4. Simulate a TCP communication session in a closed internal network using Netcat. Use one machine (Kali) as a TCP client and another machine (Ubuntu) as a TCP server. Capture the TCP traffic with Wireshark to observe the TCP three-way handshake, data exchange, and connection termination.

Step 1: Check IP addresses of kali Linux and Ubuntu VM using ifconfig command and then check each vm is reachable using ping <ip addr> command.

Step 2:

- Open Wireshark in kali linux
- Select the internal network interface (e.g., eth0 or ens33).
- Apply filter:

tcp.port==5000

Step3 : Start a tcp server on Ubuntu.

Before using the below command for netcat.. apply the rules using ufw to allow port no 5000

```
sudo su

ufw allow 5000

nc -lvp  5000

# this command waits for tcp connection
```

Step 4: Connect from kali (TCP Client)

nc -v <Ubntu IP> 5000

Connection successful..

Step 5: Type below messages

In Kali terminal:

hello ubuntu

In Ubuntu terminal:

hello kali

Step 6: Observe Wireshark in Kali linux

1. TCP 3-Way Handshake

SYN → from Kali to Ubuntu

SYN/ACK → Ubuntu replies

ACK → Kali acknowledges

2. TCP Data Packets

Packets marked as:

[TCP segment data]

with your messages inside.

3. TCP Connection Termination

When you close both nc sessions, you will see:

FIN

ACK

FIN/ACK

ACK

Step 7: Close the connection in both terminal using <CTRl-C>