

Practical 9 – Implementation of Subnetting in Cisco Packet Tracer

Aim:

To implement classless IP subnetting in Cisco Packet Tracer and configure routers, switches, and PCs for proper communication.

Procedure (Summary):

1. Create Topology

- Open Packet Tracer → *New Project*.
- Add routers, switches, and PCs from the device list.
- Connect devices using appropriate cables.

2. Subnetting the Network

- Given network: [192.168.1.0/24](#).
- Requirement: At least 5 usable IPs per subnet.
- Apply **/27 subnet mask** → creates **8 subnets**, each with 30 usable hosts.
- Example Subnets:
 - [192.168.1.0/27](#) → Hosts: 192.168.1.1 – 192.168.1.30
 - [192.168.1.32/27](#) → Hosts: 192.168.1.33 – 192.168.1.62
 - [192.168.1.64/27](#) → Hosts: 192.168.1.65 – 192.168.1.94 ... and so on.

3. IP Addressing Example

- **Router R1:**
 - G0/0 → [192.168.1.1/27](#)
 - G0/1 → [192.168.2.1/27](#)
- **Router R2:**
 - F0/0 → [192.168.3.1/27](#)
 - F0/1 → [192.168.4.1/27](#)
- **PCs:** Assigned sequential IPs like 192.168.1.11 – 192.168.1.15, 192.168.2.11 – 192.168.2.15, etc.

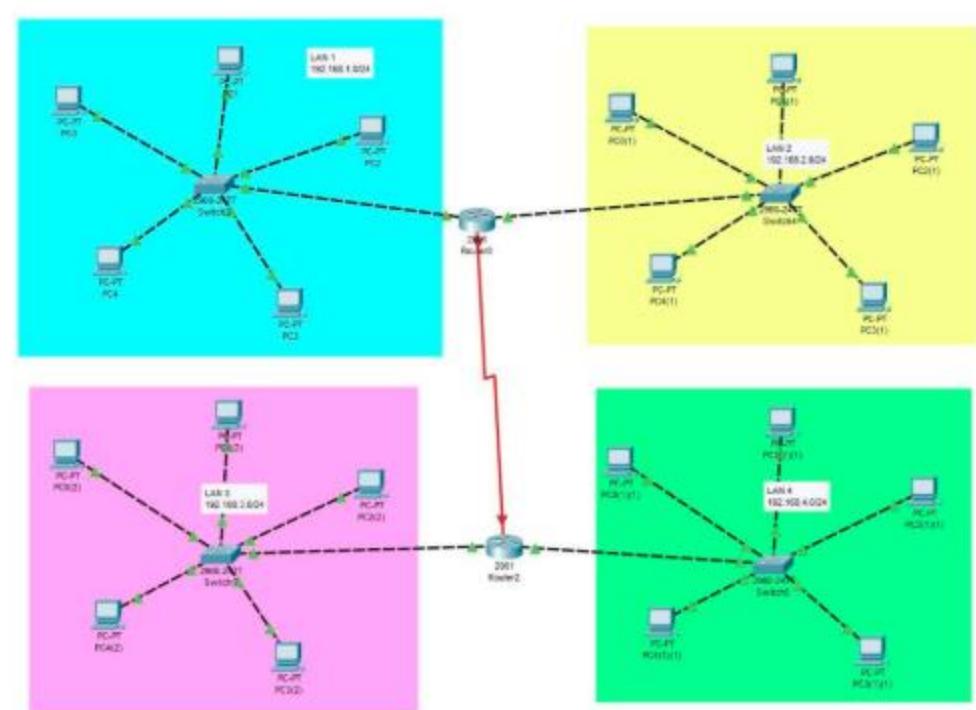
4. Device Configuration

- **Routers (CLI):**
- enable
- configure terminal
- interface g0/0

- ip address <IP> <Subnet Mask>
- no shutdown
- exit
- **Switches:** Set ports to *access mode* (switchport mode access).
- **PCs:** Configure IP, subnet mask, and default gateway from respective subnet.

5. Testing

- Use the ping command from one PC to another.
- If ping replies are received, the subnetting and routing are working correctly.



Student Observations

a) Understanding of Subnetting:

Subnetting is the process of dividing a larger IP network into smaller logical sub-networks. This allows better utilization of IP addresses, reduces wastage, and helps organize networks based on departments or functions.

b) Advantages of Subnetting:

- Efficient use of IP addresses.

- Reduces network congestion and improves performance.
- Enhances security by isolating departments.
- Simplifies troubleshooting and management.

c) Subnetting in College (Example):

Yes, subnetting is generally implemented in colleges. Different departments and facilities are usually assigned separate subnets, for example:

- **Administration Dept:** 10.1.1.0/24
- **Computer Labs:** 10.1.2.0/24
- **Library Network:** 10.1.3.0/24
- **Wi-Fi Access:** 10.1.4.0/24

This ensures smooth communication, controlled access, and efficient IP management across the campus.