DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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Course Code: PCC-CSG592

Sl. No	Topic Name	Date of Experiment	Signature with Date	Remarks
1	Understanding different network interface commands	17/07/25	17/07/25	
2	Design a simple computer with two computers & test its connectivity.	24/07/25	31/07/25	
3.	Configuration and analysis of Network Devices(Hub)using cisco Packet Tracer	7.08.25	07/08	
4.	Understand the difference between Hub and Switch	07.08.25	8.25	
5	connecting two different ~~network~~ networks using a router	25.08.25	29/8/25	
6	visualize Ring topology using 4 PCs & 4 switches, Cisco Packet Tracer	4.9.25	4/9/25	
7.	visualize Mesh topology using 4 PCs and 4 switches in cisco packet tracer	4.9.25	11/9/25	
8	visualize Bus topology using 4 PCs and switches in cisco Packet Tracer	4.9.25	11/9/25	
9	visualize star topology using 4PCs and 1 switche in cisco packet Tracer	4.9.25	11/9/25	
10	connecting two different department in a company, where each department having 4 PCs and	11.9.25	30/10/25	
	connect them with switches & router			
11	connecting multiple dept in a company.			

Assignment 1 :- Understanding different Network interface commands.

1) Details for connected network with your system.

=> output :-

User Profiles

All User Profile : BWU5R003
All User Profile : BWU5R205A
All User Profile : Dibjo A
All User Profile : You are hacked
All User profile : krish

2) To find ip address from url

=> code : nslookup www.google.com

output :-

Server : Unknown
Address : 7.7.7.7
Name : www.google.com
Address : 2404:6800:4007:837::2004
142.251.221.132

3) To find the ip-address of any system.

=> code :- ipconfig

output :- Windows IP Configuration

Ethernet adapter Ethernet :

Connection-Specific DNS Suffix :
Link-local IPV6 Address . . . : fe80::b4e9:a7d3:a1f5:c6d5%17
IPV4 Address . . . : 7.7.3.90
Subnet mask . . . . . : 255.255.248.0
Default Gateway . . . . : 7.7.7.7

4) To send info into other node of the network.

=> Code:- ping

Output:-

-t Ping the specified host until stopped.
To see statistics and continue - type Control-Break;
To stop - type control-C.

-a Resolve addresses to hostnames.

-n count Number of echo requests to send.

-l size send buffer size.

-f set Don't Fragment flag in packet (IPv4-only).

-i TTL Time to live.

-v TOS Type of service (IPv4-only. This setting has been deprecated and has no effect on the type of service field in the IP Header).

5) To check the connectivity of your m/c.

=> Code:- ping 7.7.7.7

output:- Pinging 7.7.7.7 with 32 bytes of data:
Reply from 7.7.7.7: bytes=32 time<1ms TTL=64
Reply from 7.7.7.7: bytes=32 time<1ms TTL=64
Reply from 7.7.7.7: bytes=32 time<1ms TTL=64
Reply from 7.7.7.7: bytes=32 time<1ms TTL=64

Ping statistics for 7.7.7.7:
Packets: Sent=4, Received=4, Lost=0 (0% loss)
Approximate round trip times in milli-seconds.
Minimum=0 ms, Maximum=0ms, Average=0ms

Experiment 2:- Design a simple computer with two computers & test its connectivity.

1) Aim of the Experiment:- To simulate and verify connectivity between two computers in a simple network using cisco Pocket tracer.

2) Learning outcomes:-

- Understanding basic Peer-to-Peer networking.
- Learn how to assign IP address to end devices.
- Test communication between computers using ping command.

3) Prerequisites:-

- Basic knowledge of networking concepts (IP address, subnet).
- Familiarity with cisco pocket tracer software

4) Materials/Equipment/software Required:-

- Cisco Packet Tracer Software
- Two PCs
- One copper crossover cable

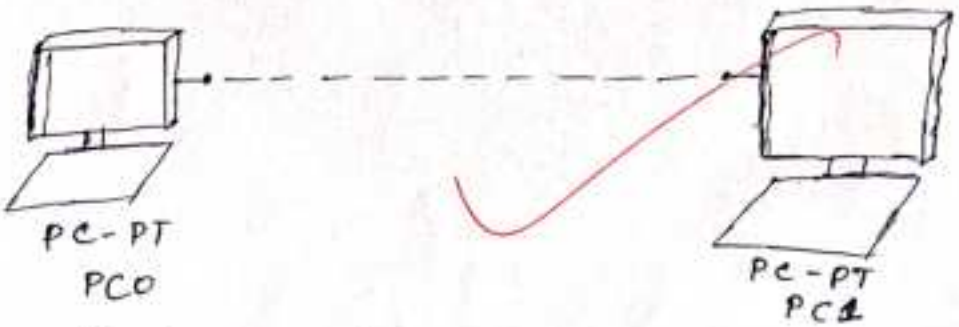
5) Introduction and Theory:-

A simple LAN (Local Area Network) connects two or more computers to allow data exchange. This experiment demonstrates the smallest form LAN with just two PCs, configured either through a switch or directly with a crossover cable.

6) Operating Procedure :-

By direct Connection :-

1. Connect PC1 and PC2 using a copper cross-over cable.
2. Assign IP addresses :
   - PC1 : 192 : 162 . 128 . 1
   - PC2 : 192 . 162 . 128 . 2
3. On each PC, go to desktop > IP configuration and set the IP.
4. Use ping from one PC to the other :
   - on PC1, open command prompt and type : ping 192 . 162 . 128 . 2
   - you should receive replies.



7) Precautions and/or Trouble shooting :-

- Ensure correct IP subnet is used.
- Check that cables and properly connected.
- Use the correct cable type (straight-through for switch, crossover for direct connection).
- If ping fails, check if both PCs are powered on and configured.

8) Observation:-

- Successful Pings indicate correct setup.
- Time taken for each ping request can be noted.
- Failed Pings suggest misconfiguration or bad connection.

9) Result and Interpretation:-

- When configured correctly, two PCs in a LAN can communicate using their IP addresses.
- This demonstrates fundamental LAN connectivity and importance of proper IP configuration.

31/07/25

Experiment 3:- Configuration and analysis of network Devices (HUb) using Cisco Packet Tracer.

1. Aim/Purpose of the Experiment:- To simulate, configure and analyze the functionality of basic network devices (Hub) using Cisco Packet Tracer.

2. Learning outcomes:-

- Understand the working principles of different network devices.
- Differentiate between various network devices in terms of their operation and use cases.
- Develop skills to configure and analyze network devices in a simulation environment using Cisco Packet Tracer.

3. Prerequisites:-

- Basic understanding of networking concepts (e.g., LAN, WAN, network layers).
- Familiarity with Cisco Packet Trace software.

4. Materials/Equipment/Apparatus/Devices/software required:-

- Cisco Packet Tracer software (latest version)
- PC/Laptop with a stable operating system.

5. Introduction and Theory:-

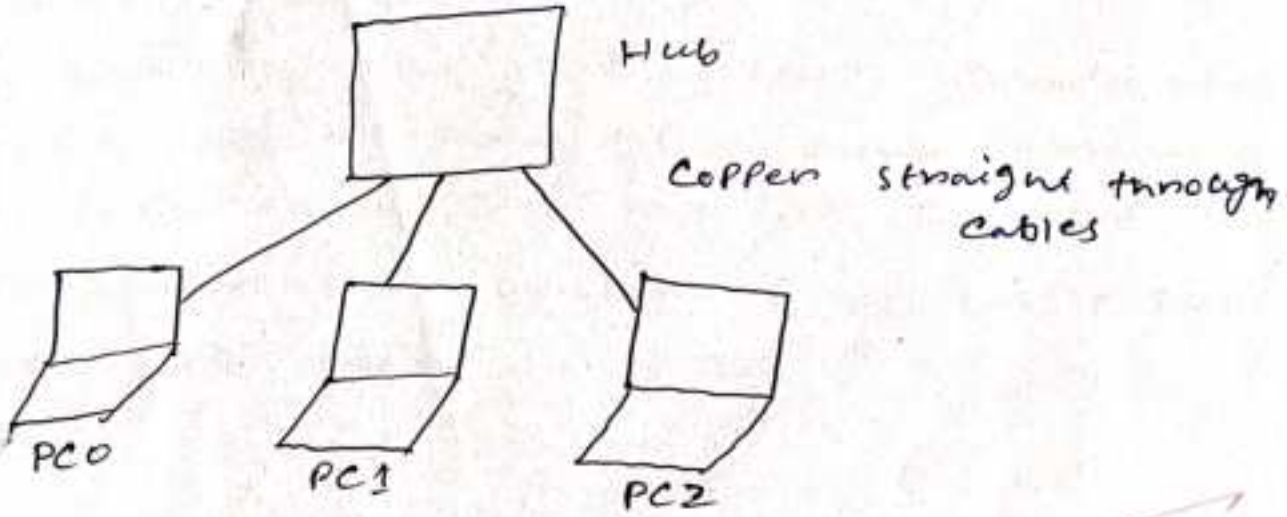
Network devices such as ~~repeaters~~. hubs serve different purposes in a computer network. This experiment will cover the following devices:

Hub:- Broadcasts data to all connected devices but does not filter traffic

6. Operating Procedure:-

Setting up the Hub:-

- Drag and drop a hub onto the workspace.
- Connect three PCs to the hub.
- Assign unique IP addresses to the PCs.
- Analyze the broadcast behavior of the hub by using packet tracing.



7. Precautions and/or Troubleshooting:

- Ensure that all devices are connecting connected and powered on in Packet Tracer.
- Double-check IP configurations for each network device and PC.
- For router configurations, ensure correct routing protocols or static routes are applied.

8. Observations :-

Source Device	Destination IP	Result
PC0	192.168.0.2	Reply Received
PC0	192.168.0.3	Reply Receives
PC1	192.168.0.1	Reply Received
PC2	192.168.0.1	Reply Receives

9. Result :-

The network was successfully created using a hub, and all three PCs could communicate with each other using the ping command. This demonstrate the working of a basic hub-based LAN setup.

07/08/25

Assignment - 4

1) Aim/Purpose of the Experiment:

To study and understand the functional difference between Hub and switch in a computer network using cisco packet Tracer.

2) Learning outcomes:

- Understand how a hub transmits data to all connected devices.
- Understand how a switch forwards data selectively using MAC addresses.
- Differentiate between the working principles, efficiency and collision domains of Hub and switch.
- Analyze data flow using simulation in a Cisco Packet Tracer.

3. Prerequisites:

- Basic knowledge of Computer networks (LAN, topology, data transmission).
- Familiarity with cisco Packet Tracer Software.

4. Materials / Equipment:

- Cisco Packet Tracer
- one Hub device
- Six PCs
- Copper straight-through cables
- switch

5. Introduction and Theory:

In Computer Networks, devices like Hub and Switch are used to connect multiple computers.

Hub: Works at the data link layer and sends data to all devices, causing traffic and collisions.

Switch: Works at the data link layer and sends data only to the destination device using MAC addresses, making it faster and more efficient.

6. Operating Procedure:

(i) Connect PCs 1, 2, and 3 to the hub and PC 4, 5, and 6 with switch with straight-through cable.

(ii) Assign IP address:

PC1: 192.162.128.1
PC2: 192.162.128.2
PC3: 192.162.128.3
PC4: 192.162.128.4
PC5: 192.162.128.5
PC6: 192.162.128.6

(iii) On each PC, go to desktop > IP-Configuration and set the IP.

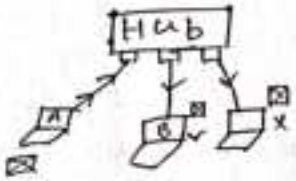
(iv) From PC1, send a ping to PC3 (hub side) and observe the data flow in the simulations.

(v) From PC4, send a ~~ping~~ Ping or message to PC6 (switch side) and observe the data flow.

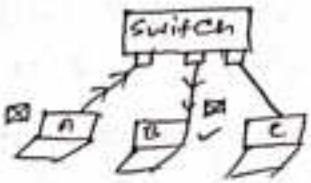
(vi) Record observations of packet flow and network behaviour for both setups.

Diagram:

A send to B



A send to B



Precautions:

- Ensure all devices are properly connected and powered on.
- Assign correct IP addresses to all PCs to avoid IP config.

Observations:

- Data transmission:- Data from one PC broadcasted to all the hubs. but Data sent only to the destination PC.
- Network Traffic:- In case of hub it is high but for switch it is low.
- Collisions:- In hub it is frequent due to shared bandwidth and in switch it is minimal.

Result:

Collision Rate:- Hub network shows higher collisions due to broadcast nature.

Efficiency:- switch network improves efficiency by limiting traffic to destination devices only.

21-8-25

Experiment 5

Title: Connecting two different networks using a router.

Aim: To configure a router to connect two different networks so that devices in one network can communicate with devices in another network.

Objective:

- Understand the role of a router interconnecting two different IP networks.
- Learn to assign IP addresses to interfaces and devices.
- Enable routing between two subnets.

Learning outcomes:

- Configure IP addresses for different networks.
- Assign IPs to router interfaces.
- Verify successful communication between devices on separate network via a router.

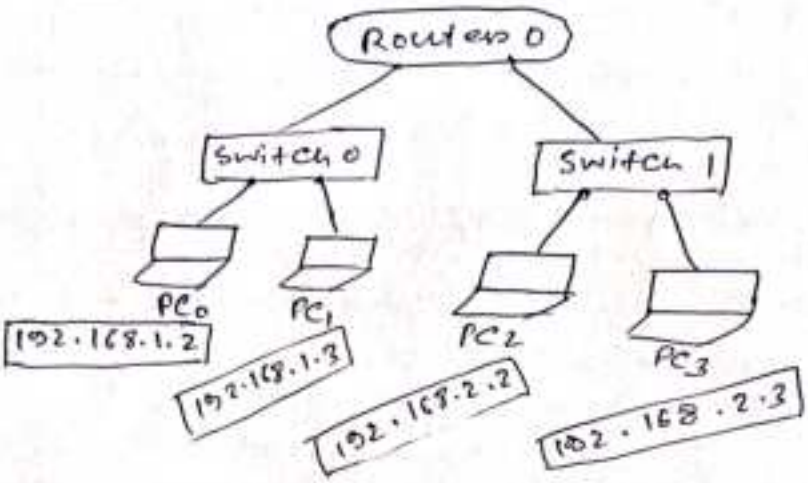
Prerequisites:

- Basic knowledge of IP addressing and subnetting.
- Understanding of router and it's interfaces.
- Familiarity with Cisco packet tracer or physical router setup.

Materials / Software Required:-

- 1 Router (e.g. Cisco 1841 to 1941)
- 2 switches
- 4 PCs (via each network)
- Straight-through Ethernet cables
- Cisco packet tracer (for simulation) or real devices.

Network topology Diagram:



IP Addressing Table:

Device	Interface	IP address	Subnet mask
PC0	NIC	192.168.1.2	255.255.255.0
PC1	NIC	192.168.1.3	255.255.255.0
PC2	NIC	192.168.2.2	255.255.255.0
PC3	NIC	192.168.2.3	255.255.255.0
Router	G0/0	192.168.1.1	255.255.255.0
Router	G0/1	192.168.2.1	255.255.255.0

Procedure:

1. Connect devices according to the topology using switches and a router.
2. Assign IP addresses to all PCs and router interfaces as per the table.
2. Configure the router interfaces:

Access CLI:

```
Router> enable
Router# conf
Router(config)# interface gig0/0 or interface fastethernet 0/0
Router(config-if)# ip address 192.168.1.1 255.255.255.0
Router(config-if)# no shutdown
Router(config-if)# exit
```

Router(config)# interface gig0/1 on interface fastethernet0/1
Router(config-if)# ip address 192.168.2.1 255.255.255.0
Router(config-if)# no shutdown
Router(config-if)# exit

4. Configure default gateways on each PC:

- PCs in network1: Default gateway = 192.168.1.1
- PCs in network2: Default gateway = 192.168.2.1

5. Test connectivity:

- Ping from PC0 to PC2 and PC3
- Ping from PC2 to PC0 and PC1.

Observations:

Test	Expected Result	Actual Result
PC0 to PC1	success	✓
PC0 to PC2	success	✓
PC2 to PC3	sucess	✓
PC3 to PC1	success	✓

Experiment - 6

Visualize Ring Topology using 4 PCs & 4 switches, Cisco Packet Tracer.

1. Aim: To design & visualize a Ring Topology using 4 PCs & 4 switches in cisco Packet Tracer.

2. Apparatus/software Required:

- Cisco Packet Tracer software
- 4 PCs
- 4 switches (2960 or 2950 model)
- straight-through cables.

3. Theory:

- A Ring Topology connects each devices to exactly two other devices, forming a circular path for signals.
- Data travels in one connection (Uni-directional) or both direction (bi-directional).
- Though real ring topologies often use point-to-point links, in cisco packet Tracer we simulate it with switches connecting PCs in a circular arrangment.

Procedure:

1. Open cisco Packet Tracer and create a new project.
2. Add 4 PCs (PC0, PC1, PC2, PC3) to the workspace.
3. Add 4 switches (switch0, switch1, switch2, switch3).
4. Connect each PC to it's corresponding switch using a copper straight-Through cable.
   - PC0 → switch0
   - PC1 → switch1
   - PC2 → switch2
   - PC3 → switch3
5. Connect the switches in a ring topology using straight through cables.
   - switch0 → switch1
   - switch1 → switch2
   - switch2 → switch3
   - switch3 → switch0

6. Assign IP addresses to each:

- PC0 → 192.168.1.1
- PC1 → 192.168.1.2
- PC2 → 192.168.1.3
- PC3 → 192.168.1.4

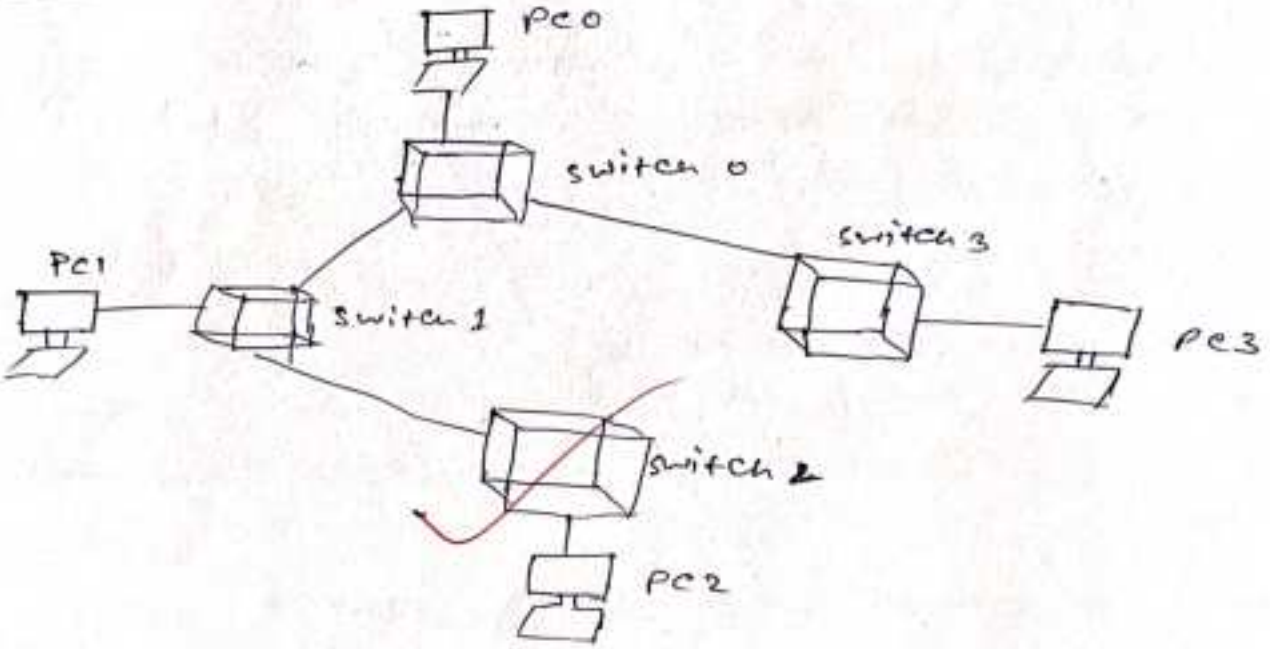
Subnet mask: 255.255.255.0

7. Test connectivity using ping command:

① Open PC0 → Command Prompt → Ping 192.168.1.2

② Similarly ping other PCs to verify communication

Topology Diagram:



Result: The ring topology with 4 PCs and 4 switches was successfully created in Cisco Packet Tracer. The PCs were able to communicate, demonstrating the working of the ring topology.

Experiment 7

Visualize Mesh Topology using 4 PCs and 4 switches in cisco packet tracer.

Aim: To design and visualize a Mesh topology using 4PCs and 4 switches in cisco packet Tracer.

Apparatus/ software required:

- cisco packet Tracer software
- 4 PCs
- 4 switches (2960 or 2950 model)
- Autometing Cable

Theory:

- A Mesh Topology connects each devices to all other devices, forming a path for signals.
- Data travels in one direction or both directions.
- Through real mesh topologies often use Point-to-Point links, in cisco packet Tracer we simulate it with switches connecting PCs in a Circular arrangement.

Procedure:

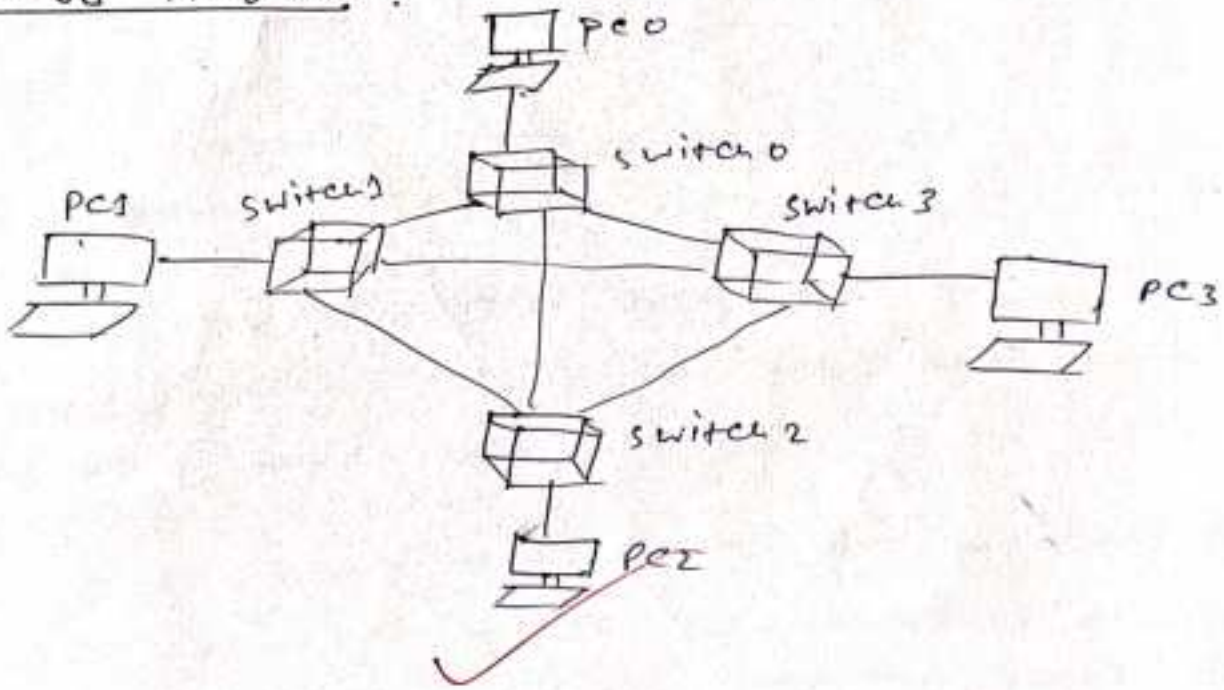
1. Open cisco packet Tracer and create a new project.
2. Add 4 PCs (PC0, PC1, PC2, PC3) to the workspace.
2. Add 4 switches (switch 0, switch 1, switch 2, switch3).
4. connect each PC to it's Corresponding switch using a automated cable.
   - PC 0 → switch 0
   - PC1 → switch 1
   - PC2 → switch 2
   - PC3 → switch 3
5. Connect the switches in a mesh topology using automatic cables:
   - switch 0 → switch 1
   - switch 0 → switch 2
   - switch 0 → switch 3
   - switch 01 → switch 0
   - switch 1 → switch 2
   - switch 1 → switch 3

- Switch 2 ⟶ Switch 0
- Switch 2 ⟶ Switch 1
- Switch 2 ⟶ Switch 3
- Switch 3 ⟶ Switch 0
- Switch 3 ⟶ Switch 1
- Switch 3 ⟶ Switch 2

6. Assign IP addresses to each PC -
   - PC 0 ⟶ 192.168.1.1
   - PC 1 ⟶ 192.168.1.2
   - PC 2 ⟶ 192.168.1.3
   - PC 3 ⟶ 192.168.1.4

7. Test connectivity using the ping command:
   - Open PC0 → command → ping 192.168.1.2
   - Similarly, ping other PCs to verify communication.

Topology Diagram:



Result:

The mesh topology with 4 PCs and 4 switches was successfully created in cisco Packet Tracer. The PCs were able to communicate, demonstrating the working of the ring topology.

Assignment 8

Visualize Bus topology using 4 PCs and 1 Switches in Cisco Packet Tracer.

Aim: To design and visualize a Bus topology using 4 PCs and 1 switches in cisco Packet tracer.

Apparatus / software Required:

- Cisco Packet Tracer software
- 4 PCs
- 1 switch (2960 or 2950 model)
- Straight-through Cables

Theory:

- A Bus topology connects all devices to a single control communication line (called the Bus or backbone cable).
- All data is transmitted along this shared cable and each device listens for data addressed to it.
- Only one device can send data at a time; otherwise, collesions occur.
- In cisco Packet Tracer, we can simulate Bus topology connecting all PCs (switches) to a single hub or by using a single central switch to act as the shared communication medium.

Procedure:

1. Open cisco Packet Tracer and create a new project.
2. Add 4 PCs (PC0, PC1, PC2, PC3) to the workspace.
3. Add 1 central Switch (Switch 0) to act as the shared communication medium.
4. Connect each PC to the switch using a copper straight-Through cable:
   - PC0 ⟶ Switch 0
   - PC1 ⟶ Switch 0

- PC 2 → Switch 0
- PC 3 → Switch 0

5. Ensure all device are powered on.

6. Assign IP addresses to each PC(same network, eg, 192.168.1.0/24):

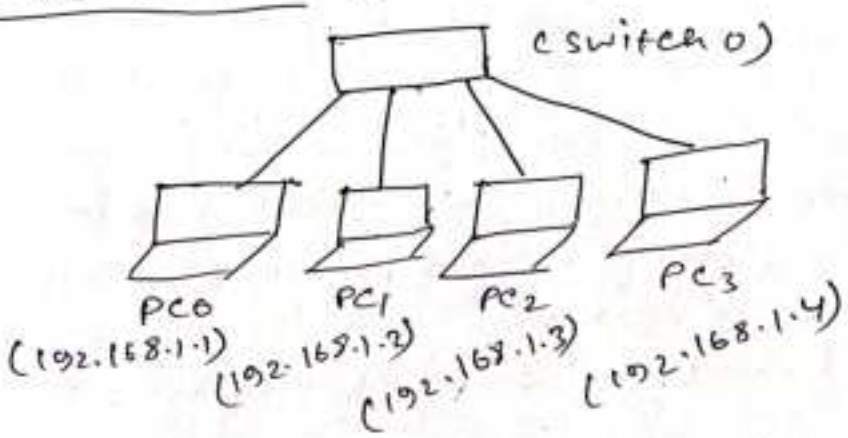
- PC0 → 192.168.1.1
- PC1 → 192.168.1.2
- PC2 → 192.168.1.3
- PC3 → 192.168.1.4

subnet mask → 255.255.255.0

7. Test connectivity using the ping command:

- Open PC0 → command prompt → ~~Ping~~ Ping 192.168.1.2
- similarly, Ping other PCs to verify communication.

Topology Diagram:



Result: The Bus topology with 4 PCs and 1 switches successfully created in cisco Packet tracer. The PCs able to communicate, demonstrating the working of the Bus topology.

Fire	Last Status	Source	Destination	Type	Colour	Time(sec)
●	Successful	PC0	PC3	ICMP	□	0.000

Periodic	Num
N	0

Assignment 6

Visualize Star topology using 4PCs and 1 switch in cisco packet Tracer.

Aim: To design and visualize a star topology using 4 PCs and 1 switch in cisco packet Tracer.

Apparatus/Software Required:

- Cisco Packet Tracer software
- 4 PCs
- 1 switches (2960 or 2950 model)
- Straight-through cables

Theory:

- A star topology connects all devices to a central device (usually a switch or hub).
- All communication between devices passes through the central device.
- If one peripheral device fails, the rest of the network remains operational.
- In cisco packet tracer, we simulate it by connecting all pcs directly to a single switch (central point), forming a star-like arrangement.

Procedure:

1. Open cisco packet tracer and create a new project.
2. Add 4 PCs (PC0, PC1, PC2, PC3) to the workspace.
3. Add 1 switch (switch 0) to act as the central device.
4. connect each PC to the central switch (switch0) using a copper straight-through cable.
   - PC0 → switch0
   - PC1 → switch0
   - PC2 → switch0
   - PC3 → switch0

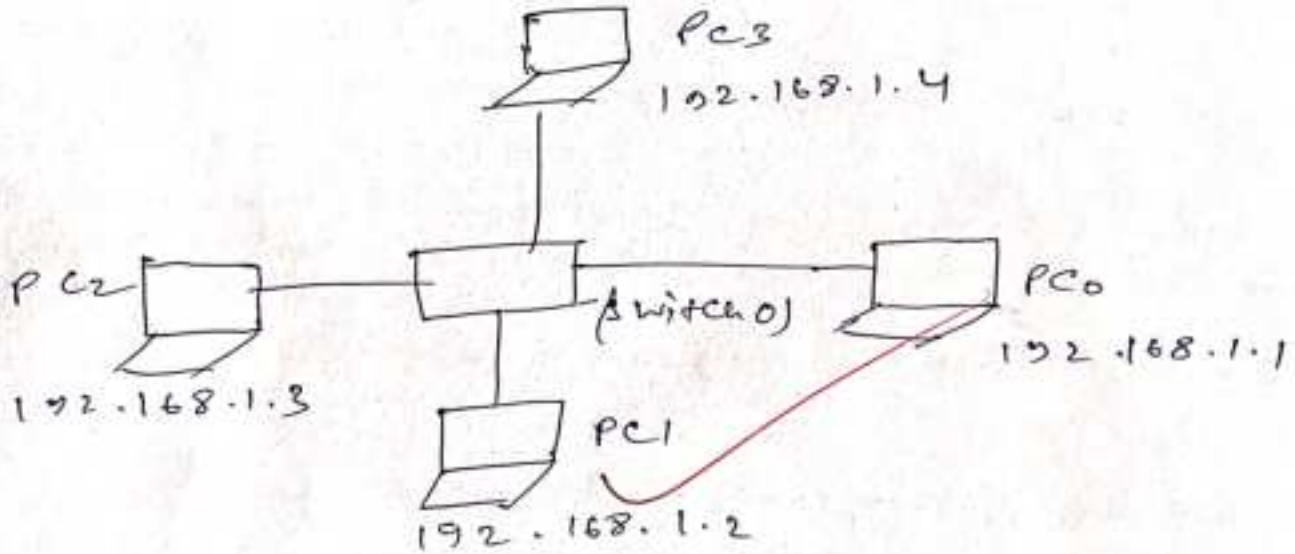
6. Assign IP addresses to each PC (same network, e.g., 192.168.1.0/24):

- PC0 → 192.168.1.1
- PC1 → 192.168.1.2
- PC2 → 192.168.1.3
- PC3 → 192.168.1.4

7. Test connectivity using the ping command:

- Open PC0 → Command Prompt → Ping 192.168.1.2
- Similarly, ping other PCs to verify communication

Topology Diagram :



Result :- The star topology with 4 PCs and 1 switch has successfully created in Cisco packet Tracer. The PCs were able to communicate demonstrating the working of the star topology.

Fire	Last Status	Source	Destination	Type	Color	Time(sec)
⊙	Successful	PC1	PC0	ICMP	□	0.000

Periodic	Num
N	0

Experiment 10

Connecting two different department in a company where each department having 4 PCs and connect them with switches & 1 router.

Aim: TO Configure a router to connect two different Networks here two different company's department. where each department having 4PCs.

Objective:

- Understanding the role of a router in interconnecting two different IP Network.
- Learn to assign IP addresses to interfaces & devices.

Learning outcome:

By the end of this experiment we have the knowledge about —

① Configure IP addresses for different network, here in two different department in the company.

② Assign IP's to router interface.

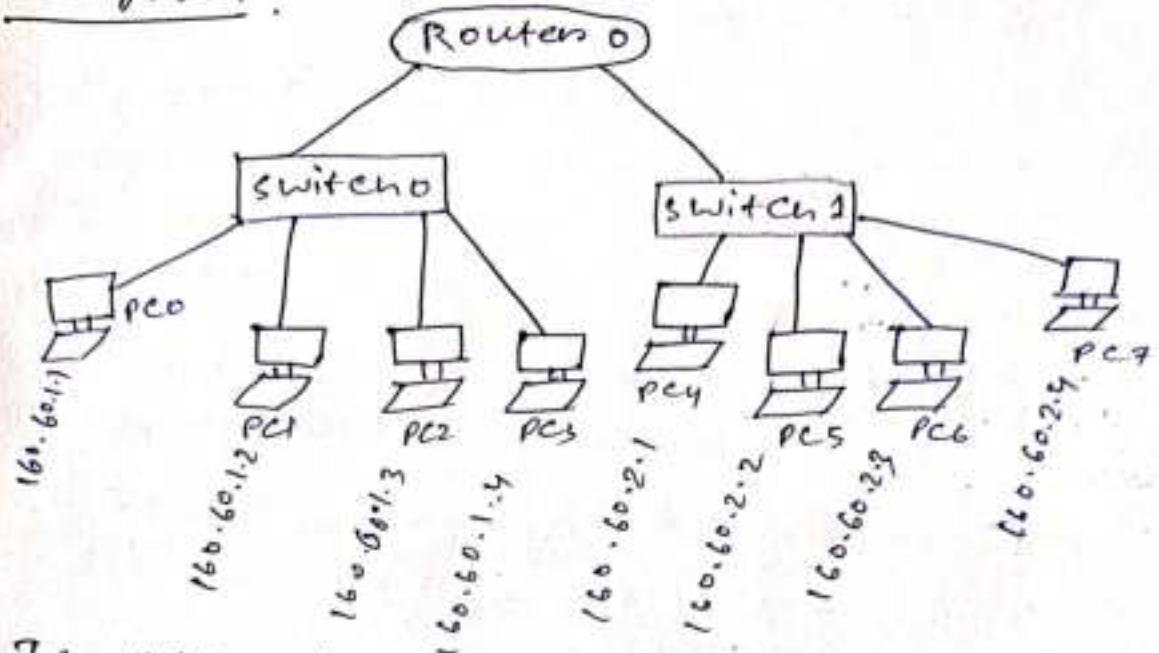
prerequisites:

- Basic knowledge of IP addressing and subnetting.
- Understanding of router and it's interface.

Materials:

- 1 router
- 2 switches
- 4 PCs in each department.
- Straight-through Ethernet cables.

Diagram:



IP Addressing Table:

Device	Interface	IP Address	Subnet Mask
PC0	NIC	160.60.1.1	255.255.255.0
PC1	NIC	160.60.1.2	255.255.255.0
PC2	NIC	160.60.1.3	255.255.255.0
PC3	NIC	160.60.1.4	255.255.255.0
PC4	NIC	160.60.2.1	255.255.255.0
PC5	NIC	160.60.2.2	255.255.255.0
PC6	NIC	160.60.2.3	255.255.255.0
PC7	NIC	160.60.2.4	255.255.255.0

Procedure:

1. Connect devices according to the topology using switches & a router.
2. Assign IP address to all PCs and router interface as per the table.
3. Configure the router interface:

Access CLI:

```
Router> enable
Router# conf
Router(Config)# interface gig0/0
```

```
Router(config-if)# ip address 192.168.1.1
                                255.255.255.0
Router(config-if)# no shutdown
Router(config-if)# exit
Router(config)# interface gig0/1
Router(config-if)# ip address 192.168.2.1
                                255.255.255.0
Router(config-if)# no shutdown
Router(config-if)# exit
```

Configure default gateway on each PC:

- PCs in Network 1: Default gateway = 192.168.1.1
- PCs in Network 2: Default gateway = 192.168.2.1

Test connectivity:

- Ping from PC0 to PC2 and PC3.
- Ping from PC2 to PC0 and PC4.

Observations:

Test	Expected Result	Actual Result
PC0 to PC1	success	✓
PC0 to PC2	success	✓
PC2 to PC3	success	✓
PC3 to PC1	success	✓

Exp 11: Connecting multiple dept in a company.

Aim: In each router to connect with different networks and make connection between those routers

Objective:

- Understanding the role of router in interconnecting two different IP networks.
- Learn to assign Ip addresses to interfaces and devices.
- Connect two different routers.

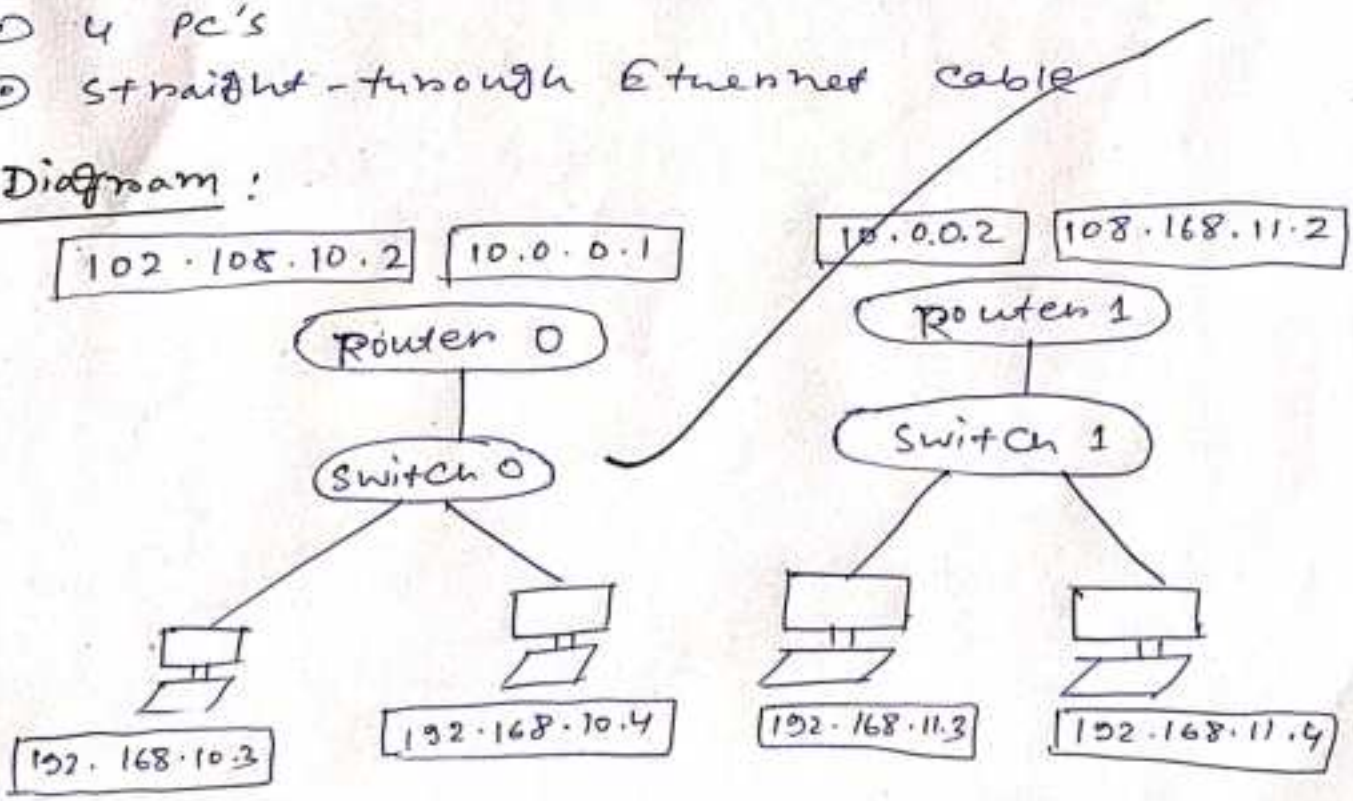
Prerequisites:

- Basic knowledge of ip addressing and subneting.
- Understanding the router & it's interface.

Materials:

- 2 routers
- 2 switches
- 4 PC's
- Straight-through Ethernet cable

Diagram:



Procedure:

1) Connect devices according to the topology using switches & routers.
2) Assign IP address to all PC's.
3) Assign IP address to all routers.
4) Write the IP address of the router as the default gateway into the PC's.
5) Perform the simulation.

Test connectivity:

- Ping from PC0 to PC1 & PC2
- Ping from PC2 to PC0 & PC4

Observation:

Test	Expect result	Actual Result
PC0 to PC1	success	✓
PC0 to PC3	Success	✓
PC2 to PC3	Success	✓
PC2 to PC1	Success	✓