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Assignment 05

Problem statement:
    Write a program to demonstrate subnetting and find subnet mask.

Title: Subnetting

Defination: to divide a network into smaller sections.

Requirements: —
    OS: Windows 10 64 bits
    language : Python
    IDE/editor : vscode

Learning objectives:
    students will be able to understand ip addressing and subnetting.

Theory:

IP address: It is a unique virtual address given to a network device. It can be static which do not change or dynamic which changes.
    Types
1. IPV4   32 bit long.
2. IPV6   128 bit

Network classes: Networks are divided into classes based on their IP's, class A, B, C, D and E.

Need of subnetting:

1. to divide large network in smaller parts.

2. To connect networks across geographical areas.

3. To connect different topologies.

4. To avoid physical limitations such as cable length etc.

Explaining IP

$$\underbrace{192.168.5.5}_{IP} / 26 \leftarrow mask.$$

This is a 32 bit long IPv4 address followed by subnet mask.

26 means 26 bits of subnet mask are

1. The subnet mask can be used to find the range of IPs this IP can ping.

26
↓

11111111.11111111.11111111.11000000

255.255.255.192

this is the mask for given IP.

Test cases

case	Input	Expected o/p	actual o/p	result
1.	192.168.1.68 /26	subnet: 255.255.255.192 Pingable IP: 192.168.1.64 to 192.168.1.127	same as expected	Pass
2.	192.168.1.68/ 22	subnet: 255.255.252.0 Pingable IPS 192.168.0.0 to 192.168.3.255	same as expected	pass
3	192.168155.68/ 28	mask: 255.255.255.240 192.168.155.64 to 192.168.155.79	Same as exp.	pass

Conclusion :

In this assignment we successfully understood the concept of subnetting and implemented code to find subnet mask and pingable IPs in python.

assignment05.py   Output.txt   Python   X

```
PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 05> python assignment05.py

Enter an IP address:    192.168.1.68/26

IP address:             192.168.1.68 (11000000.10101000.00000001.01000100)

Mask is:                26
Subnet decimal is:      255.255.255.192 (11111111.11111111.11111111.11000000)

Pingable IPs:           192.168.1.64 to 192.168.1.127

Random Pingable IPs:    192.168.1.95

PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 05> python assignment05.py

Enter an IP address:    192.168.1.68/22

IP address:             192.168.1.68 (11000000.10101000.00000001.01000100)

Mask is:                22
Subnet decimal is:      255.255.252.0 (11111111.11111111.11111100.00000000)

Pingable IPs:           192.168.0.0 to 192.168.3.255

Random Pingable IPs:    192.168.0.127

PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 05> python assignment05.py

Enter an IP address:    192.168.155.68/22

IP address:             192.168.155.68 (11000000.10101000.10011011.01000100)

Mask is:                22

Subnet decimal is:      255.255.252.0 (11111111.11111111.11111100.00000000)

Pingable IPs:           192.168.152.0 to 192.168.155.255
```

Python 3.9.4 64-bit   ⊗ 0 ⚠ 0   python

assignment05.py   Output.txt   Python   X

```
Random Pingable IPs:    192.168.152.127

PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 05> python assignment05.py

Enter an IP address:    192.168.155.68/28

IP address:             192.168.155.68 (11000000.10101000.10011011.01000100)

Mask is:                28

Subnet decimal is:      255.255.255.240 (11111111.11111111.11111111.11110000)

Pingable IPs:           192.168.155.64 to 192.168.155.79

Random Pingable IPs:    192.168.155.71

PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 05> python assignment05.py

Enter an IP address:    192.155.155.68/28

IP address:             192.155.155.68 (11000000.10011011.10011011.01000100)

Mask is:                28

Subnet decimal is:      255.255.255.240 (11111111.11111111.11111111.11110000)

Pingable IPs:           192.155.155.64 to 192.155.155.79

Random Pingable IPs:    192.155.155.71

PS C:\Users\HP\Rupesh\PICT\TE SEM 1\CNS Lab\Assignment 05> python assignment05.py

Enter an IP address:    192.155.155.68/24

IP address:             192.155.155.68 (11000000.10011011.10011011.01000100)

Mask is:                24
```

Python 3.9.4 64-bit   ⊗ 0 ⚠ 0   python