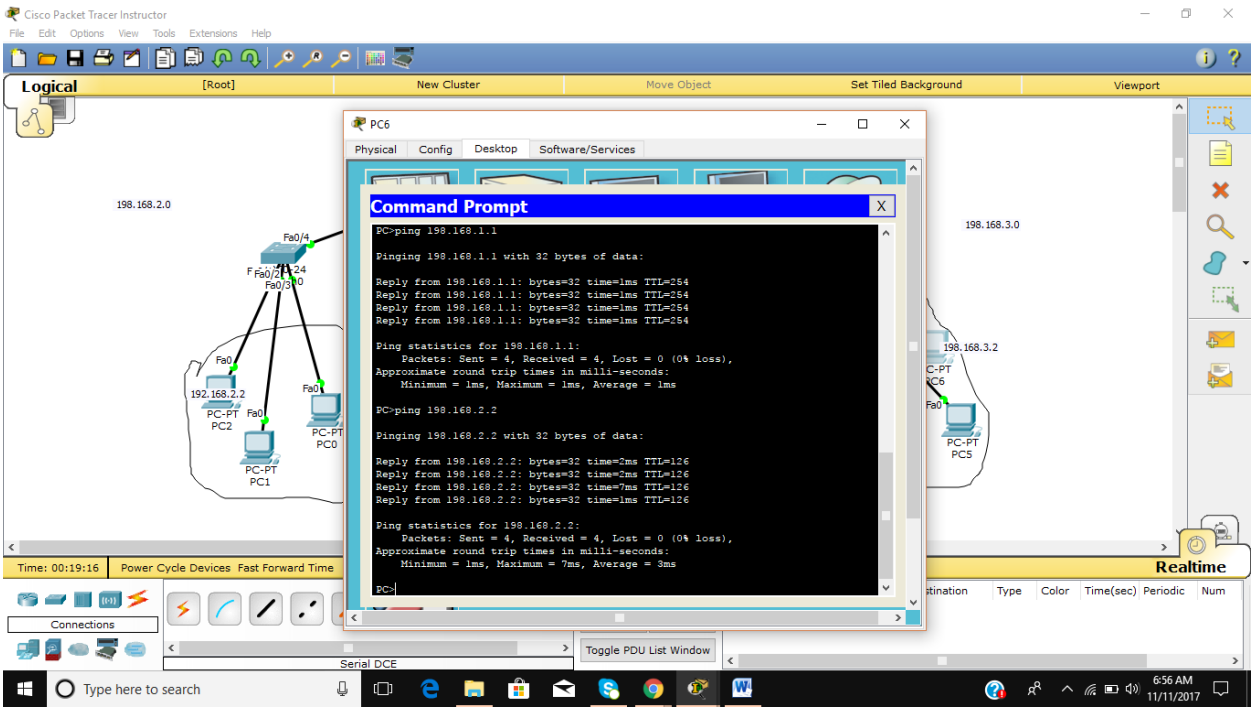
11. Configure the RIP-V2 in router1 as shown in the figure

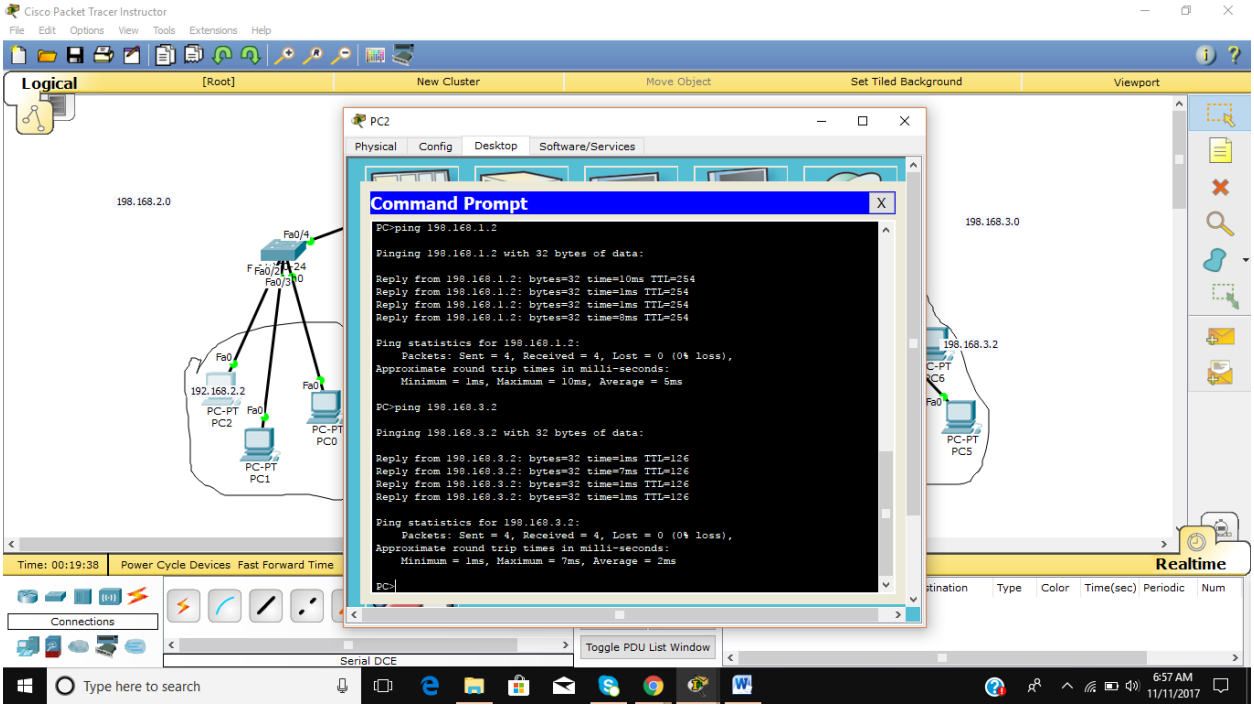


12. Check the status of the connections in source and destination PC using network commands as shown in the figure

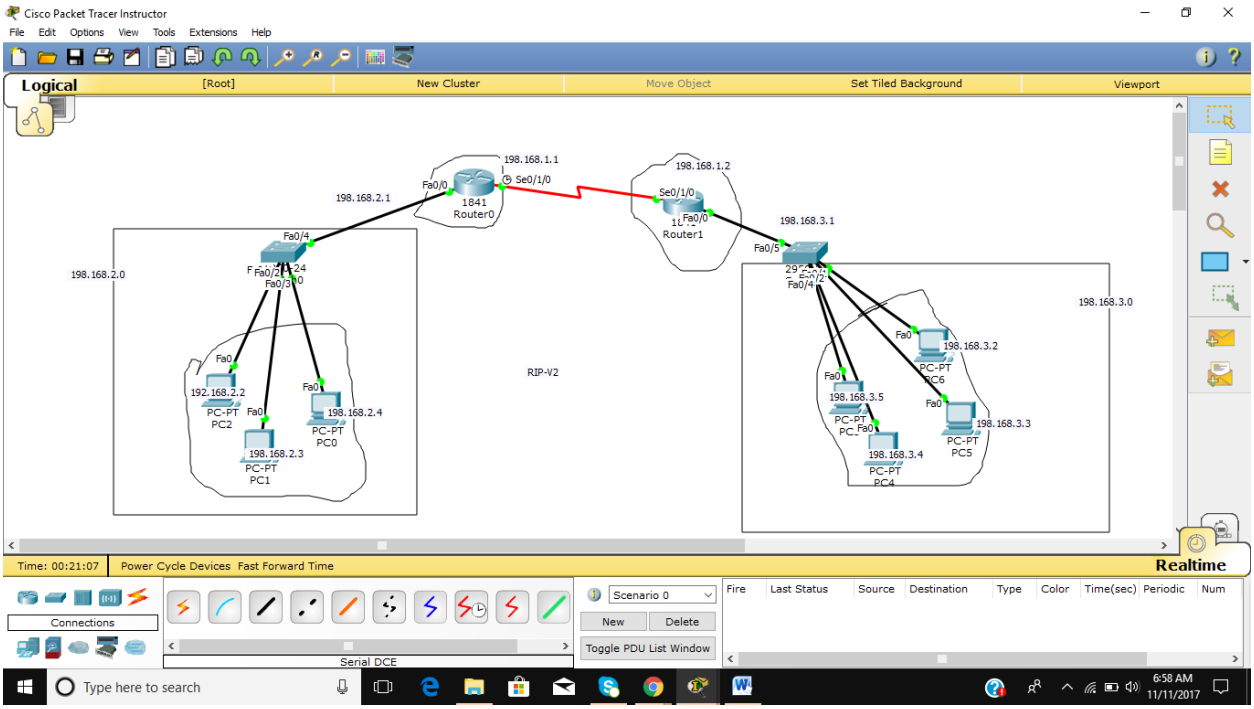

Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC2
Physical
Config
Desktop
Software/Services
Command Prompt
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 198.168.1.2
Pinging 198.168.1.2 with 32 bytes of data:
Request timed out.
Request timed out.
Request timed out.
Request timed out.
Ping statistics for 198.168.1.2:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
PC>ping 198.168.1.2
Pinging 198.168.1.2 with 32 bytes of data:
Reply from 198.168.1.2: bytes=32 time=10ms TTL=254
Reply from 198.168.1.2: bytes=32 time=1ms TTL=254
Reply from 198.168.1.2: bytes=32 time=1ms TTL=254
Reply from 198.168.1.2: bytes=32 time=8ms TTL=254
Ping statistics for 198.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 5ms
PC>
198.168.2.0
198.168.3.0
192.168.2.2
PC-PT PC2
PC-PT PC0
PC-PT PC1
PC-PT PC5
Time: 00:18:27
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type here to search
6:55 AM
11/11/2017

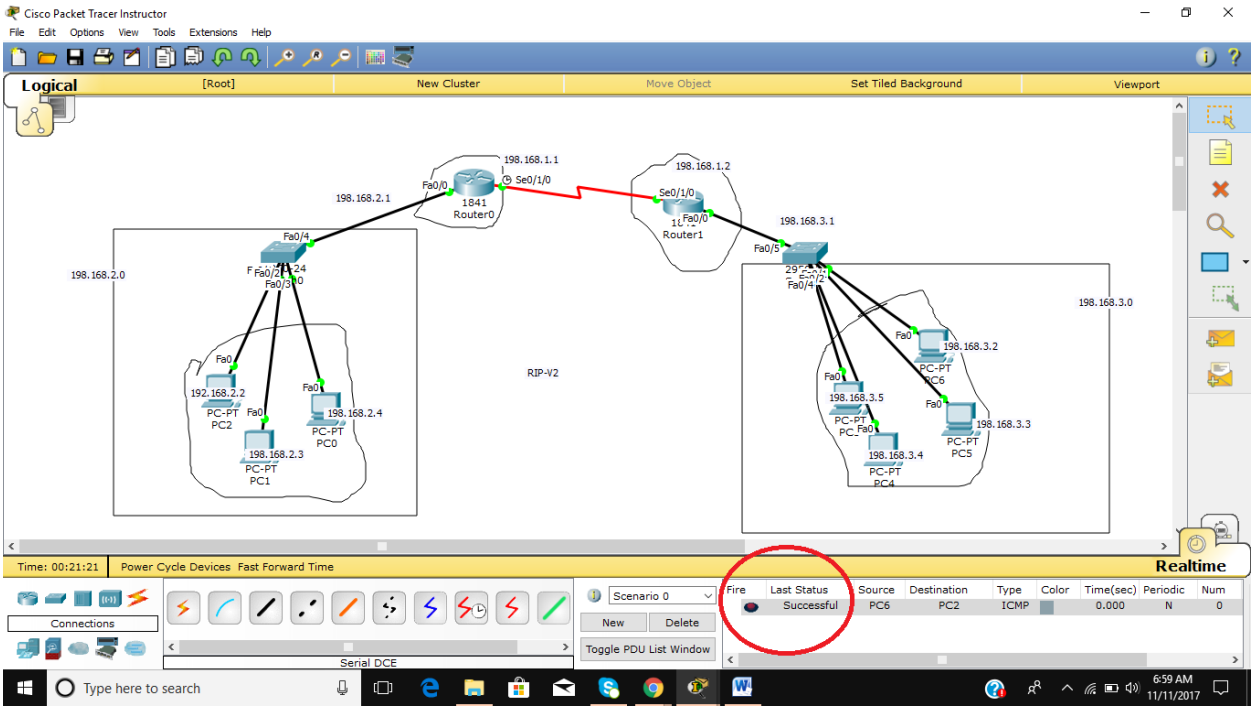

Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC6
Physical
Config
Desktop
Software/Services
Command Prompt
PC>ping 198.168.1.2
Pinging 198.168.1.2 with 32 bytes of data:
Reply from 198.168.1.2: bytes=32 time=9ms TTL=255
Reply from 198.168.1.2: bytes=32 time=0ms TTL=255
Reply from 198.168.1.2: bytes=32 time=0ms TTL=255
Reply from 198.168.1.2: bytes=32 time=0ms TTL=255
Ping statistics for 198.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 9ms, Average = 2ms
PC>ping 198.168.1.1
Pinging 198.168.1.1 with 32 bytes of data:
Reply from 198.168.1.1: bytes=32 time=1ms TTL=254
Reply from 198.168.1.1: bytes=32 time=1ms TTL=254
Reply from 198.168.1.1: bytes=32 time=1ms TTL=254
Reply from 198.168.1.1: bytes=32 time=1ms TTL=254
Ping statistics for 198.168.1.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
PC>
198.168.2.0
198.168.3.0
192.168.2.2
PC-PT PC2
PC-PT PC0
PC-PT PC1
PC-PT PC5
Time: 00:18:50
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type here to search
6:56 AM
11/11/2017


Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC6
Physical
Config
Desktop
Software/Services
Command Prompt
PC>ping 198.168.1.1
Pinging 198.168.1.1 with 32 bytes of data:
Reply from 198.168.1.1: bytes=32 time=1ms TTL=254
Reply from 198.168.1.1: bytes=32 time=1ms TTL=254
Reply from 198.168.1.1: bytes=32 time=1ms TTL=254
Reply from 198.168.1.1: bytes=32 time=1ms TTL=254
Ping statistics for 198.168.1.1:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 1ms, Average = 1ms
PC>ping 198.168.2.2
Pinging 198.168.2.2 with 32 bytes of data:
Reply from 198.168.2.2: bytes=32 time=2ms TTL=126
Reply from 198.168.2.2: bytes=32 time=2ms TTL=126
Reply from 198.168.2.2: bytes=32 time=7ms TTL=126
Reply from 198.168.2.2: bytes=32 time=1ms TTL=126
Ping statistics for 198.168.2.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 7ms, Average = 3ms
PC>
198.168.2.0
198.168.3.0
192.168.2.2
PC-PT PC2
PC-PT PC1
PC-PT PC0
PC-PT PC5
Time: 00:19:16
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type here to search
6:56 AM
11/11/2017


Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
PC2
Physical
Config
Desktop
Software/Services
Command Prompt
PC>ping 198.168.1.2
Pinging 198.168.1.2 with 32 bytes of data:
Reply from 198.168.1.2: bytes=32 time=10ms TTL=254
Reply from 198.168.1.2: bytes=32 time=1ms TTL=254
Reply from 198.168.1.2: bytes=32 time=1ms TTL=254
Reply from 198.168.1.2: bytes=32 time=8ms TTL=254
Ping statistics for 198.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 10ms, Average = 5ms
PC>ping 198.168.3.2
Pinging 198.168.3.2 with 32 bytes of data:
Reply from 198.168.3.2: bytes=32 time=1ms TTL=126
Reply from 198.168.3.2: bytes=32 time=7ms TTL=126
Reply from 198.168.3.2: bytes=32 time=1ms TTL=126
Reply from 198.168.3.2: bytes=32 time=1ms TTL=126
Ping statistics for 198.168.3.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 1ms, Maximum = 7ms, Average = 2ms
PC>
198.168.2.0
198.168.3.0
192.168.2.2
PC-PT PC2
PC-PT PC1
PC-PT PC0
PC-PT PC5
Time: 00:19:38
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type here to search
6:57 AM
11/11/2017

OUTPUT:





OUTCOMES:

The students can understand the concept of RIP V2 using packet tracer.

EX.11: CONFIGURATION OF OPEN SHORTEST PATH FIRST (OSPF) PROTOCOL

AIM:

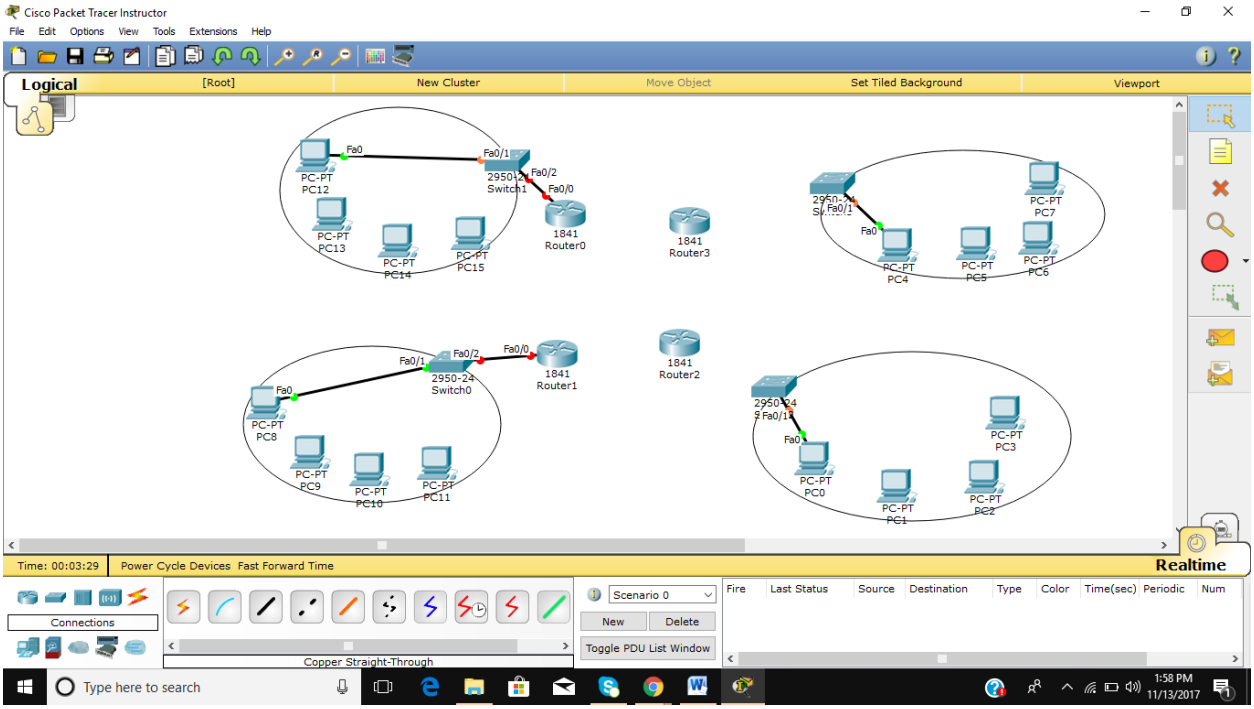
Create a network connection between two different LANs using Open Shortest Path First (OSPF) protocol.

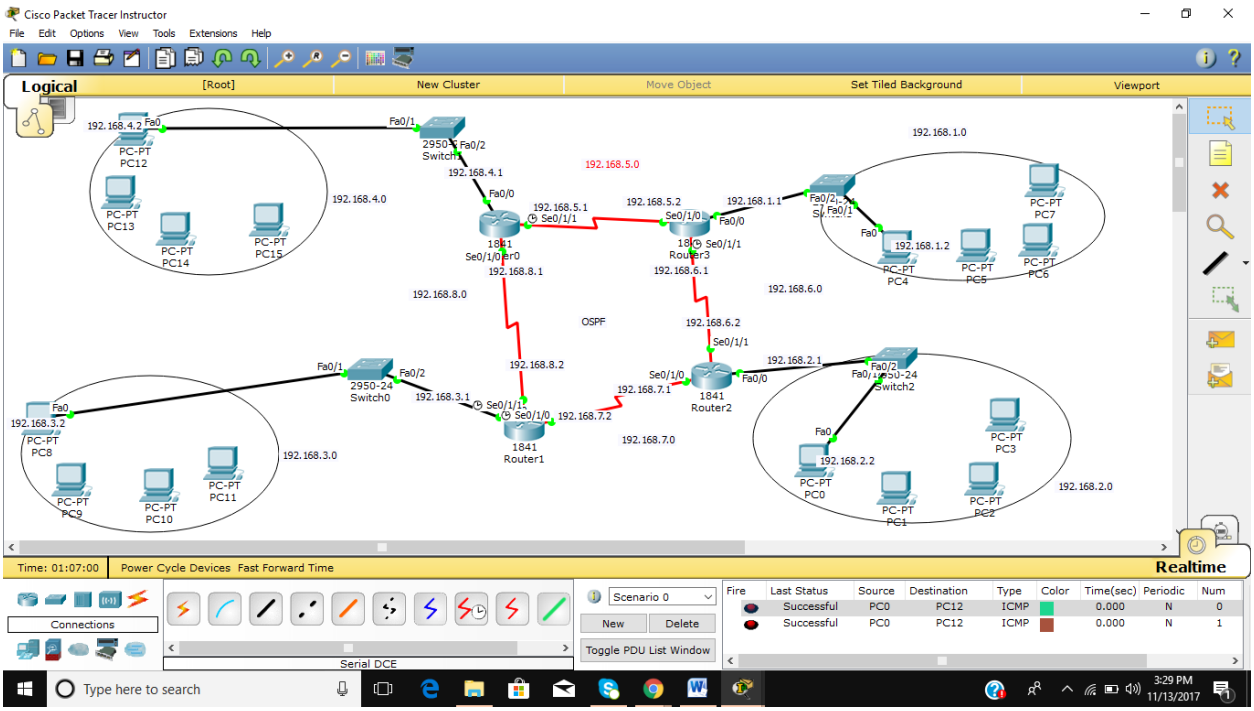
APPARATUS:

1. Personal Computer
2. Cisco Packet Tracer

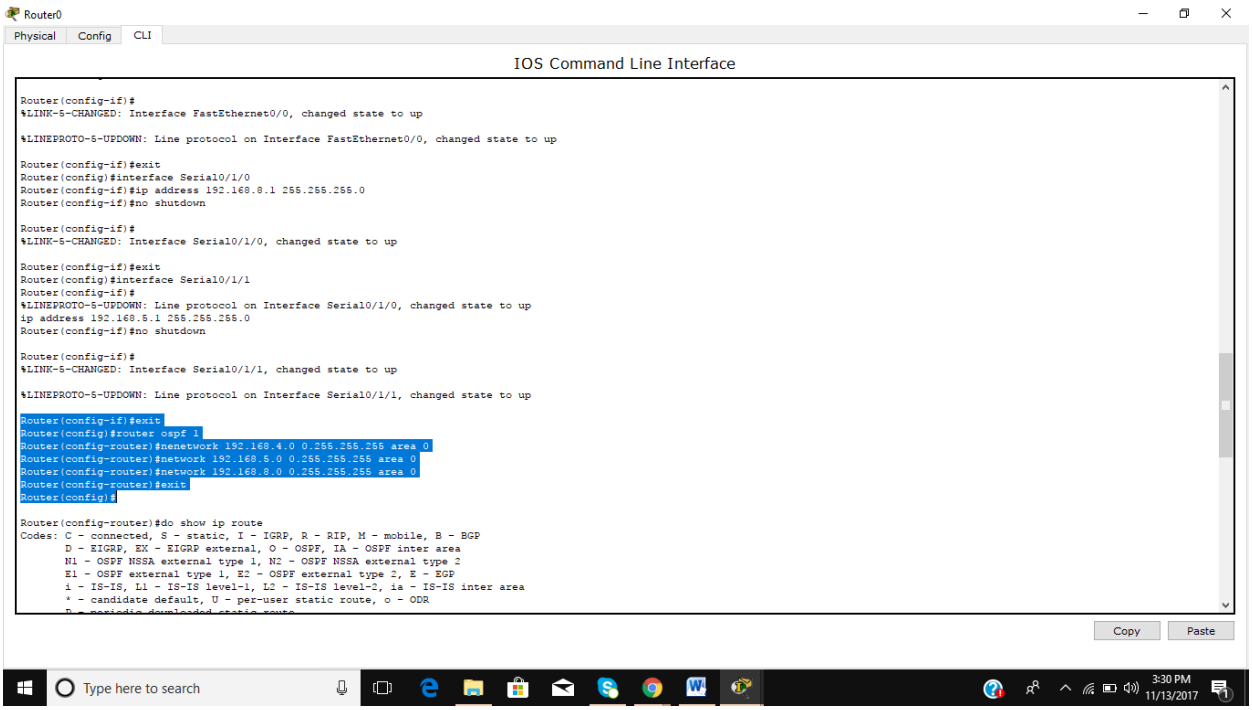
DESCRIPTION/PROCEDURE

1. Create the different LAN connections as shown in the figure

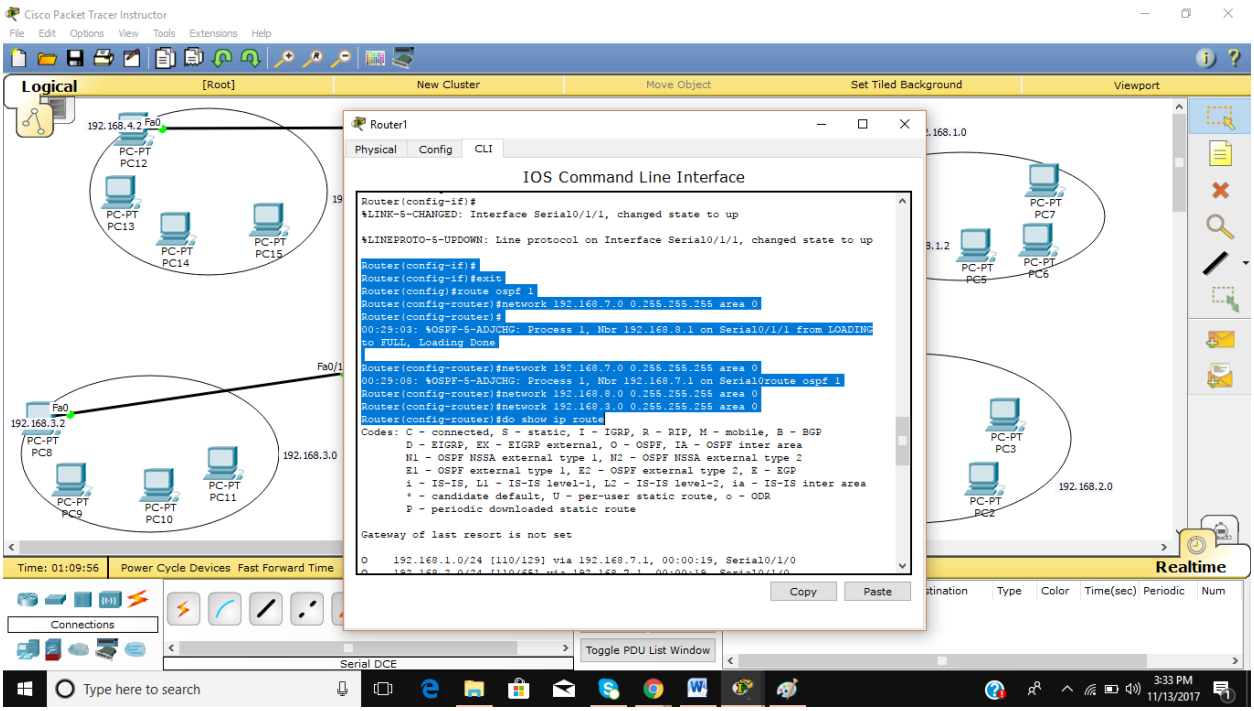


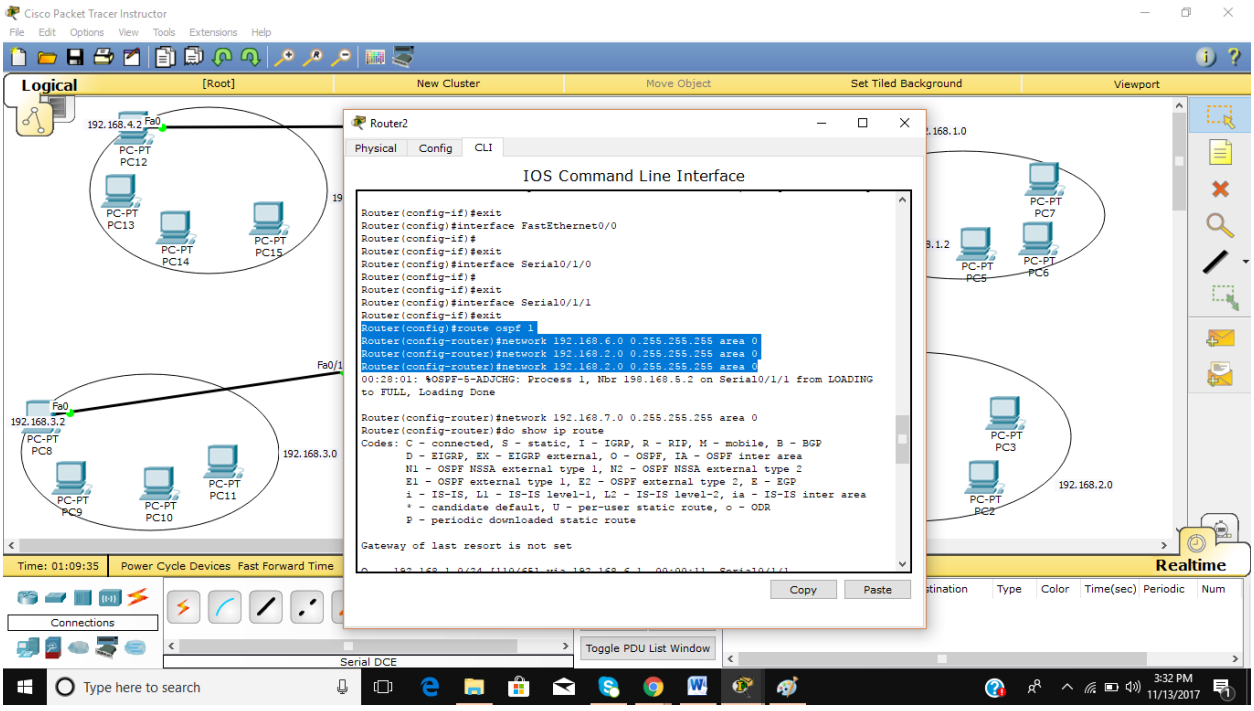


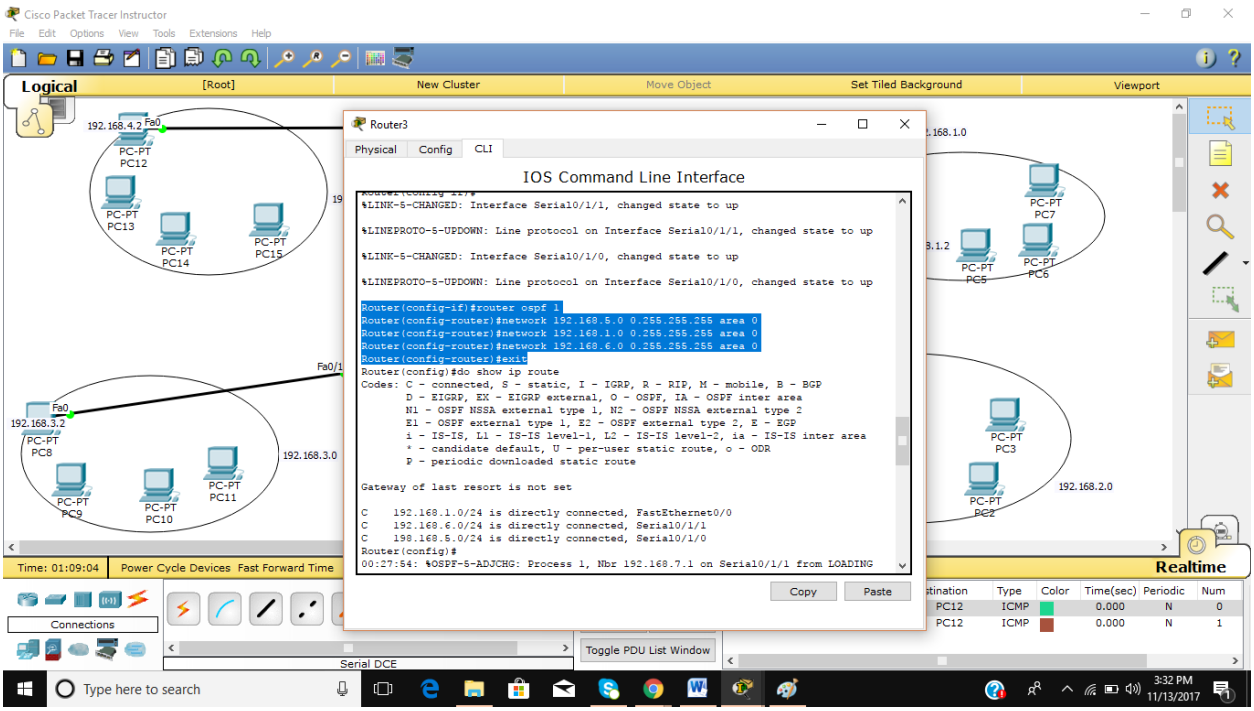
2. Open the router 0 and configure the OSPF as shown in the figure



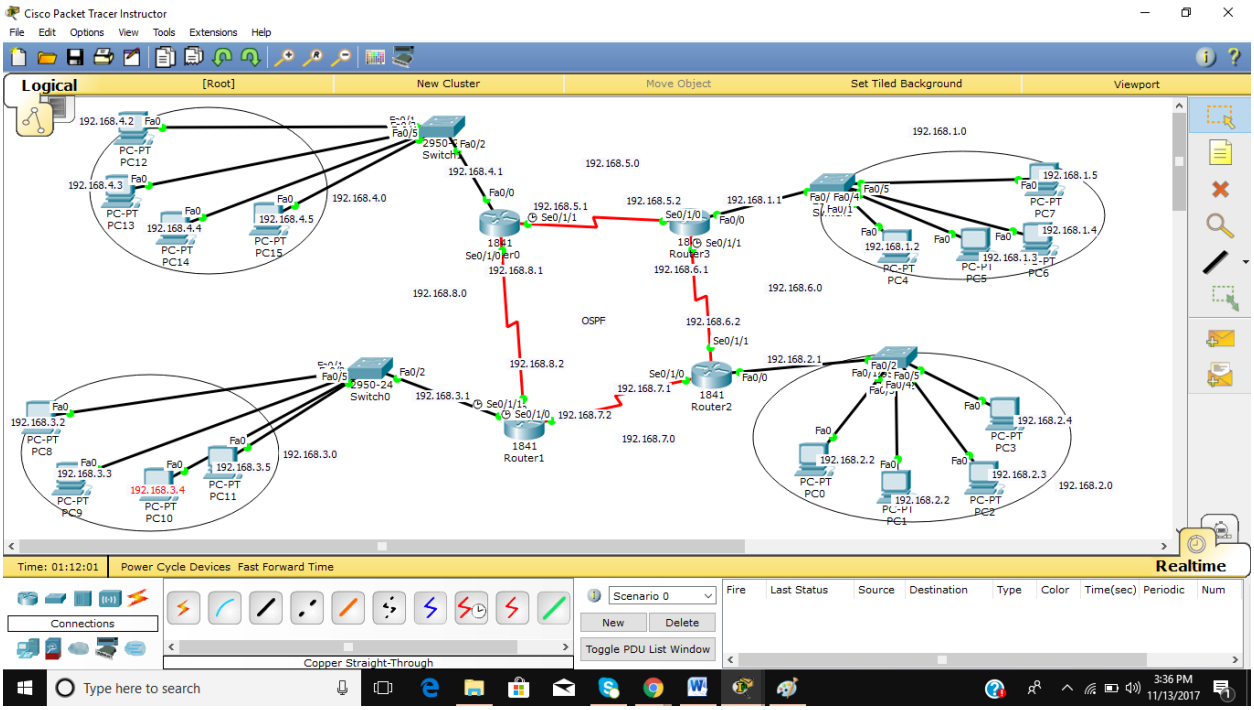
3. Do the same step of 2 in rest of the routers as shown in the figure.


Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router1
Physical
Config
CLI
IOS Command Line Interface
Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
Router(config-if)#
Router(config-if)#exit
Router(config)#route ospf 1
Router(config-router)#network 192.168.7.0 0.255.255.255 area 0
Router(config-router)#
00:29:08: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.8.1 on Serial0/1/1 from LOADING to FULL, Loading Done
Router(config-router)#network 192.168.7.0 0.255.255.255 area 0
00:29:08: %OSPF-5-ADJCHG: Process 1, Nbr 192.168.7.1 on Serial0route ospf 1
Router(config-router)#network 192.168.8.0 0.255.255.255 area 0
Router(config-router)#network 192.168.3.0 0.255.255.255 area 0
Router(config-router)#do show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
O 192.168.1.0/24 [110/129] via 192.168.7.1, 00:00:19, Serial0/1/0
Copy
Paste
192.168.4.2
Fa0
PC-PT PC12
PC-PT PC13
PC-PT PC14
PC-PT PC15
Fa0/1
192.168.3.2
PC-PT PC8
PC-PT PC9
PC-PT PC10
PC-PT PC11
192.168.3.0
PC-PT PC7
PC-PT PC5
PC-PT PC6
PC-PT PC3
PC-PT PC2
192.168.2.0
Time: 01:09:56
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type here to search
3:33 PM
11/13/2017

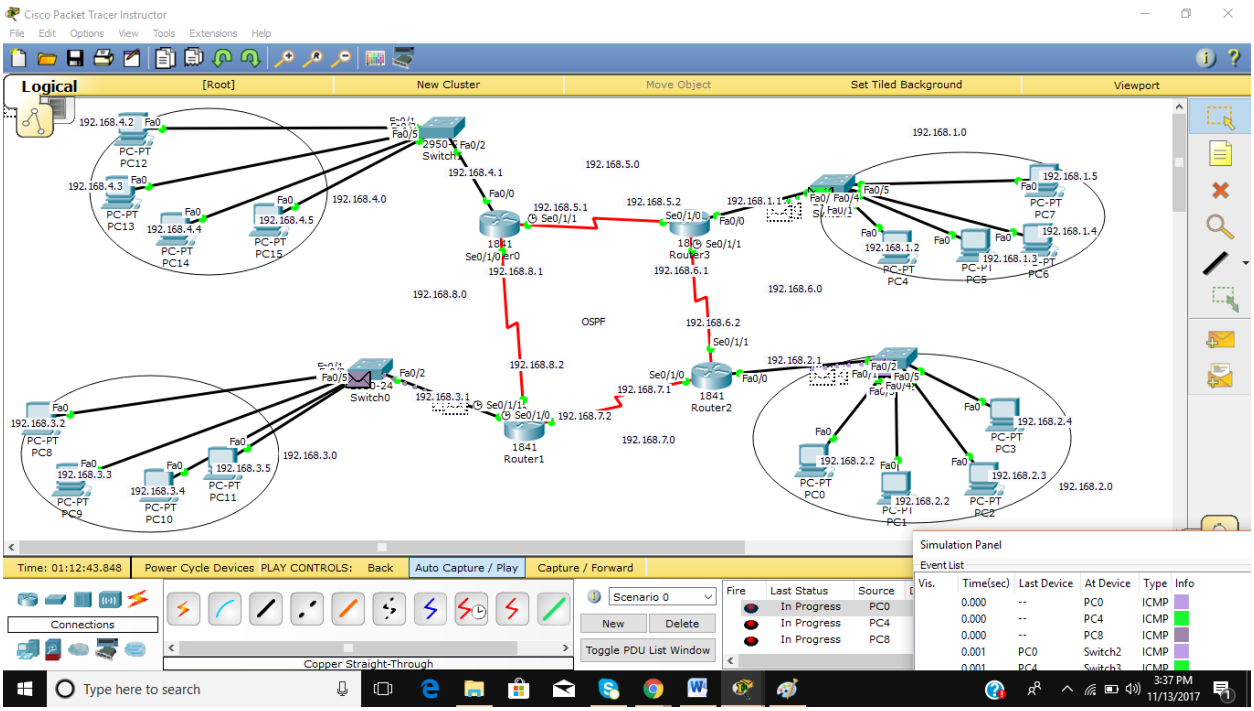

Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
Router2
Physical
Config
CLI
IOS Command Line Interface
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/1/1
Router(config-if)#exit
Router(config)#route ospf 1
Router(config-router)#network 192.168.6.0 0.255.255.255 area 0
Router(config-router)#network 192.168.2.0 0.255.255.255 area 0
Router(config-router)#network 192.168.7.0 0.255.255.255 area 0
00:28:01: %OSPF-5-ADJCHG: Process 1, Nbr 198.168.5.2 on Serial0/1/1 from LOADING to FULL, Loading Done
Router(config-router)#network 192.168.7.0 0.255.255.255 area 0
Router(config-router)#do show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
* - candidate default, U - per-user static route, o - ODR
P - periodic downloaded static route
Gateway of last resort is not set
Copy
Paste
192.168.4.2
Fa0
PC-PT PC12
PC-PT PC13
PC-PT PC14
PC-PT PC15
Fa0/1
192.168.3.2
PC-PT PC8
PC-PT PC9
PC-PT PC10
PC-PT PC11
192.168.3.0
PC-PT PC7
PC-PT PC5
PC-PT PC6
PC-PT PC3
PC-PT PC2
192.168.2.0
Time: 01:09:35
Power Cycle Devices
Fast Forward Time
Realtime
Connections
Serial DCE
Toggle PDU List Window
Type here to search
3:32 PM
11/13/2017

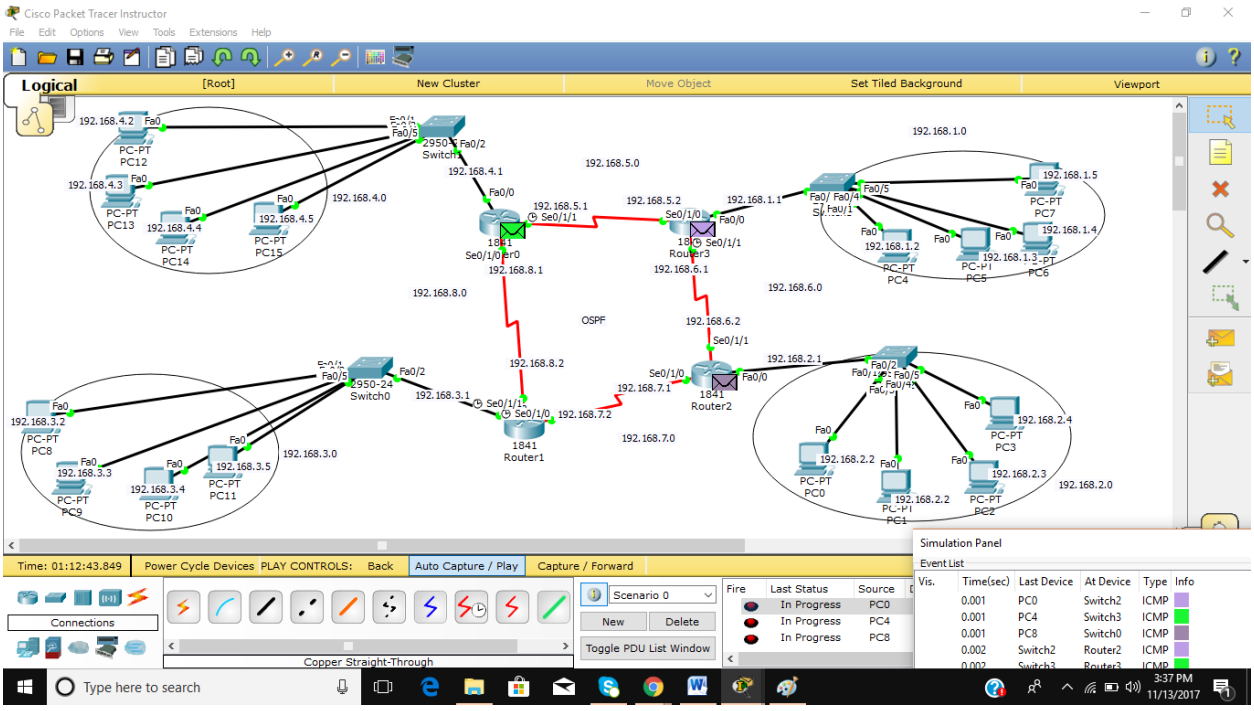


4. Establish the connections between the devices and set the IP addresses for all computers as shown in the figure.

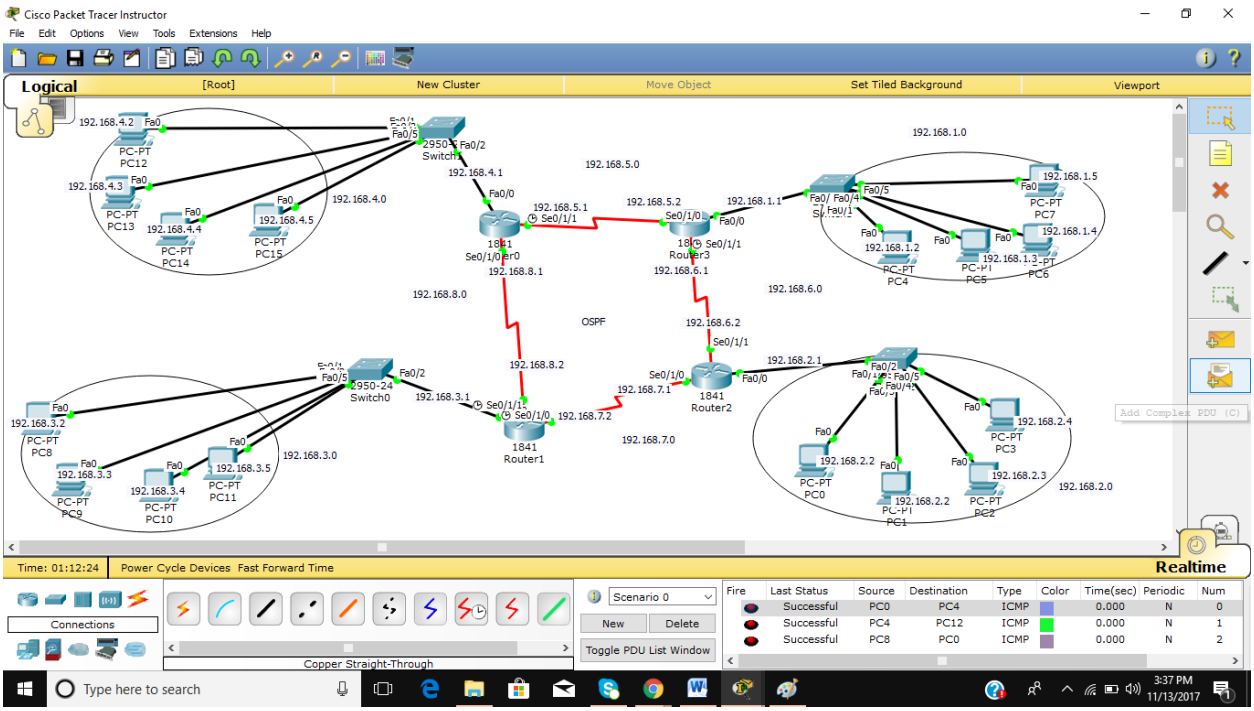


5. Set the source and destination for sending packets as shown in the figure.


Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
192.168.1.0
192.168.5.0
192.168.4.0
192.168.8.0
192.168.6.0
192.168.2.0
192.168.3.0
OSPF
Router1
Router2
Router3
Switch0
Switch1
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13
PC14
PC15
Time: 01:12:43.848
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Simulation Panel
Event List
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Type here to search
3:37 PM
11/13/2017


Cisco Packet Tracer Instructor
Logical
[Root]
New Cluster
Move Object
Set Tiled Background
Viewport
192.168.1.0
192.168.5.0
192.168.4.0
192.168.8.0
192.168.6.0
192.168.2.0
192.168.3.0
OSPF
Router1
Router2
Router3
Switch0
Switch1
PC0
PC1
PC2
PC3
PC4
PC5
PC6
PC7
PC8
PC9
PC10
PC11
PC12
PC13
PC14
PC15
Time: 01:12:43.849
Power Cycle Devices
PLAY CONTROLS:
Back
Auto Capture / Play
Capture / Forward
Simulation Panel
Event List
Connections
Copper Straight-Through
Scenario 0
New
Delete
Toggle PDU List Window
Type here to search
3:37 PM
11/13/2017

OUTPUT:



OUTCOMES:

Thus, the students can understand the concepts of OSPF from this experiment.

EX.12: CONFIGURATION OF VLANS AND TRUNKING

AIM:

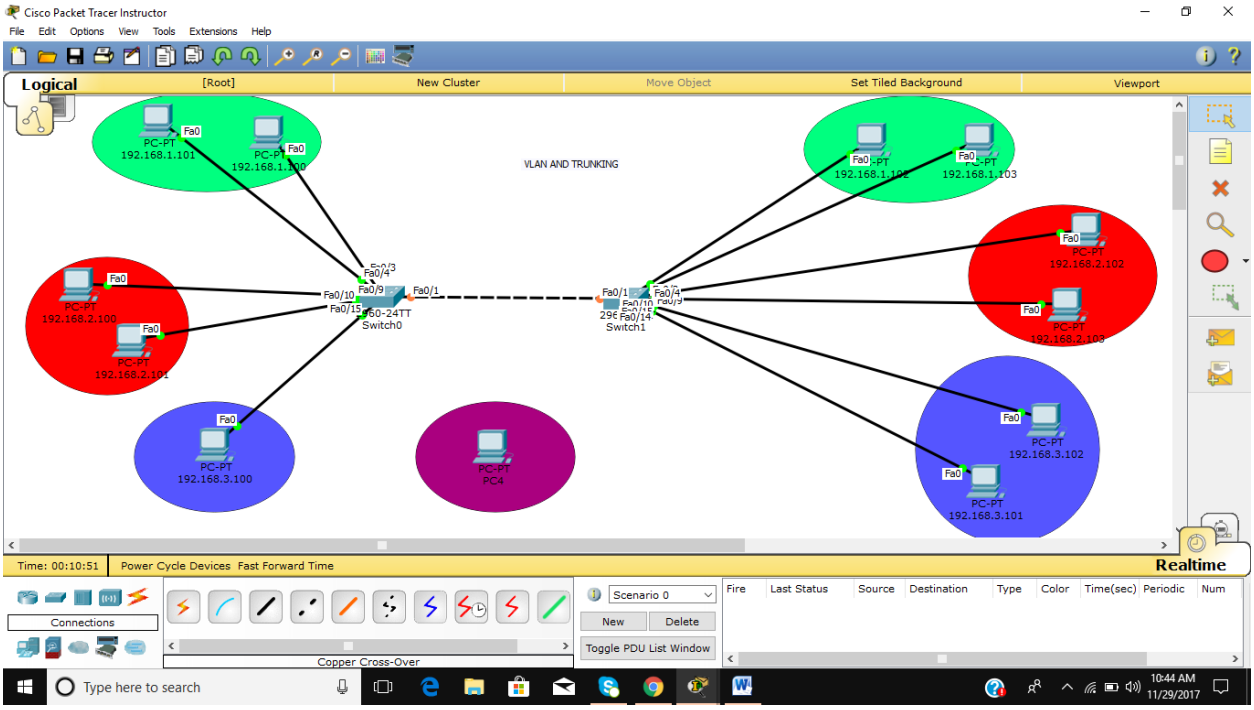
Create the different VLANS and connect both by Trunking.

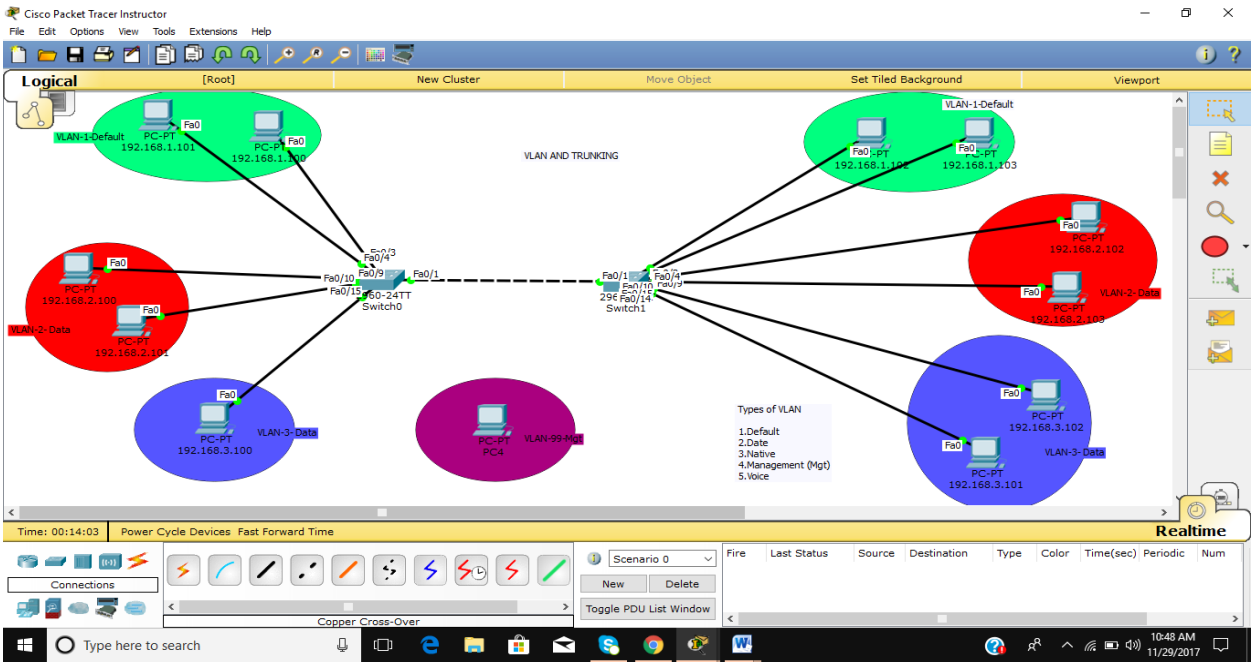
APPARATUS:

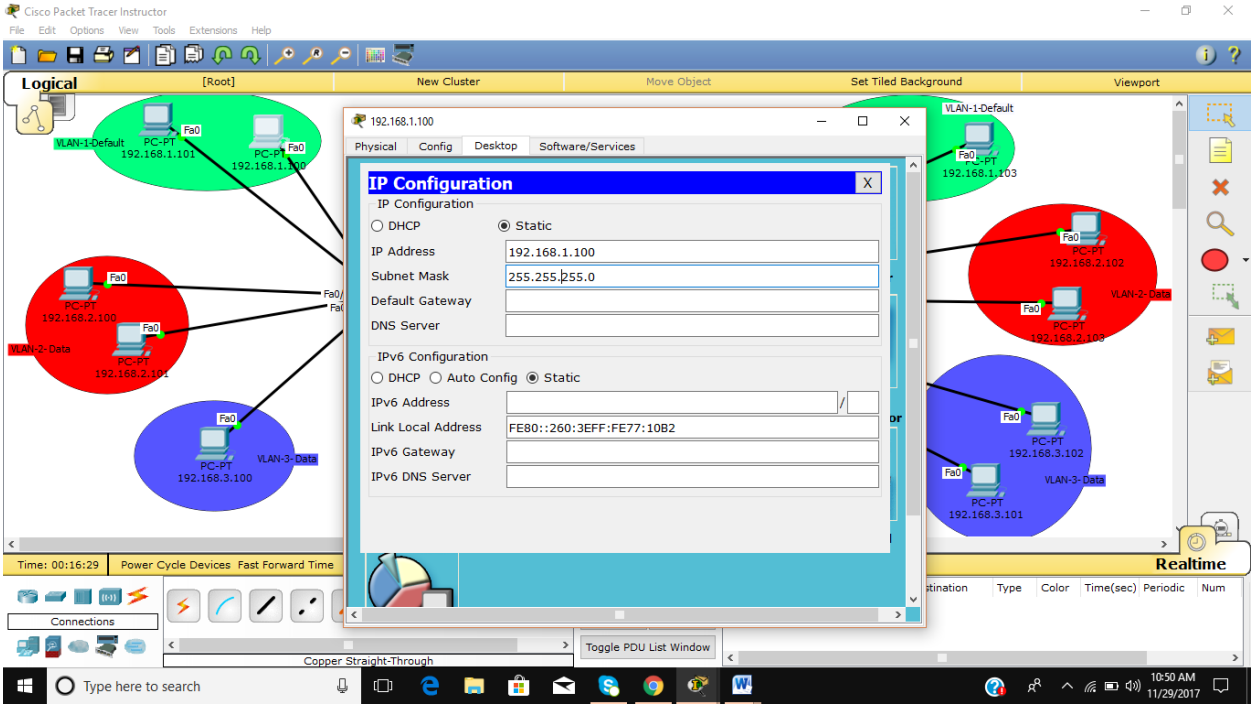
1. Personal Computer
2. Cisco Packet Tracer

DESCRIPTION/PROCEDURE

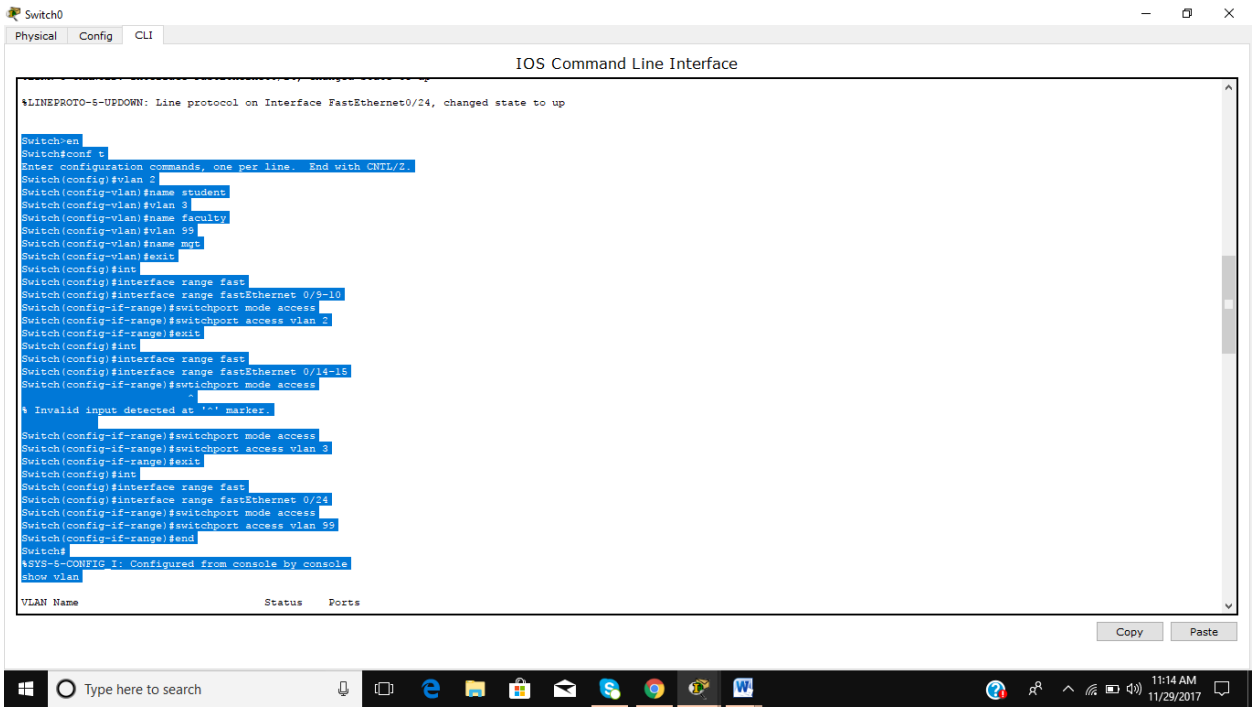
1. Create the different VLANs as shown in the figure and set the IP address as well.



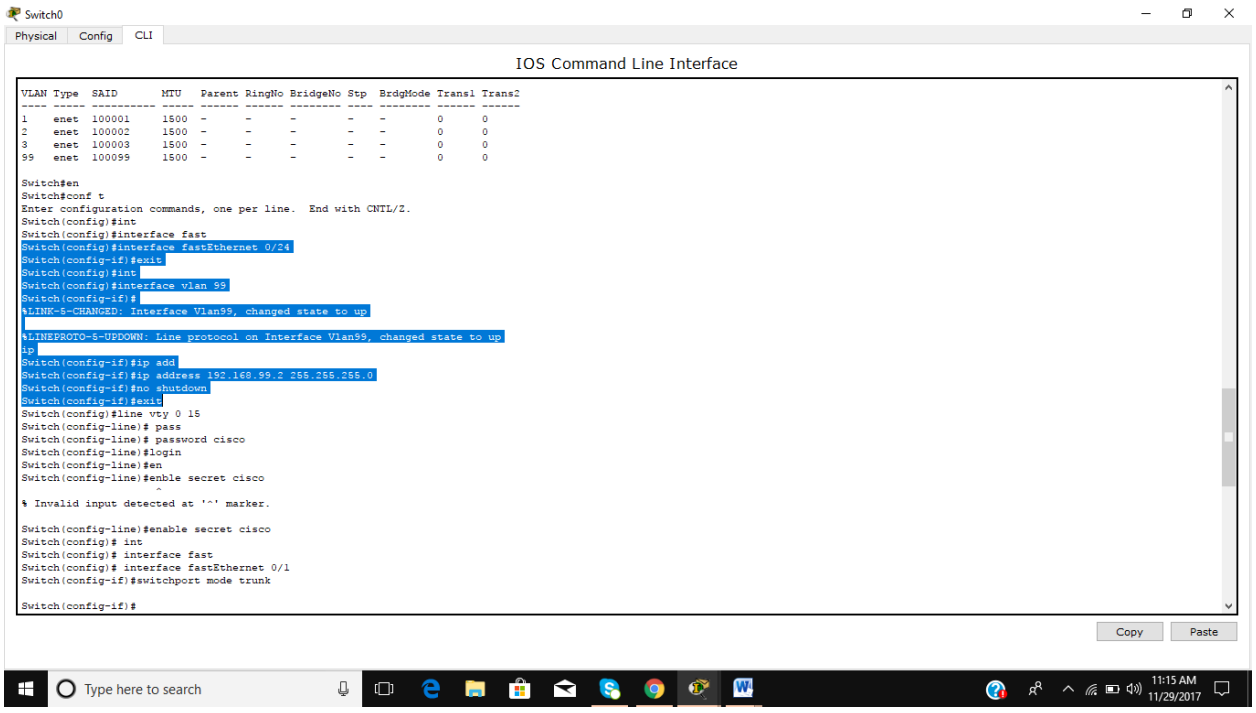


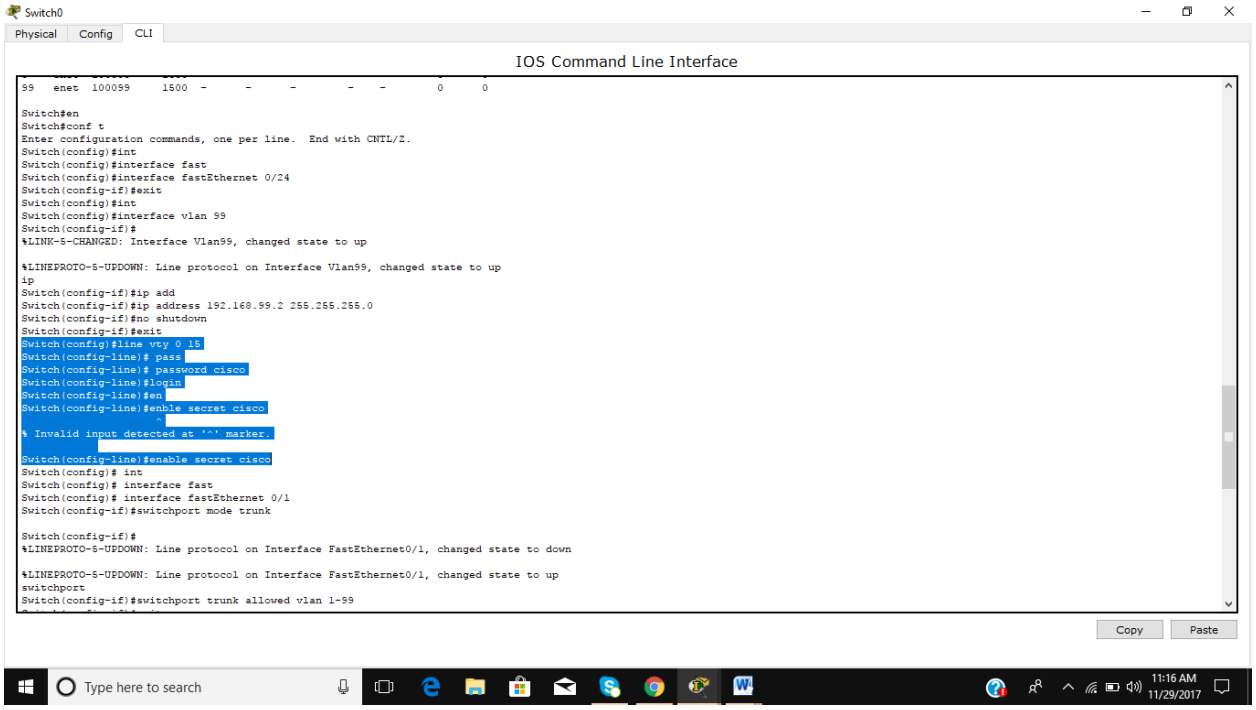


2. Open the first switch 0 and enter the commands which are given in the figure.

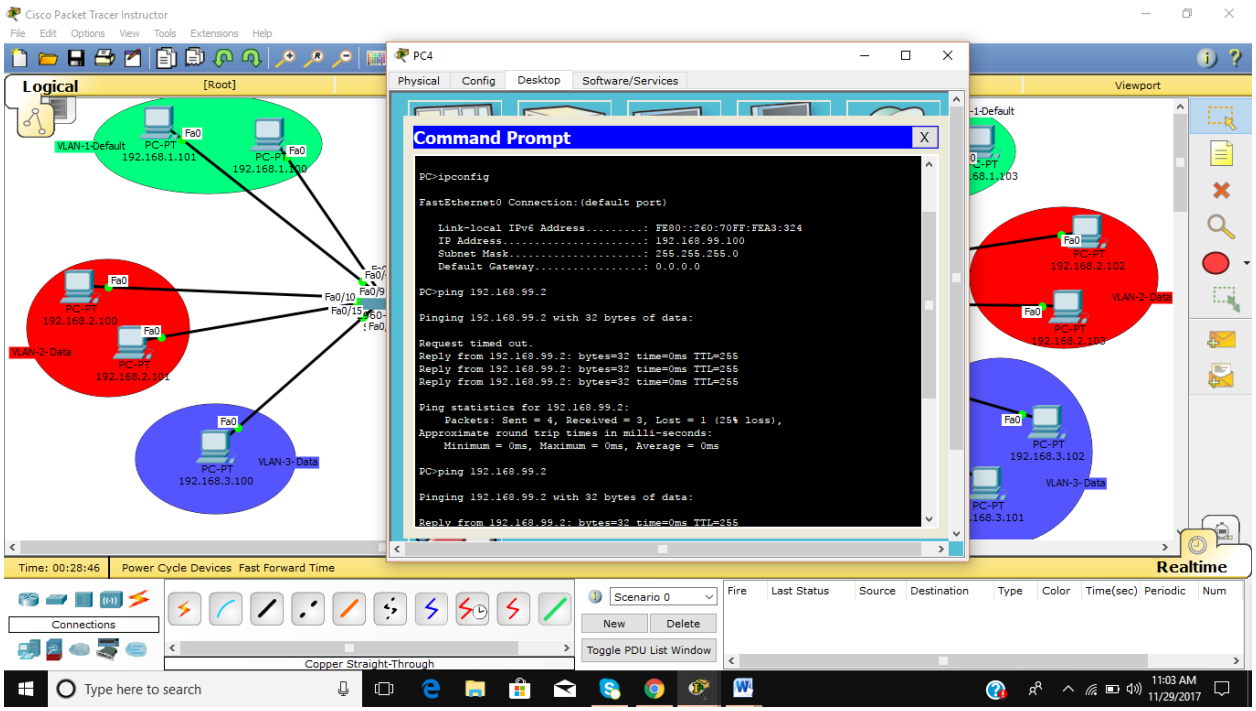

Switch0
Physical
Config
CLI
IOS Command Line Interface
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/24, changed state to up
Switch>en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#name student
Switch(config-vlan)#vlan 3
Switch(config-vlan)#name faculty
Switch(config-vlan)#vlan 99
Switch(config-vlan)#name mgt
Switch(config-vlan)#exit
Switch(config)#int
Switch(config)#interface range fast
Switch(config)#interface range fastEthernet 0/9-10
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#int
Switch(config)#interface range fast
Switch(config)#interface range fastEthernet 0/14-15
Switch(config-if-range)#switchport mode access
% Invalid input detected at '^' marker.
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#exit
Switch(config)#int
Switch(config)#interface range fast
Switch(config)#interface range fastEthernet 0/24
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 99
Switch(config-if-range)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
show vlan
VLAN Name Status Ports
Copy
Paste
Type here to search
11:14 AM
11/29/2017

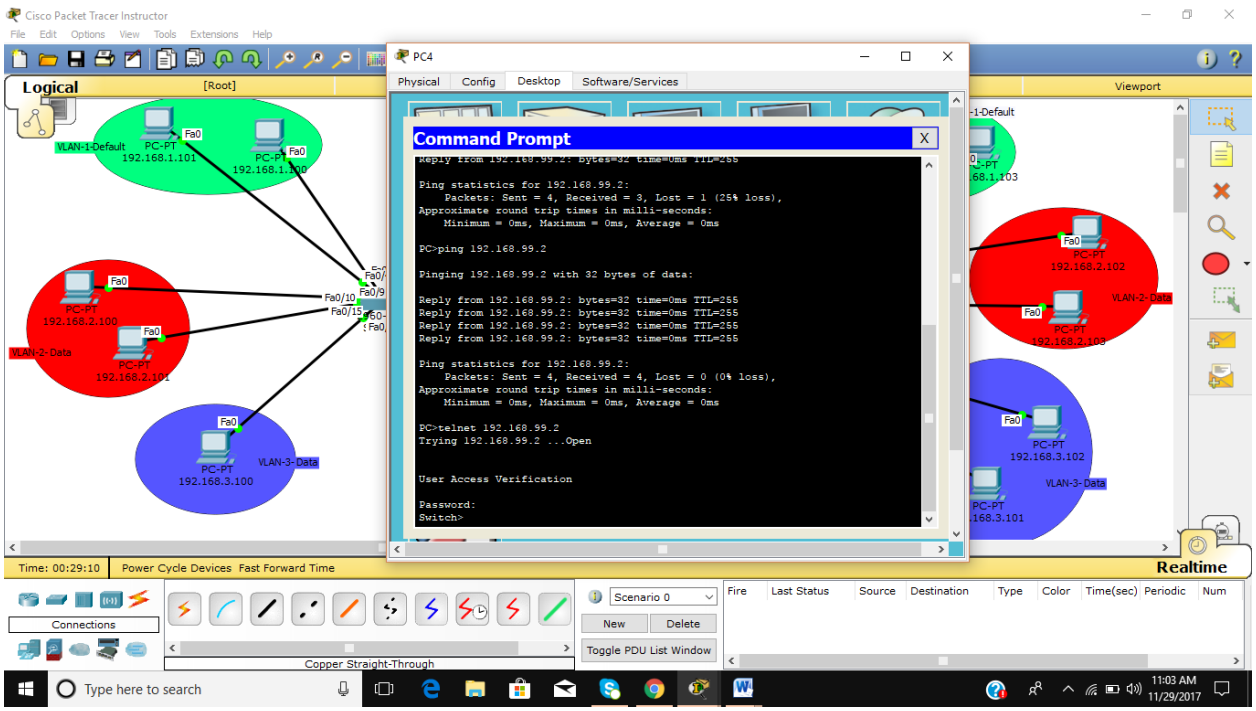

Switch0
Physical
Config
CLI
IOS Command Line Interface
Switch(config-if-range)#switchport access vlan 99
Switch(config-if-range)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
show vlan
VLAN Name Status Ports
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/11, Fa0/12, Fa0/13, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Gig0/1
Gig0/2
2 student active Fa0/9, Fa0/10
3 faculty active Fa0/14, Fa0/15
99 mgt active Fa0/24
1002 fddi-default act/unsup
1003 token-ring-default act/unsup
1004 fddinet-default act/unsup
1005 trnet-default act/unsup
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
1 enet 100001 1500 - - - - - 0 0
2 enet 100002 1500 - - - - - 0 0
3 enet 100003 1500 - - - - - 0 0
99 enet 100099 1500 - - - - - 0 0
Switch#en
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int
Switch(config)#interface fast
Switch(config)#interface fastEthernet 0/24
Switch(config-if)#exit
Switch(config)#int
Switch(config)#interface vlan 99
Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan99, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan99, changed state to up
Copy
Paste
Type here to search
11:14 AM
11/29/2017



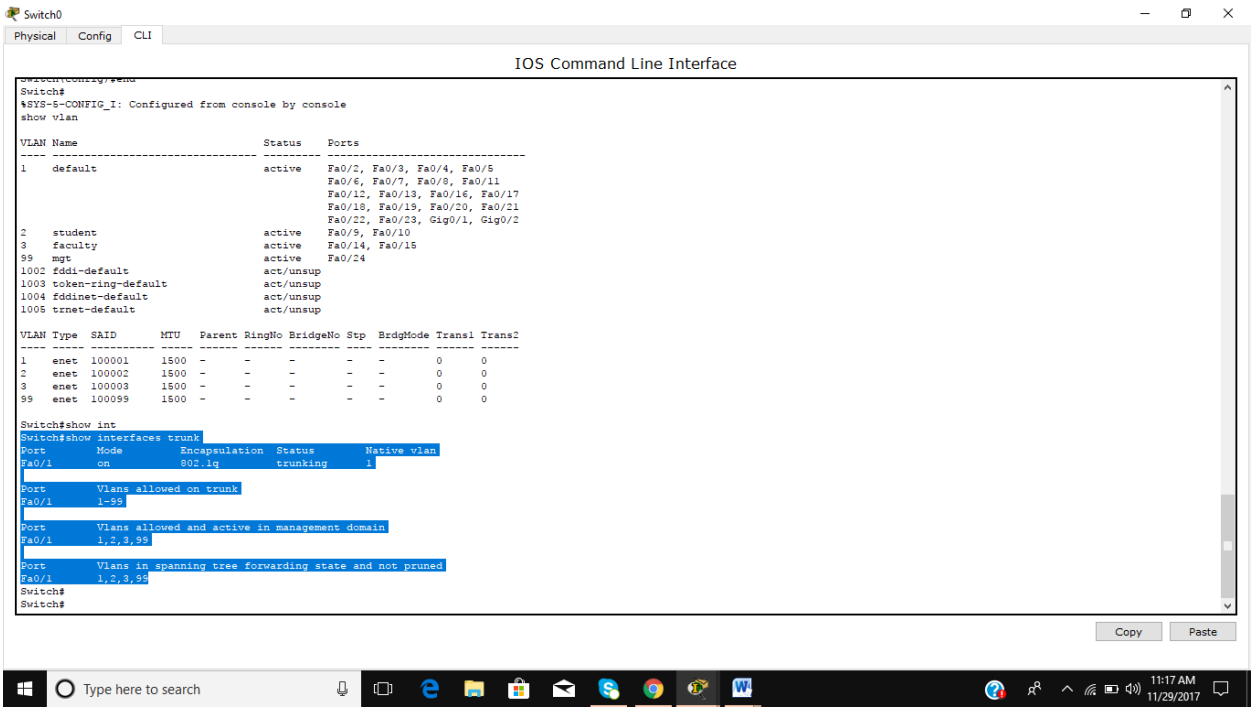


3. Check the management VLAN configurations as shown in the figure.

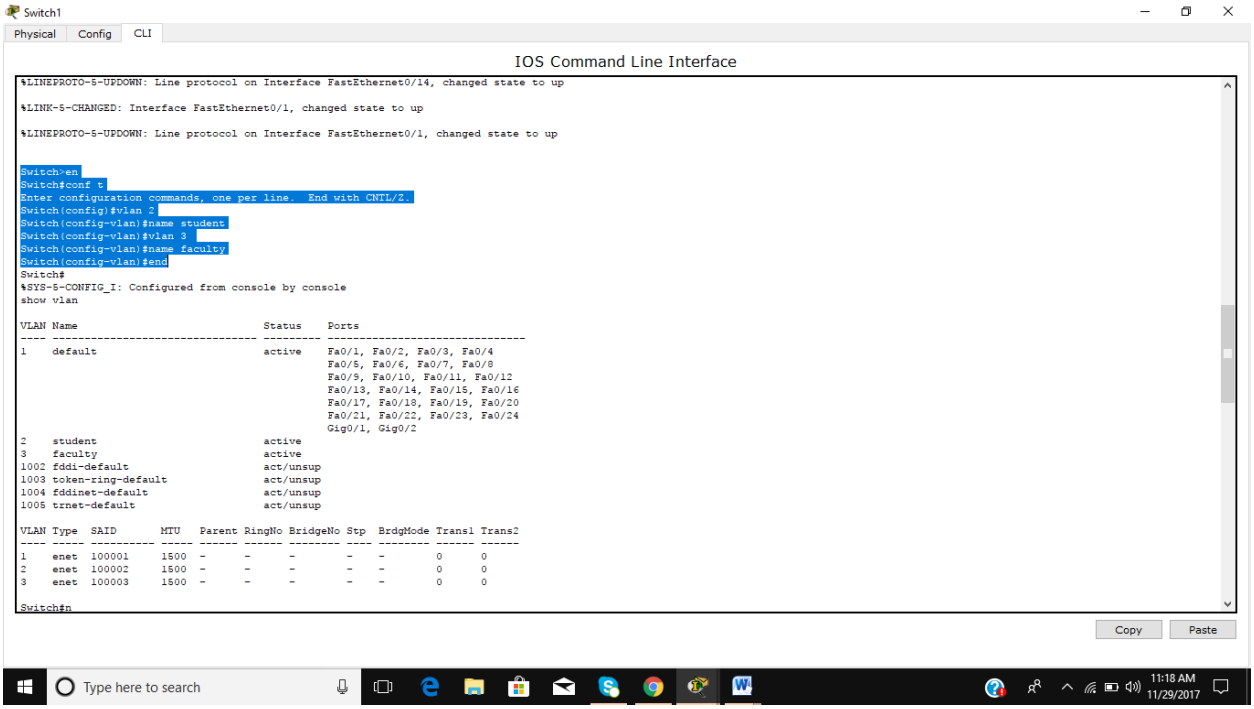


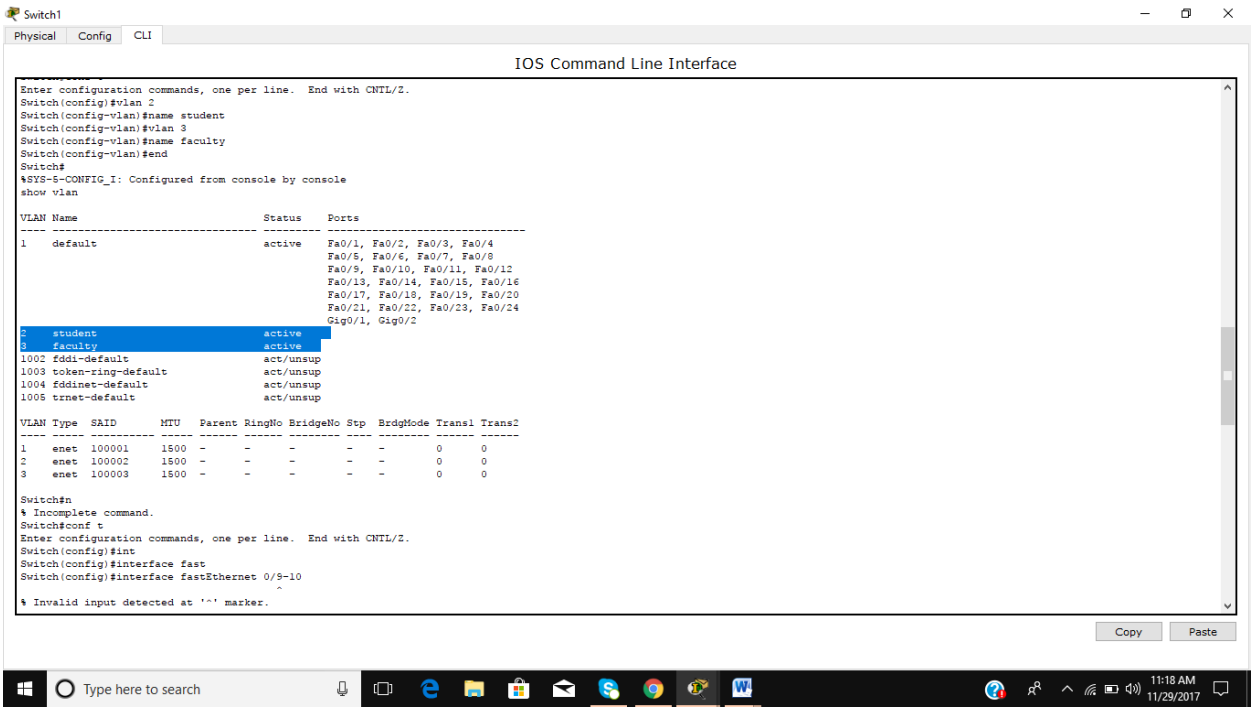


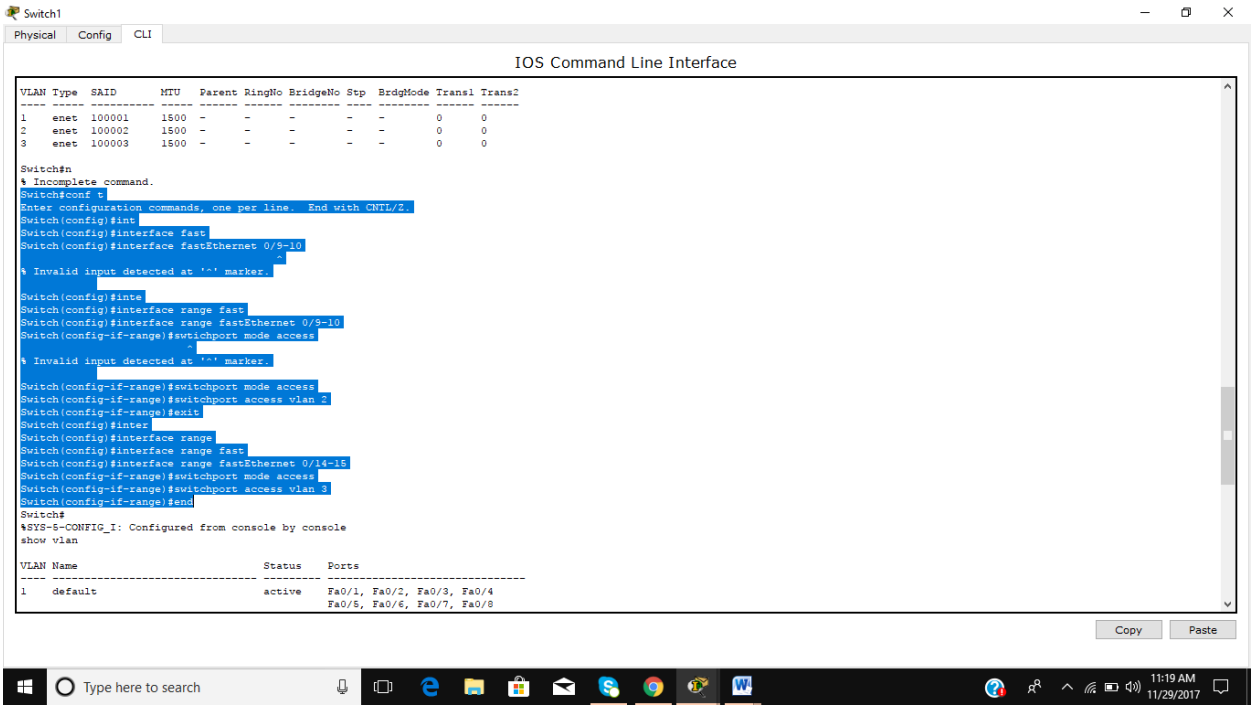
4. Do check the Trunking configuration status from the switch 0 as shown in the figure.

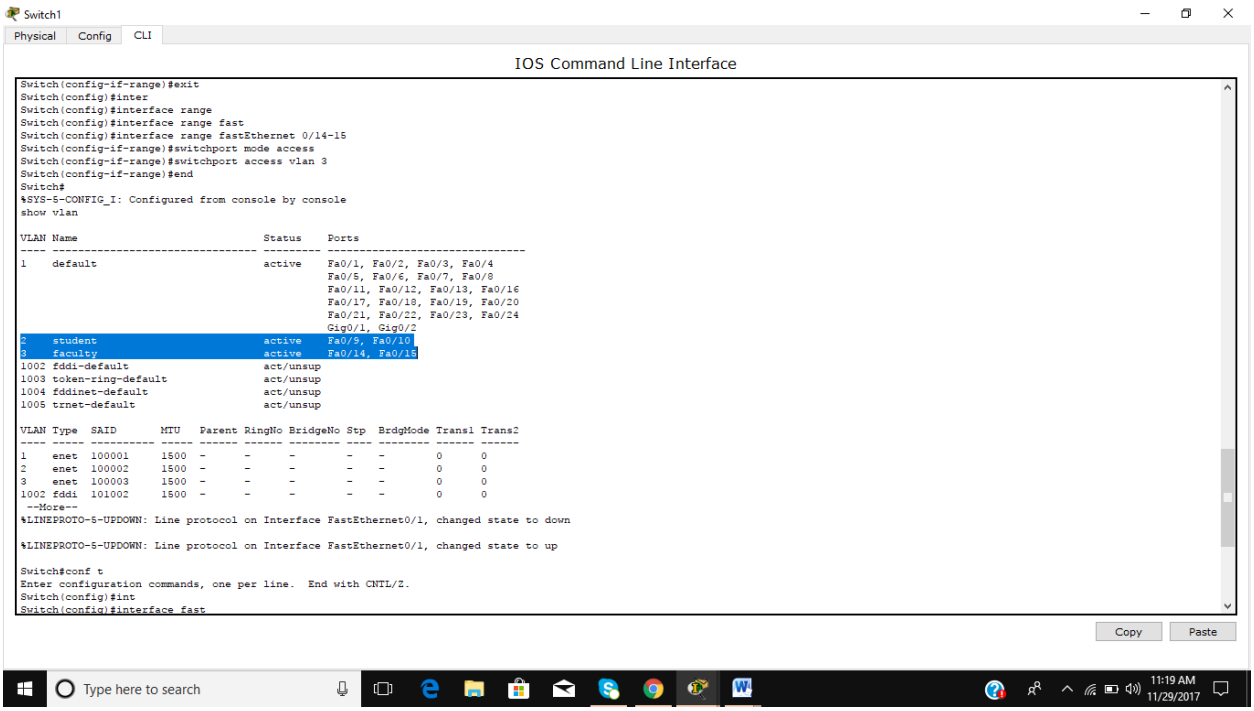


5. Do the same configuration in switch 1 as like as switch 0.

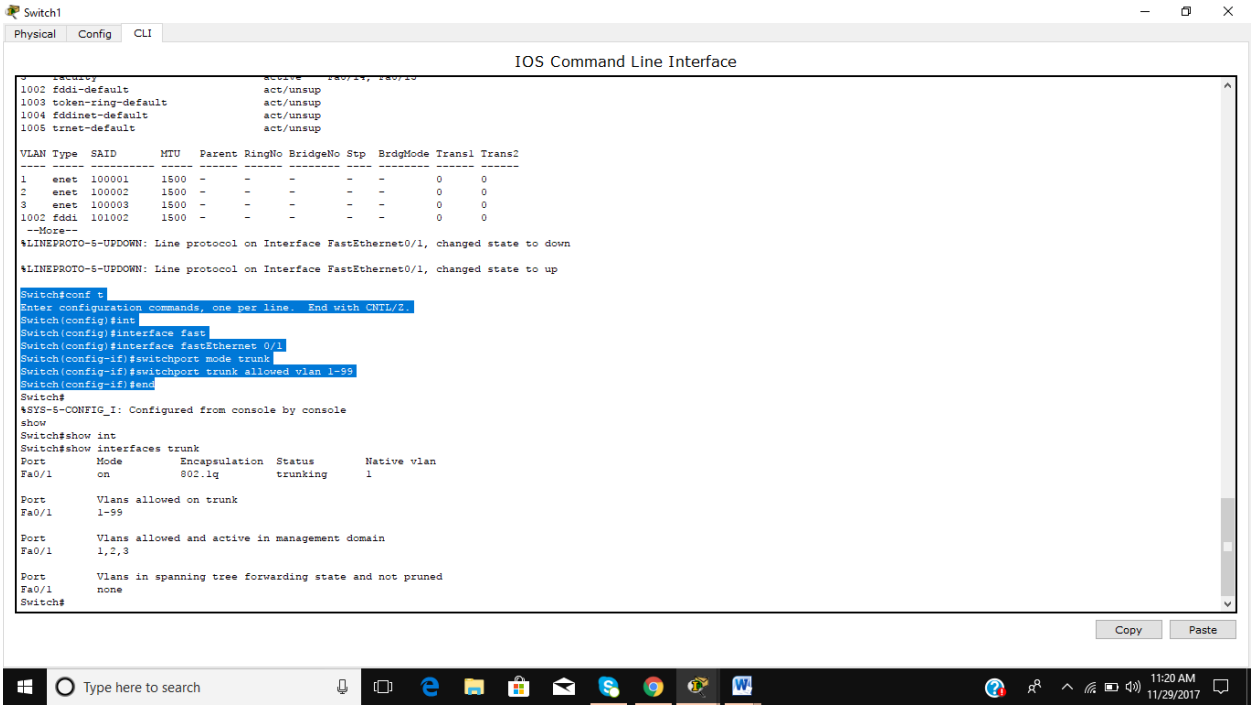


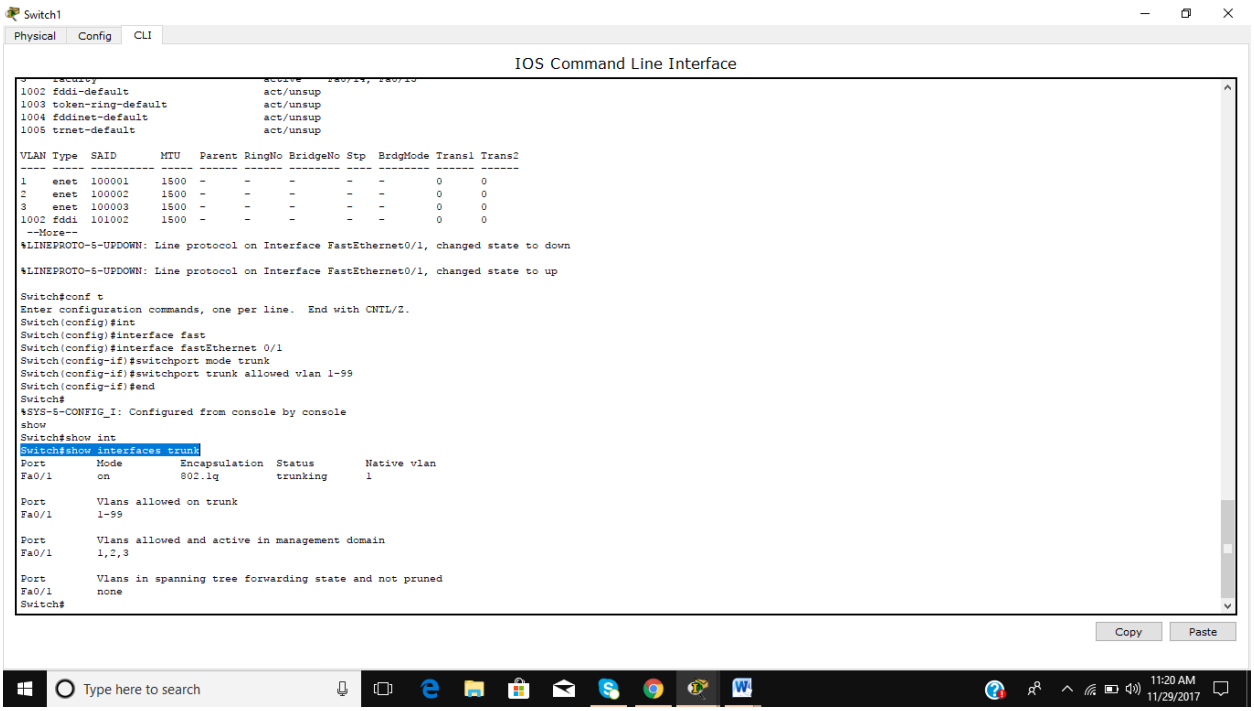

Switch1
Physical
Config
CLI
IOS Command Line Interface
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#name student
Switch(config-vlan)#vlan 3
Switch(config-vlan)#name faculty
Switch(config-vlan)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
show vlan
VLAN Name Status Ports
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
Gig0/1, Gig0/2
2 student active
3 faculty active
1002 fddi-default act/unsup
1003 token-ring-default act/unsup
1004 fddinet-default act/unsup
1005 trnet-default act/unsup
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
1 enet 100001 1500 - - - - - 0 0
2 enet 100002 1500 - - - - - 0 0
3 enet 100003 1500 - - - - - 0 0
Switch#n
% Incomplete command.
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int
Switch(config)#interface fast
Switch(config)#interface fastEthernet 0/9-10
% Invalid input detected at '^' marker.
Copy
Paste
Type here to search
11:18 AM
11/29/2017


Switch1
Physical
Config
CLI
IOS Command Line Interface
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
1 enet 100001 1500 - - - - - 0 0
2 enet 100002 1500 - - - - - 0 0
3 enet 100003 1500 - - - - - 0 0
Switch#n
% Incomplete command.
Switch#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int
Switch(config)#interface fast
Switch(config)#interface fastEthernet 0/9-10
% Invalid input detected at '^' marker.
Switch(config)#inte
Switch(config)#interface range fast
Switch(config)#interface range fastEthernet 0/9-10
Switch(config-if-range)#switchport mode access
% Invalid input detected at '^' marker.
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 2
Switch(config-if-range)#exit
Switch(config)#inter
Switch(config)#interface range
Switch(config)#interface range fast
Switch(config)#interface range fastEthernet 0/14-15
Switch(config-if-range)#switchport mode access
Switch(config-if-range)#switchport access vlan 3
Switch(config-if-range)#end
Switch#
%SYS-5-CONFIG_I: Configured from console by console
show vlan
VLAN Name Status Ports
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Copy
Paste
Type here to search
11:19 AM
11/29/2017

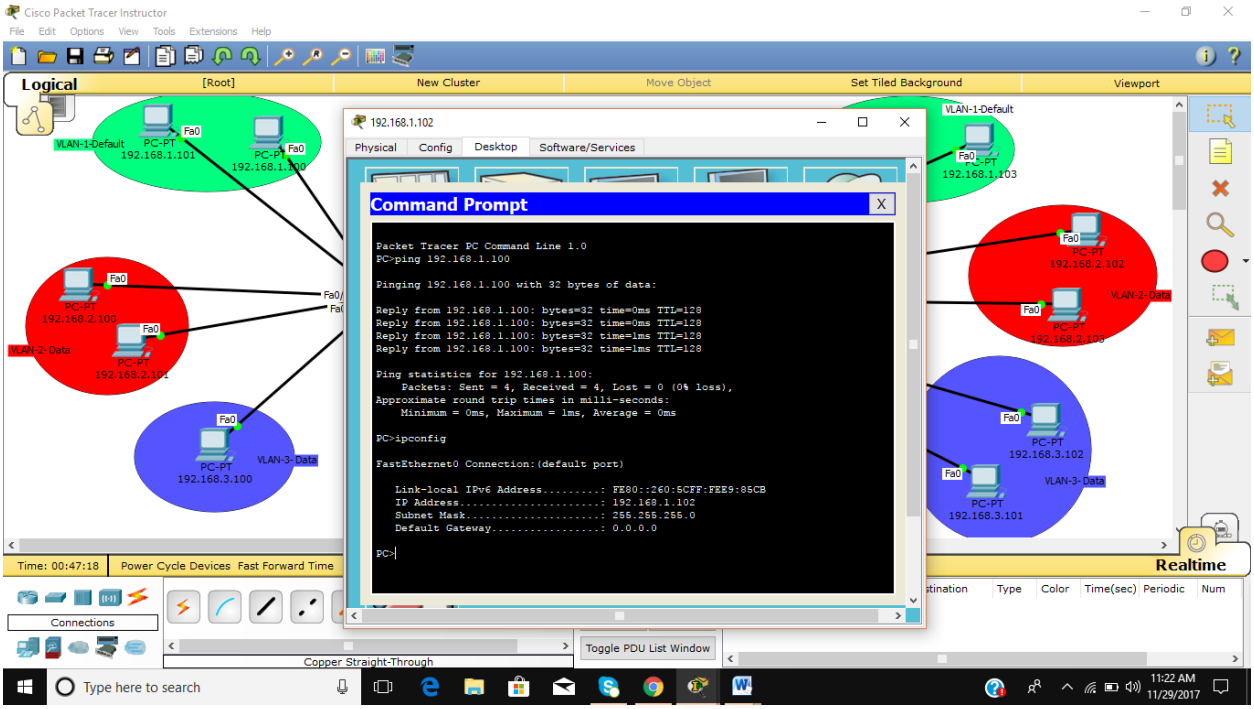


6. Set the trunk configuration in router 1 as show in the figure

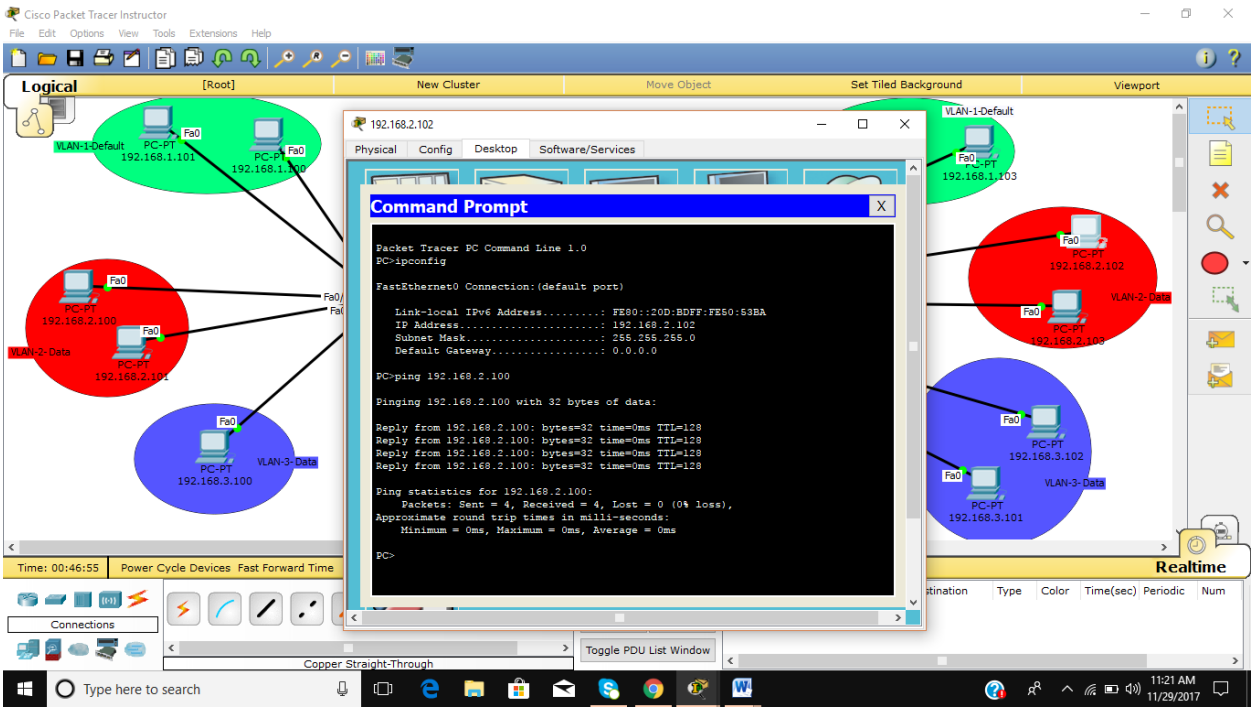




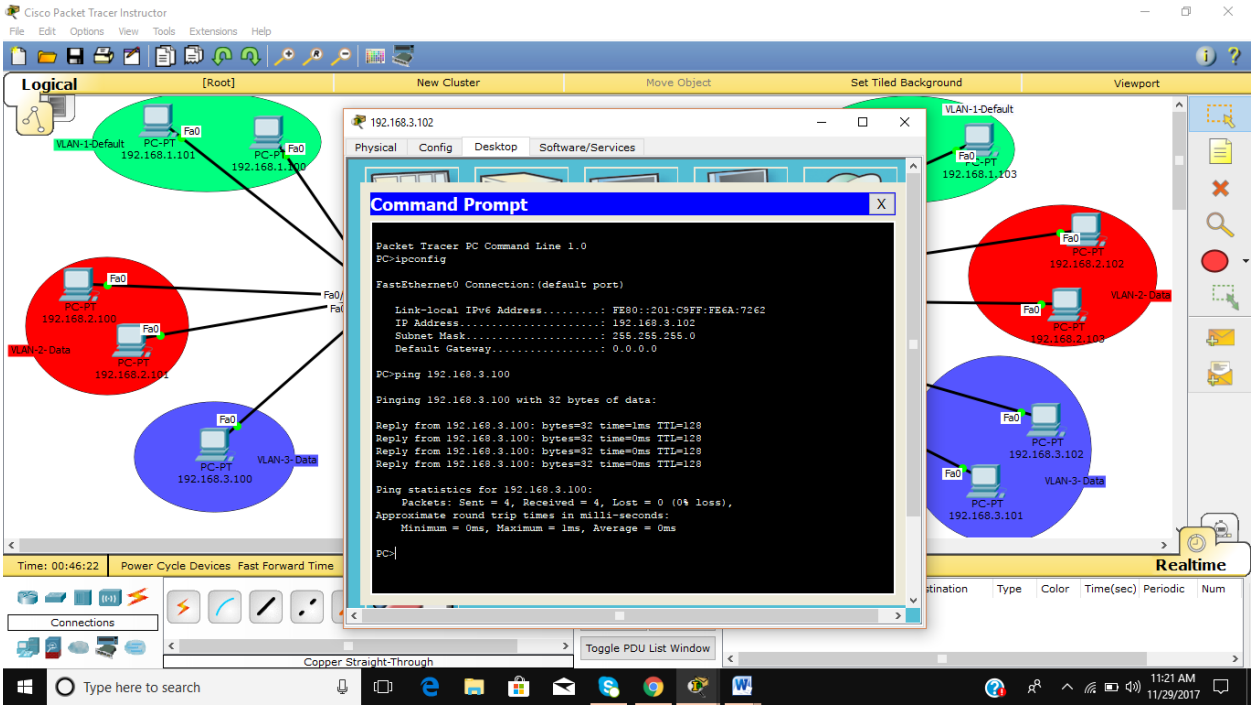
7. Do check the connection status of VLAN-1 after the configuration as shown in the figure.



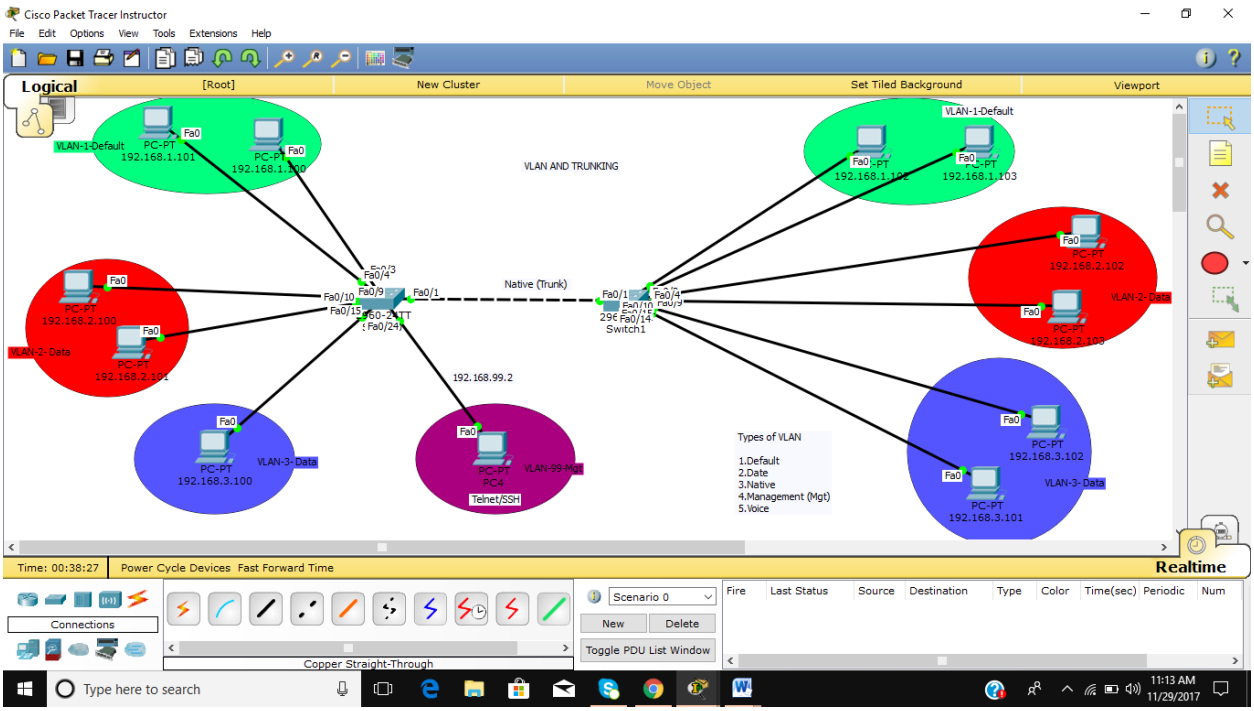
8. Do check the connection status of VLAN-2 after the configuration as shown in the figure.

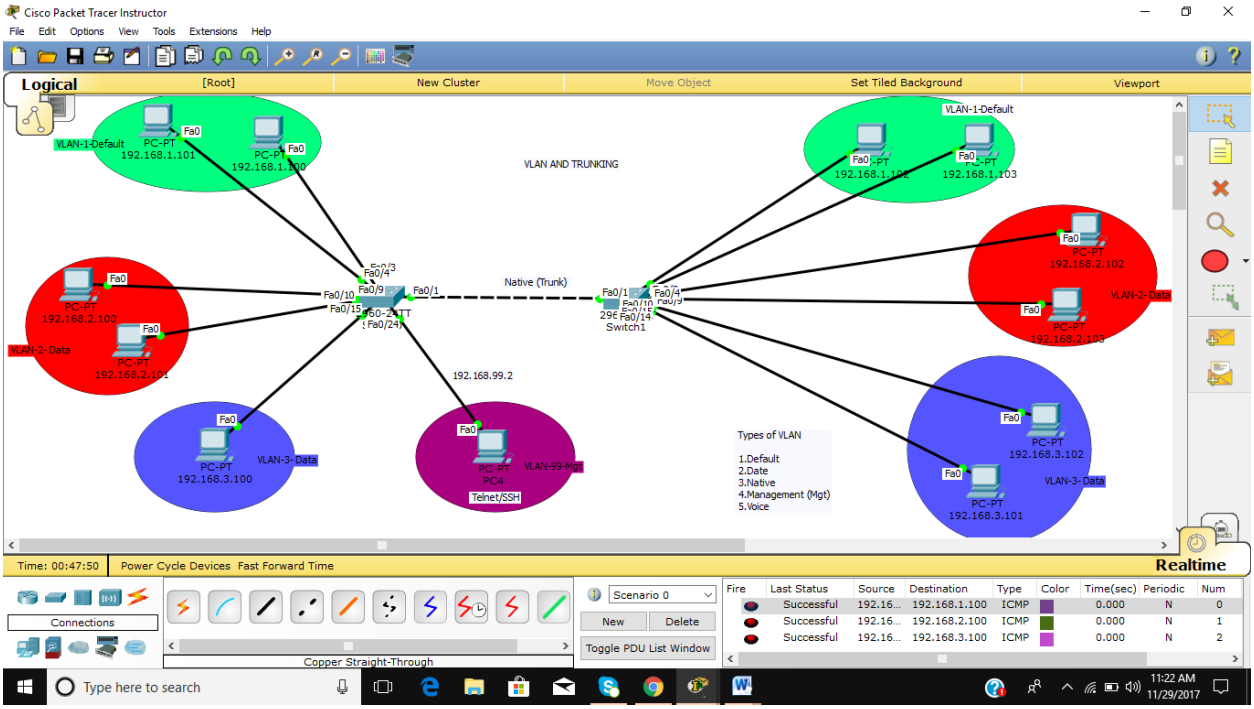


9. Do check the connection status of VLAN-3 after the configuration as shown in the figure.



OUTPUT:





OUTCOMES:

Thus the students can understand the concepts of VLAN and Trunking from this experiment.