PONDICHERRY UNIVERSITY

(A Central university)

SCHOOL OF ENGINEERING AND TECHNOLOGY DEPARTMENT OF COMPUTER SCIENCE

M.Sc. Computer Science

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REG. NO.	:	20384111
SEMESTER	:	9TH Semester
SUBJECT	:	CSSC 513 - WEB TECHNOLOGY AND COMPUTER NETWORKS LAB

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TECHNOLOGY DEPARTMENT OF COMPUTER

SCIENCE

M.Sc. Computer Science

PRACTICAL LAB RECORD

BONAFIDE CERTIFICATE

This is to certify that this is a Bonafide record of practical work done by **D A GURUPRIYAN**, having Reg. No. **20384111** semester - IX from the month July 2024 to December 2024.

FACULTY IN-CHARGE

SUBMITTED FOR THE PRACTICAL EXAM HELD ON: -

INTERNAL EXAMINER **EXTERNAL EXAMINER**

NETWORK TOPOLOGY

AIM: To configure a basic Network Topology using Cisco Packet Tracer.

PROCEDURE:

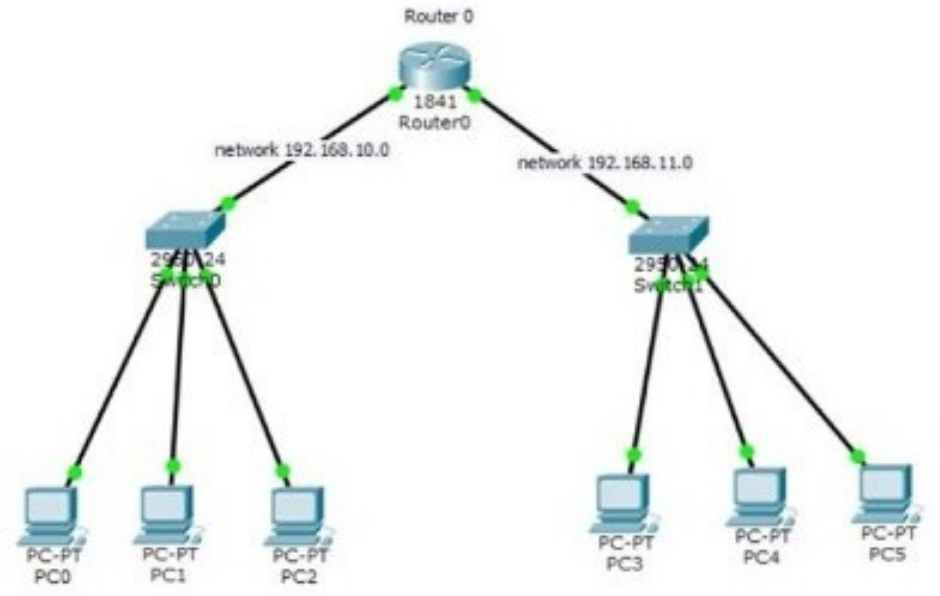
1. **Place the devices:**
   - From the **Devices menu**, select **Routers** and choose the **1841 Router**. Place it in the center.
   - Go to **Switches**, select two **2960 switches**, and place them on the left and right of the router.
   - From **End Devices**, select **PC** and place three PCs connected to the left switch and three PCs connected to the right switch.
2. **Configure Connections:**
   - **Router to Switches:**
     - Use the **Copper Straight-Through Cable** tool to connect:
       - **Router FastEthernet0/0** to **Switch0 FastEthernet0/1** (left switch).
       - **Router FastEthernet0/1** to **Switch1 FastEthernet0/1** (right switch).
   - **Switches to PCs:**
     - For **Switch0**, connect each of its **FastEthernet ports (e.g., FastEthernet0/2, FastEthernet0/3, and FastEthernet0/4)** to **PC0, PC1, and PC2**.
     - For **Switch1**, connect its **FastEthernet ports (e.g., FastEthernet0/2, FastEthernet0/3, and FastEthernet0/4)** to **PC3, PC4, and PC5**.
3. **Configure IP Addresses:**
   - **Router Interfaces:**
     - Click on **Router0**, go to **Config** > **FastEthernet0/0**, and set:
       - **IP Address:** 192.168.10.1
       - **Subnet Mask:** 255.255.255.0
       - **Turn on** the interface by clicking on **Port Status**.

- Go to **FastEthernet0/1** and set:
  - **IP Address:** 192.168.11.1
  - **Subnet Mask:** 255.255.255.0
  - **Turn on** the interface by clicking on **Port Status**.

- **PCs:**
  - For **PC0, PC1, and PC2** (connected to the left switch):
    - Set IP addresses within the 192.168.10.0 network (e.g., 192.168.10.2, 192.168.10.3, 192.168.10.4) with a **Subnet Mask** of 255.255.255.0.
    - Set the **Default Gateway** to 192.168.10.1.
  - For **PC3, PC4, and PC5** (connected to the right switch):
    - Set IP addresses within the 192.168.11.0 network (e.g., 192.168.11.2, 192.168.11.3, 192.168.11.4) with a **Subnet Mask** of 255.255.255.0.
    - Set the **Default Gateway** to 192.168.11.1.

4. **Test Connectivity:**
   - Use the **Ping Tool** from **PC0** to **PC3** (or any PC on a different subnet) to verify connectivity.

DIAGRAM :



RESULT:

Thus the configuration of the basic Network Topology is successfully pings indicate proper configuration and connectivity between the subnets.

VLAN

AIM: To configure VLANs on a switch and router in Cisco Packet Tracer to enable communication between devices in different VLANs through inter-VLAN routing.

PROCEDURE:

Step 1: Set Up the Devices

- Place the **Router**, **Switch**, and **PCs** in the workspace.
- Connect the **Router to the Switch** using a cross-over cable from **Router FastEthernet0/0** to **Switch FastEthernet0/20**.
- Connect each **PC to the Switch**:
    - PC1 and PC2 will be in VLAN 10 (connect to any ports like Fa0/1 and Fa0/2).
    - PC3 and PC4 will be in VLAN 20 (connect to any ports like Fa0/3 and Fa0/4).

Step 2: Configure VLANs on the Switch

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

    config# enable

    config# configure terminal
3. **Create VLANs:**
    - **VLAN 10:**

      config# vlan 10

      config# name

      VLAN10 config# exit
    - **VLAN 20:**

      config# vlan 20

      config# name

      VLAN20 config# exit

4. **Assign Ports to VLANs:**
    - For **VLAN 10 (PC1 and PC2)**:

      config# interface FastEthernet0/1

      config# switchport mode access

      config# switchport access vlan 10

      config# exit

      config# interface FastEthernet0/2

      config# switchport mode access

      config# switchport access vlan 10

      config# exit
    - For **VLAN 20 (PC3 and PC4)**:

      config# interface FastEthernet0/3

      config# switchport mode access

      config# switchport access vlan 20

      config# exit

      config# interface FastEthernet0/4

      config# switchport mode access

      config# switchport access vlan 20

      config# exit
5. **Configure the Trunk Port:**
    - Set the port connected to the router as a trunk port (e.g., FastEthernet0/20).

      config# interface FastEthernet0/20

      config# switchport mode trunk

      config# exit

Step 3: Configure the Router for Inter-VLAN Routing

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

config# enable

config# configure terminal

3. **Configure Subinterfaces for Each VLAN:**
    - **Subinterface for VLAN 10:**

      config# interface FastEthernet0/0.10

      config# encapsulation dot1Q 10

      config# ip address 192.168.1.100

      255.255.255.0 config# exit
    - **Subinterface for VLAN 20:**

      config# interface FastEthernet0/0.20

      config# encapsulation dot1Q 20

      config# ip address 192.168.2.100

      255.255.255.0 config# exit
4. **Enable the Main Interface:**
    - Make sure the main interface **FastEthernet0/0** is

      up. config# interface FastEthernet0/0

      config# no shutdown

      config# exit

Step 4: Configure IP Addresses on PCs

- For **PC1 (VLAN 10)**:
    - IP Address: 192.168.1.1
    - Subnet Mask: 255.255.255.0
    - Default Gateway: 192.168.1.100
- For **PC2 (VLAN 10)**:
    - IP Address: 192.168.1.2
    - Subnet Mask: 255.255.255.0
    - Default Gateway: 192.168.1.100
- For **PC3 (VLAN 20)**:
    - IP Address: 192.168.2.1

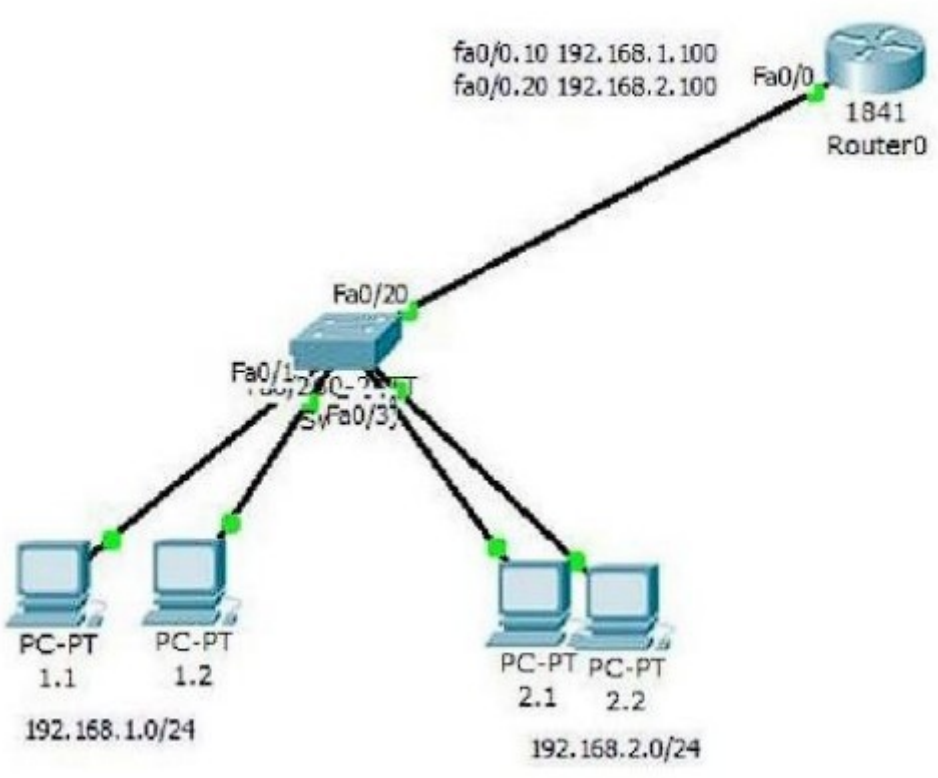
- Subnet Mask: 255.255.255.0
- Default Gateway: 192.168.2.100

- For **PC4 (VLAN 20)**:
  - IP Address: 192.168.2.2
  - Subnet Mask: 255.255.255.0
  - Default Gateway: 192.168.2.100

Step 5: Test Connectivity

- **Ping** from PC1 to PC2 within VLAN 10 (should succeed).
- **Ping** from PC3 to PC4 within VLAN 20 (should succeed).
- **Ping** between PCs in different VLANs (e.g., PC1 to PC3) to verify inter-VLAN routing (should also succeed).

DIAGRAM:



RESULT:

Thus the configuration of VLAN is successfully done and the ping from one PC to other PCs is verified.

FIREWALL

AIM: To setup an network based firewall using Cisco Packet Tracer.

PROCEDURE:

Step 1: Replace Router_A with Firewall_1

- **a.** Remove **Router_A** and replace it with **Firewall_1**.
- **b.** Connect the **FastEthernet 0/0** interface on **Firewall_1** to the **FastEthernet 0/1** interface on **Switch_A**.
  Connect the **FastEthernet 0/1** interface on **Firewall_1** to the **Ethernet 6** interface of the **ISP cloud**.
  (Use straight-through cables for both connections.)
- **c.** Confirm that the host name of **Firewall_1** is **Firewall_1**.
- **d.** On **Firewall_1**, configure the WAN IP address and subnet mask for the **FastEthernet 0/1** interface as **209.165.200.225** and **255.255.255.224**.
- **e.** Configure the LAN IP address and subnet mask for the **FastEthernet 0/0** interface on **Firewall_1** as **192.168.1.1** and **255.255.255.0**.

Step 2: Verify the Firewall_1 Configuration

- **a.** Use the **show run** command to verify your configuration. This is a partial example of the output:

```
Firewall_1#show run

Building configuration...

hostname Firewall_1

!

interface FastEthernet0/0

  ip address 192.168.1.1 255.255.255.0

  ip nat inside

  duplex  auto

  speed auto

!

interface FastEthernet0/1
```

```
 ip address 209.165.200.225 255.255.255.224
 ip access-group 100 in
 ip nat outside
 duplex auto
 speed auto
!
interface
 Vlan1  no  ip
 address
 shutdown
!
ip nat inside source list 1 interface FastEthernet0/0 overload
ip classless
ip route 192.168.2.0 255.255.255.0 192.168.1.2
ip route 192.168.3.0 255.255.255.0 192.168.1.3
!
access-list 1 permit 192.168.0.0 0.0.255.255
access-list 100 deny ip any host
209.165.200.225
<output omitted>
!
end
```

- **b.** From **PC_B**, ping **209.165.200.225** to verify that the internal computer can access the Internet.

```
PC>ping 209.165.200.225
Pinging 209.165.200.225 with 32 bytes of data:
Reply from 209.165.200.225: bytes=32 time=107ms TTL=120
Reply from 209.165.200.225: bytes=32 time=98ms TTL=120
Reply from 209.165.200.225: bytes=32 time=104ms TTL=120
Reply from 209.165.200.225: bytes=32 time=95ms TTL=120
```

Ping statistics for 209.165.200.225:

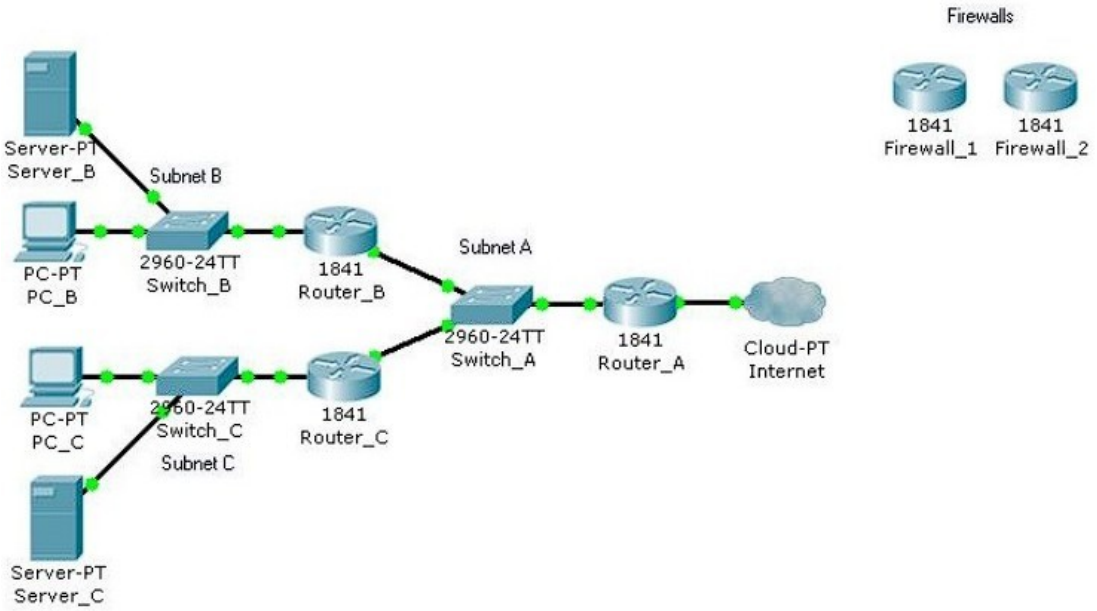
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),

Approximate round trip times in milli-seconds: Minimum

= 95ms, Maximum = 107ms, Average = 101ms

- **c.** From privileged EXEC mode on **Firewall_1**, save the running configuration to the startup configuration using the **copy run start** command.

DIAGRAM:



RESULT:

Hence, the firewall setup is configured within the network interface.

ROUTER CONFIGURATION

AIM:

Basic configuration of Router using Cisco Packet Tracer.

PROCEDURE:

1. **Place the Router:**
   - From the **Devices menu**, go to **Routers** and select a router model (e.g., **1841 Router**). Place it on the workspace.
2. **Add Network Devices (Optional):**
   - Add switches and PCs if you want to connect multiple devices to the router, creating different networks or subnets.
3. **Connect Devices:**
   - Use **Copper Straight-Through Cable** to connect the router to other devices.
   - Connect **Router's FastEthernet or GigabitEthernet ports** to the switches or directly to PCs, depending on the setup.
4. **Enter Router Configuration Mode:**
   - Click on the router, then go to the **CLI (Command Line Interface)** tab.
   - When prompted, type no if it asks if you want to enter the initial configuration dialog.
5. **Access the Router's Global Configuration Mode:**
   - Type enable to enter **privileged EXEC mode**.
   - Type configure terminal to enter **global configuration mode**.
6. **Configure Router Interfaces:**
   - Enter interface configuration mode for each interface you want to configure:
     - For **FastEthernet0/0**:

       config# interface FastEthernet0/0
     - Set the IP address and subnet mask:

       config# ip address 192.168.10.1 255.255.255.0
     - Turn on the interface:

config# no shutdown

- Exit the interface configuration:

  config# exit

- Repeat the process for **FastEthernet0/1** (or any other interface): config# interface FastEthernet0/1

  config# ip address 192.168.11.1 255.255.255.0

  config# no shutdown

  config# exit

7. **Configure Routing (Optional, if using multiple networks):**
   - For **static routing**, type:

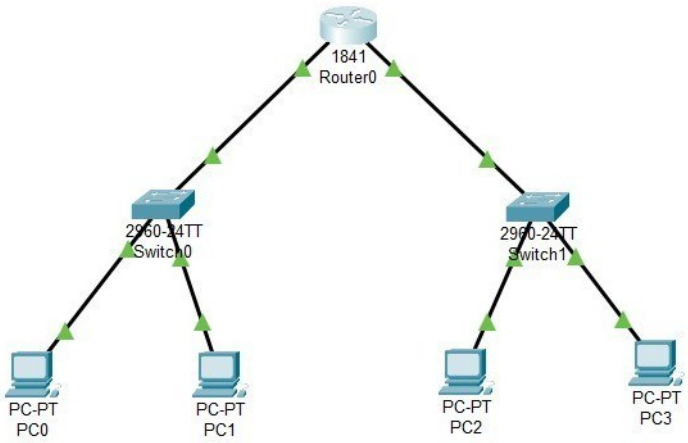
     config# ip route 192.168.11.0 255.255.255.0 192.168.10.2

   - This step is optional if you only need basic routing between directly connected networks.
8. **Save the Configuration:**
   - To save the configuration, exit global configuration mode by typing exit until you return to the privileged EXEC mode.
   - Type:

     config# write memory

   - Alternatively, use copy running-config startup-config to save the configuration to non-volatile memory.
9. **Test Connectivity:**
   - Connect PCs to the router via switches or directly.
   - Assign IP addresses and default gateways to each PC in their respective network.
   - Use the **Ping Tool** to test communication between devices in different networks.

DIAGRAM:



RESULT:

The basic router configuration is made using PCs, Switches and Router which connects all seamlessly.