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Lab 1 - Packet Sniffing and Spoofing Lab

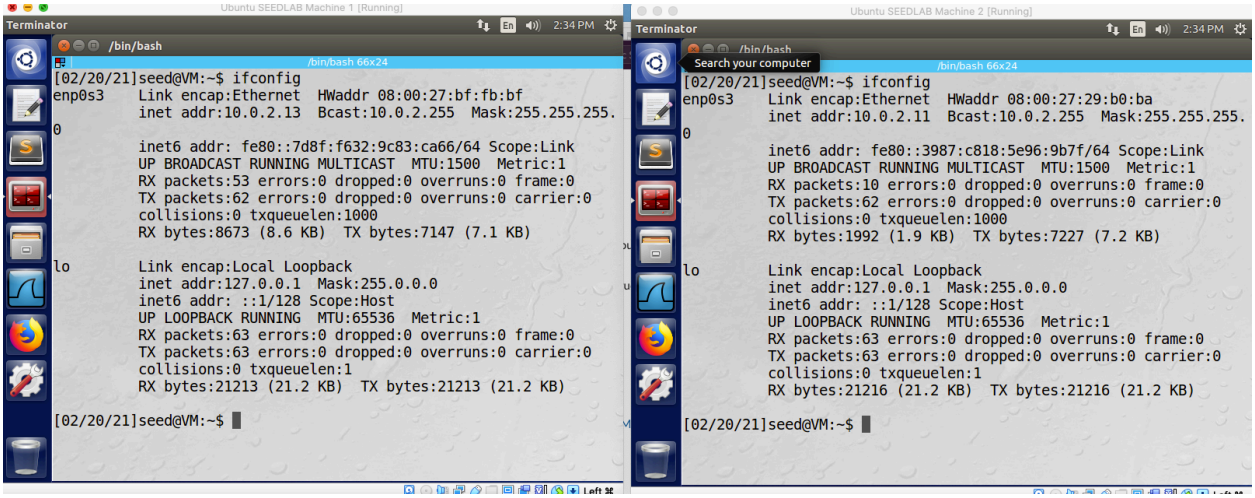
Submission Guidelines

Submit a Word document with the items shown below.

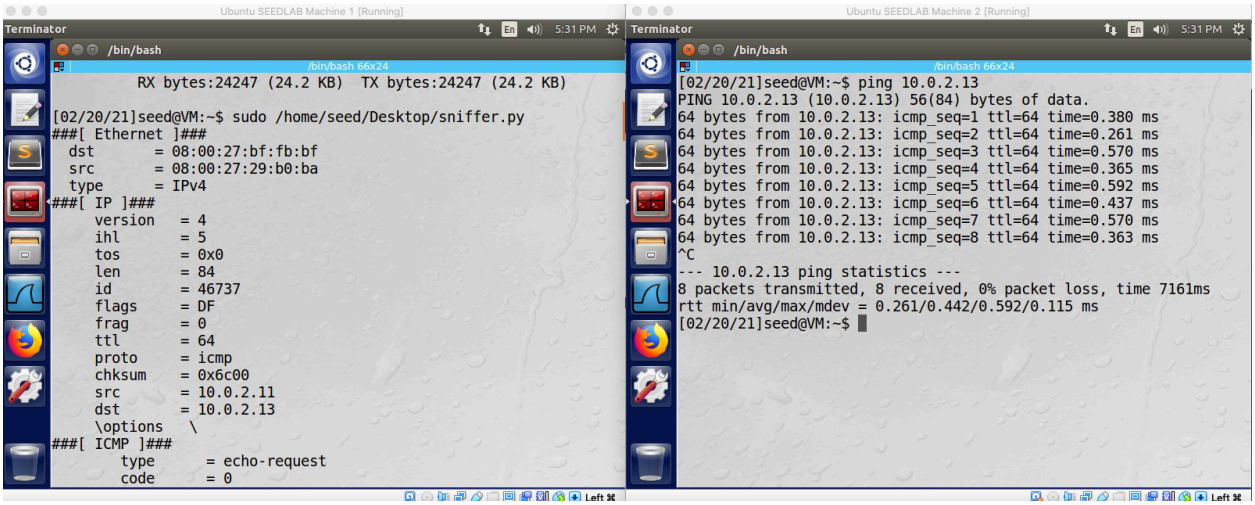
Task 1.1A [5 pts]: Run the program with root privilege and demonstrate that you can indeed capture packets.

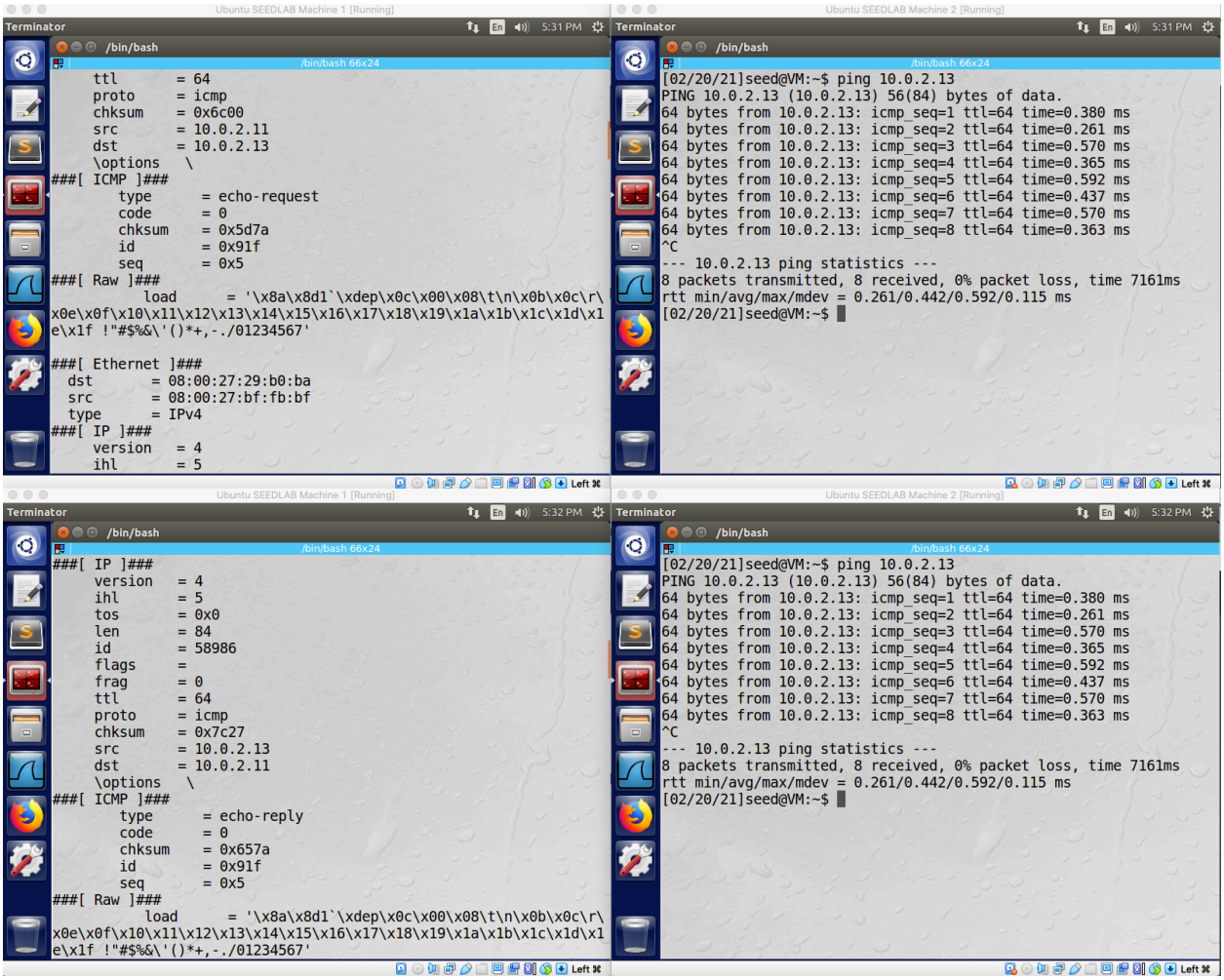
(1) Show a screenshot showing that packets are being captured.

First, a screen shot to show that the Lab was setup successfully, with two different MAC addresses so the machines could ping each other:



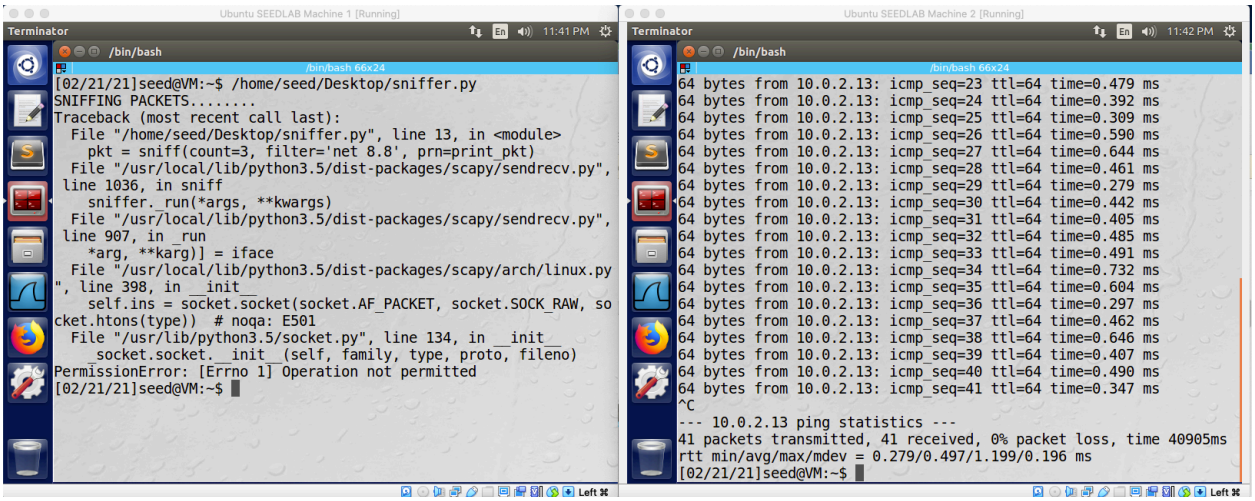
Ran sniffer.py with root privileges and captured packets:





(2) Write a paragraph to answer: What happens when you don't run with root privileges? Why?

Screen capture of attempt to run sniffer.py without root privileges:

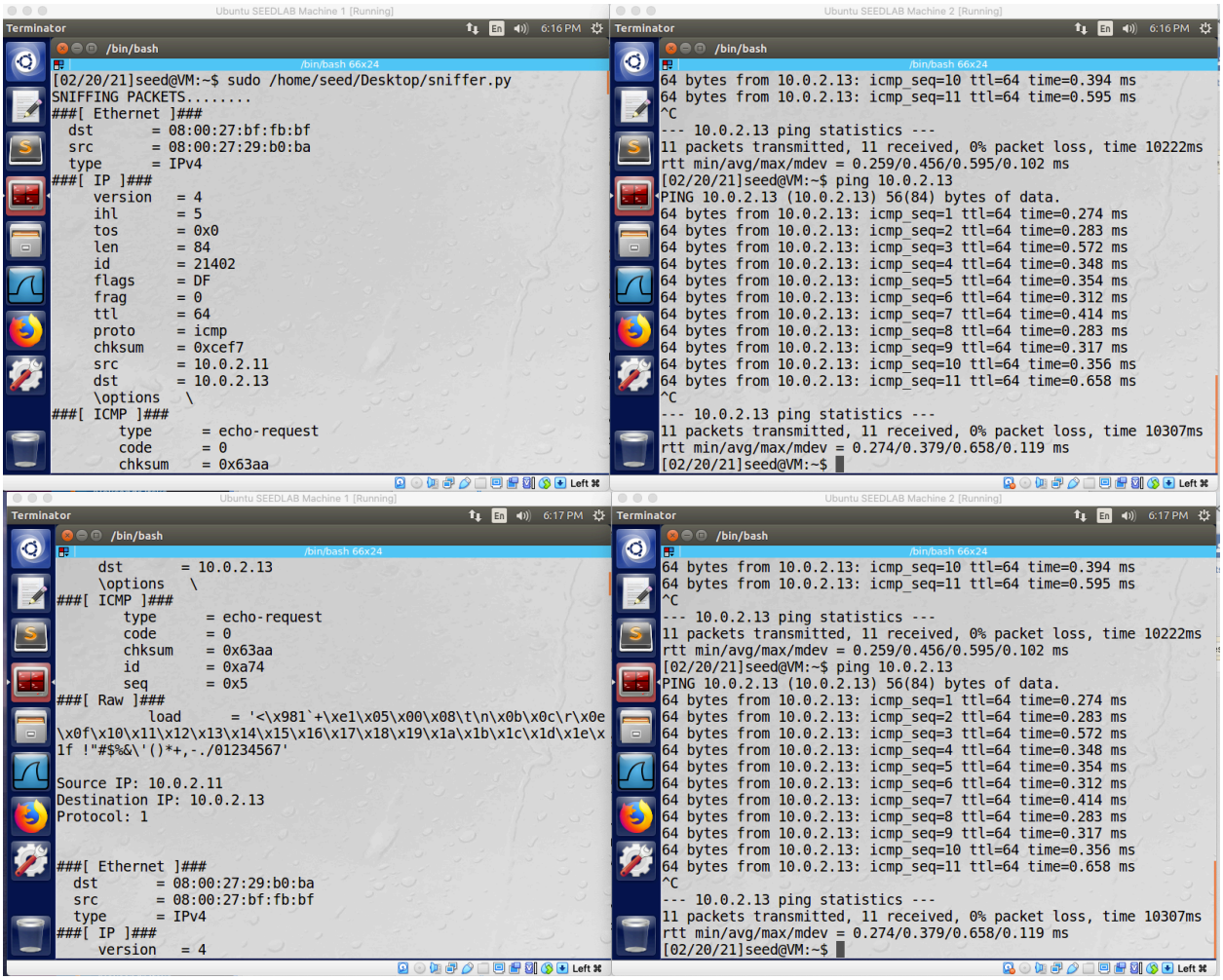


Error reply stated that the operation was not permitted. The reason it was not possible to run the program without root privileges is that Linux has a 'least permissions' policy for security reasons. In other words, the default setting is the most restricted.

Task 1.1B [15 pts]:

(1) Capture only the ICMP packet. Submit your code and take a screenshot demonstrating that ICMP packets are captured.

Screen capture of traffic captured on Machine 1, using sniffer.py program, while a ping was sent from Machine 2 to Machine 1:

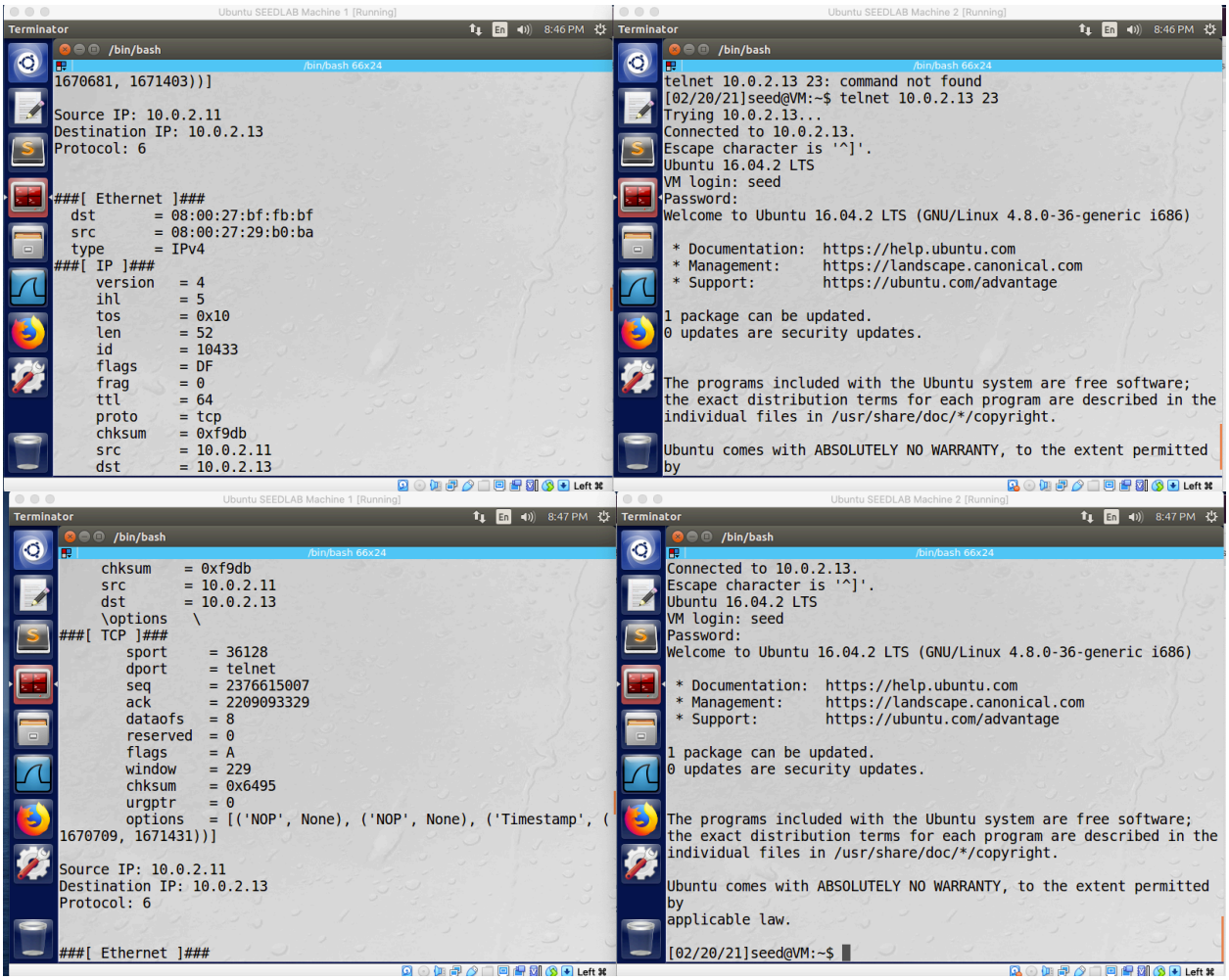


Sniffer.py code:

```
#!/usr/bin/python3
from scapy.all import *

print("SNIFFING PACKETS.....")

def print_pkt(pkt):
    pkt.show()
    print("Source IP:", pkt[IP].src)
    print("Destination IP:", pkt[IP].dst)
    print("Protocol:", pkt[IP].proto)
    print("\n")

pkt = sniff(filter='icmp', prn=print_pkt)
```

(2) Capture any TCP packet that comes from a particular IP and with a destination port number 23. Submit your code and take a screenshot demonstrating that.

Ran sniffer.py on Machine 1, while connected via telnet from Machine 2:

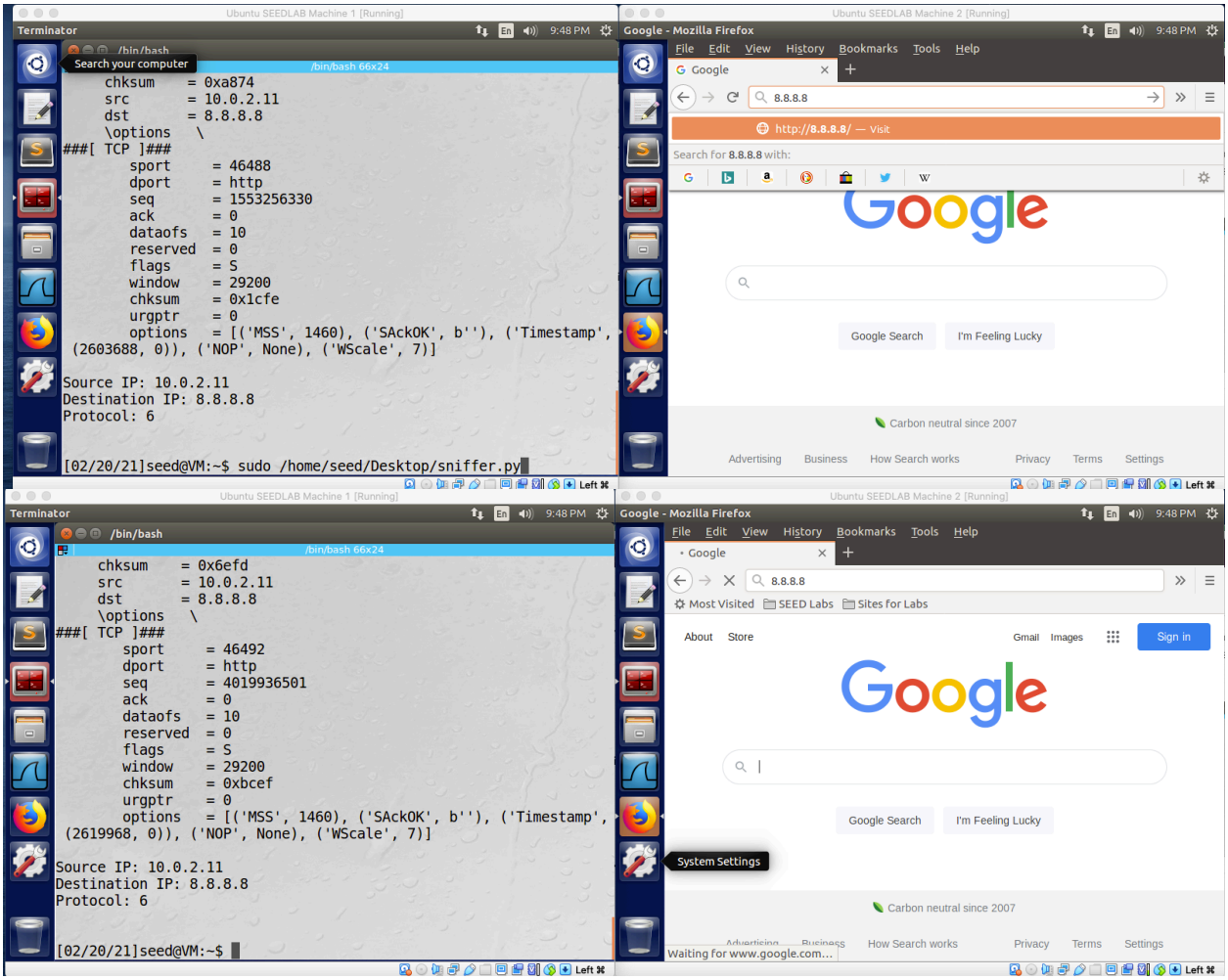


Code:

```
#!/usr/bin/python3
from scapy.all import *

print("SNIFFING PACKETS.....")

def print_pkt(pkt):
    pkt.show()
    print("Source IP:", pkt[IP].src)
    print("Destination IP:", pkt[IP].dst)
    print("Protocol:", pkt[IP].proto)
    print("\n")

pkt = sniff(filter='tcp and src host 10.0.2.11 and dst port 23', prn=print_pkt)
```

(3) Capture packets coming from or to going to a particular subnet. Submit your code and take a screenshot demonstrating the traffic generated.

The IP for www.google.com, 8.8.8.8 was chosen to generate traffic. In the code, 8.8 was the subnet filtered.



Code:

```
#!/usr/bin/python3
from scapy.all import *

print("SNIFFING PACKETS.....")

def print_pkt(pkt):
    pkt.show()
    print("Source IP:", pkt[IP].src)
    print("Destination IP:", pkt[IP].dst)
    print("Protocol:", pkt[IP].proto)
    print("\n")

pkt = sniff(count=3, filter='net 8.8', prn=print_pkt)
```

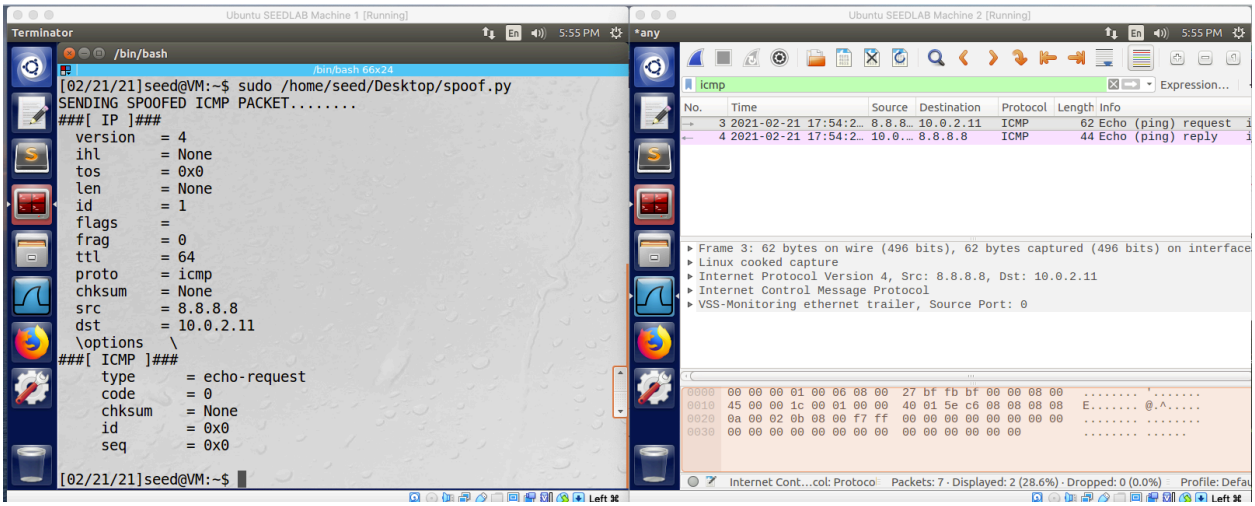
Task 1.2 [20 pts]: Spoof an ICMP echo request packet with source IP address 8.8.8.8 from the first VM and send to the second VM. Use Wireshark on the second VM to show that it replies back with echo replies.

(1) Submit your scapy code

```
#!/usr/bin/python3
```

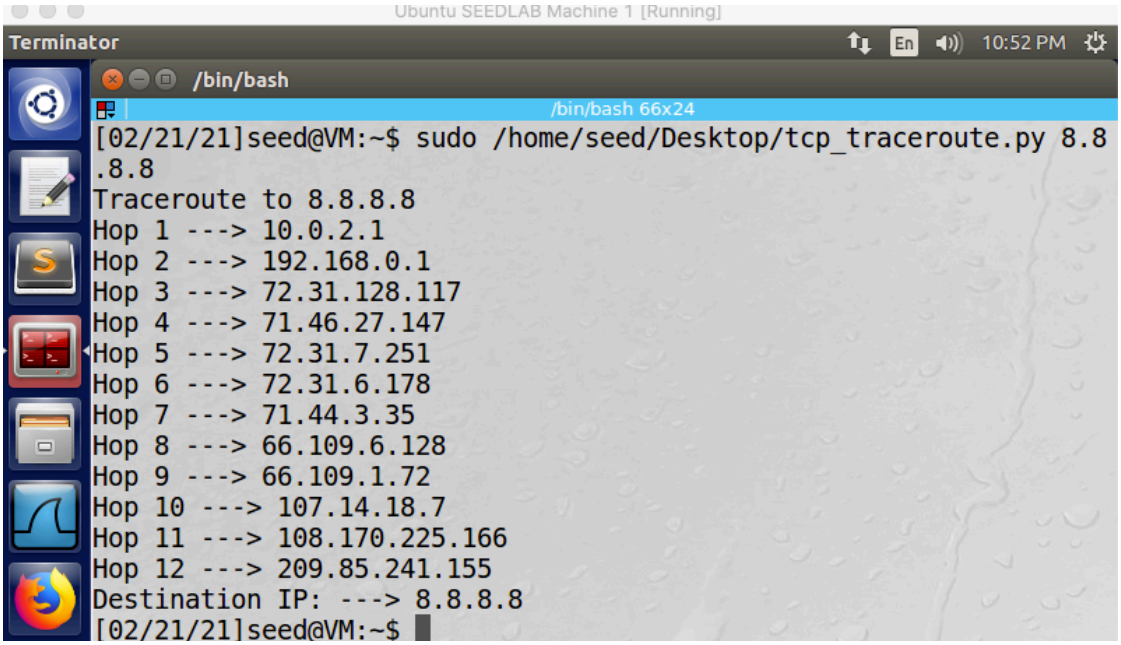
```
from scapy.all import *

print("SENDING SPOOFED ICMP PACKET.....")
ip = IP(src="8.8.8.8", dst="10.0.2.11")
icmp = ICMP()
pkt = ip/icmp
pkt.show()
send(pkt, verbose=0)
```

(2) Submit a screenshot of Wireshark showing that the VM replies back with echo requests from 8.8.8.8.



Task 1.3 [20 pts]: Implement TCP traceroute using scapy. Do NOT use the built-in scapy traceroute function. Perform a traceroute to 8.8.8.8. Submit your code and take screenshot of your program's output.

Implementation of traceroute to 8.8.8.8:



Code:

```
#!/usr/bin/python3
```

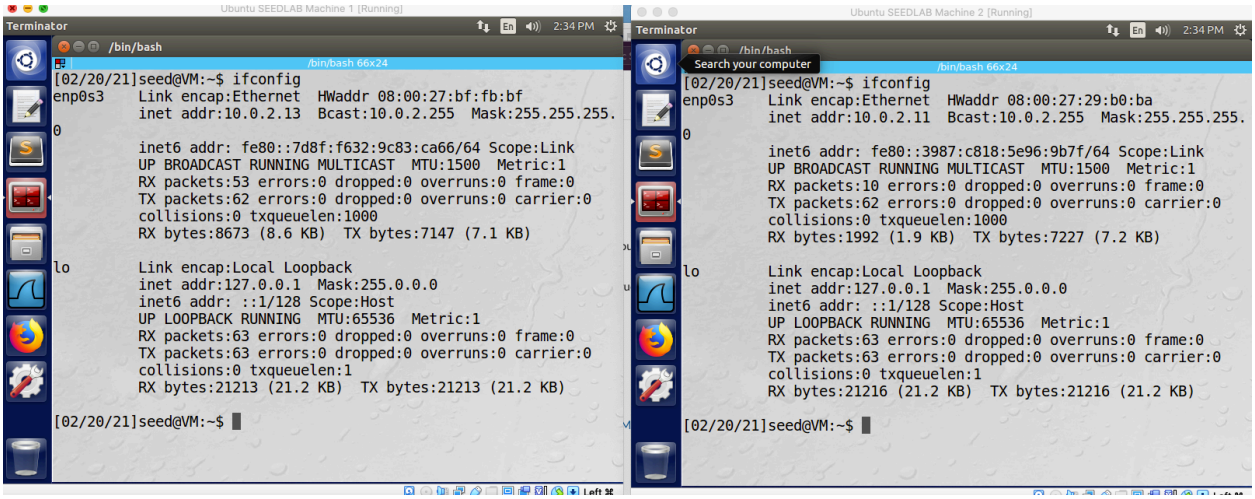
```
import sys
import os
from scapy.all import *

print("Traceroute to 8.8.8.8")

if len(sys.argv) != 2:
   sys.exit('Usage: tcp_traceroute.py 8.8.8.8')

# we start with 1
ttl = 1
while 1:
   p=sr1(IP(dst=sys.argv[1],ttl=ttl)/ICMP(id=os.getpid()),
       verbose=0)
   # if time exceeded due to TTL exceeded
   if p[ICMP].type == 11 and p[ICMP].code == 0:
      print("Hop", ttl, "--->", p.src)
      ttl += 1
   elif p[ICMP].type == 0:
      print("Destination IP: --->", p.src)
      break
```

Task 1.4 [40 pts]: Sniffing and-then Spoofing. You will use two different VMs to sniff ping packets and then spoof a reply.

Note 1: No ARP spoofing or other Attacker-in-the-Middle (AITM) techniques are required.

Note 2: if you're using VirtualBox, be sure to follow the instructions on Appendix B of the SEED Lab Setup Instructions to setup the network adaptor correctly.

First, a screen shot to confirm that the network adaptor was set up according to the SEED Lab Instructions, with unique MAC addresses.

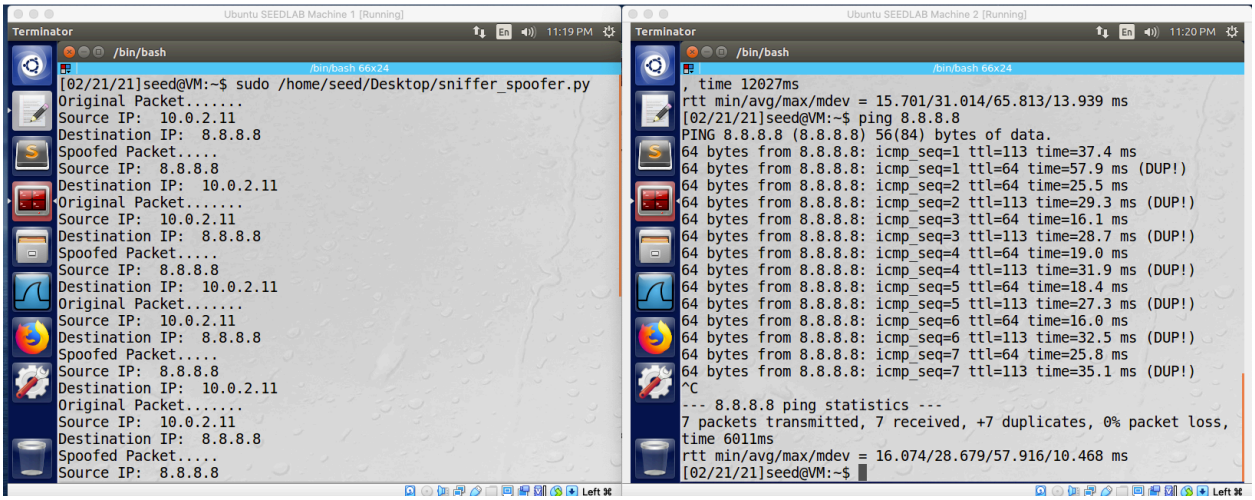


(1) Submit your scapy code for sniffing and then spoofing

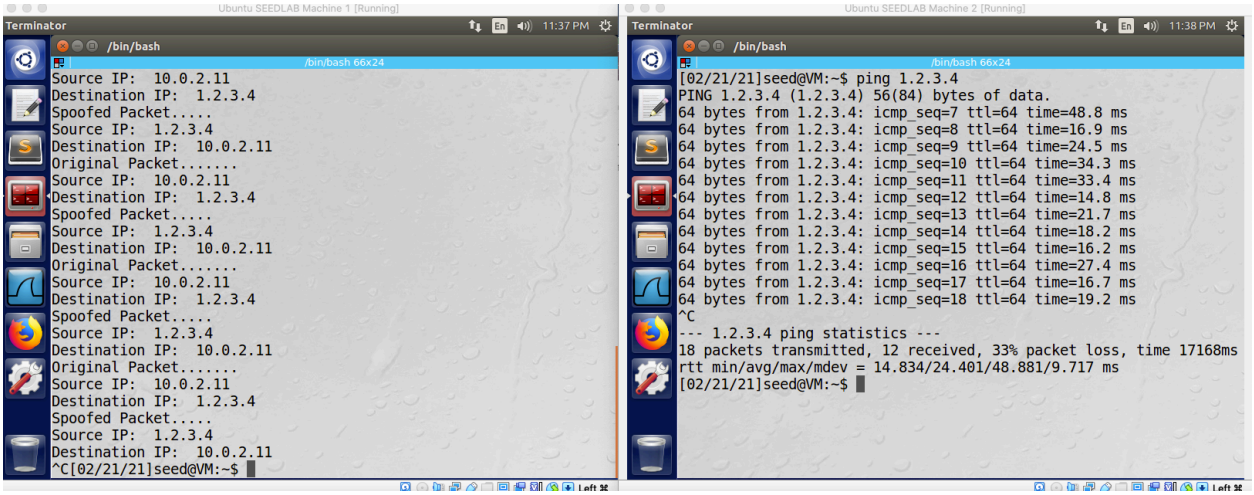
```
#!/usr/bin/python3
```

```
from scapy.all import *


def spoof_pkt(pkt):
    if ICMP in pkt and pkt[ICMP].type == 8:
        print("Original Packet.....")
        print("Source IP: ", pkt[IP].src)
        print("Destination IP: ", pkt[IP].dst)

    ip = IP(src=pkt[IP].dst, dst=pkt[IP].src, ihl=pkt[IP].ihl)
    icmp = ICMP(type=0, id=pkt[ICMP].id, seq=pkt[ICMP].seq)
    data = pkt[Raw].load
    newpkt = ip/icmp/data

    print("Spoofed Packet.....")
    print("Source IP: ", newpkt[IP].src)
    print("Destination IP: ", newpkt[IP].dst)
    send(newpkt, verbose=0)

pkt = sniff(filter='icmp and src host 10.0.2.11', prn=spoof_pkt)
```

(2) Ping 8.8.8.8 and show screenshots of the output from your program and from ping



(3) Ping 1.2.3.4 and show screenshots of the output from your program and from ping



Sources:

Du, Wenliang, “Computer & Internet Security: A Hands-on Approach”, Second Edition
https://scapy.readthedocs.io/en/latest/introduction.html
https://wiki.sans.blue/Tools/pdfs/ScapyCheatSheet_v0.2.pdf
https://buildmedia.readthedocs.org/media/pdf/scapy/latest/scapy.pdf