DATA COMMUNICATION & NETWORK LAB

Subject Code 1618506	Practical			No of Period in one session :			Credits
	No. of Periods Per Week			Full Marks	:	50	02
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
				External	:	35	

Rationale & Objective:

List of Experiments:

	Contents : Practical	Hrs/week	Marks
Unit -1	Consider a PCM system in which 24 signals are to be time-multiplexed. Each signal has a bandwidth from 400 to 3.4 KHz the sampling rate is 33.33% higher than the theoretical minimum, and 8 bits are used for each sample. Determine the output bit rate.		
Unit -2	A very heavily loaded 1-km-long 10-Mbps token ring has a propagation speed of 200m/ usec. Fifty stations are uniformly spaced around the ring. Data frames and are thus included as spare bits within the data frames and are effectively free. The token is 8 bits. Calculate the effective data rate of the ring.		
Unit -3	Explain the steps involved in computing the checksum for a given message frame, and hence find the complete frame bit pattern for the data given below: Data polynomial D(x) = 1101011011 Generator polynomial $G(x) = x^4 + x + 1$		
Unit -4	Write a program to simulate the operation of a token ring with no priorities. Take into account the walk time between stations and the time required to drain the ring before regenerating the token. Now change the simulator to allow stations to regenerate the token as soon as they are done transmitting, without waiting to drain the ring.		
Unit -5	Configure a machine to assign an IP address to it and also put a suitable subnet mask.		
Unit -6	Connect two machines to a hub and ping one machine from the other. Now change the subnet masks of the machines and see the effects.		
Unit -7	Connect a client to a server via a hub and telnet to log in to the server.		
Unit -8	Connect two machines to two different hubs and connect the hubs to a switch. Connect a server to the switch and telnet to the server from the machines.		

Certificate

Name: Harsh Kumar Class: Diploma 5th sem

Roll No: 511771816012 Exam No: CSE-5th sem

Institution Patna sahib technical campus, Bhagwanpur, Vaishali.

This is certified to be the bonafide work of the student in the Data Communication & Network Lab *Laboratory during the academic year 20 16/ 20 19.*

No. of practicals certified _____ *out of* 08 *in the subject of* Data Communication & Network Lab.

.....
Teacher In-charge

.....
Examiner's Signature

.....
Principal

Date: .....

Institution Rubber Stamp

(N.B: The candidate is expected to retain his/her journal till he/she passes in the subject.)

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Expt. No. 01 Experiment - 01 Page No. 01

AIM :- Configure a machine to assign an IP address to it and also put a suitable subnet mask.

REQUIRMENT :- ROUTER
A PC, having Windows OS.

PROCEDURE :-

[Finding Addresses on windows]

Step 1 : Open Start ⊞. Click the windows logo in the bottom-left corner of the screen. The start menu will pop up.

Step 2 : Open setting. Click the gear-shaped icon in the lower-left side of the start menu.

Step 3 : Click Network & Internet. It's in the middle of the settings window.

Step 4 : Click [View your network Properties].
This link is near the bottom of the page.
- If we don't see this link, scroll down. we may also need to click the About tab in the upper-left corner of the window.

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Step 5: Scroll down to the "Wi-Fi" heading. It's near the bottom of the page. We'll see a list of information about our Wi-Fi connection here.

Step 6: Note the "Default gateway" address. The address to the right of the "Default gateway" heading is the address we'll enter in a web browser to access our router's page.

Step 7: Press [Win] + [X].

- Doing so will open the advanced start menu.
- We can also right-click the start icon in the lower-left corner of the screen.

Step 8: Click [System]. It's in the advanced start menu. Doing so opens a window with your windows computer's specification.

Step 9: Note the computer's name. This is a name to the right of the "Device name" heading in the middle of the page. At this point, we're ready to proceed with setting a static IP address.

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Step 10: [Setting a static IP address][through Router]
Open a web browser.
Click or double-click the app icon for our preferred web browser.
(e.g., Google Chrome)

Step 11: Enter the router's address.
In the address bar at the top of the browser window, type in the address we retrieved for our router, then press [↵ Enter].
This will open our router's page.

Step 12: Log in if necessary.
If prompted for a username and/or password, type in the required credentials and press [↵ Enter].
- If we didn't set a username and/or password, we'll probably need to use the factory credentials found either in the router's manual or on the router itself.

Step 13: Find the list of connected Internet items.
Since each router's page will vary in terms of item placement and titling, we may have to poke around the router page or menu to find this section.

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- For example, some routers place the Connected Devices button on the main page, while other pages require we to click settings or Advanced to see the list of connected items.

Step 14: Find our computer's name.
Look for the name that we found earlier in the list of connected items.

Step 15: Click the [Reserve] button.
We'll probably find this next to the computer's name and address, though we may first have to click our computer's name to do so.
- Again, our router's page may show a different option here.
- If prompted to confirm our choice or specify an unused IP address, do so before proceeding.

Step 16: Click [Save] or [Apply]. It's usually at the bottom of the page. This will save our changes and apply our new IP address to the computer.

- We may need to restart our computer for the changes to take place, and the router may reboot as well.

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Step 17: [Set IP address and subnet mask from windows].
Click Start Menu > Control Panel > Network and Sharing Center.

Step 18: Click Change adapter settings.

Step 19: Right-click on Local Area Connection and click Properties.

Step 20: Select Internet Protocol version 4 (TCP/IPV4) and click on Properties.

Step 21: Select "Use the following IP addresses" and enter IP address, Subnet Mask, Default gateway. and DNS server.

- Click OK.
- Close the local Area Connection Properties window.

RESULT:-

We find IP addresses of computer, set up Static IP address through Router and set IP address and subnet mask from windows properties dialog box.

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Expt. No. 02 Experiment - 002 Page No. 06

AIM :- Connect two machines to a hub and ping one machine from the other. Now change the subnet masks of the machines and see the effects.

THEORY :-

A network hub is a device used to connect multiple computers. It is a simple and inexpensive solution when small networks that require file and printer sharing, like ones in homes or small offices, are needed to be made. Most common hub today support the Ethernet standard. These hubs usually comes with 4, 8 or sometimes 16 Ethernet ports.

Materials Needed :-

- one (1) 4-port or 8-Port 10/100 Mbps Ethernet hub.
- two (2) or more computers with windows installed.
- 10/100 Mbps Network Interface cards (NIC) or built-in Ethernet ports installed on each of the computers.
- two (2) or more straight through Ethernet cables.

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PROCEDURE :-

[Connect two machine to a hub]

Step 1 : Turn on the computers and wait for windows to boot properly.

Step 2 : Supply the hub with power if the Ethernet hub requires power. Plug the AC Power supply into the hub and the power cord into any sufficient power outlet or wall outlet. Most hubs do not have on/off switches. and only require to be plugged into an outlet to become active. Make sure that proper voltages are applied to the hub's power supply to avoid damaging the device. Voltage ratings are typically printed on the underside of the device, alongside the model and manufacturer information.

Step 3 : Connect the first computer to Ethernet hub when all systems are running properly and the Ethernet hub is powered on. Proceed to step 5 if the computers has built-in Ethernet port. Proceed to next step if the computer has no built-in Ethernet port.

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Step 4: Install a compatible 10/100 Mbps Ethernet card when the computer has no built-in Ethernet port. Install the drivers of the network card and turn the computer off. Install the network card into the system. Boot for the system when the hardware installation is finished. Follow succeeding instructions that may appear in the operating system after restarting the computer to install the network card properly.

Step 5: Take the Ethernet cable and plug one end into the computer's port when an ethernet port is already available in the system. Plug the other end into one of the network hub's ports. Make sure the ends are plugged in tightly and properly.

Step 6: Repeat step 3 to 5 to connect the other computers to the network. It is then time to configure the systems when all computers are connected to the network hub.

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Step 7: Open the Local Area Connection Properties of the system. In windows' Control Panel (Click Start > Control Panel), look for the Network Connection icon. Double click on the icon to view all available network connections. An icon for a Local Area Connection should be available if the network card was properly installed and is properly working. Right click on the icon and select Properties. Under the General tab, a small area should show the available protocol windows is using. Look for Internet Protocol (TCP/IP), click on it, and then click on properties button just under the selection.

Step 8: The Internet Protocol (TCP/IP) properties window now appears on the screen. Select "use the following IP address and subnet mask for the system". Typically Type in IP address and subnet mask for the system. Typically IP addresses for small home networks have the pattern 192.168.0.X, where X can be any number from 1 to 127.

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The subnet mask for this network will be 255.255.255.0. Click on OK to close the current window. Click on close to exit the Local Area Connection properties.

Step 9: Repeat step 7 and 8 for each computer connected to the hub. Each computer must have different IP addresses in step 8 but the subnet mask for all the computers must be the same.

The systems are now ready for sharing files across the network after steps 3 to 8 are successfully done.

[Ping one machine from the other]

[We can ping by using the ping command to verify the connectivity between two network devices that are IP based]

Step 10: On one windows computer, Press windows Key + R to bring Run on the screen.

Step 11: Type cmd and press Enter.

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Step 12: Type ping <IP address> and press Enter. The IP Address is XXX.XXX.XXX.XXX where XXX is a number between 0 and 255. For example to ping 192.168.1.1, we type ping 192.168.1.1

If the ping is successful, we should receive replies from the address that we are typing to ping. If the ping is unsuccessful, we need to diagnose our network setup further.

[Changing subnet masks of the machine]

Step 13: Click start Menu > control Panel > Network and Sharing center.

Step 14: Click change adapter settings.

Step 15: Right-click on Local Area Connection and click Properties

Step 16: Select Internet Protocol version 4 (TCP/IPv4) and click on Properties.

Step 17: Select "Use the following IP addresses" and enter Subnet Mask,
- Click OK
- Click the local Area Connection Properties window.

Observations :-

Changing subnet mask of one comp-uter in the network leads the computer to no longer stay in the network.

Result :-

Two computers with windows OS connected to each other and one computer ping to another to verify connection between them. and At last we changed subnet mask of one computer in the network to see its effect.

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Expt. No. 03 — Experiment - 03 — Page No. 13

AIM :- Connect a client to a server using via a hub and telnet to log in to the server.

Materials needed :-

- Two computer (PC)
- A Hub.
- Two cables for each machine

PROCEDURE :-

[Connect client to a server]

Step 1 :- Turn on the computers and wait for windows to boot properly.

Step 2 : Supply the hub with Power if require.

Step 3 : Connect Ethernet cable to the PC port and connect other end to the hub, in one port.

Step 4 : Similarly for the other machine, Connect Ethernet cable to the PC port and other end to the other port of the hub.

Step 5 : Set IP address or subnet mak from Local-Area connection window.
Click start > Control Panel > Network Connection > Local-Area Connection. Repeat step 3 to 5 for server.

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[Connect using Telnet]

Step 6: Connecting to server.

- To connect to the server using a Telnet-only shell interface, go to the sysax multi server control Panel and click start server.
- The multi-server account setup window is displayed.
- Click Telnet on port, set the port to 23, and click Next.

Step 7: Connecting to server using PUTTY.exe

To connect to the server using Putty.exe program, double-click the putty.exe icon, or run the putty.exe command.

Step 8: Configuring Putty.exe.

The Putty.exe configuration includes specifying Host Name (or IP address), Port, Protocol and about sessions.

Step 9: Connecting in Telnet-only interface.

(1) Enter the host name (or IP address).
(2) Select Telnet protocol.
(3) Enter 23 in the Port field.
(4) Click Open.

At the login command line, enter the login name and password to open the protected

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FTP account or windows user account.

RESULT:-

A client is connected to server via hub and telnet to login to the server.

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AIM :- Connect two machines to two different hubs and connect the hubs to a switch. Connect a server to the switch and telnet to the server from the machines.

Material required :-

- Two PC with one server (i.e. 3 PC)
- Two (2) 4-port or 8-port 10/100 Mbps Ethernet hub.
- 10/100 Mbps Network Interface Cards (NIC) or built-in Ethernet ports installed on each of the computers.
- Two (2) or more straight through Ethernet cables
- One (1) Ethernet switch.

THEORY :-

A Hub is a networking device that allows one to connect multiple PCs to a single network. Hubs may be based on Ethernet, Firewire, or USB connections. A switch is a control unit that turns the flow of electricity on or off in a circuit. It may also be used to route information patterns in streaming electronic data sent over networks.

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PROCEDURE :-

[Connect two machines to two different hubs]

Step 1: Turn on the computers and wait for windows to boot properly.

Step 2: Supply the hub with power if the Ethernet hub requires power.

Step 3: Connect the first computer to one Ethernet hub when all systems are running properly and Ethernet hub is powered on.

Step 4: Take the ethernet cable and plug one end into the computer port where an ethernet port is already available in the system. Plug the hub ports. Make sure the ends are plugged in tightly and properly.

Step 5: Repeat step 3 and 4. Connect the second computer to second (other) Ethernet hub. and then follow step 4, with the second computer and second Ethernet hub.

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Step 6: [Connecting the hubs to a switch]
Take the ethernet cable and plug one end into one hub port and other end to switch port.

step 7: Repeat step 6, by taking ethernet cable and plugging one end to other hub's port and other end to switch port.

Step 8: [Connect server to switch]
connect one end of ethernet cable to the servers Port and other end to the switch's port.

Step 9: [Connect Telnet to server]
- To connect to server using a Telnet-only shell interface, go to the Sysax multi-server Control Panel and click Start server.
- The multi-server account setup window is displayed.
- Click Telnet on port, set the port to 23, and click Next.

Step 10: Connecting to server using PUTTY.exe
To connect to the server using PUTTY.exe program, double-click the putty.exe icon, or run the putty.exe command.

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Step 11: Connecting in Telnet-only interface.
(1) Enter the host name.
(2) Select Telnet Protocol.
(3) Enter 23 in the port field.
(4) Click Open.

At the login command line, enter the login name and password to open the protected FTP account or windows user account.

RESULT:—

Two machines are connected to two different hubs and the hubs are connected to a switch and switch further connected to server and at last the telnet is connected to server and login tested.