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 :

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):**

```
None
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.

Result:
Hence the implementation of subnetting in cisco packet tracer is done successfully**.**

Output: