

PART A

Pinging to localhost

```
Pinging 127.0.0.1 using Python:
36 bytes from 127.0.0.1; time=0.0ms
36 bytes from 127.0.0.1; time=0.1ms
36 bytes from 127.0.0.1; time=0.2ms
36 bytes from 127.0.0.1; time=0.0ms
36 bytes from 127.0.0.1; time=0.0ms
36 bytes from 127.0.0.1; time=0.0ms
36 bytes from 127.0.0.1; time=0.0ms
36 bytes from 127.0.0.1; time=0.1ms
36 bytes from 127.0.0.1; time=0.1ms
36 bytes from 127.0.0.1; time=0.1ms
36 bytes from 127.0.0.1; time=0.0ms
^C--- 127.0.0.1 ping statistics ---
round-trip min/avg/max 0.0/0.1/0.2 ms
```

Pinging to stonybrook.edu

```
Pinging 172.30.32.25 using Python:
36 bytes from 172.30.32.25; time=12.2ms
36 bytes from 172.30.32.25; time=3.2ms
36 bytes from 172.30.32.25; time=6.4ms
36 bytes from 172.30.32.25; time=12.2ms
36 bytes from 172.30.32.25; time=6.5ms
36 bytes from 172.30.32.25; time=12.9ms
36 bytes from 172.30.32.25; time=3.9ms
36 bytes from 172.30.32.25; time=11.0ms
36 bytes from 172.30.32.25; time=4.5ms
36 bytes from 172.30.32.25; time=3.0ms
36 bytes from 172.30.32.25; time=6.7ms
36 bytes from 172.30.32.25; time=4.0ms
^C--- 172.30.32.25 ping statistics ---
round-trip min/avg/max 3.0/7.2/12.9 ms
```

Pinging 3 root servers outside the United States

```
Pinging 192.5.5.241 using Python:
36 bytes from 192.5.5.241; time=6.4ms
36 bytes from 192.5.5.241; time=6.2ms
36 bytes from 192.5.5.241; time=13.0ms
36 bytes from 192.5.5.241; time=12.3ms
36 bytes from 192.5.5.241; time=6.6ms
36 bytes from 192.5.5.241; time=6.7ms
36 bytes from 192.5.5.241; time=5.9ms
36 bytes from 192.5.5.241; time=6.2ms
36 bytes from 192.5.5.241; time=5.1ms
36 bytes from 192.5.5.241; time=6.1ms
^C--- 192.5.5.241 ping statistics ---
round-trip min/avg/max 5.1/7.5/13.0 ms
```

```
Pinging 193.0.14.129 using Python:
36 bytes from 193.0.14.129; time=105.0ms
36 bytes from 193.0.14.129; time=103.8ms
36 bytes from 193.0.14.129; time=96.7ms
36 bytes from 193.0.14.129; time=103.4ms
36 bytes from 193.0.14.129; time=103.2ms
36 bytes from 193.0.14.129; time=96.5ms
36 bytes from 193.0.14.129; time=95.8ms
36 bytes from 193.0.14.129; time=96.4ms
36 bytes from 193.0.14.129; time=110.3ms
36 bytes from 193.0.14.129; time=107.2ms
^C--- 193.0.14.129 ping statistics ---
round-trip min/avg/max 95.8/101.8/110.3 ms
```

```
Pinging 199.7.83.42 using Python:
36 bytes from 199.7.83.42; time=66.9ms
36 bytes from 199.7.83.42; time=62.3ms
36 bytes from 199.7.83.42; time=68.0ms
36 bytes from 199.7.83.42; time=71.4ms
36 bytes from 199.7.83.42; time=69.2ms
36 bytes from 199.7.83.42; time=61.2ms
36 bytes from 199.7.83.42; time=69.0ms
36 bytes from 199.7.83.42; time=69.7ms
36 bytes from 199.7.83.42; time=62.0ms
36 bytes from 199.7.83.42; time=68.9ms
^C--- 199.7.83.42 ping statistics ---
round-trip min/avg/max 61.2/66.9/71.4 ms
```

The RTT for pinging to the localhost is the lowest primarily because of the fact that it is the closest, therefore the packets do not have to travel far to reach the server. The 3 root servers had the longest RTT times. This is because since they are outside the United States, it likely has a larger distance to travel. All the timings differ from each other largely due to network connection and also the path it took to get to the destination. The stonybrook.edu server was somewhere in the middle of the two, which makes sense because the distance is between the first two parts mentioned above.

PART B

| | | | | | |
|--------|-----------|-------------------|-------------------|-----|---|
| 102... | 59.778430 | HewlettP_5e:4a:00 | Apple_ec:12:81 | ARP | 56 Who has 172.25.235.64? Tell 172.25.232.2 |
| 102... | 59.778571 | Apple_ec:12:81 | HewlettP_5e:4a:00 | ARP | 42 172.25.235.64 is at 3c:22:fb:ec:12:81 |

ARP Request:

```
Hardware Type: 0001
Hardware Size: 06
Protocol Type: 0800
Protocol Size: 04
Opcode: request 0001
Sender MAC address: 08:f1:ea:5e:4a:00
Sender IP address: 172.25.232.2
Target MAC address: 00:00:00:00:00:00
Target IP address: 172.25.235.64
```

ARP Reply:

```
Hardware Type: 0001
Hardware Size: 06
Protocol Type: 0800
Protocol Size: 04
Opcode: reply 0002
Sender MAC address: 3c:22:fb:ec:12:81
Sender IP address: 172.25.235.64
Target MAC address: 08:f1:ea:5e:4a:00
Target IP address: 172.25.232.2
```

The IP address of the router is 172.25.232.2 because this is the sender IP address from the ARP request and is the target IP address from the ARP response. The MAC address of the router should be 08:f1:ea:5e:4a:00, since it is the same as sender IP addresses from the request.