

Week-1

1. Build a circuit to Generate and detect of BASK signal and BFSK signal using communication kit.

THEORY: - In frequency shift keying the carrier frequency is shifted in steps i.e. from one frequency to one particular value of data & another corresponding to another value of digital data. The higher frequency is used to represent a data '1' & lower frequency a data '0' thus, DATA = 1: Higher frequency DATA = 0: Low frequency On a closer look at the BFSK wave, it can be represented as the sum of BASK wave forms.

BFSK MODULATION:- Let us now apply the binary data stream to 1st BASK modulator using the high frequency carrier. Let us now invert the original data stream. Original 0110001011 Inverted 1001110100 Now apply the inverted data stream to the 2nd BASK modulator using a lower frequency carrier. The result is the original data '0' filled with lower frequency carrier & 1 is filled with higher frequency carrier. Finally, we will sum the two ASK waveform, to get the BFSK wave.

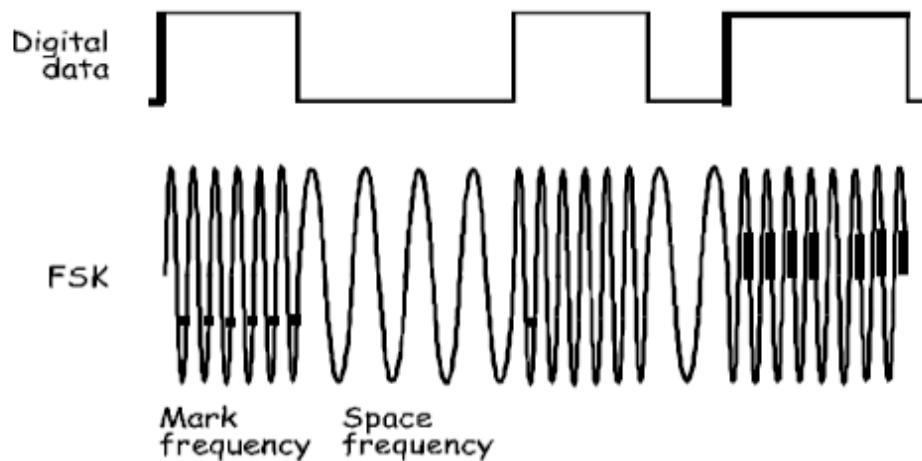


Fig 5.1BFSK modulation

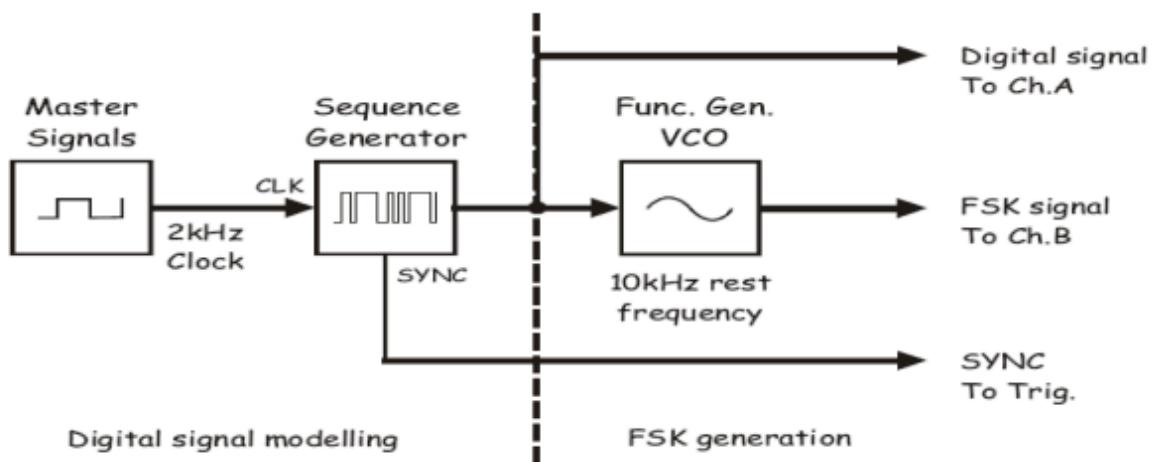


Fig -BFSK generator

PROCEDURE:-

1. Switch on FSK Generator, FSK demodulator.
2. Connect 150Hz square wave from functioning generator to input digital data terminal.
3. Observe BFSK O/P on channel 1 of CRO.
4. Observe the demodulator output at output digital terminal on channel 2 of CRO. To get correct waveform adjust potentio meter Knobs.

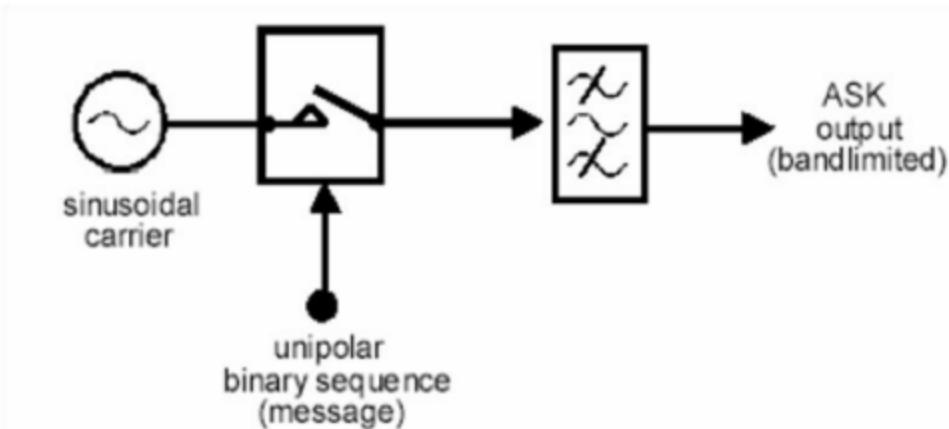
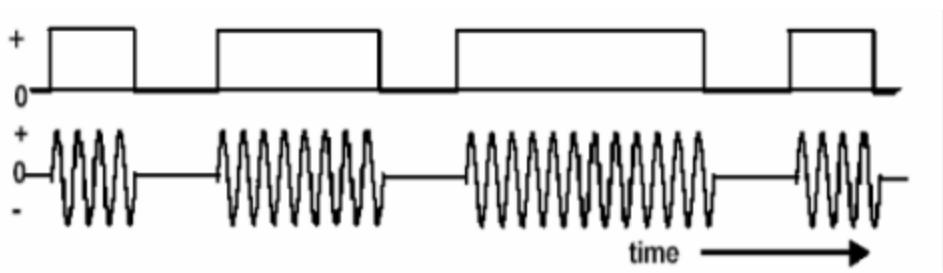
RESULT:-

The study of BFSK modulation and demodulation is completed.

THEORY: -

To transmit the digital data from one place to another, we have to choose the transmission medium. It is not possible to send the digital data directly over the antenna because the antenna of practical size works on very high frequencies much higher than our data transmission rate. To be able to transmit the data over antenna, we have to MODULATE the carrier signal phase frequencies or amplitude etc. which is varied in accordance with the digital data. At the receiver we separate the signal from digital information by the process of “DEMODULATION”. Modulation also allows different data streams to be transmitted over same channel. This process is called as MULTPLEXING & result in a considerable saving of available bandwidth. Some of the basic digital modulation techniques are ASK PSK & FSK.

BASK (BINARY AMPLITUDE SHIFT KEYING): -The simplest method of modulating a carrier with a data stream is to change the amplitude of the carrier wave every time the data changes. This modulation technique is known as “AMPLITUDE SHIFT KEYING”. The simplest way of achieving amplitude shift keying is by switching on the carrier whenever the data bit is 1 & switching off whenever the data bit is ‘0’ This technique is known as ON-OFF KEYING. Thus DATA = 1 CARRIER TRANSMITTED. DATA = 0 CARRIER SUPPRESSED. The BASK wave form is generated by balanced modulator circuit which is also known as a linear multiplier. In order to generate ASK wave form we apply the digital data stream and modulation input as a input to the linear multiplier. The method of demodulate the ASK wave form is to rectify it pass it through the filter & square up the resulting wave form, the output is the original data stream. Amplitude shift keying is less efficient because the noise inherent in the transmission channel can deteriorate the signal so much that the amplitude changes in the modulated carrier wave due to noise addition. This may lead to the incorrect decoding at the receiver. Hence THIS TECHNIQUE IS NOT WIDELY USED IN PRACTICAL application & it is however used in diverse areas and old emergency radio transmissions and fiber-optic communication.



RESULT:-

The study modulation & demodulation is completed

Week2

Ex1: Explore all ISP in your area/locality and select best internet ISP/plan based on cost and performance.

Internet service provider (ISP), company that provides [Internet](#) connections and services to individuals and organizations.

How do I choose an ISP?

1. Find internet providers in your area.
2. Compare plans, pricing, speeds, and more.
3. Look for promotions, discounts, and bundle deals.
4. Figure how much internet speed you need.
5. Test your internet speed.
6. Choose your internet provider.

BSNL Karnataka Fiber Optic Broadband Plans

Nomenclature	Speed	Monthly Rent in Rs	6 Month s Rent	1 Year Rent
Fibre Basic	30 Mbps till 3300 GB beyond 2Mbps	449	0	0
Fibre Basic Plus	60Mbps till 3300GB beyond 2Mbps	599	0	7188
Fibre Value **	100Mbps till 3300GB beyond 2Mbps	799	0	9588
Fibre Premium **	200Mbps till 3300GB then 2Mbps	999	0	11988
Fibre Premium Plus	200Mbps till 3300GB then 15Mbps	1277	7024	13409
Fibre Ultra **	300Mbps till 4000GB then 4Mbps	1499	0	17988
Super Star 1 (Copper)	10Mbps till 779GB, after 2Mbps	799	0	8569
1600GB CUL (Copper)	10Mbps till 1600GB then 5Mbps	1299	0	13640

Airtel Broadband Plans in Mysore 2021

Airtel Wifi Plans Mysore	Data & Speed	Validity	Price
Airtel Basic Broadband Plan for ₹499	Unlimited @Up to 40Mbps	1 Month	₹499
Airtel Standard Broadband Plan for ₹799	Unlimited @Up to 100Mbps	1 Month	₹799
Airtel Entertainment Broadband Plan for ₹999	Unlimited @Up to 200Mbps	1 Month	₹999
Airtel Professional Broadband Plan for ₹1,499	Unlimited @Up to 300Mbps	1 Month	₹1,499
Airtel Standard Broadband Plan for ₹2,397	Unlimited @Up to 100Mbps	3 Months	₹2,397
Airtel Entertainment Broadband Plan for ₹2,997	Unlimited @Up to 200Mbps	3 Months	₹2,997
Airtel Standard Broadband Plan for ₹4,434	Unlimited @Up to 100Mbps	6 Months	₹4,434
Airtel Professional Broadband Plan for ₹4,497	Unlimited @Up to 300Mbps	3 Months	₹4,497
Airtel Entertainment Broadband Plan for ₹5,544	Unlimited @Up to 200Mbps	6 Months	₹5,544

Jio Broadband Plans in Mysore 2021

Jio Fiber Plans Mysore	Data & Speed	Validity	Price
JioFiber ₹199 Data Sachet	Unlimited @100 Mbps	7 Days	₹199
JioFiber ₹399 Monthly Plan	Unlimited @30 Mbps	1 Month	₹399
JioFiber ₹699 Monthly Plan	Unlimited @100 Mbps	1 Month	₹699
JioFiber ₹999 Monthly Plan	Unlimited @150 Mbps	1 Month	₹999
JioFiber ₹1,197 Quarterly Plan	Unlimited @30 Mbps	3 Months	₹1,197
JioFiber ₹1,499 Monthly Plan	Unlimited @300 Mbps	1 Month	₹1,499
JioFiber ₹2,097 Quarterly Plan	Unlimited @100 Mbps	3 Months	₹2,097
JioFiber ₹2,394 Semi-Annual Plan	Unlimited @30 Mbps	6 Months + 15 Days	₹2,394
JioFiber ₹2,499 Monthly Plan	Unlimited @500 Mbps	1 Month	₹2,499
JioFiber ₹2,997 Quarterly Plan	Unlimited @150 Mbps	3 Months	₹2,997

Ex2: Test the download/upload speed in your computer/mobile phone also check type, bandwidth and ISP

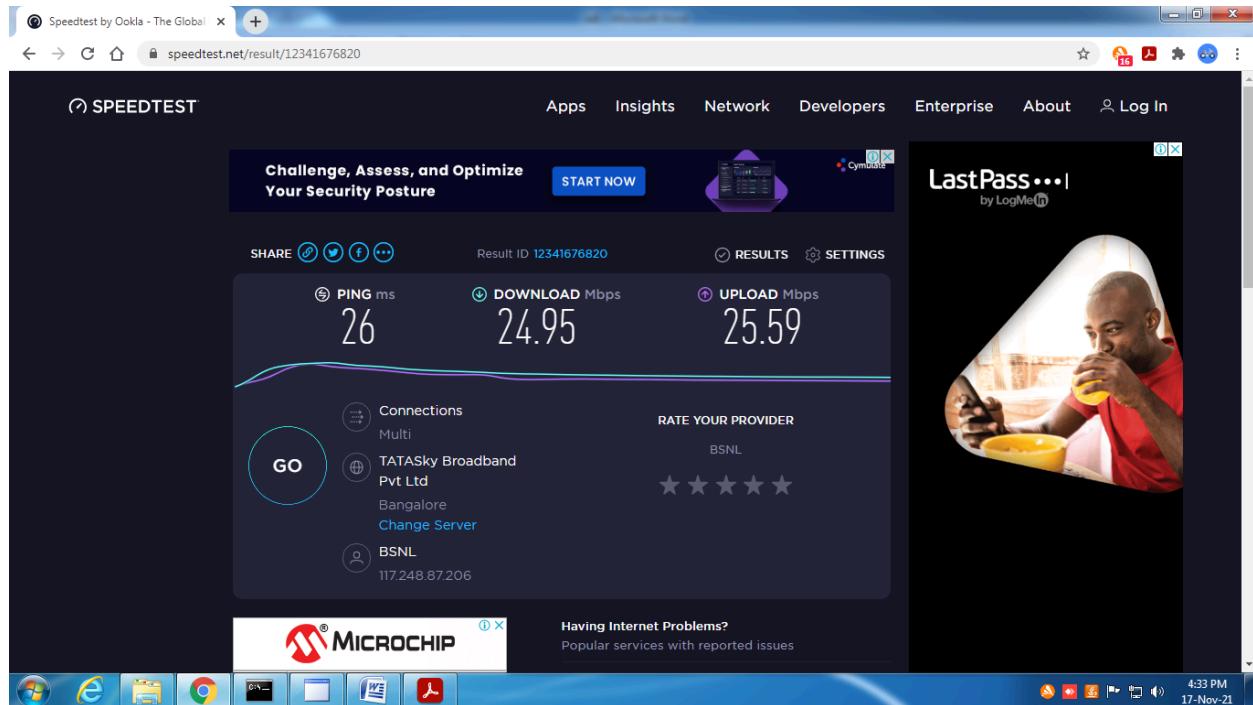
For Computer and laptop

- Open the internet browser
- Type www.Google.com
- Search Internet speed test app/website
- Select [Speedtest by Ookla - The Global Broadband Speed Test](#)
- Click on Go button
- Note down Upload and Download speed
- Verify ISP provider

For Mobile Phones

Go to Play store and download and install Speedtest by Ookla app

- Click on Go button
- Note down Upload and Download speed
- Verify ISP provider



Ex3: Explore Bluetooth, Wi-Fi, NFC in your Smartphone and note their key technical attributes (Radio spectrum band, range, path loss, throughput, mode etc).

Bluetooth is a short-range wireless communication technology standard. It is used for exchanging data between fixed and mobile devices over short distances using UHF radio waves.

Wi-Fi is the wireless technology used to connect computers, tablets, smart phones and other devices to the internet.

Attributes

Network Speed: 72mbps

Security: WPA2 PSK

IP Address: 192.168.0.109

Near Field Communication (NFC) technology allows users to make secure transactions, exchange digital content, and connect electronic devices with a touch.

Path loss, or path attenuation, is the reduction in power density (attenuation) of an electromagnetic wave as it propagates through space.

Network **throughput** is the amount of data moved successfully from one place to another in a given time period, and it is measured in bits per second (bps)

	Bluetooth	Wi-Fi	NFC
Frequency Range	2.400 GHz and 2.483 GHz	2.4 GHz and 5 GHz	13.56 MHz
Range	10 meters	100 meters	10 centimeters
Throughput	0.7-2.1 Mbit/s	450 Mbps or 600 Mbps	It supports data rate of 106 Kbps , 212 kbps and 424 Kbps
Bandwidth	1 MHz	22 MHz	14KHz

Week3

Ex1: My Protocol Rules Objectives

a) Relate computer network protocols to the rules that you use every day for various forms of communication.

Before beginning to communicate with each other, we establish rules or agreements to govern the conversation. These rules, or protocols, must be followed for the message to be successfully delivered and understood.

b) Define the rules that govern how to communicate in a group of students.

- An identified sender and receiver
- Agreed upon method of communicating
- Common language and grammar
- Speed and timing of delivery
- Confirmation or acknowledgement requirements

c) List what would happen if the sender and receiver did not agree on the details of the protocol.

- Sender will keep on sending the information in high speed but receiver is not able to receive the information then communication is useless.
- Sender information is not understandable by the receiver.

Ex2: Manual and Automatic address assignment (Windows)

a) IPv4 address

b) Subnet mask

c) DNS

Windows 8.1

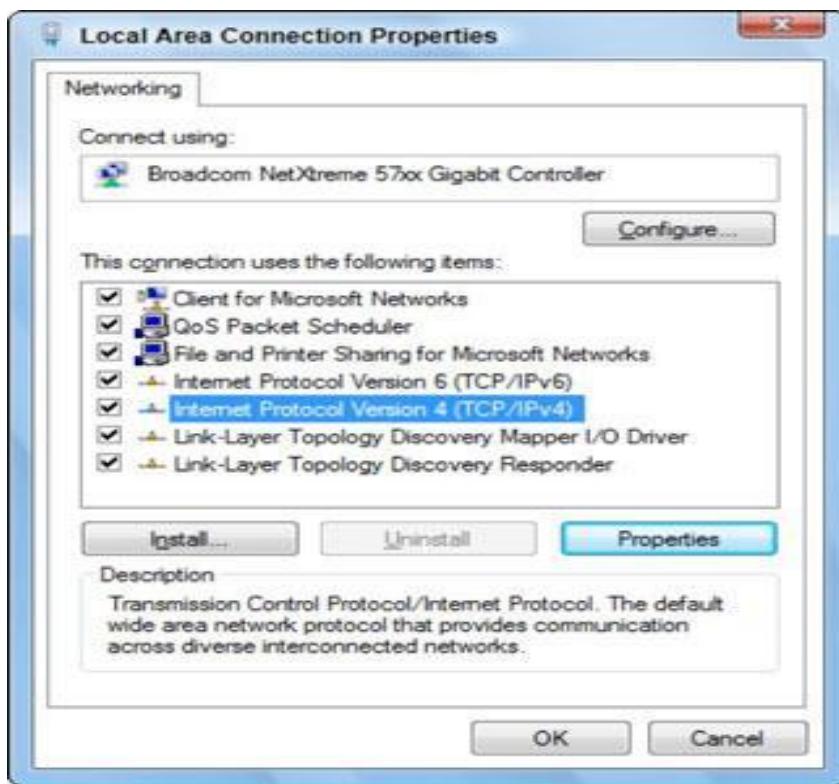
How to Manually Assign an IP Address in Windows 8.1/windows10

1. Go to Control Panel and select network and internet
2. Open the Network and Sharing Center window.

Or

Choose the link Local Area Connection On the right side of the window, and then click on Open the Network and Sharing Center.

3. Click on Ethernet link
4. In the Ethernet Status dialog box, click the Properties button.



5. Select the service titled Internet Protocol Version 4 (TCP/IPv4).
6. Click the Properties button.

The dialog box labeled Internet Protocol Version 4 (TCP/IPv4) Properties appears.

7. Choose the option Use the Following IP Address.
8. Type the IP address.
9. Type a subnet mask.

For a local-area network, the value is usually 255.255.255.0 (depending on the specifics of your network).

10. Type the default gateway address.

The default gateway address is the IP address for the network's router.

Ex: 192.168.1.1

11. Type the address of the preferred DNS server.

This value is obtained from your ISP.

12. Type the address for the alternative DNS server (Optional).

The alternate DNS server's IP address is also something that your ISP must provide.

13. Click OK to close the Internet Protocol Version 4 (TCP/IPv4) Properties dialog box.

14. Close the other open dialog boxes and windows.

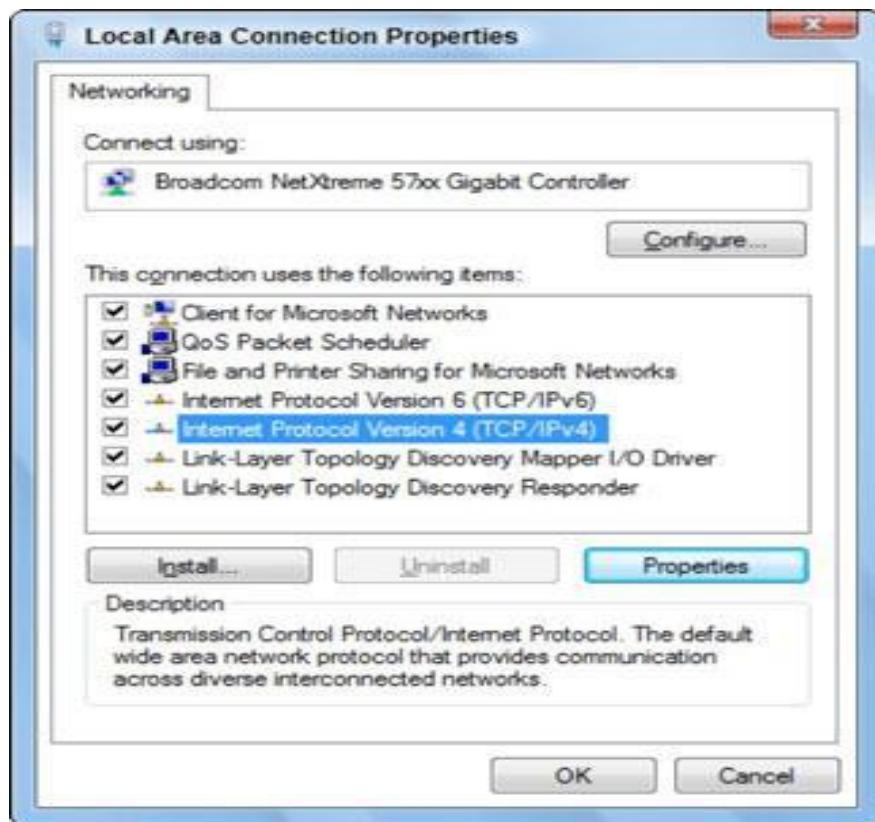
How to Automatic Assign an IP Address in Windows 8.1/windows10

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2. Open the Network and Sharing Center window.

Or

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Open the Network and Sharing Center.

3. Click on Ethernet link
4. In the Ethernet Status dialog box, click the Properties button.



5. Select the service titled Internet Protocol Version 4 (TCP/IPv4).
6. Click the Properties button.

The dialog box labeled Internet Protocol Version 4 (TCP/IPv4) Properties appears.

7. Obtain an IP address automatically, click OK and close all the windows.

Week4

Ex1. Organize and play games to understand working of TCP/IP like: Create 2 group of students, each playing role of layers of TCP/IP (intermediate network devices roles can also be considered). Start the communication between two with a sender and receiver

TCP/IP Game (Data Communications and Networking)

The purpose of this game is to help you better understand how messages are transmitted in TCP/IP-based computer networks. Players are organized into five-person teams that represent different computers in the network. Each person in the team assumes the role of one layer of software or hardware on that computer and works with the others to send messages through the network.

SMTP	From	To	Message	

TCP	Sequence Number of	User Data

IP	Final Destination	Next Node	User Data

Ethernet	Source	Destination	Control	Message #	Error	User Data

Application layer

Activities

1. Send messages to other computers
2. Respond to messages from other computers

SMTP	From	To	Message	

To send a message, you must:

1. Find a blank SMTP packet.
2. Write the IP address of your computer in the From box.
3. Write the IP address of the destination computer in the To box.
4. Write the message you wish to send in the Message box.
5. Write the message and the name of the computer to which you send the message on the blank piece of paper.
6. Pass the message to the transport layer.

Transport layer

Activities

1. Accept outgoing SMTP messages from the application layer, packetize them, and pass them to the network layer.
2. Accept incoming messages from the network layer and, assemble the entire SMTP message before passing it to the application layer.

TCP	Sequence Number	User Data
	of	

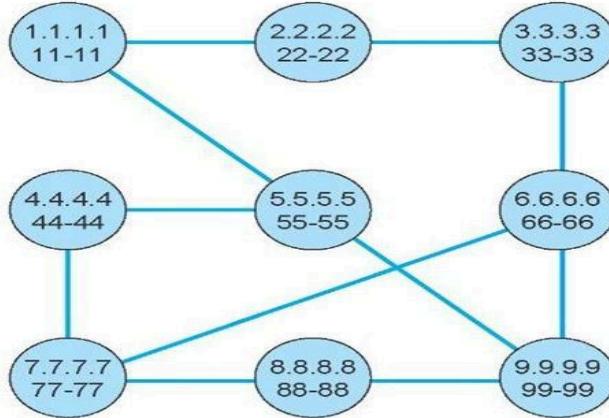
Accepting Outgoing Messages from the Application Layer

1. Break the SMTP message into smaller packets.
2. Find one or two blank TCP packets.
3. Fill in the Sequence Number box. Ex: write "1 of 1","1 of 2", etc
4. Tape the SMTP packet(s) to the TCP packet(s) over the User Data space.
5. Pass the TCP + SMTP packet(s) to the network layer.

Network layer

Activities

1. Accept messages from the transport layer, route them, and pass them to the data link layer.
2. Accept messages from the data link layer and pass them to the transport layer



IP	Final Destination	Next Node	User Data

Accepting Outgoing Messages from the Transport Layer

1. Find a blank IP packet.
2. Write the IP address of the destination computer in the Final Destination box of the IP packet.
3. Route the message by finding the next computer in the network
4. Tape the TCP + SMTP packet to the IP packet over the User Data space.
5. Pass the IP + TCP + SMTP packet to the data link layer.

Data link layer

Activities

1. Accept outgoing messages from the network layer, format them, add error-control information, and pass them to the physical layer.
2. Accept incoming messages from the physical layer and send an ACK to the network layer.

Accepting Outgoing Messages from the Network Layer

1. Find a blank Ethernet packet.
2. Writing the Ethernet address.
3. Number the message. Ex: 01 for the first message you send, 02 for the second, and so on.
4. Add error-control information.
5. Tape the SMTP + TCP + IP packet to the Ethernet packet over the User Data space.
6. Pass the message to the physical layer.

Physical layer

Activities

1. Accept messages from the data link layer and pass them to the physical layer.
2. Accept messages from the physical layer and pass them to the data link layer.

Ethernet	Source	Destination	Control	Message #	Error	User Data

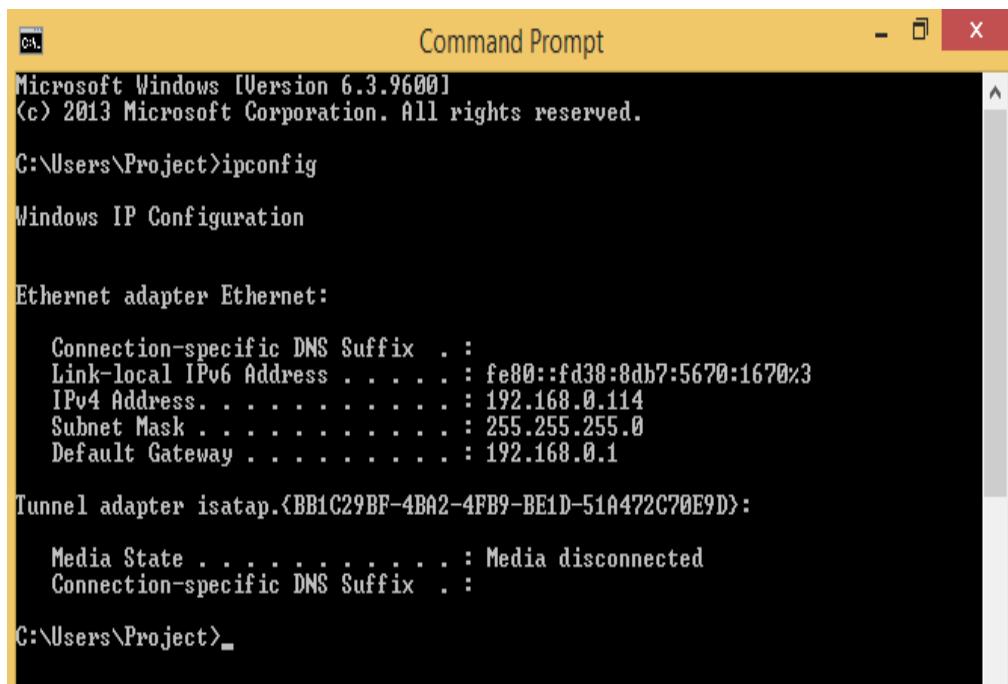
Accepting Messages from the Data Link Layer

Pass the copied SMTP + TCP + IP + Ethernet packet to the physical layer of the computer whose address is listed in the Destination box.

Ex2. Determine the IP Address Configuration of a Computer (Windows) and Test the Network Interface TCP/IP Stack (Ping).

Method1:

1. Click the Start button, type cmd, then press Enter.
2. The Command Prompt window will open, which you can type operating system commands through.
3. Type ipconfig and press Enter.



The screenshot shows a Windows Command Prompt window titled "Command Prompt". The window displays the following text output:

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\Project>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

  Connection-specific DNS Suffix  . :
  Link-local IPv6 Address . . . . . : fe80::fd38:8db7:5670:1670%3
  IPv4 Address . . . . . : 192.168.0.114
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 192.168.0.1

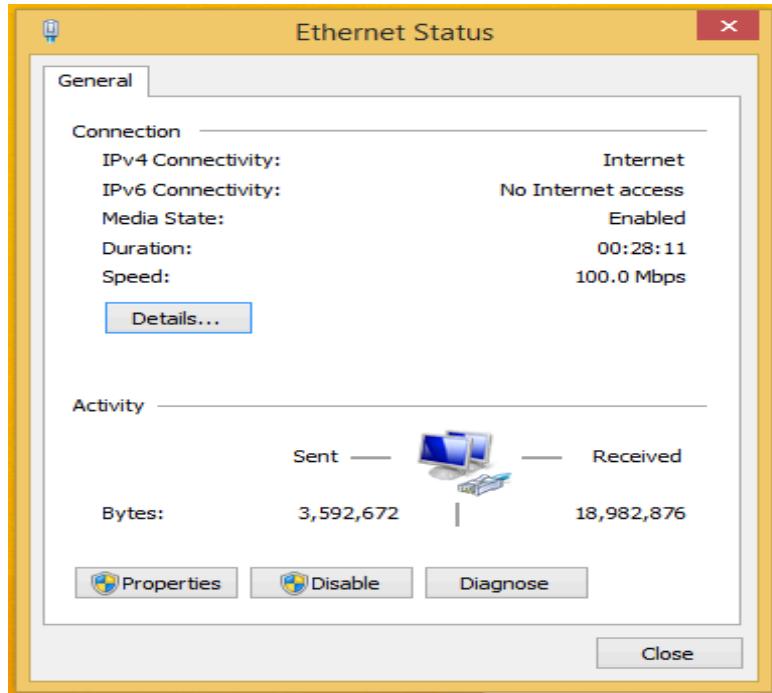
Tunnel adapter isatap.{BB1C29BF-4BA2-4FB9-BE1D-51A472C70E9D}:

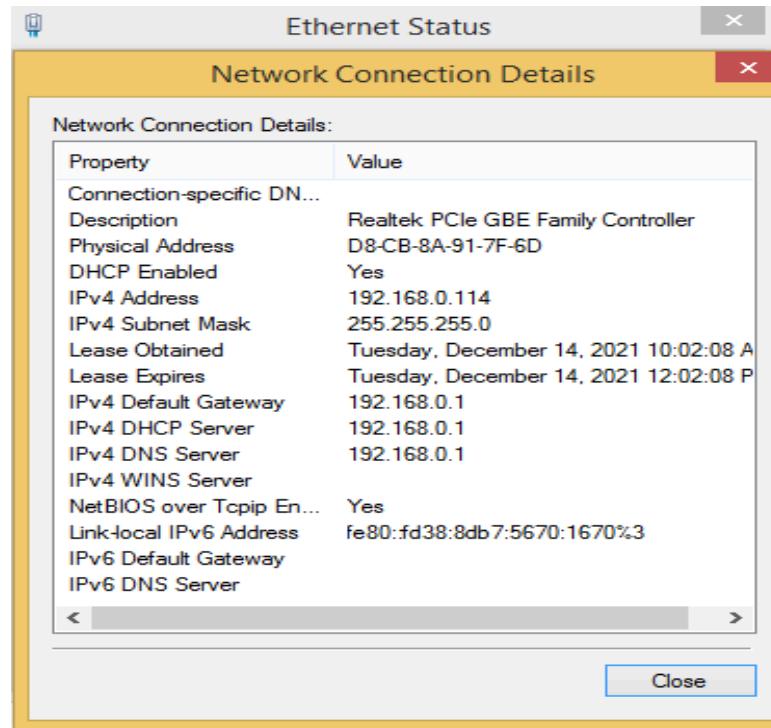
  Media State . . . . . : Media disconnected
  Connection-specific DNS Suffix  . :

C:\Users\Project>
```

Method2:

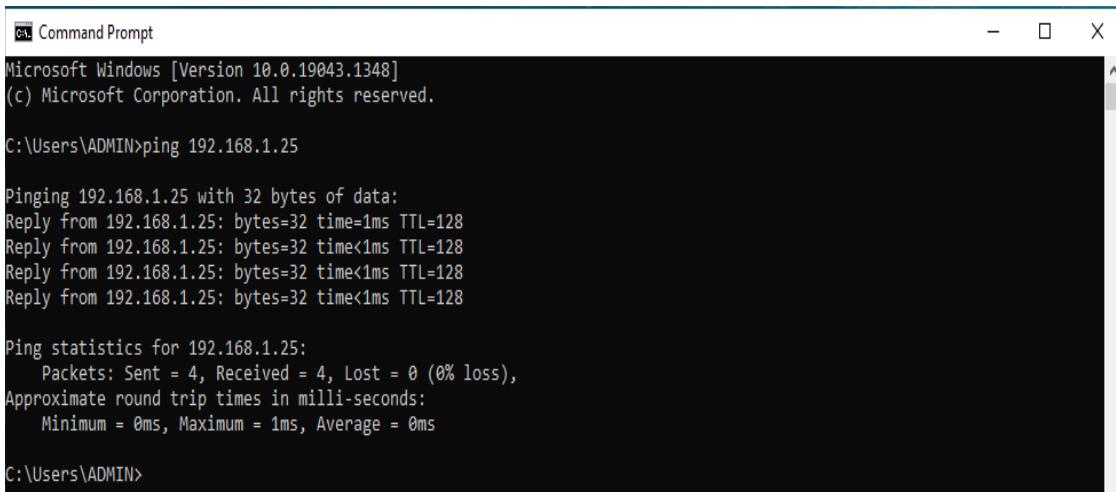
1. Choose the link Local Area Connection On the right side of the window, and then click on Open the Network and Sharing Center.
2. Click on Ethernet link
3. In the Ethernet Status dialog box, click the Details button.
4. Note down the Network Connection Details





How to run a ping network test

1. Click the Start button, type cmd, and then press Enter.
2. Open the Command Prompt.
3. Type ping in the black box and hit the space bar.
4. Type the IP address you'd like to ping (e.g., 192.168.1.25)
5. Review the ping results displayed.



```
Microsoft Windows [Version 10.0.19043.1348]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ADMIN>ping 192.168.1.25

Pinging 192.168.1.25 with 32 bytes of data:
Reply from 192.168.1.25: bytes=32 time=1ms TTL=128
Reply from 192.168.1.25: bytes=32 time<1ms TTL=128
Reply from 192.168.1.25: bytes=32 time<1ms TTL=128
Reply from 192.168.1.25: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.25:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users\ADMIN>
```

Week5

Ex1: Demonstrate working of common network devices.

Types of network devices

- Hub.
- Switch.
- Router.
- Bridge.

- Gateway.
- Modem.
- Repeater.
- Access Point

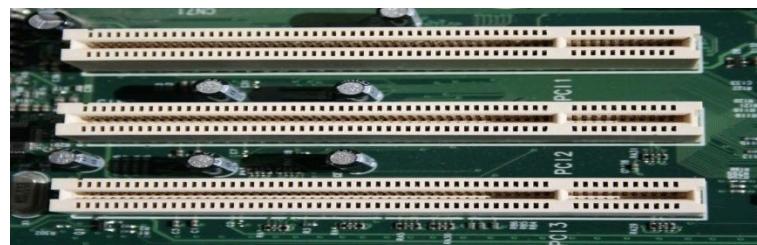
To connect the hub or switch to your network, first take the ethernet cord going from your modem to your computer, and plug the end into the port located (labeled “internet”). Then, attach a new ethernet cord to one of the ports in the group of ports and the other end to your computer.

Ex2: Demonstrate different network cables and connectors.

- Coaxial Cable.
- Fiber Optic Cable.
- Shielded Twisted Pair (STP) Cable.
- Unshielded Twisted Pair (UTP) Cable.

Ex3: Install and configure NIC.

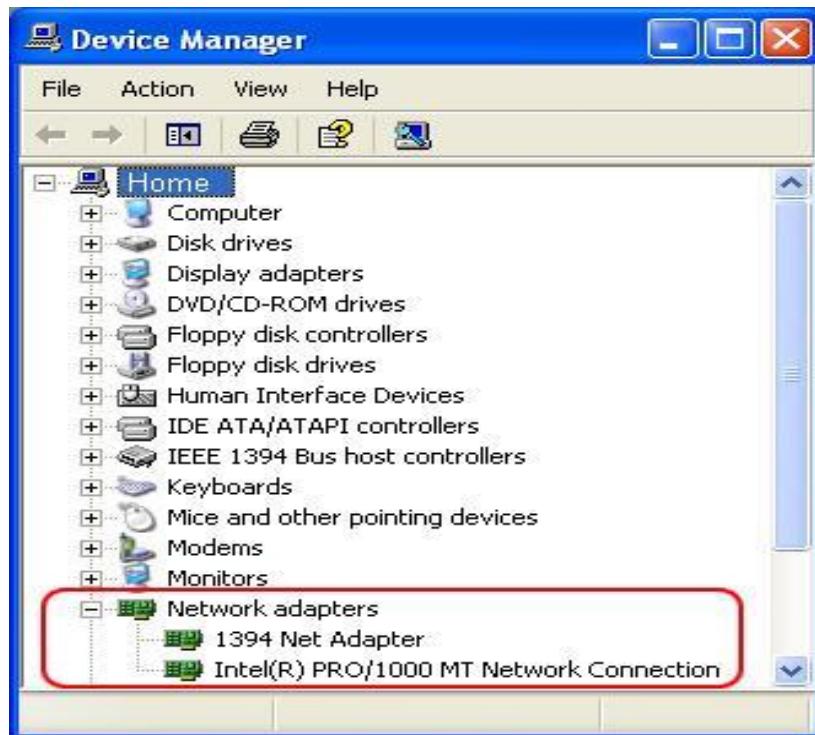
1. Remove the AC power cord and Open the computer case.
2. Find an available Peripheral Component Interconnect (PCI) slot on the motherboard



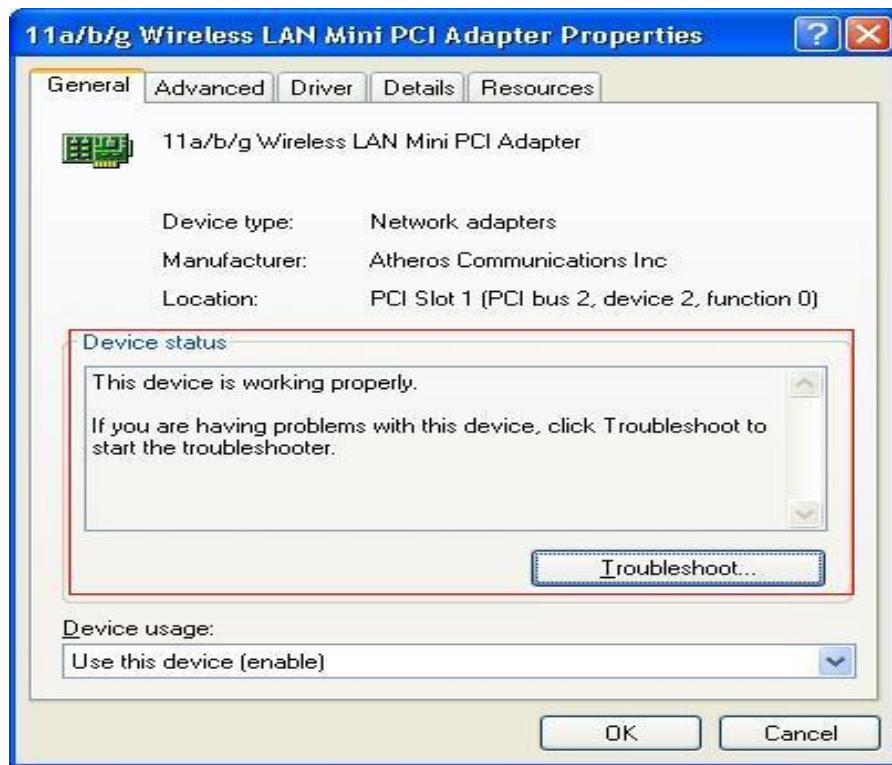
3. Place the cord properly on PCI slot.



4. Screw the card to the computer frame and Close the computer case.
5. Plug your computer in and power it up.
6. Click Start, and then click Control Panel.
7. In Category View (Large Icon). Or Right click on This PC icon on Desktop and select Manage
8. Click the Device Manager Button.
9. Double-click Network Adapters.



10. Beneath it should appear the name of your Ethernet card.
11. Next, double click the name of your Ethernet adapter.
12. If the text in the "Device Status" box says "This device is working properly.", then you successfully installed the card and are finished.
13. If the text in the "Device status" box doesn't say "This device is working properly." Click the Troubleshoot Button and follow instructions.



Ex4: Crimping of RJ45: Straight and Cross.

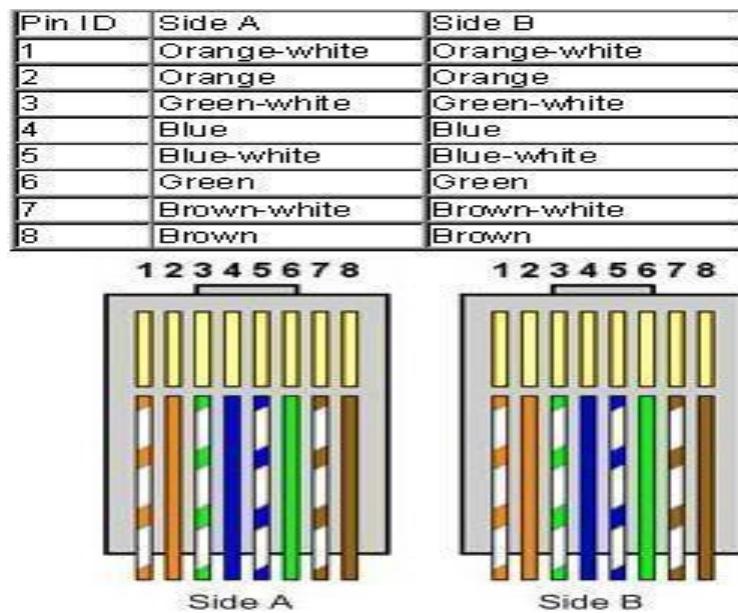
- a) **Punching Cat 6 cable to I/O Box. Use punching tool.**
- b) **Check connectivity using LAN tester**

Procedure: Using a Crimping Tool

1. Strip the cable back 1 inch from the end.
2. Untwist and straighten the wires inside of the cable.
3. Arrange the wires into the right order
4. Cut the wires into an even line $\frac{1}{2}$ inch (1.3 cm) from sheathing.
5. Insert the wires into the RJ-45 connector.
6. Stick the connector into the crimping part of the tool and squeeze twice.
7. Remove the cable from the tool and check that all of the pins are down.

Straight Cable: Used to connect different type of devices.

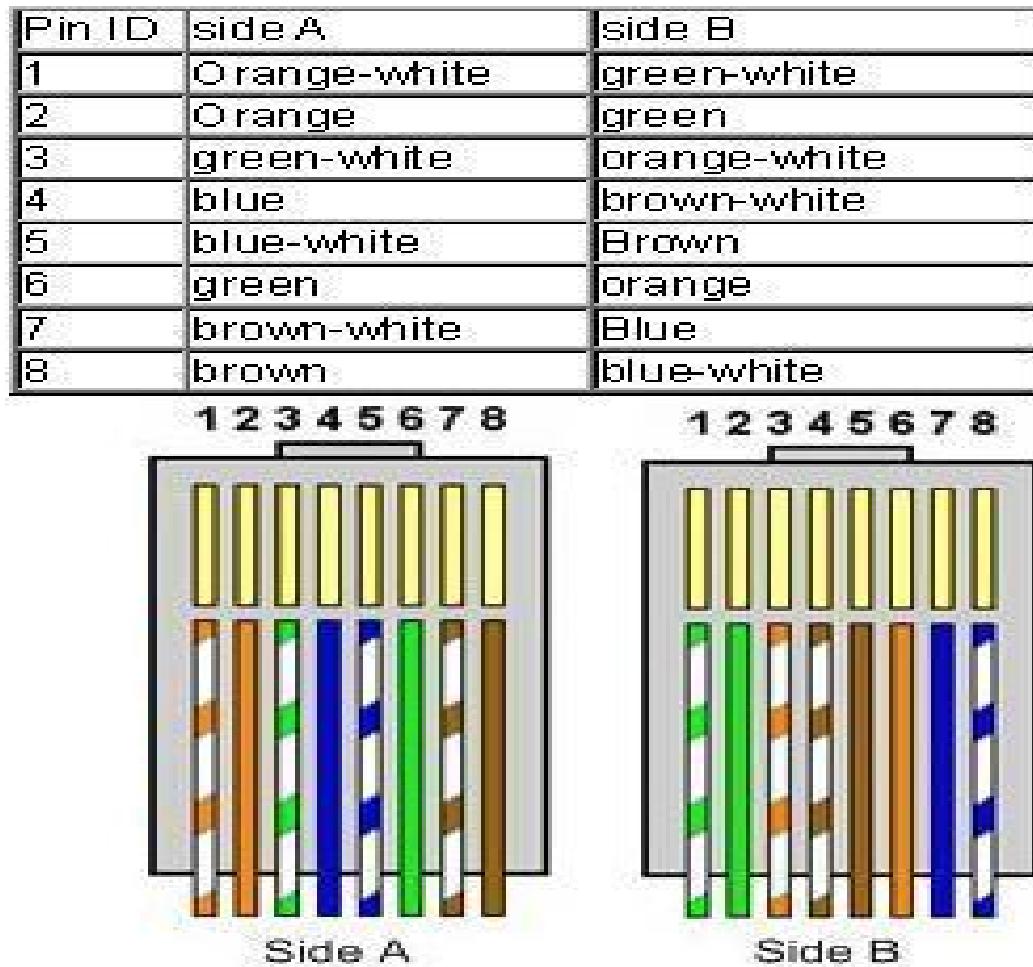
- 1) Connect a computer to a switch/hub's normal port.
- 2) Connect a computer to a cable/DSL modem's LAN port.
- 3) Connect a router's WAN port to a cable/DSL modem's LAN port.
- 4) Connect a router's LAN port to a switch/hub's uplink port.

Straight through

Crossover Cable: used to connect same type of devices.

- 1) Connect 2 computers directly.
- 2) Connect a router's LAN port to a switch/hub's normal port.

Cross over



Week6

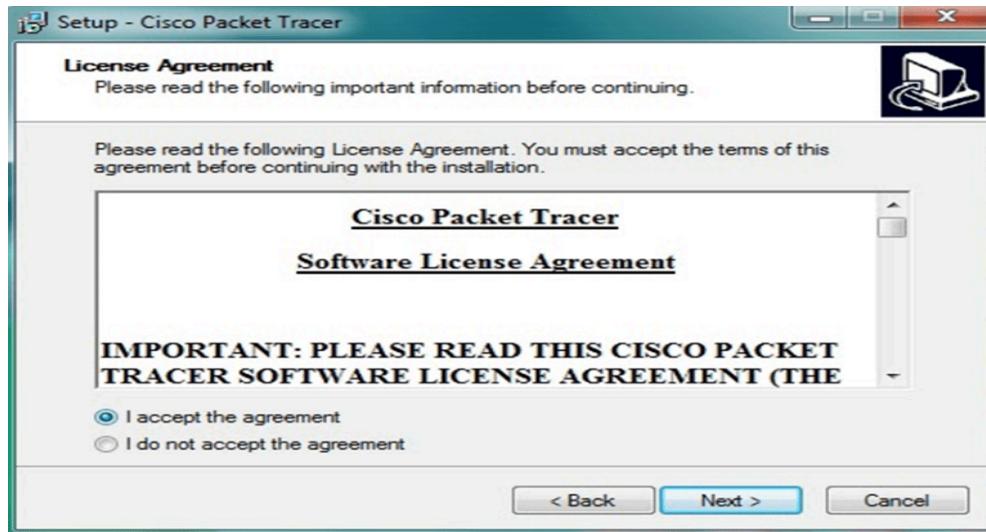
Ex1. Install Network simulator like Cisco packet tracer.

Step by Step procedure to install Cisco Packet tracer on Windows PC

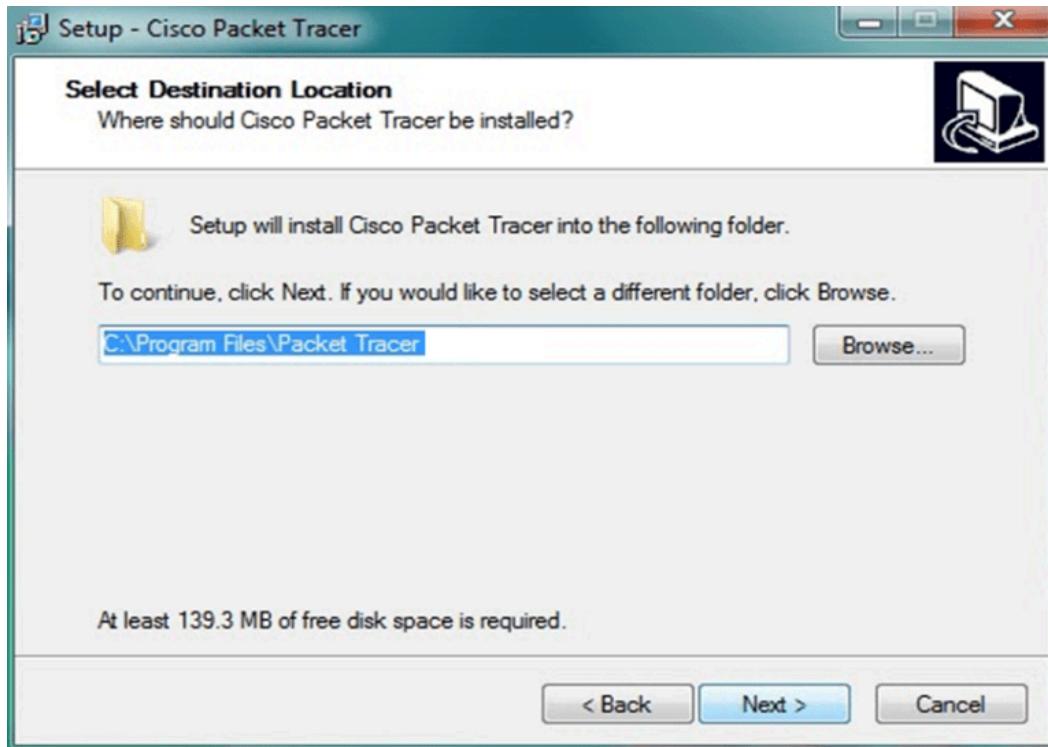
STEP 1: After **Cisco Packet Tracer download**, click on the downloaded exe file. Once below Window will appear, click the “Next” option



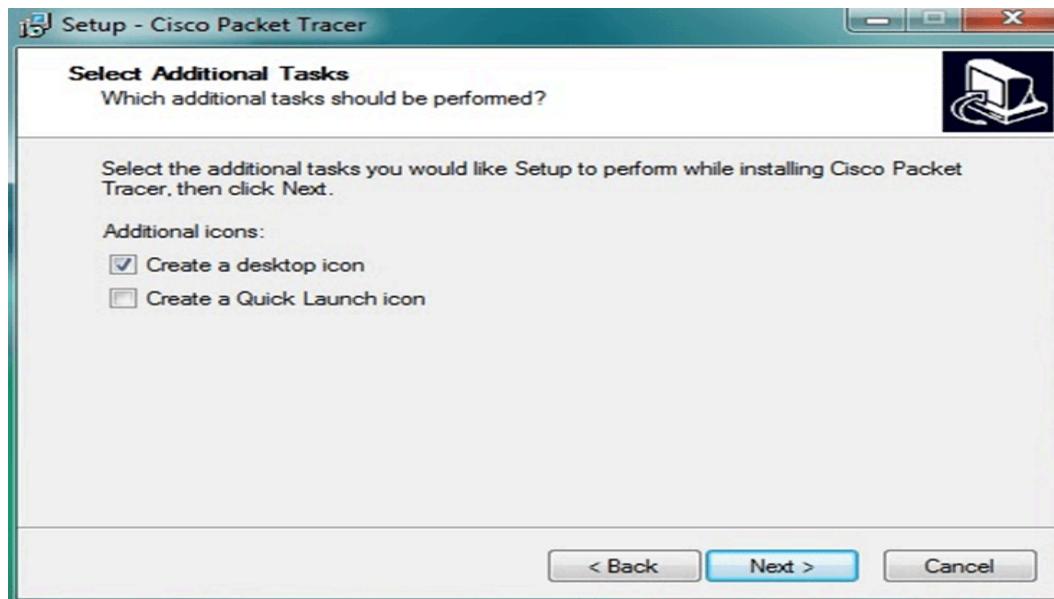
STEP 2: On the next screen, select “I accept the agreement” and click on “Next”.



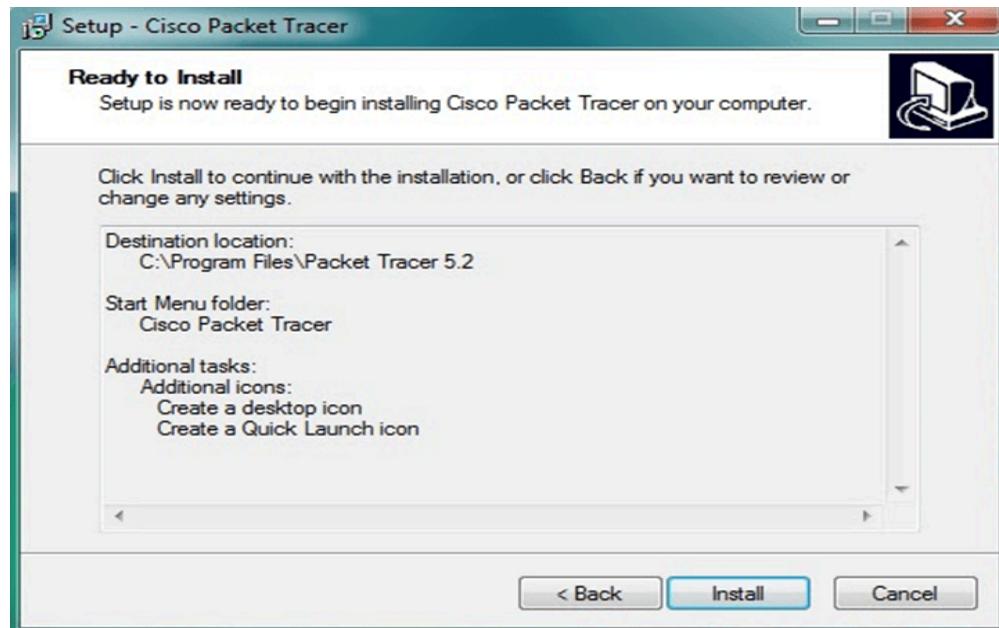
STEP 3: Setup will show the folder in which the program’s shortcuts will be created. If you want to change the folder, you can change it. Click on “Next”.



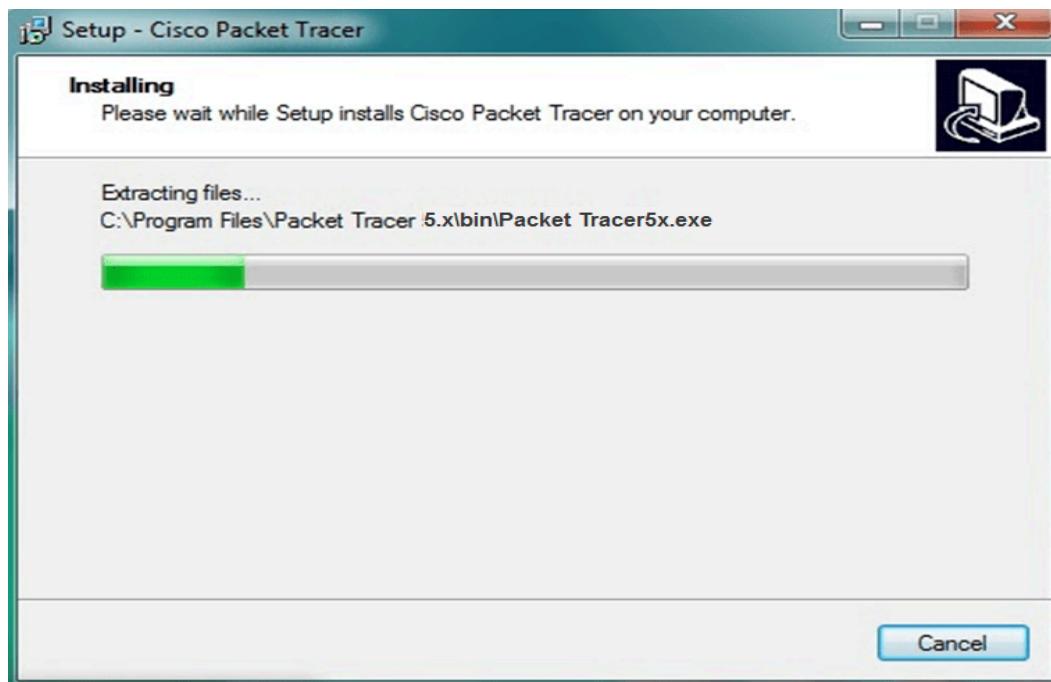
STEP 4: Then the program will ask whether to create a Desktop icon and create a Quick Launch icon. Make your choice and click on “Next”.



STEP 5: The summary of the settings we selected is displayed. Click on “Install”.



STEP 6: The Cisco packet tracer installation starts as shown below.



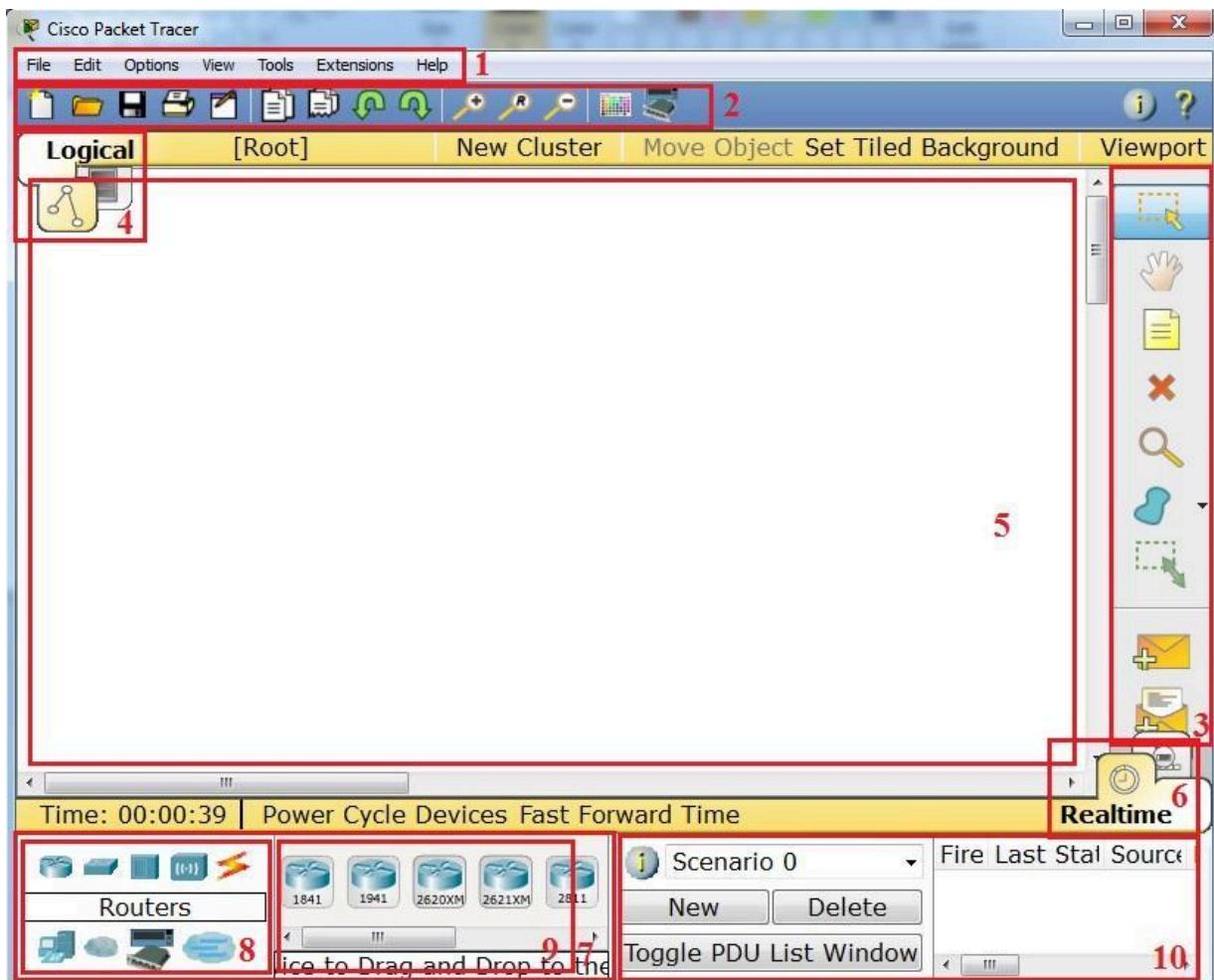
STEP 7: Cisco packet tracer Installation gets completed and the below screen is shown. Click on “Finish”.

Click “OK” on next popup asking you to close or restart your computer.



STEP 8: Packet Tracer is installed and ready to be used.

Packet Tracer Interface Overview



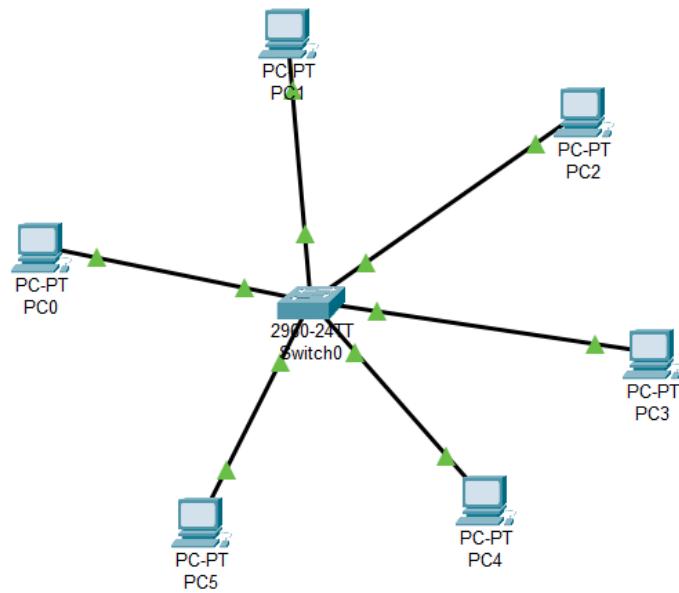
1	Menu Bar	This bar provides the File, Edit, Options, View, Tools, Extensions, and Help menus. You will find basic commands such as Open, Save, Save as Pkz, Print, and Preferences in these menus. You will also be able to access the Activity Wizard from the Extensions menu.
2	Main Tool Bar	This bar provides shortcut icons to the File and Edit menu commands. This bar also provides buttons for Copy, Paste, Undo, Redo, Zoom, the Drawing Palette, and the Custom Devices Dialog . On the right, you will also find the Network Information button, which you can use to enter a description for the current network (or any text you wish to include).
3	Common Tools Bar	This bar provides access to these commonly used workspace tools: Select, Move Layout, Place Note, Delete, Inspect, Resize Shape, Add Simple PDU, and Add Complex PDU . See “Workspace Basics” for more information.
4	Logical/Physical Workspace and Navigation Bar	You can toggle between the Physical Workspace and the Logical Workspace with the tabs on this bar. In Logical Workspace, this bar also allows you to go back to a previous level in a cluster, create a New Cluster, Move Object, Set Tiled Background, and Viewport . In Physical Workspace, this bar allows you to navigate through physical locations, create a New City , create a New Building , create a New Closet, Move Object , apply a Grid to the background, Set Background , and go to the Working Closet .
5	Workspace	This area is where you will create your network, watch simulations, and view many kinds of information and statistics.
6	Realtime/Simulation Bar	You can toggle between Realtime Mode and Simulation Mode with the tabs on this bar. This bar also provides buttons to Power Cycle Devices and Fast Forward Time as well as the Play Control buttons and the Event List toggle button in Simulation Mode. Also, it

		contains a clock that displays the relative Time in Realtime Mode and Simulation Mode.
7	Network Component Box	This box is where you choose devices and connections to put into the workspace. It contains the Device-Type Selection Box and the Device-Specific Selection Box .
8	Device-Type Selection Box	This box contains the type of devices and connections available in Packet Tracer. The Device-Specific Selection Box will change depending on which type of device you choose.
9	Device-Specific Selection Box	This box is where you choose specifically which devices you want to put in your network and which connections to make.
10	User Created Packet Window*	This window manages the packets you put in the network during simulation scenarios. See the "Simulation Mode" section for more details.

Ex2. Create simple network in simulator.

Procedure

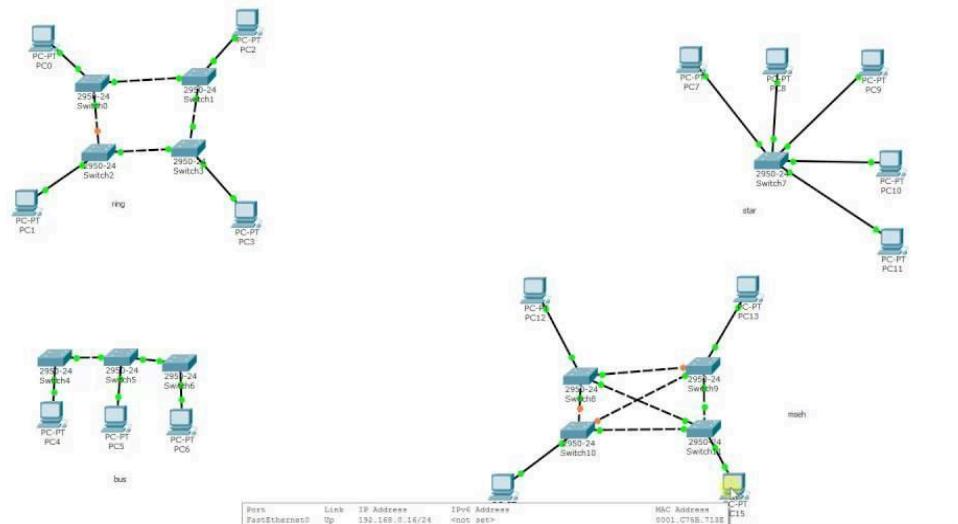
- Go to Cisco Packet Tracer.
- Click on the End Devices and deploy 4 PCs.
- Click on the Network Devices and deploy 2960 switch
- Click on the connection category and select the Copper Straight-Through cable type to connect PC to Switch
- From the pop-up menu select the Fast Ethernet interface to connect switch and PC.
- Click on PC, go to desktop and select IP configuration and assign IP address to all the individual PCs.
- Go to the command and ping all the PCs. Ex: ping 192.168.1.1
- Go to tool bar & take a packet (PDU) & place it into source device and mention the destination device.
- We can start the simulation & we can see the message going from one PC to another PC.



Ex3. Create and demonstrate all possible network topologies using simulator.

Procedure

- Go to Cisco Packet Tracer.
- Click on the End Devices and deploy 4 PCs.
- Click on the Network Devices and deploy four 2960 switches
- Click on the connection category and Select a Copper Cross-Over cable to connect the switches.
- From the pop-up menu select the FastEthernet0/1 interface to connect switch0 and switch1, select the FastEthernet0/2 interface to connect switch1 and switch2, select the FastEthernet0/3 interface to connect switch2 and switch3
- Click on the connection category and select the Copper Straight-Through cable type to connect PC to Switch
- From the pop-up menu select the Fast Ethernet interface to connect switch and PC.
- Click on PC, go to desktop and select IP configuration and assign IP address to all the individual PCs.
- Go to the command and ping all the PCs. Ex: ping 192.168.1.1
- Go to tool bar & take a packet (PDU) & place it into source device and mention the destination device.
- We can start the simulation & we can see the message going from one PC to another PC.



Week7

1. Build a physical Ethernet LAN Network and demonstrate file sharing, printer sharing.

File Sharing

1. Go to control panel
2. Select network & internet
3. Under network & sharing center select view network state & tasks
4. Select Ethernet -> go to properties -> select internet protocol version 4 (IP4) -> click properties -> Set the IP Address
5. Select any drive, create a new folder & file with in the folder
6. Right click on the folder to select properties
7. Go to sharing Tab -> Advanced Sharing -> share this folder -> Permission -> choose every one -> Give permission (Full Control) -> ok
8. Go to sharing Tab -> click on network & sharing center

Under Private Section

Select Turn on network discovery

Select Turn on file and printer sharing

Select Allow windows to manage home group connections.

Under Public Section

Select Turn on network discovery

Select Turn on file and printer sharing.

Under All Networks Section

Find file sharing connections and Select the enable file sharing for devices.

9. Go to Security Tab -> Edit -> Add -> Type eve and click on check name -> Choose Every one -> Give permission (Full Control) -> ok
10. Select network icon on desktop->Find the shared folder and share the files.
11. In the client system, go to run and type the IP address followed by double backward slash and click on OK. Find the shared folder. Ex:\192.168.1.26

Printer sharing

1. Install printer
2. Go to control Panel
3. Click on Hardware and Sounds
4. Click on Devices and Printers
5. Select your Printer (ex: Hp Laser jet 1020)
6. Right click on the printer and select printer properties
7. Go to sharing tab
8. Click on share this printer and click apply and ok
9. In the client system, go to run and type the IP address followed by double backward slash and click on OK. Find the shared printer. Ex:\192.168.1.26
10. Right click on shared printer and click on connect and follow the instruction

2. Install and configure wireless access point over the LAN.

Setting up DSL-2730U for BSNL broadband Wireless Router

Step 1 Connect the modem/access point to power supply and one LAN port to the computer.

Step 2 Find the IP address of your modem (default IP address is **192.168.1.1**).

Step 3 Login to this address. Default is **admin (username)** and **admin (password)**.

Step 4 After login Device status page will open up.

Step 5 Go to **Setup>Wireless Setup->Wireless Basics**. Enter SSID -> Apply Changes

Step 5 Go to **Setup>Wireless Setup->Wireless Security**. Enter password -> Apply Changes

3. Use pathping command to find actual path between source to destination with information about network latency/delay & network loss.

Using pathping

This network utility is a more advanced version of the Ping tool, which performs a ping to each hop along the route to the destination. It is extremely useful in diagnosing packet loss, and can help with diagnosing slow speed faults.

To PathPing a device, proceed as follows.

1. Open a Windows Command Prompt window.
2. At the command prompt, type, pathping <IP address>, as shown below.

```

Command Prompt
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\Project>pathping -n google.com

Tracing route to google.com [142.250.195.142]
over a maximum of 30 hops:
  0  192.168.0.114
  1  192.168.0.1
  2  10.212.140.1
  3  218.248.120.58
  4  * * *
Computing statistics for 75 seconds...
      Source to Here   This Node/Link
Hop  RTT     Lost/Sent = Pct  Lost/Sent = Pct  Address
  0          0/ 100 = 0%          0/ 100 = 0%  192.168.0.114
  1    0ms    0/ 100 = 0%    0/ 100 = 0%  192.168.0.1
  2    3ms    0/ 100 = 0%    0/ 100 = 0%  10.212.140.1
  3    0ms    0/ 100 = 0%    0/ 100 = 0%  218.248.120.58

Trace complete.

C:\Users\Project>pathping 192.168.1.217

Tracing route to 192.168.1.217 over a maximum of 30 hops
  0  Lenovo [192.168.0.114]
  1  192.168.0.1
  2  10.212.140.1
  3  static.ill.218.248.120.46/24.bsnl.in [218.248.120.46]
  4  * * *
Computing statistics for 75 seconds...
      Source to Here   This Node/Link
Hop  RTT     Lost/Sent = Pct  Lost/Sent = Pct  Address
  0          0/ 100 = 0%          0/ 100 = 0%  Lenovo [192.168.0.114]
  1    0ms    0/ 100 = 0%    0/ 100 = 0%  192.168.0.1
  2    4ms    0/ 100 = 0%    0/ 100 = 0%  10.212.140.1
  3    1ms    0/ 100 = 0%    0/ 100 = 0%  static.ill.218.248.120.46/24.bsnl.
in [218.248.120.46]

Trace complete.

C:\Users\Project>

```

Note: You can interrupt PathPing at any time by holding down the **CTRL** key, and pressing **C** on your keyboard.

pathping -n google.com

The screenshot shows a Windows Command Prompt window titled "Command Prompt". The output of the "pathping -n google.com" command is displayed. The command traces the route to google.com over a maximum of 30 hops, listing four routers (192.168.0.114, 192.168.0.1, 10.212.140.1, and 218.248.120.58) and then computing statistics for 75 seconds. The statistics table shows RTT, lost/sent percentages, and addresses for each hop. The trace is complete, and the prompt returns to C:\Users\Project>.

```
Microsoft Windows [Version 6.3.9600]
(c) 2013 Microsoft Corporation. All rights reserved.

C:\Users\Project>pathping -n google.com

Tracing route to google.com [142.250.195.142]
over a maximum of 30 hops:
  0  192.168.0.114
  1  192.168.0.1
  2  10.212.140.1
  3  218.248.120.58
  4  *   *   *
Computing statistics for 75 seconds...
      Source to Here   This Node/Link
Hop  RTT     Lost/Sent = Pct  Lost/Sent = Pct  Address
  0          0/ 100 = 0%          0/ 100 = 0%  192.168.0.114
  1    0ms    0/ 100 = 0%    0/ 100 = 0%  192.168.0.1
  2    3ms    0/ 100 = 0%    0/ 100 = 0%  10.212.140.1
  3    0ms    0/ 100 = 0%    0/ 100 = 0%  218.248.120.58

Trace complete.

C:\Users\Project>
```

Week 8

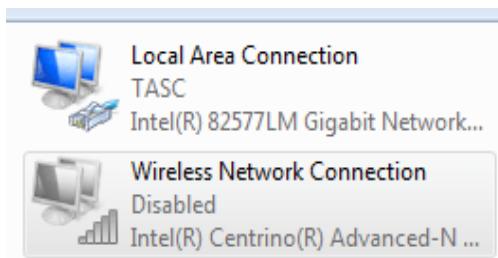
Ex1: Determine the MAC Address of a Host(PC and Phone).

1. Open the command prompt.
2. Type in ipconfig /all and press Enter.
3. This will display your network configuration.
4. Find your machine's Host Name and MAC Address.

Ex2: View Wireless and Wired NIC Information and make a table explaining each.

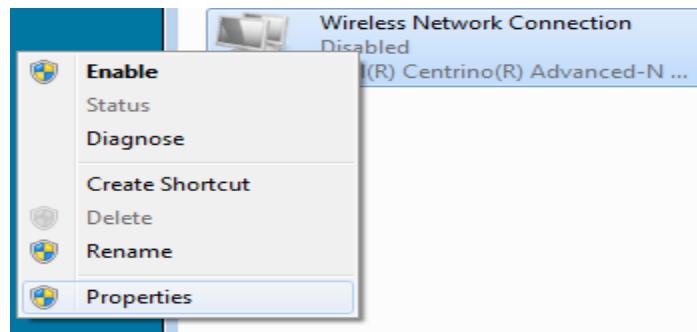
Step 1: Use the Network and Sharing Center.

- Open the **Network and Sharing Center**.
- In the left pane, click the **Change adapter settings** link.
- The Network Connections window displays, which provides the list of NICs available on this PC. Look for your Local Area Connection and Wireless Network Connection adapters in this window.

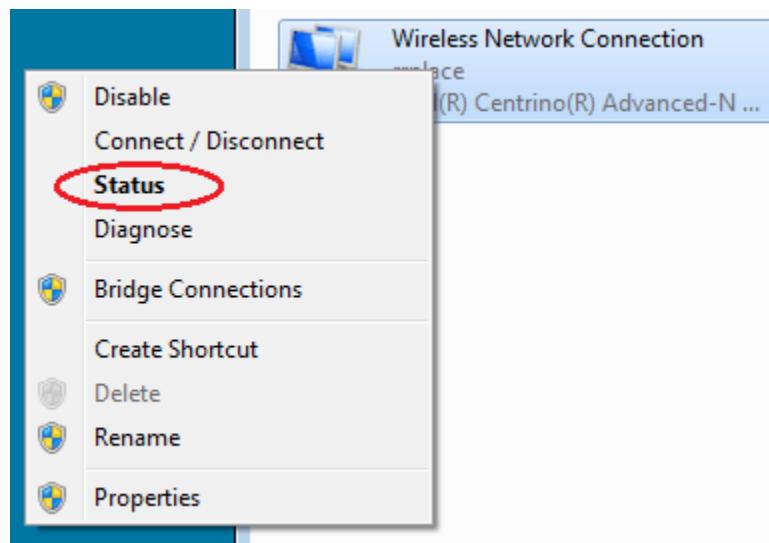


Step 2: Work with your wireless NIC.

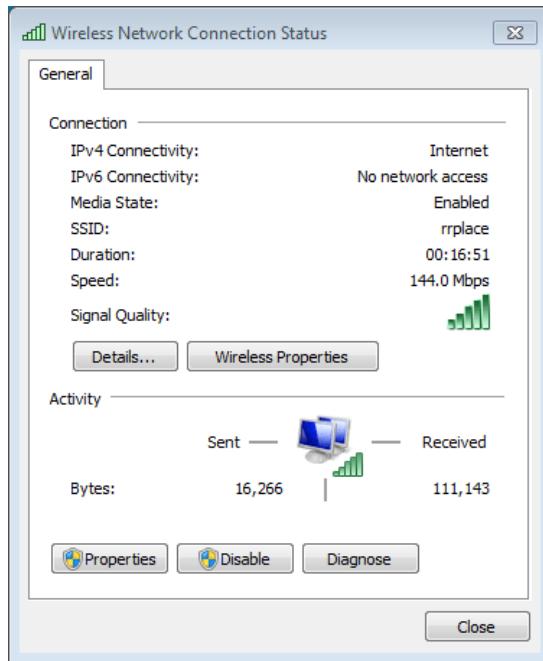
- Select the **Wireless Network Connection** option and right-click it to bring up a drop-down list. If your **Wireless Network Connection** is currently disabled, then click **Enable**.



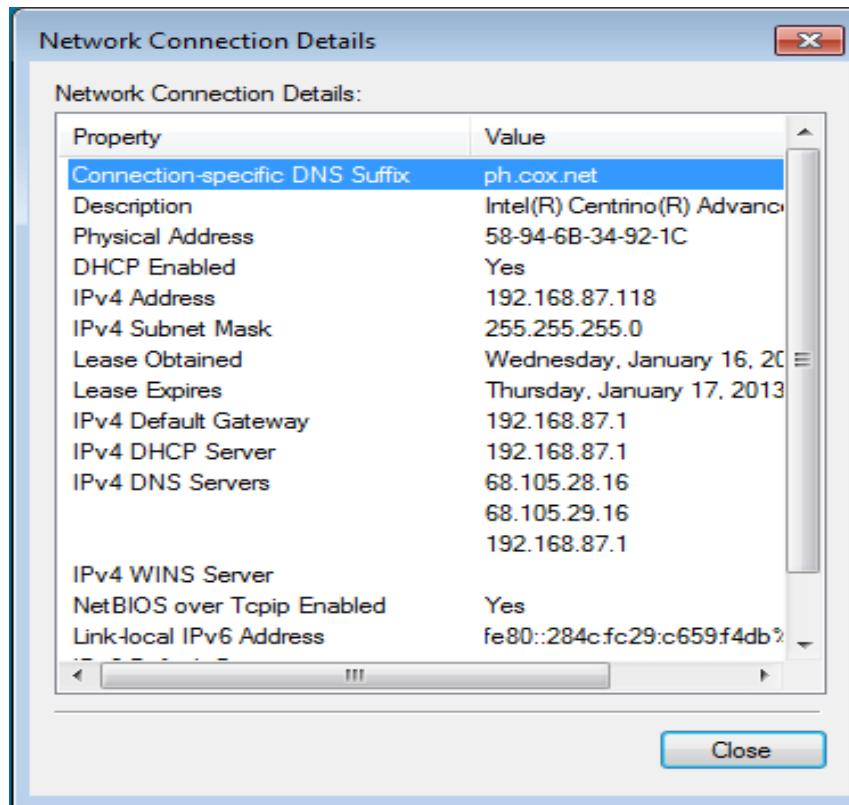
- Right-click the **Wireless Network Connection**, and then click **Status**.



- The Wireless Network Connection Status window displays where you can view information about your wireless connection



- Click **Details** to display the Network Connection Details window.



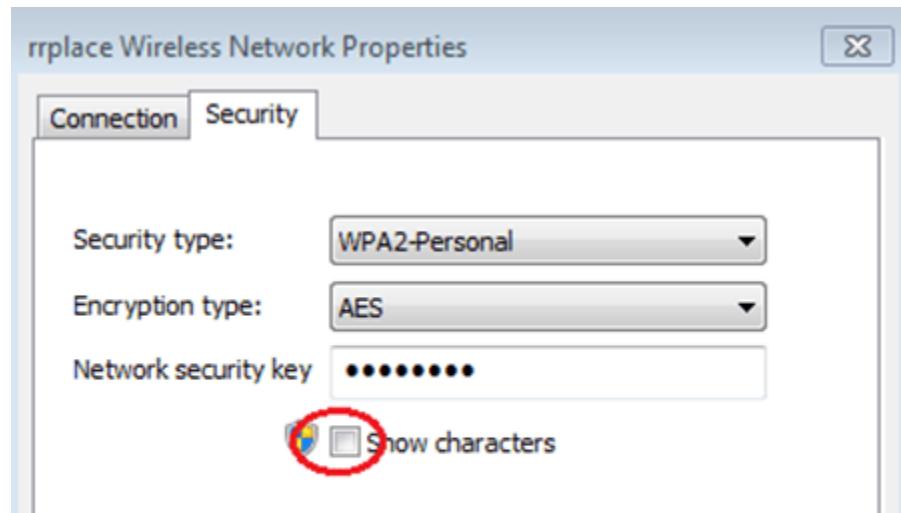
- When you have reviewed the network connection details, click **Close**.
- Open a command window prompt and type **ipconfig /all**.

```
Wireless LAN adapter Wireless Network Connection:
Connection-specific DNS Suffix . : ph.cox.net
Description . . . . . : Intel(R) Centrino(R) Advanced-N 6200 AGN
Physical Address . . . . . : 58-94-6B-34-92-1C
DHCP Enabled. . . . . : Yes
Auto-configuration Enabled . . . . . : Yes
Link-local IPv6 Address . . . . . : fe80::284c:fc29:c659:f4db%11(PREFERRED)
IPv4 Address. . . . . : 192.168.87.118(PREFERRED)
Subnet Mask . . . . . : 255.255.255.0
Lease Obtained. . . . . : Thursday, January 17, 2013 8:30:40 AM
Lease Expires . . . . . : Friday, January 18, 2013 8:30:41 AM
Default Gateway . . . . . : 192.168.87.1
DHCP Server . . . . . : 192.168.87.1
DHCPv6 IAID . . . . . : 307795051
DHCPv6 Client DUID. . . . . : 00-01-00-01-14-AC-22-0A-5C-26-0A-24-2A-60
DNS Servers . . . . . : 68.105.28.16
                           68.105.29.16
                           192.168.87.1
NetBIOS over Tcpip. . . . . : Enabled
```

- Click **Wireless Properties**. In the **Wireless Network Properties** window, click the **Security** tab.

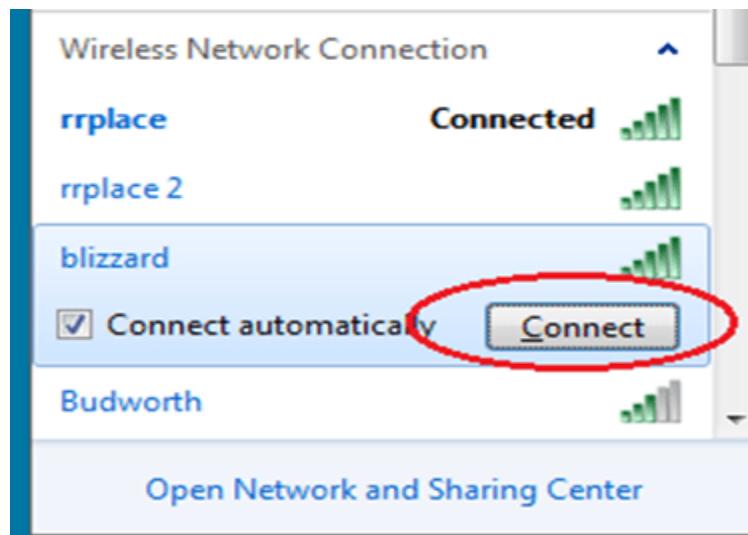


- Click the **Show characters** check box to display the actual Network security key and then click **OK**.



- Select and right-click the **Wireless Network Connection** option > **Connect/Disconnect**. Select the required SSIDs.

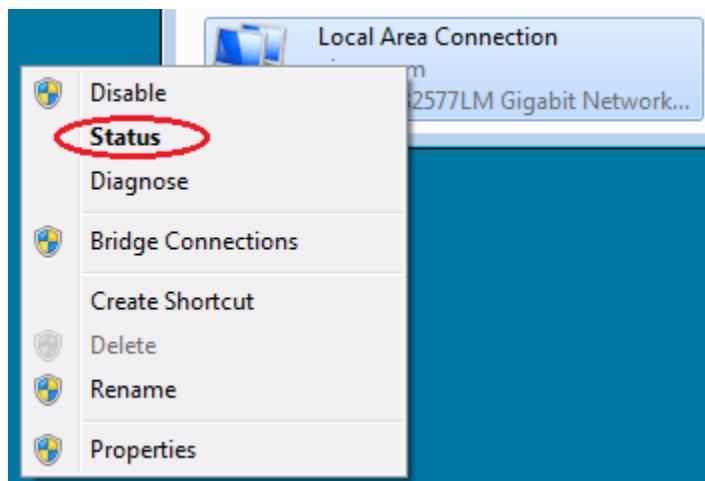




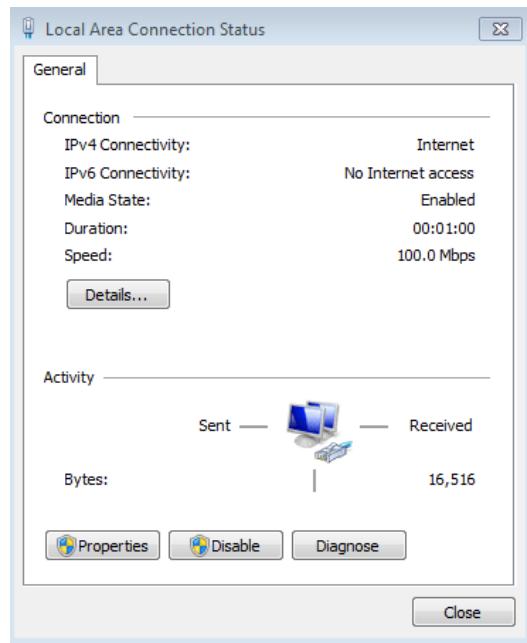
- If you have selected a secure SSID, you are prompted to enter the **Security key** for the SSID. Type the security key for that SSID and click **OK**.

Step 3: Work with your wired NIC.

- On the Network Connections window, select and right-click the **Local Area Connection** option to display the drop-down list. If the NIC is disabled, enable it, and then click the **Status** option.



- The Local Area Connection Status window will open. This window displays information about your wired connection to the LAN.



- Click Details to view the address information for your LAN connection.

Network Connection Details:	
<hr/>	
Property	Value
Connection-specific DN...	ph.cox.net
Description	Intel(R) 82577LM Gigabit Network Co
Physical Address	5C-26-0A-24-2A-60
DHCP Enabled	Yes
IPv4 Address	192.168.87.127
IPv4 Subnet Mask	255.255.255.0
Lease Obtained	Thursday, January 17, 2013 10:38:14
Lease Expires	Friday, January 18, 2013 10:38:14 AM
IPv4 Default Gateway	192.168.87.1
IPv4 DHCP Server	192.168.87.1
IPv4 DNS Servers	68.105.28.16 68.105.29.16 192.168.87.1
IPv4 WINS Server	
NetBIOS over Tcpip En...	Yes
Link-local IPv6 Address	fe80::b875:731b:3c7b:c0b1%10

Ex3: Configure and install an Ethernet switch/Hub (Use simulator if hardware devices are not available)

1. Configure the Host name of the switch to SW1
2. Set IP Address
3. Set a Message of the day(MOTD) banner for Switch

Only Authorized Users Allowed

4. Configure
Line Console Password jss@123
Enable Secrete Password cs@123

Configure the Host name of the switch to SW1

- Go to Cisco Packet Tracer.

- Click on the Network Devices and deploy 2960 switch
- Double click on the switch and go to CLI
- To change Host name of the Switch: Type enable and press enter
- Type configure terminal
- Type hostname sw1 and press enter
- Type exit

To Set IP Address

- Type enable
- Type configure terminal
- Type interface vlan 1
- Type ip address 192.168.1.25 255.255.255.0

Set a Message of the day(MOTD) banner for Switch

Only Authorized Users Allowed

- Type enable
- Type config t
- Type banner ?
- Type banner motd ?
- Type banner motd c
- *****
- Only Authorized Users Allowed
- *****
- Type c (MOTD message end with c)
- Exit
- Exit

Configure

Line Console Password jss@123 (Used to Login into Switch)

Enable Secret Password cs@123 (Used to Configure the Switch)

- Type enable
- Type sh run (To check the startup and running configuration)
- Type config t
- Type line con 0
- Type password jss@123 Or enable password jss@123
- Type login
- Type exit
- Type enable secret cs@123
- Type exit

Ex: 4 Create/model a simple Ethernet network using 3 hosts and a switch, Observe traffic behavior on the network and Observer data flow of ARP broadcasts and pings.

- Go to Cisco Packet Tracer.
- Click on the End Devices and deploy 3 PCs.
- Click on the Network Devices and deploy 2960 switch
- Click on the connection category and select the Copper Straight-Through cable type to connect PC to Switch.
- Click on PC, go to desktop and select IP configuration and assign IP address to all the individual PCs.
- Go to the command prompt and ping all the PCs. Ex: ping 192.168.1.1
- Go to tool bar & take a packet (PDU) & place it into source device and mention the destination device.
- We can start the simulation & we can see the message going from one PC to another PC.
- Go to the command prompt Type arp -a to view the arp table

- Click on PDU and go to inbound or outbound PDU Details and Check the source address, destination address and MAC address
- Go to tool bar and select inspect(search icon) tool and place it on pc and select arp table to view ARP information

Week 9

Ex1: Build a simple peer-to-peer network and verify physical connectivity and Assign various IPv4 addresses to hosts and observe the effects on network communication

- Go to Cisco Packet Tracer.
- Click on the End Devices and deploy 2PCs.
- Click on the connection category and select the Copper Cross-over cable type to connect PCs
- Click on PC, go to desktop and select IP configuration and assign IP address to all the individual PCs.
- Go to the command prompt and ping all the PCs. Ex: ping 192.168.1.1
- Go to tool bar & take a packet (PDU) & place it into source device and mention the destination device.
- We can start the simulation & we can see the message going from one PC to another PC.

Ex2: Configure IP addresses of a network (real or simulated) and ping across to test

and troubleshoot.

- Go to Cisco Packet Tracer.
- Click on the End Devices and deploy 3 PCs.
- Click on the Network Devices and deploy 2960 switch
- Click on the connection category and select the Copper Straight-Through cable type to connect PC to Switch.
- Click on PC, go to desktop and select IP configuration and assign IP address to all the individual PCs.
- Go to the command prompt and ping all the PCs. Ex: ping 192.168.1.1
- Go to tool bar & take a packet (PDU) & place it into source device and mention the destination device.
- We can start the simulation & we can see the message going from one PC to another PC.

Ex3: Subnetting of a network (either using real network or in Simulator).

Subnetting

- It is the process of dividing a network into two or more smaller networks. It increases the network performance and routing efficiency.
- In class C network, the first three octets(24 bits) represents network address and the last octet (8 bits) represents the host address. Therefore the subnet address can be created by modifying the bits of the last octet.
- When subnets are created, the number of subnets is a power of 2. The value of the exponent gives the number of bits that represent the subnet mask.

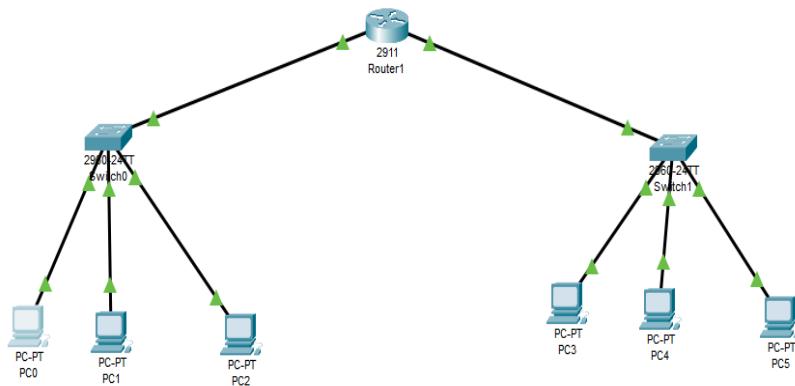
Example: Two subnets

Sl No	Subnet Address (Dotted)	Subnet Address (Binary)
Subnet 0	192.168.1.128	1100000.10101000.00000001. 1 0000000
Subnet 1	192.168.1.255	1100000.10101000.00000001. 11 000000

First subnet will have address between 192.168.1.1 and 192.168.1.127

Second subnet will have address between 192.168.1.129 and 192.168.1.255

- Go to Cisco Packet Tracer.
- Click on the End Devices and deploy 6 PCs.
- Click on the Network Devices and deploy two switches (2960) and one router (2911) and design a network as shown in the figure.



- Click on the connection category and select Automatically choose connection type to connect PC to Switch and switch to router
- Click on PC, go to desktop and select IP configuration and assign IP address to all the individual PCs.
- Go to the command prompt and ping all the PCs. Ex: ping 192.168.1.1

For first Network

	PC1	PC2	PC3
IP ADDRESS	192.168.1.1	192.168.1.2	192.168.1.3
SUBNET MASK	255.255.255.128	255.255.255.128	255.255.255.128
DEFAULT GATEWAY	192.168.1.4	192.168.1.4	192.168.1.4

For Second Network

	PC1	PC2	PC3

IP ADDRESS	192.168.1.129	192.168.1.130	192.168.1.131
SUBNET MASK	255.255.255.128	255.255.255.128	255.255.255.128
DEFAULT GATEWAY	192.168.1.132	192.168.1.132	192.168.1.132

For Router

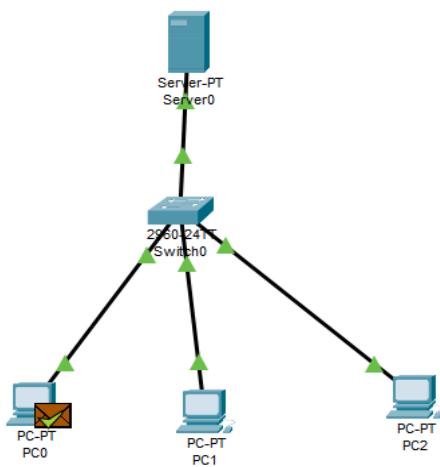
- Click on router
- Go to config
- Click on GigabitEthernet0/0
- Click the on check box in the right corner and assign IP Address : 192.168.1.4
And subnet mask: 255.255.255.128
- Click on GigabitEthernet0/1
- Click the on check box in the right corner and assign IP Address : 192.168.1.132
And subnet mask: 255.255.255.128

Ex4: Connect to web server using simulator, Observe how packets are sent across the Internet using IP addresses

- Go to Cisco Packet Tracer.
- Deploy 3 PC, one switch and one server as shown in the figure.
- Click on the connection category and select Automatically choose connection type to connect PC to Switch and switch to server
- Click on PC, go to desktop and select IP configuration and assign IP address to all the individual PCs and a server.
- Go to tool bar & take a packet (PDU) & place it into source device (PC) and mention the destination device (Server).
- We can start the simulation & we can see the message going from one PC to another Server.

	PC1	PC2	PC3	Server
--	-----	-----	-----	--------

IP ADDRESS	192.168.1.2	192.168.1.3	192.168.1.4	192.168.1.1
SUBNET MASK	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
DEFAULT GATEWAY	192.168.1.1	192.168.1.1	192.168.1.1	



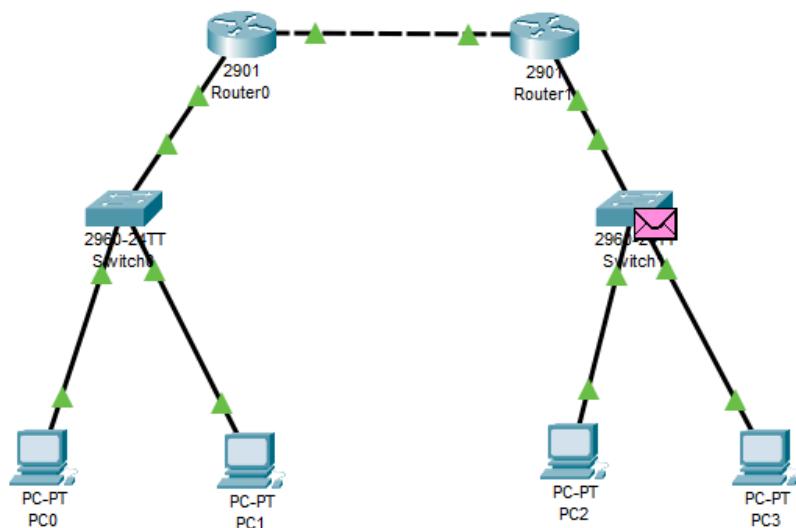
Week 10

Ex1: Implement simple static routing.

- Go to Cisco Packet Tracer.
- Deploy 4 PC, 2 switch and 2 routers as shown in the figure.
- Click on the connection category and select Automatically choose connection type to connect PC to Switch and switch to router and router to router
- Click on PC, go to desktop and select IP configuration and assign IP address to all the individual PCs and a Routers
- Go to tool bar & take a packet (PDU) & place it into source device (PC) and mention the destination device (Server).
- We can start the simulation & we can see the message going from one PC to another Server.

	PC1	PC2	Router1 (Interface 0)	Router1 (Interface 1)
IP ADDRESS	192.168.1.2	192.168.1.3	192.168.1.1	192.168.3.1
SUBNET MASK	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
DEFAULT GATEWAY	192.168.1.1	192.168.1.1		

	PC3	PC4	Router2 (Interface 0)	Router2 (Interface 1)
IP ADDRESS	192.168.2.2	192.168.2.3	192.168.3.2	192.168.2.1
SUBNET MASK	255.255.255.0	255.255.255.0	255.255.255.0	255.255.255.0
DEFAULT GATEWAY	192.168.2.1	192.168.2.1		



For Router

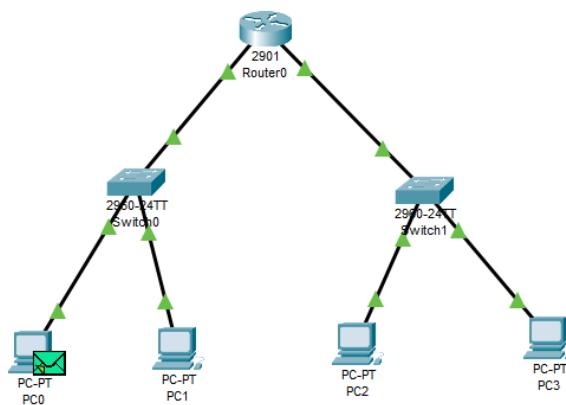
- Click on router
- Go to config
- Click on Static and mention Network, Mask and Next Hop
- Click Add

	Router1	Router2
Network	192.168.2.0	192.168.1.0
Mask	255.255.255.0	255.255.255.0
Next Hop	192.168.3.2	192.168.3.1

Ex2: Troubleshooting of IP Addressing

- a) Change a routing table entry
- b) Wrong address
- c) Incorrect subnet mask

Design the topology with the following IP Address and Subnet Mask



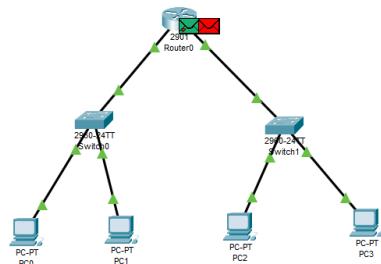
For first Network

	PC1	PC2	Router1 (Interface 0)
IP ADDRESS	192.168.1.1	192.168.1.2	192.168.1.3
SUBNET MASK	255.255.255.128	255.255.255.128	255.255.255.128
DEFAULT GATEWAY	192.168.1.3	192.168.1.3	

For Second Network

	PC1	PC2	Router1 (Interface 1)
IP ADDRESS	192.168.1.129	192.168.1.130	192.168.1.131
SUBNET MASK	255.255.255.128	255.255.255.128	255.255.255.128
DEFAULT GATEWAY	192.168.1.131	192.168.1.131	

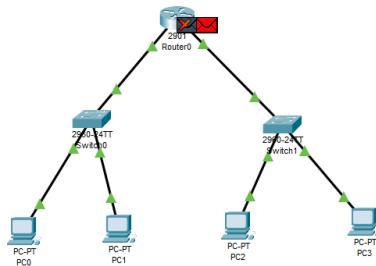
Change the router IP address (Interface1) from 192.168.1.131 to 10.1.1.1 and observe the packet movement



Change the IP address and subnet mask of the PC2 and observe the packet movement

IP address 10.1.1.1

Subnet mask 255.0.0.0

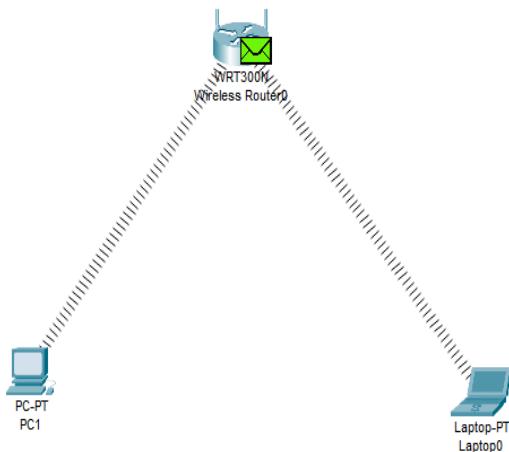


Ex3: Configure and test DHCP on a wireless router (real or simulated)

- Go to Cisco Packet Tracer.
- Click on Wireless Devices
- Deploy a wireless Router, one PC and one Laptop as shown in the figure.
- Click on PC/Laptop go to Physical Tab. In physical device view, turnoff the PC, scroll down and remove PT- HOST-NM-1CFE slot (drag and drop to Left Panel) and replace it with WMP300N (drag and drop into slot) and turn on the PC/Laptop.
- Click on PC/Laptop, Go to Desktop Click on IP Configuration Choose DHCP
- Click on PC Select Web Browser Type 192.168.0.1
- Enter admin as User Name and Password
- Go to Wireless Tab, Change Network Name (SSID) and save the changes.
- Click on Router, go to Config tab and choose Wireless and select WEP and set the WEP

Key as password(Integer 10 numbers)

- Click on PC/Laptop, select PC Wireless, click on connect, select Wireless Network Name and click on connect and enter WEP Key, click on connect.
- Go to tool bar & take a packet (PDU) & place it into source device (PC) and mention the destination device (Server).
- We can start the simulation & we can see the message going from one PC to another.



Week 11

1. Packet Tracer-Examine NAT on a Wireless Router

Network Address Translation (NAT) involves switching the source and destination IP addresses as well as the port numbers. By hiding private network address ranges, address translation lessens the necessity for IPv4 public addresses. Typically, routers or firewalls carry out this process.

Example of NAT:

A web page request is made to an internet server by a host. The source address of the request must be altered by the router since Host A utilizes a private IP address, which is not routable on the Internet. After receiving the request, the router modifies the packet's source IP address to be its own public IP address before sending it to the server. After receiving the packet, the server responds to the router. After receiving the packet, the router modifies the destination IP addresses to include Host A's private IP address before sending the message to the host.

To examine NAT on a Wireless Router follow the below steps:

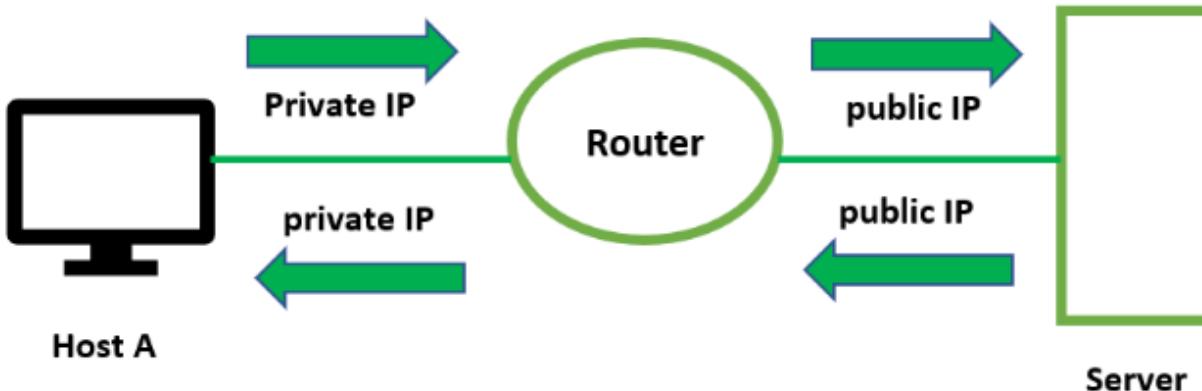
Step 1: Check the settings for gaining access to a remote network.

Step 2: Check the settings for gaining access to the internal network.

Step 3: Connect up 3 computers with the wireless router.

Step 4: View the wireless router's NAT translation.

Step 5: View the packet header data that was sent across the network.



2. Identify the different types of IPv6 addresses

IPv6 addresses are 128-bits long and are identifiers for individual interfaces and sets of interfaces. IPv6 addresses of all types are assigned to interfaces, not nodes (hosts and routers). Because each interface belongs to a single node, any of that node's interfaces' unicast addresses can be used as an identifier for the node. A single interface can be assigned multiple IPv6 addresses of any type.

The three types of IPv6 addresses are: unicast, anycast, and multicast.

- Unicast addresses identify a single interface.
- Anycast addresses identify a set of interfaces in such a way that a packet sent to an anycast address is delivered to a member of the set.
- Multicast addresses identify a group of interfaces in such a way that a packet sent to a multicast address is delivered to all of the interfaces in the group.

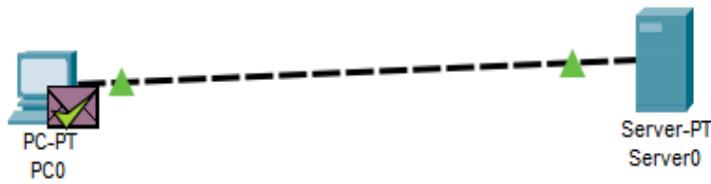
IPv6 has no broadcast addresses: multicast addresses took over.

IPv6 supports addresses that are four times the number of bits as IPv4 addresses (128 vs. 32). This is 4 billion times 4 billion times the size of the IPv4 address space. Realistically, the assignment and routing of addresses requires the creation of hierarchies that reduce the efficiency of address space usage, thus reducing the number of available addresses. Nonetheless, IPv6 provides enough address space to last into the foreseeable future.

Week 12

Ex1: Create a client – server model in simulator and observe the client interaction between the server and PC using packet tracer.

- Go to Cisco Packet Tracer.
- Deploy and connect a PC and a Server as shown in the figure.
- Click on server select config tab, click on FastEthernet0, set the IP address 192.168.1.1
- Click on settings, set default gateway 192.168.1.1
- Set the IP address to PC as 192.168.1.2
- Click on Service tab select DHCP, click on Service “On” (Radio Button), set default gateway 192.168.1.1 and Save the Changes
- Place the PDU and simulate



Ex2: Observe DNS name Resolution

a) Observe the conversion of a URL to an IP address.

- Go to Cisco Packet Tracer.
- Deploy three servers, one switch and a PC
- Connect all the devices

	Server1	Server2	Server3 (DNS)	PC
IP Address	192.168.1.101	192.168.1.102	192.168.1.254	192.168.1.1
DNS Server	192.168.1.254	192.168.1.254	192.168.1.254	192.168.1.254

- Click on first server, select service tab, choose HTTP and edit the index.html file and write welcome to Facebook and save the changes.
- Click on second server, select service tab, choose HTTP and edit the index.html file and write welcome to Youtube and save the changes.
- Click on PC, goto Command prompt and ping all the IP address.
- Click on Third server (DNS), select service tab, choose DNS, Switch on the DNS Service and Fill Resource Records which includes Name of the server and IP address of all servers and click on add button.

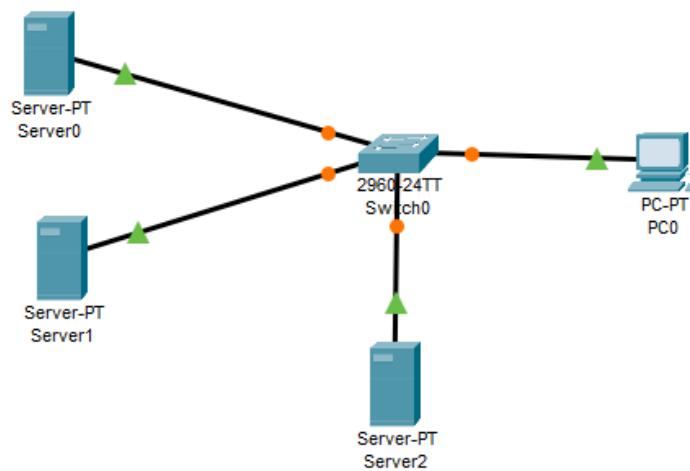
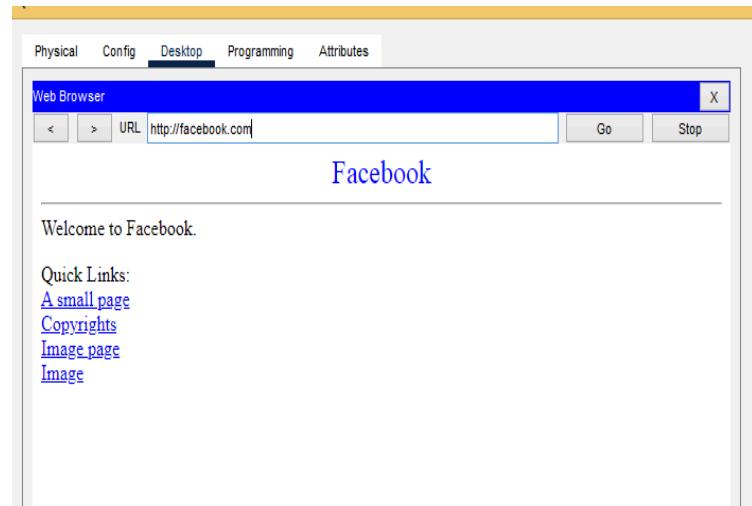
Ex: Name: facebook.com

IP address: 192.168.1.101

Name: youtube.com

IP address: 192.168.1.102

- Click on PC go to web browser, in the URL type facebook.com or youtube.com and observe the response



b) Observe DNS lookup using the nslookup command.

- Click on PC, go to Command prompt and type nslookup, press enter and Check the sever and its address

Example: nslookup

Ex3: Use simulator to demonstrate Telnet and SSH (Secure Shell Protocol)

Telnet transfers the data in simple plain text and No authentication or privileges are provided for user's authentication. On other hand SSH uses Encrypted format to send data and also uses a secure channel and it uses public key encryption for authentication

- Go to Cisco Packet Tracer.
- Deploy and connect one PC and one Router
- Set the IP address and Default Gateway

	Router (Interface 0/0)	PC
IP Address	192.168.1.1	192.168.1.2
Default Gateway		192.168.1.1

**For Telnet**

Click on Router, go to CLI follow the Commands

Type exit

Type line vty 0

Type password 12345

Type login

Type enable password 12345

- Click on PC, go to command prompt and type telnet 192.168.1.1 and press enter

- Enter the router password, enable and configure the router

For SSH

Type en

Password: 12345

Type config t

Type hostname niranjan

Type ip domain name jss

Type crypto key generate rsa

How many bits in the modulus [512]: 1024

Type line vty 0

Type transport input ssh

Type exit

- Click on PC, go to command prompt and type

C:\>ssh -l admin 192.168.1.1

Password: 12345

niranjan>enable

Password: 12345

niranjan#

Week 13

1. Demonstrate troubleshooting Commands with a scenario- ipconfig, ping , netstat, tracert, nslookup.

ipconfig

- Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings.
- ipconfig displays Internet Protocol version 4 (IPv4) and IPv6 addresses, subnet mask, and default gateway for all adapters

Example: ipconfig

Ping

- The ping command used to test the ability of the source computer to reach a specified destination computer.
- The ping command sends packets of data to a specific IP address on a network, and then lets you know how long it took to transmit that data and get a response.

Syntax: ping IP address

Example: ping 192.168.1.133

netstat

- The netstat command display the network status and protocol statistics. It also displays status of TCP and UDP endpoints in table format, routing table information, and interface information.

Syntax: netstat [-m] [-n] [-s] [-i | -r] [-f] IP address

Example: netstat -n 192.168.1.133

tracert

- Trace Route used to trace the path that an Internet Protocol (IP) packet takes to its destination.

Example: tracert 192.168.1.133

nslookup

- name server lookup is a network administration command-line tool for querying the Domain Name System (DNS) to obtain the mapping between domain name and IP address, or other DNS records.

Example: nslookup

2. Interpret the output of commonly used network command line utilities and Determine which network utility can provide the necessary information to perform troubleshooting activities in a bottom-up troubleshooting strategy

arp

- Displays and modifies entries in the Address Resolution Protocol (ARP) cache, which contains one or more tables that are used to store IP addresses and their resolved Ethernet or Token Ring physical addresses.
- Examples

To display the ARP cache tables for all interfaces

```
arp -a
```

pathping

- Pathping sends packets to each router on its path to destination and then calculates results based on the packet returned from each hop. This way, it becomes easy to understand where the lost packets occur and pin-point the location of the problem

Syntax: pathping -n IPaddress

Example: pathping -n www.google.com

Route

- The **route** tool displays the routing table that allows Windows 10 to understand the network and communicate with other devices and services.

Example: route print

ipconfig

- Use the **ipconfig** command. Identify the IP address, subnet mask and default gateway addresses configured on the computer

net view

- The **net view** command displays the computer names of other Windows devices in your Windows domain or workgroup.
- When **net view** displays the names of other computers it indicates that your computer is able to successfully send messages across the network.

Example: net view.

3. Physical Layer Problems - Common Layer 1 Problems, how to use the five senses to troubleshoot, Wireless Router LEDs, Cabling Problems

Common Layer 1 Problems

- Common Layer 1 problems include:
 - The interface is administratively shut down
 - The cable is disconnected on either or both ends
 - The device on the other end of the cable is powered off
 - Broken connectors which cause loose connections
 - Bent or stretched cables which lead to broken wires or fibres
 - Electro-Magnetic Interference (EMI) sources such as motors or microwaves which cause errors in transmission (newer cable is less susceptible to this)

Five senses to troubleshoot

- Hearing
- Seeing
- Feeling
- Smelling

- Tasting(not recommended to use)

Wireless Router LEDs

- The LEDs on your router indicate the status of the connection between your router and the devices that are connected to it.
- They also indicate the status of your Internet, Wi-Fi, Ethernet, and WPS connections.

Power LED

Internet LED

WiFi LEDs

USB LEDs

Ethernet LEDs

WPS (Wi-Fi Protected Setup) LED

Common network cabling problems

- Your cabling does not meet standards.
- Your cabling is outdated or damaged.
- The cables and connectors are not compatible.
- The patch cords are of poor quality.
- The cables are not properly installed.

Ex4: Common Internet Connectivity Issues - DHCP Server Configuration Errors, Check Internet Configuration, Check Firewall Settings.

DHCP Server Configuration Errors

- A DHCP error means the server on your network that provides an Internet Protocol (IP) address for devices is not able to assign your device an IP address.

Check Internet Configuration

- Go to Control Panel and select network and internet
- Open the Network and Sharing Center window.
- Click on Ethernet link
- Click on Details button to view Network connection details
- Click the Properties button to change the IP address
- Select Internet Protocol Version 4 (TCP/IPv4).
- Click the Properties button.
- Set the IP address automatically or manually

Check Firewall Settings.

- Go to Control panel
- Click on System and security
- Click on windows firewall
- Turn window firewall on or off
- Check the status