Faculty of Engineering & Technology
Electrical & Computer Engineering Department

ENCS3320-Computer Networks

Project#2

Network Design

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Section:
Rua & Diana 1
Hala 2

Instructor:
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Task0: IP subnetting & Assignment Part

- we will define in a briefly way about Internet Protocol version v4 (IPv4) it is widely used for identifies the devices in a network to let those devices able to be connected and sharing data, it has four octets as shown in Figure 1 , each one with 1Byte .

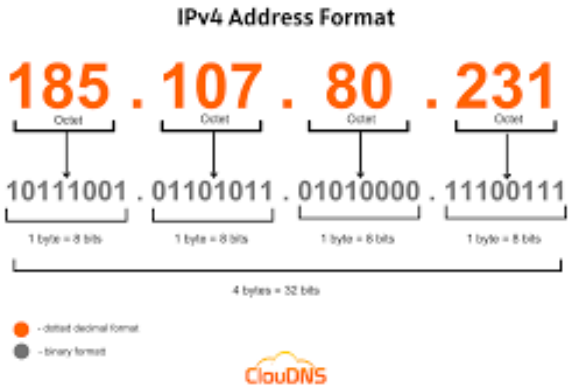


Figure 1: IPv4 format.(source : clou DNS)

- we assign the IP addresses of the routers and end devices with respect to Rua IDs as follows:

Hala ID is 1210312 then the used IP is 112.3.8.0/22.

Then we designed the required IP addressing scheme and subnets using the above address space and the number of devices in Table 1 and the topology given in Figure 2

Network	Number of Hosts
NET2	60
NET1	20
NET3	30
NET4	10

Table 1: Number of hosts (Laptops, PCs, and Servers) per network excluding the router interface.

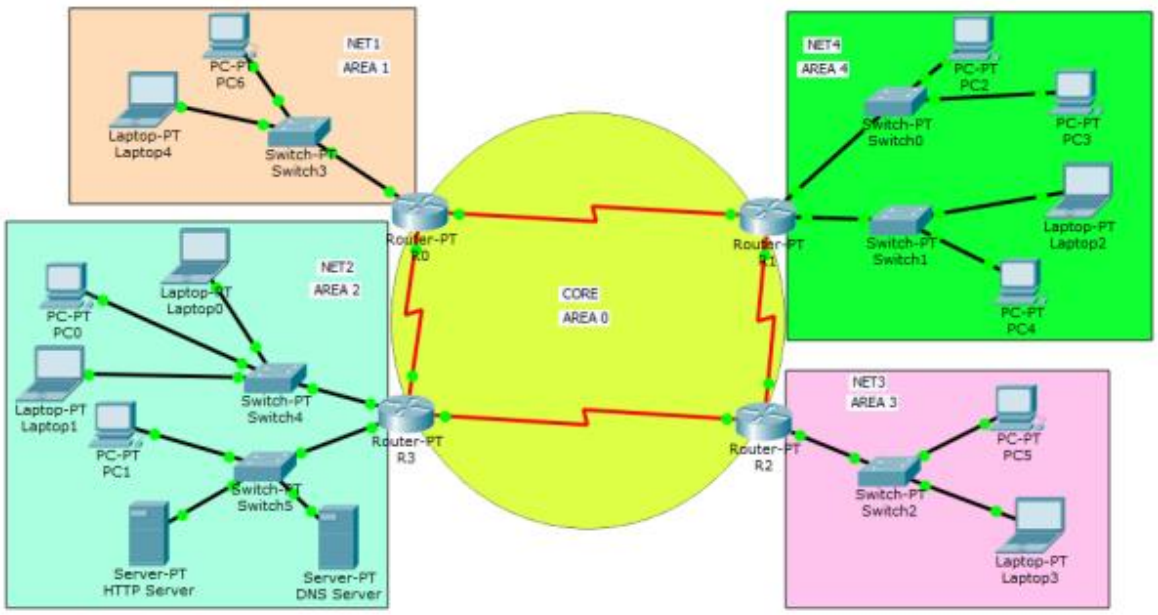


Figure 2: Network Topology

IP addresses:

112.3.8.0/22. From this IP we will design the IP addresses for :

1. NET1: 1 PC, 1 Laptop, and 1 Switch.
2. NET2: 2 Servers, 2 Switches, 2 PCs, and 2 Laptops.
3. NET3: 1 PC, 1 Laptop, and 1 Switch.
4. NET4: 3 PCs, 1 Laptop, and 2 Switches.
5. CORE: 4 Routers with proper interfaces.

Processing :

actually we have 8 = 4 network + 4 link → then we need 3 bit .

112.3.8.0/22 →112.3.00001000.00000000

For NET1 we will need 5 bits → 20+2 = 22

For the first interface in NET2 we will need 5 bits → 30+2 = 32

For the second interface in NET2 we will need 5 bits → 30+2 = 32

For NET3 we will need 5 bits → 30+2 = 32

For the first interface in NET4 we will need 3 bits → 5+2 = 7

For the second interface in NET2 we will need 5 bits → 5+2 =7

For R0-R1, R1-R2,R2-R3, R3-R0, we will need 2 bits .

Then the IP's will be as following from the NET that has highest hosts number to the lowest one:

NET2(First Interface) → 112.3. 00001000.00000000→112.3.8.0/27

NET2(second Interface) → 112.3. 00001000.00100000→112.3.8.32/27

NET3→ 112.3. 00001000.01000000→112.3.8.64/27

NET1→ 112.3. 00001000.01100000→112.3.8.96/27

NET4(First Interface) → 112.3. 00001000.10000000→112.3.8.128/29

NET4(second Interface) → 112.3. 00001000.10001000→112.3.8.136/29

R0-R1→ 112.3. 00001000. 10010000→112.3.8.144/30

R1-R2→ 112.3. 00001000. 10010100→112.3.8.148/30

R2-R3→ 112.3. 00001000. 10011000→112.3.8.152/30

R3-R0→ 112.3. 00001000. 10011100→112.3.8.156/30

Now I will give each device in the topology an IP :

NET 2 :

IP network → 112.3. 00001000.00000000→112.3.8.0/27

NET2(First Interface) → 112.3. 00001000.00000000→112.3.8.0/27

IP for Switch4is 112.3. 00001000.00000001→112.3.8.1/27

IP for Laptop0 is 112.3. 00001000.00000010→112.3.8.2/27

IP for PC0 is 112.3. 00001000.00000011→112.3.8.3/27

IP for Laptop1 is 112.3. 00001000.00000100→112.3.8.4/27

NET2(second Interface) → 112.3. 00001000.00100000→112.3.8.32/27

IP for Switch5 is 112.3. 00001000.00100001→112.3.8.33/27

IP for PC1 is 112.3. 00001000.00100010→112.3.8.34/27

IP for HTTP Server is 112.3. 00001000.00100011→112.3.8.35/27

IP for DNS Server is 112.3. 00001000.00100100→112.3.8.36/27

NET 3 :

NET3→ 112.3. 00001000.01000000→112.3.8.64/27

IP for Switch2 is 112.3. 00001000.01000001→112.3.8.65/27

IP for Laptop3 is 112.3. 00001000.01000010→112.3.8.66/27

IP for PC5 is 112.3. 00001000.01000011→112.3.8.67/27

NET 1 :

NET1→ 112.3. 00001000.01100000→112.3.8.96/27

IP for Switch3 is 112.3. 00001000.01100001→112.3.8.97/27

IP for PC6 is 112.3. 00001000.01100010→112.3.8.98/27

IP for Laptop4 is 112.3. 00001000.01100011→112.3.8.99/27

NET4:

NET4(First Interface) → 112.3. 00001000.10000000→112.3.8.128/29

IP for Switch0 is 112.3.17. 00001000.10000001→112.3.8.129/29

IP for PC2 is 112.3. 00001000.10000010→112.3.8.130/29

IP for PC3 is 112.3. 00001000.10000011→112.3.8.131/29

NET4(second Interface) → 112.3. 00001000.10001000→112.3.8.136/29

IP for Switch1 is 112.3. 00001000.10001001→112.3.8.137/29

IP for Laptop2 is 112.3. 00001000.10001010→112.3.8.138/29

IP for PC4 is 112.3. 00001000.10001011→112.3.8.139/29

Subnet	Subnet Mask "/x"	Network IP	Broadcast IP	First IP	Last IP	#hosts
NET2(First Interface)	255.255.255.224/27	112.3.8.0	112.3.8.31	112.3.8.1	112.3.8.30	30
NET2(second Interface)	255.255.255.224/27	112.3.8.32	112.3.8.63	112.3.8.33	112.3.8.62	30
NET3	255.255.255.224/27	112.3.8.64	112.3.8.95	112.3.8.65	112.3.8.94	30
NET1	255.255.255.224/27	112.3.8.96	112.3.8.127	112.3.8.97	112.3.8.126	30
NET4(First Interface)	255.255.255.248/29	112.3.8.128	112.3.8.135	112.3.8.129	112.3.8.134	6
NET4(second Interface)	255.255.255.248/29	112.3.8.136	112.3.8.143	112.3.8.137	112.3.8.142	6
R0-R1 Link	255.255.255.252/30	112.3.8.144	112.3.8.147	112.3.8.145	112.3.8.146	2
R1-R2 Link	255.255.255.252/30	112.3.8.148	112.3.8.151	112.3.8.149	112.3.8.150	2
R2-R3 Link	255.255.255.252/30	112.3.8.152	112.3.8.155	112.3.8.153	112.3.8.154	2
R3-R0 Link	255.255.255.252/30	112.3.8.156	112.3.8.159	112.3.8.157	112.3.8.158	2

Table 2:Subneting details

Task1: Building Topology Part

1- We Built the topology given in Figure 2 using packet tracer based on the IP addressing that we designed in Task0

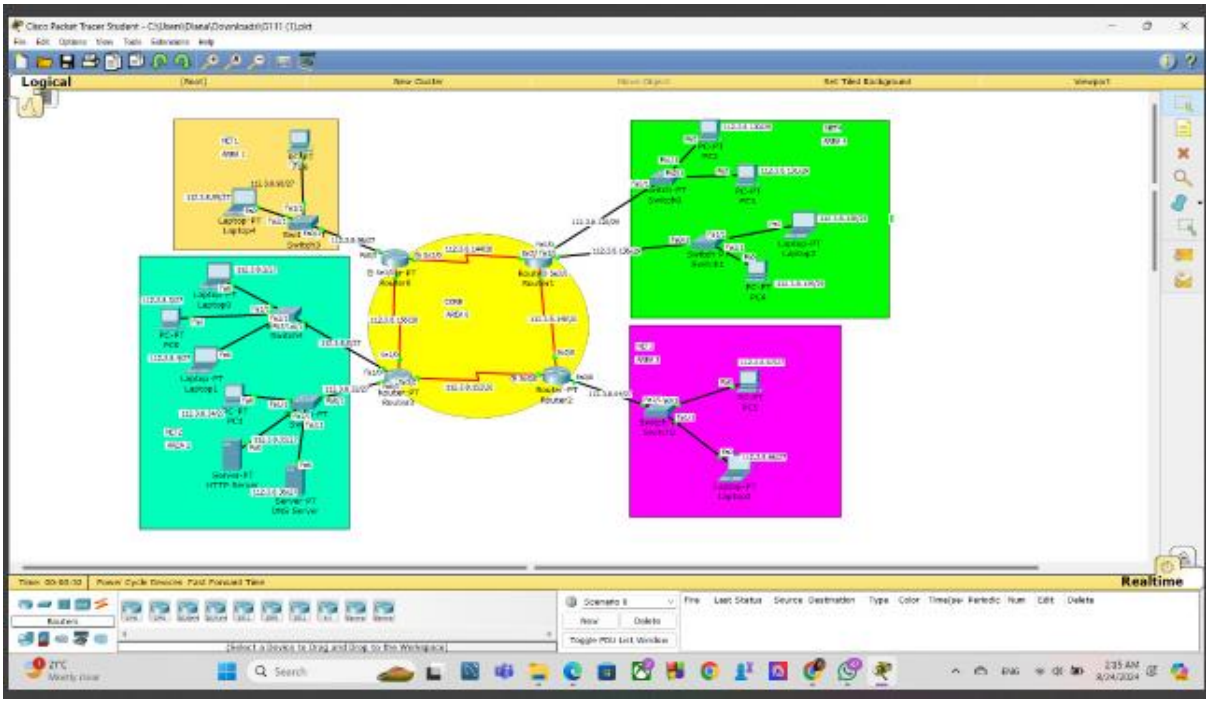


Figure 3:Network Topology after addressing

- NET1 : Orange AREA1
- NET2 : Blue AREA2
- NET4 : Green AREA4
- NET3 : Pink AREA3
- Core : Yellow AREA0

Then we Configured the interfaces of all routers as instructed in Figure 2.

Routers:

Router0:

For Router (R0), the FastEthernet0/0 interface has been assigned the IP address 112.3.8.96 with a subnet mask of 255.255.255.224.By using the commands(configure terminal , no shutdown ,enable ,interface , IP address ,exit) as shown in Figure 4 and 5. TheSerial3/0 port on the same router has been assigned an IP address of 112.3.8.156 , using a subnet mask of 255.255.255.252. These configurations are illustrated in Figures 6, and 7.

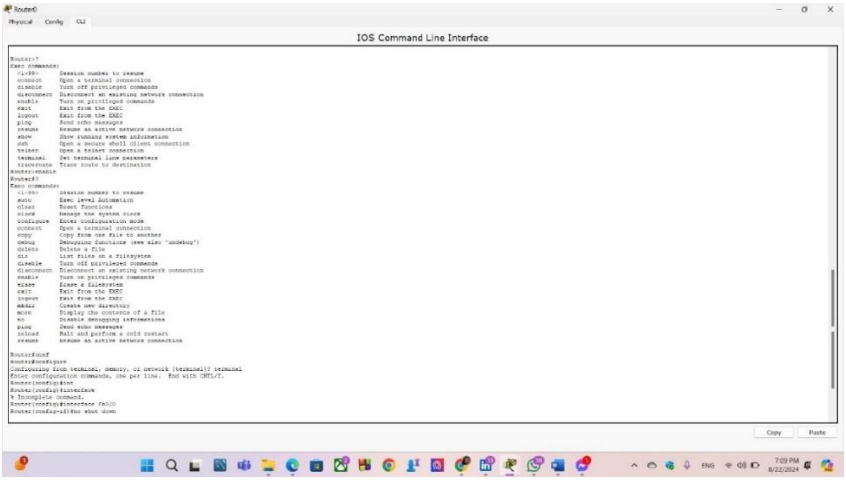


Figure 4: Commands For FastEthernet0/0 Configration part one.

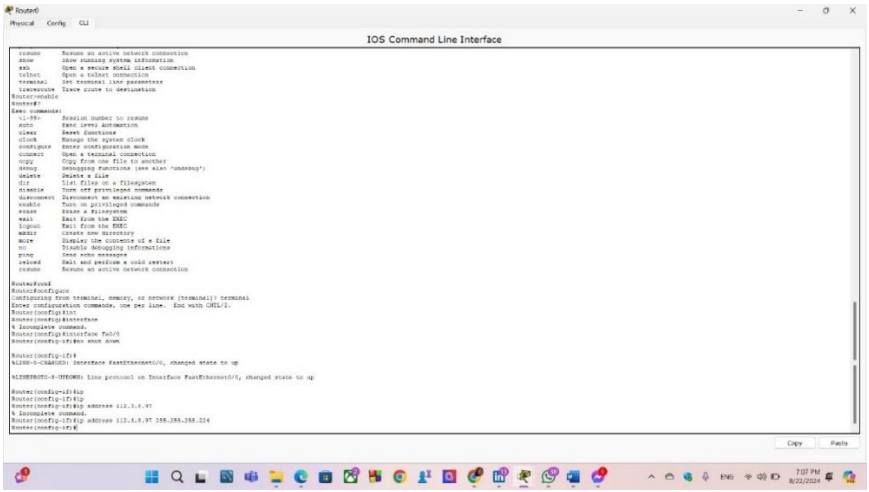


Figure 5:Figure 4: Commands For FastEthernet0/0 Configurations part tow.

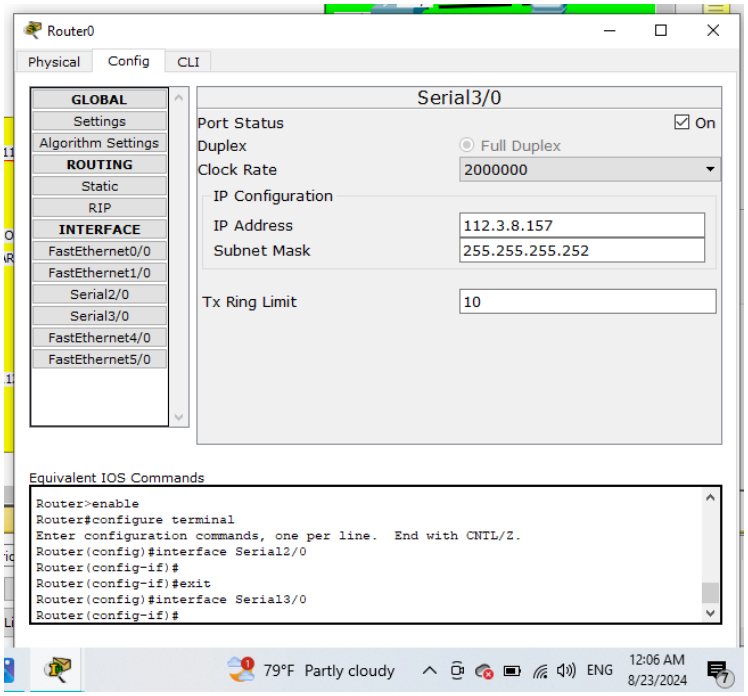


Figure 6: configuration for Serial 3/0 in R0 .

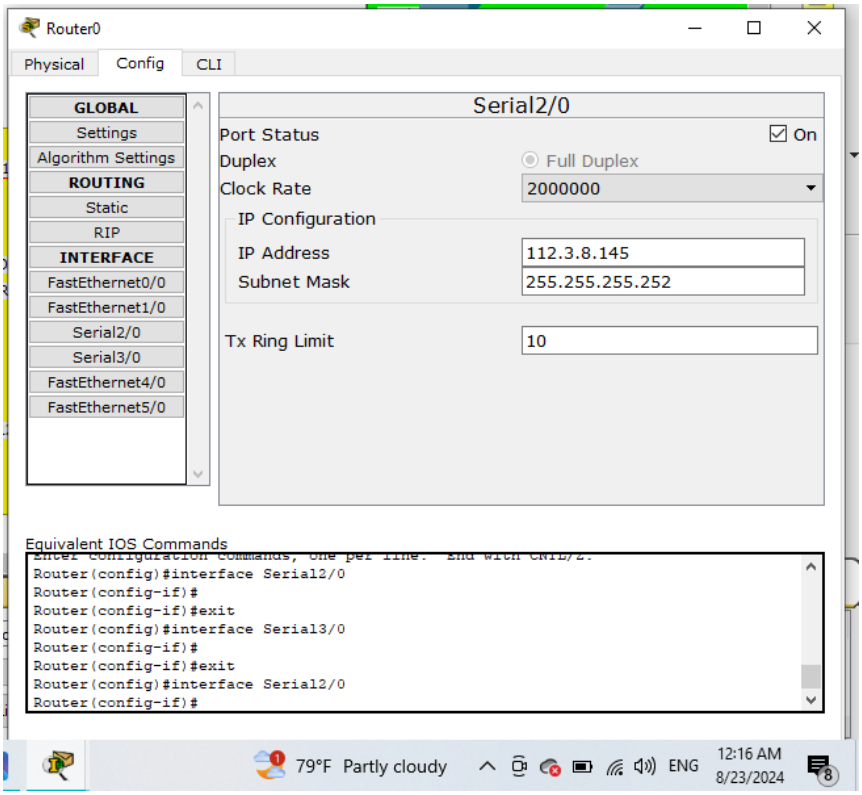


Figure 7:configuration for Serial 2/0 in R0 .

Router1:

For Router (R1), the FastEthernet0/0 interface has been assigned the IP address 112.3.8.129 with a subnet mask of 255.255.255.248 as shown in Figure 8 . the FastEthernet1/0 interface has been assigned the IP address 112.3.8.137 with a subnet mask of 255.255.255.248 as shown in Figure 8 . Serial3/0 port on the same router has been assigned an IP address of 112.3.8.149 , using a subnet mask of 255.255.255.252 as shown in Figure 9. Serial2/0 port on the same router has been assigned an IP address of 112.3.8.146 , using a subnet mask of 255.255.255.252 as shown in Figure 10. . Serial 3/0 port on the same router has been assigned an IP address of 112.3.8.149 , using a subnet mask of 255.255.255.252 as shown in Figure 11.

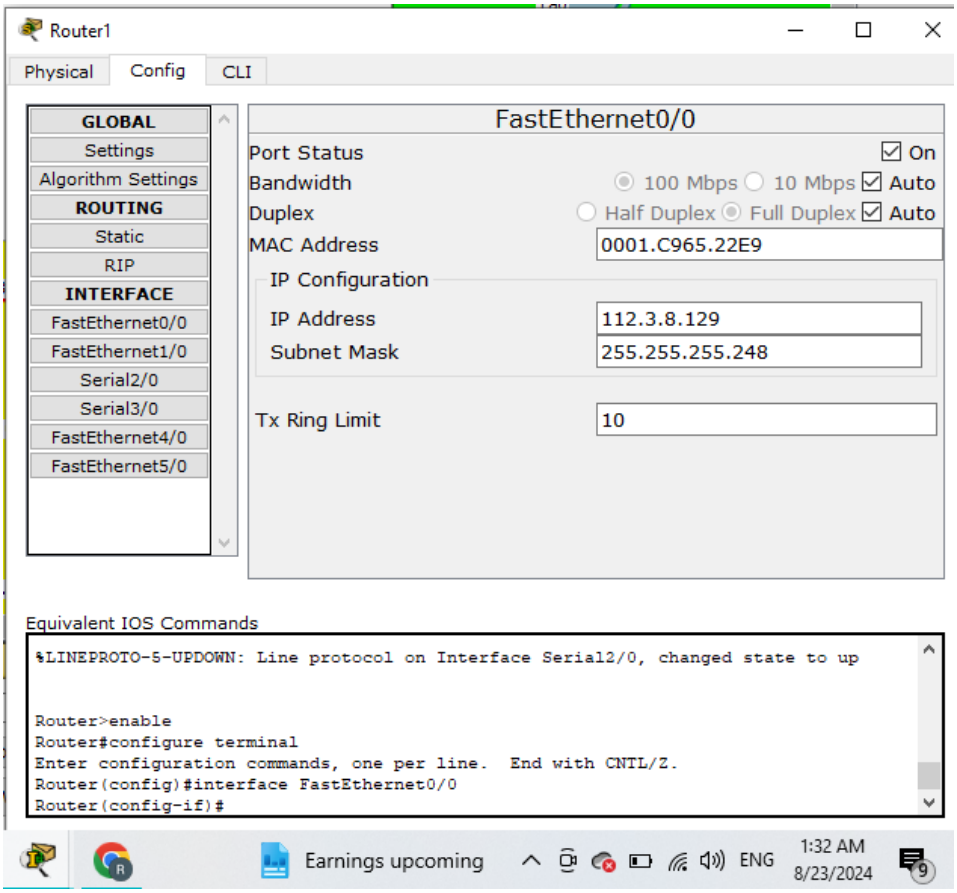


Figure 8:Router1 FastEthernet0/0 Configurations part tow.

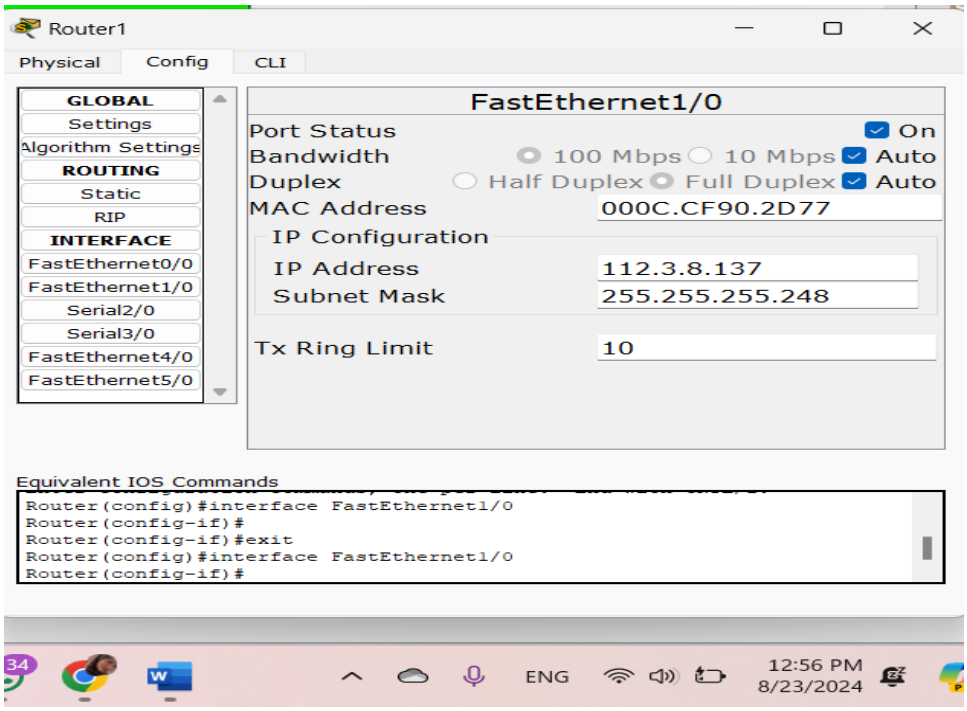


Figure 9:Router1 FastEthernet1/0 Configurations part tow.

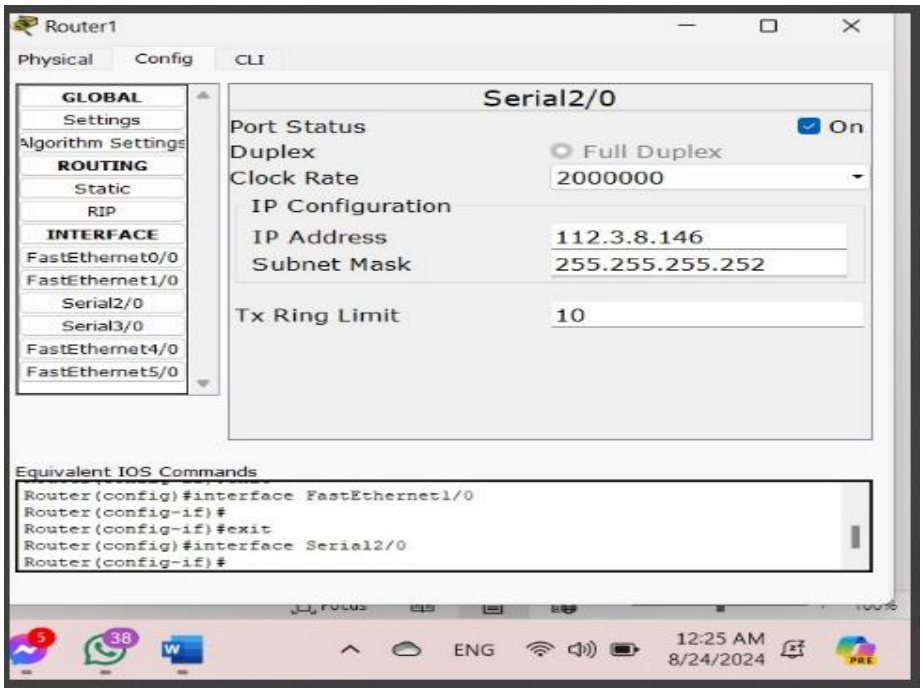


Figure 10:configuration for serial 2/0 in R1.

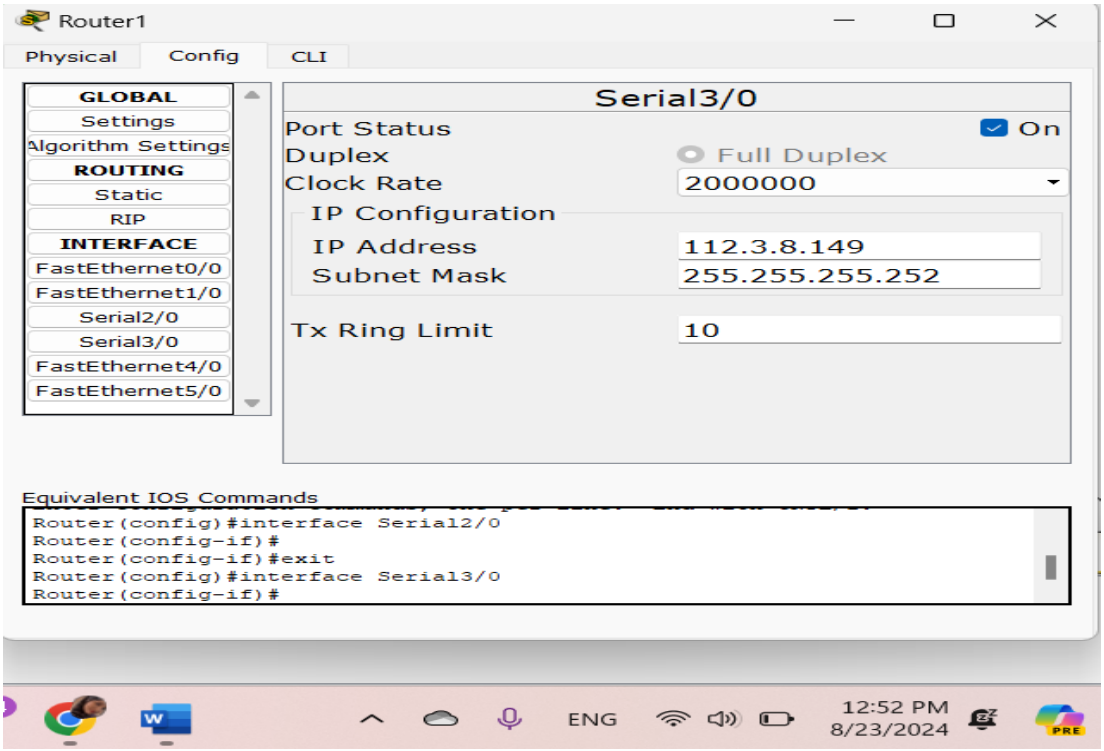


Figure 11:Configuration for serial 3/0 in R1.

Router2:

For Router (R2), the FastEthernet0/0 interface has been assigned the IP address 112.3.8.65 with a subnet mask of 255.255.255.224 as shown in Figure 12 . TheSerial3/0 port on the same router has been assigned an IP address of 112.3.8.154 , using a subnet mask of 255.255.255.252. The Serial 2/0 port on the same router has been assigned an IP address of 112.3.8.150 , using a subnet mask of 255.255.255.252. These configurations are illustrated in Figures 13, and 14.

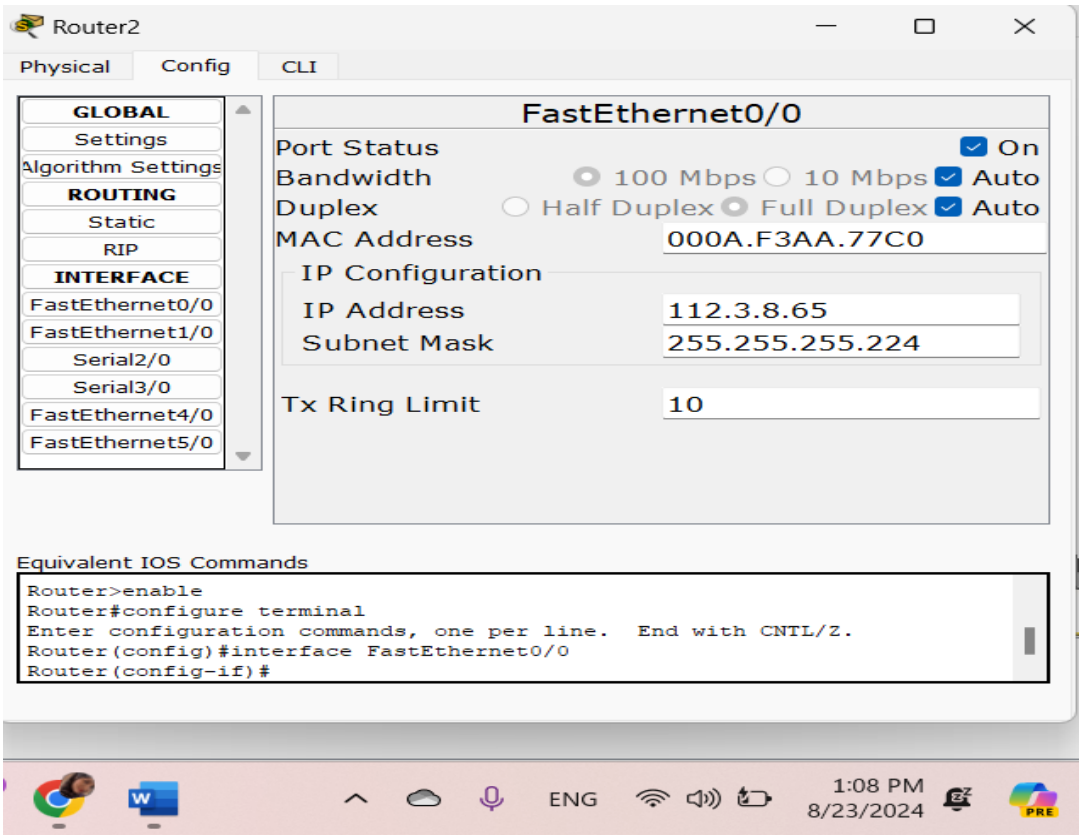


Figure 12:Router2 FastEthernet0/0 Configurations part tow.

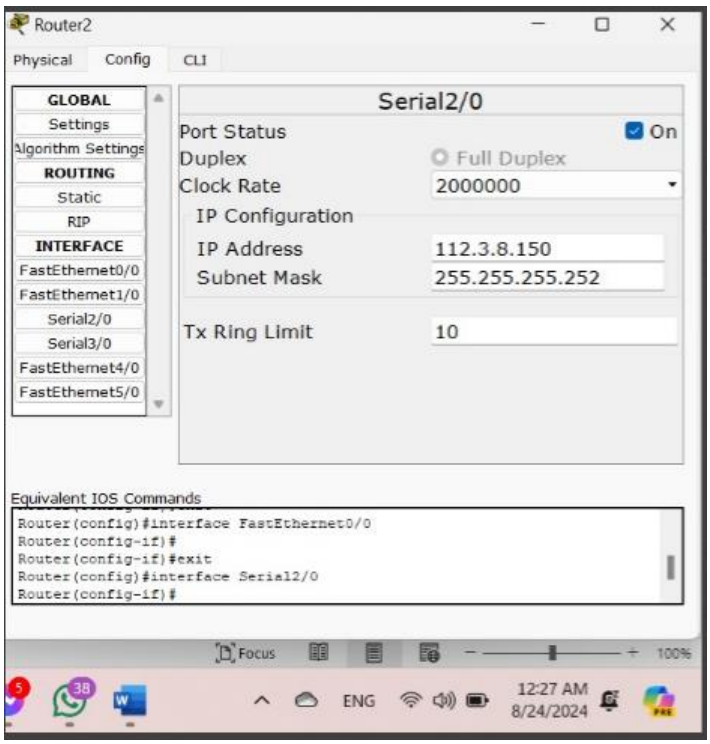


Figure 13:configuration for serial 2/0 in R2.

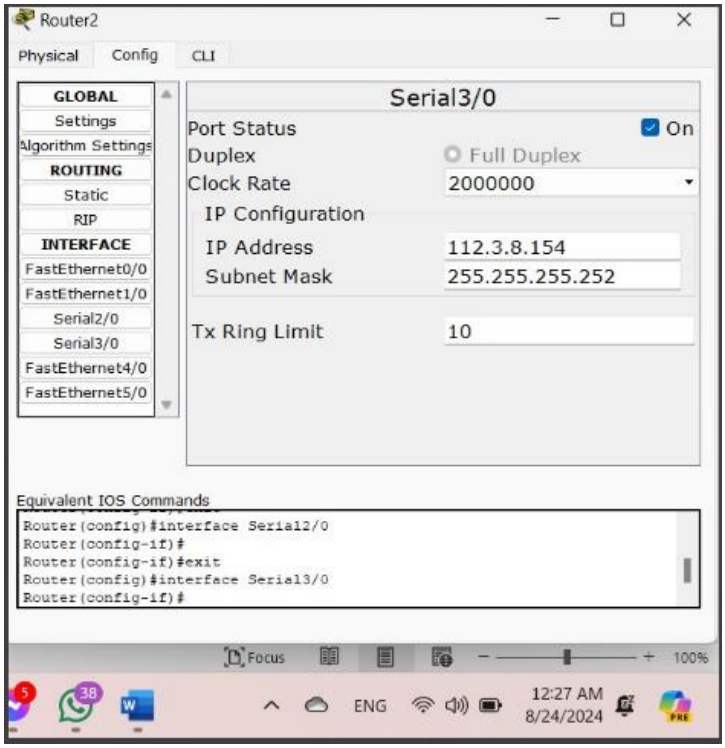


Figure 14:configuration for serial 3/0 in R2.

Router3:

For Router (R3), the FastEthernet0/0 interface has been assigned the IP address 112.3.8.33, the FastEthernet1/0 interface has been assigned the IP address 112.3.8.1 with a subnet mask of 255.255.255.224. TheSerial3/0 port on the same router has been assigned an IP address of 112.3.8.153 , using a subnet mask of 255.255.255.252. TheSerial2/0 port on the same router has been assigned an IP address of 112.3.8.158 , using a subnet mask of 255.255.255.252. These configurations are illustrated in Figures 15, 16,18 and 17.

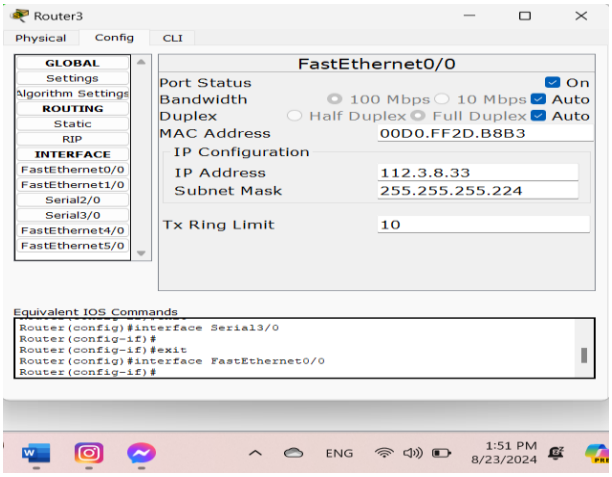


Figure 15:Router3 FastEthernet0/0 Configurations .

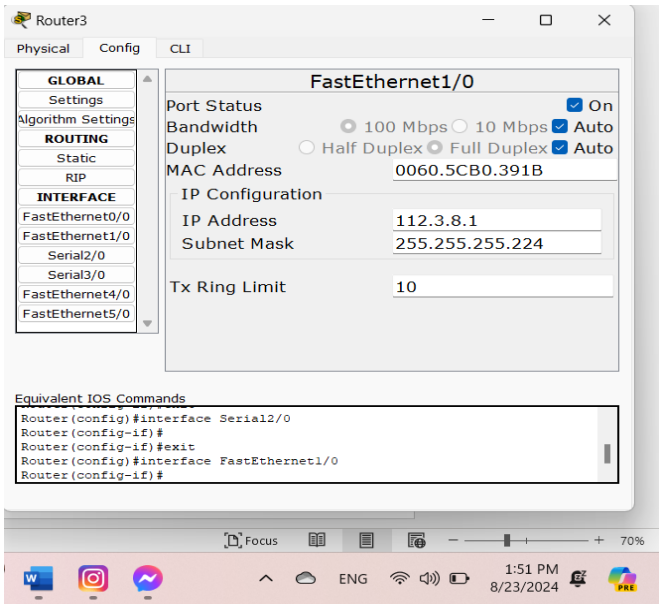


Figure 16:Router3 FastEthernet1/0 Configurations .

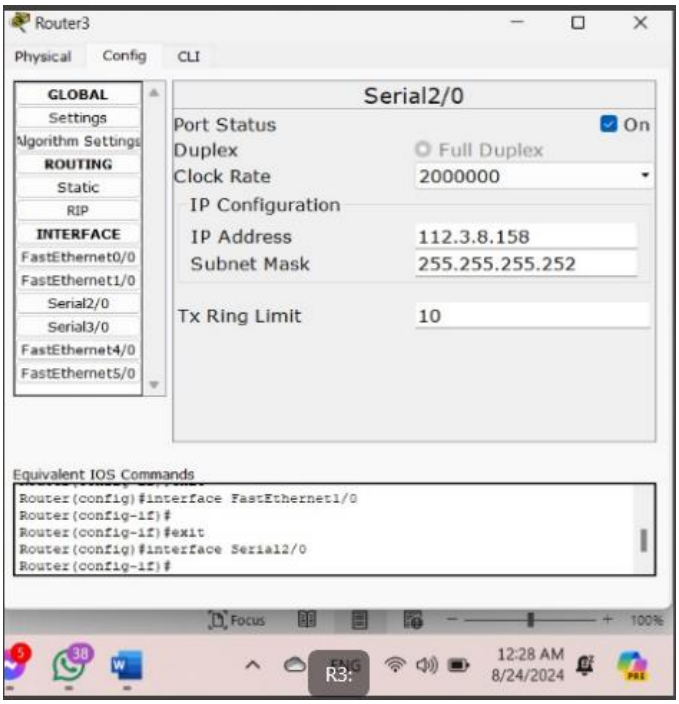


Figure 17:configuration for serial 2/0 in R3.

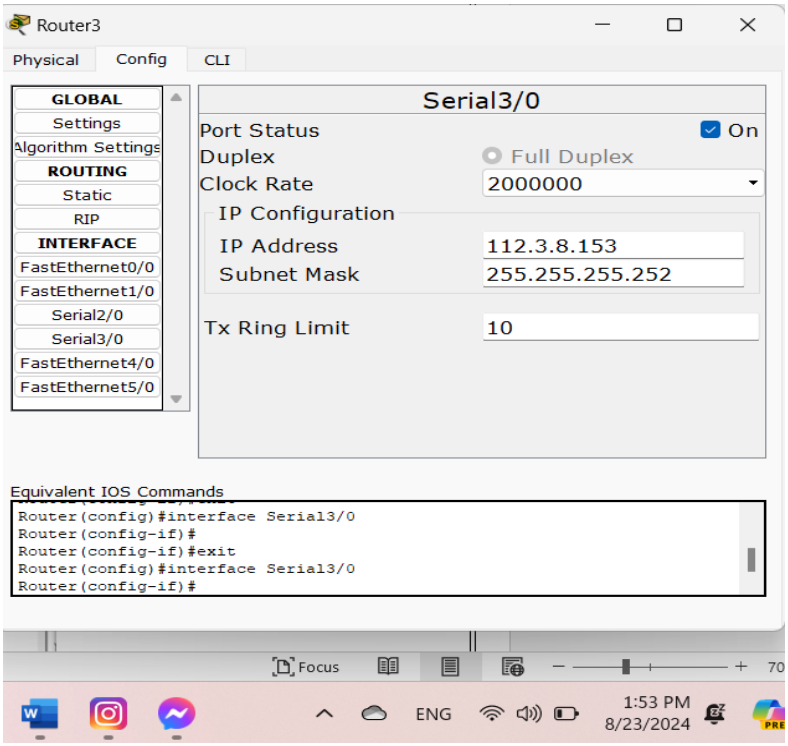


Figure 18:configuration for serial 3/0 in R3.

PC & Laptop configuration:

In this part we defined the PC's and the Laptops configuration depends on Faster eathrnet as a Default gateway in a static way and depends on the Networks IP's in Table 2.

To each Pc and laptop we added an IP address include the range if it's interface Networok IP, the subnet mask,Finally the DNS server IP which is the same for all end devices.

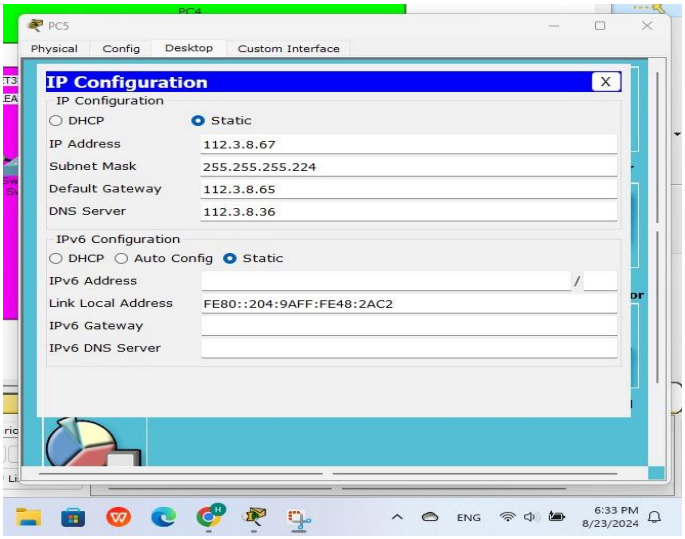


Figure 19:PC5 Configuration.

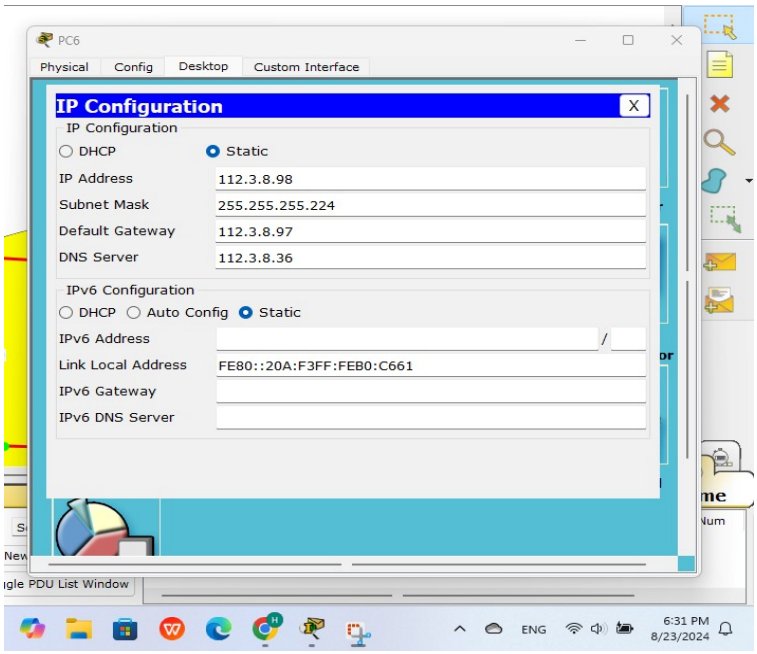


Figure 20:PC6 Configuration.

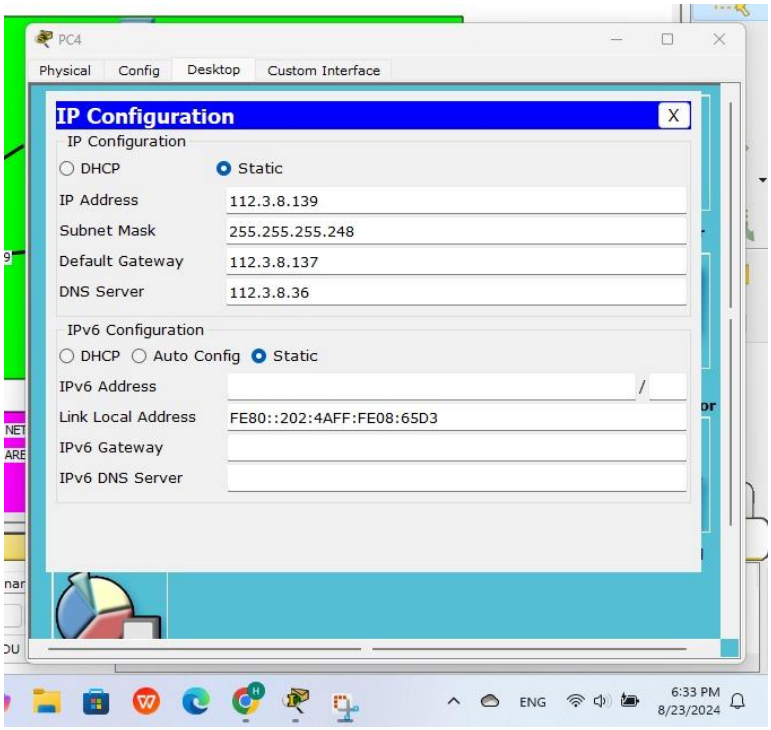


Figure 22:PC4 Configuration.

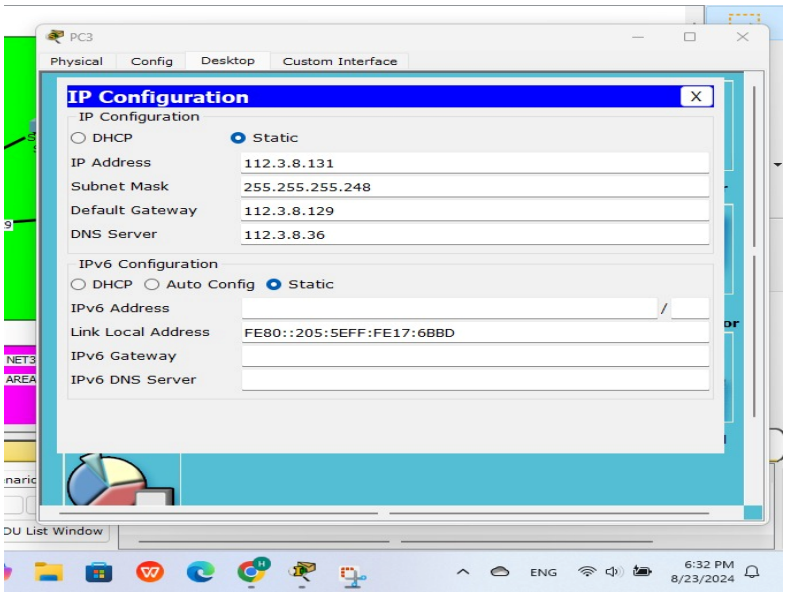


Figure 21:PC3 Configuration.

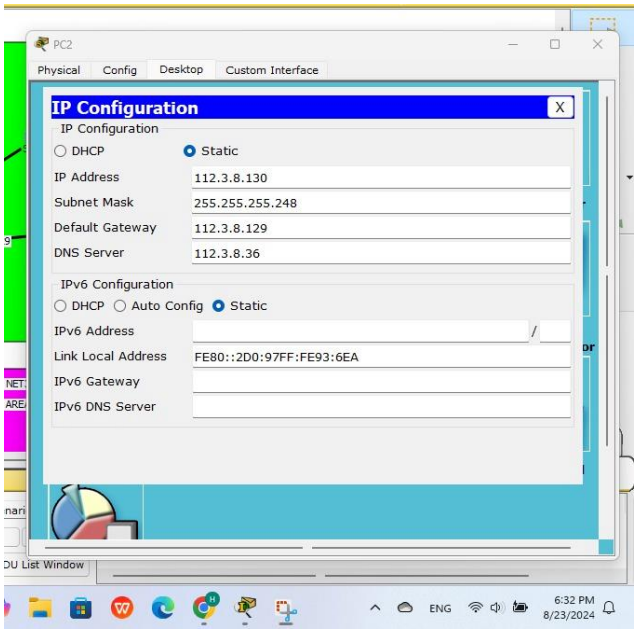


Figure 23:PC2 Configuration.

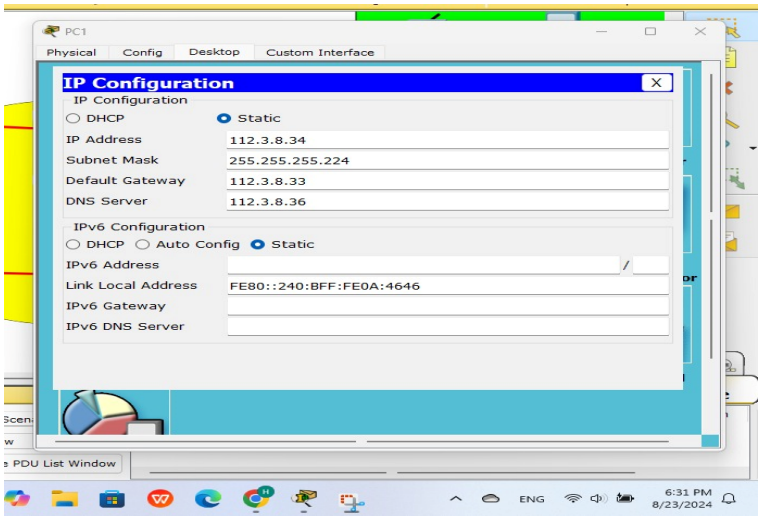


Figure 24:PC1 Configuration

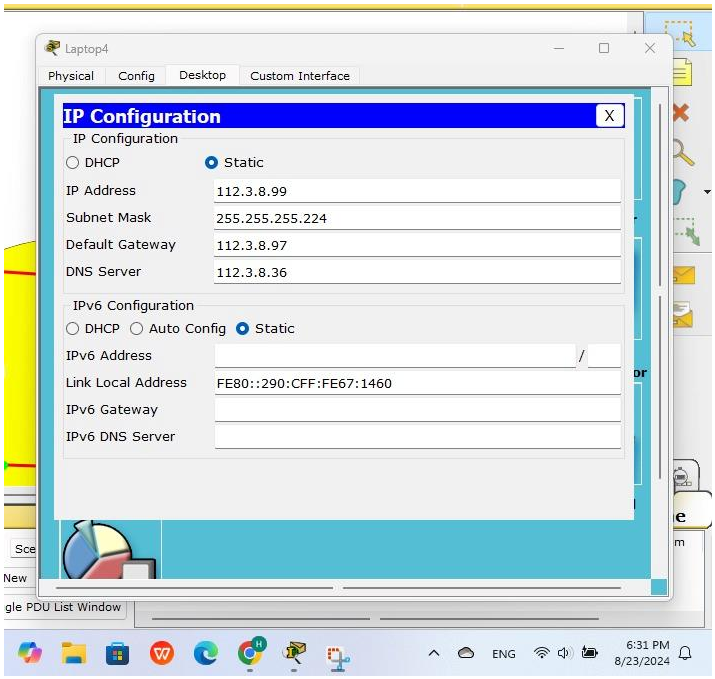


Figure 25:Laptop4 Configuration.

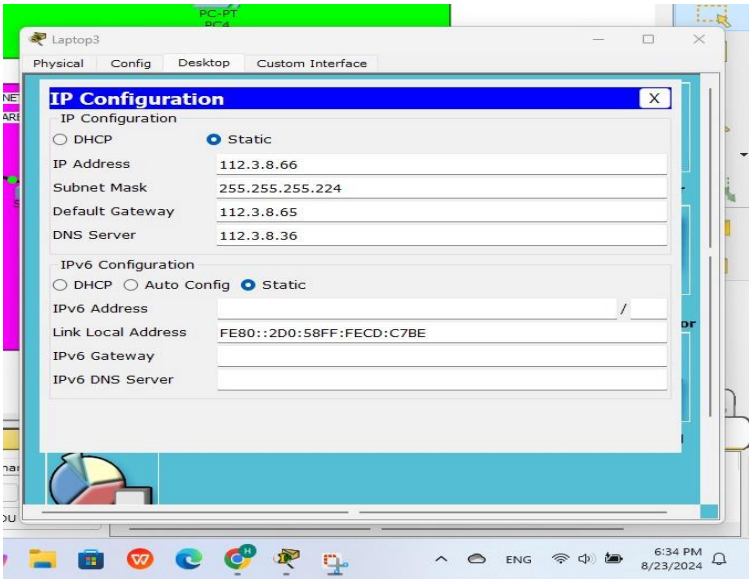


Figure 26:Laptop3 Configuration.

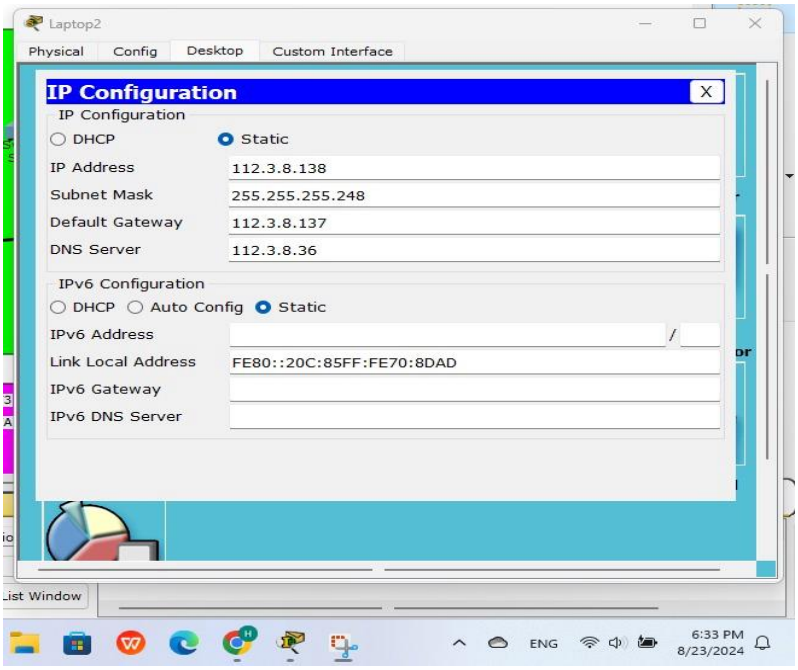


Figure 27::Laptop2 Configuration.

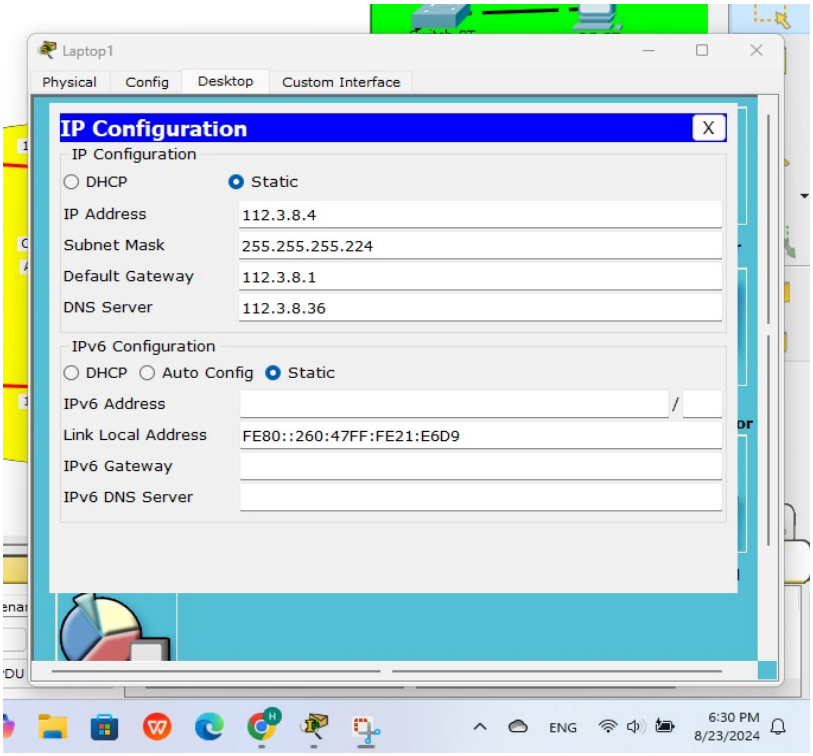


Figure28::Laptop1 Configuration.

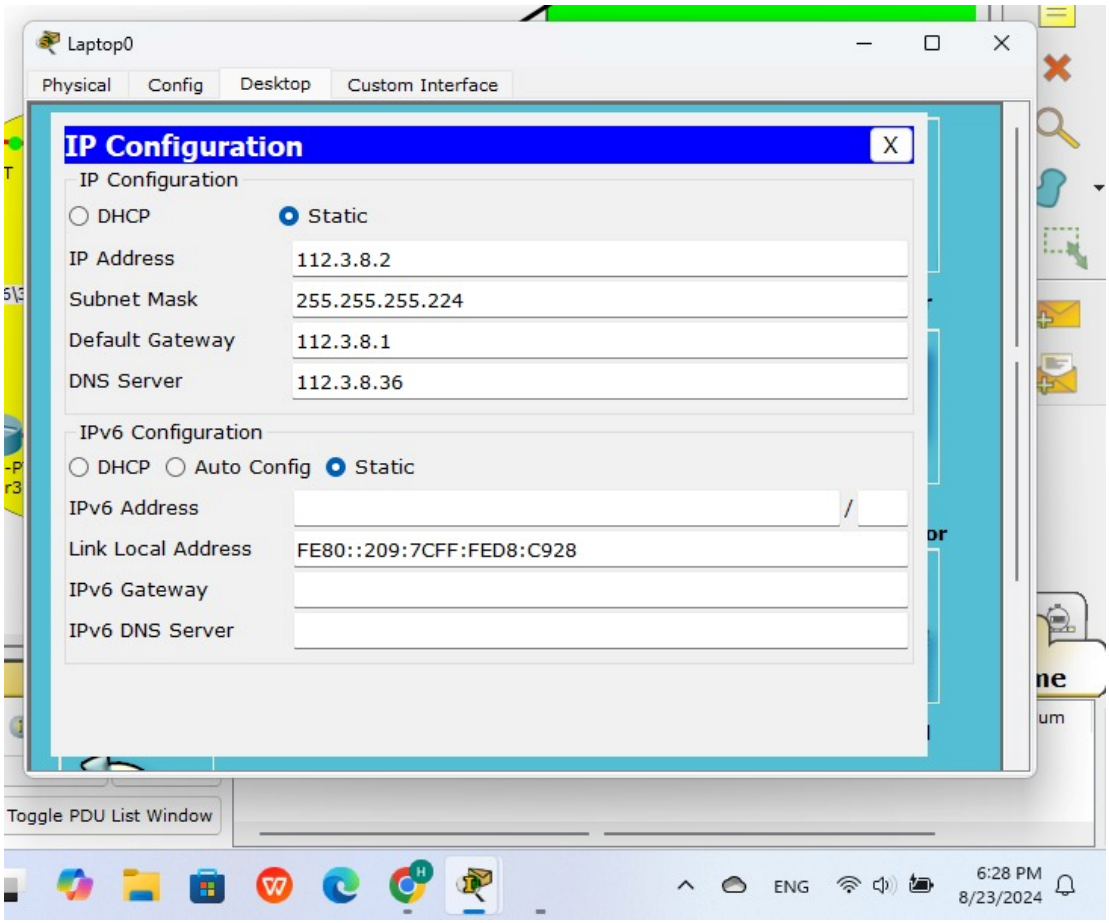


Figure 27:Laptop0 configuration.

Task 2 Setting-up Servers Part:

In this part we have Two servers that are used in this topology: HTTP/WEB server and DNS server in NET2.

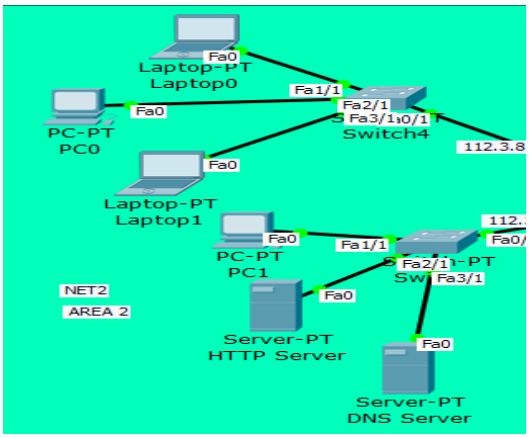


Figure 28:HTTP/WEB server and DNS server in NET2.

then Configure the DNS server and WEB server with domain name www.ENCS3320Summer.com:

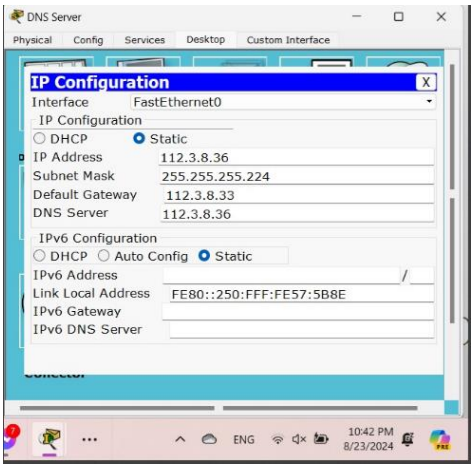


Figure 30:HTTP server IP Configuration.

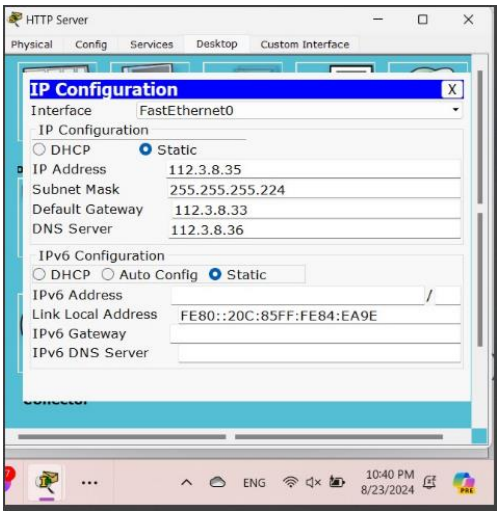


Figure 29:DNS server IP Configuration.

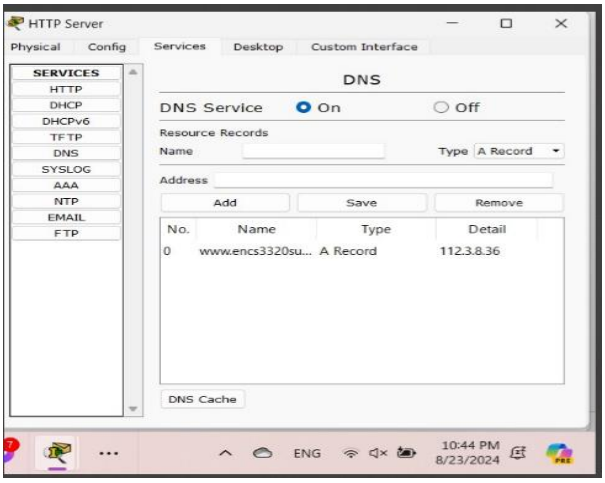


Figure 32:HTTP Domain name.

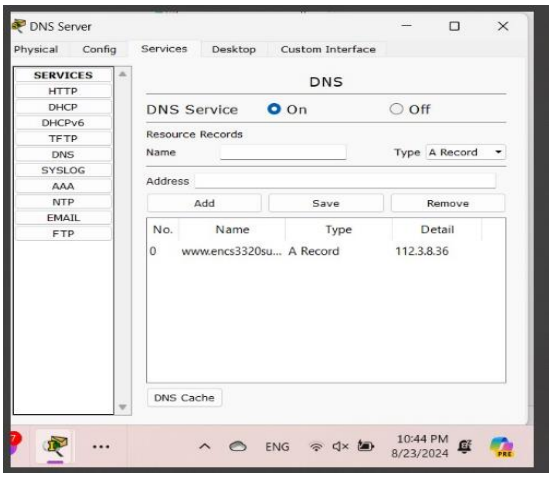


Figure 31:DNS Domain name.

Then I Create our website by modifying the index.html file in the HTTP server. And our website Contained:

- “ENCS3320-Summer Course Website” in the title.
- “Welcome to Computer Networks”
- Group members’ names and IDs.

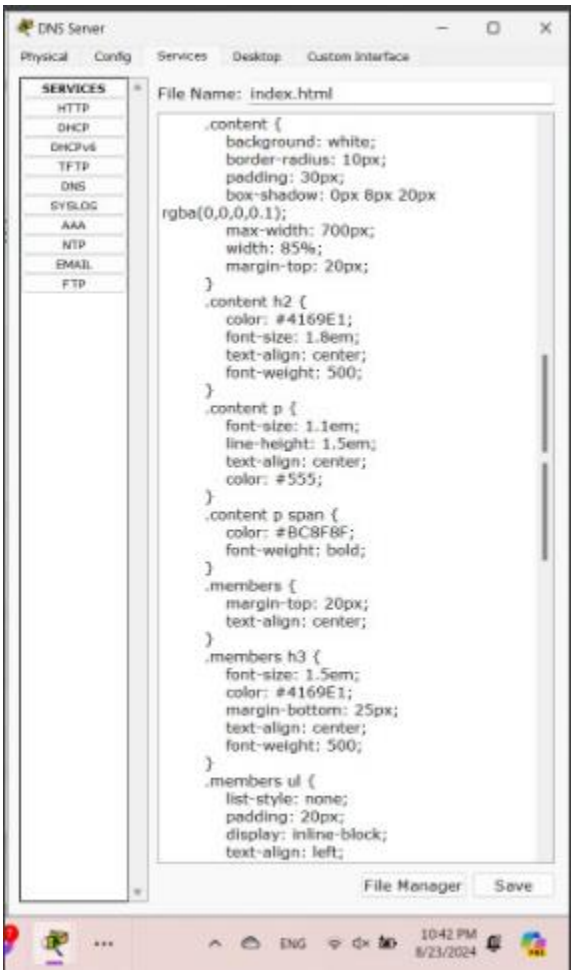
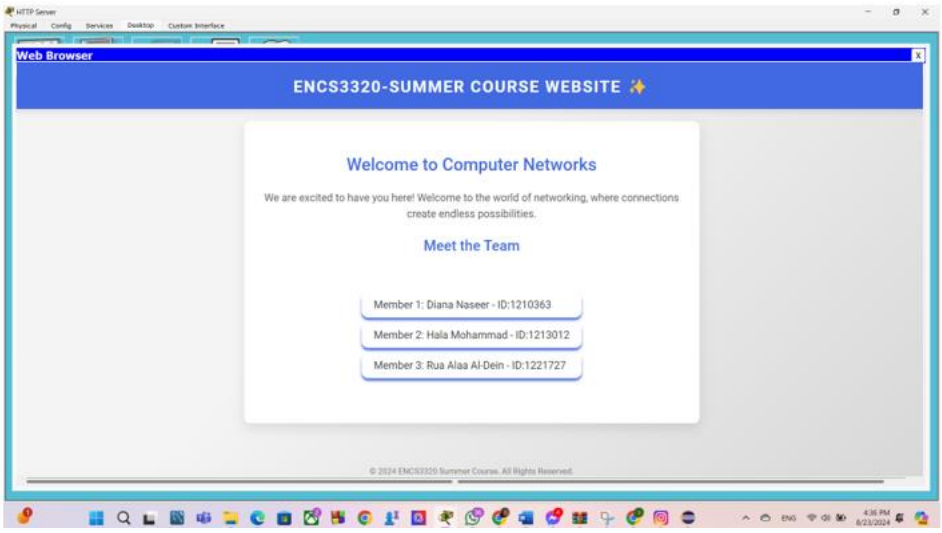


Figure 34: html code in HTTP server (1).

Figure 33: html code in HTTP server (2).

Figure 35:html page (index html)



Task3 Routing Part:

“Open Shortest Path First (OSPF) is an IP routing protocol that uses a mathematical algorithm to calculate the most efficient path to direct traffic on IP networks”[2].

In this part we used OSPF protocol to let all devices contact with each other using the core area 0.

For each router we defined the directly connected interfaces with it using network command in OSPF protocol and to be sure that our setting is correct we used sh ip protocol which will give us routing for network.

note for each router we used first these commands before network command :

Enable→ configuration terminal →router ospf < process ID 20> →network <Network IP wildcard mask area #area> sh ip protocol.

Router 0:

The network IP’s for Router 0:

network 112.3.8.96 0.0.0.31 area 1

network 112.3.8.156 0.0.0.3 area 0

network 112.3.8.144 0.0.0.3 area 0

By these commands we connected 112.3.8.96 with area 1, 112.3.8. 156 and 112.3.8.144 with area 0.

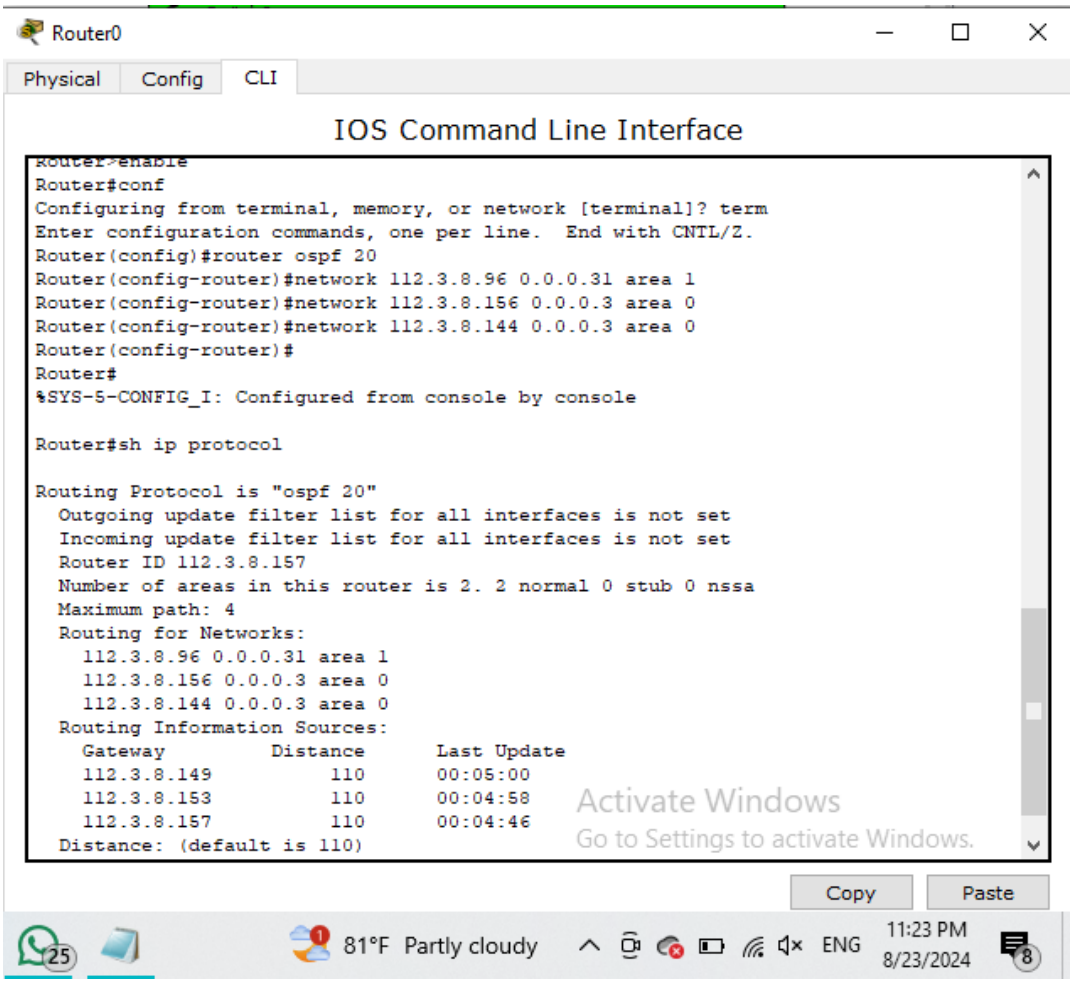


Figure 36: OSPF protocol for R0 with sh ip protocol command

Router 1 :

The IP's network for Router 1:

network 112.3.8.144 0.0.0.3 area 0

network 112.3.8.148 0.0.0.3 area 0

network 112.3.8.128 0.0.0.7 area 4

network 112.3.8.136 0.0.0.7 area 4

By these commands we connected 112.3.8.128 and 112.3.8.136 with area 4, 112.3.8.144 and 112.3.8.148 with area 0.

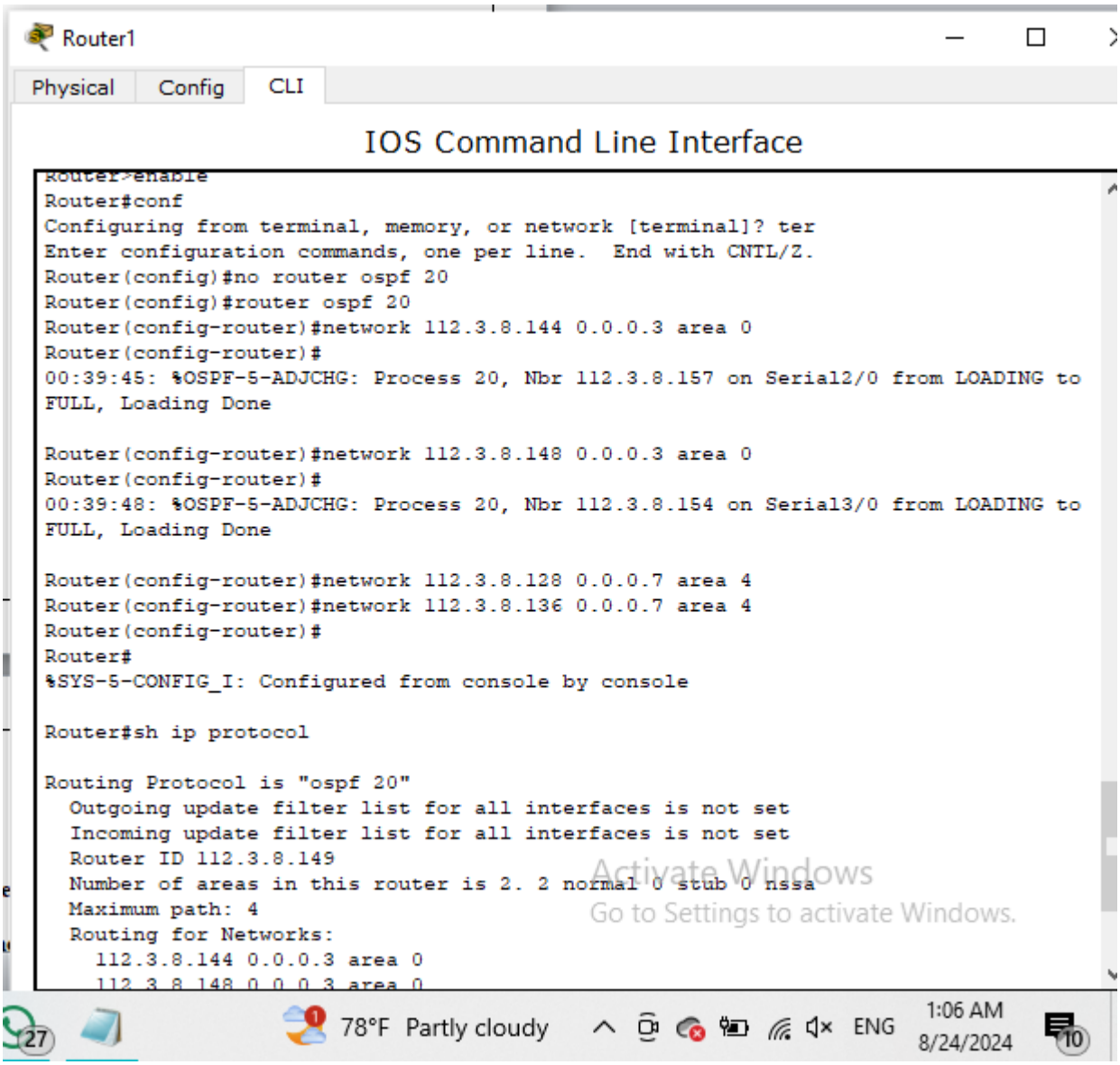


Figure 37:OSPF protocol for R1 with sh ip protocol command part one

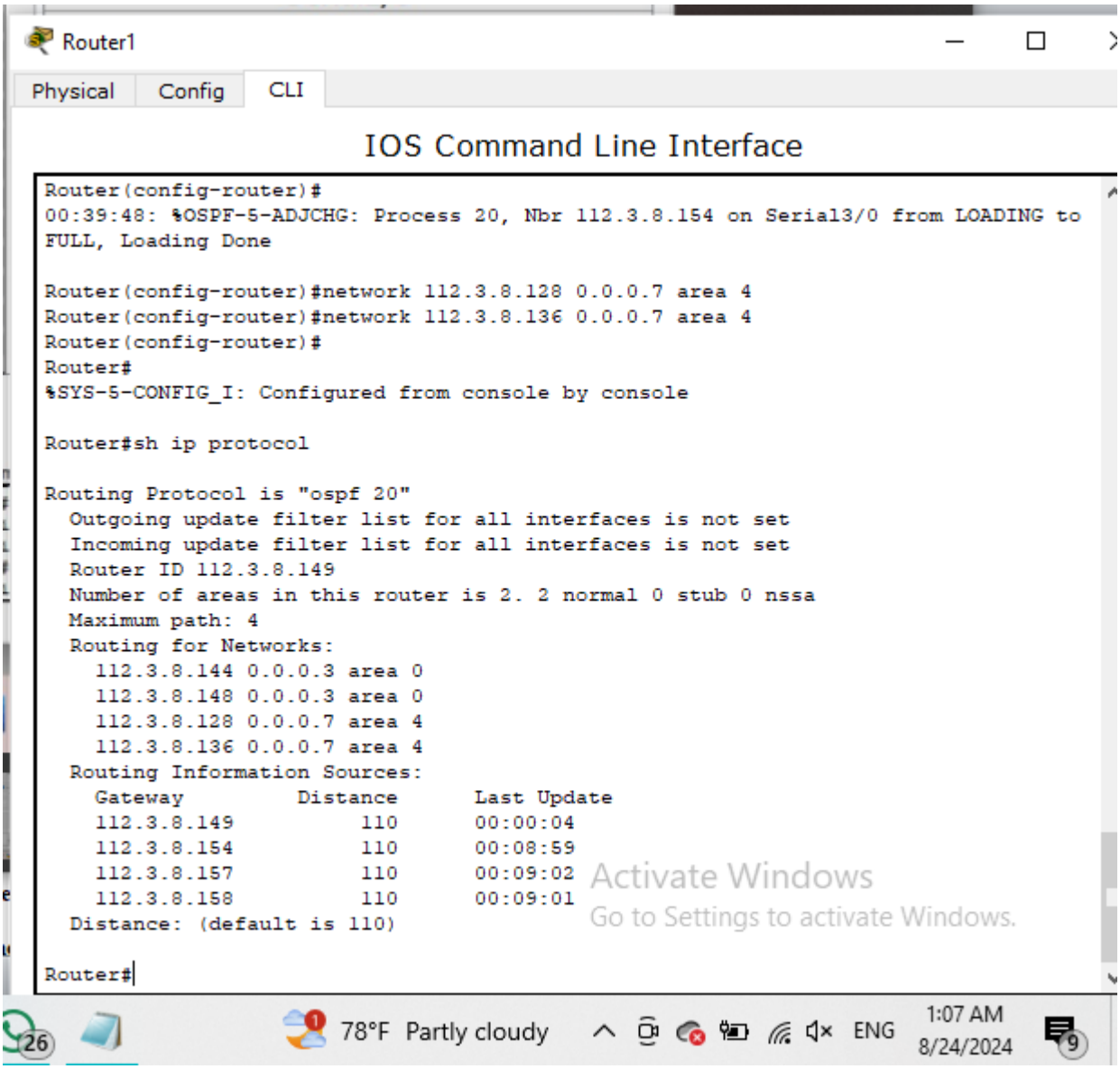


Figure 38:OSPF protocol for R1 with sh ip protocol command par two

Router 2 :

The network IP's for Router 2:

network 112.3.8.64 0.0.0.31 area 3

network 112.3.8.148 0.0.0.3 area 0

network 112.3.8.152 0.0.0.3 area 0

By these commands we connected 112.3.8.64 with area 3, 112.3.8.148 and 112.3.8.148 with area 0.

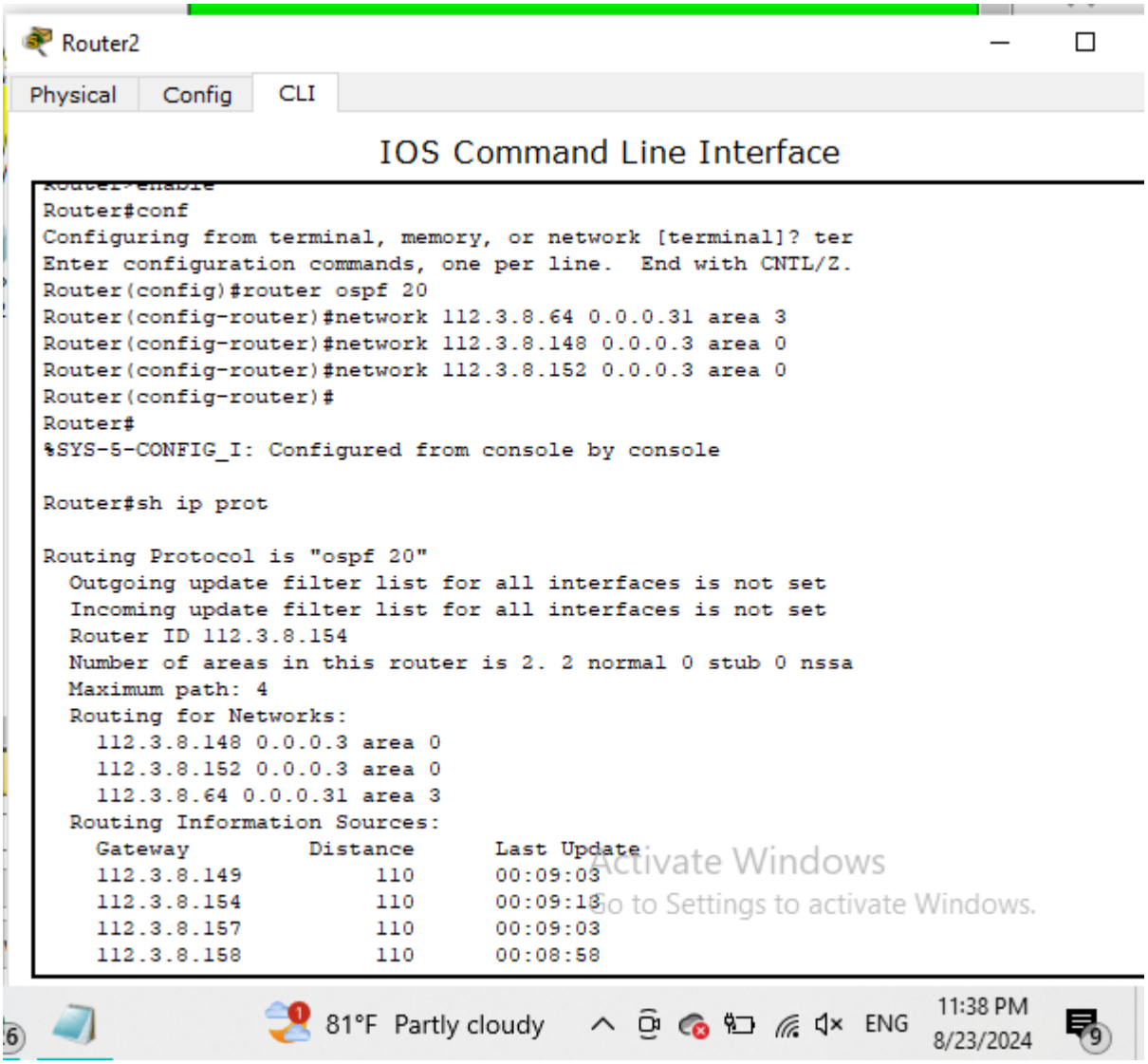


Figure 39:OSPF protocol for R2 with sh ip protocol command

Router 3:

The network IP's for Router 3:

network 112.3.8.152 0.0.0.3 area 0

network 112.3.8.156 0.0.0.3 area 0

network 112.3.8.0 0.0.0.31 area 2

network 112.3.8.32 0.0.0.31 area 2

By these commands we connected 112.3.8.0 and 112.3.8.32 with area 2, 112.3.8.144 and 112.3.8.148 with area 0.

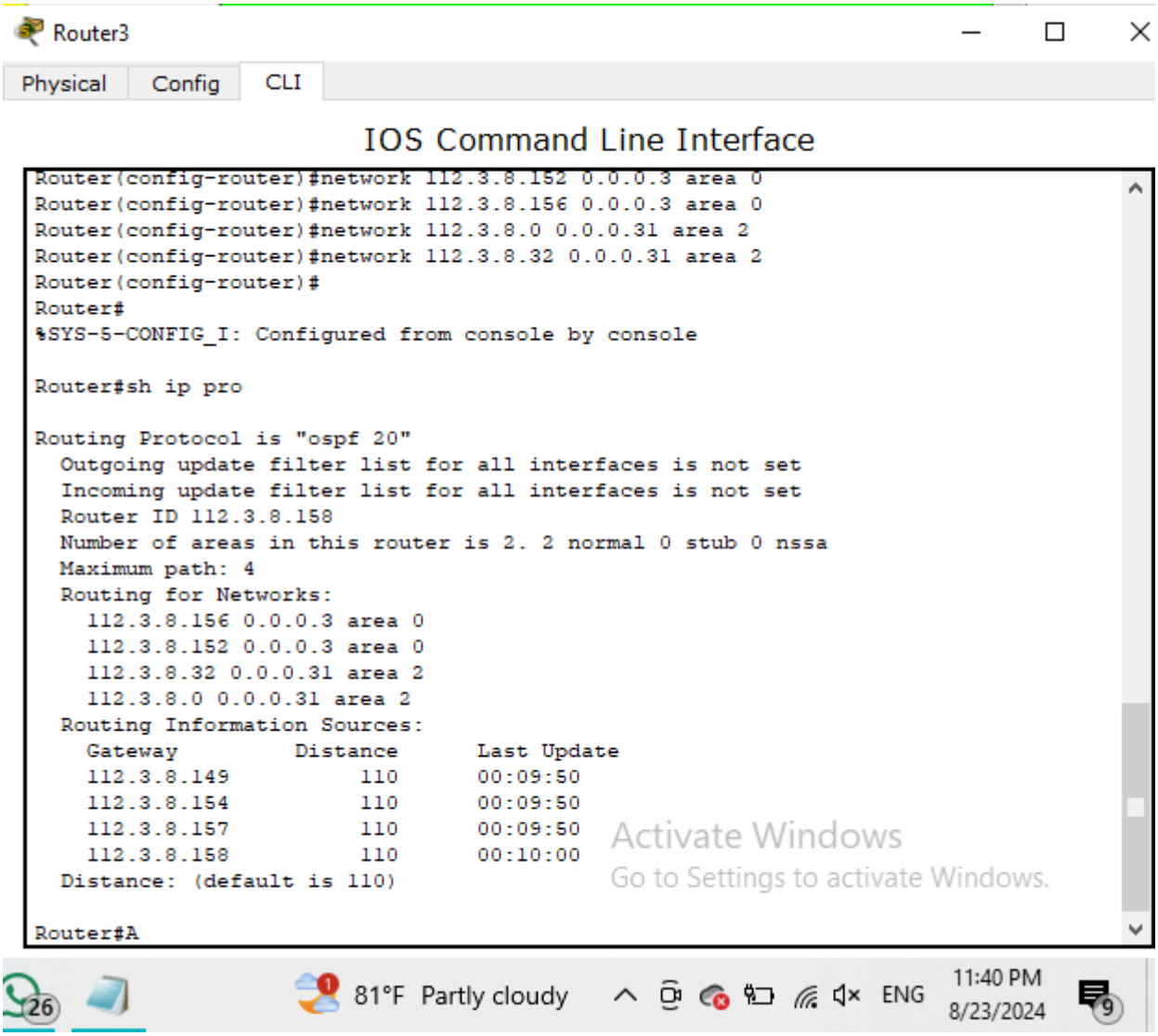


Figure 40: OSPF protocol for R3 with sh ip protocol command

Task 4 Testing and Troubleshooting Part:

1-in the first part of this Task we used the command ping <IP address> , to be sure to test the path and connection between those devices and be sure there will be not a loosing in the packets or data between devices.

Note: since the number of the devices is very large we tested the command in some devices ,some in the same are others in different ones.

Ping command test:

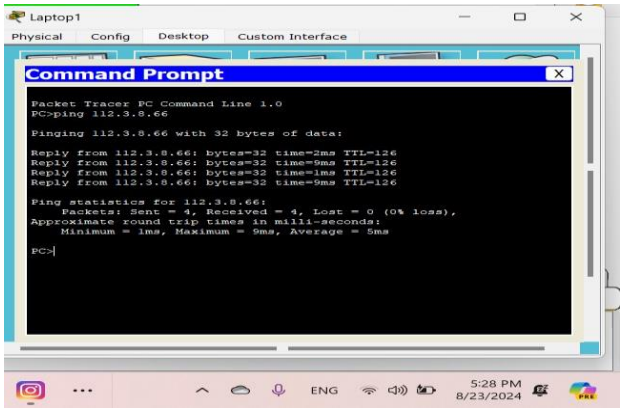


Figure 41:Ping from laptop1 to Laptop3.

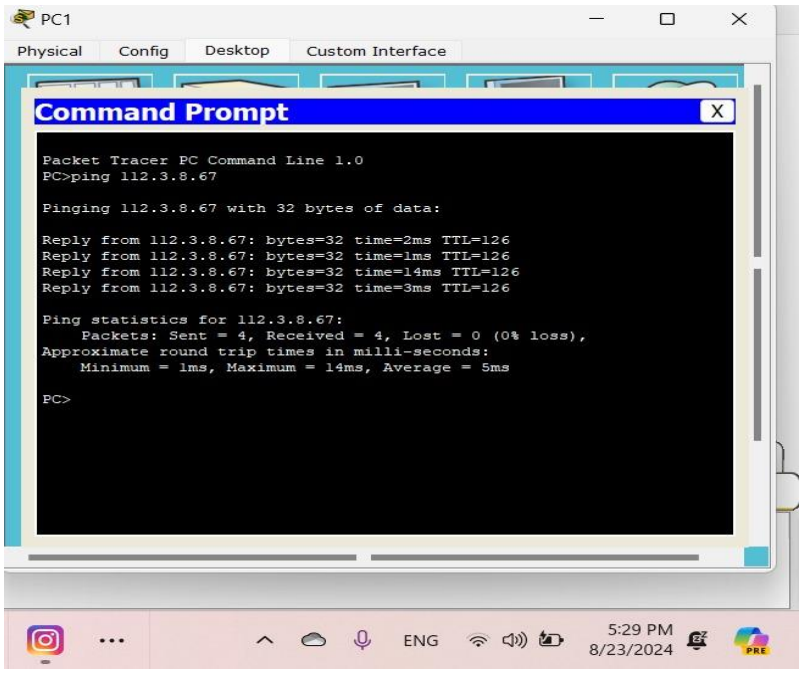


Figure 42:Ping from pc1 to pc5.

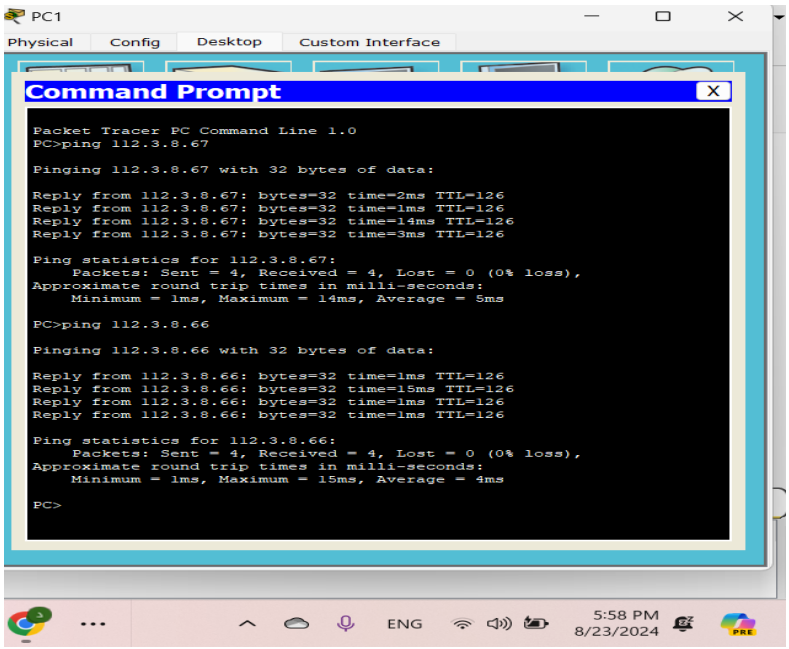


Figure 43:ping from pc1 to laptop3

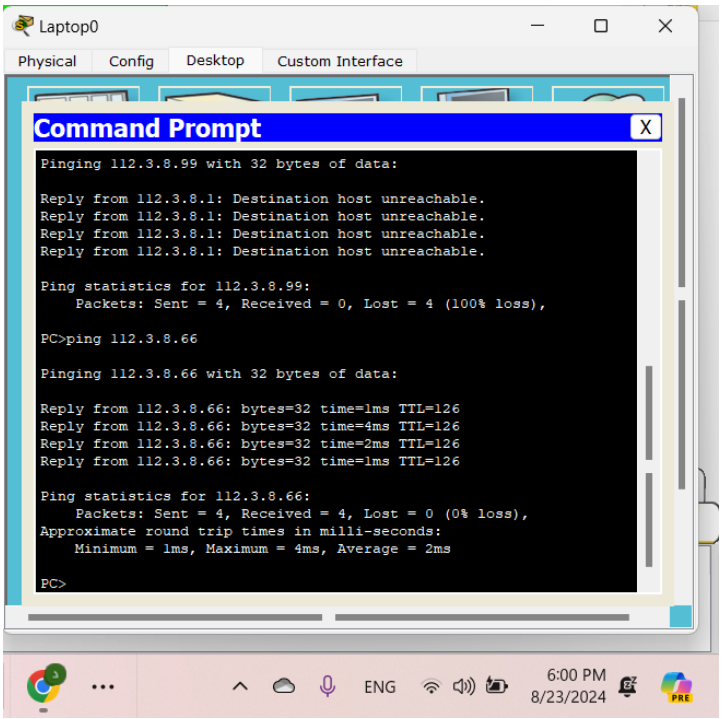


Figure 44:ping from laptop0 to laptop3.

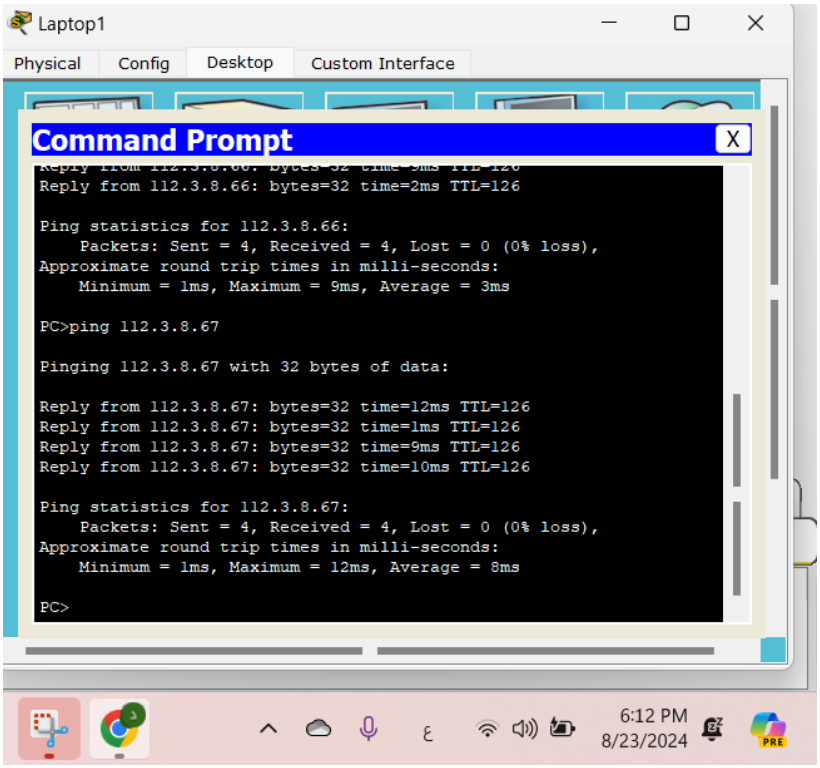


Figure 45:ping from laptop1 to pc5.

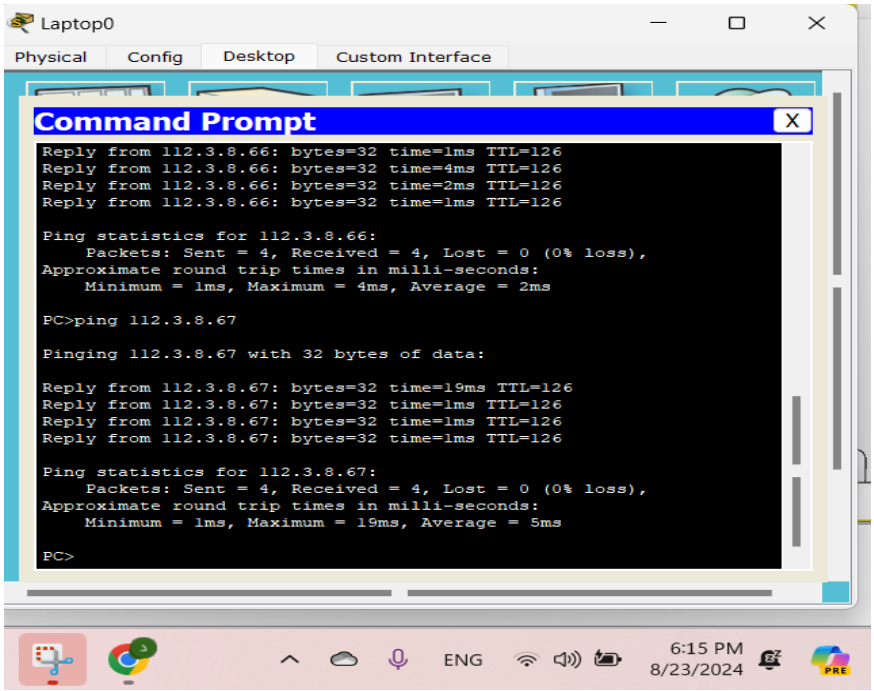


Figure 46:ping from laptop0 to pc5

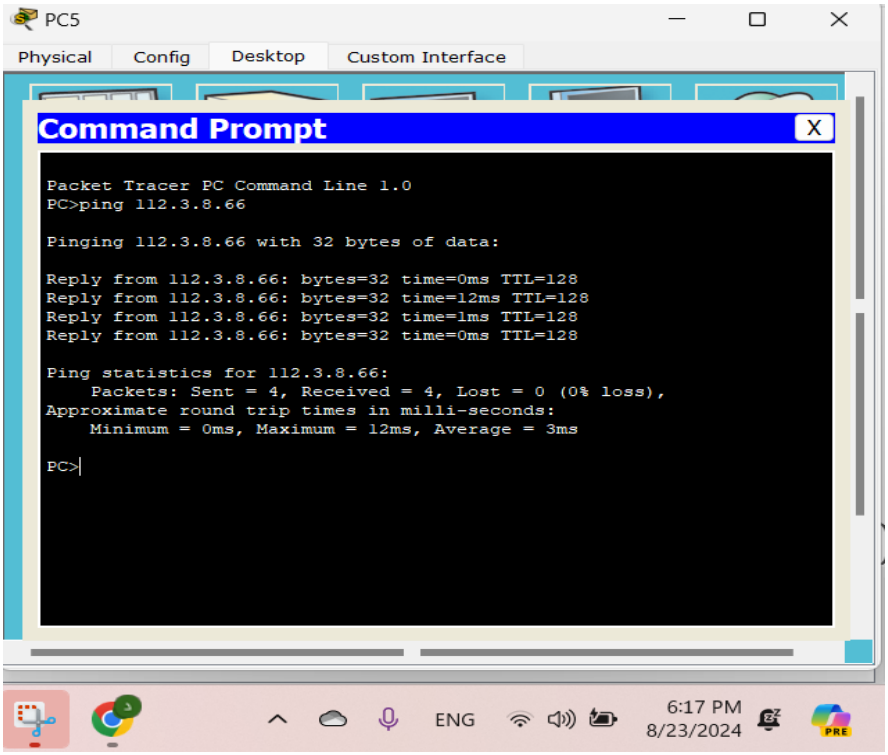


Figure 47:ping pc5 to laptop3.

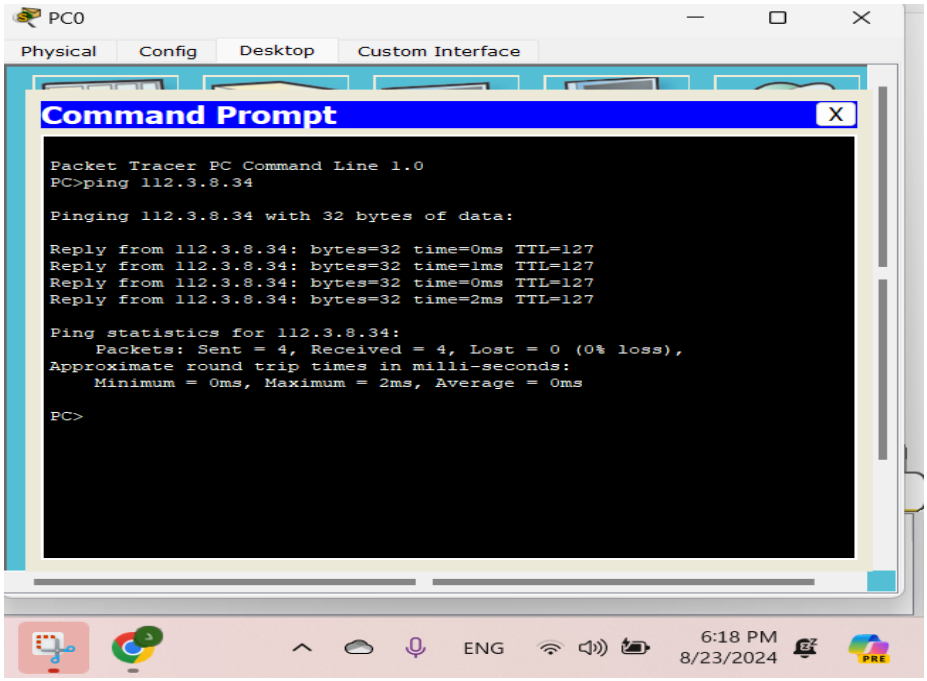


Figure 48:ping from pc0 to pc1.

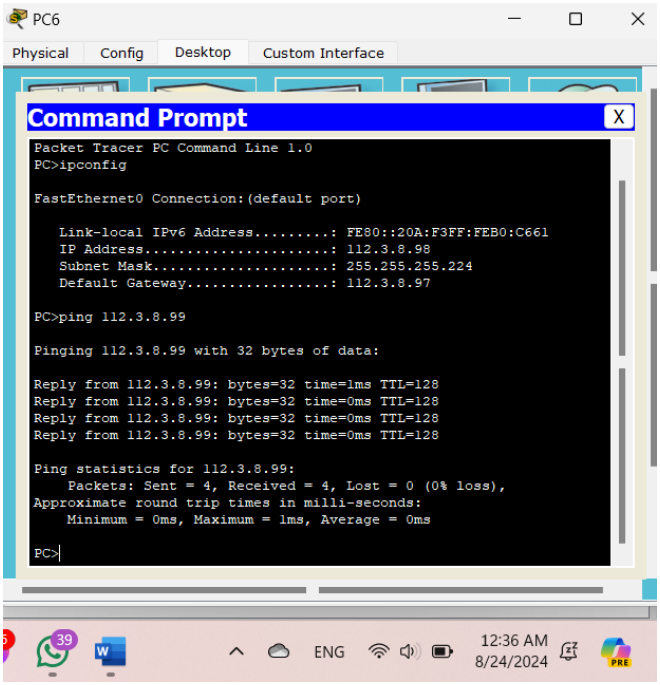


Figure 49:Ping From pc6 to lap4

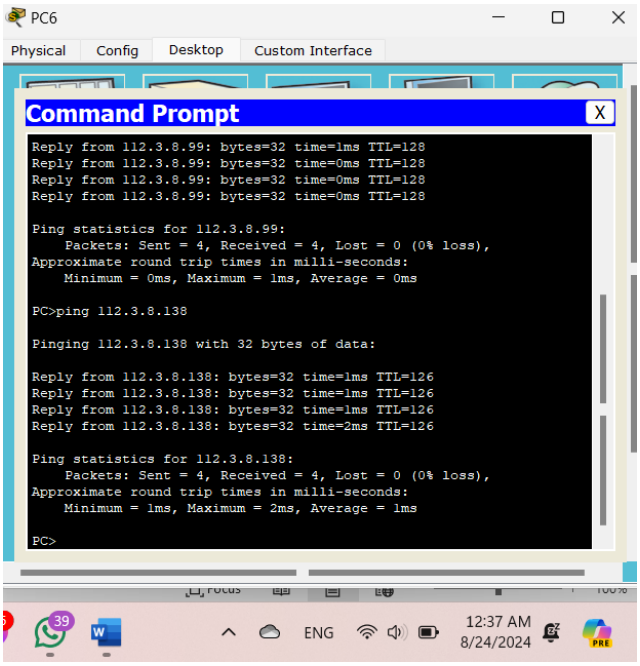


Figure 50: Ping from pc6 to lap2

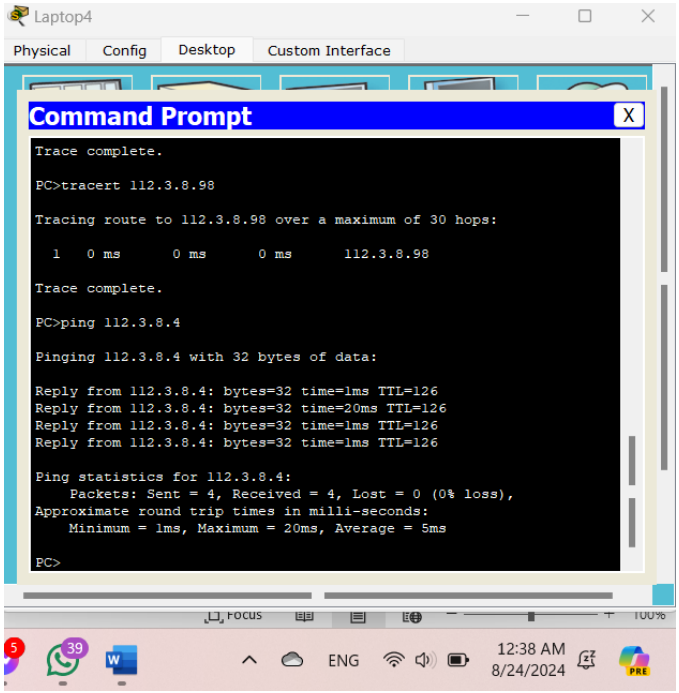


Figure 51: Ping from lap4 to lap1

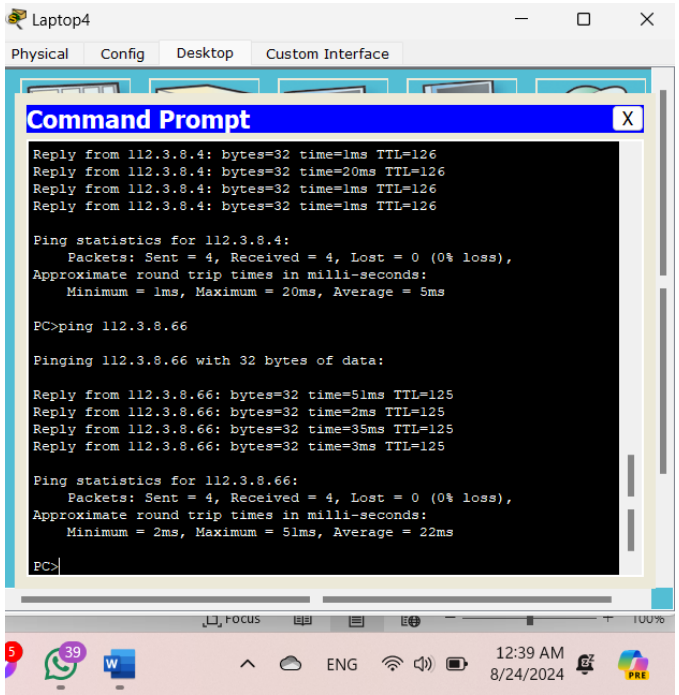


Figure 52:Ping from lap4 to lap3

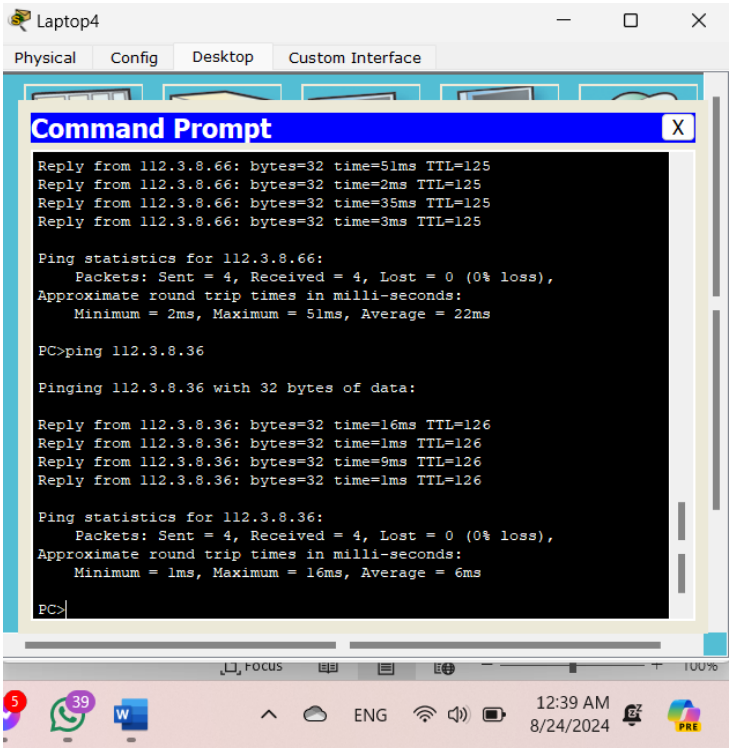


Figure 53: Ping from lap4 to DNS.

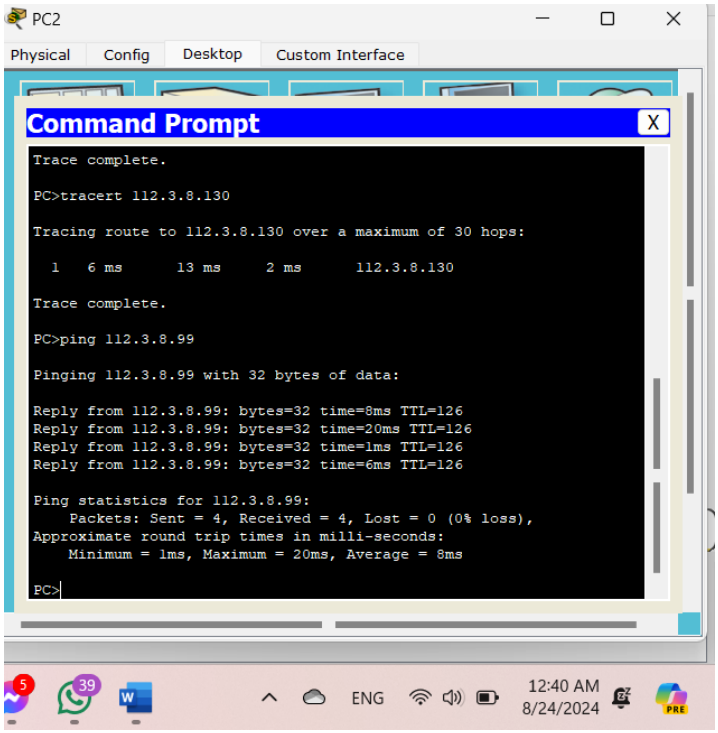


Figure 54:Pinf From PC2 to lap4

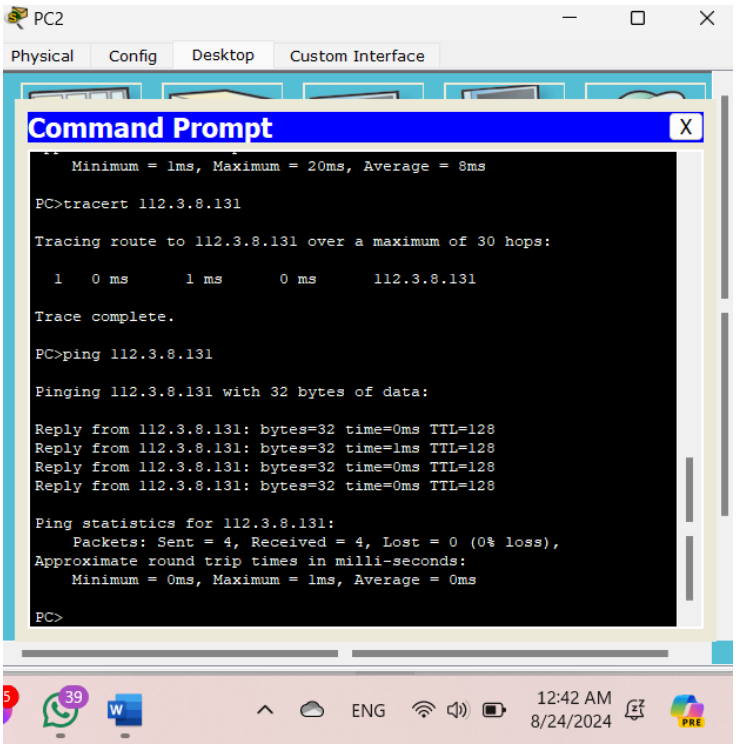


Figure 55:Ping from PC2 to PC3

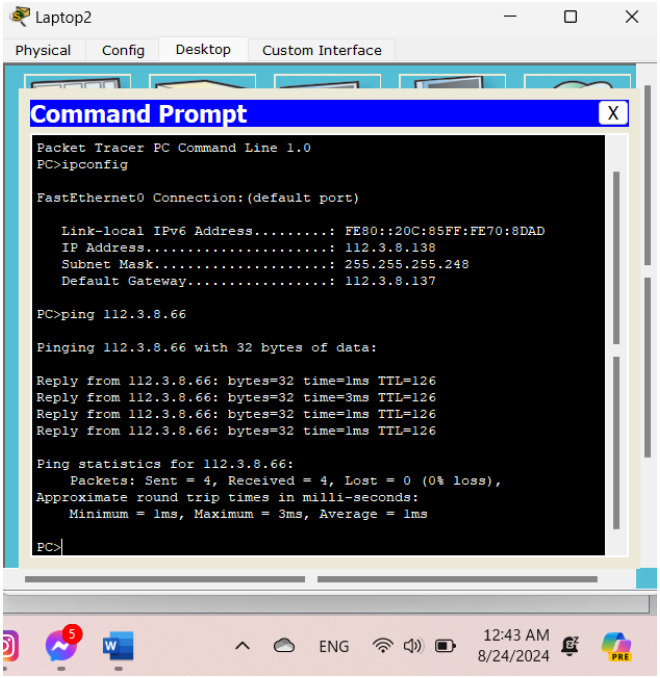


Figure 56:Ping From lap2 to lap3

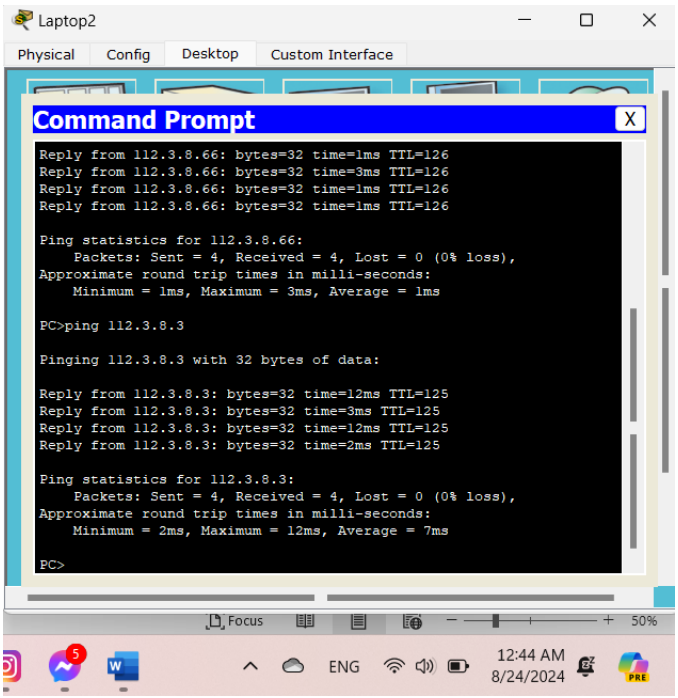


Figure 57:Ping from lap2 to pc0

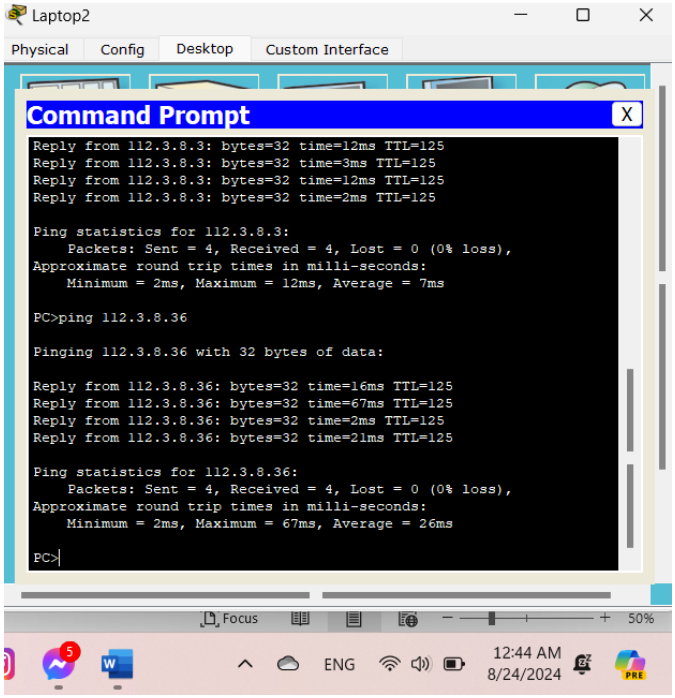


Figure 58 : ping from Laptop2 - DNS server

2-in the second part we will use tracert command to check if the packets that sends from one to other device reach with loss or not , in addition to the TTR for each packet.

Note: since the number of the devices is very large we tested the command in some devices ,some in the same and others in different ones.

Trecert command test:

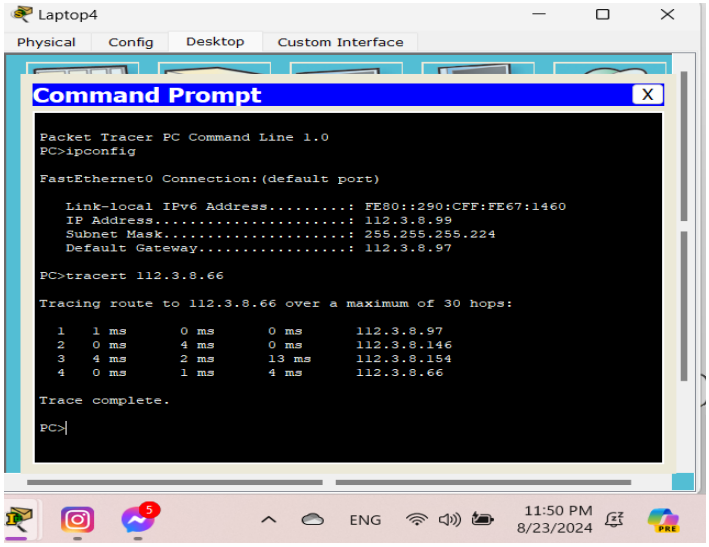


Figure 59:Tracert From laptop 4 to laptop 3

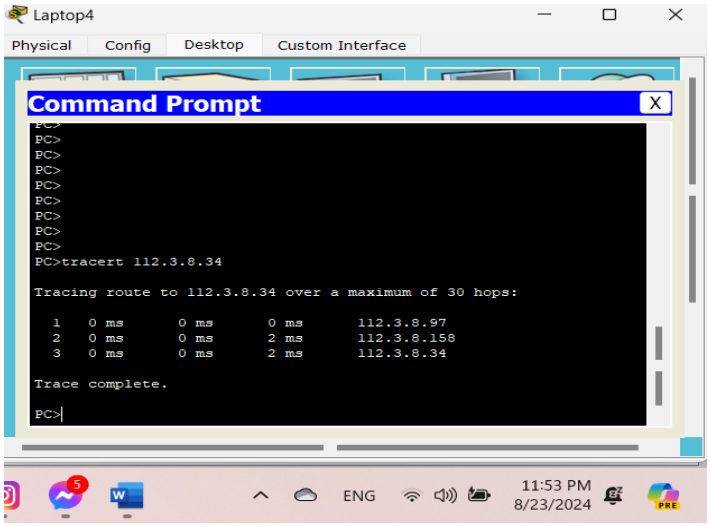


Figure 60:Tracert from laptop 4 to pc1

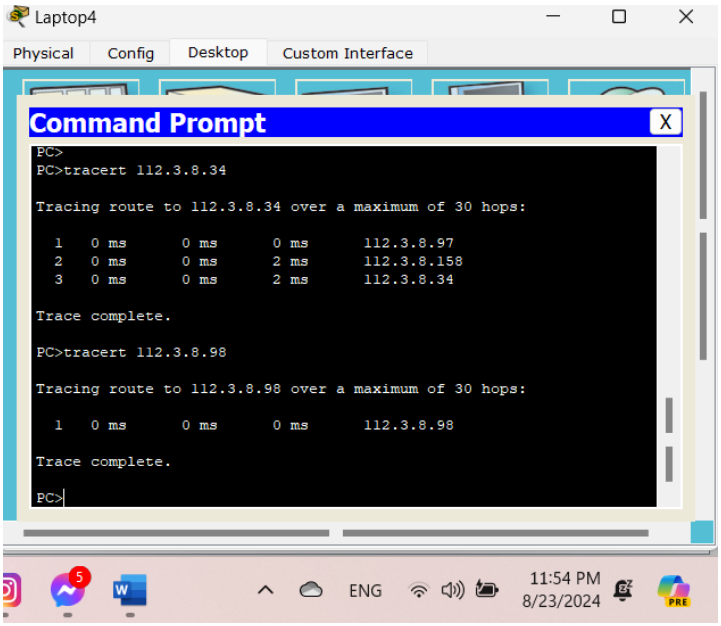


Figure 61:Tracert From laptop 4 to pc6

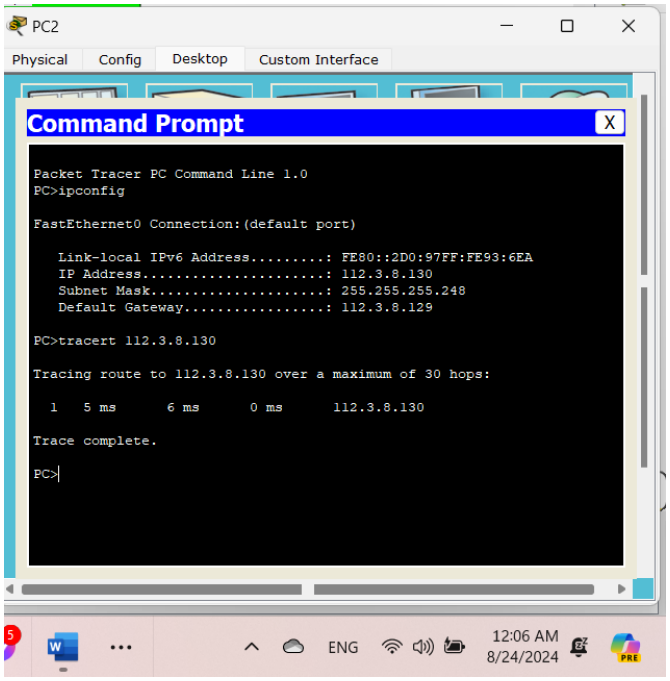


Figure 62:Tracert From laptop 4 to pc2

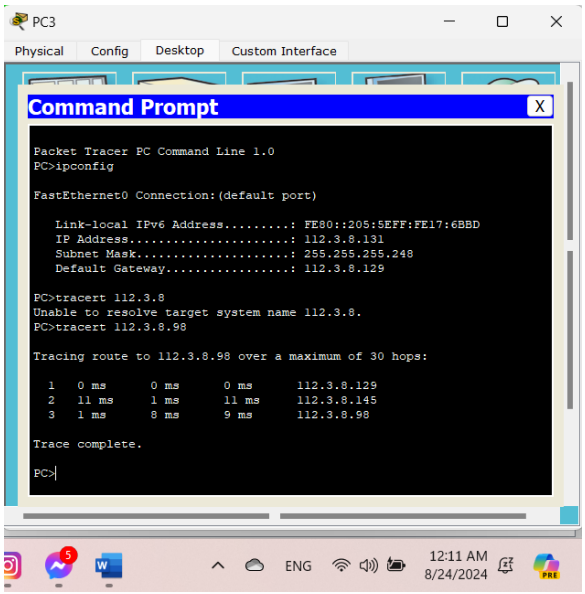


Figure 63:Tracert From pc3 to pc6

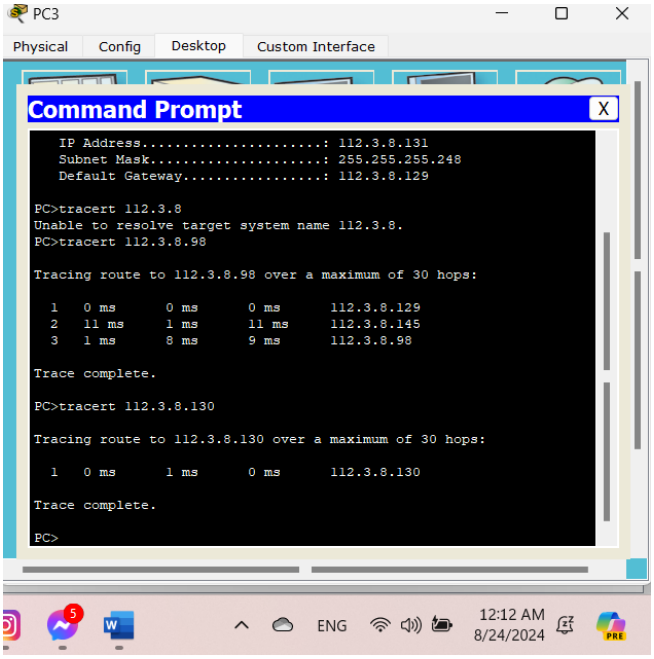


Figure 64:Tracert From pc3 to pc2

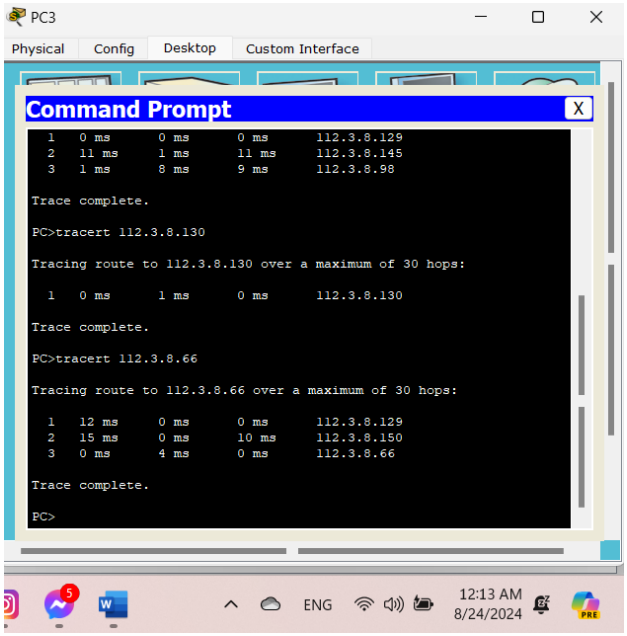


Figure 65: Tracert from PC3 to Laptop3

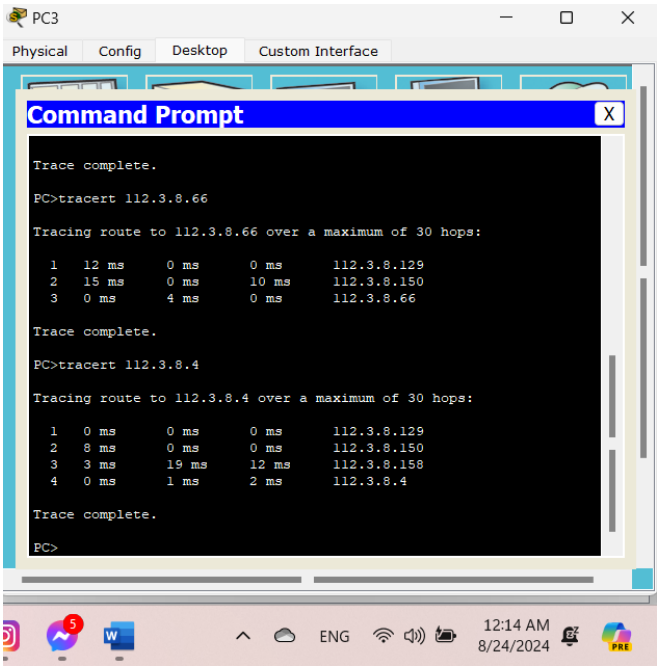


Figure 66:Tracert From pc3 to laptop1

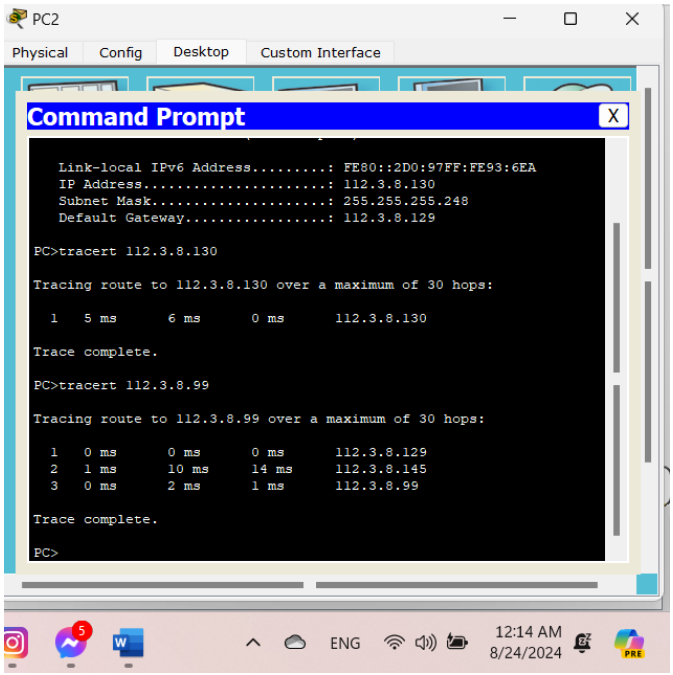


Figure 67:Tracert From pc2 to laptop4

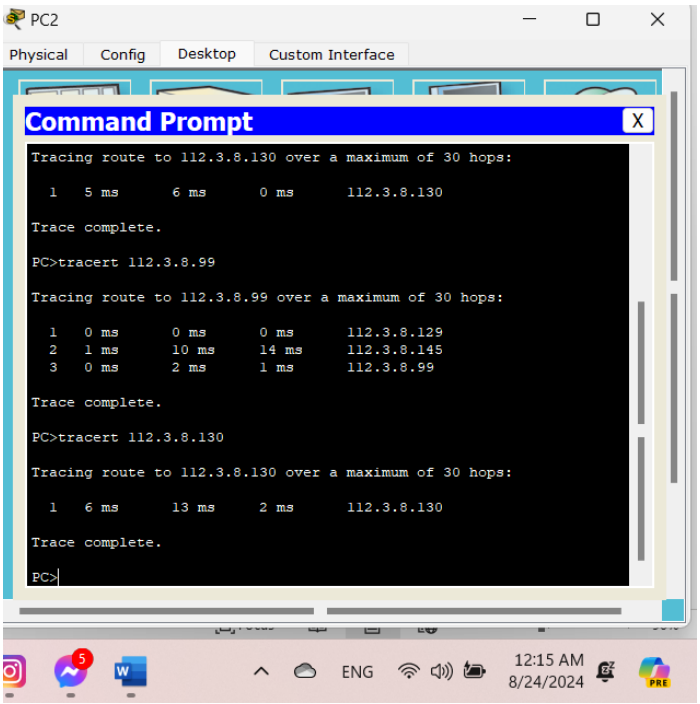


Figure 68:Tracert From pc2 to pc2

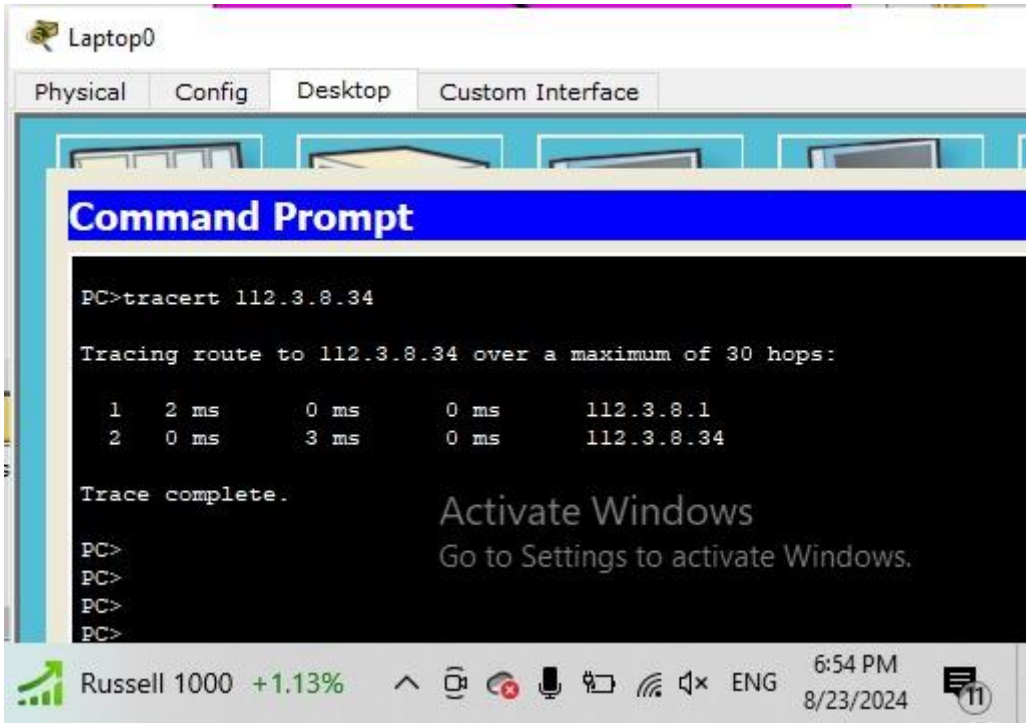


Figure 69:Tracert from Pc1 to laptop0

3-Thirdly , we tried to open the website that wrote it with html , opening this website in each device will perform that the DNS and HTTP servers are reachable with other device.

Website from all devices test:

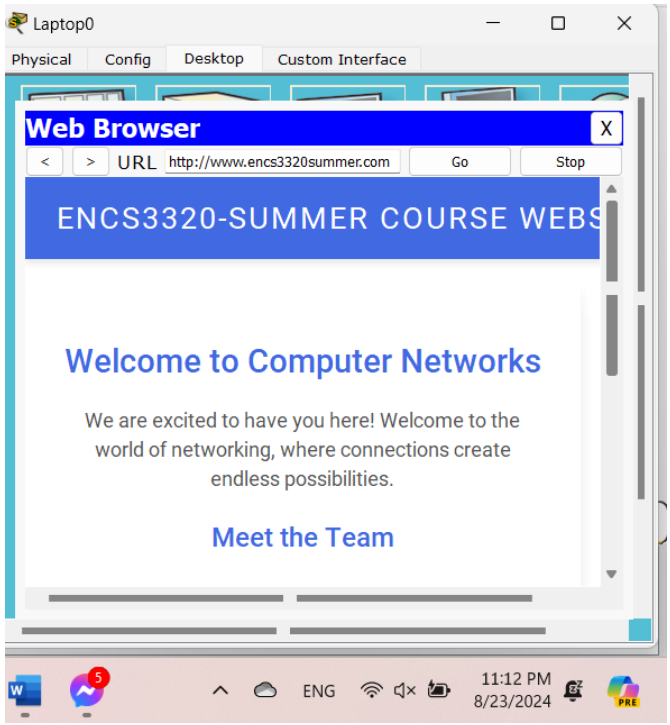


Figure 70:Html file in Laptop0

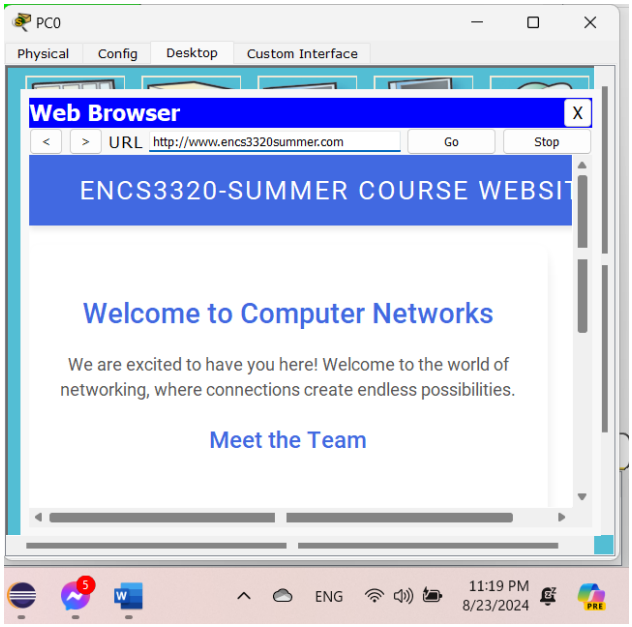


Figure 71:Html file in PC0

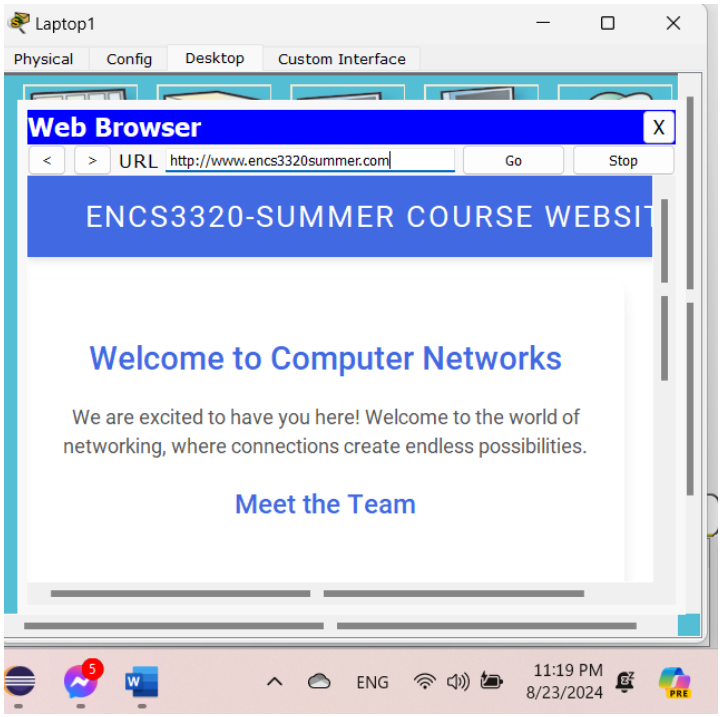


Figure 72:Html file in Laptop 1

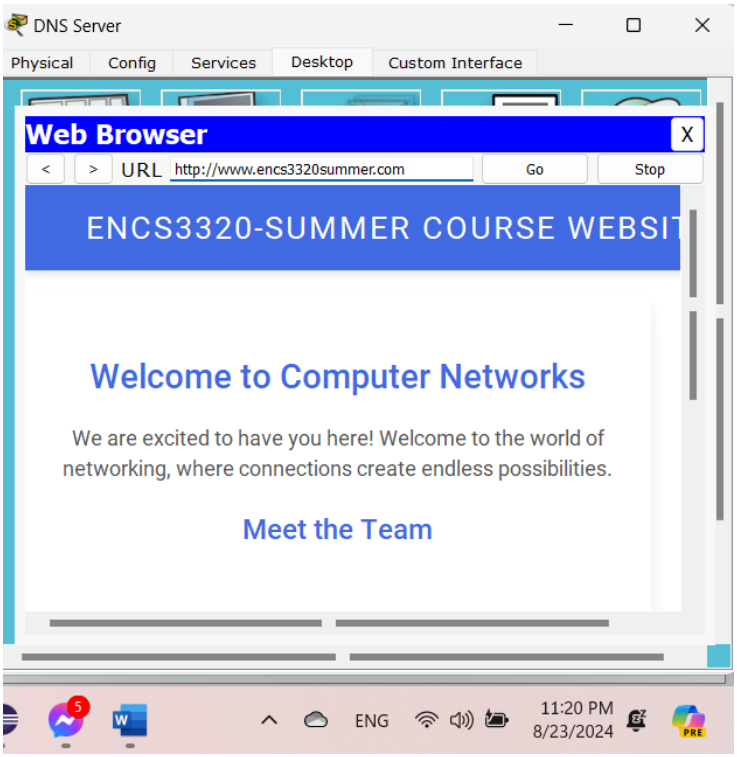


Figure 73:Html file in DNS server

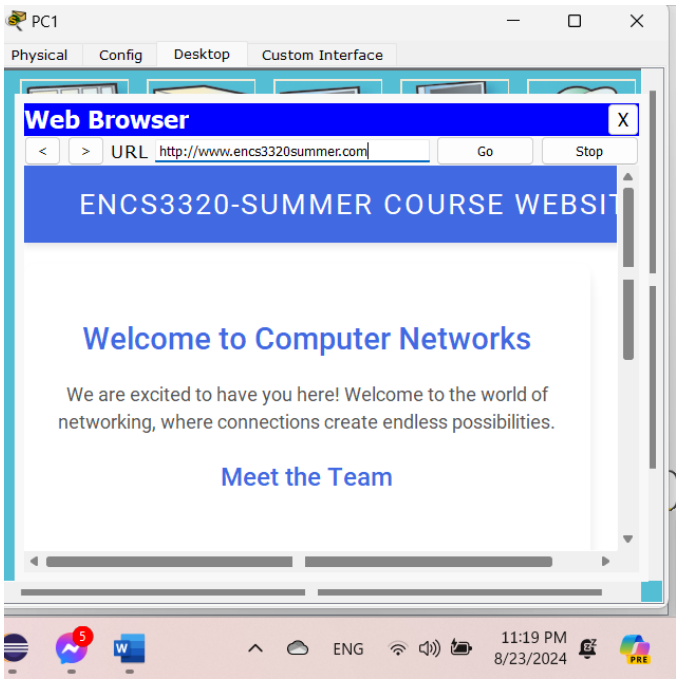


Figure 74:Html file in PC1

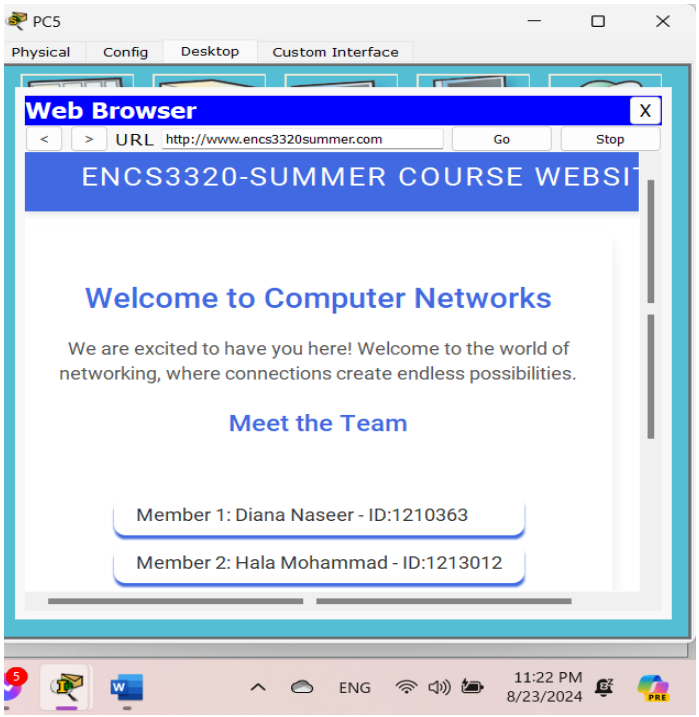


Figure 75:Html file in PC5

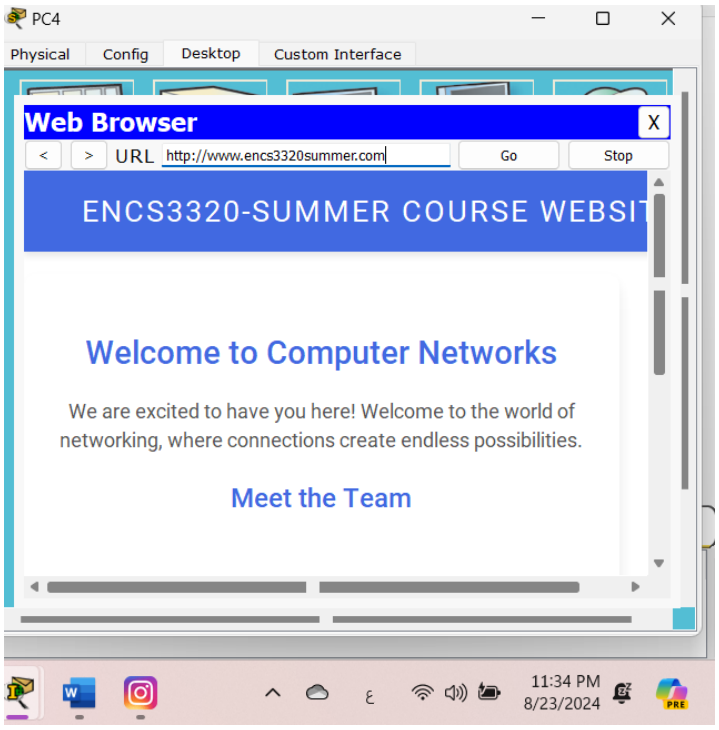


Figure 76:Html file in PC4

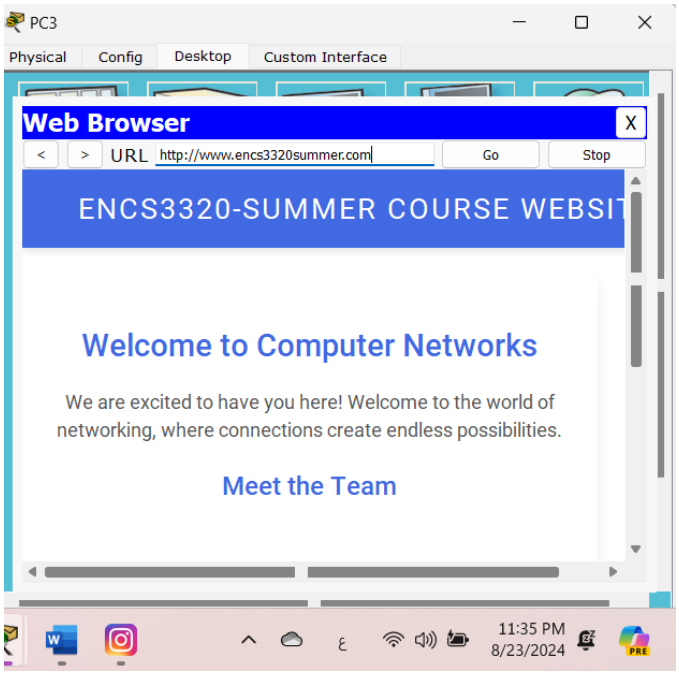


Figure 77:Html file in PC3

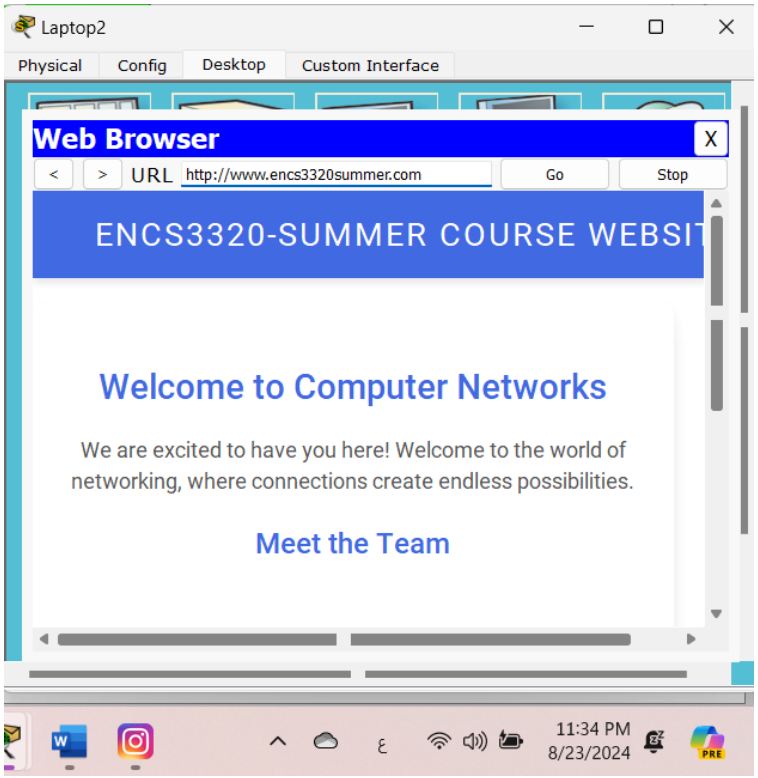


Figure 78:Html file in Laptop2

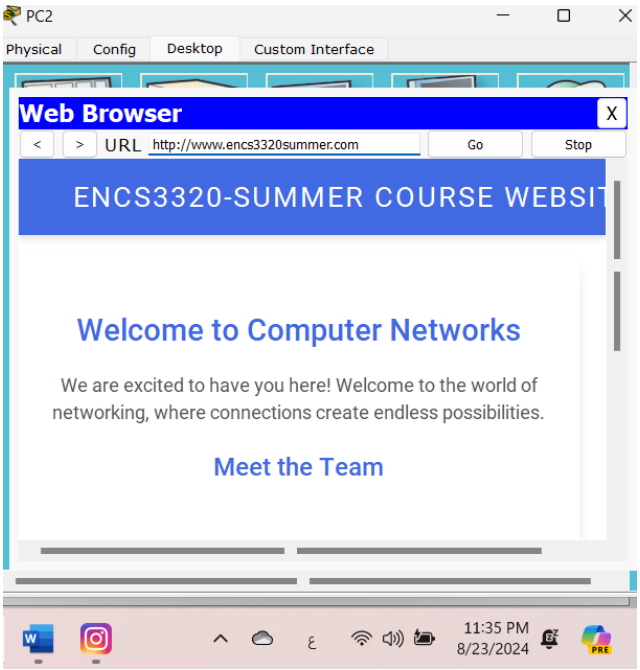


Figure 79:Html file in PC2

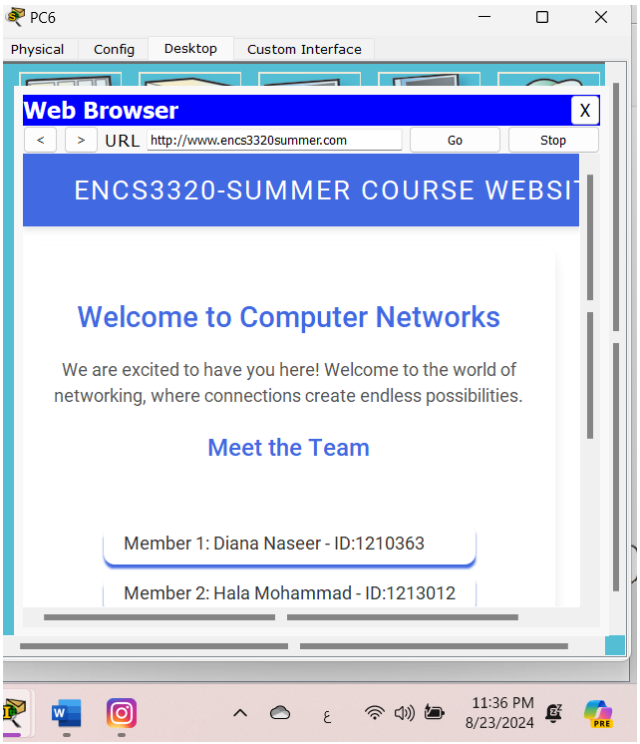


Figure 80:Html file in PC6

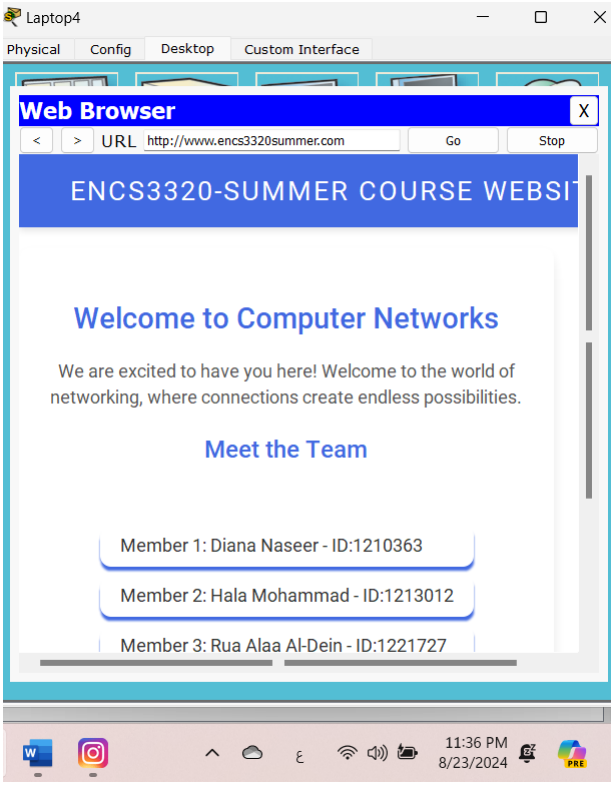


Figure 81:Html file in laptop4

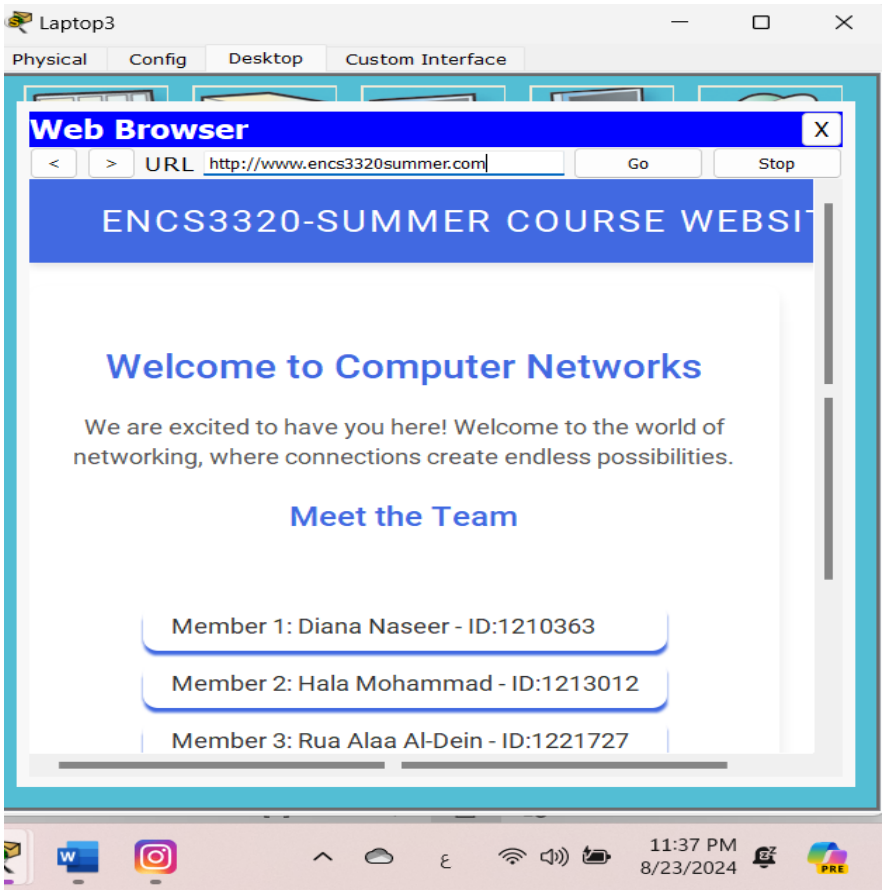


Figure 82:Html file in laptop3

Routing tables:

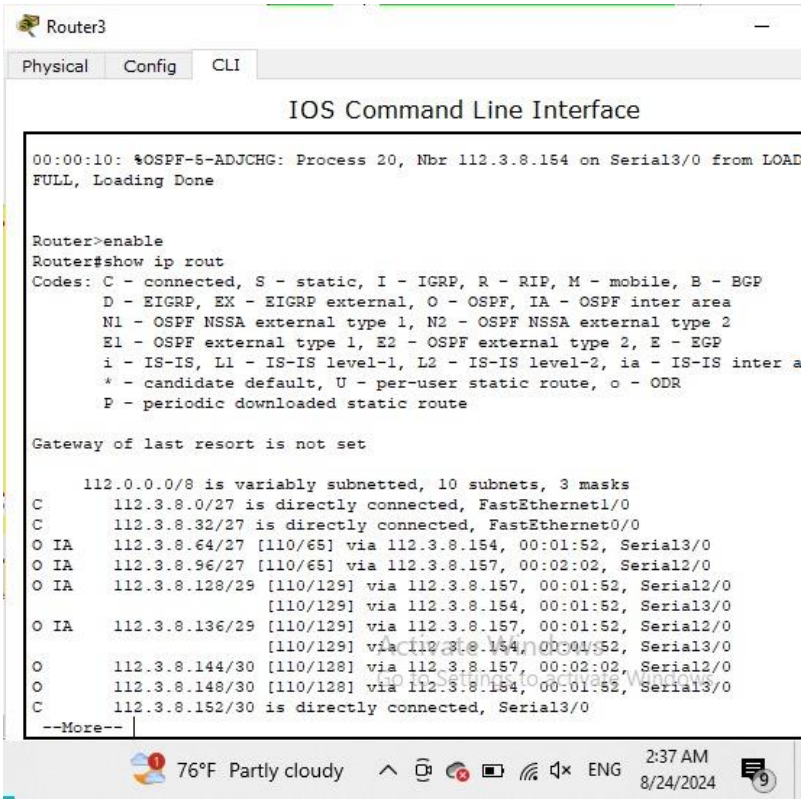


Figure 83:Routing table for Router 3.

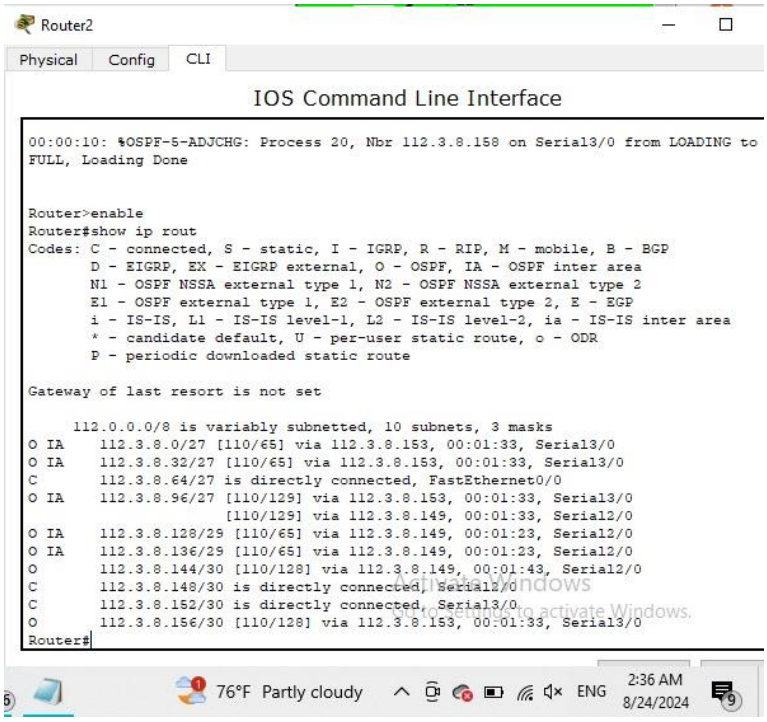


Figure 84:Routing table for Router 2.

Figure 85:Routing table for Router 0.

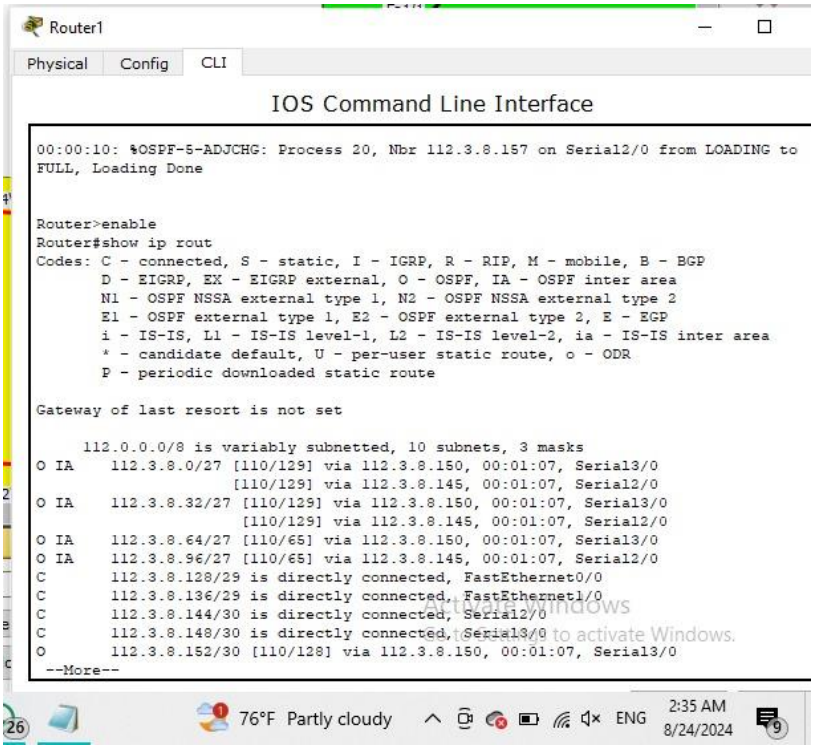


Figure 86:Routing table for Router 1.

IP configuration:

In this part, we used the command “ipconfig” to check the IP of each pc.

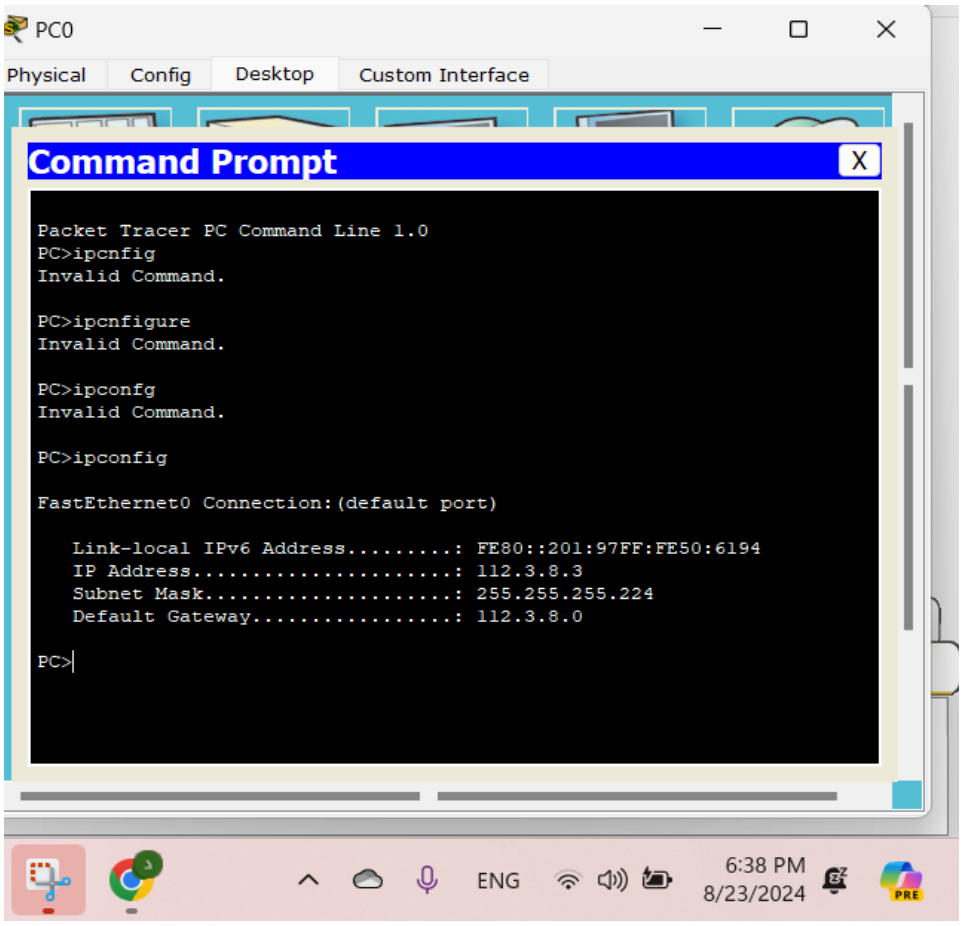


Figure 87:testing the ipconfig command for pc0.

As shown in the figure, all results for PC0 were correct and as expected:

- IP address: 112.3.8.3
- Subnet Mask: 255.255.255.224
- Default gateway: 112.3.8.0

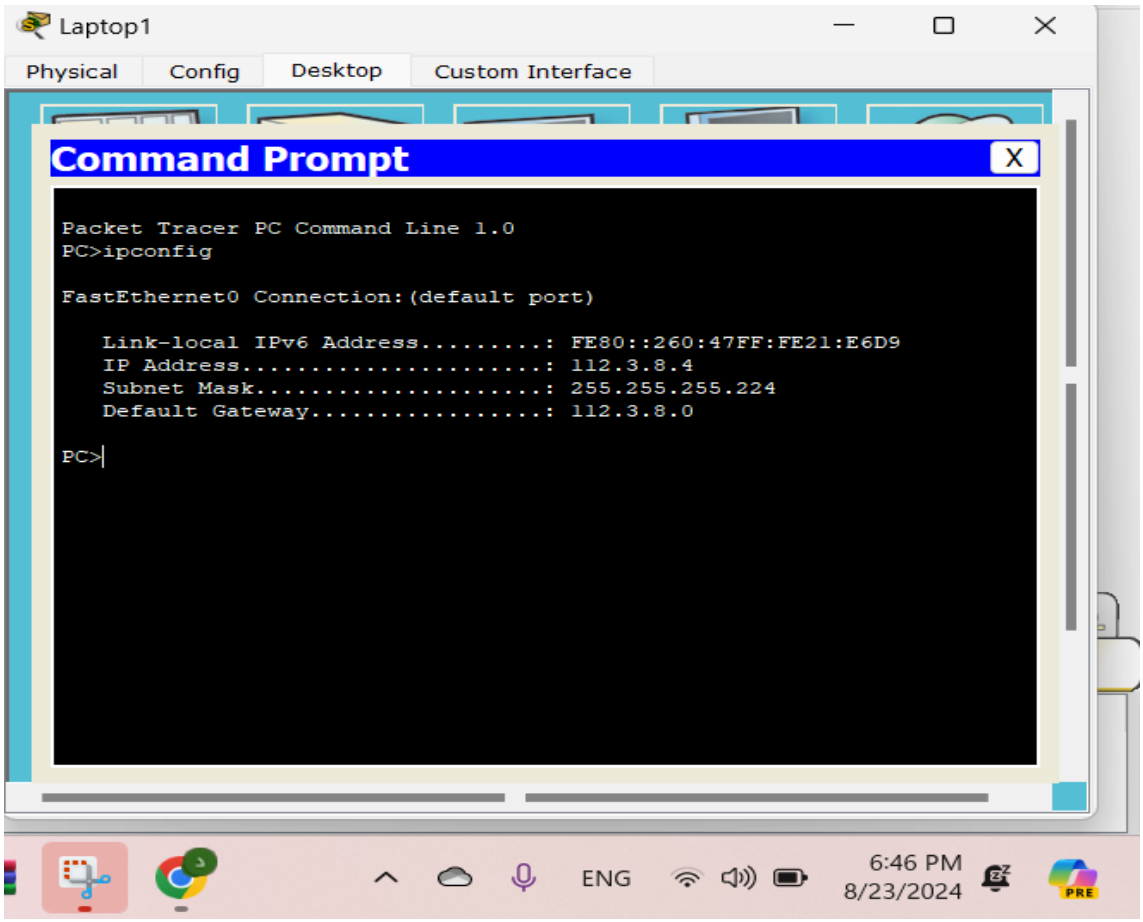


Figure 88:testing the ipconfig command for Laptop1.

As shown in the figure, all results for Laptop1 were correct and as expected:

- IP address: 112.3.8.4
- Subnet Mask: 255.255.255.224
- Default gateway: 112.3.8.0

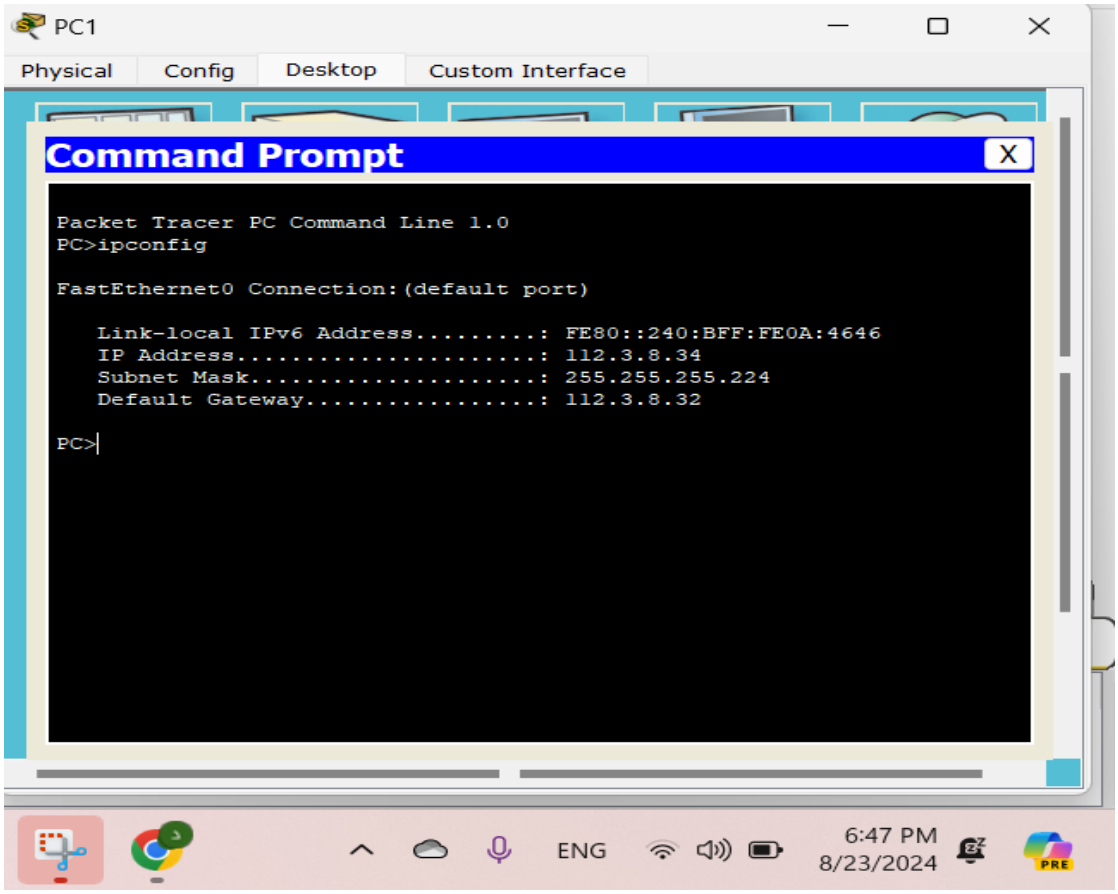


Figure 89:testing the ipconfig command for pc1.

As shown in the figure, all results for pc1 were correct and as expected:

- IP address: 112.3.8.34
- Subnet Mask: 255.255.255.224
- Default gateway: 112.3.8.32

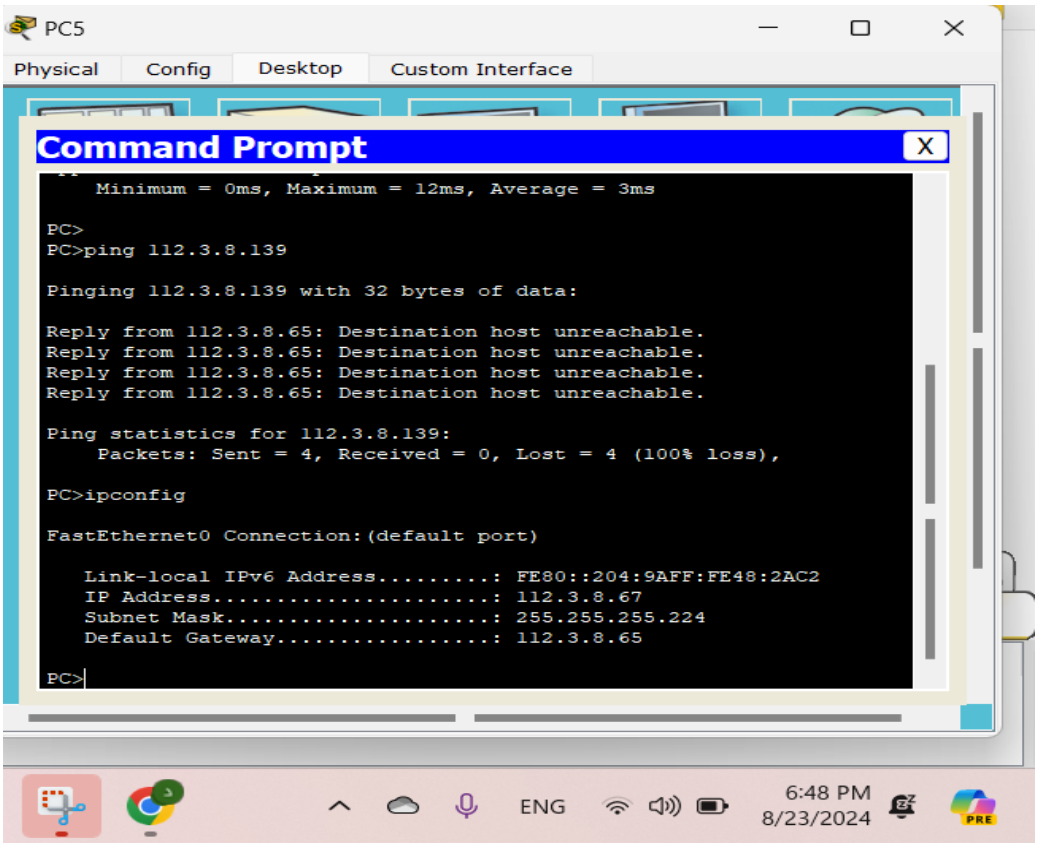


Figure 90:testing the ipconfig command for pc5.

As shown in the figure, all results for pc5 were correct and as expected:

- IP address: 112.3.8.67
- Subnet Mask: 255.255.255.224
- Default gateway: 112.3.8.65

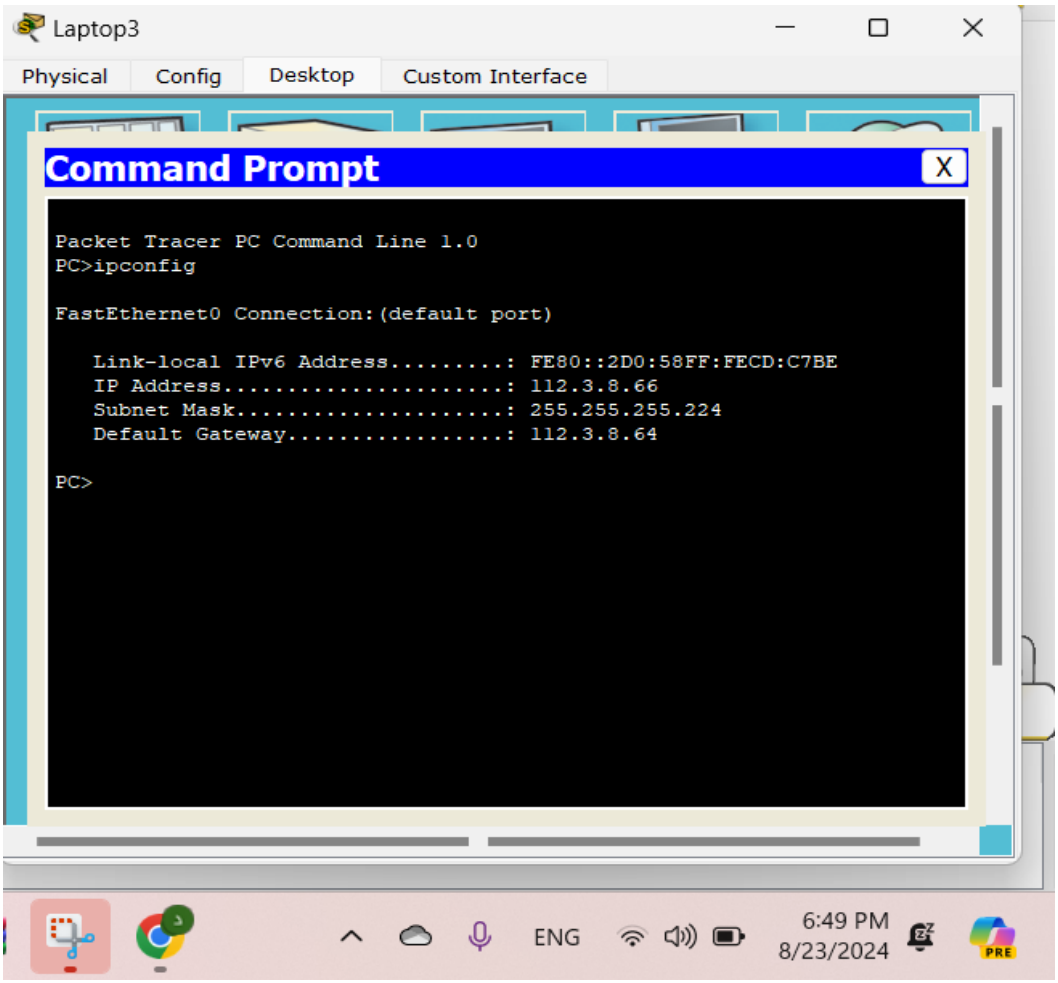


Figure 91:testing the ipconfig command for Laptop3

As shown in the figure, all results for Laptop3 were correct and as expected:

- IP address: 112.3.8.66
- Subnet Mask: 255.255.255.224
- Default gateway: 112.3.8.64

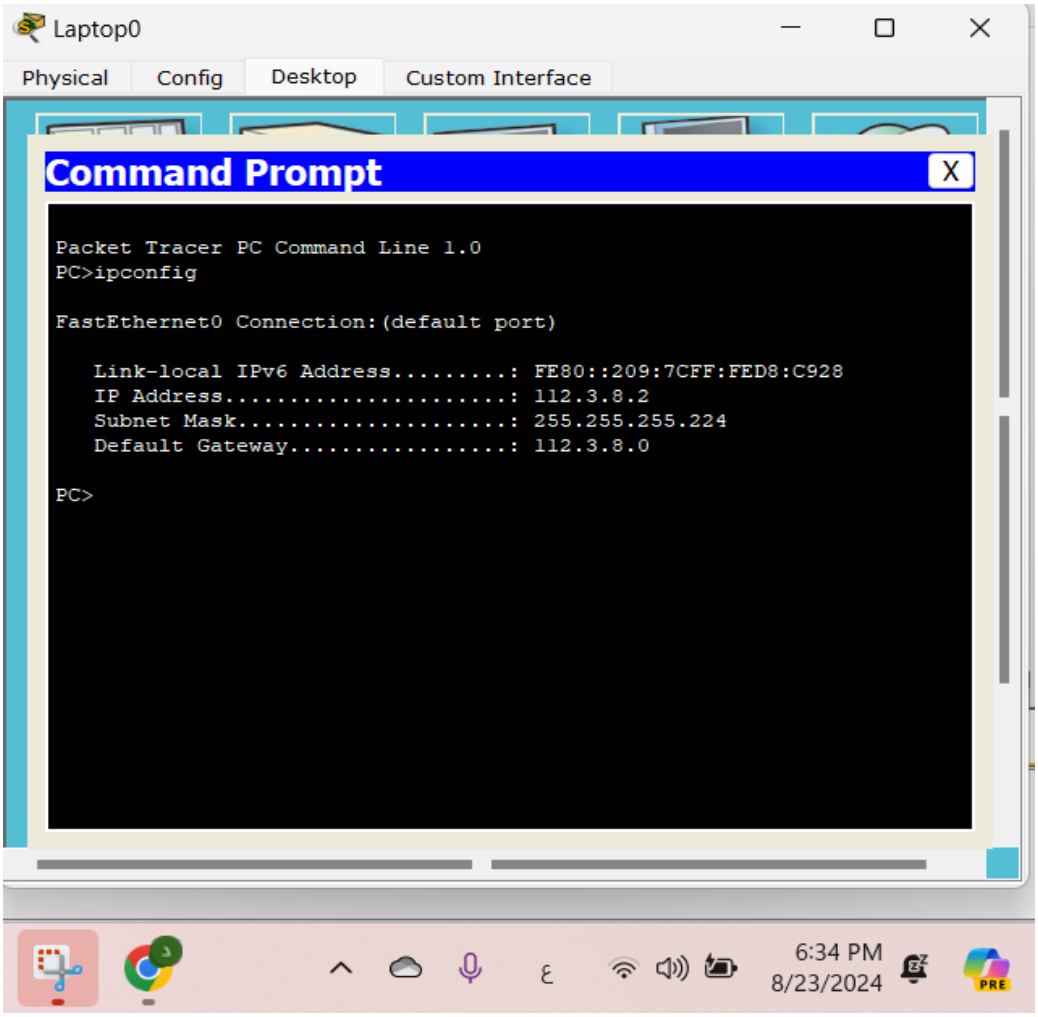


Figure 92:testing the ipconfig command for Laptop0.

As shown in the figure, all results for Laptop0 were correct and as expected:

- IP address: 112.3.8.2
- Subnet Mask: 255.255.255.224
- Default gateway: 112.3.8.0

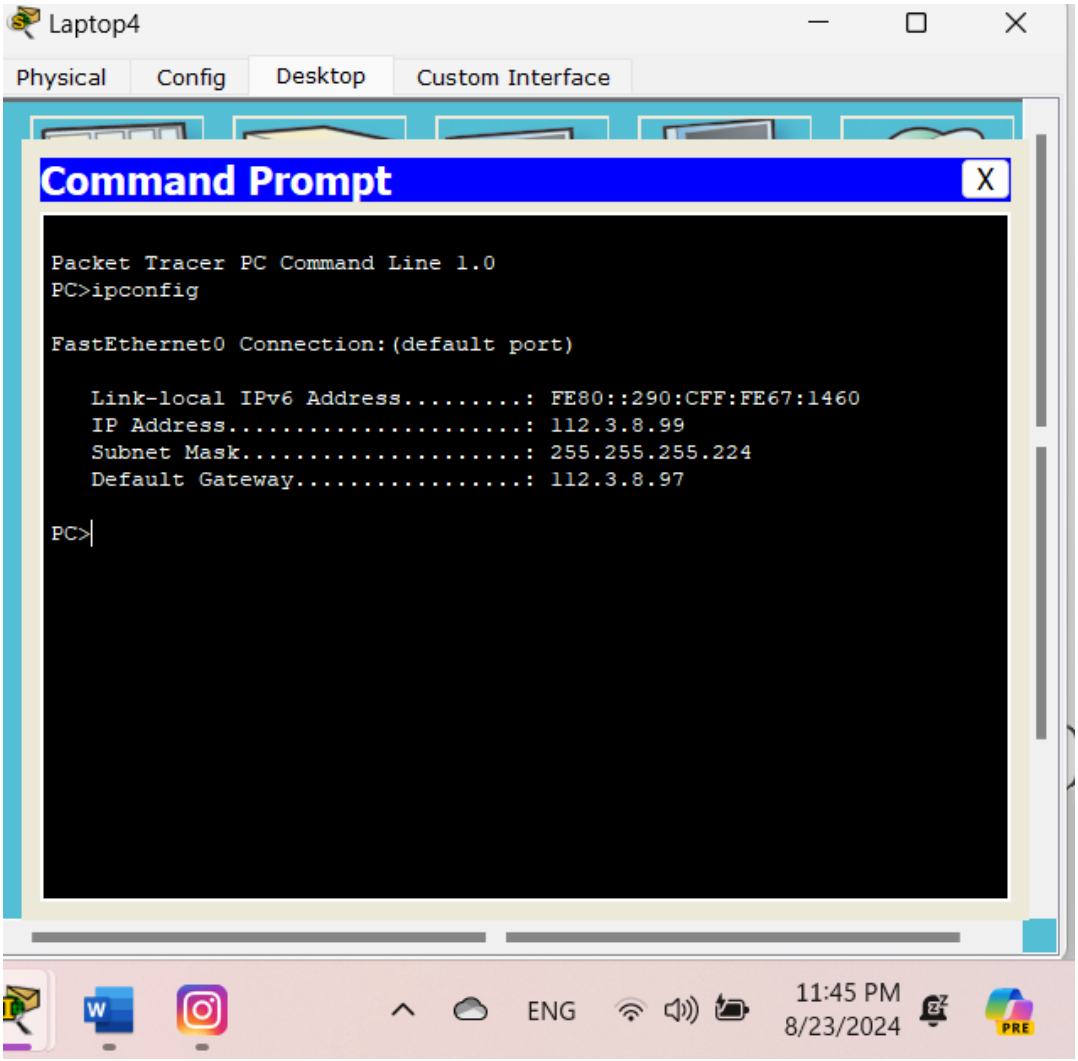


Figure 93:testing the ipconfig command for Laptop4.

As shown in the figure, all results for Laptop4 were correct and as expected:

- IP address: 112.3.8.99
- Subnet Mask: 255.255.255.224
- Default gateway: 112.3.8.97

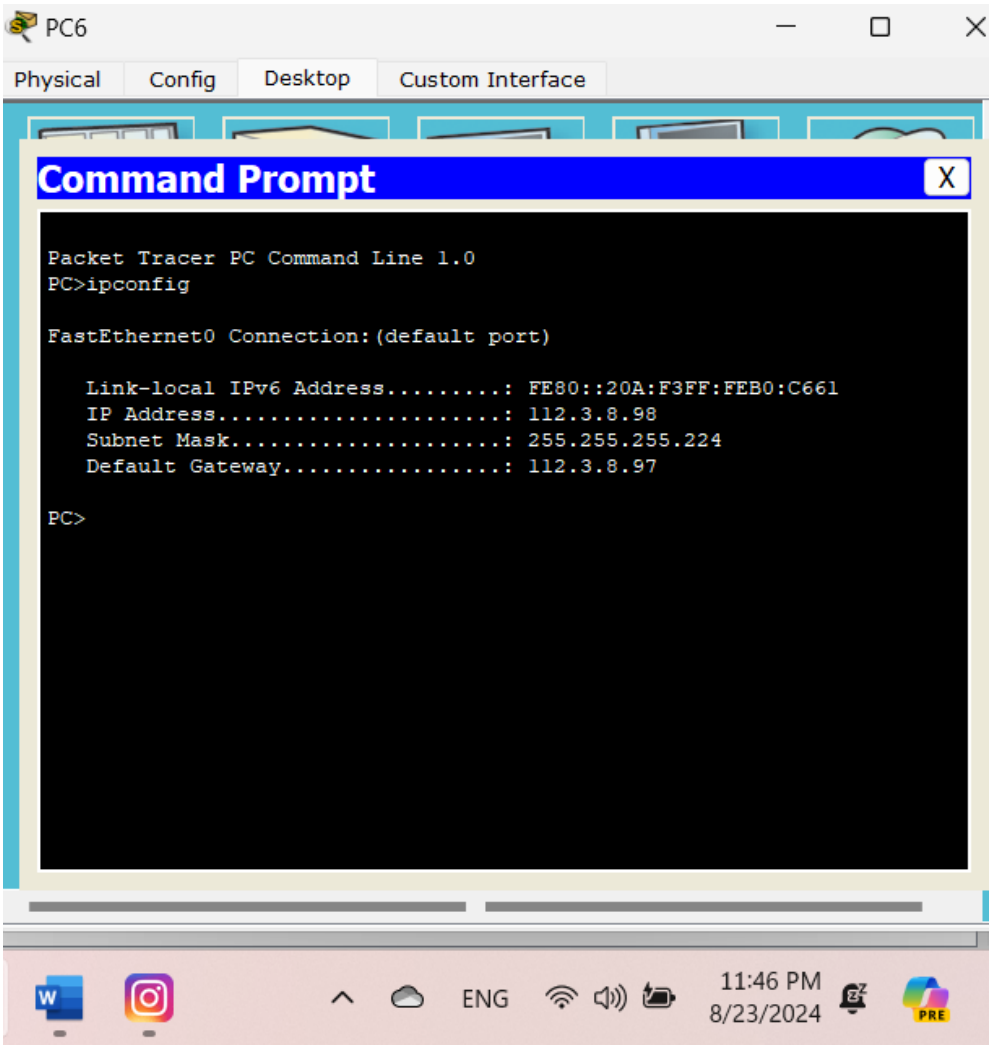


Figure 94:testing the ipconfig command for PC6.

As shown in the figure, all results for pc6 were correct and as expected:

- IP address: 112.3.8.98
- Subnet Mask: 255.255.255.224
- Default gateway: 112.3.8.97

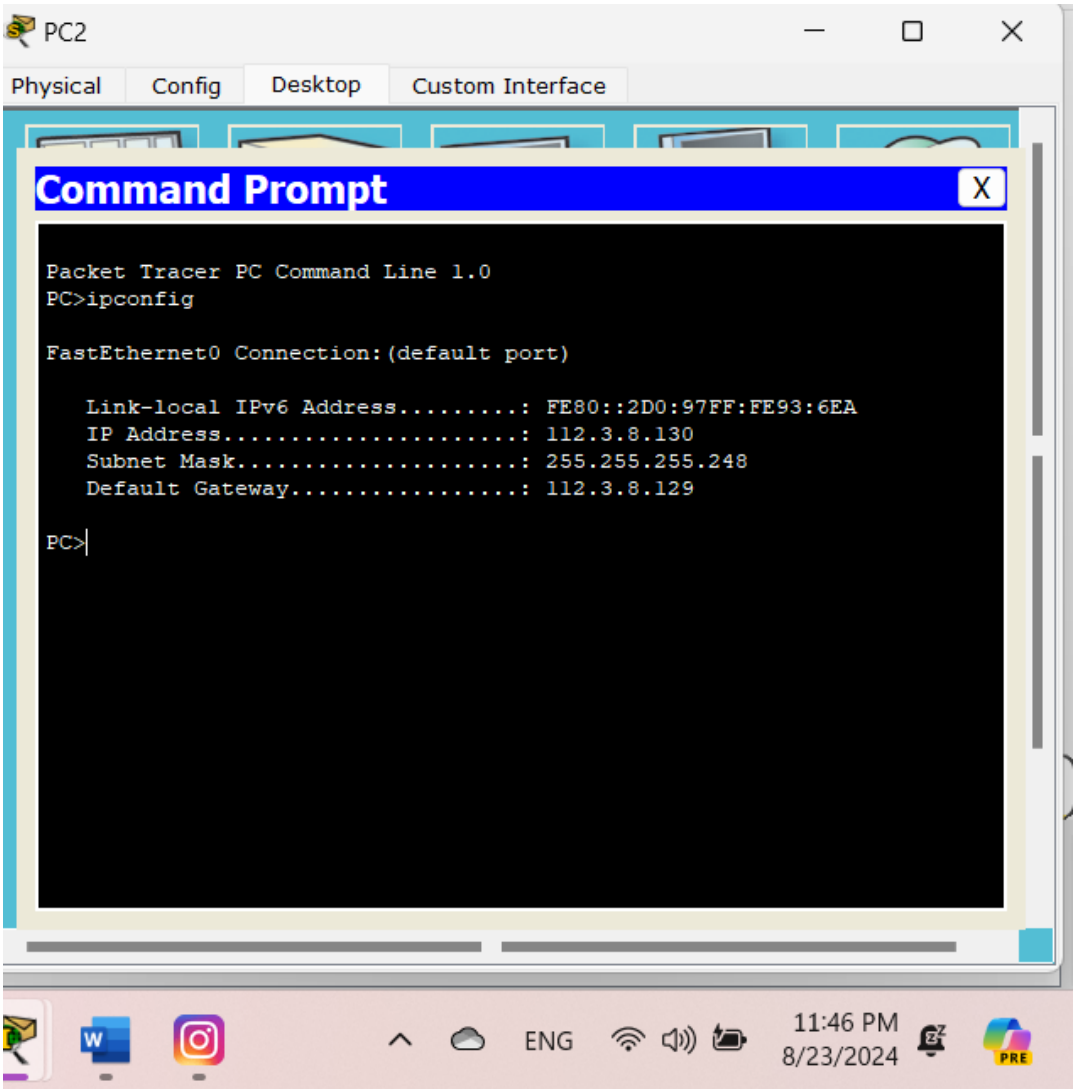


Figure 95:testing the ipconfig command for PC2.

As shown in the figure, all results for pc2 were correct and as expected:

- IP address: 112.3.8.130
- Subnet Mask: 255.255.255.248
- Default gateway: 112.3.8.129

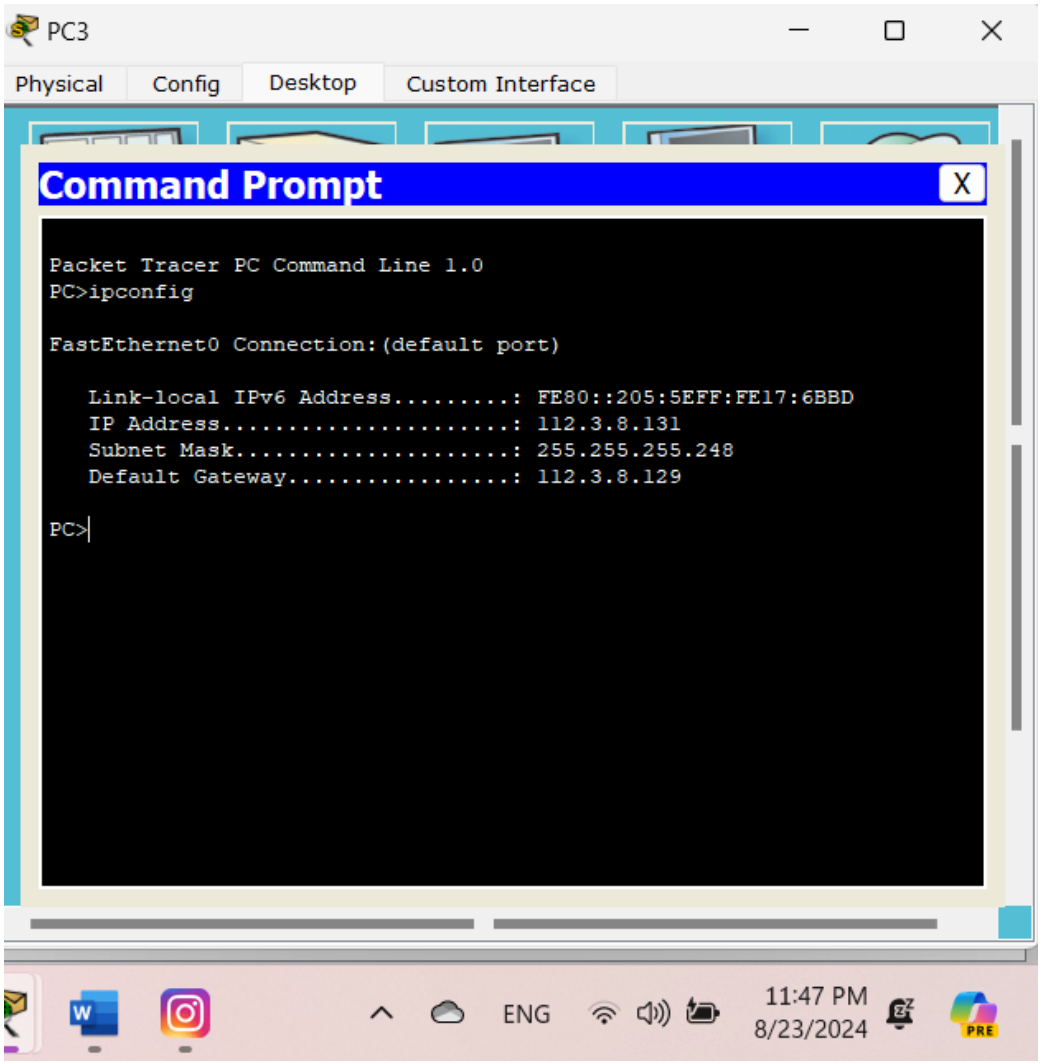


Figure 96:testing the ipconfig command for PC3.

As shown in the figure, all results for pc3 were correct and as expected:

- IP address: 112.3.8.131
- Subnet Mask: 255.255.255.248
- Default gateway: 112.3.8.129

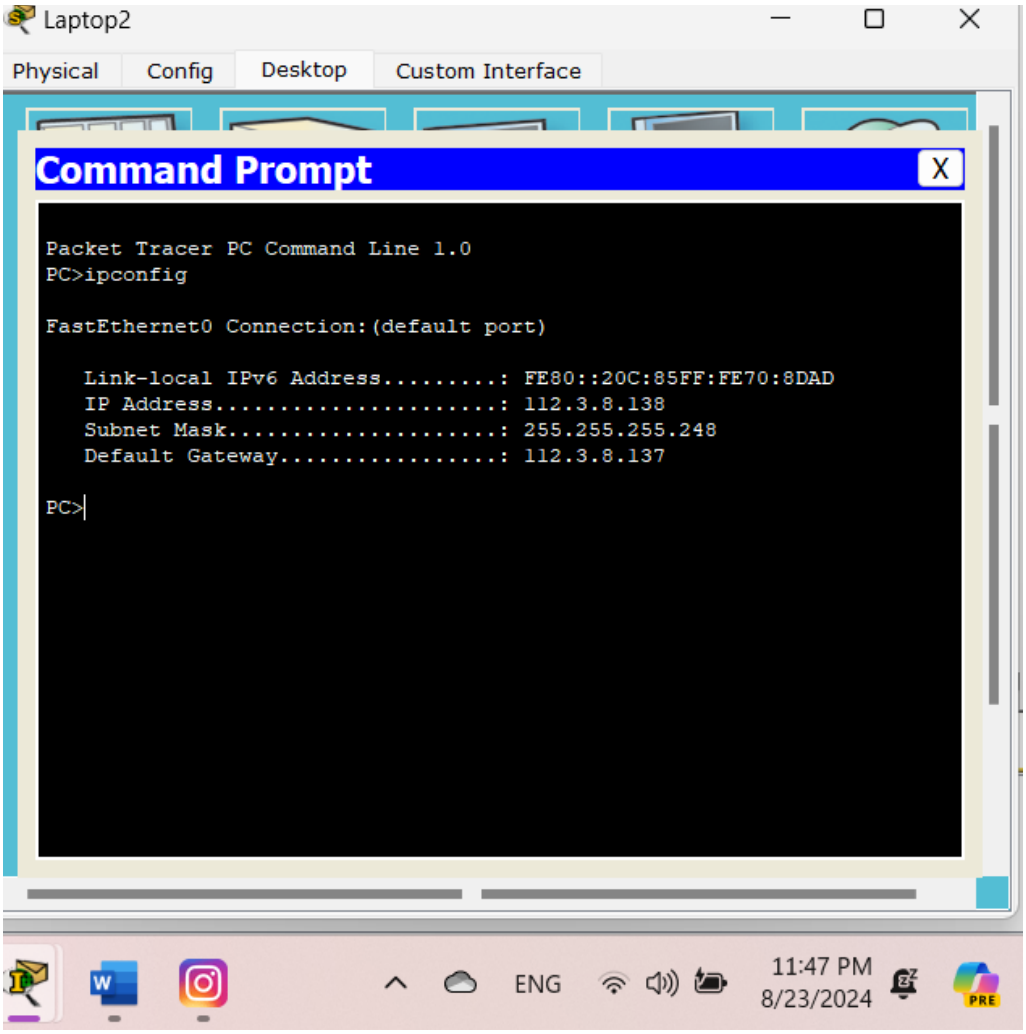


Figure 97:testing the ipconfig command for Laptop2.

As shown in the figure, all results for Laptop2 were correct and as expected:

- IP address: 112.3.8.138
- Subnet Mask: 255.255.255.248
- Default gateway: 112.3.8.137

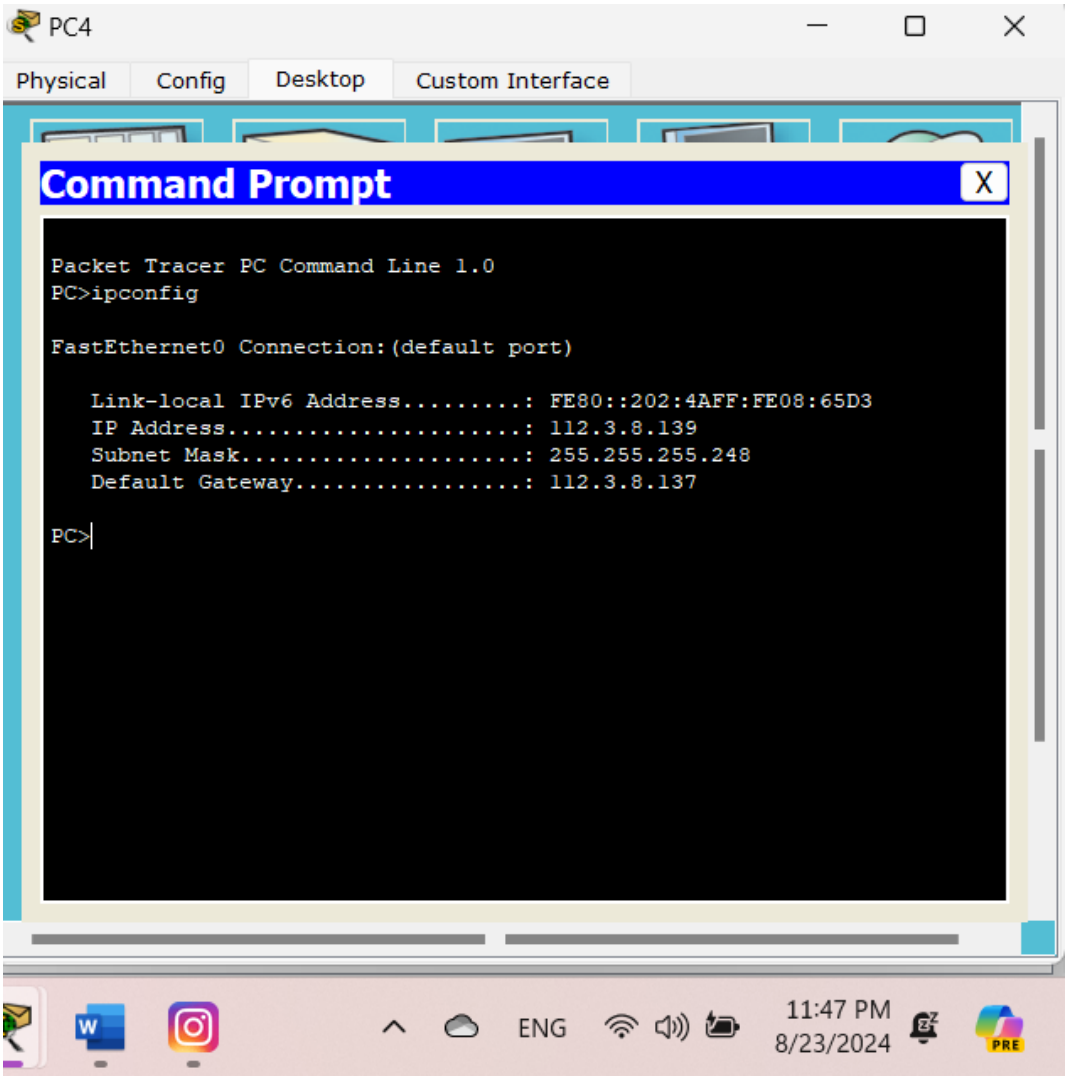


Figure 98:testing the ipconfig command for PC4.

As shown in the figure, all results for pc4 were correct and as expected:

- IP address: 112.3.8.139
- Subnet Mask: 255.255.255.248
- Default gateway: 112.3.8.137

Conclusion

this group project is the embodiment of a comprehensive exercise which applies networking principles to Packet Tracer. By taking one student ID in the group and using it to pick the IP addressing structure makes the project stress on the importance of IP subnetting for efficient network design. Moreover, this topology includes servers and end devices in different subnets thereby increasing its complexity that requires careful configuration and routing setup. The use of OSPF routing protocol with segmented networks areas demonstrates how routing algorithms are vital in efficient data transfer; while configuring servers for DNS, web, and email servers among others provides an element of practicality by simulating some services commonly found within enterprise networks.

Connectivity tests, website access as well as email functionalities are part of testing phase which validates whether or not the network performs what is anticipated. In this sense students can troubleshoot their own problems, test them out and document their network configurations since they are involved in hands-on activities that made them familiar with these activities.

By so doing, it will both review theoretical knowledge attained and equip students directly with the technical expertise needed to excel in this rapidly evolving field of computer networking. The collaborative nature that characterizes team-based learning improves interpersonal relationships within groups thus enhancing communication skills as well as problem solving abilities.

Teamwork:

Our team is committed to working closely together to ensure the success of our project. We have created a tradition of holding daily Google Meet sessions that help us cooperate, share news and challenges for discussion. During these meetings, which make sure we are in line with one another, we can come up with thoughts and solutions that we could think about together and support each other. We meet once every day to concentrate on what should be done during this day and then accomplish both the system development project and its final report successfully. This regular interaction and collaboration enabled us to realize our objectives.

References:

[1] : Clou DNS

https://www.cloudns.net/blog/what-is-ipv4-everything-you-need-to-know/

[Accessed on 21/8/2024 at 10:30 PM]

[2] Techtarget

https://www.techtarget.com/searchnetworking/definition/OSPF-Open-Shortest-Path-First#:~:text=Open%20Shortest%20Path%20First%20(OSPF)%20is%20an%20IP%20routing%20protocol,direct%20traffic%20on%20IP%20networks.

[Accessed on 24/8/2024 at 12:27 PM]

Appendix:

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>ENCS3320-Summer Course Website</title>
    <style>
        @import
url('https://fonts.googleapis.com/css2?family=Roboto:wght@400;500;700&display=swap');

        body {
            font-family: 'Roboto', sans-serif;
            background: linear-gradient(135deg, #f4f4f4 40%, #d7d7d7 100%);
            color: #333;
            margin: 0;
            padding: 0;
            display: flex;
            flex-direction: column;
            align-items: center;
            justify-content: flex-start;
            height: 100vh;
        }
        header {
            background-color: #4169E1;
            width: 100%;
            padding: 20px;
            box-shadow: 0px 4px 10px rgba(0,0,0,0.1);
            text-align: center;
            position: relative;
        }
```

```
header h1 {
    margin: 0;
    color: white;
    font-size: 1.7em;
    text-transform: uppercase;
    letter-spacing: 2px;
    font-weight: 700;
}
.content {
    background: white;
    border-radius: 10px;
    padding: 30px;
    box-shadow: 0px 8px 20px rgba(0,0,0,0.1);
    max-width: 700px;
    width: 85%;
    margin-top: 20px;
}
.content h2 {
    color: #4169E1;
    font-size: 1.8em;
    text-align: center;
    font-weight: 500;
}
.content p {
    font-size: 1.1em;
    line-height: 1.5em;
    text-align: center;
    color: #555;
}
.content p span {
    color: #BC8F8F;
```

```
    font-weight: bold;
}
.members {
    margin-top: 20px;
    text-align: center;
}
.members h3 {
    font-size: 1.5em;
    color: #4169E1;
    margin-bottom: 25px;
    text-align: center;
    font-weight: 500;
}
.members ul {
    list-style: none;
    padding: 20px;
    display: inline-block;
    text-align: left;
}
.members ul li {
    background-color: #FFFF;
    padding: 10px 20px;
    margin-bottom: 8px;
    border-radius: 11px;
    box-shadow: 0px 4px 4px #4169E1;
    font-size: 1.1em;
    color: #333;
}
footer {
    margin-top: 70px;
    text-align: center;
```

```
            font-size: 0.85em;
            color: #777;
        }
    </style>
</head>
<body>
    <header>
        <h1>ENCS3320-Summer Course Website ✨</h1>
    </header>
    <div class="content">
        <h2>Welcome to Computer Networks</h2>
        <p>We are excited to have you here! Welcome to the world of networking, where connections create endless possibilities.</p>

        <div class="members">
            <h3>Meet the Team</h3>
            <ul>
                <li>Member 1: Diana Naseer - ID:1210363</li>
                <li>Member 2: Hala Mohammad - ID:1213012</li>
                <li>Member 3: Rua Alaa Al-Dein - ID:1221727</li>
                <!-- Add more members as needed -->
            </ul>
        </div>
    </div>

    <footer>
        &copy; 2024 ENCS3320 Summer Course. All Rights Reserved.
    </footer>

</body>
</html>
```