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CSCI-4273

Problem Set 1

1. a) Handshake = 2RTT + 2000KB/1.5Mbps = 2(.16) + 10.1725 = 10.49 seconds

   b) 2RTT + 1999(RTT) + 10.1725 = 5 Minutes and 5 seconds

   c) 2RTT + 40(.160) = 6.72 seconds

   d) 2RTT + 10RTT + 1/2RTT = 17.26 seconds

      *cutting the time in half for part b would require a bandwidth of 3Mbps.

2. a) RTT = 2*(Dist/Speed of Light) = 2(385/300) = 2.57 seconds

   b) Delay x Bandwidth = 2.57(50Mbps) = 128.5/8 MB = 16 Mb

   c) 25Mb/50Mbps = (25(8)) / 50 = 4

      RTT + 4 = 2.57+ 4 = 6.57 seconds

   d) These two are not similar, one has a longer distance of travel adding to its RTT(Delay) but has a faster bandwidth. The other wire has a shorter distance of travel and a slower bandwidth. These could be made of different materials causing this difference in bandwidth.

3. a) (1/1,000,000) x 2.3 x 10^8 = 230 m

   b)4

4. a) in the absence of a packet lose/duplication, it is not necessary to have a sequence bit header because packets that are presumed lost or overdue are retransmitted anyways

   b) Yes, a 2-bit and a 1-bit sequence numbers are long enough. In the case where we send a 0-frame bit like the example in the book for the header for a packet 1that is being sent from host A to B. If B's Ack is lost to A and A resends that packet with header 0, B will already know it has had this packet received instead of requesting a copy packet with header 1.

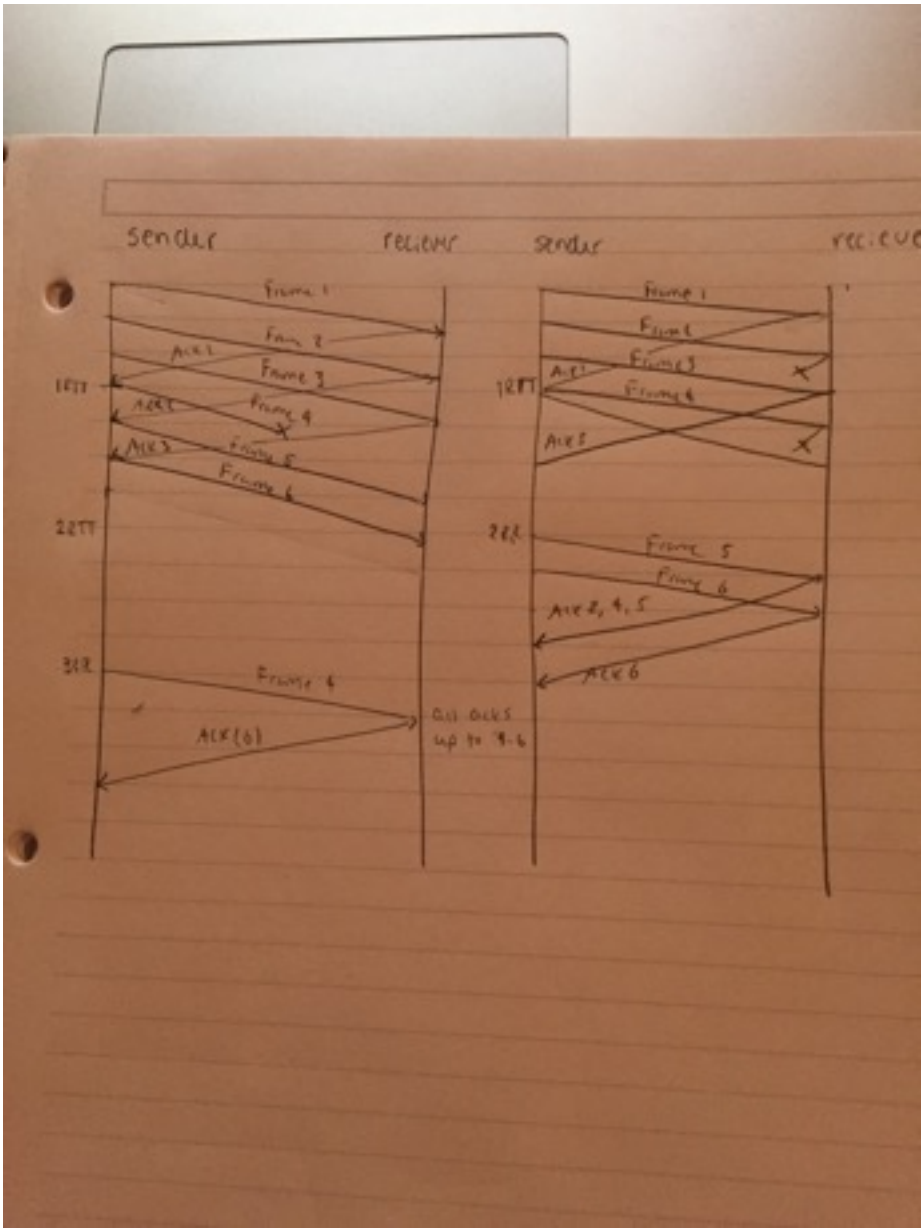
c) If the Timeout is around a minute, this will limit how man bits per frame we can send, resulting in less bits per second. Wont change the sequence number, as described in the book.

5. a) One way prop = .002 seconds = delay

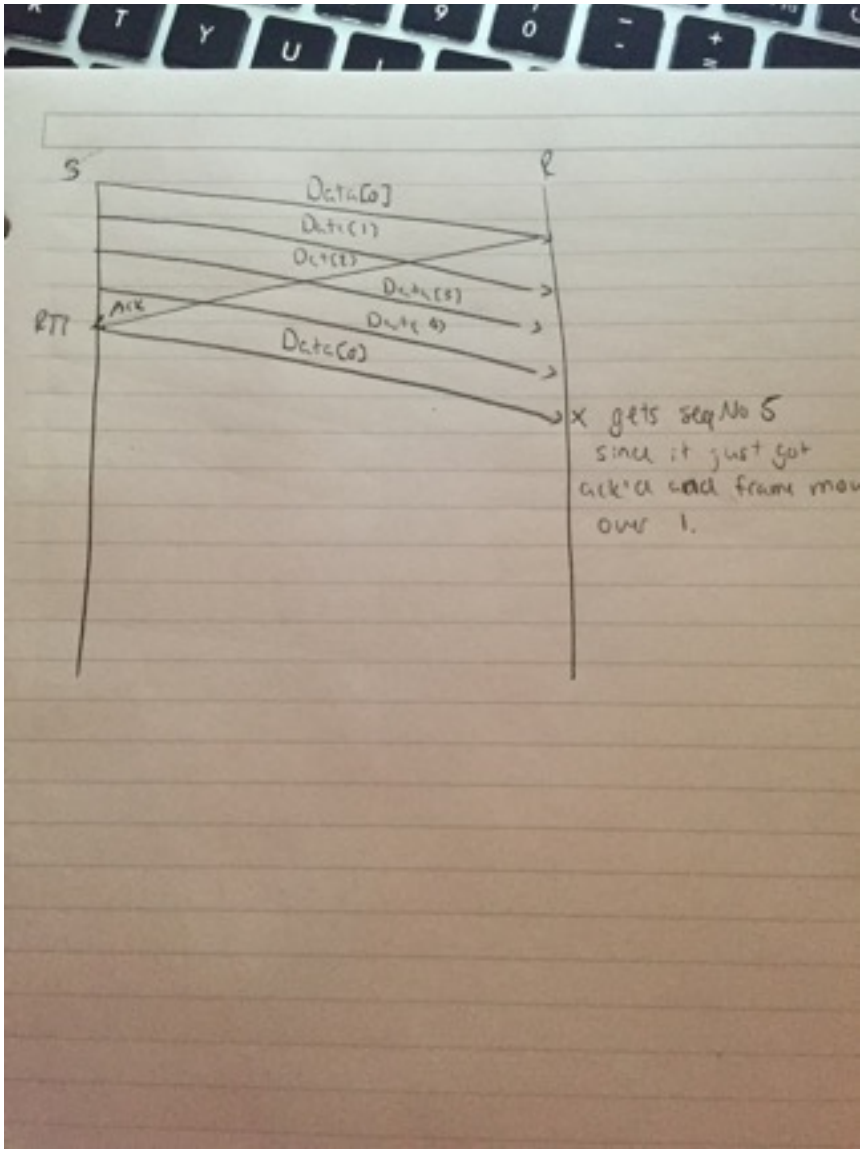
b) delay x 2 + safety constant

c) This is only one source of delay, delays can happen other ways by sitting in queue and exceeding the safety constant, this will lead to a retransmission.

6.



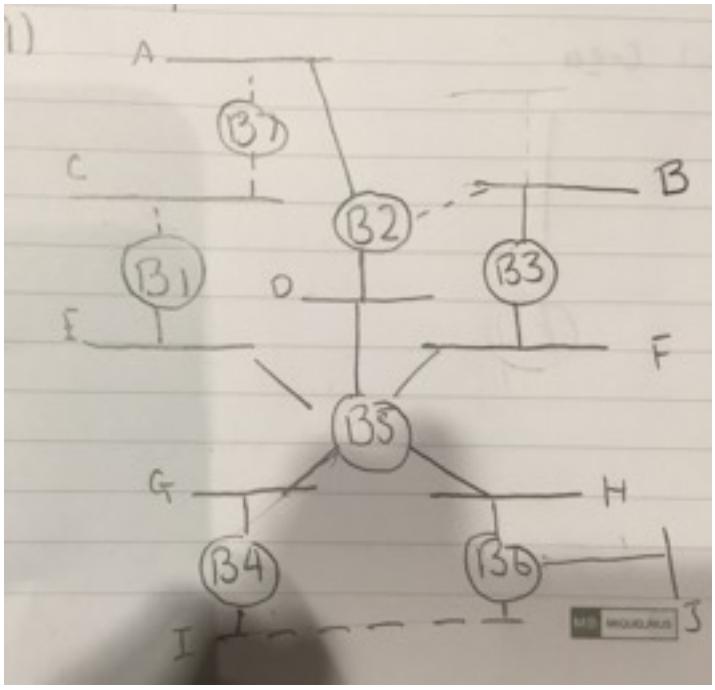
7. The algorithm becomes confused when the fifth packet comes in with a sequence number of 0 comes in again. It will assume that everything was processed and moves its window frame over and then accepts the new frame. Will become confused because we are assuming everything is coming in order.



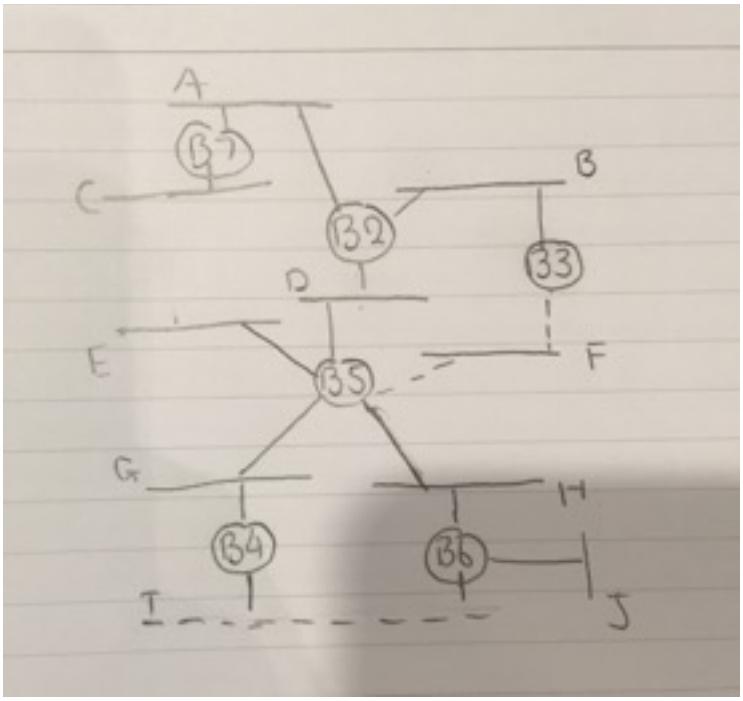
8.

| Bridge X | | Bridge Y | |
|---|---|---|---|
| Address | Interface | Address | Interface |
| A | 1 | A | 1 |
| B | 1 | B | 1 |
| C | 2 | C | 1 |
| D | 3 | D | 1 |
| E | 3 | E | 2 |

9.



10.




Ping Assignment

| Average RTT | Local | National | International |
|---|---|---|---|
| Morning | 9.314 | 61.092 | NA |
| Afternoon | 32.554 | 84.043 | NA |
| Late Night | 10.463 | 90.031 | NA |

Server of Choice

Local: www.colorado.edu

Nat: cs.pinceton.edu

Inter: kaist.ac.kr

b) Yes there were variations in the RTT time, my explanation is the traffic for these certain times.

I also conducted these on different days apart, some on Friday and some on Sunday. The

increased RTT time came from Sundays, with most likely more people connecting to these Hosts at a time.

| Average PackLoss | Local | National | International |
|---|---|---|---|
| Morning | 0% | 0% | 100% |
| Afternoon | 0% | 3% | 100% |
| Late Night | 0% | 0% | 100% |

c. There wasn't too much packet loss for local. I only had 1 packet loss for national and this occurred during the afternoon. For some reason as well I could not receive any packets at all from the International servers. I tried various other servers for International and I had a 100% packet loss for all of them.

d. There wasn't a significant change for me in RTT when I changed geographic location. It all seemed to start within a ranged of +/- 10 RTT average time.

e. Propagation Delay for: National would be 8.3 ms

Internat would be 38.2 ms

My methodology for finding these delays (minus the international) was to just divide the averages times by 2 and find the time it takes to transmit a packet across one way. Which from the book is the general term for the delay it takes to send a packet. These values if I were to draw a line or use basic information on RTT for these locations is National is around 20 ms for a 10Gbps bandwidth. Local is around .33 Bandwidth. These values are not close at all for my predicted values, but some errors come to mind. My internet connection is no the best/nor

fastest. This might add to a lot of delay on my end sending these requests not really the other

```
--- www.colorado.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 7.381/10.458/21.812/4.078 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 www.colorado.edu
PING www.colorado.edu (128.138.129.98): 200 data bytes
208 bytes from 128.138.129.98: icmp_seq=0 ttl=244 time=7.813 ms
208 bytes from 128.138.129.98: icmp_seq=1 ttl=244 time=31.557 ms
208 bytes from 128.138.129.98: icmp_seq=2 ttl=244 time=9.321 ms
208 bytes from 128.138.129.98: icmp_seq=3 ttl=244 time=9.887 ms
208 bytes from 128.138.129.98: icmp_seq=4 ttl=244 time=5.347 ms
208 bytes from 128.138.129.98: icmp_seq=5 ttl=244 time=28.562 ms
208 bytes from 128.138.129.98: icmp_seq=6 ttl=244 time=39.226 ms
208 bytes from 128.138.129.98: icmp_seq=7 ttl=244 time=5.348 ms
208 bytes from 128.138.129.98: icmp_seq=8 ttl=244 time=7.988 ms
208 bytes from 128.138.129.98: icmp_seq=9 ttl=244 time=14.274 ms

--- www.colorado.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 5.340/15.923/39.226/11.763 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 kaist.ac.kr
PING kaist.ac.kr (143.248.5.130): 200 data bytes
Request timeout for icmp_seq 0
Request timeout for icmp_seq 1
Request timeout for icmp_seq 2
Request timeout for icmp_seq 3
Request timeout for icmp_seq 4
Request timeout for icmp_seq 5
Request timeout for icmp_seq 6
Request timeout for icmp_seq 7
Request timeout for icmp_seq 8

--- kaist.ac.kr ping statistics ---
10 packets transmitted, 0 packets received, 100.0% packet loss
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 cs.princeton.edu
PING cs.princeton.edu (128.112.136.10): 200 data bytes
208 bytes from 128.112.136.10: icmp_seq=0 ttl=45 time=56.681 ms
208 bytes from 128.112.136.10: icmp_seq=1 ttl=45 time=58.941 ms
208 bytes from 128.112.136.10: icmp_seq=2 ttl=45 time=83.868 ms
208 bytes from 128.112.136.10: icmp_seq=3 ttl=45 time=66.384 ms
208 bytes from 128.112.136.10: icmp_seq=4 ttl=45 time=58.259 ms
208 bytes from 128.112.136.10: icmp_seq=5 ttl=45 time=58.273 ms
208 bytes from 128.112.136.10: icmp_seq=6 ttl=45 time=55.294 ms
208 bytes from 128.112.136.10: icmp_seq=7 ttl=45 time=397.615 ms
208 bytes from 128.112.136.10: icmp_seq=8 ttl=45 time=56.517 ms
208 bytes from 128.112.136.10: icmp_seq=9 ttl=45 time=58.478 ms
```

```
--- cs.princeton.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 55.294/95.031/397.615/101.182 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 cs.princeton.edu
PING cs.princeton.edu (128.112.136.10): 200 data bytes
208 bytes from 128.112.136.10: icmp_seq=0 ttl=45 time=56.675 ms
208 bytes from 128.112.136.10: icmp_seq=1 ttl=45 time=61.176 ms
208 bytes from 128.112.136.10: icmp_seq=2 ttl=45 time=60.632 ms
208 bytes from 128.112.136.10: icmp_seq=3 ttl=45 time=66.975 ms
208 bytes from 128.112.136.10: icmp_seq=4 ttl=45 time=60.848 ms
208 bytes from 128.112.136.10: icmp_seq=5 ttl=45 time=61.319 ms
208 bytes from 128.112.136.10: icmp_seq=6 ttl=45 time=58.625 ms
208 bytes from 128.112.136.10: icmp_seq=7 ttl=45 time=60.388 ms
208 bytes from 128.112.136.10: icmp_seq=8 ttl=45 time=61.190 ms
208 bytes from 128.112.136.10: icmp_seq=9 ttl=45 time=67.083 ms

--- cs.princeton.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 56.675/61.555/67.083/3.226 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 cs.princeton.edu
PING cs.princeton.edu (128.112.136.10): 200 data bytes
208 bytes from 128.112.136.10: icmp_seq=0 ttl=45 time=75.248 ms
208 bytes from 128.112.136.10: icmp_seq=1 ttl=45 time=81.231 ms
208 bytes from 128.112.136.10: icmp_seq=2 ttl=45 time=80.852 ms
208 bytes from 128.112.136.10: icmp_seq=3 ttl=45 time=80.497 ms
208 bytes from 128.112.136.10: icmp_seq=4 ttl=45 time=102.975 ms
208 bytes from 128.112.136.10: icmp_seq=5 ttl=45 time=93.027 ms
208 bytes from 128.112.136.10: icmp_seq=6 ttl=45 time=84.780 ms
208 bytes from 128.112.136.10: icmp_seq=7 ttl=45 time=87.099 ms
208 bytes from 128.112.136.10: icmp_seq=8 ttl=45 time=75.733 ms
208 bytes from 128.112.136.10: icmp_seq=9 ttl=45 time=82.814 ms

--- cs.princeton.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 75.248/84.430/102.975/7.911 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 www.colorado.edu
PING www.colorado.edu (128.138.129.98): 200 data bytes
208 bytes from 128.138.129.98: icmp_seq=0 ttl=244 time=33.077 ms
208 bytes from 128.138.129.98: icmp_seq=1 ttl=244 time=35.191 ms
208 bytes from 128.138.129.98: icmp_seq=2 ttl=244 time=33.461 ms
208 bytes from 128.138.129.98: icmp_seq=3 ttl=244 time=27.955 ms
208 bytes from 128.138.129.98: icmp_seq=4 ttl=244 time=31.767 ms
208 bytes from 128.138.129.98: icmp_seq=5 ttl=244 time=33.725 ms
208 bytes from 128.138.129.98: icmp_seq=6 ttl=244 time=29.186 ms
208 bytes from 128.138.129.98: icmp_seq=7 ttl=244 time=32.668 ms
208 bytes from 128.138.129.98: icmp_seq=8 ttl=244 time=31.966 ms
208 bytes from 128.138.129.98: icmp_seq=9 ttl=244 time=36.153 ms

--- www.colorado.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 27.955/32.554/36.153/2.411 ms
```

host sending it across country. Me on my own

network is where I personally slow down.

```
PING www.colorado.edu (128.138.129.98): 200 data bytes
208 bytes from 128.138.129.98: icmp_seq=0 ttl=244 time=4.876 ms
208 bytes from 128.138.129.98: icmp_seq=1 ttl=244 time=7.596 ms
208 bytes from 128.138.129.98: icmp_seq=2 ttl=244 time=7.412 ms
208 bytes from 128.138.129.98: icmp_seq=3 ttl=244 time=29.686 ms
208 bytes from 128.138.129.98: icmp_seq=4 ttl=244 time=7.284 ms
208 bytes from 128.138.129.98: icmp_seq=5 ttl=244 time=4.787 ms
208 bytes from 128.138.129.98: icmp_seq=6 ttl=244 time=7.537 ms
208 bytes from 128.138.129.98: icmp_seq=7 ttl=244 time=7.797 ms
208 bytes from 128.138.129.98: icmp_seq=8 ttl=244 time=8.011 ms
208 bytes from 128.138.129.98: icmp_seq=9 ttl=244 time=7.612 ms

--- www.colorado.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 4.787/9.260/29.686/6.899 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 www.colorado.edu
PING www.colorado.edu (128.138.129.98): 200 data bytes
208 bytes from 128.138.129.98: icmp_seq=0 ttl=244 time=12.068 ms
208 bytes from 128.138.129.98: icmp_seq=1 ttl=244 time=8.073 ms
208 bytes from 128.138.129.98: icmp_seq=2 ttl=244 time=9.265 ms
208 bytes from 128.138.129.98: icmp_seq=3 ttl=244 time=15.550 ms
208 bytes from 128.138.129.98: icmp_seq=4 ttl=244 time=5.004 ms
208 bytes from 128.138.129.98: icmp_seq=5 ttl=244 time=11.586 ms
208 bytes from 128.138.129.98: icmp_seq=6 ttl=244 time=8.096 ms
208 bytes from 128.138.129.98: icmp_seq=7 ttl=244 time=7.762 ms
208 bytes from 128.138.129.98: icmp_seq=8 ttl=244 time=10.926 ms
208 bytes from 128.138.129.98: icmp_seq=9 ttl=244 time=5.081 ms

--- www.colorado.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 5.004/9.341/15.550/3.101 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 www.colorado.edu
PING www.colorado.edu (128.138.129.98): 200 data bytes
208 bytes from 128.138.129.98: icmp_seq=0 ttl=244 time=7.673 ms
208 bytes from 128.138.129.98: icmp_seq=1 ttl=244 time=7.387 ms
208 bytes from 128.138.129.98: icmp_seq=2 ttl=244 time=7.445 ms
208 bytes from 128.138.129.98: icmp_seq=3 ttl=244 time=7.455 ms
208 bytes from 128.138.129.98: icmp_seq=4 ttl=244 time=6.593 ms
208 bytes from 128.138.129.98: icmp_seq=5 ttl=244 time=7.783 ms
208 bytes from 128.138.129.98: icmp_seq=6 ttl=244 time=7.771 ms
208 bytes from 128.138.129.98: icmp_seq=7 ttl=244 time=7.441 ms
208 bytes from 128.138.129.98: icmp_seq=8 ttl=244 time=9.670 ms
208 bytes from 128.138.129.98: icmp_seq=9 ttl=244 time=7.009 ms
```

```
--- www.colorado.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 6.593/7.623/9.670/0.763 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 www.colorado.edu
PING www.colorado.edu (128.138.129.98): 200 data bytes
208 bytes from 128.138.129.98: icmp_seq=0 ttl=244 time=8.085 ms
208 bytes from 128.138.129.98: icmp_seq=1 ttl=244 time=5.418 ms
208 bytes from 128.138.129.98: icmp_seq=2 ttl=244 time=7.878 ms
208 bytes from 128.138.129.98: icmp_seq=3 ttl=244 time=7.877 ms
208 bytes from 128.138.129.98: icmp_seq=4 ttl=244 time=15.954 ms
208 bytes from 128.138.129.98: icmp_seq=5 ttl=244 time=9.517 ms
208 bytes from 128.138.129.98: icmp_seq=6 ttl=244 time=5.308 ms
208 bytes from 128.138.129.98: icmp_seq=7 ttl=244 time=7.417 ms
208 bytes from 128.138.129.98: icmp_seq=8 ttl=244 time=7.321 ms
208 bytes from 128.138.129.98: icmp_seq=9 ttl=244 time=8.626 ms

--- www.colorado.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 5.308/8.344/15.954/2.816 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 tsinghua.edu.cn
ping: cannot resolve tsinghua.edu.cn: Unknown host
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 cs.princeton.edu
PING cs.princeton.edu (128.112.136.10): 200 data bytes
208 bytes from 128.112.136.10: icmp_seq=0 ttl=45 time=58.036 ms
208 bytes from 128.112.136.10: icmp_seq=1 ttl=45 time=58.375 ms
208 bytes from 128.112.136.10: icmp_seq=2 ttl=45 time=65.680 ms
208 bytes from 128.112.136.10: icmp_seq=3 ttl=45 time=58.964 ms
208 bytes from 128.112.136.10: icmp_seq=4 ttl=45 time=56.794 ms
208 bytes from 128.112.136.10: icmp_seq=5 ttl=45 time=59.688 ms
208 bytes from 128.112.136.10: icmp_seq=6 ttl=45 time=60.827 ms
208 bytes from 128.112.136.10: icmp_seq=7 ttl=45 time=59.588 ms
208 bytes from 128.112.136.10: icmp_seq=8 ttl=45 time=59.174 ms
208 bytes from 128.112.136.10: icmp_seq=9 ttl=45 time=65.447 ms

--- cs.princeton.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 56.794/60.252/65.680/2.843 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 cs.princeton.edu
PING cs.princeton.edu (128.112.136.10): 200 data bytes
208 bytes from 128.112.136.10: icmp_seq=0 ttl=45 time=61.180 ms
208 bytes from 128.112.136.10: icmp_seq=1 ttl=45 time=58.539 ms
208 bytes from 128.112.136.10: icmp_seq=2 ttl=45 time=58.742 ms
208 bytes from 128.112.136.10: icmp_seq=3 ttl=45 time=62.144 ms
208 bytes from 128.112.136.10: icmp_seq=4 ttl=45 time=59.238 ms
208 bytes from 128.112.136.10: icmp_seq=5 ttl=45 time=60.193 ms
208 bytes from 128.112.136.10: icmp_seq=6 ttl=45 time=74.604 ms
208 bytes from 128.112.136.10: icmp_seq=7 ttl=45 time=57.833 ms
208 bytes from 128.112.136.10: icmp_seq=8 ttl=45 time=58.526 ms
208 bytes from 128.112.136.10: icmp_seq=9 ttl=45 time=59.292 ms
```

```
--- cs.princeton.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 57.833/61.039/74.604/4.694 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 cs.princeton.edu
PING cs.princeton.edu (128.112.136.10): 200 data bytes
208 bytes from 128.112.136.10: icmp_seq=0 ttl=45 time=60.191 ms
208 bytes from 128.112.136.10: icmp_seq=1 ttl=45 time=60.767 ms
208 bytes from 128.112.136.10: icmp_seq=2 ttl=45 time=72.186 ms
208 bytes from 128.112.136.10: icmp_seq=3 ttl=45 time=59.514 ms
208 bytes from 128.112.136.10: icmp_seq=4 ttl=45 time=57.508 ms
208 bytes from 128.112.136.10: icmp_seq=5 ttl=45 time=60.837 ms
208 bytes from 128.112.136.10: icmp_seq=6 ttl=45 time=64.837 ms
208 bytes from 128.112.136.10: icmp_seq=7 ttl=45 time=58.420 ms
208 bytes from 128.112.136.10: icmp_seq=8 ttl=45 time=65.229 ms
208 bytes from 128.112.136.10: icmp_seq=9 ttl=45 time=60.707 ms

--- cs.princeton.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 57.508/62.030/72.186/4.114 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 cs.princeton.edu
PING cs.princeton.edu (128.112.136.10): 200 data bytes
208 bytes from 128.112.136.10: icmp_seq=0 ttl=45 time=59.345 ms
208 bytes from 128.112.136.10: icmp_seq=1 ttl=45 time=57.916 ms
208 bytes from 128.112.136.10: icmp_seq=2 ttl=45 time=58.526 ms
208 bytes from 128.112.136.10: icmp_seq=3 ttl=45 time=57.779 ms
208 bytes from 128.112.136.10: icmp_seq=4 ttl=45 time=57.904 ms
208 bytes from 128.112.136.10: icmp_seq=5 ttl=45 time=57.425 ms
208 bytes from 128.112.136.10: icmp_seq=6 ttl=45 time=61.244 ms
208 bytes from 128.112.136.10: icmp_seq=7 ttl=45 time=65.521 ms
208 bytes from 128.112.136.10: icmp_seq=8 ttl=45 time=58.473 ms

--- cs.princeton.edu ping statistics ---
10 packets transmitted, 9 packets received, 10.0% packet loss
round-trip min/avg/max/stddev = 57.425/59.348/65.521/2.437 ms
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 kaist.ac.kr
PING kaist.ac.kr (143.248.5.130): 200 data bytes
Request timeout for icmp_seq 0
Request timeout for icmp_seq 1
Request timeout for icmp_seq 2
Request timeout for icmp_seq 3
Request timeout for icmp_seq 4
Request timeout for icmp_seq 5
Request timeout for icmp_seq 6
Request timeout for icmp_seq 7
Request timeout for icmp_seq 8

--- kaist.ac.kr ping statistics ---
10 packets transmitted, 0 packets received, 100.0% packet loss
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 kaist.ac.kr
PING kaist.ac.kr (143.248.5.130): 200 data bytes
Request timeout for icmp_seq 0
Request timeout for icmp_seq 1
Request timeout for icmp_seq 2
Request timeout for icmp_seq 3
Request timeout for icmp_seq 4
Request timeout for icmp_seq 5
Request timeout for icmp_seq 6
Request timeout for icmp_seq 7
Request timeout for icmp_seq 8
```

```
--- kaist.ac.kr ping statistics ---
10 packets transmitted, 0 packets received, 100.0% packet loss
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 kaist.ac.kr
PING kaist.ac.kr (143.248.5.130): 200 data bytes
Request timeout for icmp_seq 0
Request timeout for icmp_seq 1
Request timeout for icmp_seq 2
Request timeout for icmp_seq 3
Request timeout for icmp_seq 4
Request timeout for icmp_seq 5
Request timeout for icmp_seq 6
Request timeout for icmp_seq 7
Request timeout for icmp_seq 8

--- kaist.ac.kr ping statistics ---
10 packets transmitted, 0 packets received, 100.0% packet loss
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 www.colorado.edu
PING www.colorado.edu (128.138.129.98): 200 data bytes
208 bytes from 128.138.129.98: icmp_seq=0 ttl=244 time=9.227 ms
208 bytes from 128.138.129.98: icmp_seq=1 ttl=244 time=8.681 ms
208 bytes from 128.138.129.98: icmp_seq=2 ttl=244 time=7.909 ms
208 bytes from 128.138.129.98: icmp_seq=3 ttl=244 time=10.421 ms
208 bytes from 128.138.129.98: icmp_seq=4 ttl=244 time=7.354 ms
208 bytes from 128.138.129.98: icmp_seq=5 ttl=244 time=12.996 ms
208 bytes from 128.138.129.98: icmp_seq=6 ttl=244 time=7.897 ms
208 bytes from 128.138.129.98: icmp_seq=7 ttl=244 time=7.833 ms
208 bytes from 128.138.129.98: icmp_seq=8 ttl=244 time=7.773 ms
208 bytes from 128.138.129.98: icmp_seq=9 ttl=244 time=7.491 ms

--- www.colorado.edu ping statistics ---
10 packets transmitted, 10 packets received, 0.0% packet loss
round-trip min/avg/max/stddev = 7.354/8.758/12.996/1.668 ms
Kevins-MBP:ex9 kevinrau$
Kevins-MBP:ex9 kevinrau$ ping -c 10 -s 200 www.colorado.edu
PING www.colorado.edu (128.138.129.98): 200 data bytes
208 bytes from 128.138.129.98: icmp_seq=0 ttl=244 time=8.705 ms
208 bytes from 128.138.129.98: icmp_seq=1 ttl=244 time=18.095 ms
208 bytes from 128.138.129.98: icmp_seq=2 ttl=244 time=7.449 ms
208 bytes from 128.138.129.98: icmp_seq=3 ttl=244 time=9.916 ms
208 bytes from 128.138.129.98: icmp_seq=4 ttl=244 time=7.481 ms
208 bytes from 128.138.129.98: icmp_seq=5 ttl=244 time=7.701 ms
208 bytes from 128.138.129.98: icmp_seq=6 ttl=244 time=7.548 ms
208 bytes from 128.138.129.98: icmp_seq=7 ttl=244 time=7.381 ms
208 bytes from 128.138.129.98: icmp_seq=8 ttl=244 time=21.812 ms
208 bytes from 128.138.129.98: icmp_seq=9 ttl=244 time=8.490 ms

--- www.colorado.edu ping statistics ---
```