

LAB MANUAL



Computer Networks (MCA-161)

Submitted by:

Submitted to:

Name: Abhishek Tyagi

Roll no: 03311104422

Sem: MCA 1st

Name: Mrs. Sonia Batra

Designation: Subject Faculty

INDEX

S.no	Topic
1	WAP to find the class of IP address entered by user
2	Illustrate the various networking command available.
3	Illustrate the functioning of straight through, cross over and role over wire cable commonly used in LAN connection.
4	study the cisco packet tracer and simulate peer to peer network using cisco packet tracer.
5	Simulate LAN using HUB.
6	Simulate LAN using SWITCH
7	Simulate LAN using Router
8	Create a client-server network and show steps to send a simple PDU in simulation mode
9	Configure a service DHCP server and auto configure to such clients through the server.

Q1. Write a program to find the class of IP address entered by user.

```
#include<iostream.h>
#include<conio.h>
#include<stdio.h> void
main()
{
int a,b,c,d;
clrscr();
printf("/n/t ENTER THE VALUE FOR 1st OCTATE:");
scanf("%d",&a);
printf("/n/t ENTER THE VALUE FOR 2ND OCTATE:");
scanf("%d",&b);
printf("/n/t ENTER THE VALUE OF 3RD OCTATE:");
scanf("%d",&c);
printf("/n/t ENTER THE VALUE OF 4TH OCTATE:");
scanf("%d",&d);

if(a>=0 && a<=255 && b>=0 && b<=255 && c>=0 && c<=255 && d>=0 &&
d<=255)
{
printf("/n\tADDRESS VALID");
}
else{
printf("/n\t address invalid");
```

```
}  
if(a>=1 && a<=126)  
{  
printf("\n\t CLASS A ADDRESS");  
}  
else if(a==127)  
{  
printf("\n\t loopback adress");  
}  
else if(a>=128 && a<=191)  
{  
printf("\n\t class B address");  
}  
else if(a>=192 && a<=233)  
{  
printf("\n\t class C address");  
}  
else if(a>=234 && a<=239)  
{  
printf("\n\t class D address");  
}  
else if( a>=240 && a<= 254)  
{  
printf("\n\t class E address");  
}  
getch();
```

```
}
```

Output program 1:

```
/n/t ENTER THE VALUE FOR 1st OCTATE:123
/n/t ENTER THE VALUE FOR 2ND OCTATE:45
/n/t ENTER THE VALUE OF 3RD OCTATE:0
/n/t ENTER THE VALUE OF 4TH OCTATE:57
```

```
ADDRESS VALID
CLASS A ADDRESS_
```

Q2 Illustrate the various networking commands available.

1. ipconfig

Displays all current TCP/IP network configuration values and refreshes Dynamic Host Configuration Protocol (DHCP) and Domain Name System (DNS) settings.

(ipconfig /all): It tells us ethernet address.

It gives mac(physical) and ip address.

```
C:\Users\PC16LAB1280G6>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

    Connection-specific DNS Suffix  . : 
    Link-local IPv6 Address . . . . . : fe80::4102:d55f:b77a:7516%14
    IPv4 Address. . . . . : 192.168.10.116
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.10.1

C:\Users\PC16LAB1280G6>
```

2. PING

Its most basic use is to confirm network connectivity between two hosts. Ping sends out an ICMP echo request to which it expects an ICMP echo reply response.

(ping www.google.com or ping ip address)

```
Command Prompt

C:\Users\PC16LAB1280G6>ping www.google.com

Pinging www.google.com [216.58.196.100] with 32 bytes of data:
Reply from 216.58.196.100: bytes=32 time=1ms TTL=120
Reply from 216.58.196.100: bytes=32 time=1ms TTL=120
Reply from 216.58.196.100: bytes=32 time=1ms TTL=120
Reply from 216.58.196.100: bytes=32 time=2ms TTL=120

Ping statistics for 216.58.196.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\Users\PC16LAB1280G6>ping 192.168.10.117

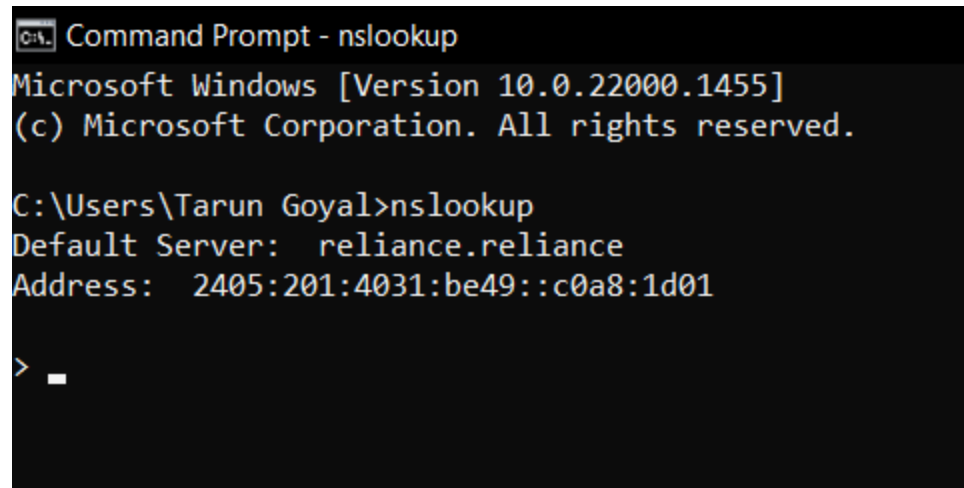
Pinging 192.168.10.117 with 32 bytes of data:
Reply from 192.168.10.117: bytes=32 time=4ms TTL=128
Reply from 192.168.10.117: bytes=32 time=3ms TTL=128
Reply from 192.168.10.117: bytes=32 time=3ms TTL=128
Reply from 192.168.10.117: bytes=32 time=3ms TTL=128

Ping statistics for 192.168.10.117:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 4ms, Average = 3ms

C:\Users\PC16LAB1280G6>
```

3. NSLOOKUP

Stands for “Name Server Lookup” is a useful command for getting information from the DNS server. It is a network administration tool for querying the Domain Name System (DNS) to obtain domain name or IP address mapping or any other specific DNS record. It is also used to troubleshoot DNS-related problems.

A screenshot of a Windows Command Prompt window titled "Command Prompt - nslookup". The window shows the following text: "Microsoft Windows [Version 10.0.22000.1455] (c) Microsoft Corporation. All rights reserved. C:\Users\Tarun Goyal>nslookup Default Server: reliance.reliance Address: 2405:201:4031:be49::c0a8:1d01 > _".

```
Command Prompt - nslookup
Microsoft Windows [Version 10.0.22000.1455]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Tarun Goyal>nslookup
Default Server:  reliance.reliance
Address:  2405:201:4031:be49::c0a8:1d01

> _
```


4. tracert

The TRACERT diagnostic utility determines the route to a destination by sending Internet Control Message Protocol (ICMP) echo packets to the destination.

It tells up to and from route of packet how many routers hit during packet transfer. first hit default gateway. It gives final address in last.

```
C:\Users\PC16LAB1280G6>tracert www.bciit.com

Tracing route to hdr-nlb7-aebd5d615260636b.elb.us-east-1.amazonaws.com [54.161.222.85]
over a maximum of 30 hops:

  0  1 ms  <1 ms  1 ms  192.168.10.1
  1  3 ms  1 ms  <1 ms  172.16.106.1
  2  3 ms  4 ms  4 ms  103.196.223.149
  3  4 ms  4 ms  3 ms  10.100.8.5
  4  3 ms  2 ms  4 ms  219.65.112.233.static-delhi.vsnl.net.in [219.65.112.233]
  5  44 ms  45 ms  45 ms  172.31.167.54
  6  39 ms  39 ms  39 ms  14.141.123.226.static-Chennai.vsnl.net.in [14.141.123.226]
  7  39 ms  39 ms  41 ms  ix-ae-4-2020.tcore1.cxr-chennai.as6453.net [180.87.36.165]
  8  *      *      *      Request timed out.
  9  *      *      *      Request timed out.
 10 259 ms  260 ms  259 ms  if-ae-36-2.tcore3.aeq-ashburn.as6453.net [216.6.87.110]
 11 262 ms  263 ms  264 ms  216.6.87.227
 12 *      *      *      Request timed out.
 13 *      *      *      Request timed out.
 14 260 ms  260 ms  260 ms  52.93.28.114
 15 *      *      *      Request timed out.
 16 *      *      *      Request timed out.
 17 *      *      *      Request timed out.
 18 *      *      *      Request timed out.
 19 *      *      *      Request timed out.
 20 *      *      *      Request timed out.
 21 *      *      *      Request timed out.
 22 *      *      *      Request timed out.
 23 *      *      *      Request timed out.
 24 *      *      *      Request timed out.
```

Q3. Illustrate the functioning of straight through, cross over and role over wire cable commonly used in LAN connection.

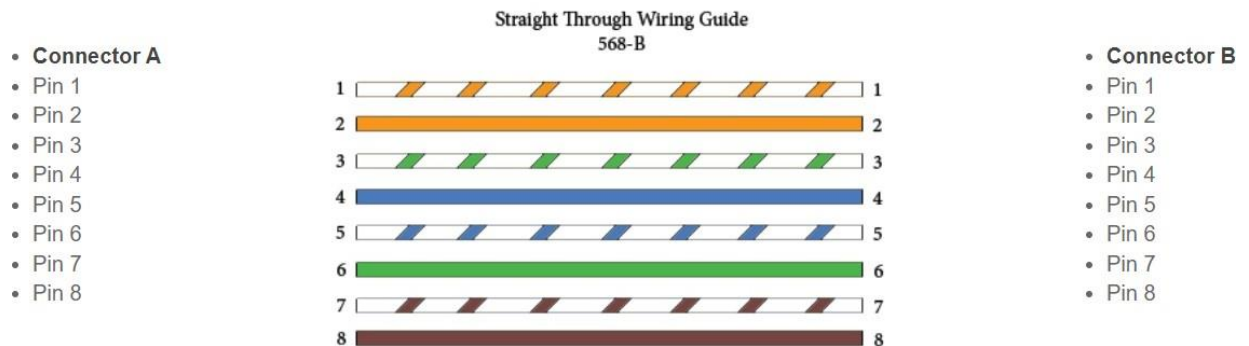
a) Straight-Through Cables

Straight-Through refers to cables that have the pin assignments on each end of the cable.

In other words, Pin 1 connector A goes to Pin 1 on connector B, Pin 2 to Pin 2, etc.

Straight-Through wired cables are most commonly used to connect a host to a client.

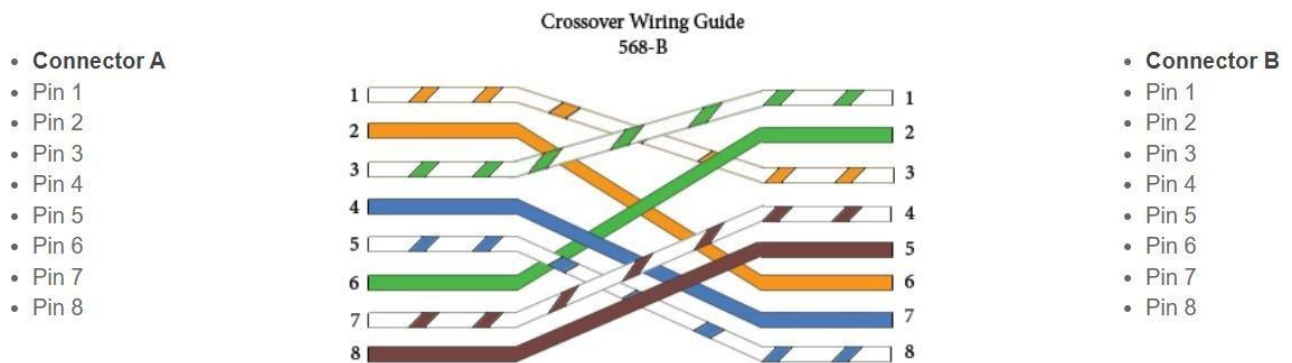
When we talk about cat5e patch cables, the Straight-Through wired cat5e patch cable is used to connect computers, printers, and other network client devices to the router switch or hub (the host device in this instance).



B. Cross-over cables

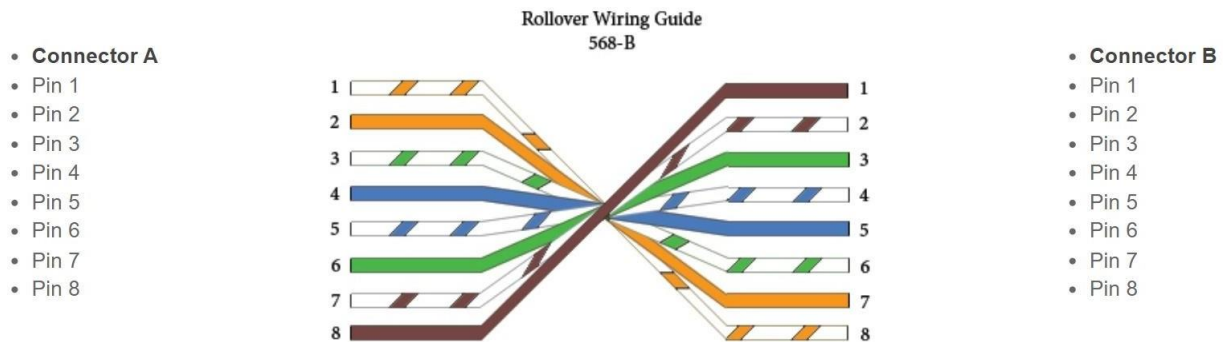
Crossover wired cables (commonly called crossover cables) are very much like Straight-Through cables with the exception that TX and RX lines are crossed (they are at opposite positions on either end of the cable). Using the 568-B standard as an example below, you will see that Pin 1 on connector A goes to Pin 3 on connector B. Pin 2 on connector

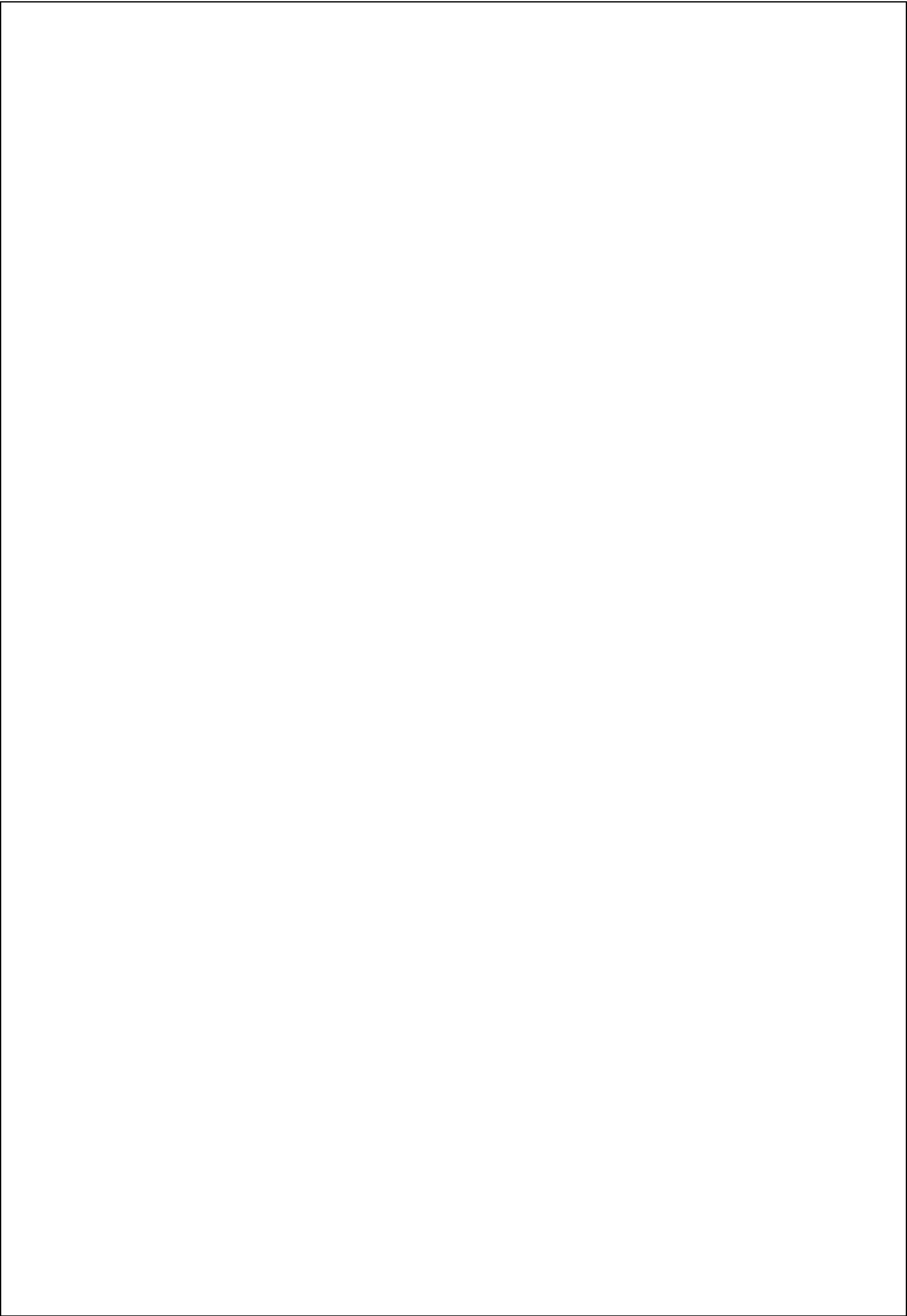
A goes to Pin 6 on connector B, etc. Crossover cables are most commonly used to connect two hosts directly. Examples would be connecting a computer directly to another computer, connecting a switch directly to another switch, or connecting a router to a router. Note: While in the past, when connecting two host devices directly, a crossover cable was required. Nowadays, most devices have auto-sensing technology that detects the cable and device and crosses pairs when needed.



c. Rollover cables

Rollover wired cables, most commonly called rollover cables, have opposite Pin assignments on each end of the cable or, in other words, it is "rolled over." Pin 1 of connector A would be connected to Pin 8 of connector B. Pin 2 of connector A would be connected to Pin 7 of connector B and so on. Rollover cables, sometimes referred to as Yost cables are most commonly used to connect to a device's console port to make programming changes to the device. Unlike crossover and straight-wired cables, rollover cables are not intended to carry data but instead create an interface with the device.

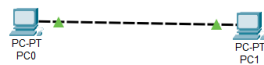
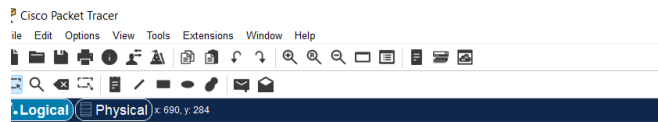




Q4. Study the cisco packet tracer and simulate peer to peer network using ciscopacket tracer.

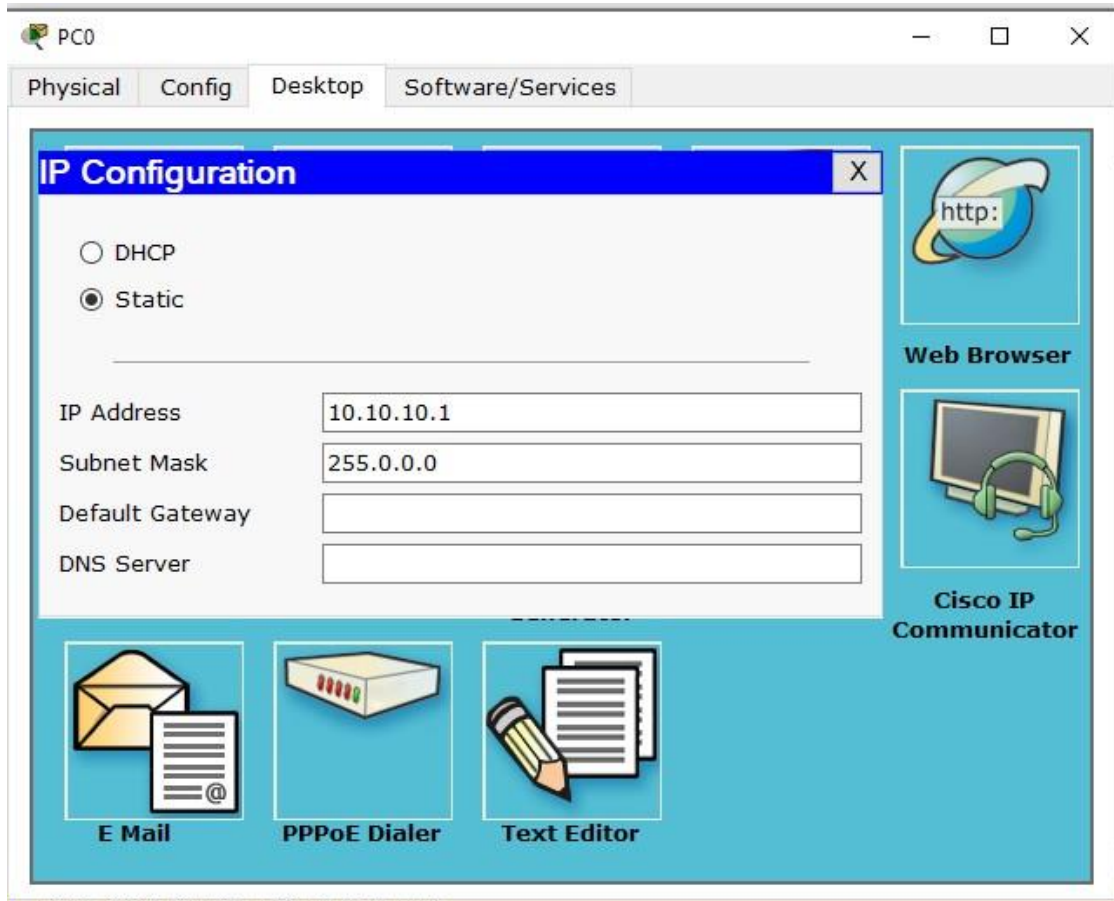
Steps for peer to peer connection.

1. open software packet tracer
2. click End Devices icon (lower left corner) or press CTRL + ALT + V
3. drag icon general (Personal Computer) and drop to worksheets.
4. click Connections icon or press CTRL + ALT + 0 , then click Automatically Choose Connection Type.



5. click PC0 then click PC1.
6. double click PC0.
7. Desktop tab, then click IP Configuration.
8. set IP Address for PC0.

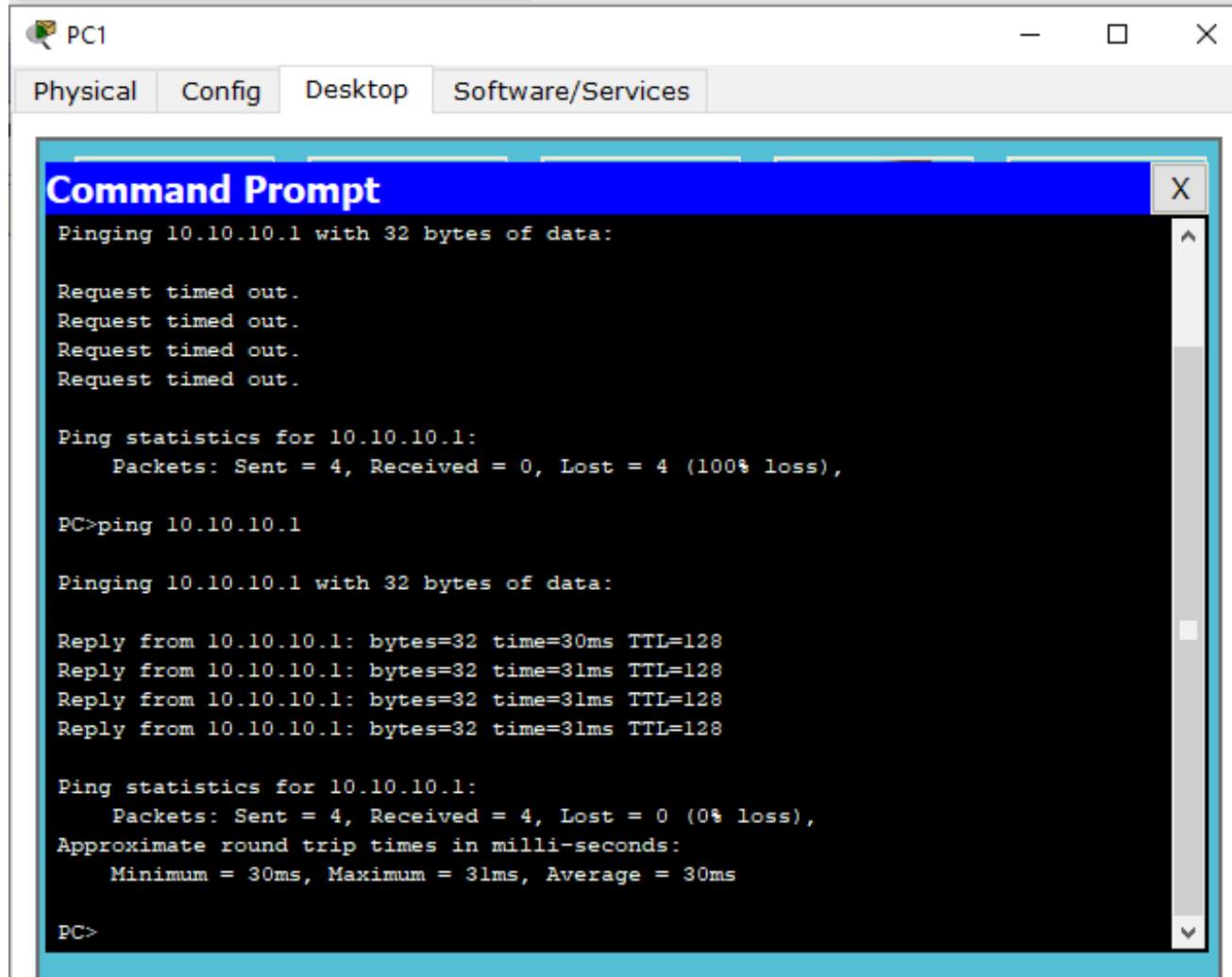
IP Address PC0 = 10.10.10.1



9. close window PC0
10. double click PC1
11. Desktop tab, then click IP Configuration.
12. set IP Address for PC1. IP Address
PC0 = 10.10.10.2

13. Desktop tab, then click Command Prompt
14. type ping 10.10.10.1 then enter
15. if it appears as shown below, it means PC0 and PC1 are connected and successful.

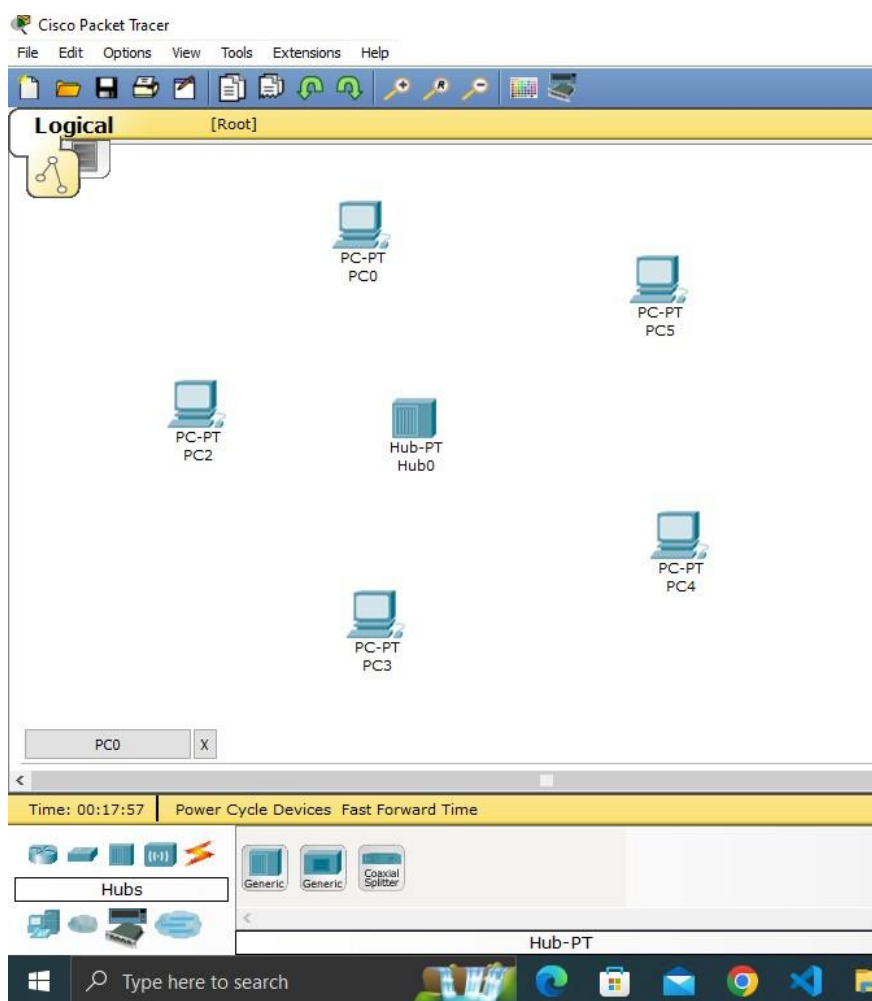
isco Packet Tracer



Q5. Simulate LAN using HUB.

Steps for simulate LAN using HUB

1. open software packet tracer
2. click End Devices icon (lower left corner) or press CTRL + ALT + V
3. drag icon general (Personal Computer) and drop to worksheets.
4. Drag a HUB.



5. click Connections icon or press CTRL + ALT + 0 , then click Automatically Choose Connection Type.

6. click PC0 then click HUB

7. double click PC0.

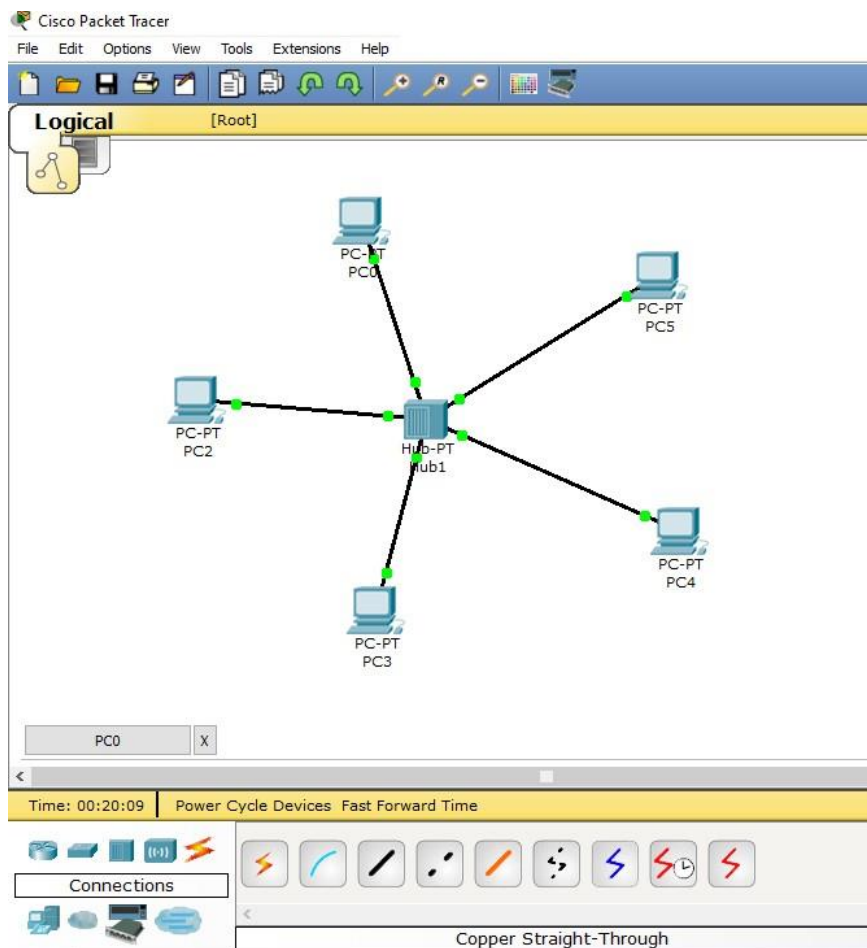
8. Desktop tab, then click IP Configuration.

9. set IP Address for PC0.

IP Address PC0 = 10.10.10.1

10. Repeat steps 5 to 8 for all PCs.

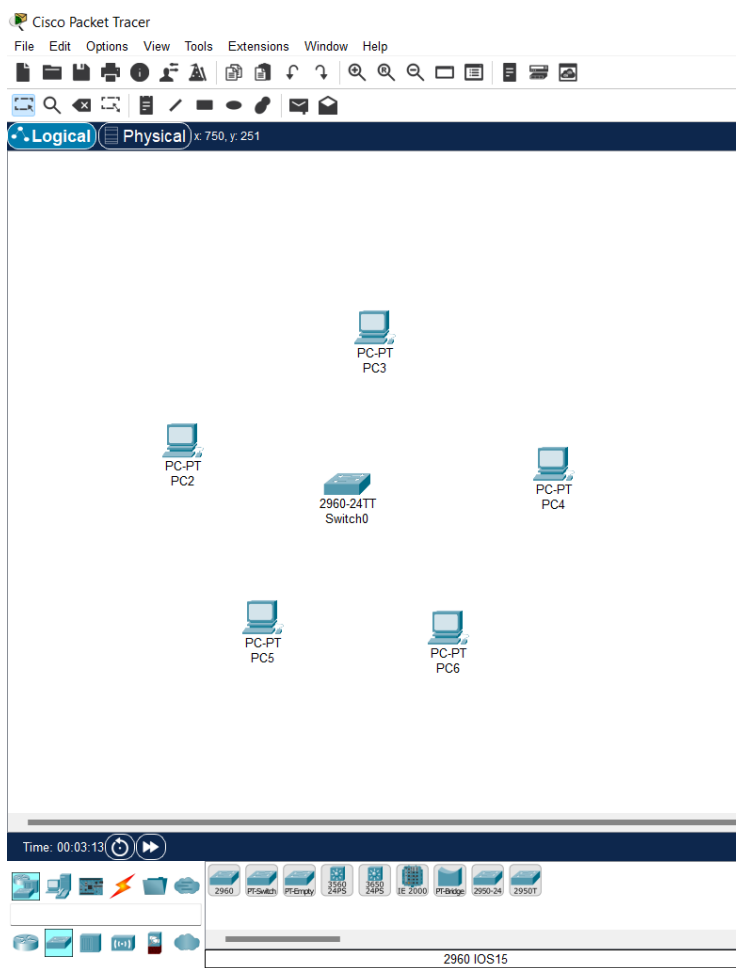
11. If it shows GREEN dots on both the end of cable it means connection establish successfully.



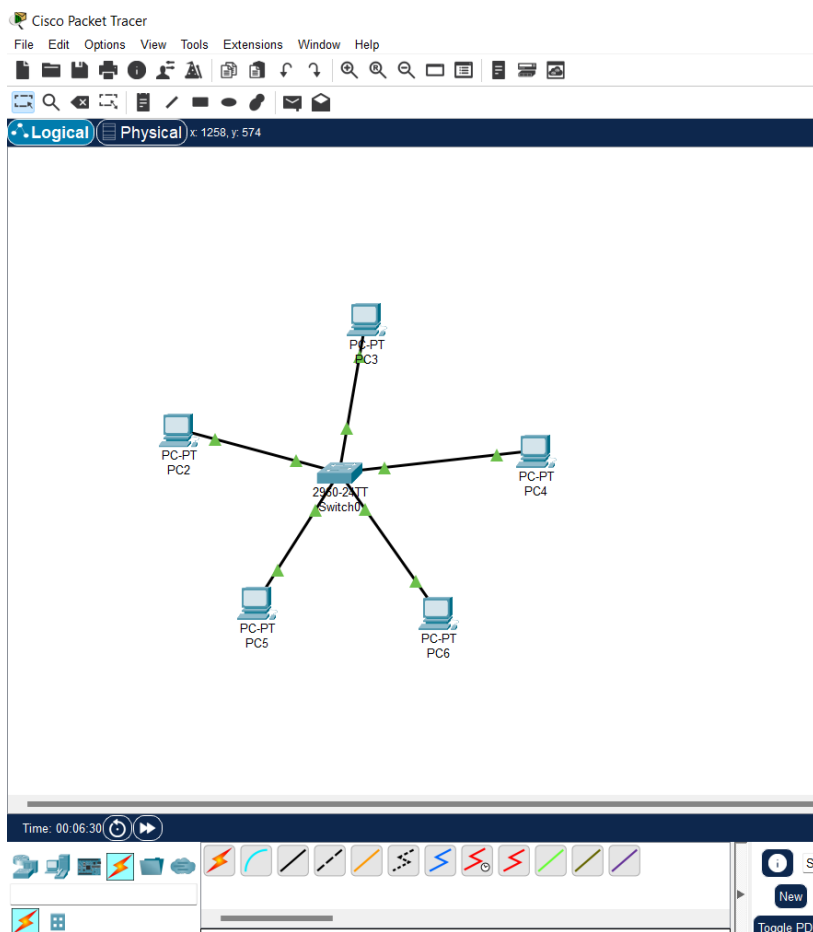
Q6. Simulate LAN using SWITCH.

Steps for simulate LAN using SWITCH:

1. open software packet tracer
2. click End Devices icon (lower left corner) or press CTRL + ALT + V
3. drag icon general (Personal Computer) and drop to worksheets.
4. Drag a Switch.



5. click Connections icon or press CTRL + ALT + 0 , then click Automatically Choose Connection Type.
 6. click PC0 then click SWITCH
 7. double click PC0.
 8. Desktop tab, then click IP Configuration.
 9. set IP Address for PC0.
- IP Address PC0 = 10.10.10.1
10. Repeat steps 5 to 8 for all PCs.
 11. If it shows GREEN dots on both the end of cable it means connection establish successfully.



12. Enter into simulation mode.

13. Select packet.

14. Click on sender PC, then Click on receiving PC.15 play.

The screenshot displays the Cisco Packet Tracer application interface. The main workspace shows a network topology with a central switch labeled '2950-24TT Switch0' connected to six PCs labeled 'PC-PT PC2' through 'PC-PT PC6'. The interface includes a menu bar (File, Edit, Options, View, Tools, Extensions, Window, Help) and a toolbar with various icons. On the right side, there is a 'Simulation Panel' with an 'Event List' table. The 'Event List' table has columns for 'Vis', 'Time(sec)', and 'Last Device'. The table contains several entries, with the last entry being '5.068' and 'Switch0'. Below the 'Event List' table, there are buttons for 'Reset Simulation', 'Constant Delay', and 'Captured to...'. The 'Play Controls' section includes buttons for 'Previous', 'Play', and 'Next'. The 'Event List Filters - Visible Events' section lists various protocols and services. The bottom status bar shows the time '00:06:47.274', the play controls, and the 'Scenario 0' dropdown menu. The bottom taskbar shows the Windows operating system with various application icons and the system clock '09:30 01-02-2023'.

Vis	Time(sec)	Last Device
	3.351	Switch0
	5.064	—
	5.064	—
	5.064	—
	5.065	Switch0
	5.065	PC2
	5.066	Switch0
	5.066	Switch0
	5.066	Switch0
	5.066	Switch0
	5.067	PC3
	5.068	Switch0

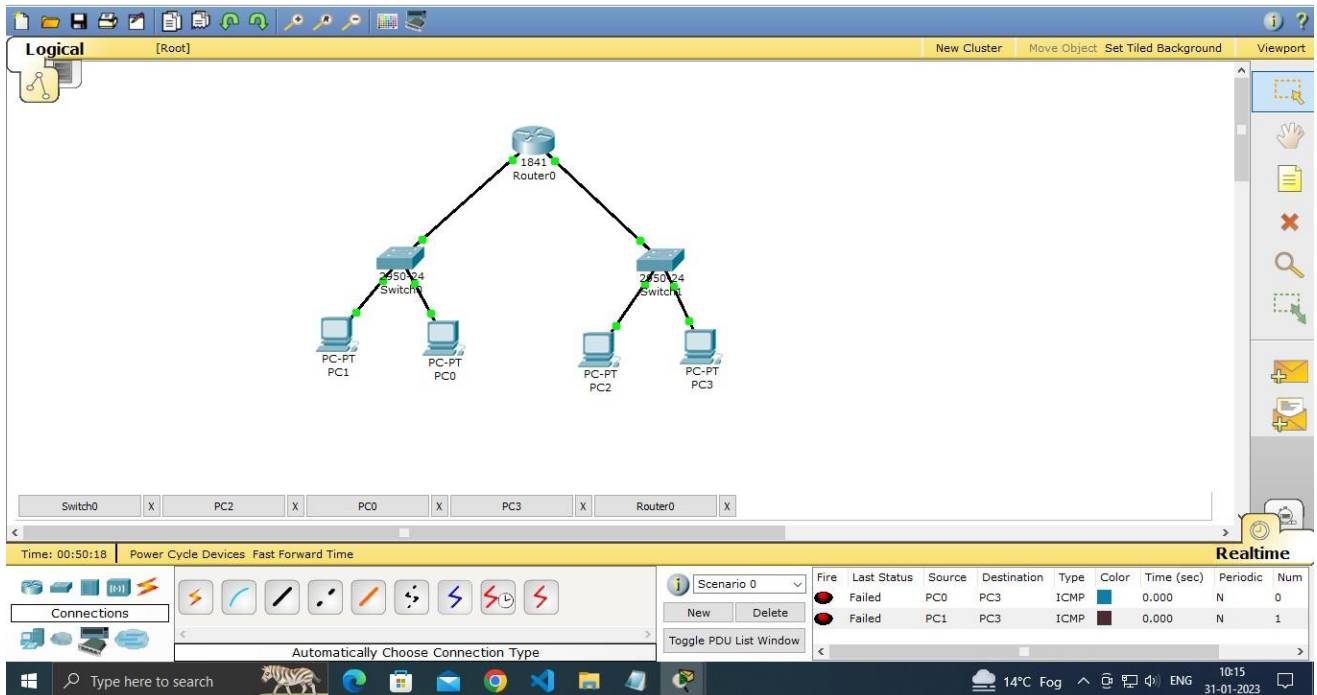
Q7. Simulate LAN using ROUTER.

Steps for simulate LAN using ROUTER:

1. open software packet tracer
2. click End Devices icon (lower left corner) or press CTRL + ALT + V
3. drag icon general (Personal Computer) and drop to worksheets.
4. Drag a Switch.
5. repeat steps 3 and 4 to make another LAN on same worksheet.
6. Drag a ROUTER.
7. connect both switches with router.
8. 5. click Connections icon or press CTRL + ALT + 0 , then click Automatically Choose Connection Type.
9. click PC0 then click SWITCH
10. double click PC0.
11. Desktop tab, then click IP Configuration.
12. set IP Address for PC0. IP Address PC0= 10.10.10.1
13. Repeat steps 5 to 8 for all PCs
14. connect SWITCHES with ROUTER PORT and assign Default gateway of switches as ROUTER IP.

Note: must ensure that network is of different class.

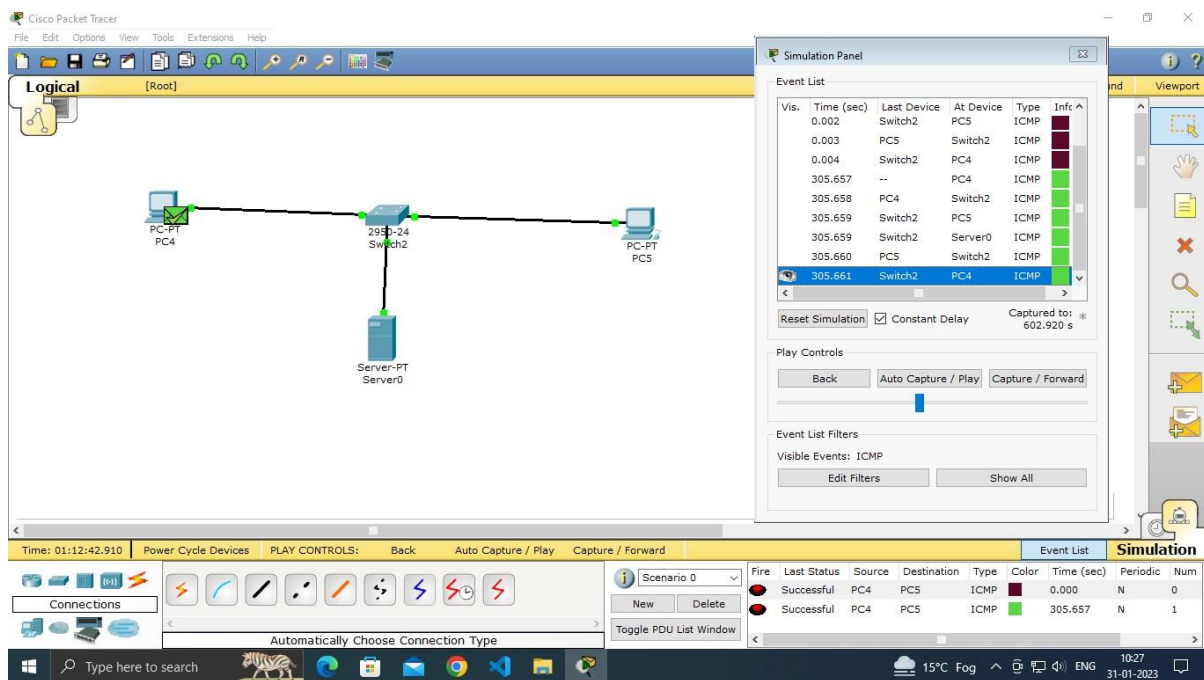
15. If it shows GREEN dots on both the end of cable it means connection establish successfully.



Q8. Create a client-server network and show steps to send a simple PDU in simulation mode.

Steps for client-server

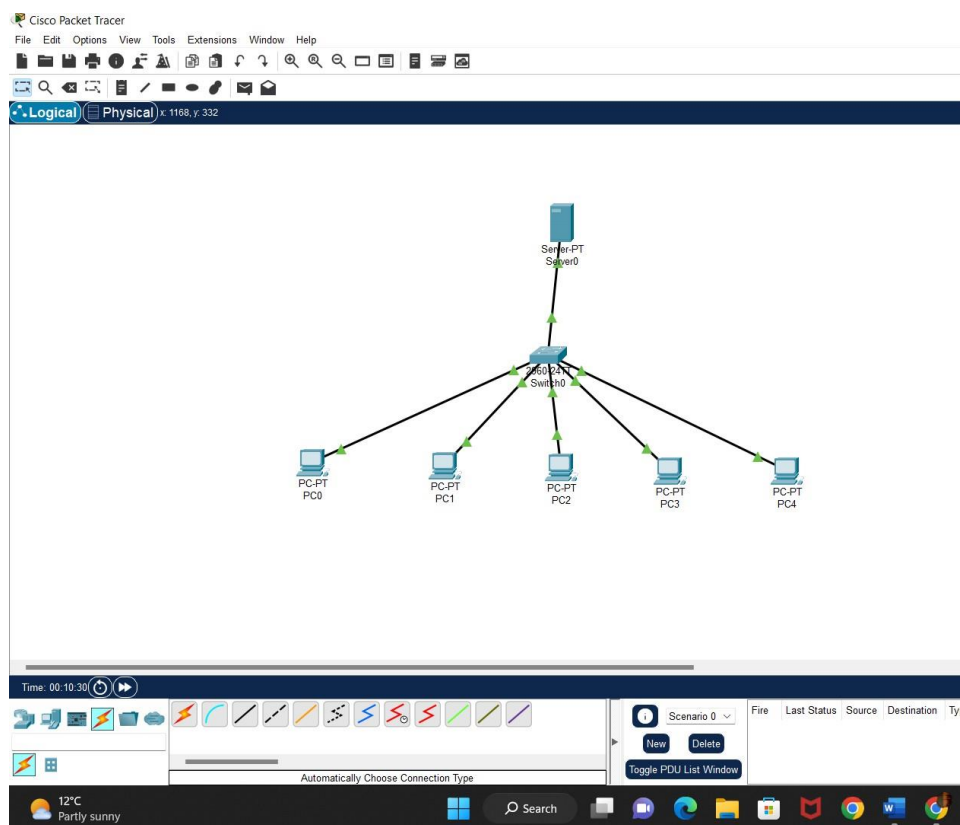
1. Drag two PCs.
2. Drag switch.
3. Connect PCs two Switch.
4. Double click on PC and assign IP address to both and default gateway.
5. Drag Server to worksheet
6. Give same default gateway to server as PC.
7. Green dots means connection established successfully.



Q9. Configure a service DHCP server and autoconfigure to such clients through the server.

Steps for DHCP server:

1. Drag 5 PC, 1 Switch, 1 Router
2. Connect PCs to Switch.
3. Connect Switch to Router.
4. Double click on Router go to desktop tab
5. Give IP ADDRESS 192.168.20.1
6. Go to Services
7. Select DHCP
8. ENTER IP address and DNS address as 10.0.0.1
9. Double click on PC



10. Go to desktop
11. Click on IP
12. Select DHCP, it will automatically give IP address by requesting to DHCP
13. Enter into simulation mode
14. Select packet.
15. Select sender and receiver PC.
16. Play.

