Assignment - 3

Aim - Write a program to demonstrate subnetting and find the subnet masks.

Objectives -

1. To understand structure of IP addresses and subnet masks.
2. To understand concept of subnetting and create subnet of given IP address.

S/W and H/W Requirements -

Java Development Kit (JDK), Linux / Windows 10, i7 Processor, IntelliJ IDE, Keyboard, Mouse, etc.

- **Theory** -

-> **Subnetting** -

Subnetting is a process of dividing large networks into smaller networks based on layer 3 IP address. Every computer on network has IP address that represent its location on network.

Two versions of IP addresses are available IPv6 and IPv4.

IPv4 -

IP addresses are displayed in dotted decimal notations and appear as four numbers separated by dots. Each number of an IP address is made from eight individual bits known as octet.

Each octet can create number value from 0 to 255. An IP address would be 32 bit long in binary divided into the 2 components, NETWORK and HOST component. Network component is used to identify the network that the packet is intended for, and host component is used to identify the individual host and a network.

IP address are broken into two components -
Network component - Defines network component of a device.
Host component - Defines the specific device of a particular network segment.

IP classes in decimal notation :

i) Class A : 1 - 126
ii) Class B : 128 - 191
iii) Class C : 192 - 223
iv) Class D : 224 - 239
v) Class E : 240 - 254

Subnet Masks -

Subnet Mask is a 32-bit long address used to distinguish between network address and host address in IP address. Subnet mask is always used with IP address.

Subnet mask has only one purpose, to identify which part of an IP address is network and

which is host part.

- **Algorithm** -

- Ask for IP address from the user
- From the decimal notations of IP classes provided in theory determine the class of IP address.
- Print the class of IP address and its default subnet mask.
- Ask for number of subnets (must be in power of 2).
- Calculate the subnet mask and print.
- Print the number of addresses and hosts available for each subnet.
- Then print ranges of IP addresses of all the subnets.

- **Test Cases** -

	Input	Expected O/P	Result.
1.	IP address : 192.168.1.1	IP Address Class C	Success
		Default Subnet Mask : 255.255.255.0	
	Subnets : 4	Per subnets there are 64 address & 62 hosts	
		Subnet Range # 0 : 192.168.1.0 - 192.168.1.63	

Subnet Range #1 :
192.168.1.64 - 192.168.1.127
Subnet Range #2 :
192.168.1.128 - 192.168.1.191
~~Babb~~ Subnet Range #3 :
192.168.1.192 - 192.168.1.255

- Conclusion -

Thus, we were successfully able to implement subnetting and subnet mask using program for demonstration.