

# Assignment 8 – Ping and Socket programming

## 1. Ping (6 points)

Ping is a tool that measures the connectivity and latency between two machines. Ping sends a special type of packet (called an ICMP packet) and measures the round-trip latency from host A to host B and back to host A.

Here is how you run ping:

```
$ ping www.google.com
$ ping 127.0.0.1
```

When terminating (by pressing "Ctrl-C"), ping will report the min, max, average, and standard deviation of round-trip latencies observed by ping.

In the exercises below, when asking to measure the latencies, please provide a **ping report of at least 10 pings**. Here is an example of a ping report (the result you get after "Ctrl-C"):

```
--- e12215.dscb.akamaiedge.net ping statistics ---
12 packets transmitted, 12 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 14.158/16.494/19.827/1.653 ms
```

To ensure the accuracy of the experiments, you should:

- close your browsers and any other networking applications on your machine
- run the following experiments with the same network condition (e.g., same wifi)

### Question 1.a (1 point)

Ping your own computer ("ping 127.0.0.1").

What latencies do you observe?

**Write down the ping report of at least 10 pings below.**

**Question 1.b (1 point)**

Ping "www.northeastern.edu".

What latencies do you observe?

**Write down the ping report of at least 10 pings below.**

**Question 1.c (1 point)**

Ping "139.130.4.5", a DNS server in Australia.

What latencies do you observe?

**Write down the ping report of at least 10 pings below.**

**Question 1.d (1 point)**

To create cross traffic, download a large file using the command in a separate shell.

```
$ wget http://releases.ubuntu.com/16.04.3/ubuntu-16.04.3-  
desktop-amd64.iso -O /dev/null
```

Meanwhile, "\$ ping www.northeastern.edu" in another shell.

What latencies do you observe?

**Write down the ping report of at least 10 pings below.**

(You can also try starting and stopping `wget` to see the effect more clearly.)

**Question 1.e (2 point)**

Sort "your own computer", "northeastern", "Australia DNS", and "northeastern+traffic" in ascending order based on their average latencies.

Does this order make sense to you?

**Explain why or why not in a few sentences.**

## 2. Socket programming (4 points)

Read the following chapters of "Beej's Guide to Network Programming":

- Ch2 "What is a socket"

<https://beej.us/guide/bgnet/html/split/what-is-a-socket.html>

- Ch5.2-5.7 "System Calls or Bust"

<https://beej.us/guide/bgnet/html/split/system-calls-or-bust.html>

**Please write down "yes" if you have finished reading Ch2 and Ch5.2-5.7; otherwise, write down "no".**

(You will lose points when writing down "no".)