Expt. No. 1A

Date 7/8/25

Page No. 1

INTRODUCTION TO COMPUTER NETWORKS

A network is a set of devices (often referred to as nodes) connected by communication links so that they can share resources, exchange data and communicate with each other.

Why networks are needed?

1. Resource Sharing : Sharing printers, files, storage and applications.
2. Communication : Emails, video and audio conferencing.
3. Data sharing : Transfer of files and information between systems.
4. Scalability : Easy to add new devices.
5. Cost efficiency : Reduces hardware / software cost through sharing.

Components of Computer Network :

1. Router : Connects different networks and forwards data packets between them.

Teacher's Signature :

2. Switch: Connects multiple devices in a LAN and intelligently forwards data only to the intended device.

3. Hub: Simple device that connects multiple computers but sends data to all devices.

4. NIC (Network Interface Card): A hardware component inside a computer that enables it to connect to a network.

5. Cables & Connectors: Physical medium used for wired communication.

6. Access Point (AP): Provides wireless connectivity to devices within a network.

7. Modem: Converts digital signals into analog, and vice versa, to connect to internet over telephone/cable lines.

Types of Networks:

1. LAN:
   - Covers a small area such as home, office or campus.
   - High speed, low cost.

Teacher's Signature : _____

2. MAN:
- Covers a larger area like a city or multiple buildings.
- Used by ISPs, cable TV networks.

3. WAN:
- Spans very large geographical areas (country or world).
- Slower compared to LAN.
- Connects multiple LANs and MANs.

4. PAN:
- Very small area network
- Connects devices like smartphones, laptops for personal use and communication.

5. CAN:
- Connects multiple LANs within a campus.
- Larger than LAN but smaller than MAN.

Network Topology:

1. Bus Topology:

All devices are connected to a single central cable called the backbone. Data travels through this backbone and each device checks if data is meant for it.

Advantages:
- It is simple, requires less cabling
- Requires less cabling

Teacher's Signature : _____

- Cost - effective for small networks.

Disadvantages:
- A failure in the backbone cable can bring down the entire network.
- Performance decreases as more devices are added due to data collisions.

2. Star Topology:

All devices are individually connected to a central hub or switch. The hub manages communication between devices by forwarding data to the intended destination.

Advantages:
- Easy to install and expand.
- Failure of one device does not affect the rest.
- Centralised management makes troubleshooting simple.

Disadvantages:
- More cabling than bus topology.
- If central hub or switch fails, the entire network goes down.

Expt. No. _____ Date _____

Page No. 5

3. Ring Topology:

Each device is connected to exactly two other devices, forming a circular path. Data travels in one direction or both directions in dual ring.

Advantages:
- No data collisions
- Each device has equal access to the network.

Disadvantages:
- A single cable or device failure can disrupt the entire network.
- Troubleshooting can be complex.

4. Mesh Topology:

Every device is connected to every other device, providing multiple paths for data transfer.

Advantages:
- Very reliable
- Fault - tolerant
- High security

Disadvantages:
- Very expensive
- Intallation and maintenance are complex.

Teacher's Signature : _____

5. Tree Topology:

It is a combination of bus and star topologies. Multiple star networks are connected to a central backbone, forming a hierarchical structure.

Advantages:
- Highly scalable
- Supports expansion
- Suitable for large networks

Disadvantages:
- Costly
- If backbone, the entire network is affected.

6. Hybrid Topology:

It is formed by combining two or more different types of topologies depending on the network's requirement.

Advantages:
- Flexible
- Reliable
- Scalability
- Suitable for large and complex

Disadvantages:
- Complex
- Costly
- Difficult to manage.

Teacher's Signature : _____

Expt. No. 1B

Date 7/8/25

Page No. 1

INTRODUCTION TO CISCO PACKET TRACER

Cisco Packet Tracer is a comprehensive networking simulation software tool for teaching and learning how to create network topogies and imitate modern computer networks.

Uses of Cisco Packet Tracer:

1. Learning & Education:

- Packet Tracer provides a platform for students to gain practical experience in networking by building and experimenting with virtual network.
- The tool allows users to visually observe how data travels through the network enhancing their understanding of network protocols and concepts.

2. Network Design & Testing:

- Users can simulate network issues and troubleshoot them in Packet Tracer, gaining valuable experience in identifying and resolving problems.
- Before making changes to a live networks, users can test them in Packet Tracer to ensure they work as expected, minimizing the risk of disruption.

Teacher's Signature :

3. Other Users:

- Packet Tracer supports multi-user collaboration, allowing uses to work together on network projects and participate in competitions.
- It can be integrated with other tools and technologies such as Python scripting and IOT devices, for more advanced learning and experimenting.

Working of Cisco Packet Tracer:

1. Launch Packet Tracer on your computer.
2. Create a new network topology by dragging and dropping network devices such as routers, switches and PCs onto the workspace.
3. Connect the devices by dragging cables between them.
4. Configure the devices by using the command line interface or GUI.
5. Test the network by sending packets between devices.
6. Troubleshoot any issues that arrive by using the built in tools and features.

Teacher's Signature : _____

Expt. No. 2A

Date 21/8/25

Page No. 9

AIM:

To establish peer to peer connection between similar devices using Cisco Packet Tracer.

THEORY:

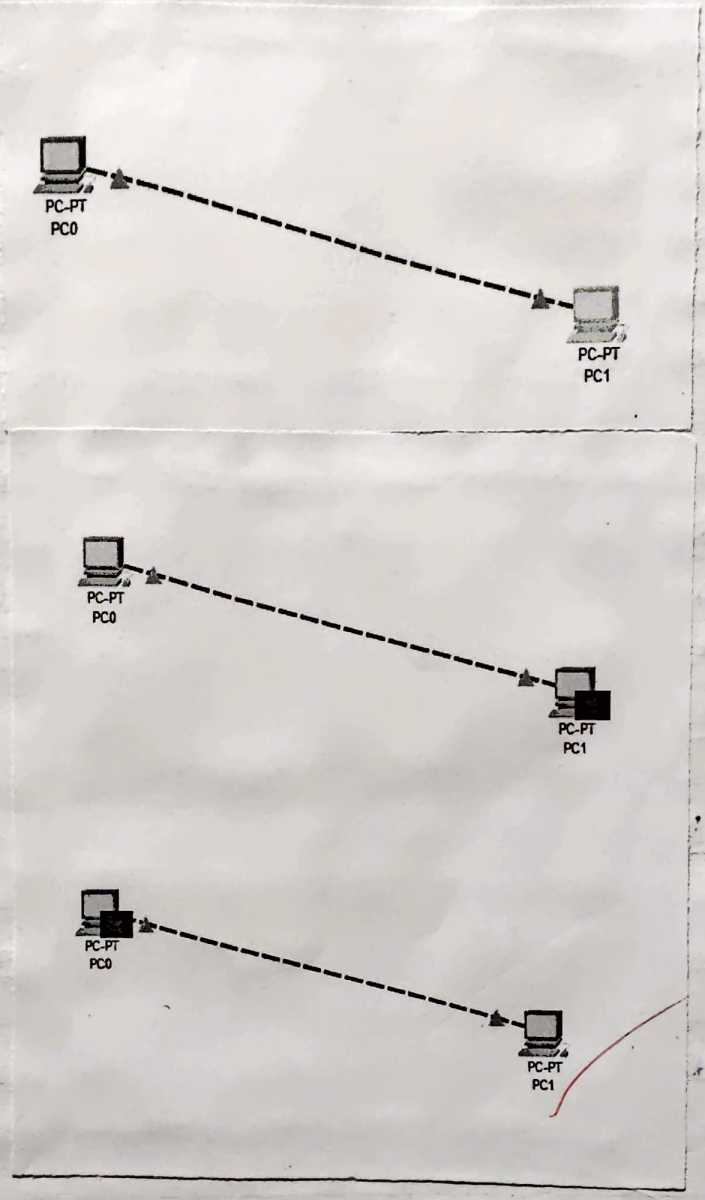
It is a simulation software which can be used to create complicated network topologies, as well as to test and simulate abstract networking concepts.

PROCEDURE:

A. To connect, peer to peer connection is developed.

1. Select and drag two end devices from device panels at bottom left corner.
2. Select and drag copper crosswire from wires panel and connect the two devices while choosing fast ethernet option.
3. After dragging the wire to the second device, again select fast ethernet option.
4. Required connection is established.

Teacher's Signature : _____


PC-PT
PC0
PC-PT
PC1
PC-PT
PC0
PC-PT
PC1
PC-PT
PC0
PC-PT
PC1

Expt. No. _____ Date _____

Page No. 10

B. To test and configure:

1. Select a device, click it, go to desktop option, go to IP configuration and add the IP address for the device
2. Repeat for the other devices.
3. Open command prompt of first device.
4. Run 'ipconfig' to get basic information about connection.
5. Run 'ping <ipaddress>. enter the ip address of the other device, to check whether they can communicate or not.
6. Repeat 3 to 5 for both devices.

COMMANDS USED:

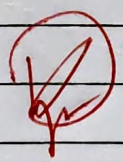
1. ipconfig: Displays all current TCP/IP network configuration values and refreshes DHCP and DNS settings.
2. ipconfig /all: Displays all configuration information for each adapter bound to TCP/IP.
3. ping <ipaddress>: Used to troubleshoot connectivity,

Teacher's Signature: _____

reachability and name resolution. It returns four packets of 32 bytes each.

SIMULATION:

1. Open traffic generator.
2. Set the source and destination IP addresses.
3. Set the sequence number and periodic interval.
4. Click on send and minimize window.
5. Switch to simulation and play.



Teacher's Signature : _____

Expt. No. 2B

Date

Page No. 12

AIM:

To establish peer to peer connection between dissimilar devices using Cisco Packet Tracer.

THEORY:

Cisco Packet Tracer is a simulation software used to create complicated network topologies as well as to test and simulate abstract networking concepts.

PROCEDURE:

A. To connect, peer to peer connection is developed:

1. Select and drag two dissimilar devices from device pends.
2. Select and drag copper straight through wire from wires pend and connect the two devices, choosing the fast ethernet option.
3. Required connection is established.

B. To test and configure:

1. ~~Test~~ Assign ~~Give~~ IP address to both devices

Teacher's Signature :

2. Open command prompt.

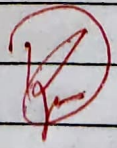
3. Run ping command.

COMMANDS USED:

1. ping <ipaddress>: Used to troubleshoot connectivity, reachability and name resolution. It returns four packets of 32 bytes each.

SIMULATION:

1. Open traffic generator.
2. Set the source and destination IP addresses.
3. Set the sequence number and periodic interval.
4. Click on send.
5. Switch to simulation and play.



Teacher's Signature : _____

Expt. No. 3

Date 28/8/25

Page No. 14

AIM:

Introduction to straight through cables, crossover cables and RJ45 connector.

Straight Through Cables:

A straight through cable is a type of ethernet cable used to connect different types of devices within a network. When connecting between two dissimilar devices, for eg. from the computer to the router, a straight - through cable will be needed. There are no left or right constrictions on the straight through cable, as both ends have the same wiring signals, so the wires correspond to the same pins at the other end too. There is no need for any manual configuration.

Features:

1. Direct Connection: Links devices of different categories for instance a computer with a switch or a router.
2. Standard Ethernet Cable: It is particularly used in ethernet networks for data transmission purposes.
3. Color Code Consistency: The endings of the electrodes have identical sequences in terms of the color codes in wires.
4. Common Usage: Sometimes used in home and office networks for sharing devices among nodes and link points.

Teacher's Signature : _____

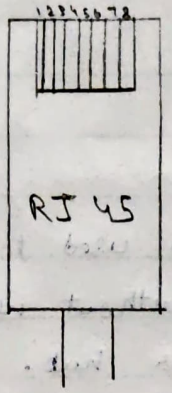
Crossover Cable:

A crossover cable is a type of ethernet cable used to connect similar devices directly to each other without needing an intermediate network device like a switch or hub. Example: Two computers or two switches. A difference between straigh-through cable and crossover cable is that the order of the wires differ at each end of the cable. This will allow communication of devices indicating if they are transmitting or recieving by crossovering the 'Tx' and 'Rx' so that the data can be obtained by both similar devices.

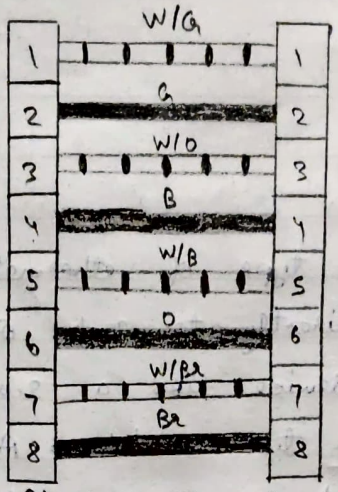
Features:

1. Device-to-Device Connection: Mostly used in direct connectivity between composites of similar types like two computers.
2. Pin Configuration: Pins are connected on two ends with different arrangements, for eg: T568A on one end and T568B on the other.
3. Transmit/Recieve Swapping: Exchange the two ports T/R signal between the two ends.
4. Specific Purpose: Typically employed in scenarios where devices must be able to interfere without requiring a hub.
5. Color Code Variation: In a crossover, some wires at each end have color coded sequences from each other.

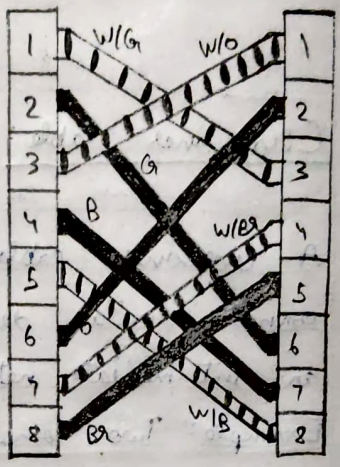
Teacher's Signature : _____



RJ45 Connector



Straight Through Cable



Crossover Cable

Color Coding of Wires in RJ45

Pin	T568B	T568A
1	White/Orange	White/Green
2	Orange	Green
3	White/Green	White/Orange
4	Blue	Blue
5	White/Blue	White/Blue
6	Green	Orange
7	White/Brown	White/Brown
8	Brown	Brown

RJ45 Connector:

RJ45 stands for Registered Jack 45 and is the most commonly used connector in wired networks. The jacks are mainly used to connect to the LAN. The width of RJ45 is usually greater than that of the telephone cables. The bandwidth is high and the range is usually 10 Gbps.

Structure:

RJ45 has a transparent plastic structure and is an 8 pin connector. The jacks are mostly used with shielded twisted pair or unshielded twisted pair cables. Out of the 8 wires, 4 wires are solid and 4 are stripe colored. The two color code schemes are RJ45 T568A and RJ45 T568B.

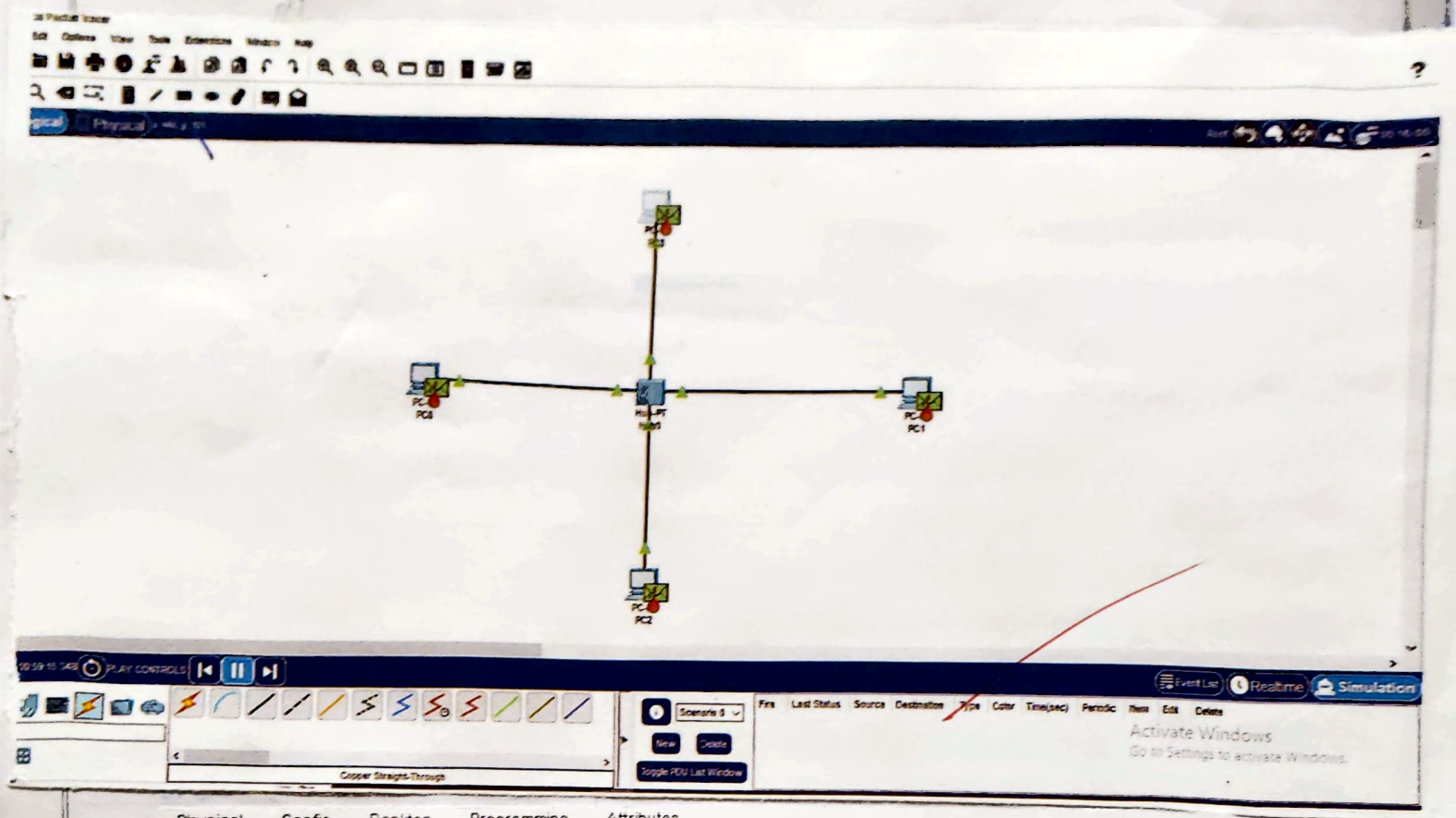
Advantages:

- Provides great speed.
- Cheaper as compared to other connectors.
- Supports much greater bandwidth.
- Reliable.

Disadvantages:

- ~~Complexity~~ Compatibility issues with other connectors.
- Neither waterproof nor durable.

Teacher's Signature : _____


PC3
PC0
PC1
PC2
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2
Pinging 192.168.1.2 with 32 bytes of data:
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Reply from 192.168.1.2: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.1.2:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>

Expt. No. 4

Date 4/9/25

Page No. 17

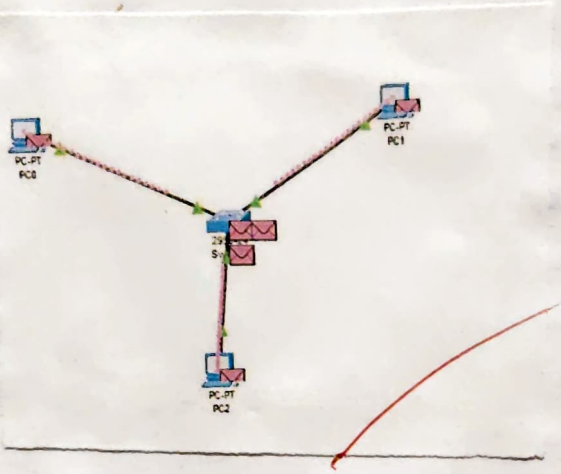
AIM:

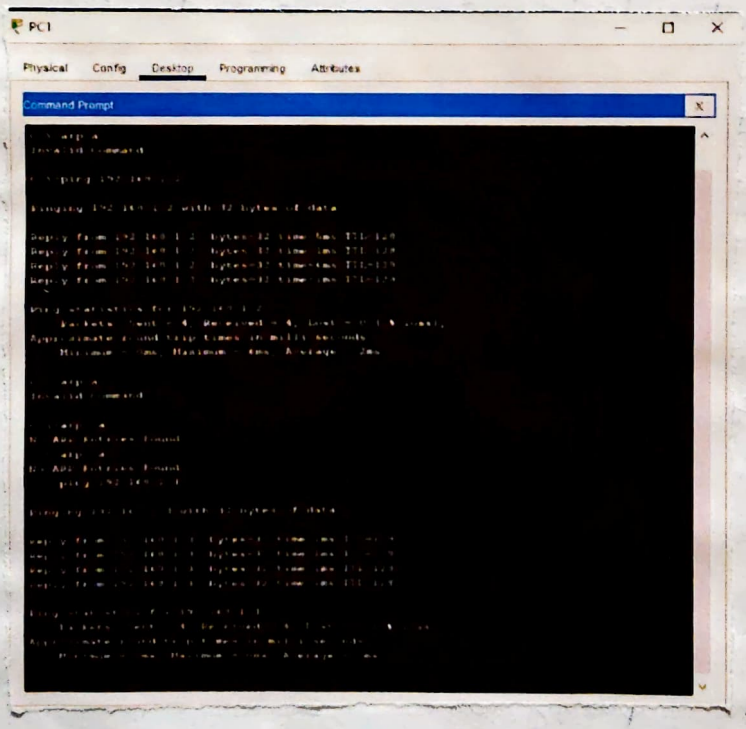
To connect dissimilar devices connected (machine & hub) using ethernet cable.

PROCEDURE:

1. Open Cisco Packet Tracer.
2. From the toolbars at the bottom, select multiple end devices like PC, laptop, etc. and connect all devices with a generic hub using copper straight through cable with fast ethernet port.
3. Assign IP addresses to all end devices by clicking on the end devices. A dialog box appear on the screen. Select desktop then IP config. In IP address, assign IP to the devices.
4. Now, all the devices can communicate with each other.
5. Test the connection by clicking on one end device, then desktop and then command prompt.
6. Execute the following commands:
   - ipconfig
   - ipconfig all
   - ping <ip-of-other-end-device>
7. Repeat step 5 and 6 for every other combination.

Teacher's Signature : _____


PC-PT
PC0
PC-PT
PC1
PC-PT
PC2


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt

Expt. No. 5

Date 11/9/23

Page No. 18

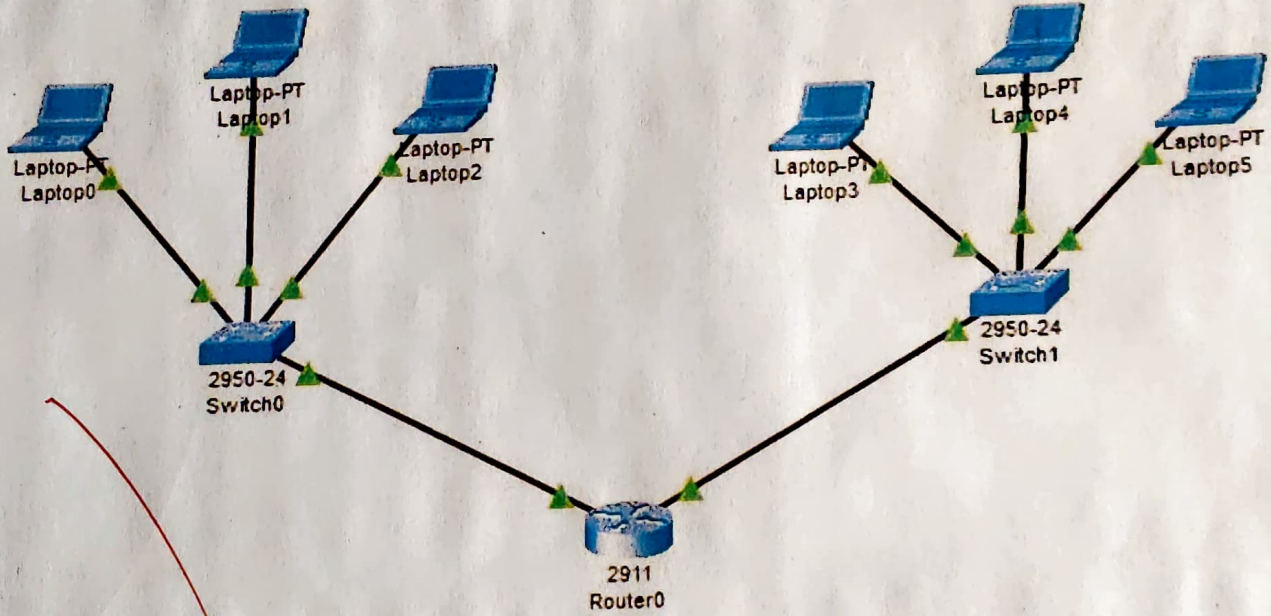
AIM:

ARP configuration of various devices using APP protocol connect system and server through copper block straight through cable with a switch.

PROCEDURE:

1. Start Cisco Packet Tracer.
2. Select 9 end devices and a switch with 2950 - 24 config as well as a server.
3. Arrange them as shown.
4. Connect all the devices with the help of copper straight through cable.
5. Now set the IP address for each end device.
6. Open terminal for any of the devices an run 'arp -a'.
7. Now run ping command and ping 2 end devices.
8. Switch to simulation from realtime through the option on bottom, right of screen.
9. Now use capture / forward button to simulate how devices ping each other.
10. After simulation is completed. ARP table has one entry.

Teacher's Signature : _____


Laptop-PT
Laptop0
Laptop-PT
Laptop1
Laptop-PT
Laptop2
2950-24
Switch0
Laptop-PT
Laptop3
Laptop-PT
Laptop4
Laptop-PT
Laptop5
2950-24
Switch1
2911
Router0

Expt. No. 6

Date 11/9/25

Page No. 19

AIM:

To establish connecting between two LANs using routers on Cisco Packet Tracer.

PROCEDURE:

1. Firstly, we will create two different LAN network, having one switch and 2-3 PC each.
2. Select generic tab and select PC, then drag them on the screen
3. Select switch tab and drag it to screen.
4. Make another similar network.
5. Now connect each PC in each LAN to its corresponding switch using copper straight through wires.
6. Now set separate IP addresses for either LANs. PCs belonging to class A and class C respectively.
7. Now ping 2 PCs for LAN 1 and check its connectivity.
8. Repeat the same for LAN 2.
9. Go to router tab. Select 2911 router and drag it to the screen.
10. Now connect LAN1 to gigent 010 of router and connect it with switch of LAN 1.
11. Repeat the same for LAN 2 to gigent 011 of router.
12. Now, select and click the router, there will be a switch, if not on, click on it to turn it on.
13. To configuration selection, left select gigent 010.

Teacher's Signature : _____

14. Name options will appear, select the ON checkbox and in IP address, enter the class address corresponding to the class.
15. This IP address acts as gateway for all devices of LAN 1 to enter this in gateway for all devices of option in IP configuration of each device on LAN 1.
16. Repeat steps 13 - 15 for gigent ON 011 and LAN 1.
17. If the network is ready with no red marks, go to step 20, else to step 19.
18. Click the fast forward time tab near switch router tab.
19. Now ping a device on LAN 2 using its IP address from a devices of of LAN 1.
20. Now select simulation mode and redo the ping operation.

Expt. No. 7

Date 18/9/25

Page No. 21

AIM:

To implement Bus, Star, Mesh and Ring Topology.

THEORY:

Network Topologies describe the methods in which all the elements of a network are mapped.

1. Ring Topology:

In this network, every device has exactly two neighboring devices for communication and resource sharing. It uses tokens to pass information from one node to another.

Steps:
1. First take 4 generic PCs and 4 generic switches
2. Connect PC to a switch.
3. Connect all PCs using their switches in a ring fashion.
4. Use automatically chosen connection type to make adjacent connections.
5. Assign IP addresses to all 4 PCs:

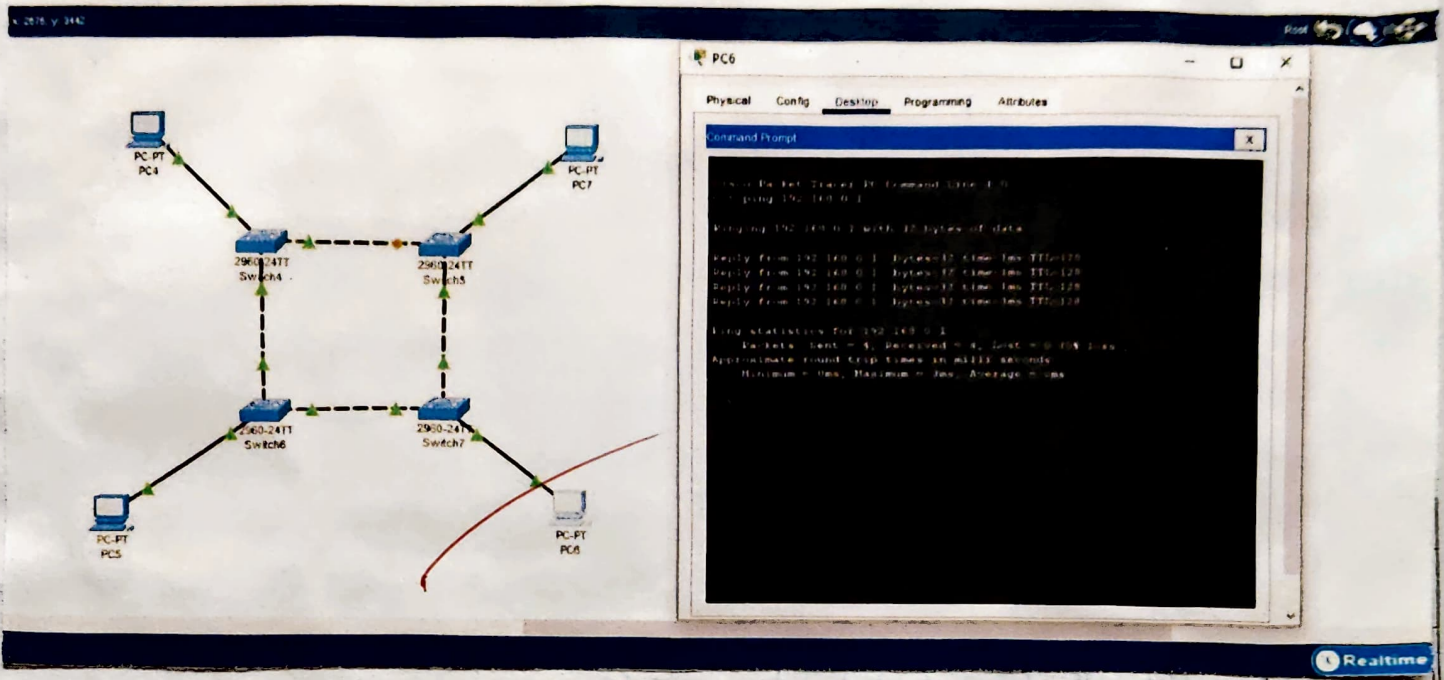
PC_0 - 192.168.0.1

PC_1 - 192.168.0.2

PC_2 - 192.168.0.3

PC_3 - 192.168.0.4

Teacher's Signature : _____


PC-PT
PC4
PC-PT
PC7
2960-24TT
Switch4
2960-24TT
Switch5
2960-24TT
Switch6
2960-24TT
Switch7
PC-PT
PC5
PC-PT
PC6
PC6
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Realtime

6. Ping device 0, i.e., PC_0 with PC_3.
7. Ring topology is established.

2. Bus Topology:

In this network, a single cable is used to connect all the included nodes. The main cable acts as a spine for the entire network. If cable fails, the whole network goes down.

Steps: 1. Connect 4 PCs with switches
2. Connect the switches simply in a linear way using automatic connection type.
3. Assign IP addresses to all PCs:

PC_4 - 192.168.0.4
PC_5 - 192.168.0.5
PC_6 - 192.168.0.6
PC_7 - 192.168.0.7

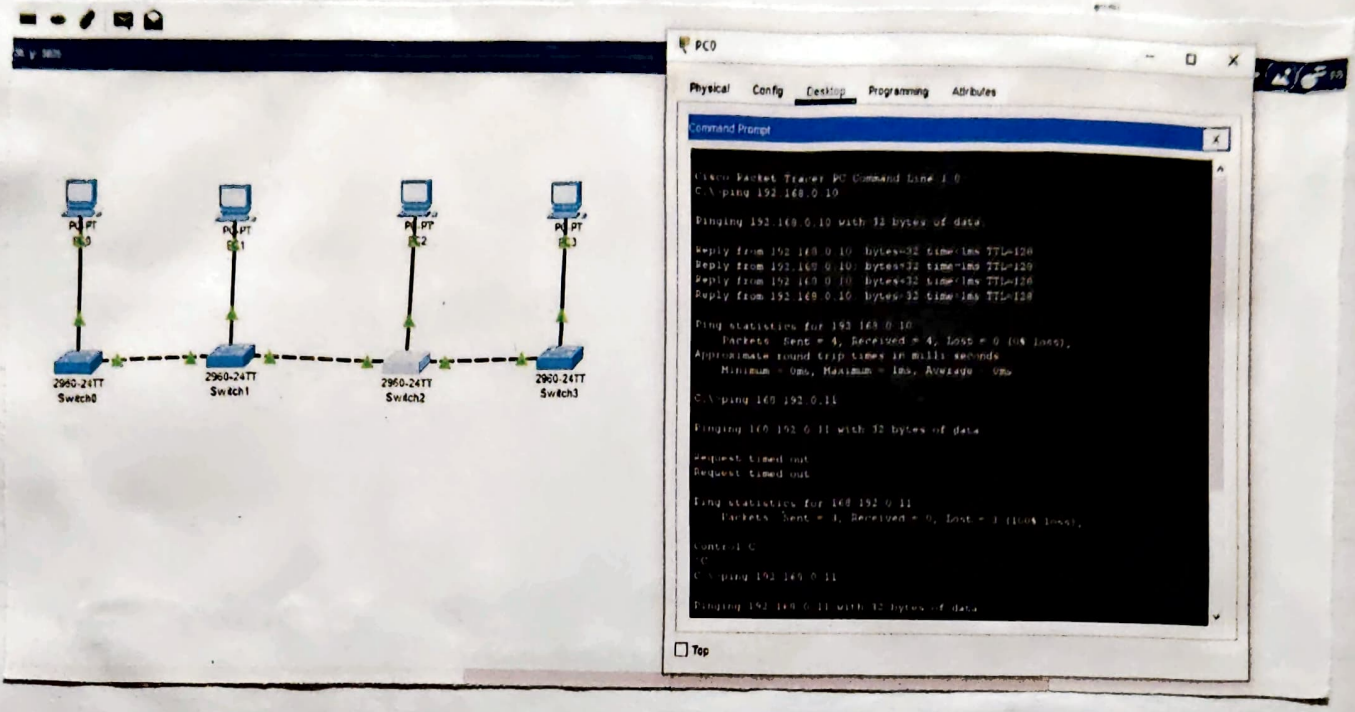
4. Ping PC_4 with PC_5.
5. Bus topology is established.

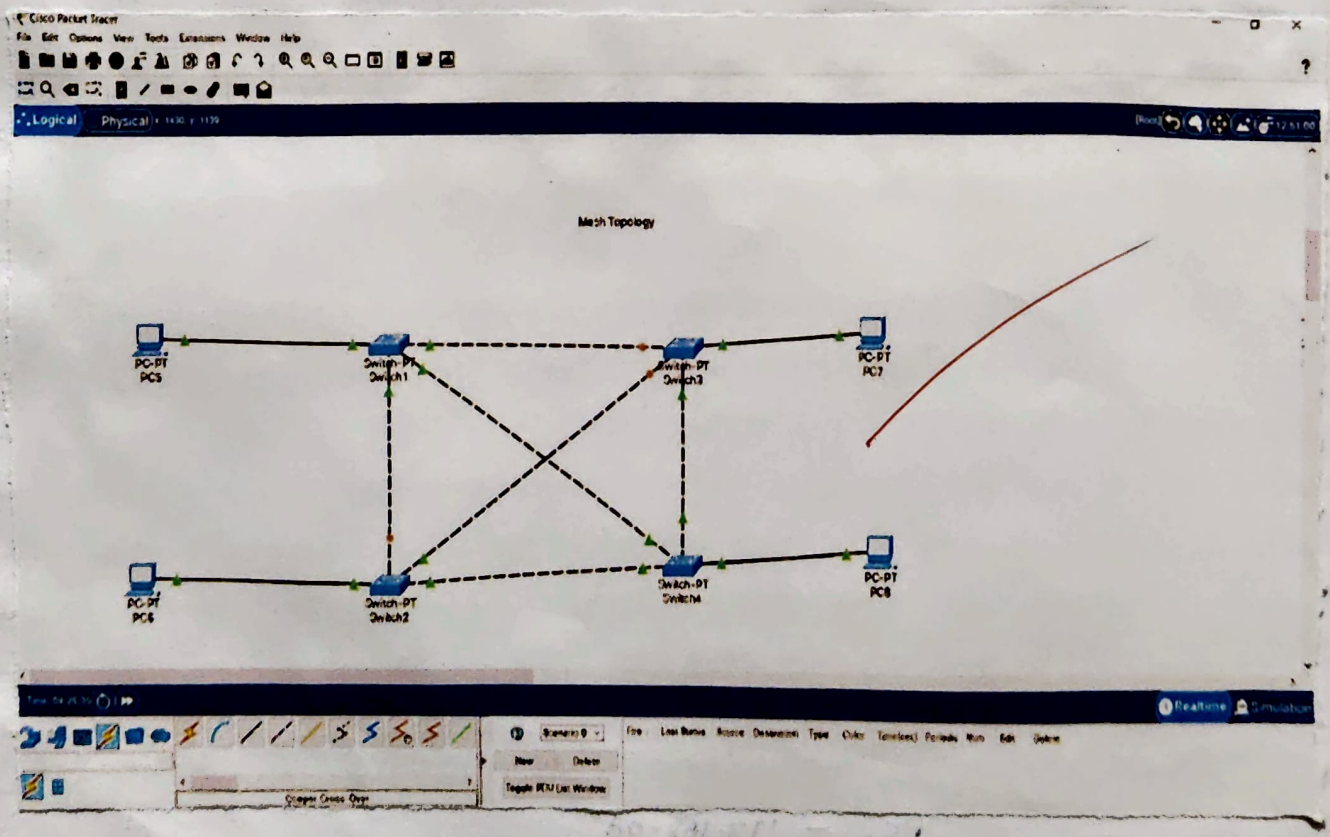
3. Mesh Topology:

In this network, each computer on the network is connected to every other computer on the network and a peer to peer connection is established between all devices.

Steps: 1. Take the formation of ring topology and make a copy.

Teacher's Signature : _____


PC0
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.0.10
Pinging 192.168.0.10 with 32 bytes of data:
Reply from 192.168.0.10: bytes=32 time=1ms TTL=128
Reply from 192.168.0.10: bytes=32 time=1ms TTL=128
Reply from 192.168.0.10: bytes=32 time=1ms TTL=128
Reply from 192.168.0.10: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.0.10:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 160.192.0.11
Pinging 160.192.0.11 with 32 bytes of data:
Request timed out.
Request timed out.
Ping statistics for 160.192.0.11:
Packets: Sent = 4, Received = 0, Lost = 4 (100% loss),
Control-C
^C
C:\>ping 192.168.0.11
Pinging 192.168.0.11 with 32 bytes of data:
Top
2960-24TT
Switch0
Switch1
Switch2
Switch3


Cisco Packet Tracer
Logical
Physical
Mesh Topology
PC-PT
PC5
PC6
PC7
PC8
Switch-PT
Switch1
Switch2
Switch3
Switch4
Realtime
Simulation

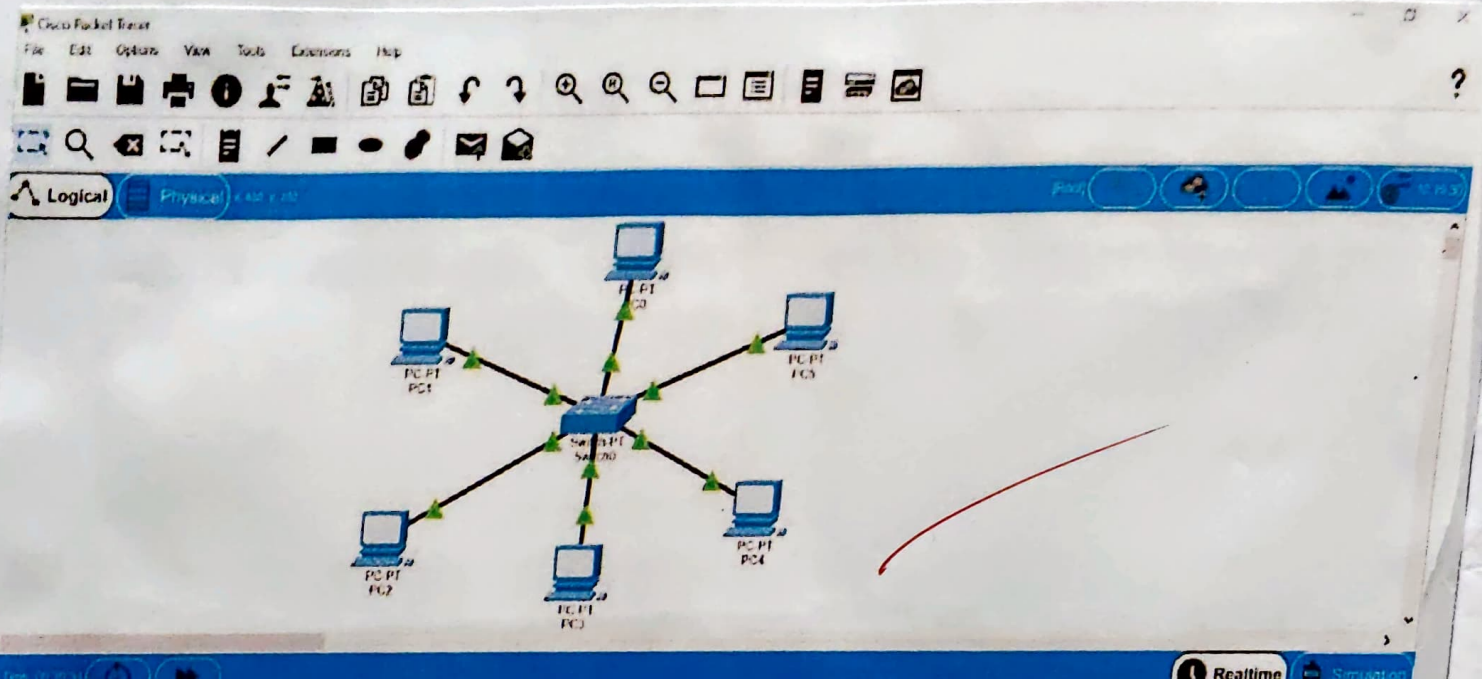
2. Connect each PC with every remaining PC on network.
3. Assign IP address:
   PC_8 - 192.168.0.8
   PC_9 - 192.168.0.9
   PC_{10} - 192.168.0.9
   PC_{11} - 192.168.0.9
4. Ping PC_9 with PC_{11}.
5. Mesh topology is established.

4. **Star Topology:**

In this network, all the computers connect to a single hub / switch. The hub is called the central node. If hub fails, then the whole network fails.

Steps: 1. Take 4 PCs and connect them with a single switch.
2. Make the connections using automatic connection type.
3. Assign IP addresses:
   PC_{10} - 192.168.0.10
   PC_{11} - 192.168.0.11
   PC_{12} - 192.168.0.12
   PC_{13} - 192.168.0.13
4. Ping PC_{10} with PC_{13}.
5. Star topology is established.

Teacher's Signature : _____


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
PC-PT PC0
PC-PT PC1
PC-PT PC2
PC-PT PC3
PC-PT PC4
PC-PT PC5
Realtime

Expt. No. 8

Date 18/9/25

Page No. 24

AIM:

To implemant Hybrid Topology in Cisco Packet Tracer.

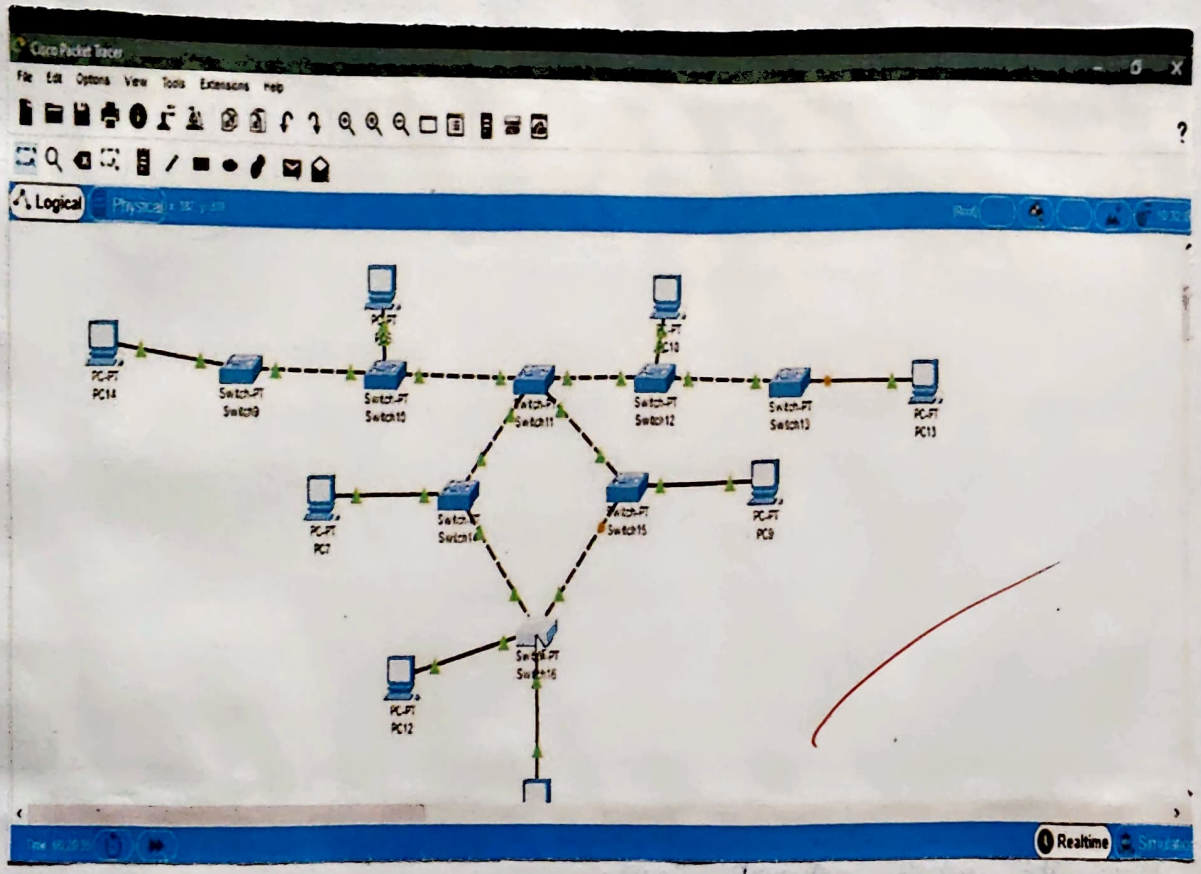
THEORY:

A hybrid topology is a combination of two or more network topologies, such as mesh + bus + ring topology. Its usage depends on the requirements like performance, number of computers, location of computers, etc. It has a super powerful setup. Thus, it has the most realtime applications at home, offices and even multi-floor buildings.

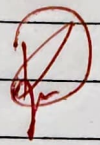
STEPS:

1. First we need to make all diffarent topologies separately.
2. Implement Ring topology using 4 PCs.
3. Assign IP addresses from 192.168.0.1 to 192.168.0.4.
4. Now make star topology adjacent to it.
5. Assign IP addresses from 192.168.0.5 to 192.168.0.8.
6. Make bus topology below ring topology.
7. Assign IP addresses from 192.168.0.9 to 192.168.0.12.
8. Make hybrid topology in the ringht.
9. Assign IP addresses from 192.168.0.13 to 192.168.0.16.
10. Connect all 4 topologies using automatic connection cable by connecting switches of all 4 topologies.

Teacher's Signature : _____


Cisco Packet Tracer
File Edit Options View Tools Extensions Help
Logical
Physical
PC-PT PC14
Switch-PT Switch9
Switch-PT Switch10
Switch-PT Switch11
Switch-PT Switch12
Switch-PT Switch13
PC-PT PC13
PC-PT PC10
PC-PT PC7
Switch-PT Switch14
Switch-PT Switch15
PC-PT PC9
Switch-PT Switch16
PC-PT PC12
Realtime

11. Ping PC_1 with PC_{14}.
12. Try sending data packet from PC_2 to PC_{15}.
13. Hybrid topology is established successfully.



Teacher's Signature : _____

Expt. No. 9

Date 16/10/25

Page No. 26

AIM:

Write a program to implement stop and wait protocol.

THEORY:

It is the data link layer protocol used for reliable data transmission where the sender sends one frame at a time and waits for acknowledge before sending the next.

If the acknowledgement is lost or not recieved in time, the same frame is resent.

This ensures reliable but slower data transmission.

Teacher's Signature : _____

```java
import java.util.Scanner;

public class StopAndWait {
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    int frames;

    System.out.print("Enter number of frames to send: ");
    frames = sc.nextInt();

    int i = 1;
    while (i <= frames) {
      System.out.println("Sending frame " + i + "...");

      // Simulate frame transmission and acknowledgment
      System.out.print("Enter 1 if Acknowledgement received for frame " + i + ", else enter 0: ");
      int ack = sc.nextInt();

      if (ack == 1) {
        System.out.println("Acknowledgement received for frame " + i + "\n");
        i++;
      } else {
        System.out.println("Acknowledgement not received. Resending frame " + i + "\n");
      }
    }
    System.out.println("All frames sent successfully!");
    sc.close();
  }
}
```

Output

```
Enter number of frames to send: 2
Sending frame 1...
Enter 1 if Acknowledgement received for frame 1, else enter 0: 1
Acknowledgement received for frame 1

Sending frame 2...
Enter 1 if Acknowledgement received for frame 2, else enter 0: 0
Acknowledgement not received. Resending frame 2

Sending frame 2...
Enter 1 if Acknowledgement received for frame 2, else enter 0: 1
Acknowledgement received for frame 2

All frames sent successfully!

=== Code Execution Successful ===
```

Expt. No. 10

Date 18/10/25

Page No. 27

AIM:

Write a program to implement sliding window protocol.

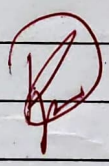
THEORY:

Sliding Window Protocol: In this protocol, the sender can transmit multiple frames before needing an acknowledgement.

Both sender and reciever maintain a window of acceptable frames.

As ACKs are recieved, the window slides forward to allow new frames.

This improves efficiency by keeping the channel busy and reducing idle time.



Teacher's Signature : _____

```java
import java.util.Scanner;

public class SlidingWindow {
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);

    System.out.print("Enter total number of frames: ");
    int totalFrames = sc.nextInt();

    System.out.print("Enter window size: ");
    int windowSize = sc.nextInt();

    int sent = 0;
    while (sent < totalFrames) {
      System.out.println("\nSending frames: ");

      // Send frames equal to window size or remaining frames
      for (int i = 0; i < windowSize && sent + i < totalFrames; i++) {
        System.out.println("Frame " + (sent + i) + " sent");
      }

      System.out.print("Enter last acknowledged frame number (-1 if none): ");
      int ack = sc.nextInt();

      if (ack >= sent && ack < totalFrames) {
        sent = ack + 1;
      } else {
        System.out.println("Invalid ACK or timeout! Resending window...");
      }
    }

    System.out.println("\nAll frames sent successfully!");
    sc.close();
  }
}
```

Output

```
Enter total number of frames: 7
Enter window size: 3

Sending frames:
Frame 0 sent
Frame 1 sent
Frame 2 sent
Enter last acknowledged frame number (-1 if none): 2

Sending frames:
Frame 3 sent
Frame 4 sent
Frame 5 sent
Enter last acknowledged frame number (-1 if none): 4

Sending frames:
Frame 5 sent
Frame 6 sent
Enter last acknowledged frame number (-1 if none): 6

All frames sent successfully!
```

Expt. No. 11

Date 6/11/25

Page No. 28

AIM:

Write a program to implement static routing in Cisco Packet Tracer.

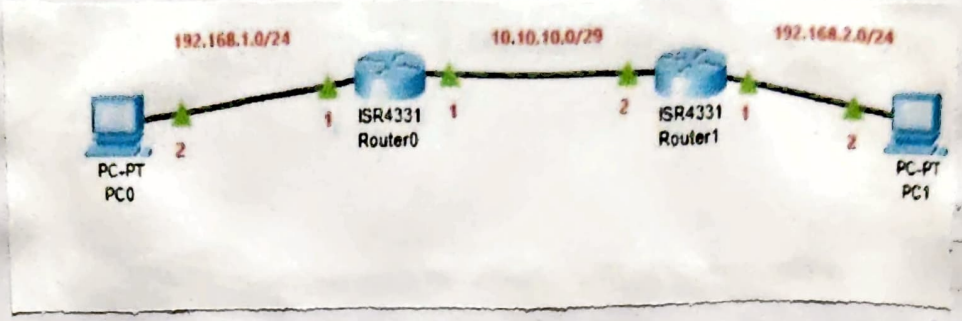
THEORY:

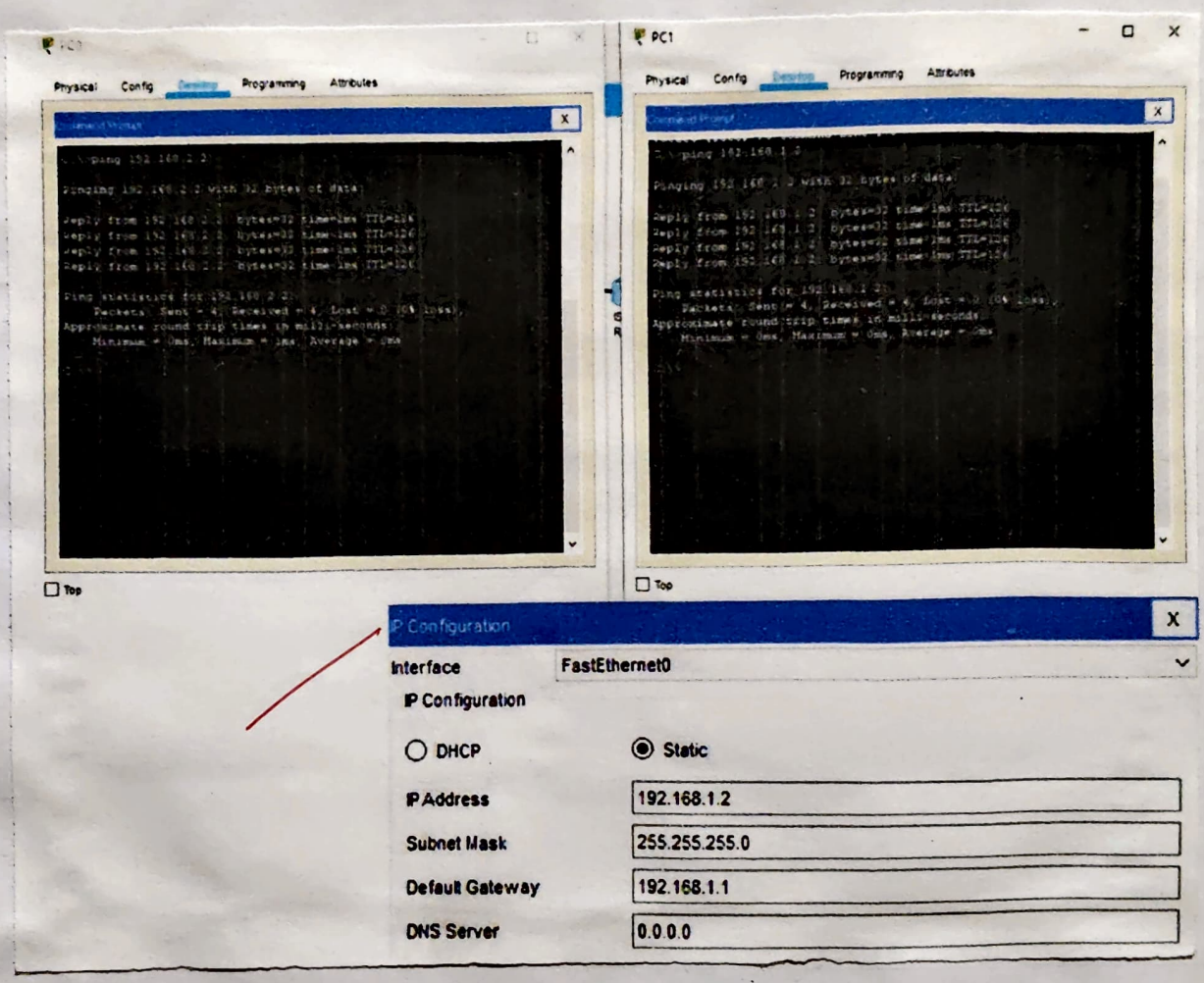
Static routing is a method of routing data packets in a network by manually configuring routes in a router's routing table. In contrast to dynamic routing, where routing decisions are made by routing protocols like PAXA, RIP, OSPF or EIGRP, static routing requires the network administrator to manually define the path that packets take.
It offers more control over routing process as it does not rely on protocols that may change routes dynamically.

Advantages:
1. Simple and easy to configure.
2. Less Bandwidth usage.
3. Security.

Disadvantages:
1. Scalability is difficult
2. No automatic failover
3. Maintainence overhead.

Teacher's Signature :


192.168.1.0/24
10.10.10.0/29
192.168.2.0/24
PC-PT
PC0
ISR4331
Router0
ISR4331
Router1
PC-PT
PC1


PC1
Physical
Config
Desktop
Programming
Attributes
Top
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
192.168.1.2
Subnet Mask
255.255.255.0
Default Gateway
192.168.1.1
DNS Server
0.0.0.0

Expt. No. 12

Date 13/11/25

Page No. 29

AIM:

Write a program to implement DNS and email services in Cisco Packet Tracer.

THEORY:

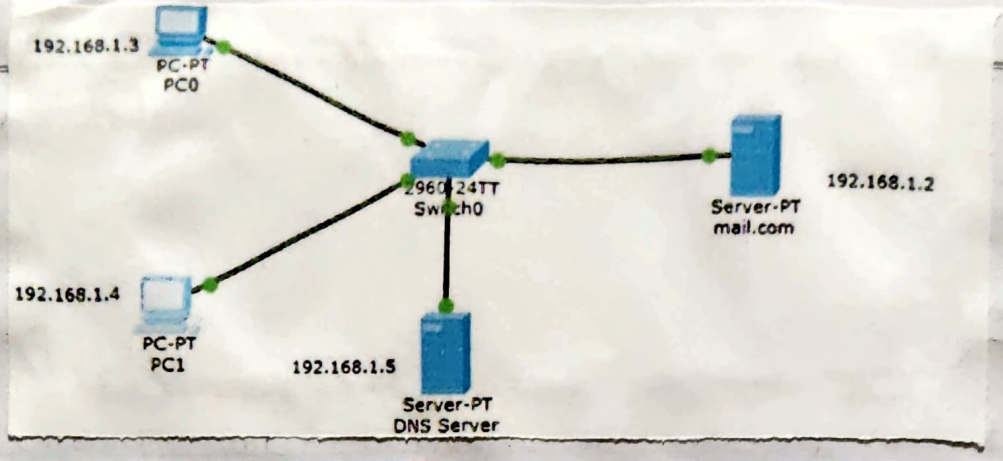
DNS (Domain Name System):

- DNS translates domain names into IP addresses that computers use to locate each other on a network.
- It acts like a phonebook of the internet, making it easier for users to access websites without remembering numerical IP addresses.
- A DNS server stores records mapping hostnames to IP addresses.

Email Services:

- Email communication relies on mail servers:
  - SMTP
  - IMAP
- Email server simulates both sending and recieving functions using these protocols.

Teacher's Signature : _____


192.168.1.3
PC-PT
PC0
2960-24TT
Switch0
Server-PT
mail.com
192.168.1.2
192.168.1.4
PC-PT
PC1
192.168.1.5
Server-PT
DNS Server