Name: Rohit Inamdar
SBU ID: 114504643

CSE 534: FCN - Assignment 3, Part B

Tasks:

1. **RIP Daemon and Traceroute at each node**

BIRD config file(With RIP protocol):

Mininet_assignment > host_2 > bird.conf

```
router id 157.0.1.1;
log stderr all;
log "bird.log" all;

protocol kernel {
    ipv4 {
        import all;
        export all;
    };
    persist;
}

protocol device{

}

protocol direct {
    ipv4;
    ipv6;
    interface "-arc*", "*";
}

protocol rip {
    ipv4 {
        import all;
        export all;
    };
    interface "*" {
        mode broadcast;
        port 1520;
        update time 5;
        timeout time 60;
    };
}
```

The routing table is as follows:

```
*** Routing Table on host_1
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
152.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 host_1-eth0
152.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 host_1-eth0
153.0.0.0       152.0.1.2       255.255.0.0     UG    32     0        0 host_1-eth0
154.0.0.0       152.0.1.2       255.255.0.0     UG    32     0        0 host_1-eth0
*** Routing Table on router_1
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
152.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_1-eth0
152.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_1-eth0
153.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_1-eth1
153.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_1-eth1
154.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_1-eth2
154.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_1-eth2
*** Routing Table on router_2
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
152.0.0.0       153.0.1.1       255.255.0.0     UG    32     0        0 router_2-eth0
153.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_2-eth0
153.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_2-eth0
155.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_2-eth1
155.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_2-eth1
157.0.0.0       155.0.1.2       255.255.0.0     UG    32     0        0 router_2-eth1
*** Routing Table on router_3
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
152.0.0.0       154.0.1.1       255.255.0.0     UG    32     0        0 router_3-eth0
153.0.0.0       154.0.1.1       255.255.0.0     UG    32     0        0 router_3-eth0
154.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_3-eth0
154.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_3-eth0
155.0.0.0       156.0.1.2       255.255.0.0     UG    32     0        0 router_3-eth1
```

```
*** Routing Table on router_4
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
152.0.0.0       155.0.1.1       255.255.0.0     UG    32     0        0 router_4-eth1
153.0.0.0       155.0.1.1       255.255.0.0     UG    32     0        0 router_4-eth1
154.0.0.0       156.0.1.1       255.255.0.0     UG    32     0        0 router_4-eth2
155.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_4-eth1
155.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_4-eth1
156.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_4-eth2
156.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_4-eth2
157.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 router_4-eth0
157.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 router_4-eth0
*** Routing Table on host_2
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
152.0.0.0       157.0.1.2       255.255.0.0     UG    32     0        0 host_2-eth0
153.0.0.0       157.0.1.2       255.255.0.0     UG    32     0        0 host_2-eth0
154.0.0.0       157.0.1.2       255.255.0.0     UG    32     0        0 host_2-eth0
155.0.0.0       157.0.1.2       255.255.0.0     UG    32     0        0 host_2-eth0
156.0.0.0       157.0.1.2       255.255.0.0     UG    32     0        0 host_2-eth0
157.0.0.0       0.0.0.0         255.255.0.0     U     0      0        0 host_2-eth0
157.0.0.0       0.0.0.0         255.255.0.0     U     32     0        0 host_2-eth0
** Standby for 6 seconds for routing table update..
*** Ping: testing ping reachability
host_1 -> host_2 router_1 router_2 router_3 router_4
host_2 -> host_1 router_1 router_2 router_3 router_4
router_1 -> host_1 host_2 router_2 router_3 router_4
router_2 -> host_1 host_2 router_1 router_3 router_4
router_3 -> host_1 host_2 router_1 router_2 router_4
router_4 -> host_1 host_2 router_1 router_2 router_3
*** Results: 0% dropped (30/30 received)
*** Starting CLI:
```

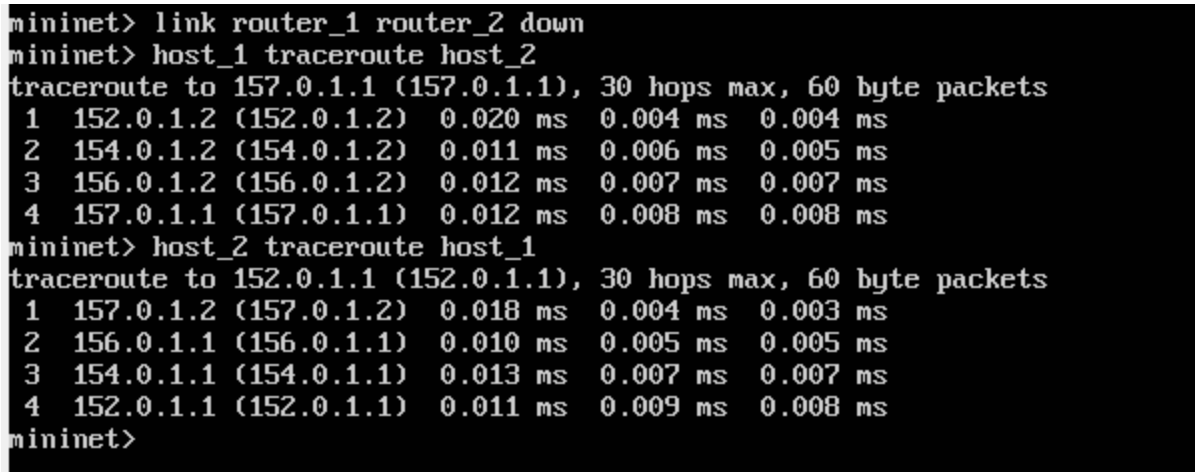
2. Bringing down links between router_1 and router_2:

The initial traceroutes between host 1 and host 2 and vice versa are shown below:

```
mininet> host_1 traceroute host_2
traceroute to 157.0.1.1 (157.0.1.1), 30 hops max, 60 byte packets
 1  152.0.1.2 (152.0.1.2)  0.019 ms  0.005 ms  0.004 ms
 2  153.0.1.2 (153.0.1.2)  0.010 ms  0.005 ms  0.005 ms
 3  155.0.1.2 (155.0.1.2)  0.012 ms  0.007 ms  0.007 ms
 4  157.0.1.1 (157.0.1.1)  0.011 ms  0.008 ms  0.009 ms
mininet> host_2 traceroute host_1
traceroute to 152.0.1.1 (152.0.1.1), 30 hops max, 60 byte packets
 1  157.0.1.2 (157.0.1.2)  0.020 ms  0.005 ms  0.004 ms
 2  155.0.1.1 (155.0.1.1)  0.010 ms  0.005 ms  0.005 ms
 3  153.0.1.1 (153.0.1.1)  0.010 ms  0.007 ms  0.006 ms
 4  152.0.1.1 (152.0.1.1)  0.011 ms  0.008 ms  0.007 ms
```

The route from **host_1** to **host_2** is: **host_1 -> router_1 -> router_2 -> router_4 -> host_2**
The route from **host_2** to **host_1** is: **host_2 ->router_4 -> router_2 -> router_1 -> host_1**

In CLI, on typing the command: “**link router_1 router_2 down**” the new traceroutes are:



Route between **host_1** to **host_2** : **host_1 -> router_1 -> router_3 -> router_4 -> host_2**
Route between **host_2** to **host_1** : **host_1 -> router_4 -> router_3 -> router_1 -> host_1**