1) Simple topology with one switch and two hosts using mininet.

steps:

1) install mininet in our system or check whether mininet is installed or not if not use the following command.

```
" Sudo apt install mininet."
```

2) to get into the mininet simulator we use the following command.

```
" Sudo mn"
```

3) TO create topology as we have Single, linear, tree topologies.

Here we create Single topology as we have connect single switch with 2 hosts.

```
" Sudo mn --topo single, 2 "
```
↳ 2 hosts. 1 switch.

topology created.

4) TO check the nodes.

```
mininet> nodes
```
→ Display nodes

available nodes :

```
mininet> net
```
→ display topology

Mininet: is a emulator that Simulates Software Defined Network (SDN)

It creates a virtual Networks consisting of hosts, switches, links, Controller on a single machine.

A basic topology is understanding how devices communicate in a network.

2) Tests Connectivity between 2 hosts:

Connectivity testing is essential in networking to ensure that devices in a network can Communicate.

The ICMP (Internet Control Message Protocol) ping test is a simple way to verify this by Sending echo requests and checking if echo replies are received.

Mininet allows us to simulate these test using its CLI.

We can use the following Command to check the Connectivity

```
mininet > pingall
```

(or) check

```
mininet > h1 ping h2
```

→ host1 can reach host2

(or)

`h1 ping -c 5 h2.`

Runs the ping command from h1 to h2 Sending exactly 5 packets.

-c 5

means "count = 5" → Sends 5 ICMP echo requests instead of default infinite ping.

3) check the IP address of your linux System using the Command line.

Every device in a network is assigned an ip address for identification and Communication.

we use the following Command

`" ip addr show"`

or

`" ip a"`

These Commands display all networks interfaces and their associated IP addresses.

or

`" hostname -I"` alternate

↳ Shows ip addr assigned to host

) Steps follow to Simulate link failure between 2 nodes in Mininet.

~~[redacted]~~.

Mininet is a powerful network emulator that allows users to ~~Si~~mulate not only ~~static~~ topologies but also dynamic changes - like link failure.

1) Create Simple topology.

```
"Sudo mn --topo single,2.
```

2) Verify Connectivity.

```
mininet> h1 ping h2.
```

Successful ping replies.

3) Simulate link failure (Brink link down).

```
mininet> link s1 h1 down.
```

↳ disables the link between s1 & h1

4) Test connectivity, again.

```
h1 ping h2.
```

ping will fail.

5) Restore the link.

```
link s1 h1 up.
```

6) Retest pink.

```
h1 ping h2
```

succeed.

5) How do you connect a remote Linux Server using a given IP address and username?

we do this by SSH (Secure Shell).

It is a protocol that allows Secure remote login from one computer to another over a network.

It encrypts all traffic, including passwords, to protect against eavesdropping and other attacks.

"ssh username@ip_address"

we use the above format

ssh → is the Command to initiate a Secure Shell Connection.

username → login name of remote machine.

ip_address → ip of remote linux server

1) Get IP of Remote Server:

"ipe addr show" eg: 192.168.1.50

2) Know the username.

cbcanta / student

3) Use SSH Command.

ssh student@192.168.1.50

4) first time Connection Confirmation

Are you sure you want to continue connecting (yes/no)?

Yes.

5) Password prompt.

Student@192.168.1.50's password: Admin

↓ pass by remote machine.

if Successfull ]

Student@server: ~$.

babt

6) How can you connect mininet topology to a real network interface?

=> Mininet installed on your System.

1) Create the mininet topology.

Sudo mn --topo single,1 --Controller=remote

2) Check the interface:

"ifconfig" or "ip a"

need to know the name of real network interface you want to connect to.

Look for interface name [eg: eth0].

3) Create a Virtual interface for the Connection:

Mininet uses veth pairs (Virtual ethernet)

Create veth pairs (link) one end to mininet host & other to real network interface.

```
sudo ip link add veth0 type veth peer name veth1
```

4) Connect the Virtual interface to Real Network.

```
Sudo ip link set veth1 up
Sudo ip link set veth0 up
```

for bridging. => create bridge and add both veth1 & eth0

```
Sudo brctl addbr br0
Sudo brctl addif br0 veth1 eth0
Sudo ip link set br0 up
```

5) assigning ip => for eth0, veth0.

```
Sudo ifconfig veth0 10.0.0.1/24 up.
Sudo ifconfig eth0 10.0.0.2/24 up.
```

6) verify Connection.

mininet > h1 ping 10.0.0.2.