Assignment-4

Title: IPV4 Addresses

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Objective:

IPV4 addresses are 32-bit integers represented in hexadecimal form. The class is used to find bits for network ID and host Id and is identified by the first byte of the address. The subnet mask divides IP addresses into two parts, one for the host and the other for the network.

Problem Statement:

The problem here is to implement the code to display the class of IP address, and network mask and generate the subnet IP address based on the subnet bits entered from the keyboard.

Algorithm:

- Input the IP address from the keyboard.
- To determine the class, if the first octet is in the range from 1-126, class A is printed and class B is in the range from 128-191, for class C it will range from 192-223, for Class D it will range from 224-239 and for class E it will range from 240-255. Accordingly, the class is printed.
- Class A has subnet mask -255.0.0.0 and class B -255.255.0.0 and class C -255.255.255.0 and for all other classes subnet Mask is not applicable.
- We know that the subnet mask for Class **A** is **8**, for Class **B** is **16** and for Class **C** is **24** whereas Class **D** and **E** are not divided into Network and Host ID. Based on this subnet mask, network and host ID are divided and printed.

Code:

```
#function to determine the class of IP Address
def findClass(ip):
    if (ip[0] >= 0 and ip[0] <= 127):
        return "A"
```

```python
    elif (ip[0] >= 128 and ip[0] <= 191):
        return "B"


    elif (ip[0] >= 192 and ip[0] <= 223):
        return "C"


    elif (ip[0] >= 224 and ip[0] <= 239):
        return "D"


    else:
        return "E"


def separate(ip, className):



    # for class A network
    if (className == "A"):
        print("Network Address is : ", ip[0])
        print("Host Address is : ", ".".join(ip[1:4]))
        print("Subnet Mask: 255.0.0.0")


    # for class B network
    elif (className == "B"):
        print("Network Address is : ", ".".join(ip[0:2]))
        print("Host Address is : ", ".".join(ip[2:4]))
        print("Subnet Mask: 255.255.0.0")
```

```python
    # for class C network
    elif (className == "C"):
        print("Network Address is : ", ".".join(ip[0:3]))
        print("Host Address is : ", ip[3])
        print("Subnet Mask: 255.255.255.0")


    else:
        print("In this Class, IP address is not divided into Network and Host ID")
        print("Subnet Mask: Not applicable")




if __name__ == "__main__":


    ip = input('Enter IP address : ')
    ip = ip.split(".")
    ip = [int(i) for i in ip]



    # Printing the network class
    networkClass = findClass(ip)
    print("Given IP address belongs to class : ", networkClass)


    # printing network and host id
    ip = [str(i) for i in ip]
    separate(ip, networkClass)
```
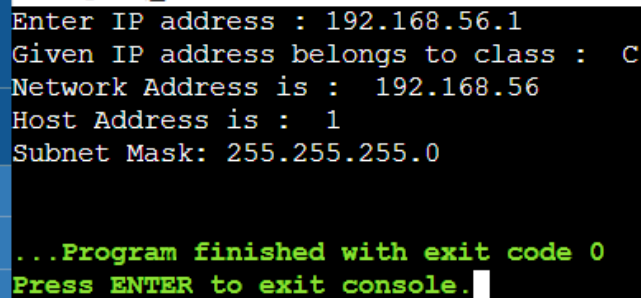
Output:

```
 ⌄  ⤢  📋
Enter IP address : 192.168.56.1
Given IP address belongs to class :  C
Network Address is :  192.168.56
Host Address is :  1
Subnet Mask: 255.255.255.0


...Program finished with exit code 0
Press ENTER to exit console.█
```

Explanation:

Here the IP address given as input by the user is 192.168.56.1. The first octet of the address is in the range of 192 to 223. So the IP address belongs to Class 'C'. The subnet mask for class C is 255.255.255.0. The IP address is divided into the network address and host address which are 192.168.56 and 1 respectively.

Problems Faced:

Initially, I found it difficult to calculate the network mask and subnet IP address, and implementing it challenged me.

Conclusion:

With the help of this experiment, I learned how to determine the class of the IP address given the address as input and also generate the network mask and subnet IP address.