ASSIGNMENT – 3

- **PART – A1:**
  - Topology:

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- **PART – A2:**
  - Route tables:
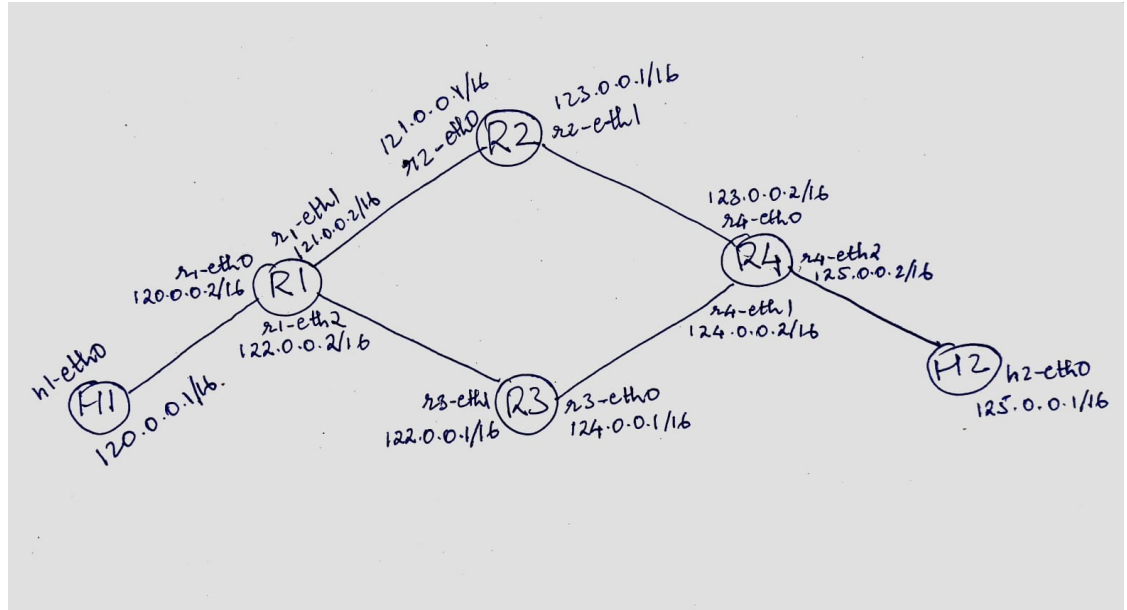
```
IP 123.0.0.1 (123.0.0.1)  0.043 ms  0.008 ms  0.007 ms
mininet> r1 route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         121.0.0.1       0.0.0.0         UG    0      0        0 r1-eth1
120.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r1-eth0
121.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r1-eth1
122.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r1-eth2
124.0.0.0       122.0.0.1       255.255.0.0     UG    0      0        0 r1-eth2
mininet> r2 route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         123.0.0.2       0.0.0.0         UG    0      0        0 r2-eth1
120.0.0.0       121.0.0.2       255.255.0.0     UG    0      0        0 r2-eth0
121.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r2-eth0
122.0.0.0       121.0.0.2       255.255.0.0     UG    0      0        0 r2-eth0
123.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r2-eth1
mininet> r3 route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         124.0.0.2       0.0.0.0         UG    0      0        0 r3-eth0
120.0.0.0       122.0.0.2       255.255.0.0     UG    0      0        0 r3-eth1
121.0.0.0       122.0.0.2       255.255.0.0     UG    0      0        0 r3-eth1
122.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r3-eth1
124.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r3-eth0
mininet> r4 route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         123.0.0.1       0.0.0.0         UG    0      0        0 r4-eth0
122.0.0.0       124.0.0.1       255.255.0.0     UG    0      0        0 r4-eth1
123.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r4-eth0
124.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r4-eth1
125.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 r4-eth2
mininet>
```

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```
mininet> h1 route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         120.0.0.2       0.0.0.0         UG    0      0        0 h1-eth0
120.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 h1-eth0
mininet> h2 route
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         125.0.0.2       0.0.0.0         UG    0      0        0 h2-eth0
125.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 h2-eth0
mininet> _
```
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- o I created 2 nodes h1, and h2, along with routers r1, r2, r3, and r4 with their corresponding eth* interfaces starting from 0.
- o I created links between these using the addLink() method.
- o I added routes between these nodes using the command "ip route add".
- o The routes are as follows,

```
• r1 ip route add 123.0.0.0/16 via 121.0.0.1 dev r1-eth1
  r1 ip route add default via 122.0.0.1 dev r1-eth2
  r2 ip route add 120.0.0.0/16 via 121.0.0.2 dev r2-eth0
  r2 ip route add 122.0.0.0/16 via 121.0.0.2 dev r2-eth0
  r2 ip route add default via 123.0.0.2 dev r2-eth1
  r3 ip route add 120.0.0.0/16 via 122.0.0.2 dev r3-eth1
  r3 ip route add 121.0.0.0/16 via 122.0.0.2 dev r3-eth1
  r3 ip route add default via 124.0.0.2 dev r3-eth0
  r4 ip route add 122.0.0.0/16 via 124.0.0.1 dev r4-eth1
  r4 ip route add default via 123.0.0.1 dev r4-eth0
```

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- o **NOTE:** I added these routes using my "MyTopo.py" file. This picture is just for showing the commands. Please refer to my MyTopo.py file for the code.
- o Trace routes:
- o h1 - > h2:

```
mininet> h1 traceroute -m 5 h2
traceroute to 125.0.0.1 (125.0.0.1), 5 hops max, 60 byte packets
 1  120.0.0.2 (120.0.0.2)  0.020 ms  0.004 ms  0.004 ms
 2  121.0.0.1 (121.0.0.1)  0.009 ms  0.005 ms  0.005 ms
 3  123.0.0.2 (123.0.0.2)  0.009 ms  0.006 ms  0.006 ms
 4  125.0.0.1 (125.0.0.1)  0.011 ms  0.007 ms  0.008 ms
```
- o
- o h2 - > h1

```
mininet> h2 traceroute -m 5 h1
traceroute to 120.0.0.1 (120.0.0.1), 5 hops max, 60 byte packets
 1  125.0.0.2 (125.0.0.2)  0.061 ms  0.004 ms  0.003 ms
 2  123.0.0.1 (123.0.0.1)  0.009 ms  0.041 ms  0.398 ms
 3  121.0.0.2 (121.0.0.2)  0.418 ms  0.410 ms  0.400 ms
 4  120.0.0.1 (120.0.0.1)  0.400 ms  0.391 ms  0.382 ms
mininet>
```
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