# COMPUTER NETWORKS
# LAB EXERCISE

## AIM:

The objective of this exercise is to design and configure a network topology that includes both LAN (Local Area Network) and WAN (Wide Area Network) using Cisco Packet Tracer. The topology will include 10-15 computers, switches, and routers. The exercise involves setting up and configuring the LANs, connecting them via a WAN, and simulating the transmission of data between different networks.

## OBJECTIVE:

The objective of this exercise is to design, configure, and simulate a network topology in Cisco Packet Tracer that includes both LAN (Local Area Network) and WAN (Wide Area Network) components. The topology will consist of 10 computers divided across two LANs, each connected to its own switch. These LANs will be connected via routers to form a WAN. The exercise will involve configuring IP addressing, setting up static routing between the networks, and simulating the transmission of data from one computer in one LAN to a computer in another LAN, ensuring successful communication across the WAN.

## PROCEDURE:

### TOPOLOGY DESIGN:

### LAN:

- Switch 1: Connects 5 PCs (PC1-PC5) using straight-through cables.
- Switch 2: Connects the remaining 5 PCs (PC6-PC10) using straight-through cables.
- Inter-Switch Connection: Connect the two switches using a straight-through cable between one of the `GigabitEthernet` or `FastEthernet` ports.

## WAN:

- Router 1 (R1): Connects to Switch 1.
- Router 2 (R2): Connects to Switch 2.
- Inter-Router Connection: Connect R1 and R2 using a cross-over cable between their `GigabitEthernet0/0` interfaces.

# NETWORK SETUP IN CISCO PACKET TRACER:

## ADD DEVICES:

- Place 10 computers and label them PC1 to PC10.
- Add two switches (Switch 1 and Switch 2).
- Add two routers (Router 1 and Router 2).

## CONNECT DEVICES:

- **LAN Configuration:**
  - **Switch 1:** Connect PC1 to PC5 using straight-through cables to `FastEthernet` ports.
  - **Switch 2:** Connect PC6 to PC10 using straight-through cables to `FastEthernet` ports.
  - **Inter-Switch Connection:** Connect Switch 1 to Switch 2 using a straight-through cable between `FastEthernet0/24` ports.
- **WAN Configuration:**
  - Connect Router 1's `GigabitEthernet0/0` to Switch 1 using a straight-through cable.
  - Connect Router 2's `GigabitEthernet0/0` to Switch 2 using a straight-through cable.
  - **Inter-Router Connection:** Connect Router 1's `GigabitEthernet0/1` to Router 2's `GigabitEthernet0/1` using a cross-over cable.

## IP ADDRESS :

- **For LAN 1 (Switch 1 - PCs 1-5):**
  - Use the `192.168.1.0/24` subnet.
  - Assign `192.168.1.1` to Router 1's `GigabitEthernet0/0` as the default gateway.
- **For LAN 2 (Switch 2 - PCs 6-10):**
  - Use the `192.168.2.0/24` subnet.
  - Assign `192.168.2.1` to Router 2's `GigabitEthernet0/0` as the default gateway.

## CONFIGURATION SETUP:

### LAN Configuration:

- Connect computers to the switches.
- Configure IP addresses on each computer.
- Connect switches with each other as needed.

### WAN Configuration:

- Connect routers to each other.
- Configure router interfaces with IP addresses.
- Set up routing (static or dynamic) to ensure connectivity between the LANs.

## SIMULATION:

- Use simulation mode to send a message from a computer in LAN 1 (e.g., PC1) to a computer in LAN 2 (e.g., PC6).
- Verify that the message successfully traverses through the routers and reaches the destination.

## DOCUMENTATION:

- **Create a Step-by-Step Procedure Document:**

➔ Outline each step taken in the network configuration and simulation.
➔ Include commands and settings used during the configuration process.

- **Take Screenshots:**

➔ Capture screenshots of the network topology.

➔ Capture screenshots showing the successful transmission of the message.

- **Save Packet Tracer File:**

➔ Save the Packet Tracer file with your completed network configuration and simulation.

## UPLOAD AND SUBMIT:

- **GitHub Repository:**

➔ Create a GitHub repository with your register number as the repository name.

➔ Upload the following files to the repository:

  ■ Procedure document (suggested to write in .MD file in github)

  ■ Screenshots

  ■ Packet Tracer file (.pkt)

➔ Ensure that the repository is public or accessible.

- **Submit the Repository Link:**

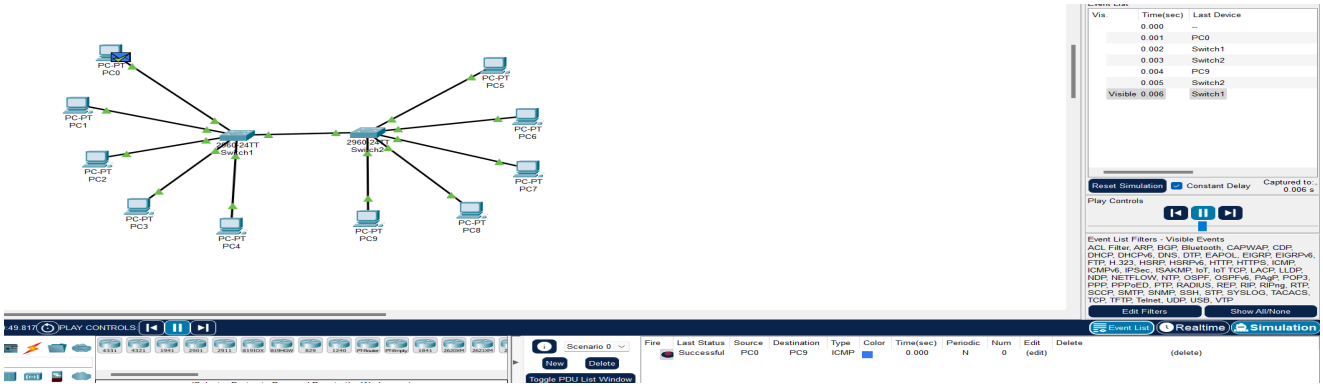
➔ Copy the URL of your GitHub repository.

➔ Submit this URL to Google Classroom as per the submission guidelines.

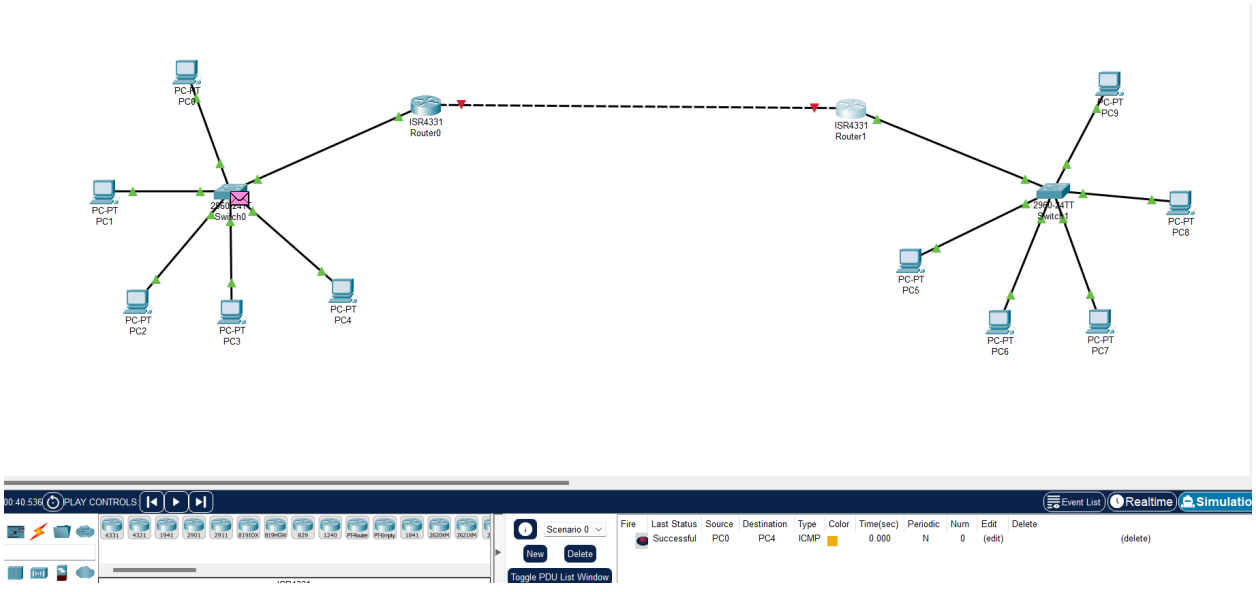
# OUTPUT:

# SCREENSHOT:

## LAN CONFIGURATION:




## WAN CONFIGURATION:




# RESULT:

The network topology was successfully designed and configured, with two LANs connected via a WAN using routers. Data transmission between computers in different LANs was successfully simulated and verified in Cisco Packet Tracer.