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Here is the designed network and its properties for part 1:

LAN	Required Hosts	Subnet Mask	Network Address	Smallest IP Address	Highest IP Address
Lan B	at least 75	255.255.255.128 (/25)	20.10.172.0	20.10.172.1	20.10.172.126
Lan A	at least 50	255.255.255.192 (/26)	20.10.172.128	20.10.172.129	20.10.172.190
Lan C	at least 20	255.255.255.224 (/27)	20.10.172.192	20.10.172.193	20.10.172.222

This shows me starting up the simulator and creating the hosts, links and routers

```
mininet@mininet-vm:~/database_hw5$ sudo python layer3_network_code.py
*** Creating network
*** Adding hosts:
hA1 hA2 hB1 hB2 hC1 hC2 rA rB rC
*** Adding switches:

*** Adding links:
(hA1, rA) (hA2, rA) (hB1, rB) (hB2, rB) (hC1, rC) (hC2, rC) (rA, rB) (rB, rC)
*** Configuring hosts
hA1 hA2 hB1 hB2 hC1 hC2 rA rB rC
*** Starting controller

*** Starting 0 switches
```

This shows the results for testing intralan connectivity in part 2.

```
===== Testing Intra-LAN Connectivity =====
hA1 -> X
hA2 -> X
*** Results: 100% dropped (0/2 received)
hB1 -> X
hB2 -> X
*** Results: 100% dropped (0/2 received)
hC1 -> X
hC2 -> X
*** Results: 100% dropped (0/2 received)
```

This shows the results for testing inter lan connectivity in part 2.

```

===== Inter-LAN Ping (Should Fail) =====
*** Ping: testing ping reachability
hA1 -> X X X X X X X X
hA2 -> X X X X X X X X
hB1 -> X X X X X X X X
hB2 -> X X X X X X X X
hC1 -> X X X X X X X X
hC2 -> X X X X X X X X
rA -> X X X X X X rB X
rB -> X X X X X X rA X
rC -> X X X X X X X X
*** Results: 97% dropped (2/72 received)

```

For part 3, this screenshot shows me adding the routes for each destination on each host.

```

# Add static routes on hosts
for h in [hA1, hA2]:
    h.cmd('route add -net 20.10.172.0 netmask 255.255.255.128 gw 20.10.172.129')
    h.cmd('route add -net 20.10.172.192 netmask 255.255.255.224 gw 20.10.172.129')

for h in [hB1, hB2]:
    h.cmd('route add -net 20.10.172.128 netmask 255.255.255.192 gw 20.10.172.1')
    h.cmd('route add -net 20.10.172.192 netmask 255.255.255.224 gw 20.10.172.1')

for h in [hC1, hC2]:
    h.cmd('route add -net 20.10.172.0 netmask 255.255.255.128 gw 20.10.172.193')
    h.cmd('route add -net 20.10.172.128 netmask 255.255.255.192 gw 20.10.172.193')

# Add static routes on routers
rA.cmd('route add -net 20.10.172.0 netmask 255.255.255.128 gw 20.10.100.2')
rA.cmd('route add -net 20.10.172.192 netmask 255.255.255.224 gw 20.10.100.2')

rB.cmd('route add -net 20.10.172.128 netmask 255.255.255.192 gw 20.10.100.1')
rB.cmd('route add -net 20.10.172.192 netmask 255.255.255.224 gw 20.10.100.3')

rC.cmd('route add -net 20.10.172.128 netmask 255.255.255.192 gw 20.10.100.2')
rC.cmd('route add -net 20.10.172.0 netmask 255.255.255.128 gw 20.10.100.2')

```

This shows the results of the new routes being added:

```
===== Testing Intra-LAN Connectivity =====
hA1 -> X
hA2 -> X
*** Results: 100% dropped (0/2 received)
hB1 -> X
hB2 -> X
*** Results: 100% dropped (0/2 received)
hC1 -> X
hC2 -> X
*** Results: 100% dropped (0/2 received)

===== Testing Inter-LAN Connectivity =====
*** Ping: testing ping reachability
hA1 -> X X X X X X X X
hA2 -> X X X X X X X X
hB1 -> X X X X X X X X
hB2 -> X X X X X X X X
hC1 -> X X X X X X X X
hC2 -> X X X X X X X X
rA -> X X X X X X rB X
rB -> X X X X X X rA X
rC -> X X X X X X X X
*** Results: 97% dropped (2/72 received)
```