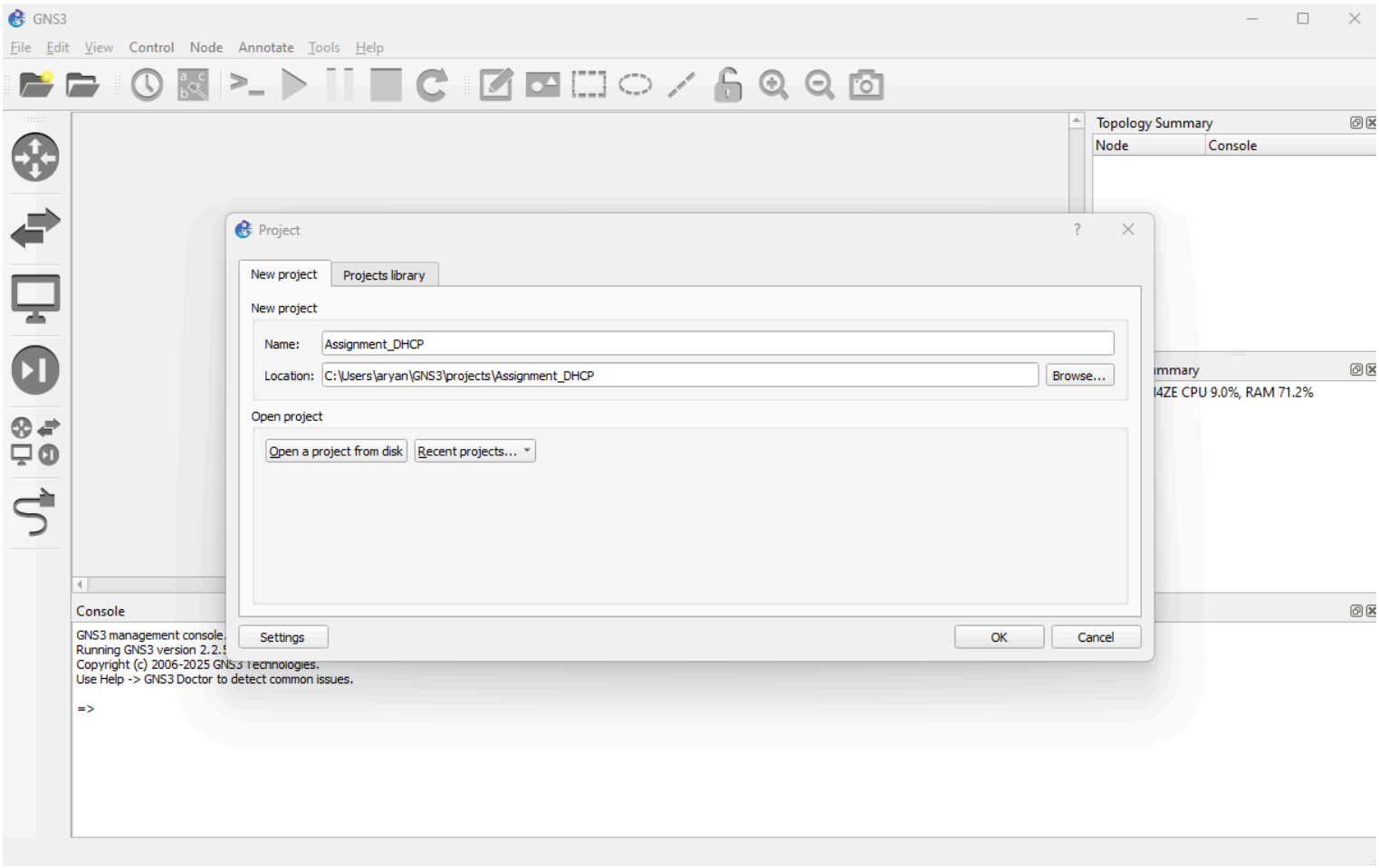
Assignment

Name - *Aryan Thapliyal*

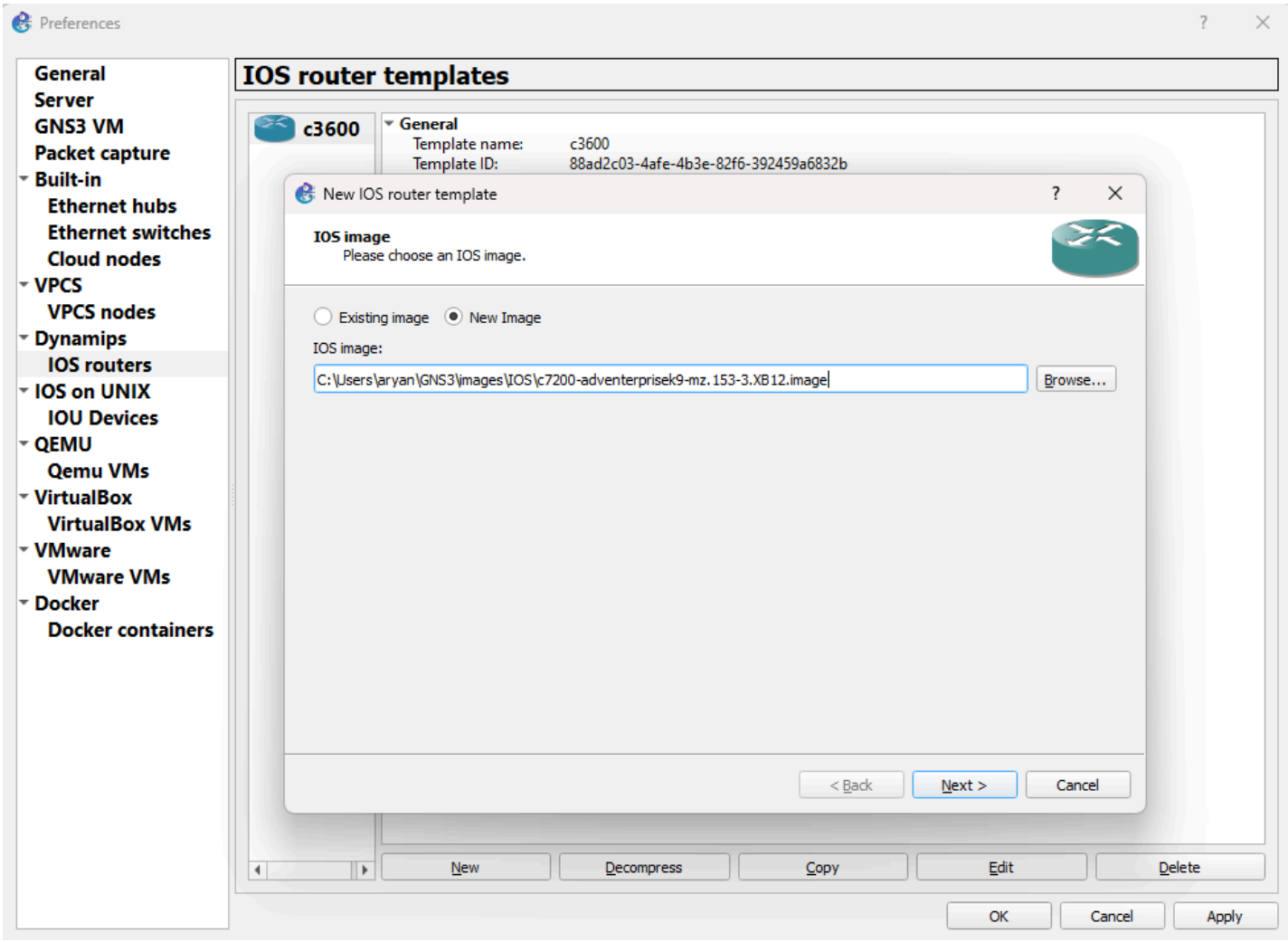
Roll No. - *13*

Subject - *Internetworking with TCP/IP*

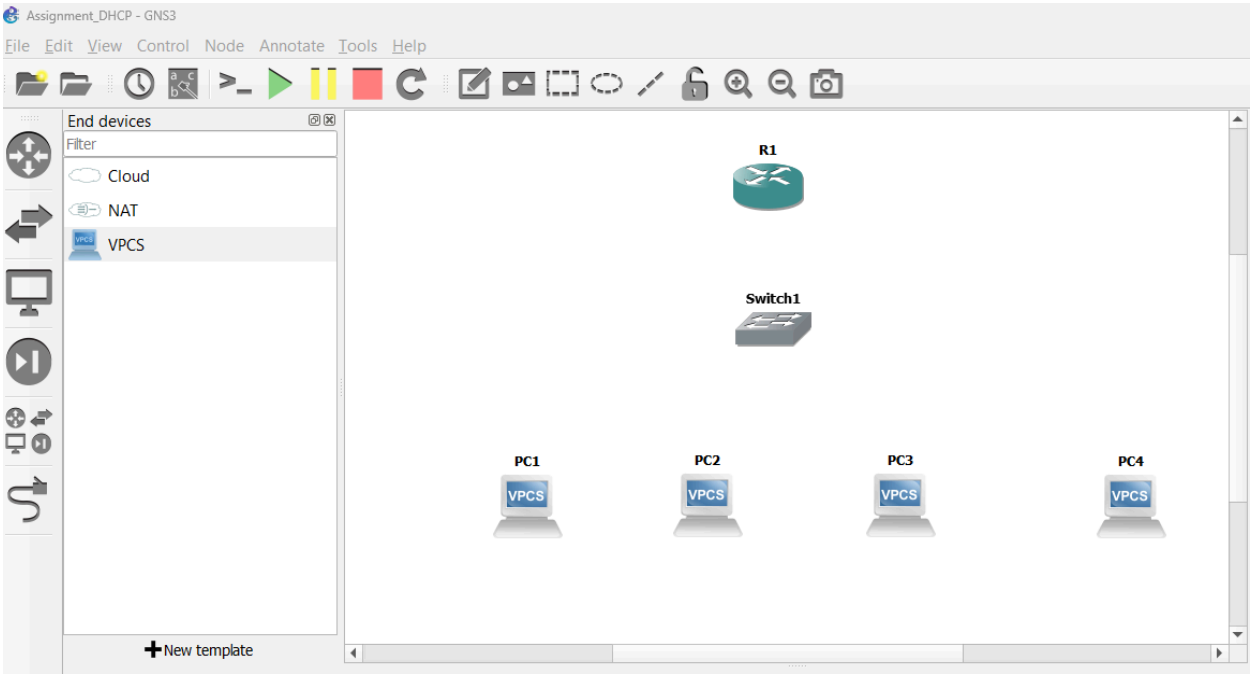
Step 1:



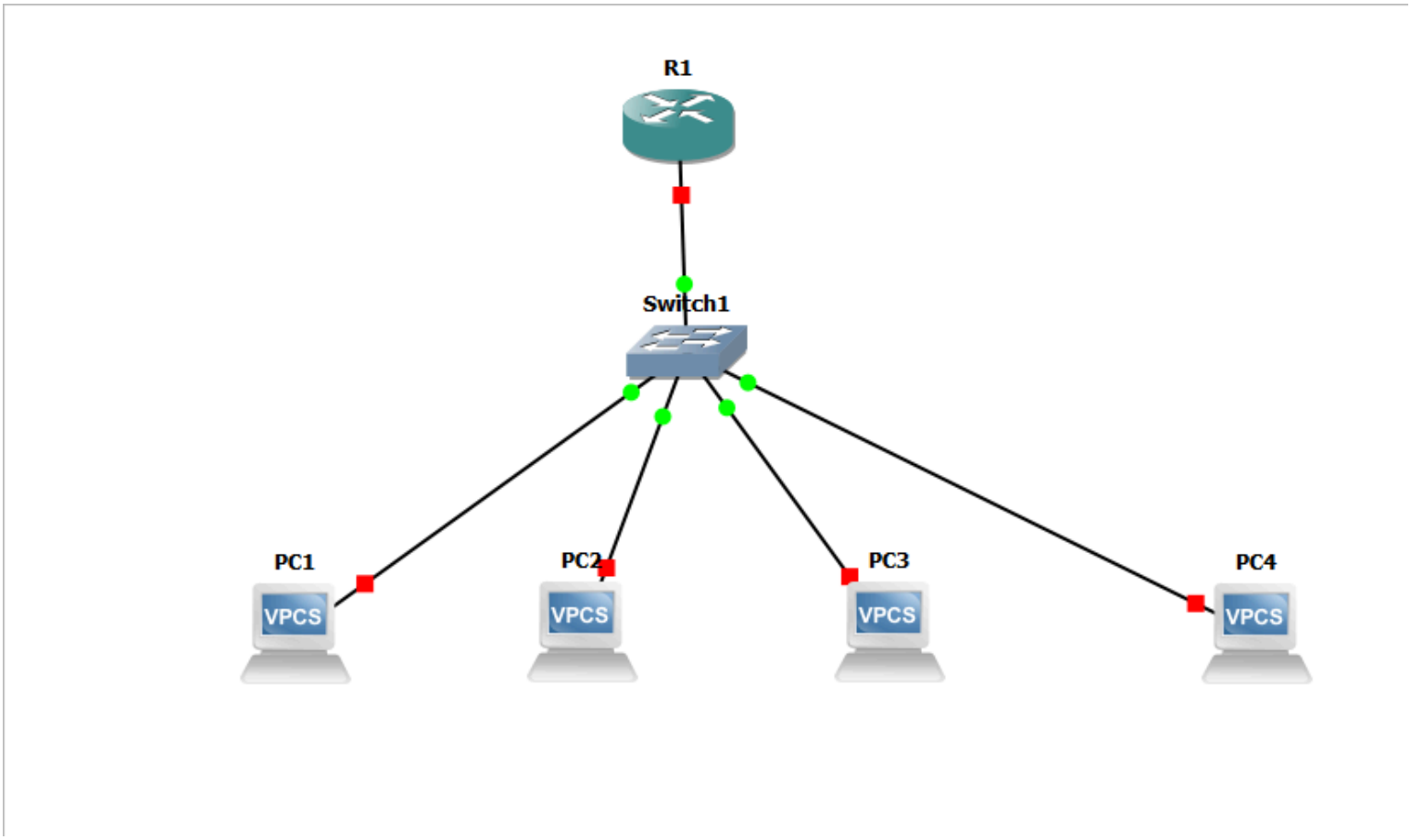
Step 2:


Preferences
General
Server
GNS3 VM
Packet capture
Built-in
Ethernet hubs
Ethernet switches
Cloud nodes
VPCS
VPCS nodes
Dynamips
IOS routers
IOS on UNIX
IOU Devices
QEMU
Qemu VMs
VirtualBox
VirtualBox VMs
VMware
VMware VMs
Docker
Docker containers
IOS router templates
c3600
General
Template name: c3600
Template ID: 88ad2c03-4afe-4b3e-82f6-392459a6832b
New IOS router template
IOS image
Please choose an IOS image.
Existing image
New Image
IOS image:
C:\Users\aryan\GNS3\images\IOS\c7200-adventerprisek9-mz.153-3.XB12.image
Browse...
< Back
Next >
Cancel
New
Decompress
Copy
Edit
Delete
OK
Cancel
Apply

Step 3:


Assignment_DHCP - GNS3
File Edit View Control Node Annotate Tools Help
End devices
Filter
Cloud
NAT
VPCS
New template
R1
Switch1
PC1
PC2
PC3
PC4
VPCS

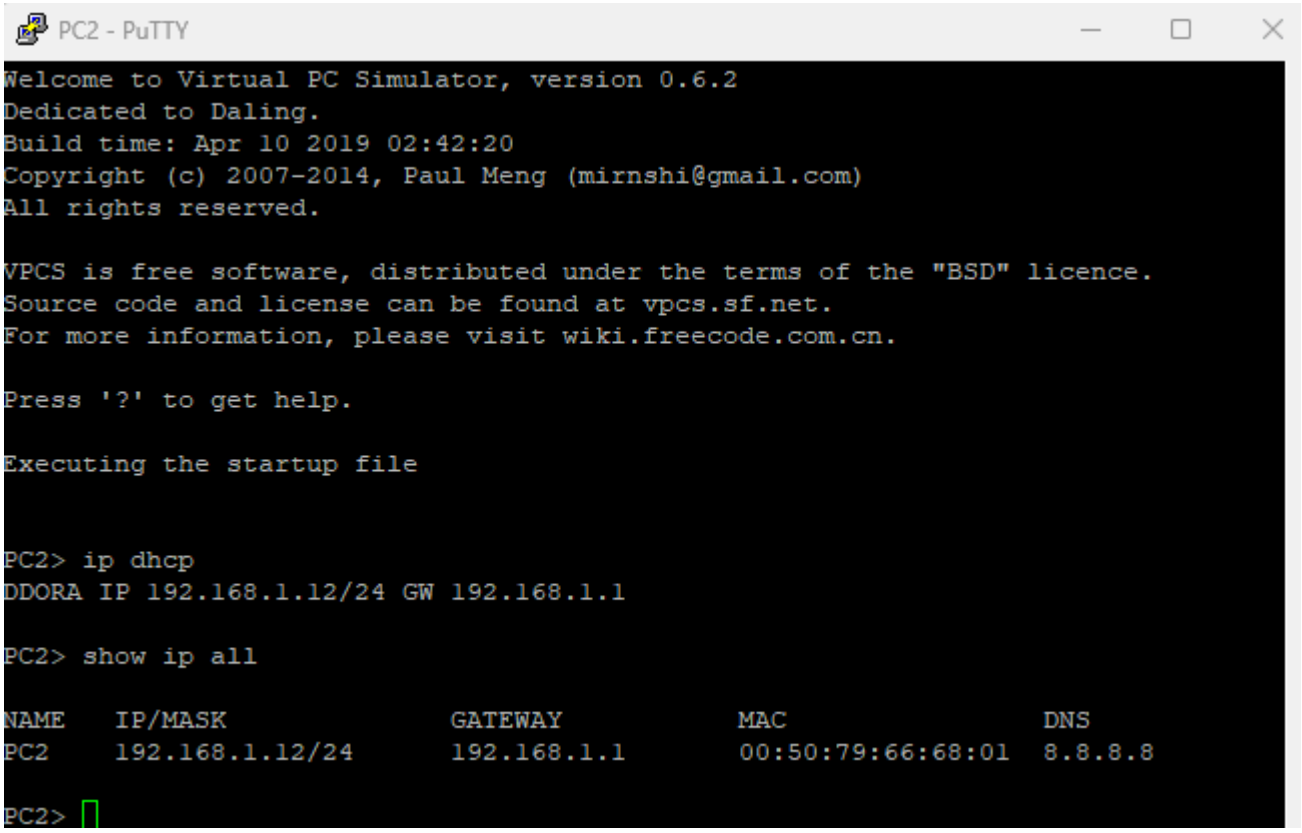
Step 4:



Step 5:

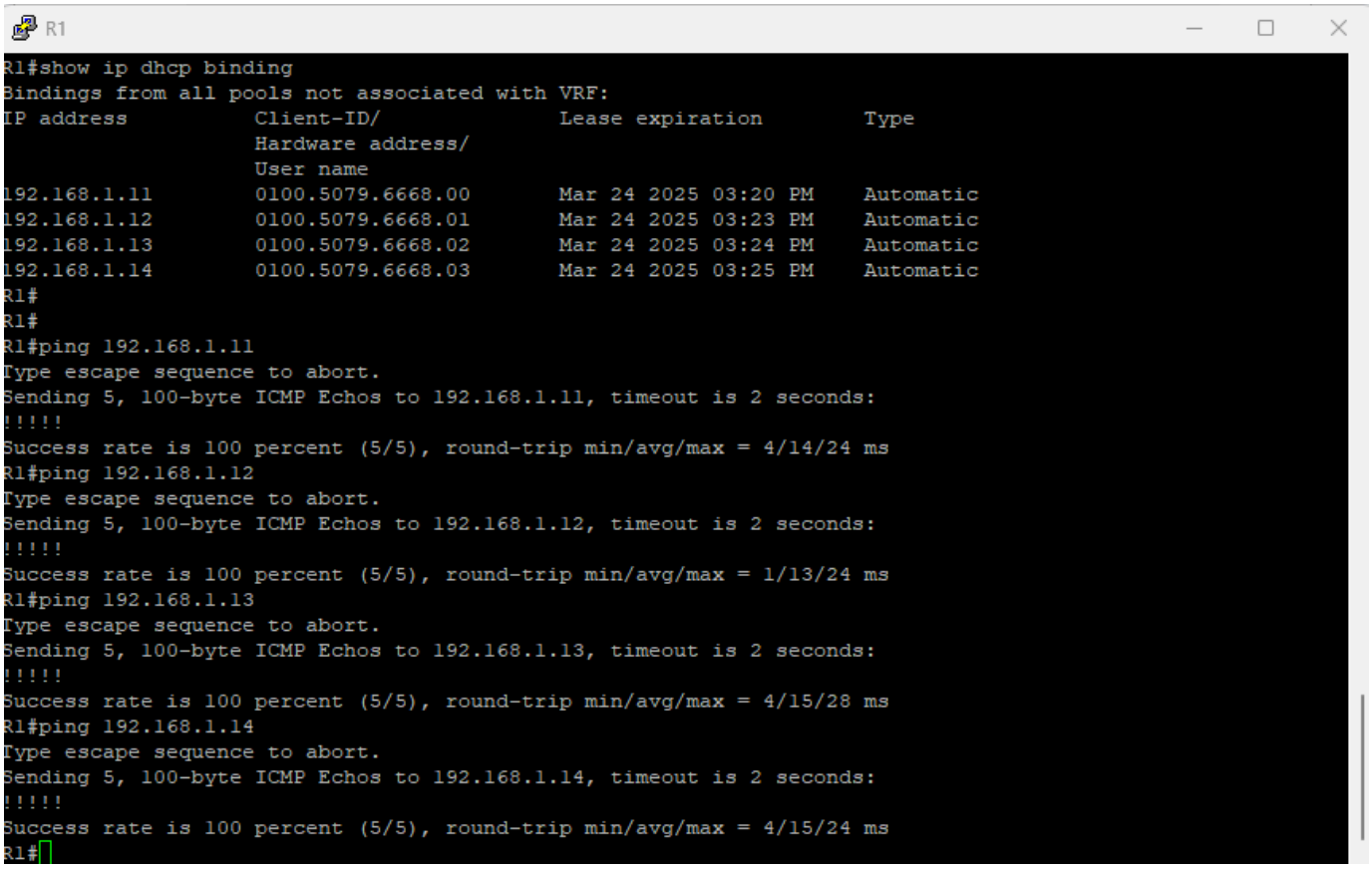
```
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface FastEthernet0/0
R1(config-if)#ip address 192.168.1.1 255.255.255.0
R1(config-if)#no shutdown
R1(config-if)#exit
R1(config)#
*Mar 23 15:16:40.947: %LINK-3-UPDOWN: Interface FastEthernet0/0, changed state t
o up
*Mar 23 15:16:41.947: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEtherr
et0/0, changed state to up
R1(config)#ip dhcp excluded-address 192.168.1.1 192.168.1.10
R1(config)#ip dhcp pool MY_POOL
R1(dhcp-config)#network 192.168.1.0 255.255.255.0
R1(dhcp-config)#default-router 192.168.1.1
R1(dhcp-config)#dns-server 8.8.8.8
R1(dhcp-config)#exit
R1(config)#
```

Step 6:



Repeated the above step in all the PCs

Assigned addresses:



```
R1#show ip dhcp server statistics
Memory usage         57816
Address pools        1
Database agents      0
Automatic bindings   4
Manual bindings      0
Expired bindings     0
Malformed messages   0
Secure arp entries   0

Message              Received
BOOTREQUEST          0
DHCPDISCOVER         8
DHCPREQUEST          4
DHCPDECLINE          0
DHCPRELEASE          0
DHCPINFORM           0

Message              Sent
BOOTREPLY            0
DHCPOFFER            4
DHCPACK              4
DHCPNAK              0
R1#
```

Additional Exercise:

Q1. What is DHCP and how does it work?

Ans. DHCP (Dynamic Host Configuration Protocol) is a network protocol that automatically assigns IP addresses to devices in a network. Instead of manually configuring each device, a DHCP server dynamically assigns an IP from a predefined pool.

1. **Discovery (D)** → The client (PC) sends a DHCPDISCOVER broadcast request to find available DHCP servers.
2. **Offer (O)** → The DHCP server responds with a DHCPOFFER, offering an available IP address.
   Request (R) → The client sends a DHCPREQUEST to request the offered IP address.
3. **Acknowledgement (A)** → The server confirms with a DHCPACK, finalizing the lease.

Once complete, the PC is assigned an IP address, subnet mask, gateway, and DNS settings.

Q2. What are the advantages and disadvantages of using DHCP?
Ans. Advantages:

- Automatic IP assignment
- Centralized Management
- Efficient IP utilization
- Flexibility

Disadvantages:

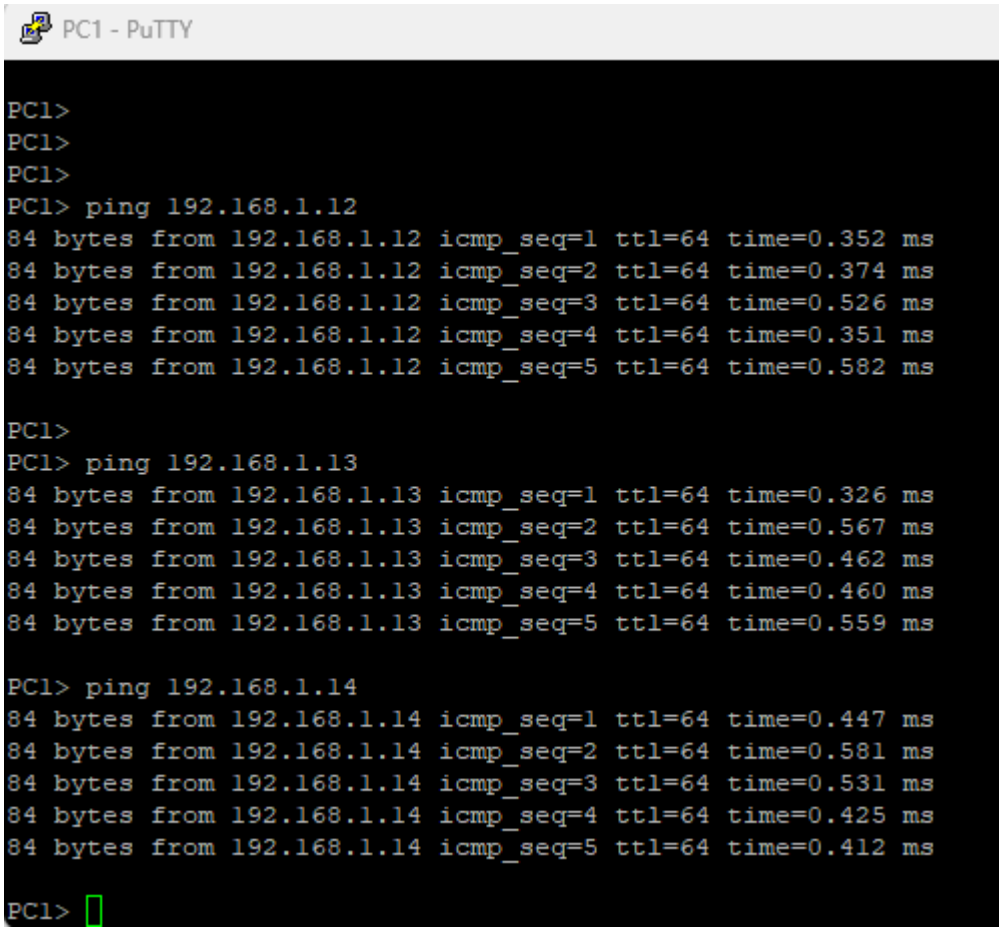
- Single Point of Failure
- Security Risks
- Short-Term IP Leases

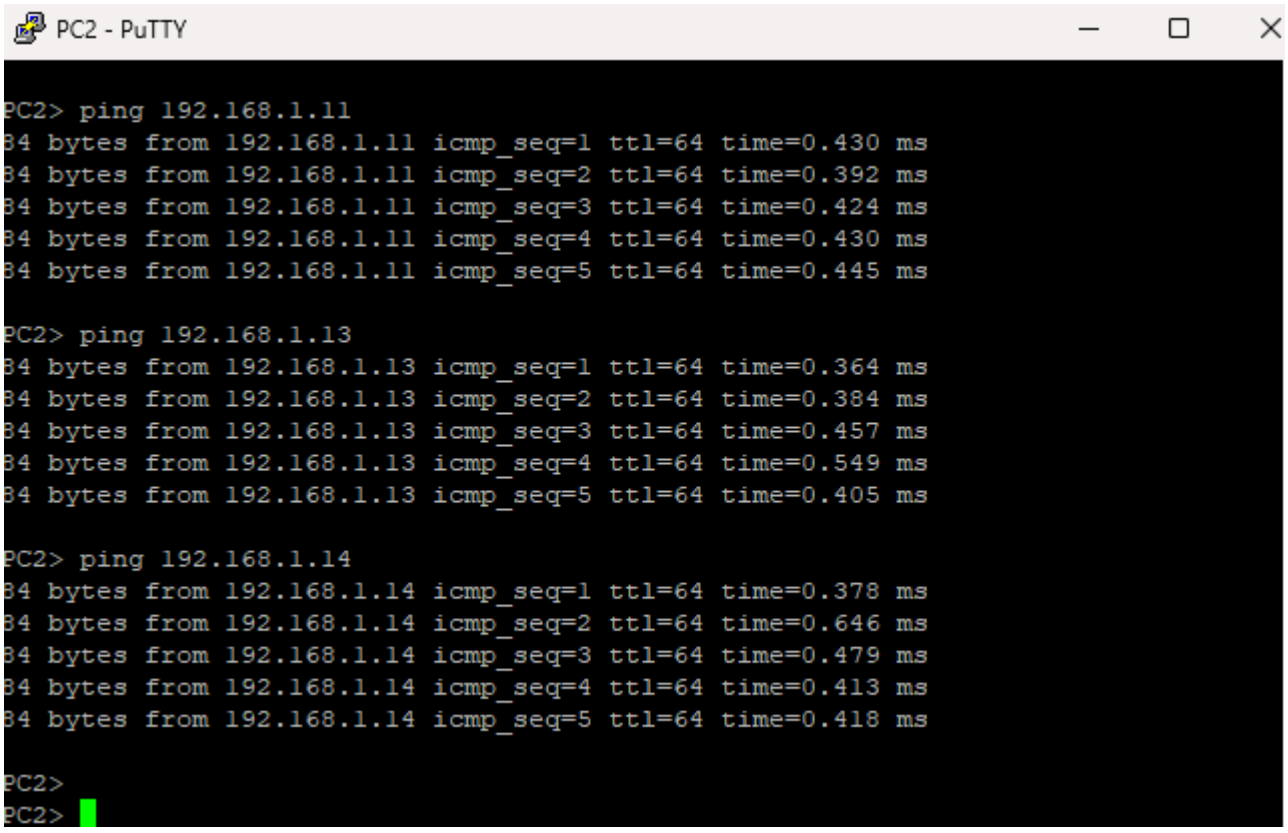
Q3. How does DHCP help in managing IP addresses in large networks?
Ans. In large networks with hundreds or thousands of devices, manually assigning IPs is impractical. DHCP simplifies management by:

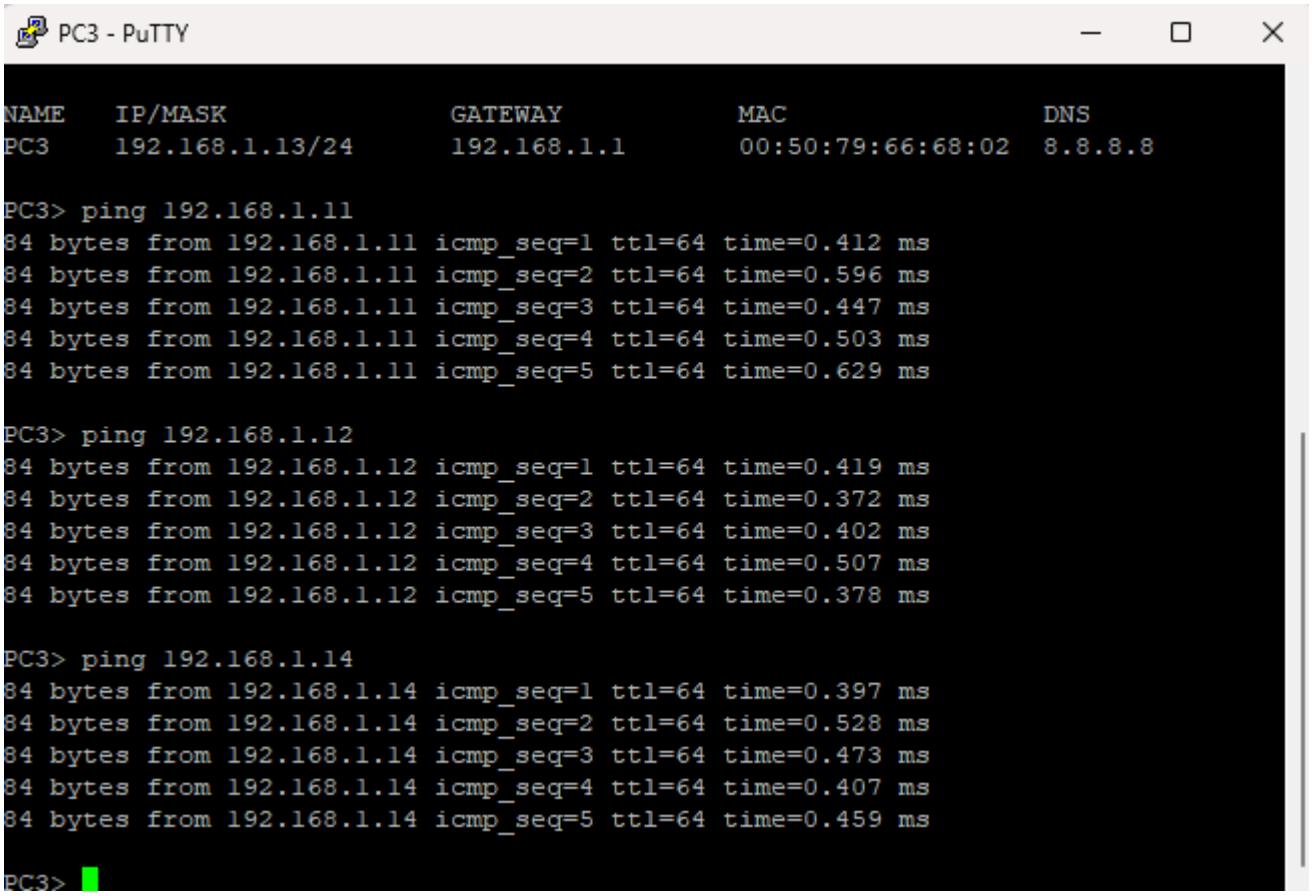
- Automatic IP assignment
- Recycling IPs
- Centralized Control
- Reducing Configuration Errors

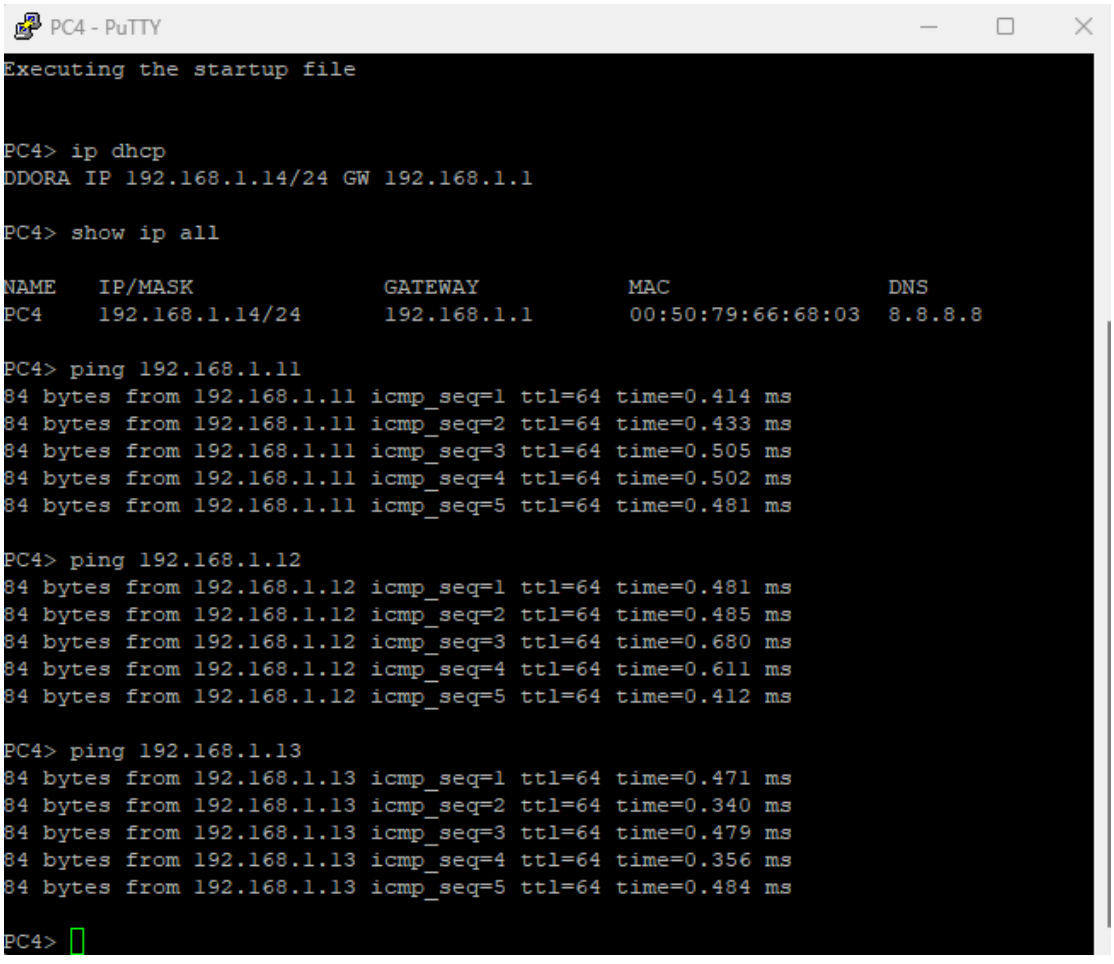
Q4. Can each PC's successfully ping the other PC's interface? Explain how you tested this and what were the results.

Ans.


PC1 - PuTTY
PC1>
PC1>
PC1>
PC1> ping 192.168.1.12
84 bytes from 192.168.1.12 icmp_seq=1 ttl=64 time=0.352 ms
84 bytes from 192.168.1.12 icmp_seq=2 ttl=64 time=0.374 ms
84 bytes from 192.168.1.12 icmp_seq=3 ttl=64 time=0.526 ms
84 bytes from 192.168.1.12 icmp_seq=4 ttl=64 time=0.351 ms
84 bytes from 192.168.1.12 icmp_seq=5 ttl=64 time=0.582 ms
PC1>
PC1> ping 192.168.1.13
84 bytes from 192.168.1.13 icmp_seq=1 ttl=64 time=0.326 ms
84 bytes from 192.168.1.13 icmp_seq=2 ttl=64 time=0.567 ms
84 bytes from 192.168.1.13 icmp_seq=3 ttl=64 time=0.462 ms
84 bytes from 192.168.1.13 icmp_seq=4 ttl=64 time=0.460 ms
84 bytes from 192.168.1.13 icmp_seq=5 ttl=64 time=0.559 ms
PC1> ping 192.168.1.14
84 bytes from 192.168.1.14 icmp_seq=1 ttl=64 time=0.447 ms
84 bytes from 192.168.1.14 icmp_seq=2 ttl=64 time=0.581 ms
84 bytes from 192.168.1.14 icmp_seq=3 ttl=64 time=0.531 ms
84 bytes from 192.168.1.14 icmp_seq=4 ttl=64 time=0.425 ms
84 bytes from 192.168.1.14 icmp_seq=5 ttl=64 time=0.412 ms
PC1>


PC2 - PuTTY
PC2> ping 192.168.1.11
84 bytes from 192.168.1.11 icmp_seq=1 ttl=64 time=0.430 ms
84 bytes from 192.168.1.11 icmp_seq=2 ttl=64 time=0.392 ms
84 bytes from 192.168.1.11 icmp_seq=3 ttl=64 time=0.424 ms
84 bytes from 192.168.1.11 icmp_seq=4 ttl=64 time=0.430 ms
84 bytes from 192.168.1.11 icmp_seq=5 ttl=64 time=0.445 ms
PC2> ping 192.168.1.13
84 bytes from 192.168.1.13 icmp_seq=1 ttl=64 time=0.364 ms
84 bytes from 192.168.1.13 icmp_seq=2 ttl=64 time=0.384 ms
84 bytes from 192.168.1.13 icmp_seq=3 ttl=64 time=0.457 ms
84 bytes from 192.168.1.13 icmp_seq=4 ttl=64 time=0.549 ms
84 bytes from 192.168.1.13 icmp_seq=5 ttl=64 time=0.405 ms
PC2> ping 192.168.1.14
84 bytes from 192.168.1.14 icmp_seq=1 ttl=64 time=0.378 ms
84 bytes from 192.168.1.14 icmp_seq=2 ttl=64 time=0.646 ms
84 bytes from 192.168.1.14 icmp_seq=3 ttl=64 time=0.479 ms
84 bytes from 192.168.1.14 icmp_seq=4 ttl=64 time=0.413 ms
84 bytes from 192.168.1.14 icmp_seq=5 ttl=64 time=0.418 ms
PC2>
PC2>


PC3 - PuTTY
NAME IP/MASK GATEWAY MAC DNS
PC3 192.168.1.13/24 192.168.1.1 00:50:79:66:68:02 8.8.8.8
PC3> ping 192.168.1.11
84 bytes from 192.168.1.11 icmp_seq=1 ttl=64 time=0.412 ms
84 bytes from 192.168.1.11 icmp_seq=2 ttl=64 time=0.596 ms
84 bytes from 192.168.1.11 icmp_seq=3 ttl=64 time=0.447 ms
84 bytes from 192.168.1.11 icmp_seq=4 ttl=64 time=0.503 ms
84 bytes from 192.168.1.11 icmp_seq=5 ttl=64 time=0.629 ms
PC3> ping 192.168.1.12
84 bytes from 192.168.1.12 icmp_seq=1 ttl=64 time=0.419 ms
84 bytes from 192.168.1.12 icmp_seq=2 ttl=64 time=0.372 ms
84 bytes from 192.168.1.12 icmp_seq=3 ttl=64 time=0.402 ms
84 bytes from 192.168.1.12 icmp_seq=4 ttl=64 time=0.507 ms
84 bytes from 192.168.1.12 icmp_seq=5 ttl=64 time=0.378 ms
PC3> ping 192.168.1.14
84 bytes from 192.168.1.14 icmp_seq=1 ttl=64 time=0.397 ms
84 bytes from 192.168.1.14 icmp_seq=2 ttl=64 time=0.528 ms
84 bytes from 192.168.1.14 icmp_seq=3 ttl=64 time=0.473 ms
84 bytes from 192.168.1.14 icmp_seq=4 ttl=64 time=0.407 ms
84 bytes from 192.168.1.14 icmp_seq=5 ttl=64 time=0.459 ms
PC3>


PC4 - PuTTY
Executing the startup file
PC4> ip dhcp
DDORA IP 192.168.1.14/24 GW 192.168.1.1
PC4> show ip all
NAME IP/MASK GATEWAY MAC DNS
PC4 192.168.1.14/24 192.168.1.1 00:50:79:66:68:03 8.8.8.8
PC4> ping 192.168.1.11
84 bytes from 192.168.1.11 icmp_seq=1 ttl=64 time=0.414 ms
84 bytes from 192.168.1.11 icmp_seq=2 ttl=64 time=0.433 ms
84 bytes from 192.168.1.11 icmp_seq=3 ttl=64 time=0.505 ms
84 bytes from 192.168.1.11 icmp_seq=4 ttl=64 time=0.502 ms
84 bytes from 192.168.1.11 icmp_seq=5 ttl=64 time=0.481 ms
PC4> ping 192.168.1.12
84 bytes from 192.168.1.12 icmp_seq=1 ttl=64 time=0.481 ms
84 bytes from 192.168.1.12 icmp_seq=2 ttl=64 time=0.485 ms
84 bytes from 192.168.1.12 icmp_seq=3 ttl=64 time=0.680 ms
84 bytes from 192.168.1.12 icmp_seq=4 ttl=64 time=0.611 ms
84 bytes from 192.168.1.12 icmp_seq=5 ttl=64 time=0.412 ms
PC4> ping 192.168.1.13
84 bytes from 192.168.1.13 icmp_seq=1 ttl=64 time=0.471 ms
84 bytes from 192.168.1.13 icmp_seq=2 ttl=64 time=0.340 ms
84 bytes from 192.168.1.13 icmp_seq=3 ttl=64 time=0.479 ms
84 bytes from 192.168.1.13 icmp_seq=4 ttl=64 time=0.356 ms
84 bytes from 192.168.1.13 icmp_seq=5 ttl=64 time=0.484 ms
PC4>