EXPERIMENT NO. 7

Aim :- Write a program to implement of IPv4 addressing concept along with subnet masking.

Theory :-

The implementation of IPv4 addressing, along with subnet masking, is a fundamental aspect of networking. Here's the theory on how IPv4 addressing and subnet masking work together:

1. IPv4 Addressing:

IPv4 (Internet Protocol version 4) is the fourth version of the Internet Protocol, which is used to identify and locate devices on a network.
An IPv4 address is a 32-bit numerical label assigned to each device on an IP network. It's represented as four sets of the decimal numbers, seperated by periods (eg., 192.168.1.1). IPv4 addresses are divided into two parts: the network portion and the host portion. The network portion identifies the network to which a device belongs, while the host portion identifies the specific device within that network.

2. Subnet Masking:

Subnet masking is a technique used to divide an IP address into network and host portions by using a subnet mask.

A subnet mask is a 32-bit value, like an IP address, but it consists of two parts: a string of consecutive 1s followed by a string of consecutive 0s. For example, 255.255.255.0. The subnet mask defines which bits in an IP address are for the network and which bits are for the host. In the example mask, (255.255.255.0), the first 24 bits are for the network, and the last 8 bits are for the host.

Applying the subnet mask to an IP address results in the network address, which represents the network itself.

3. Implementation:

To implement IPv4 addressing along with subnet masking, you follow these steps:

a. Choose IP Address Range:
Determine the range of IP addresses you want to use for your network. This typically involves selecting a network address and a range of host addresses.

b. Select a Subnet Mask : Choose an appropriate subnet mask based on your network's requirements. The mask determines the size of subnets and number of host addresses with each subnet.

c. Calculate Subnets : Divide your chosen IP address range into subnets based on the subnet mask. Each subnet will have its own network address and a range of host addresses.

d. Assign Addresses : Assign IP addresses to devices within each subnet. Devices within each subnet will share same network address and will have unique host addresses.

Default Subnet Masks :-

Class	Range	Default Subnet Mask
A	1-126	255.0.0.0
B	128-191	255.255.0.0
C	192-223	255.255.255.0

Conclusion :- Designed a program to implement the IPv4 addressing and subnetting of networks using Java programming language.