Experiment No.2

Objective

Understand the color coding for CAT5 cables and simulate the process of connecting devices using a CAT5 cable in Cisco Packet Tracer.

Steps

Step 1: Open Cisco Packet Tracer

1. **Launch Cisco Packet Tracer.**

Step 2: Add Devices

1. **Add Two PCs:**
   - Drag and drop two PCs from the "End Devices" section onto the workspace.
2. **Add a Switch:**
   - Drag a switch from the "Switches" section onto the workspace.

Step 3: Connect Devices with CAT5 Cable

1. **Select the Connection Tool:**
   - Click on the "Connections" icon (the lightning bolt).
2. **Choose the Cable:**
   - Select "Copper Straight-Through" (this simulates a CAT5 cable).
3. **Connect PC1 to Switch:**
   - Click on PC1, then select its FastEthernet port.
   - Click on the switch and select an available port (e.g., FastEthernet 0/1).
4. **Connect PC2 to Switch:**
   - Repeat the process to connect PC2 to another port on the switch (e.g., FastEthernet 0/2).

Step 4: Configure IP Addresses

1. **Assign IP Address to PC1:**
   - Click on PC1.
   - Go to the "Desktop" tab, then select "IP Configuration."
   - Assign an IP address (e.g., 192.168.1.2) and subnet mask (255.255.255.0).
2. **Assign IP Address to PC2:**
   - Click on PC2.
   - Go to the "Desktop" tab, then select "IP Configuration."
   - Assign an IP address (e.g., 192.168.1.3) and the same subnet mask.

Step 5: Test Connectivity

1. **Ping Test:**
   - Open the command prompt on PC1 (Desktop → Command Prompt).
   - Type `ping 192.168.1.3` and press Enter.
   - You should see replies if everything is configured correctly.

Step 6: Understanding Color Coding (Detailed Explanation)

Importance of Color Coding

Color coding in networking cables, particularly CAT5, is crucial for ensuring that each wire is connected correctly. A proper connection is necessary for reliable network communication.

Structure of CAT5 Cable

A CAT5 cable typically contains eight individual wires twisted into four pairs. Each pair is color-coded to reduce interference and ensure data integrity. Here's a detailed look at each pair:

Pairs and Color Codes

1. **Pair 1:**
   - **White with Orange (W/Orange)**
   - **Orange**
   - **Usage:** This pair is primarily used for transmitting data.
2. **Pair 2:**
   - **White with Green (W/Green)**
   - **Green**
   - **Usage:** This pair is often used for receiving data.
3. **Pair 3:**
   - **White with Blue (W/Blue)**
   - **Blue**
   - **Usage:** This pair is used in some applications for voice communication.
4. **Pair 4:**
   - **White with Brown (W/Brown)**
   - **Brown**
   - **Usage:** This pair is rarely used in standard networking but can be utilized in specific applications.

Conclusion

You've successfully simulated connecting two PCs using a CAT5 cable in Cisco Packet Tracer! This helps you understand the importance of color coding and how devices are interconnected in a network.

Experiment No.3

Objective:

To create a LAN using Cisco Packet Tracer and establish connectivity between multiple PCs using a switch.

Requirements:

- Cisco Packet Tracer software installed on your computer.
- Basic understanding of networking concepts (IP addressing, switches, etc.).

Equipment:

- 1 x Cisco Switch (e.g., 2960)
- 3 x PCs
- Ethernet Cables

Steps to Create a LAN:

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer.
2. Click on **File** > **New** to start a new project.

Step 2: Add Network Devices

1. **Add a Switch:**
   - Click on the **Network Devices** icon in the bottom left (it looks like a router).
   - Select **Switches**, then drag and drop a **2960 switch** onto the workspace.
2. **Add PCs:**
   - Click on the **End Devices** icon (it looks like a computer).
   - Drag and drop **3 PCs** onto the workspace.

Step 3: Connect Devices with Cables

1. **Use Copper Straight-Through Cables**:
   - Click on the **Connections** icon (it looks like a lightning bolt).
   - Select the **Copper Straight-Through** cable.
2. **Connect PC1 to Switch:**
   - Click on **PC1**, select **FastEthernet0**.
   - Click on the **Switch**, select **FastEthernet0/1**.
3. **Connect PC2 to Switch:**
   - Click on **PC2**, select **FastEthernet0**.
   - Click on the **Switch**, select **FastEthernet0/2**.
4. **Connect PC3 to Switch:**
   - Click on **PC3**, select **FastEthernet0**.
   - Click on the **Switch**, select **FastEthernet0/3**.

Step 4: Configure IP Addresses for PCs

1. **Assign IP Address to PC1:**
   - Click on **PC1**, then go to the **Desktop** tab and select **IP Configuration**.
   - Set the IP Address to `192.168.1.2`.
   - Set the Subnet Mask to `255.255.255.0`.
2. **Assign IP Address to PC2:**
   - Repeat the same steps for **PC2**.
   - Set the IP Address to `192.168.1.3`.
   - Set the Subnet Mask to `255.255.255.0`.
3. **Assign IP Address to PC3:**
   - Repeat the same steps for **PC3**.
   - Set the IP Address to `192.168.1.4`.
   - Set the Subnet Mask to `255.255.255.0`.

Step 5: Verify Connectivity

1. **Test Network Connectivity:**
   - Click on the **Add Simple PDU** (envelope icon).
   - Click on **PC1**, then on **PC2**. This sends a ping request.
   - Check for a **successful ping** (green light) to confirm connectivity.
2. **Ping using Command Prompt:**
   - Alternatively, go to **PC1** > **Desktop** > **Command Prompt**.
   - Type the command: `ping 192.168.1.3` (to ping PC2).
   - Repeat for **PC3** using `ping 192.168.1.4`.

Result:

If the pings are successful, it means that the PCs are properly configured and can communicate within the LAN through the switch.

Conclusion:

You have successfully created a simple LAN using Cisco Packet Tracer and verified the connectivity between multiple PCs using a switch.

Experiment No.4

Objective:

To create a LAN using Cisco Packet Tracer and establish connectivity between multiple PCs using a switch.

Requirements:

- Cisco Packet Tracer software installed on your computer.
- Basic understanding of networking concepts (IP addressing, switches, etc.).

Equipment:

- 1 x Cisco Switch (e.g., 2960)
- 3 x PCs
- Ethernet Cables

Steps to Create a LAN:

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer.
2. Click on **File** > **New** to start a new project.

Step 2: Add Network Devices

1. **Add a Switch:**
   - Click on the **Network Devices** icon in the bottom left (it looks like a router).
   - Select **Switches**, then drag and drop a **2960 switch** onto the workspace.
2. **Add PCs:**
   - Click on the **End Devices** icon (it looks like a computer).
   - Drag and drop **3 PCs** onto the workspace.

Step 3: Connect Devices with Cables

1. **Use Copper Straight-Through Cables**:
   - Click on the **Connections** icon (it looks like a lightning bolt).
   - Select the **Copper Straight-Through** cable.
2. **Connect PC1 to Switch:**
   - Click on **PC1**, select **FastEthernet0**.

- Click on the **Switch**, select **FastEthernet0/1**.

3. **Connect PC2 to Switch:**
    - Click on **PC2**, select **FastEthernet0**.
    - Click on the **Switch**, select **FastEthernet0/2**.
4. **Connect PC3 to Switch:**
    - Click on **PC3**, select **FastEthernet0**.
    - Click on the **Switch**, select **FastEthernet0/3**.

Step 4: Configure IP Addresses for PCs

1. **Assign IP Address to PC1:**
    - Click on **PC1**, then go to the **Desktop** tab and select **IP Configuration**.
    - Set the IP Address to `192.168.1.2`.
    - Set the Subnet Mask to `255.255.255.0`.
2. **Assign IP Address to PC2:**
    - Repeat the same steps for **PC2**.
    - Set the IP Address to `192.168.1.3`.
    - Set the Subnet Mask to `255.255.255.0`.
3. **Assign IP Address to PC3:**
    - Repeat the same steps for **PC3**.
    - Set the IP Address to `192.168.1.4`.
    - Set the Subnet Mask to `255.255.255.0`.

Step 5: Verify Connectivity

1. **Test Network Connectivity:**
    - Click on the **Add Simple PDU** (envelope icon).
    - Click on **PC1**, then on **PC2**. This sends a ping request.
    - Check for a **successful ping** (green light) to confirm connectivity.
2. **Ping using Command Prompt:**
    - Alternatively, go to **PC1 > Desktop > Command Prompt**.
    - Type the command: `ping 192.168.1.3` (to ping PC2).
    - Repeat for **PC3** using `ping 192.168.1.4`.

Result:

If the pings are successful, it means that the PCs are properly configured and can communicate within the LAN through the switch.

Conclusion:

You have successfully created a simple LAN using Cisco Packet Tracer and verified the connectivity between multiple PCs using a switch.

Experiment No.5

Objective:

To create **Star**, **Ring**, and **Bus** network topologies using Cisco Packet Tracer and observe how devices communicate within each topology.

Requirements:

- Cisco Packet Tracer software installed on your computer.
- Basic understanding of network topologies (Star, Ring, Bus).

Equipment:

- Cisco Switch (for Star topology)
- Routers (for Ring and Bus topology)
- PCs
- Ethernet Cables

Practical 1: Star Topology

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer and create a new project.

Step 2: Add Devices

1. **Add a Switch:**
   - Select **Switches** from the **Network Devices** tab.
   - Drag a **2960 switch** to the workspace.
2. **Add PCs:**
   - Go to **End Devices** and drag **5 PCs** to the workspace.

Step 3: Connect Devices

1. **Use Copper Straight-Through Cables**:
   - Select **Copper Straight-Through** cable from the **Connections** icon.
   - Connect each **PC** to the **Switch** using **FastEthernet** ports (e.g., PC1 to FastEthernet0/1, PC2 to FastEthernet0/2, etc.).

Step 4: Configure IP Addresses

1. Assign IP addresses to each PC using the **IP Configuration** under the **Desktop** tab. For example:
   - **PC1**: `192.168.1.2`
   - **PC2**: `192.168.1.3`
   - **PC3**: `192.168.1.4`
   - **PC4**: `192.168.1.5`
   - **PC5**: `192.168.1.6`
2. Set the Subnet Mask for each PC to `255.255.255.0`.

Step 5: Test Connectivity

1. Use **ping** command from each PC to check communication with other PCs.
2. If all pings are successful, the Star topology is properly configured.

Practical 2: Ring Topology

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer and create a new project.

Step 2: Add Devices

1. **Add Routers:**
   - Select **Routers** from the **Network Devices** tab.
   - Drag **4 routers** to the workspace.
2. **Add PCs:**
   - Drag **4 PCs** from **End Devices** to the workspace.

Step 3: Connect Devices in a Ring

1. **Use Serial DCE Cable**:
   - Connect **Router1** to **Router2**, **Router2** to **Router3**, **Router3** to **Router4**, and **Router4** back to **Router1** using **Serial connections**.
2. **Connect Each Router to a PC**:
   - Use **Copper Straight-Through** cable to connect each **Router** to a **PC**.

Step 4: Configure IP Addresses

1. Assign IP addresses to each router's interfaces and PCs accordingly.
2. Ensure that each segment between routers is on a different subnet.

Step 5: Test Connectivity

1. Use the **ping** command from each PC to check communication.
2. Ensure that data can travel around the ring, reaching all connected PCs.

Practical 3: Bus Topology

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer and create a new project.

Step 2: Add Devices

1. **Add a Hub:**
   - Select **Hubs** from the **Network Devices** tab.
   - Drag a **Generic Hub** to the workspace.
2. **Add PCs:**
   - Drag **4 PCs** from **End Devices** to the workspace.

Step 3: Connect Devices

1. **Use Copper Straight-Through Cables**:
   - Connect each **PC** to the **Hub** using **FastEthernet** connections.

Step 4: Configure IP Addresses

1. Assign IP addresses to each PC:
   - PC1: `192.168.2.2`
   - PC2: `192.168.2.3`
   - PC3: `192.168.2.4`

- PC4: `192.168.2.5`

2. Set the Subnet Mask for each PC to `255.255.255.0`.

Step 5: Test Connectivity

1. Use the **ping** command from each PC to check communication with other PCs.
2. If all pings are successful, the Bus topology is properly configured.

Result:

- The **Star topology** is centralized, where all devices are connected to a switch.
- The **Ring topology** forms a closed loop with routers, ensuring redundancy.
- The **Bus topology** uses a single backbone cable for communication between devices through a hub.

Conclusion:

You have successfully created and tested **Star**, **Ring**, and **Bus** topologies using Cisco Packet Tracer. Each topology has its unique structure and method of communication, useful for different networking needs.

Experiment No.6

Objective:

To create two separate networks using **Hub** and **Switch** in Cisco Packet Tracer and analyze the differences in their behavior.

Requirements:

- Cisco Packet Tracer software installed.
- Basic knowledge of IP addressing and network devices.

Equipment:

- 1 x Hub
- 1 x Switch (e.g., 2960)
- 4 x PCs
- Copper Straight-Through Cables

Practical: Create Networks with Hub and Switch

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer and create a new project.

Part A: Network with a Hub

Step 2: Add Devices (Hub Network)

1. **Add a Hub**:

    - Select **Hubs** from the **Network Devices** tab.
    - Drag and drop a **Generic Hub** onto the workspace.
2. **Add PCs**:
    - Go to **End Devices** and drag **2 PCs** onto the workspace.

Step 3: Connect Devices

1. **Use Copper Straight-Through Cables**:
    - Connect **PC1** to the **Hub** using **FastEthernet0**.
    - Connect **PC2** to the **Hub** using **FastEthernet1**.

Step 4: Configure IP Addresses

1. Assign IP addresses:
    - PC1: `192.168.1.2` with Subnet Mask `255.255.255.0`
    - PC2: `192.168.1.3` with Subnet Mask `255.255.255.0`

Step 5: Test Network Behavior

1. **Ping from PC1 to PC2**:
    - Go to **PC1 > Desktop > Command Prompt**.
    - Type `ping 192.168.1.3`.
2. **Observe Hub Behavior**:
    - Notice that when a PC sends data, the Hub **broadcasts** the data to all ports, including the one that does not need the data.

Part B: Network with a Switch

Step 6: Add Devices (Switch Network)

1. **Add a Switch**:
    - Select **Switches** from the **Network Devices** tab.
    - Drag a **2960 Switch** to the workspace.
2. **Add PCs**:
    - Drag **2 more PCs** onto the workspace.

Step 7: Connect Devices

1. **Use Copper Straight-Through Cables**:
    - Connect **PC3** to the **Switch** using **FastEthernet0/1**.
    - Connect **PC4** to the **Switch** using **FastEthernet0/2**.

Step 8: Configure IP Addresses

1. Assign IP addresses:
    - PC3: `192.168.2.2` with Subnet Mask `255.255.255.0`
    - PC4: `192.168.2.3` with Subnet Mask `255.255.255.0`

Step 9: Test Network Behavior

1. **Ping from PC3 to PC4**:
    - Go to **PC3 > Desktop > Command Prompt**.
    - Type `ping 192.168.2.3`.
2. **Observe Switch Behavior**:

- The Switch forwards the data **only** to the port where the destination device (PC4) is connected, making the communication more efficient.

Analysis: Hub vs. Switch

Feature	Hub	Switch
Data Transmission	Broadcasts data to **all devices** in the network	Forwards data **only to the intended recipient**
Bandwidth	Shared bandwidth among all connected devices	Dedicated bandwidth for each connection
Speed	Slower, especially with many devices	Faster, as it reduces unnecessary data traffic
Efficiency	Less efficient, leading to network congestion	More efficient, reducing collisions and congestion
MAC Address Table	No MAC address learning capability	Maintains a **MAC address table** to forward data
Use Case	Suitable for small networks with few devices	Preferred for larger networks and better performance

Conclusion:

- **Hub** is simple and inexpensive but broadcasts data to all devices, which can cause unnecessary network traffic and slow down communication.
- **Switch** is more efficient as it directs data only to the intended recipient, improving network performance and reducing data collisions.
- For most modern networks, **switches** are the preferred choice due to their efficiency and speed.

Experiment No.7

Objective:

To configure a **router** using Cisco Packet Tracer and enable communication between two different subnets.

Requirements:

- Cisco Packet Tracer software installed.
- Basic understanding of IP addressing, routing concepts, and CLI commands.

Equipment:

- 1 x Router (e.g., Cisco 1941)
- 2 x Switches (e.g., Cisco 2960)
- 4 x PCs (2 PCs in each subnet)
- Copper Straight-Through Cables

Steps for Router Configuration in Cisco Packet Tracer

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer and create a new project.

Step 2: Add Devices

1. **Add a Router**:
   - Select **Routers** from the **Network Devices** tab.
   - Drag and drop a **Cisco 1941 Router** onto the workspace.
2. **Add Switches**:
   - Drag and drop **2 Cisco 2960 Switches** onto the workspace.
3. **Add PCs**:
   - Drag **4 PCs** from **End Devices** onto the workspace.

Step 3: Connect Devices

1. **Use Copper Straight-Through Cables**:
   - Connect **PC1** and **PC2** to **Switch1** (e.g., **FastEthernet0/1** and **FastEthernet0/2**).
   - Connect **PC3** and **PC4** to **Switch2** (e.g., **FastEthernet0/1** and **FastEthernet0/2**).
   - Connect **Switch1** to **Router** using **FastEthernet0/0**.
   - Connect **Switch2** to **Router** using **FastEthernet0/1**.

Step 4: Configure IP Addresses for PCs

1. **Assign IP Addresses for Subnet 1**:
   - PC1: `192.168.1.2` with Subnet Mask `255.255.255.0` and Default Gateway `192.168.1.1`.
   - PC2: `192.168.1.3` with Subnet Mask `255.255.255.0` and Default Gateway `192.168.1.1`.
2. **Assign IP Addresses for Subnet 2**:
   - PC3: `192.168.2.2` with Subnet Mask `255.255.255.0` and Default Gateway `192.168.2.1`.
   - PC4: `192.168.2.3` with Subnet Mask `255.255.255.0` and Default Gateway `192.168.2.1`.

Step 5: Configure the Router

1. **Access the Router CLI**:
   - Click on the **Router**.
   - Go to the **CLI** tab.
2. **Enter Configuration Mode**:

   ```
   bash
   enable
   configure terminal
   ```

3. **Configure Router Interfaces**:
   - **Interface for Subnet 1 (connected to Switch1)**:

     ```
     bash
     interface fastethernet 0/0
     ip address 192.168.1.1 255.255.255.0
     no shutdown
     ```

   - **Interface for Subnet 2 (connected to Switch2)**:

     ```
     bash
     interface fastethernet 0/1
     ```

```
ip address 192.168.2.1 255.255.255.0
no shutdown
```

4. **Exit Configuration Mode**:

```bash
exit
```

Step 6: Save the Configuration

1. Save the configuration to the router's memory to ensure it remains after reboot:

```bash
write memory
```

Step 7: Test Connectivity Between Subnets

1. **Ping from PC1 to PC3**:
   - Go to **PC1 > Desktop > Command Prompt**.
   - Type `ping 192.168.2.2` and observe if the ping is successful.
2. **Ping from PC4 to PC2**:
   - Go to **PC4 > Desktop > Command Prompt**.
   - Type `ping 192.168.1.3` and observe if the ping is successful.

Troubleshooting Tips:

- **Check the Interface Status**: Ensure the interfaces on the router are in the `up` state using the `show ip interface brief` command.
- **Check IP Configuration**: Ensure that IP addresses and subnet masks are configured correctly.
- **Check Default Gateway on PCs**: Verify that each PC has the correct default gateway set, corresponding to its router interface.

Result:

If the pings between the devices in different subnets are successful, it means the router has been configured correctly, and routing between the two subnets is functional.

Conclusion:

You have successfully configured a router using Cisco Packet Tracer, allowing communication between two different subnets. This practical demonstrates how routers route packets between different networks and play a crucial role in inter-network communication.

Experiment No. 8

Objective:

To configure a **switch** using Cisco Packet Tracer, create and assign **VLANs**, and enable basic switch management.

Requirements:

- Cisco Packet Tracer software installed.
- Basic understanding of networking, VLANs, and IP addressing.

Equipment:

- 1 x Switch (e.g., Cisco 2960)
- 4 x PCs
- Copper Straight-Through Cables

Steps for Switch Configuration in Cisco Packet Tracer

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer and create a new project.

Step 2: Add Devices

1. **Add a Switch**:
   - Select **Switches** from the **Network Devices** tab.
   - Drag a **Cisco 2960 Switch** onto the workspace.
2. **Add PCs**:
   - Go to **End Devices** and drag **4 PCs** onto the workspace.

Step 3: Connect Devices

1. **Use Copper Straight-Through Cables**:
   - Connect **PC1** to **FastEthernet0/1** on the switch.
   - Connect **PC2** to **FastEthernet0/2**.
   - Connect **PC3** to **FastEthernet0/3**.
   - Connect **PC4** to **FastEthernet0/4**.

Step 4: Configure IP Addresses for PCs

1. **Assign IP Addresses for PCs**:
   - PC1: `192.168.10.2` with Subnet Mask `255.255.255.0`
   - PC2: `192.168.10.3` with Subnet Mask `255.255.255.0`
   - PC3: `192.168.20.2` with Subnet Mask `255.255.255.0`
   - PC4: `192.168.20.3` with Subnet Mask `255.255.255.0`

Step 5: Configure VLANs on the Switch

1. **Access the Switch CLI**:
   - Click on the **Switch** and go to the **CLI** tab.
2. **Enter Configuration Mode**:

```
bash
enable
configure terminal
```

3. **Create VLANs**:
   - **Create VLAN 10** for PC1 and PC2:

```
bash
vlan 10
name Sales
exit
```

   - **Create VLAN 20** for PC3 and PC4:

```bash
vlan 20
name HR
exit
```

4. **Assign Ports to VLANs**:
   - **Assign FastEthernet0/1 and FastEthernet0/2 to VLAN 10**:

     ```bash
     interface fastethernet 0/1
     switchport mode access
     switchport access vlan 10
     exit

     interface fastethernet 0/2
     switchport mode access
     switchport access vlan 10
     exit
     ```

   - **Assign FastEthernet0/3 and FastEthernet0/4 to VLAN 20**:

     ```bash
     interface fastethernet 0/3
     switchport mode access
     switchport access vlan 20
     exit

     interface fastethernet 0/4
     switchport mode access
     switchport access vlan 20
     exit
     ```

Step 6: Verify VLAN Configuration

1. **Show VLAN Configuration**:

```bash
show vlan brief
```

   - This command displays the VLANs created and their associated ports.

Step 7: Configure a Management IP on the Switch

1. **Configure IP Address for Remote Management**:
   - Enter interface VLAN 1 (default):

     ```bash
     interface vlan 1
     ip address 192.168.1.1 255.255.255.0
     no shutdown
     exit
     ```

2. **Configure the Default Gateway**:
   - This step is necessary if you plan to manage the switch from a different subnet:

     ```bash
     ip default-gateway 192.168.1.254
     ```

Step 8: Test VLAN Communication

1. **Test Communication Between Devices**:

- **Ping from PC1 to PC2**:
    - It should be **successful** because both are in the same VLAN (VLAN 10).
- **Ping from PC1 to PC3**:
    - It should **fail** because PC1 and PC3 are in different VLANs and there is no router configured for inter-VLAN communication.

Analysis:

- **VLAN Segmentation**: The above configuration isolates traffic between VLANs, allowing **PC1** and **PC2** to communicate but not with **PC3** and **PC4**, and vice versa.
- **Management IP**: Configuring an IP address on **VLAN 1** allows you to manage the switch remotely if you connect to the same network.
- **Traffic Control**: Using VLANs on a switch helps control broadcast domains, improves network performance, and enhances security by segmenting the network.

Conclusion:

You have successfully configured a switch using Cisco Packet Tracer, created VLANs, assigned ports to VLANs, and tested basic communication between devices. This setup is commonly used in real-world networks for **traffic segmentation** and **better network management**.

Experiment No. 9

Objective:

To configure an **HTTP server** in Cisco Packet Tracer and access it using a **PC**.

Requirements:

- Cisco Packet Tracer software installed.
- Basic understanding of IP addressing and client-server communication.

Equipment:

- 1 x Server (with HTTP service enabled)
- 1 x Switch (e.g., Cisco 2960)
- 1 x PC
- Copper Straight-Through Cables

Steps for Configuring an HTTP Server in Cisco Packet Tracer

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer and create a new project.

Step 2: Add Devices

1. **Add a Server**:
    - Select **Servers** from the **End Devices** tab.
    - Drag a **Generic Server** onto the workspace.

2. **Add a PC**:
   - Drag a **PC** from **End Devices** onto the workspace.
3. **Add a Switch**:
   - Drag a **Cisco 2960 Switch** onto the workspace.

Step 3: Connect Devices

1. **Use Copper Straight-Through Cables**:
   - Connect the **Server** to **Switch** using **FastEthernet0**.
   - Connect the **PC** to **Switch** using **FastEthernet0**.

Step 4: Configure IP Addresses

1. **Assign an IP Address to the Server**:
   - Click on the **Server**.
   - Go to **Config > FastEthernet0**.
   - Set the **IP Address** to `192.168.1.2` and **Subnet Mask** to `255.255.255.0`.
   - Click **On** to enable the interface.
2. **Assign an IP Address to the PC**:
   - Click on the **PC**.
   - Go to **Config > FastEthernet0**.
   - Set the **IP Address** to `192.168.1.3` and **Subnet Mask** to `255.255.255.0`.
   - Set the **Default Gateway** to `192.168.1.1` (assuming a router would be present in a real scenario).

Step 5: Enable HTTP Service on the Server

1. Click on the **Server**.
2. Go to the **Services** tab.
3. Select **HTTP** from the services list.
4. Ensure that the **HTTP** service is **turned on**. The HTTP service is enabled by default, but verify that it is active.

Step 6: Create a Simple Webpage (Optional)

1. In the **HTTP** service section, you can create or modify the default web page.
2. Edit the `index.html` file with a simple message like:

   ```
   html
   <html>
       <body>
           <h1>Welcome to the HTTP Server!</h1>
           <p>This is a test page on the Cisco Packet Tracer HTTP server.</p>
       </body>
   </html>
   ```

3. Save the changes.

Step 7: Test HTTP Access from the PC

1. Click on the **PC**.
2. Go to the **Desktop** tab.
3. Select **Web Browser**.
4. In the **URL** field, type the IP address of the server:

   ```
   arduino
   http://192.168.1.2
   ```

5. Press **Enter** and observe if the web page from the server loads.

Step 8: Verify Connectivity with Ping

1. On the **PC**, go to the **Command Prompt** from the **Desktop** tab.
2. Type the following command to ensure the PC can reach the server:

```
bash
ping 192.168.1.2
```

3. If the ping is successful, it means the network connectivity is established.

Analysis:

- **HTTP Communication**: The PC, acting as a client, is able to access the web page hosted on the server through the HTTP protocol.
- **Client-Server Model**: This setup simulates a basic client-server environment where the PC makes a request and the server responds with a web page.
- **Network Configuration**: Proper IP addressing and enabling of the HTTP service on the server are critical to allowing successful communication between devices.

Conclusion:

You have successfully configured an HTTP server in Cisco Packet Tracer and accessed it using a PC. This setup provides a basic understanding of how HTTP works and how web servers can be configured in a network. For more advanced setups, you can explore **HTTPS**, adding a **DNS server**, or configuring **multiple VLANs** to simulate more complex network environments.

Experiment No. 10

Objective:

To configure a **DNS server** in Cisco Packet Tracer and enable a PC to resolve domain names to IP addresses using the DNS server.

Requirements:

- Cisco Packet Tracer software installed.
- Basic knowledge of IP addressing and DNS concepts.

Equipment:

- 1 x Server (with DNS service enabled)
- 1 x Switch (e.g., Cisco 2960)
- 1 x PC
- Copper Straight-Through Cables

Steps for Configuring a DNS Server in Cisco Packet Tracer

Step 1: Start Cisco Packet Tracer

1. Open Cisco Packet Tracer and create a new project.

Step 2: Add Devices

1. **Add a Server**:
   - Select **Servers** from the **End Devices** tab.
   - Drag a **Generic Server** onto the workspace.
2. **Add a PC**:
   - Drag a **PC** from **End Devices** onto the workspace.
3. **Add a Switch**:
   - Drag a **Cisco 2960 Switch** onto the workspace.

Step 3: Connect Devices

1. **Use Copper Straight-Through Cables**:
   - Connect the **Server** to **Switch** using **FastEthernet0**.
   - Connect the **PC** to **Switch** using **FastEthernet0**.

Step 4: Configure IP Addresses

1. **Assign an IP Address to the Server**:
   - Click on the **Server**.
   - Go to **Config > FastEthernet0**.
   - Set the **IP Address** to `192.168.1.2` and **Subnet Mask** to `255.255.255.0`.
   - Click **On** to enable the interface.
2. **Assign an IP Address to the PC**:
   - Click on the **PC**.
   - Go to **Config > FastEthernet0**.
   - Set the **IP Address** to `192.168.1.3` and **Subnet Mask** to `255.255.255.0`.
   - Set the **Default Gateway** to `192.168.1.1` (typically used for routing in larger networks, but not needed here).
   - Set the **DNS Server** to `192.168.1.2` (IP of the server).

Step 5: Enable and Configure DNS Service on the Server

1. Click on the **Server**.
2. Go to the **Services** tab.
3. Select **DNS** from the list of services.
4. Turn on the **DNS** service by clicking the **On** button.
5. **Create a New DNS Record**:
   - In the **DNS Service** window, add a **new record** by entering the following details:
     - **Name**: `www.example.com`
     - **Address**: `192.168.1.2` (The IP address of the server)
   - Click **Add** to save the record.

Step 6: Test DNS Resolution from the PC

1. **Ping the Domain Name**:
   - Go to the **PC**.
   - Select the **Desktop** tab.
   - Open the **Command Prompt**.
   - Type the following command to test DNS resolution:

     ```
     bash
     ping www.example.com
     ```

   - The PC should receive a reply from `192.168.1.2`, indicating that the domain name `www.example.com` has been successfully resolved to the server's IP address.

2. **Access the Domain Using the Web Browser** (Optional):
    - Open the **Web Browser** from the **Desktop** tab of the **PC**.
    - Enter the URL:

```
arduino
http://www.example.com
```

    - The browser should display the default web page hosted on the server if the DNS resolution is successful.

Step 7: Verify DNS Configuration

1. **View the DNS Table**:
    - On the server, in the **DNS** service section, you can see the list of all the domain records that have been configured.
2. **Check DNS Server Settings**:
    - Ensure that the DNS IP address configured on the PC matches the IP address of the DNS server (`192.168.1.2`).

Analysis:

- **DNS Functionality**: The DNS server translates the domain name `www.example.com` into its corresponding IP address `192.168.1.2`, allowing the PC to communicate with the server using the domain name.
- **Client-Server Communication**: This setup demonstrates a simple **client-server** interaction using DNS, where the PC relies on the DNS server to translate a domain name into an IP address before accessing the server's web service.

Conclusion:

You have successfully configured a DNS server in Cisco Packet Tracer and enabled a PC to resolve domain names. This practical setup is a simplified version of how DNS servers operate in real-world networks, allowing users to access websites using domain names instead of remembering IP addresses.

Experiment No. 11

Objective:

To understand and implement the **LAN**, **MAN**, and **WAN** using Cisco Packet Tracer and demonstrate their configurations.

Requirements:

- Cisco Packet Tracer software installed.
- Basic understanding of network concepts such as IP addressing, routing, and switches.

Equipment:

- LAN:
    - 1 x Switch
    - 3 x PCs
- MAN:
    - 2 x Routers

    - 2 x Switches
    - 6 x PCs
- WAN:
    - 3 x Routers (simulating separate regions)
    - 1 x Cloud (optional for ISP simulation)
    - 2 x Switches per region
    - 3 PCs per region

Implementation in Cisco Packet Tracer

1. Implementing a Local Area Network (LAN)

A **LAN** is used for connecting devices within a small geographical area, such as a building or a campus. It typically involves **switches** and **end devices** like **PCs**.

Steps for LAN Configuration:

1. **Add Devices**:
    - 1 x **Switch** (e.g., Cisco 2960).
    - 3 x **PCs**.
2. **Connect Devices**:
    - Use **copper straight-through cables** to connect each **PC** to the **Switch**.
3. **Configure IP Addresses**:
    - Assign IP addresses to the **PCs**:
        - PC1: `192.168.1.2` / `255.255.255.0`
        - PC2: `192.168.1.3` / `255.255.255.0`
        - PC3: `192.168.1.4` / `255.255.255.0`
4. **Test Connectivity**:
    - Use the **ping** command from each PC to test connectivity:

      ```
      bash
      ping 192.168.1.3
      ```

    - All PCs should successfully ping each other since they are on the same network.

Analysis:

- **LAN Scope**: Typically confined to a small area such as an office building.
- **Latency**: Minimal due to close proximity of devices.
- **Devices**: Switches, hubs, and end devices like PCs.

---

2. Implementing a Metropolitan Area Network (MAN)

A **MAN** connects multiple **LANs** within a city or metropolitan area, providing high-speed connections between different locations.

Steps for MAN Configuration:

1. **Add Devices**:
    - 2 x **Routers**.
    - 2 x **Switches**.
    - 6 x **PCs** (3 connected to each switch).

2. **Connect Routers to Switches**:
   - Use **copper straight-through cables** to connect each **PC** to its respective **Switch**.
   - Connect each **Switch** to its respective **Router** using **copper straight-through cables**.
3. **Connect Routers**:
   - Use a **serial cable** or **crossover cable** to connect the **serial ports** of the **Routers** to each other.
   - Configure the serial link with IP addresses:
     - Router1 Serial0/0: `192.168.2.1` / `255.255.255.252`
     - Router2 Serial0/0: `192.168.2.2` / `255.255.255.252`
4. **Configure LAN IP Addresses**:
   - Assign IP addresses to **PCs** and **routers** within each LAN:
     - LAN1 (connected to Router1): `192.168.10.0/24`
     - LAN2 (connected to Router2): `192.168.20.0/24`
   - Example IP for a PC in LAN1: `192.168.10.2` / `255.255.255.0`
   - Example IP for a PC in LAN2: `192.168.20.2` / `255.255.255.0`
5. **Configure Routing**:
   - Use **Static Routing** or **Routing Protocols** (e.g., **RIP**, **OSPF**) on each **Router** to allow communication between LANs.
   - Example static route on **Router1**:

     ```
     bash
     ip route 192.168.20.0 255.255.255.0 192.168.2.2
     ```

   - Example static route on **Router2**:

     ```
     bash
     ip route 192.168.10.0 255.255.255.0 192.168.2.1
     ```

6. **Test Connectivity**:
   - **Ping** between PCs in different LANs to verify communication:

     ```
     bash
     ping 192.168.20.2
     ```

Analysis:

- **MAN Scope**: Larger than a LAN, typically spanning a city.
- **Latency**: Higher than LAN due to distance but still manageable.
- **Devices**: Routers, switches, and end devices.

---

3. Implementing a Wide Area Network (WAN)

A **WAN** connects networks over large geographical distances, such as cities, states, or even countries, often using **service providers**.

Steps for WAN Configuration:

1. **Add Devices**:
   - 3 x **Routers** (one for each region).
   - 1 x **Cloud** (to simulate the Internet/ISP).
   - 2 x **Switches** per region.
   - 3 x **PCs** per region.
2. **Connect Routers to the Cloud**:
   - Connect each **Router** to the **Cloud** using **serial cables** or **crossover cables**.
3. **Connect LANs to Routers**:
   - Use **copper straight-through cables** to connect **Switches** to **Routers**.

- Connect **PCs** to their respective **Switches**.
4. **Configure IP Addresses**:
   - Assign IP addresses to **LANs** in each region:
     - Region1 LAN: `10.0.0.0/24`
     - Region2 LAN: `20.0.0.0/24`
     - Region3 LAN: `30.0.0.0/24`
   - Assign IP addresses to **Serial Interfaces** between **Routers** and the **Cloud** to simulate **WAN links**.
5. **Configure Routing**:
   - Use a **routing protocol** like **OSPF** for dynamic routing between regions:
     - Example OSPF command on each router:

       ```
       bash
       router ospf 1
       network 10.0.0.0 0.0.0.255 area 0
       network 20.0.0.0 0.0.0.255 area 0
       network 30.0.0.0 0.0.0.255 area 0
       ```

   - Configure **default routes** pointing to the **Cloud** if acting as an ISP.
6. **Test Connectivity**:
   - **Ping** between **PCs** in different regions to verify that the **WAN** connection is working:

     ```
     bash
     ping 30.0.0.2
     ```

Analysis:

- **WAN Scope**: Can span countries or continents, involving ISPs.
- **Latency**: Higher due to long distances.
- **Devices**: Routers, WAN links (serial), and possibly service providers or clouds.

Comparison Summary:

Type	Scope	Devices Used	Speed	Latency	Cost
LAN	Building or Campus	Switches, PCs	High	Low	Low
MAN	City or Metropolitan Area	Routers, Switches	Moderate	Moderate	Medium
WAN	Country/Continent	Routers, WAN Links	Lower	High	High

Conclusion:

This guide covers the implementation of **LAN**, **MAN**, and **WAN** using **Cisco Packet Tracer**. Each network type serves a different scope and purpose, with **LANs** being suitable for local networks, **MANs** for city-wide networks, and **WANs** for global connections. By following these steps, you can simulate and better understand the design and functionality of different network types.