LAB REPORT 5

Subject: IPv4 and NMAP

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Class	**CS4283.O21.CTTT.1**
Work division:	
Video link of implementation *(if required)*	
Opinions (if any) + Difficulties encountered + Suggestions, comments...	

[Report content – Export to .PDF file before submitting]

1. **Convert IPv4 Addresses from Dotted Decimal to Binary**

Task 1: Convert decimal numbers to their binary equivalent.

Decimal	Binary
192	11000000
168	10101000
10	00001010
255	11111111
2	00000010

Task 2: Convert the IPv4 addresses to their binary equivalent.

Decimal	Binary
192.168.10.10	11000000.10101000.00001010.00001010
172.16.18.183	10101100.00010000.00010010.10110111
10.86.252.17	00001010.01010110.11111100.00010001
255.255.255.128	11111111.11111111.11111111.10000000
255.255.192.0	11111111.11111111.11000000.00000000

2. **Use Bitwise ANDing Operation to Determine Network Addresses**

Task 3: Determine the number of bits to use to calculate the network address.

Description	Decimal	Binary
IP Address	192.168.10.131/26	11000000.10101000.00001010.10000011
Subnet Mask	255.255.255.192	11111111.11111111.11111111.11 000000
Network Address	192.168.10.128	11000000.10101000.00001010.10000000

In the example above, there are 26 bits are used to calculate the network address.

Task 4: Use the ANDing operation to determine the network address.

a.

Description	Decimal	Binary
IP Address	172.16.145.29	10101100.00010000.10010001.00011101
Subnet Mask	255.255.0.0	11111111.11111111.00000000.00000000
Network Address	172.16.0.0	10101100.00010000.00000000.00000000

b.

Description	Decimal	Binary
IP Address	192.168.10.10	11000000.10101000.00001010.00001010
Subnet Mask	255.255.255.0	11111111.11111111.11111111.00000000
Network Address	192.168.10.0	11000000.10101000.00001010.00000000

3. Apply Network Address Calculations

Task 5: Using command ipconfig to show the IP address of your computer and ask for IP address of your friend's computer (provide the figure of your IP information)

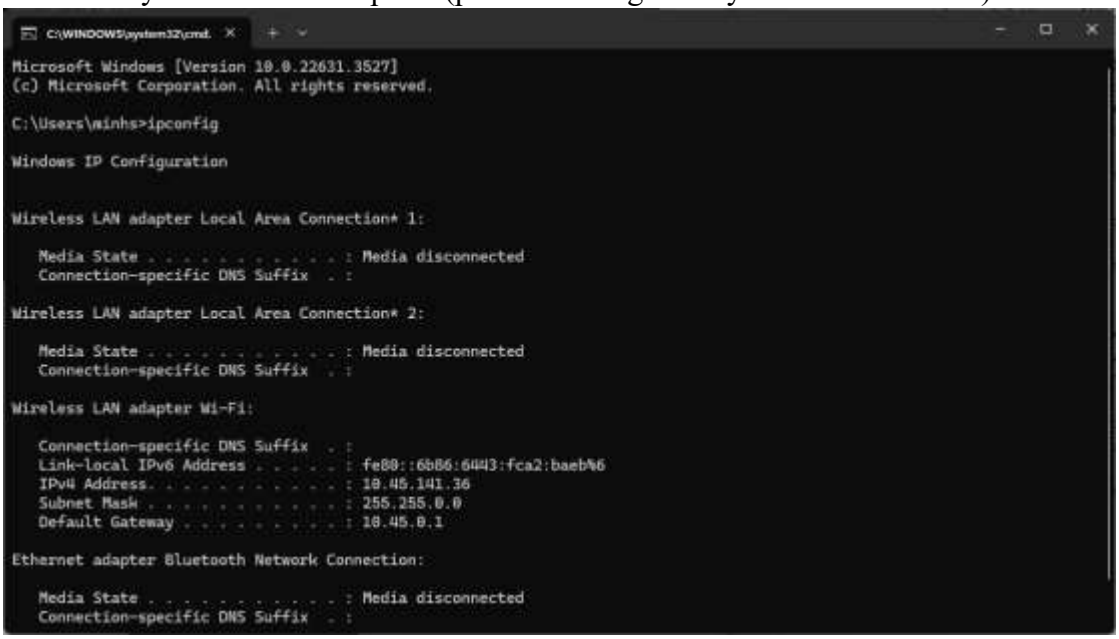

Figure 1. ipconfig of computer

Figure 2. IP address of mobile phone

- What is IP address for your PC?
  → 10.45.141.36
- What is the network address for your PC?
  → 10.45.0.0
- What is IP address for your phone?
  → 172.30.235.188
- What is the network address for your phone?
  → 172.30.0.0
- Will these PCs be able to communicate directly with each other?
  → PCs can communicate directly with each other if they are on the same network and don't have any network restrictions (like firewalls) blocking

communication. However, factors like network configuration and security settings can affect direct communication.

- What is the highest address that can be given to a PC that allows it to be on the same network as your PC?
  → 10.45.255.255
- What is the default gateway address for your PC?
  → 10.45.0.1

4. Identify IPv4 Addresses

Task 6: Analyze the table shown below and identify the network portion and host portion of the given IPv4 addresses.

Key for table:

N = all 8 bits for an octet are in the network portion of the address
n = a bit in the network portion of the address
H = all 8 bits for an octet are in the host portion of the address
h = a bit in the host portion of the address

IP Address/ Prefix	Network/ Host N,n = Network, H,h = Host	Subnet Mask	Network Address
192.168.10.10/24	N.N.N.H	255.255.255.0	192.168.10.0
10.101.99.17/22	N.N.nnnnnnnh.H	255.255.252.0	10.101.96.0
209.165.200.227/27	N.N.N.nnnhhhhh	255.255.255.224	209.165.200.224
172.31.45.252/24	N.N.N.H	255.255.255.0	172.31.45.0
10.1.8.200/26	N.N.N.nnhhhhhh	255.255.255.192	10.1.8.192
94.16.117.77/14	N.N.nnnnhhhh.H	255.252.0.0	94.16.0.0
10.1.1.130/25	N.N.N.nhhhhhhh	255.255.255.128	10.1.1.128
209.165.202.140/28	N.N.N.nnnhhhhh	255.255.255.240	209.165.202.128
192.168.28.45/29	N.N.N.nnnnhhhh	255.255.255.248	192.168.28.40

Task 7: Analyze the table below and list the range of host and broadcast addresses given a network/prefix mask pair.

IP Address/Prefix	First Host Address	Last Host Address	Broadcast Address
192.168.10.10/24	192.168.10.1	192.168.10.254	192.168.10.255
10.101.99.17/22	10.101.96.1	10.101.99.254	10.101.99.255
209.165.200.227/27	209.165.200.225	209.165.200.254	209.165.200.255
172.31.45.252/24	172.31.45.1	172.31.45.254	172.31.45.255
10.1.8.200/26	10.1.8.193	10.1.8.254	10.1.8.255
94.16.117.77/14	94.16.0.1	94.19.255.254	94.19.255.255
10.1.1.130/25	10.1.1.129	10.1.1.254	10.1.1.255
209.165.202.140/28	209.165.202.129	209.165.202.142	209.165.202.143
192.168.28.45/29	192.168.28.41	192.168.28.46	192.168.28.47

5. Classify IPv4 Addresses

Task 8: Analyze the table shown below and identify the type of address (network, host, multicast, or broadcast address).

IP Address	Subnet Mask	Address Type
10.1.1.1	255.255.255.252	host
192.168.33.63	255.255.255.192	broadcast
239.192.1.100	255.252.0.0	multicast
172.25.12.52	255.255.128.0	host
10.255.0.0	255.0.0.0	host
172.16.128.48	255.255.255.240	network

209.165.202.159	255.255.255.224	broadcast
172.16.0.255	255.255.0.0	host

Task 9: Analyze the table shown below and identify the address as public or private.

IP Address/Prefix	Public or Private
209.165.201.30/27	Public
192.168.255.253/24	Private
172.30.1.100/28	Private
192.31.7.11/24	Public
10.100.11.103/16	Private

Task 10: Analyze the table shown below and identify whether the address/prefix pair is a valid host address.

IP Address/Prefix	Valid Host Address?	Reason
127.1.0.10/24	No	Loopback
172.16.255.0/16	Yes	Host address
241.19.10.100/24	No	Reverse
224.0.0.5/16	No	Multicast
192.168.0.254/24	Yes	Host address
192.31.7.255/24	No	Broadcast
64.102.255.255/14	Yes	Host address

6. **Use NMAP to identify the network (Bonus)**

Bonus 1: Do a scan to determine all running hosts in your network.

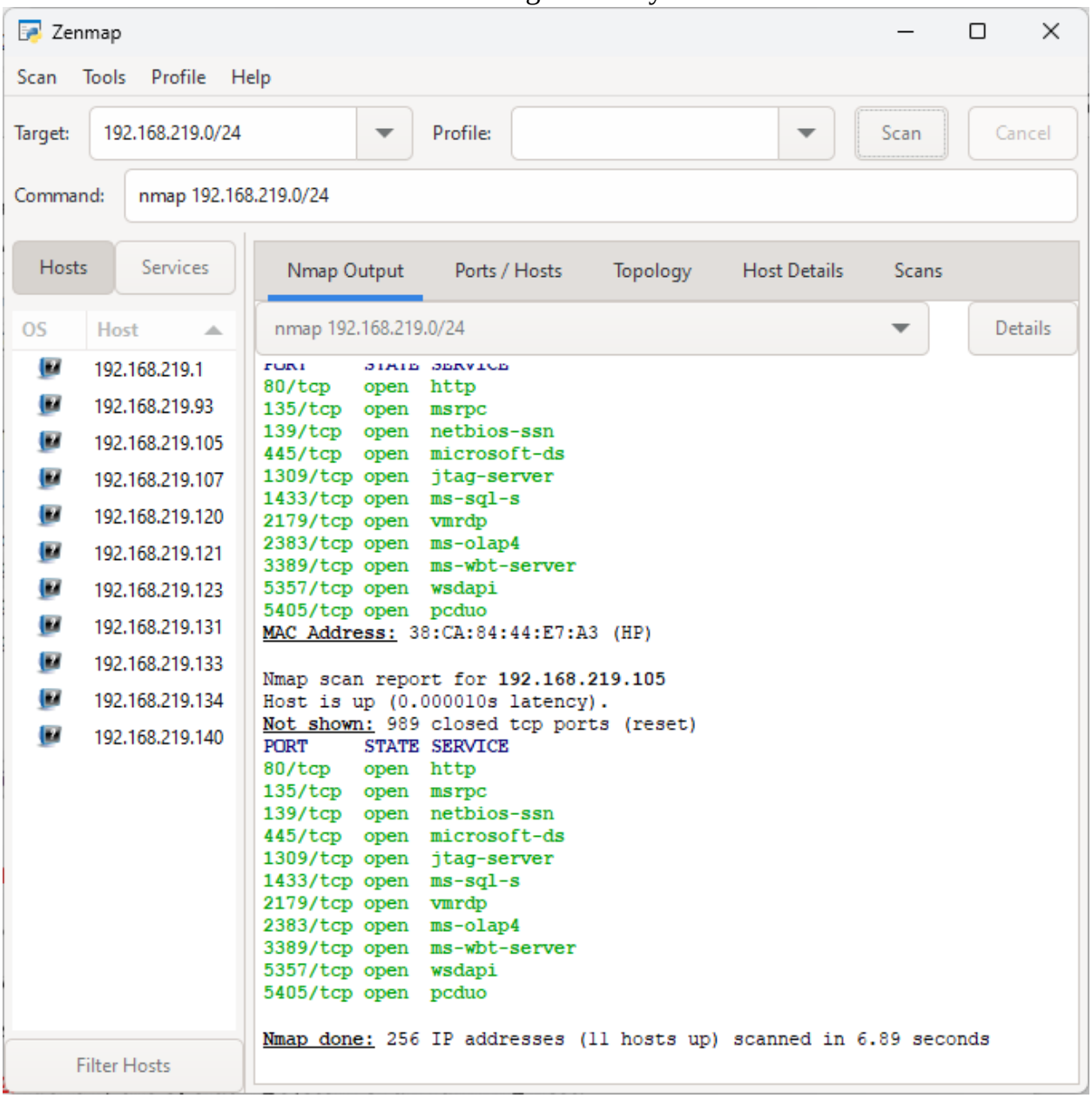

Figure 3. Scan running host

There are 11 hosts are running

192.168.219.1
192.168.219.93
192.168.219.105
192.168.219.107
192.168.219.120

192.168.219.121
192.168.219.123
192.168.219.131
192.168.219.133
192.168.219.134
192.168.219.140

Bonus 2: Identify the operating system of all running host.

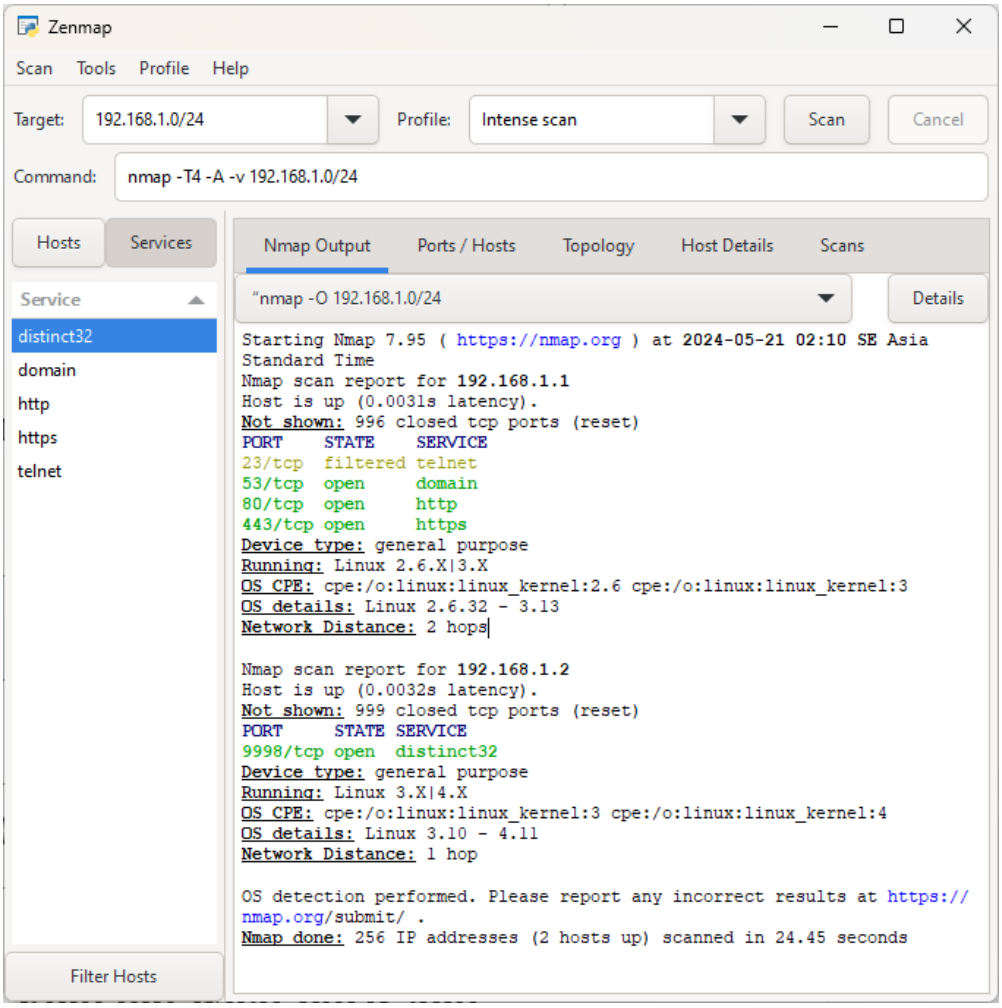

Figure 4. Scan running host

IP Addess	Operating system
192.168.1.1	Linux 2.6.32 - 3.13
192.168.1.2	Linux 3.10 - 4.11

Bonus 3: Identify the IP address of the default gateway. Find out what ports and corresponding services are open on the default gateway?

Port	Service
23/tcp	telnet
53/tcp	domain
80/tcp	http
443/tcp	https