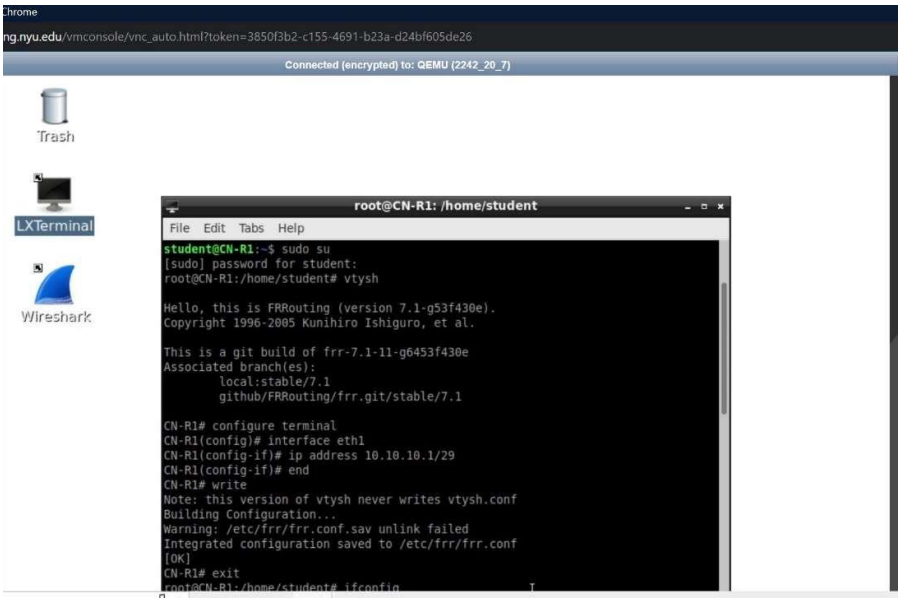
IP Interfaces Part 1

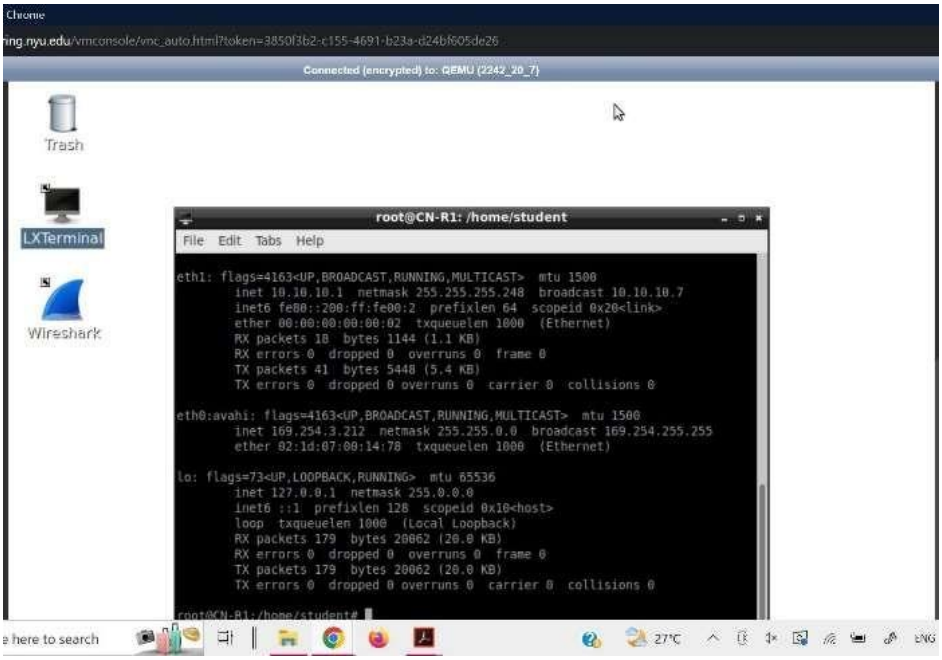
For this assignment, IP addresses assigned to R1, R2 and Kali are:
R1 - 10.10.10.1
R2 – 10.10.10.2
Kali – 10.10.10.3

Part 1: Configuring Network Interfaces

Screenshots showing the configuration steps done for R1-

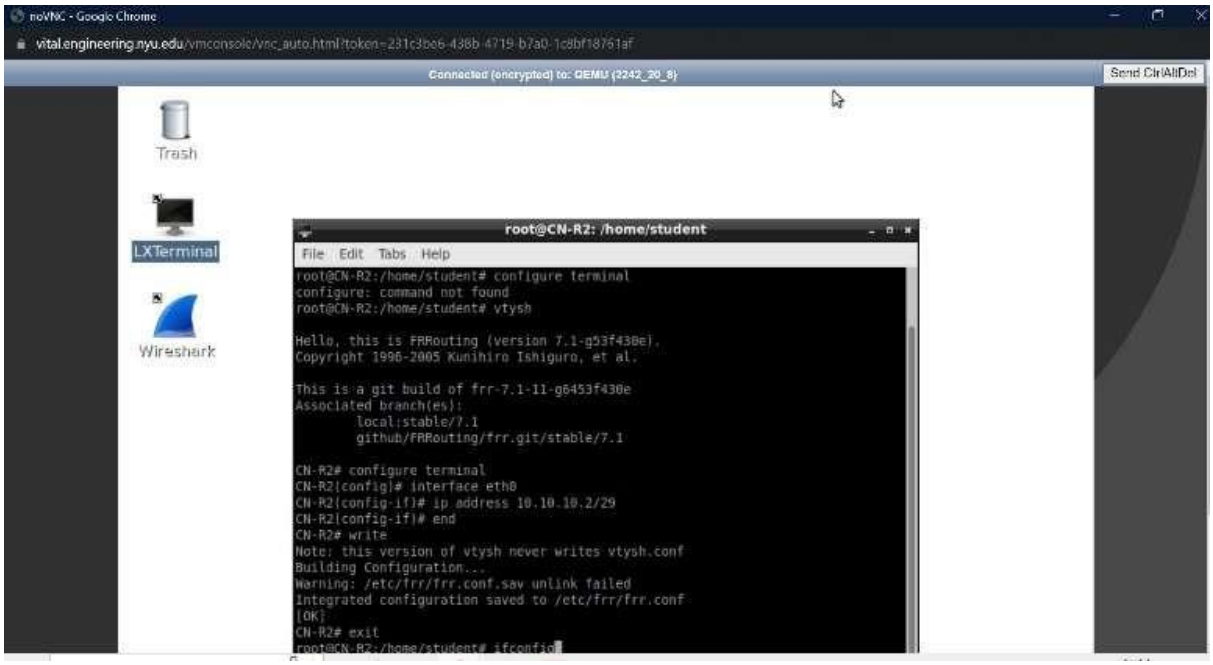


R1 config commands

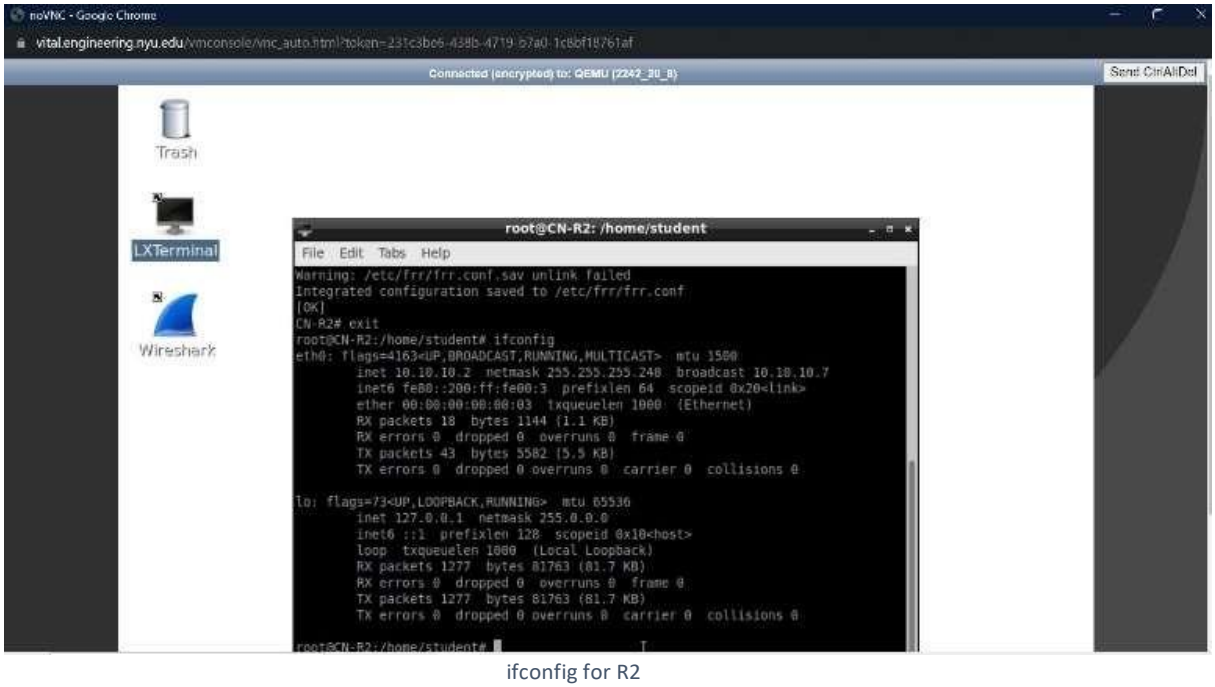


ifconfig for R1

Screenshots showing the commands given for R2 configuration –

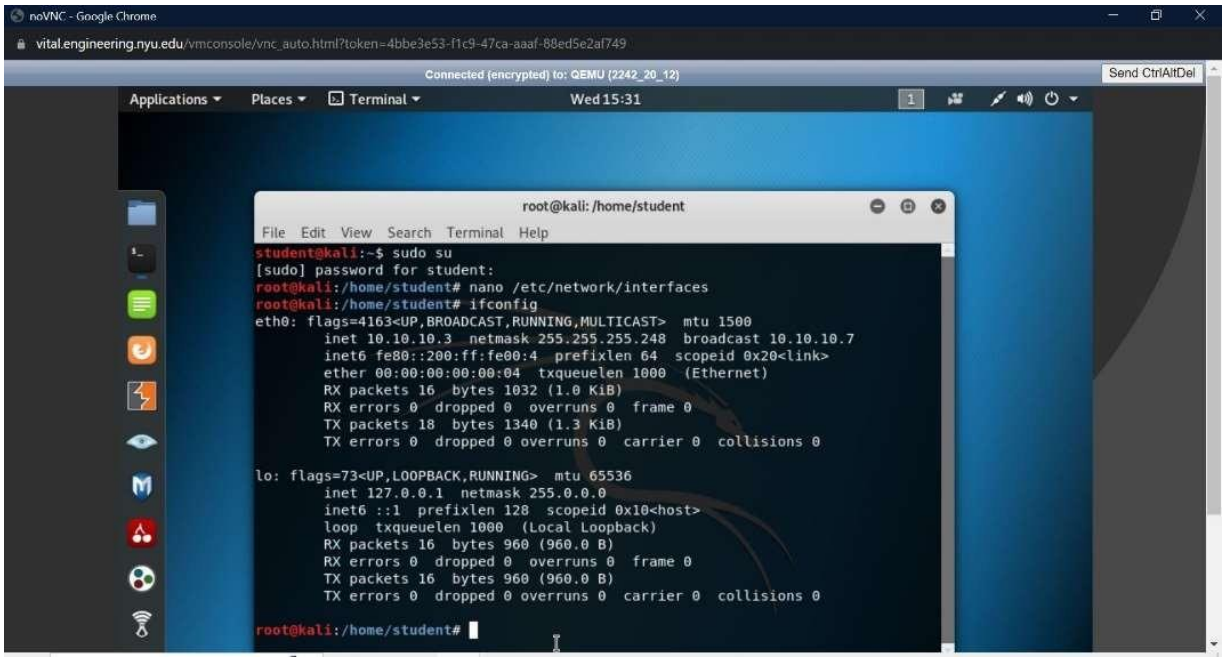


R2 configuration commands



ifconfig for R2

Part 2: Configuring Kali



ifconfig for Kali after reboot

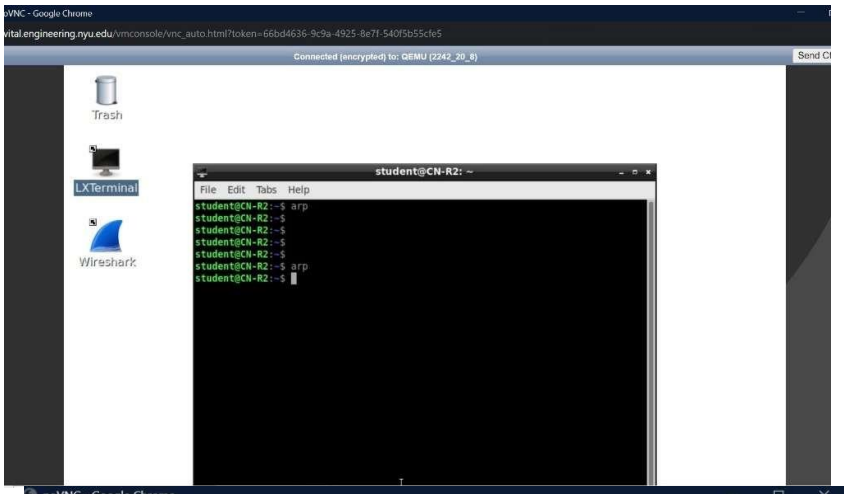
Part 3: Questions

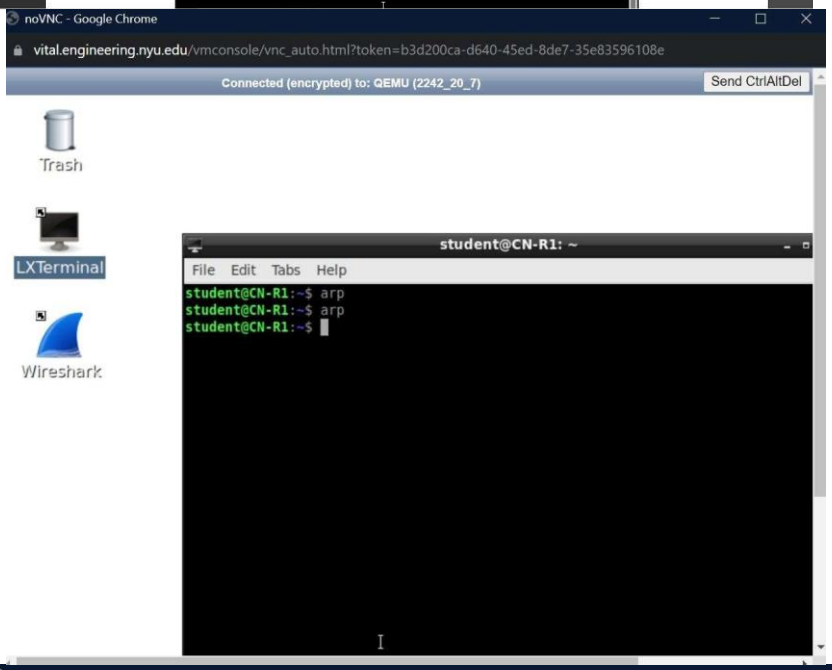
a) Why did we choose the /29 subnet mask for Area 0? (10 points)

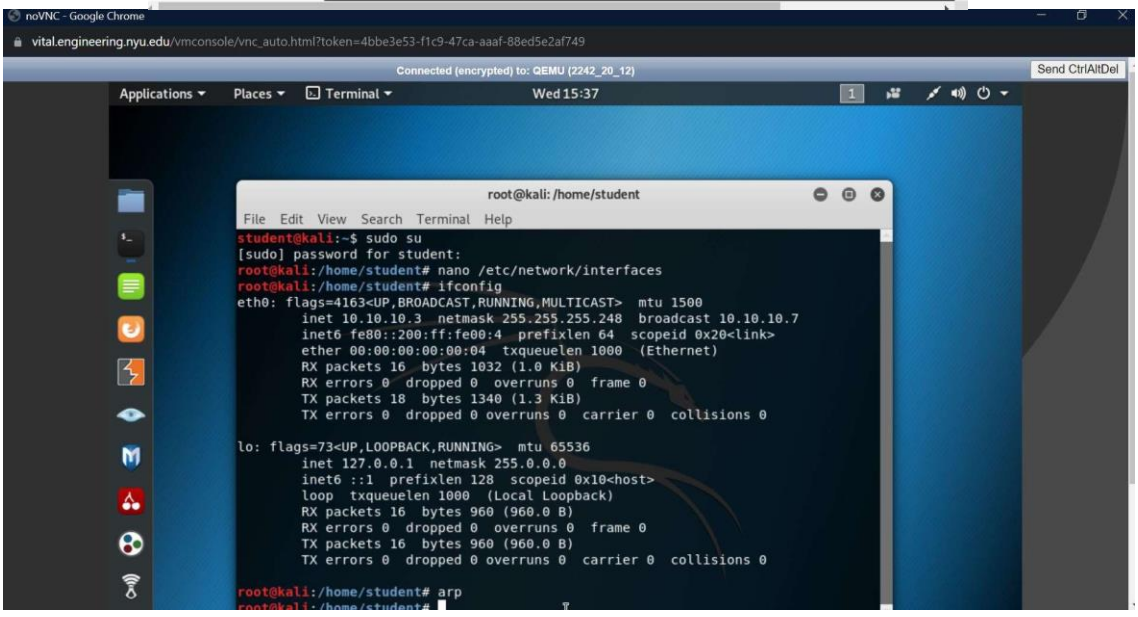
The /29 subnet mask provides 6 usable addresses. 29 bits are for network address and the 3 bits available for the host addresses allow for 8 (2^3) possible combinations. However, two of these are reserved: one for the network address (all host bits set to 0) and one for the broadcast address (all host bits set to 1).
In this case, the requirement is of 3 IP addresses for R1, R2 and Kali, which the /29 subnet mask can accommodate. Here, I assigned R1 - 10.10.10.1 , R2 – 10.10.10.2 , Kali – 10.10.10.3
If /30 or /27 subnet is chosen, the IP addresses won't be sufficient(/30 – 2 usable addresses) and would be in excess and unused(/27 scenario – 30 usable addresses). Hence, choosing the /29 subnet mask is ideal for this scenario.

b) The Linux arp (see man arp) command will print the current entries in the machine's address resolution protocol table. Now that you have configured Area 0, what entries are currently in R1, R2, and Kali? (10 points)

Initially, the arp table for R1, R2 and Kali was empty(as seen below). After the ping, R1 to R2 and Kali there were multiple entries, arp table of R2 consisted of pings to R1 and Kali. Similarly, arp table of Kali had entries for R1 and R2 after the ping. This can be seen in the below images of arp tables for each machine(Under the Submission images heading).


oVNC - Google Chrome
vital.engineering.nyu.edu/vmconsole/vnc_auto.html?token=66bd4636-9c9a-4925-8e7f-540f5b55cfe5
Connected (encrypted) to: QEMU (2242_20_8)
Send Ct
Trash
LXTerminal
Wireshark
student@CN-R2: ~
File Edit Tabs Help
student@CN-R2:~$ arp
student@CN-R2:~$
student@CN-R2:~$
student@CN-R2:~$
student@CN-R2:~$
student@CN-R2:~$ arp
student@CN-R2:~$

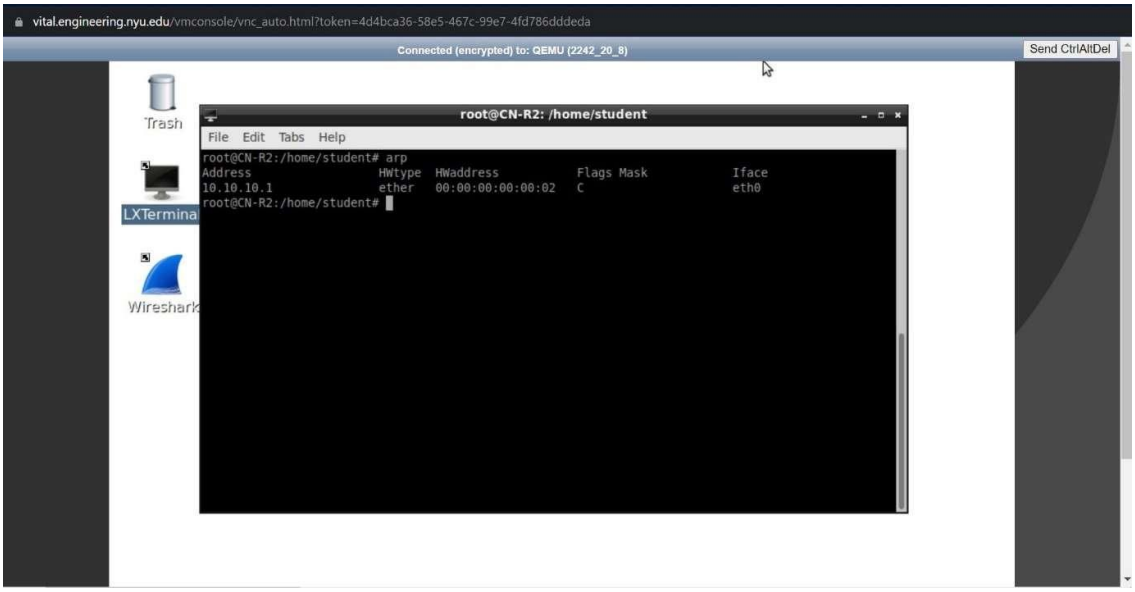

noVNC - Google Chrome
vital.engineering.nyu.edu/vmconsole/vnc_auto.html?token=b3d200ca-d640-45ed-8de7-35e83596108e
Connected (encrypted) to: QEMU (2242_20_7)
Send CtrlAltDel
Trash
LXTerminal
Wireshark
student@CN-R1: ~
File Edit Tabs Help
student@CN-R1:~$ arp
student@CN-R1:~$ arp
student@CN-R1:~$


noVNC - Google Chrome
vital.engineering.nyu.edu/vmconsole/vnc_auto.html?token=4bbe3e53-f1c9-47ca-aaaf-88ed5e2af749
Connected (encrypted) to: QEMU (2242_20_12)
Send CtrlAltDel
Applications
Places
Terminal
Wed 15:37
root@kali: /home/student
File Edit View Search Terminal Help
student@kali:~$ sudo su
[sudo] password for student:
root@kali:/home/student# nano /etc/network/interfaces
root@kali:/home/student# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
inet 10.10.10.3 netmask 255.255.255.248 broadcast 10.10.10.7
inet6 fe80::200:ff:fe00:4 prefixlen 64 scopeid 0x20<link>
ether 00:00:00:00:00:04 txqueuelen 1000 (Ethernet)
RX packets 16 bytes 1032 (1.0 KiB)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 18 bytes 1340 (1.3 KiB)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
inet 127.0.0.1 netmask 255.0.0.0
inet6 ::1 prefixlen 128 scopeid 0x10<host>
loop txqueuelen 1000 (Local Loopback)
RX packets 16 bytes 960 (960.0 B)
RX errors 0 dropped 0 overruns 0 frame 0
TX packets 16 bytes 960 (960.0 B)
TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0
root@kali:/home/student# arp

c) Now ping both R2 and Kali from R1. Note the changes on each machine's ARP tables. At this point, R2 should be aware of R1, but why doesn't R2 have a table entry for Kali? (10 points)

After pinging R2 and Kali from R1, the changes were as follows:

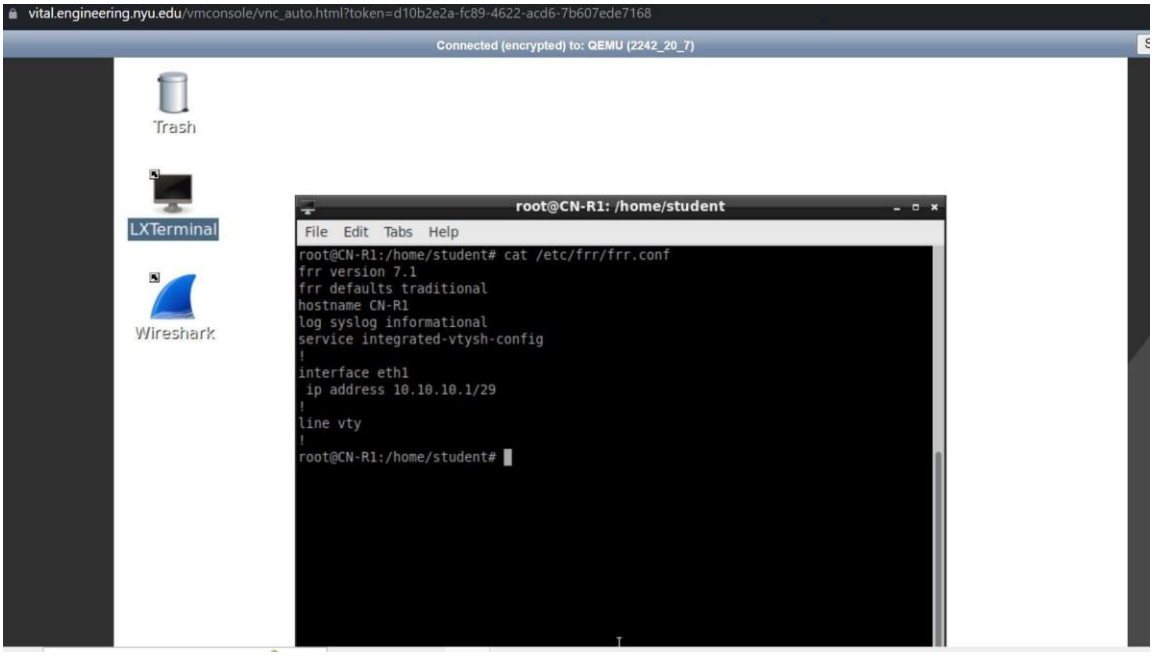
In R1's arp table, there were entries for both machines R2 and Kali. Simultaneously, the receivers, R2 and Kali, recorded data about R1. However, there was no contact made between R2 and Kali at this stage. R2 has not received any packets from Kali so has no record for the Kali machine in R2.



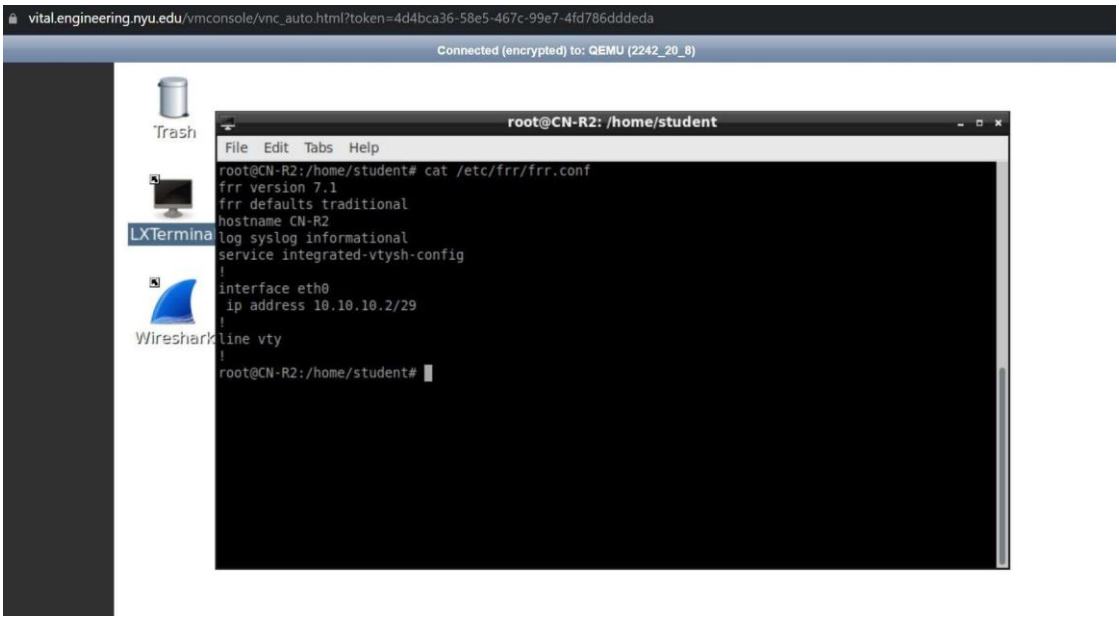
arp table of R2 showing only R1 and not Kali

SUBMISSION IMAGES

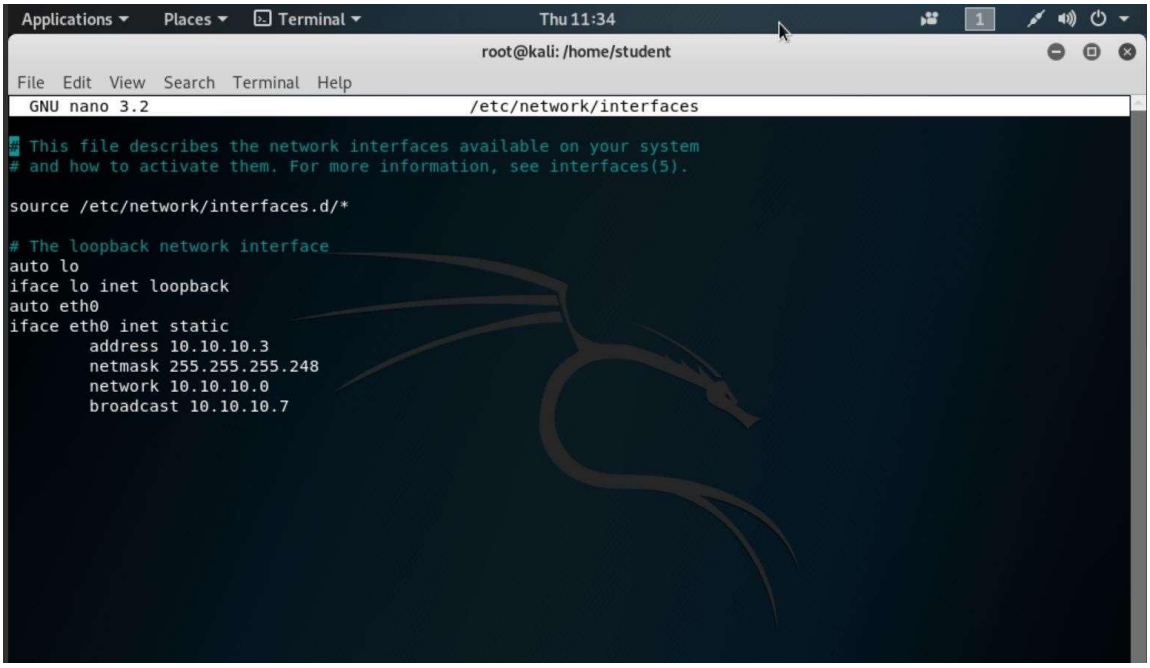
Screenshot of the .conf file under /etc/frr/frr.conf from R1



Screenshot of the .conf file under /etc/frr/frr.conf from R2

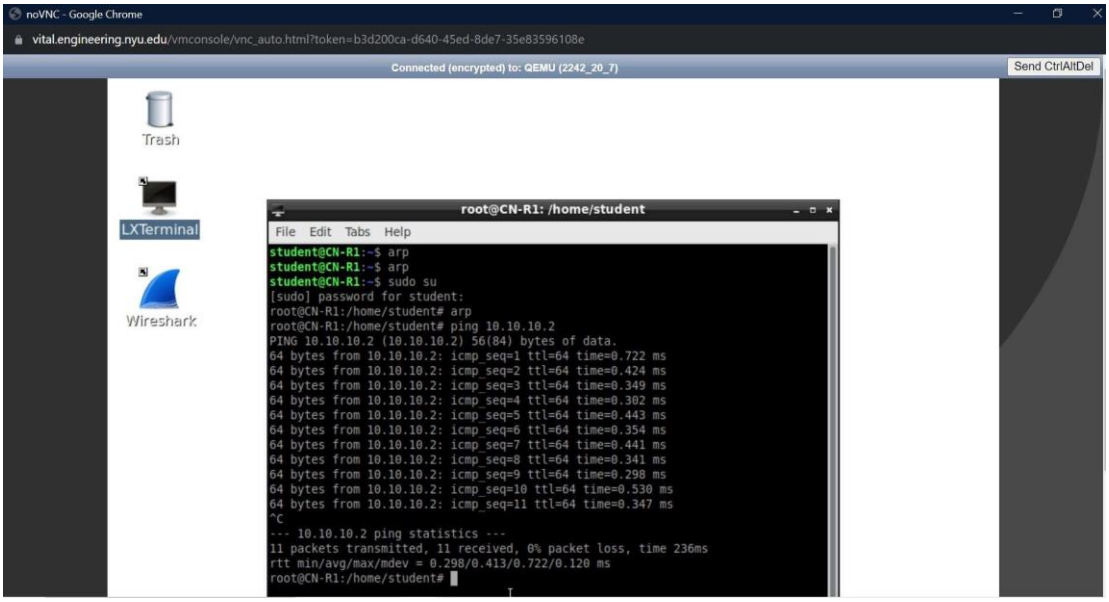


Screenshot of the /etc/network/interfaces file in Kali

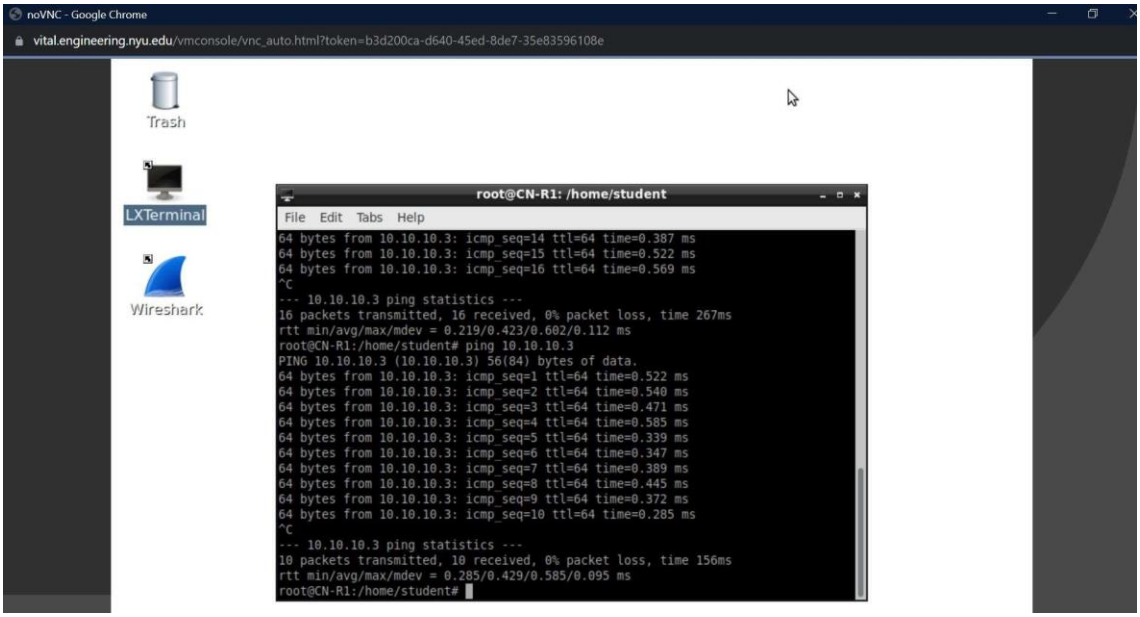


Screenshot showing that pinging works between R1, R2, and Kali

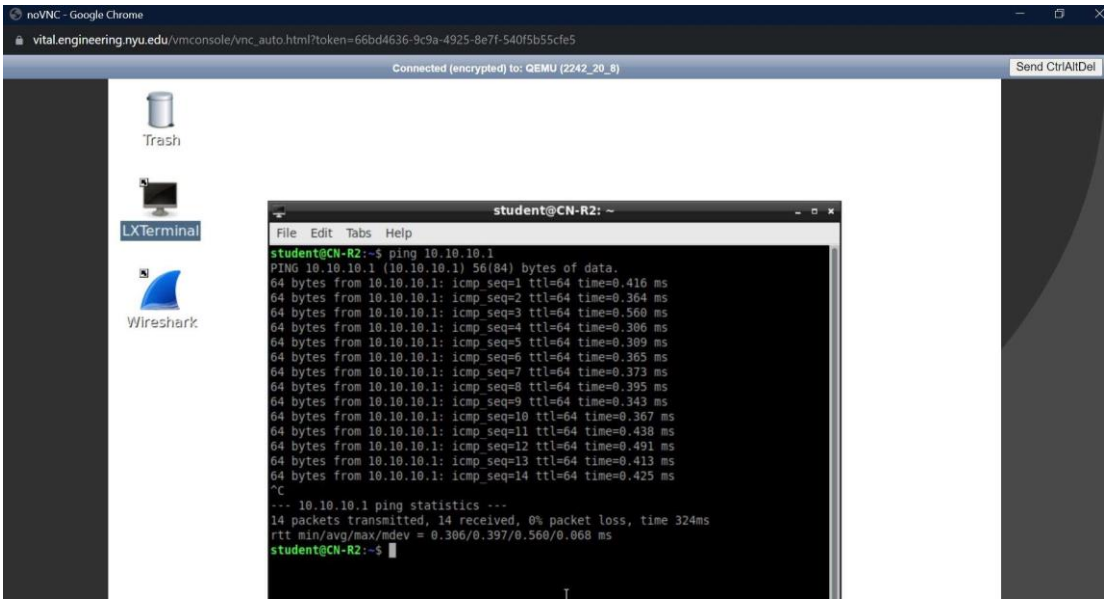
Ping from R1 to R2(10.10.10.2)



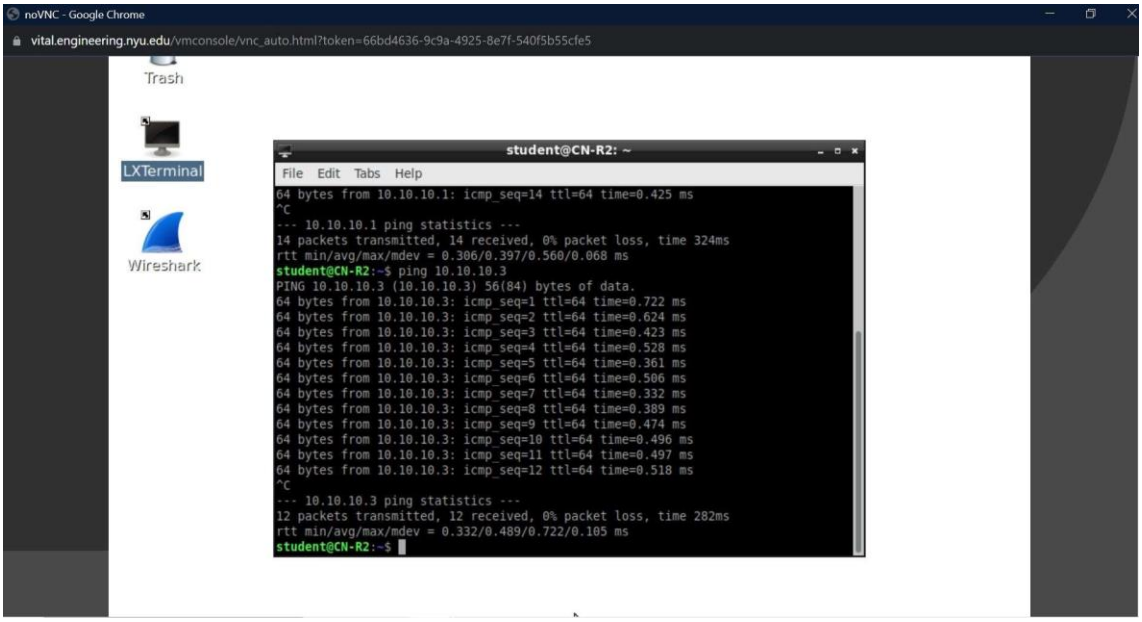
Ping from R1 to Kali(10.10.10.3)



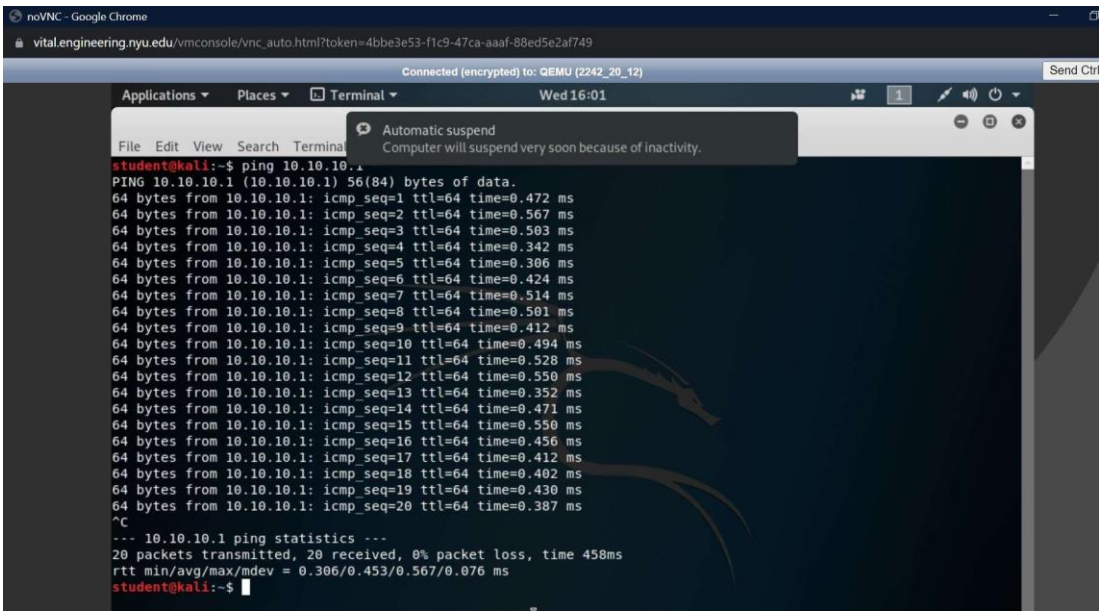
Ping from R2 to R1



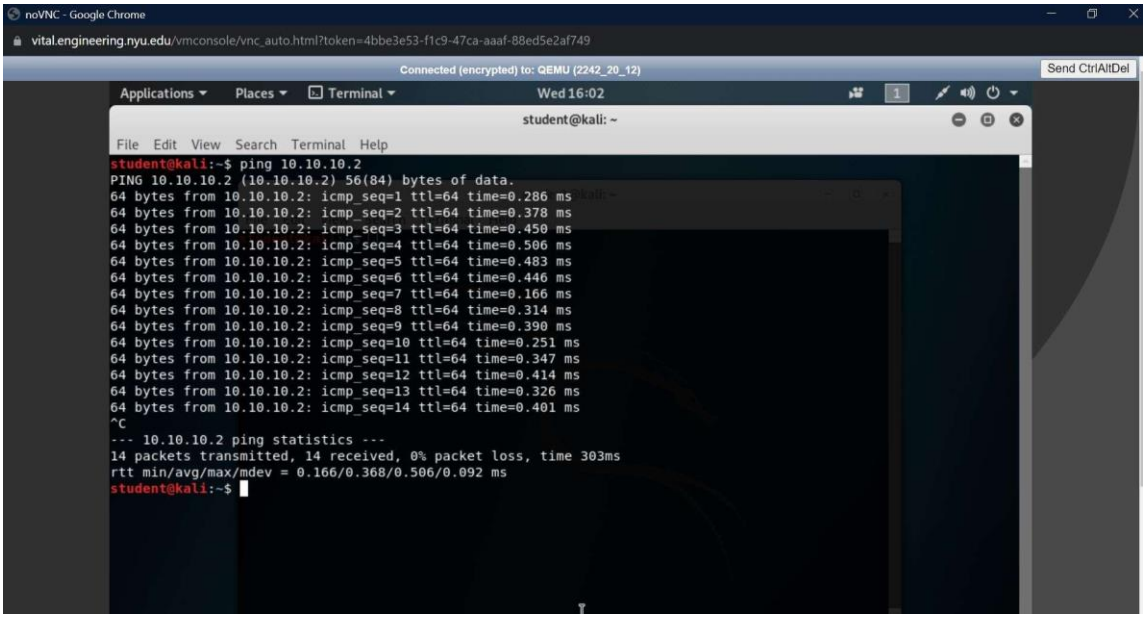
Ping from R2 to Kali



Ping from Kali to R1



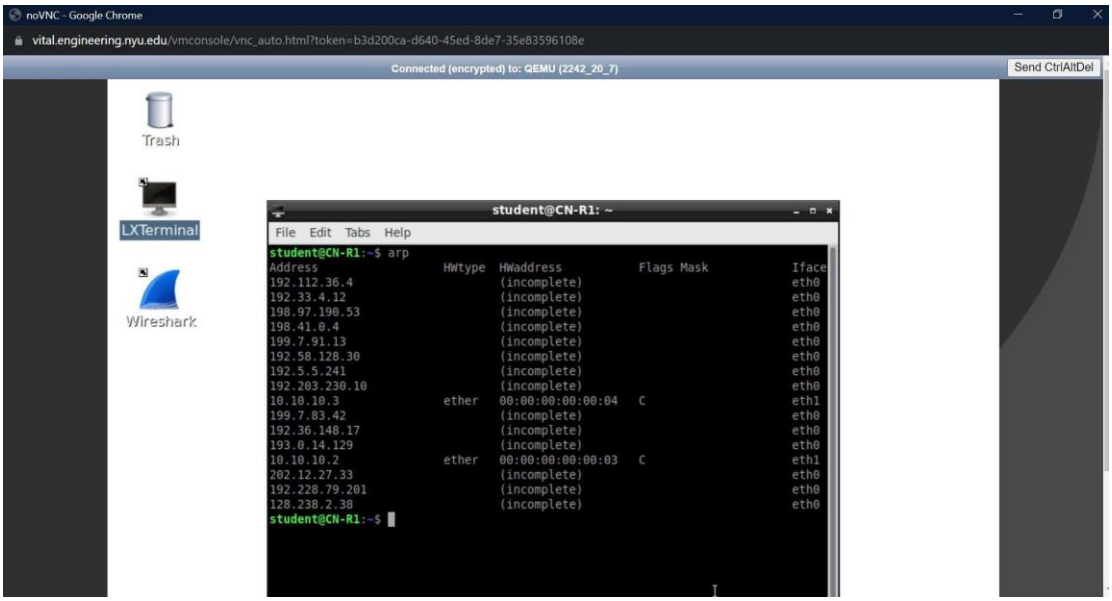
Ping from Kali to R2



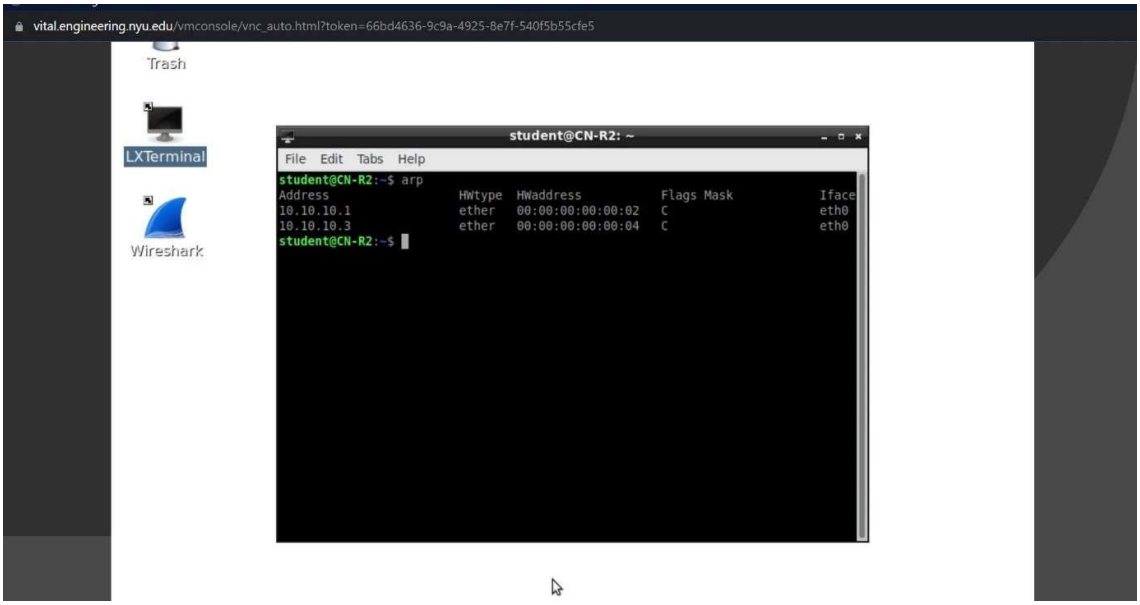
Screenshot of the ARP tables on R1, R2, and Kali

After pings

R1 ARP



R2 arp



Kali arp