Project 3 Practice Test Cases

*NOTE: These basic test cases are provided as a courtesy to help you debug your Project 3 implementations. **They are not comprehensive**, so the TAs/graders might run additional test cases during grading. You are strongly encouraged to write your own additional test cases.*

Basic Operation

ping server command

```
java -jar pingserver.jar --port=56789 --loss_rate=0.0 \
                         --bit_error_rate=0.0 --avg_delay=100
```

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=10 --period=1000 --timeout=60000
```

ping client output

```
PING 127.0.0.1
PONG 127.0.0.1: seq=1 time=255 ms
PONG 127.0.0.1: seq=2 time=76 ms
PONG 127.0.0.1: seq=3 time=64 ms
PONG 127.0.0.1: seq=4 time=157 ms
PONG 127.0.0.1: seq=5 time=100 ms
PONG 127.0.0.1: seq=6 time=16 ms
PONG 127.0.0.1: seq=7 time=144 ms
PONG 127.0.0.1: seq=8 time=115 ms
PONG 127.0.0.1: seq=9 time=143 ms
PONG 127.0.0.1: seq=10 time=73 ms

--- 127.0.0.1 ping statistics ---
10 transmitted, 10 received, 0% loss, time 9072 ms
rtt min/avg/max = 16/114/255
```

Different Count

ping server command

```
java -jar pingserver.jar --port=56789 --loss_rate=0.0 \
                         --bit_error_rate=0.0 --avg_delay=100
```

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=5 --period=1000 --timeout=60000
```

ping client output

```
PING 127.0.0.1
PONG 127.0.0.1: seq=1 time=214 ms
PONG 127.0.0.1: seq=2 time=10 ms
PONG 127.0.0.1: seq=3 time=158 ms
PONG 127.0.0.1: seq=4 time=20 ms
PONG 127.0.0.1: seq=5 time=55 ms

--- 127.0.0.1 ping statistics ---
5 transmitted, 5 received, 0% loss, time 4055 ms
rtt min/avg/max = 10/91/214
```

Different Period

ping server command

```
java -jar pingserver.jar --port=56789 --loss_rate=0.0 \
                         --bit_error_rate=0.0 --avg_delay=100
```

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=10 --period=2000 --timeout=60000
```

ping client output

```
PING 127.0.0.1
PONG 127.0.0.1: seq=1 time=234 ms
PONG 127.0.0.1: seq=2 time=32 ms
PONG 127.0.0.1: seq=3 time=25 ms
PONG 127.0.0.1: seq=4 time=68 ms
PONG 127.0.0.1: seq=5 time=115 ms
PONG 127.0.0.1: seq=6 time=9 ms
PONG 127.0.0.1: seq=7 time=160 ms
PONG 127.0.0.1: seq=8 time=174 ms
PONG 127.0.0.1: seq=9 time=162 ms
PONG 127.0.0.1: seq=10 time=115 ms

--- 127.0.0.1 ping statistics ---
10 transmitted, 10 received, 0% loss, time 18116 ms
rtt min/avg/max = 9/109/234
```

Period (Large Average Delay)

ping server command

```
java -jar pingserver.jar --port=56789 --loss_rate=0.0 \
                         --bit_error_rate=0.0 --avg_delay=5000
```

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=10 --period=1000 --timeout=60000
```

ping server output (removed "reply sent" lines)

```
Received from 127.0.0.1: PING id:3246 seqno:1 timestamp:15587267021500
Received from 127.0.0.1: PING id:3246 seqno:2 timestamp:15587267022500
Received from 127.0.0.1: PING id:3246 seqno:3 timestamp:15587267023500
Received from 127.0.0.1: PING id:3246 seqno:4 timestamp:15587267024500
Received from 127.0.0.1: PING id:3246 seqno:5 timestamp:15587267025501
Received from 127.0.0.1: PING id:3246 seqno:6 timestamp:15587267026501
Received from 127.0.0.1: PING id:3246 seqno:7 timestamp:15587267027501
Received from 127.0.0.1: PING id:3246 seqno:8 timestamp:15587267028501
Received from 127.0.0.1: PING id:3246 seqno:9 timestamp:15587267029501
Received from 127.0.0.1: PING id:3246 seqno:10 timestamp:15587267030501
```

ping client output

```
PING 127.0.0.1
PONG 127.0.0.1: seq=2 time=1014 ms
PONG 127.0.0.1: seq=1 time=1974 ms
PONG 127.0.0.1: seq=7 time=2061 ms
PONG 127.0.0.1: seq=5 time=4329 ms
PONG 127.0.0.1: seq=6 time=3709 ms
PONG 127.0.0.1: seq=4 time=6612 ms
PONG 127.0.0.1: seq=3 time=8128 ms
PONG 127.0.0.1: seq=10 time=3966 ms
PONG 127.0.0.1: seq=8 time=6337 ms
PONG 127.0.0.1: seq=9 time=9149 ms

--- 127.0.0.1 ping statistics ---
10 transmitted, 10 received, 0% loss, time 17151 ms
rtt min/avg/max = 1014/4727/9149
```

Period (High Packet Loss Rate)

ping server command

```
java -jar pingserver.jar --port=56789 --loss_rate=0.75 \
                         --bit_error_rate=0.0 --avg_delay=100
```

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=10 --period=1000 --timeout=10000
```

ping server output

```
Received from 127.0.0.1: PING id:3490 seqno:1 timestamp:1558727261913
   Reply not sent.
Received from 127.0.0.1: PING id:3490 seqno:2 timestamp:1558727262914
   Reply sent.
Received from 127.0.0.1: PING id:3490 seqno:3 timestamp:1558727263913
   Reply not sent.
Received from 127.0.0.1: PING id:3490 seqno:4 timestamp:1558727264913
   Reply not sent.
Received from 127.0.0.1: PING id:3490 seqno:5 timestamp:1558727265913
   Reply not sent.
Received from 127.0.0.1: PING id:3490 seqno:6 timestamp:1558727266914
   Reply not sent.
Received from 127.0.0.1: PING id:3490 seqno:7 timestamp:1558727267913
   Reply not sent.
Received from 127.0.0.1: PING id:3490 seqno:8 timestamp:1558727268913
   Reply sent.
Received from 127.0.0.1: PING id:3490 seqno:9 timestamp:1558727269913
   Reply not sent.
Received from 127.0.0.1: PING id:3490 seqno:10
timestamp:1558727270913
   Reply not sent.
```

ping client output

```
PING 127.0.0.1
PONG 127.0.0.1: seq=2 time=12 ms
PONG 127.0.0.1: seq=8 time=132 ms

--- 127.0.0.1 ping statistics ---
10 transmitted, 2 received, 80% loss, time 19013 ms
rtt min/avg/max = 12/72/132
```

Period (High Bit Error Rate)

ping server command

```
java -jar pingserver.jar --port=56789 --loss_rate=0.0 \
                         --bit_error_rate=0.75 --avg_delay=100
```

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=10 --period=1000 --timeout=10000
```

ping server output (removed "reply sent" lines)

```
Received from 127.0.0.1: PING id:3617 seqno:1 timestamp:1558727717147
    Reply has invalid checksum.
Received from 127.0.0.1: PING id:3617 seqno:2 timestamp:1558727718148
    Reply has invalid checksum.
Received from 127.0.0.1: PING id:3617 seqno:3 timestamp:1558727719148
    Reply has invalid checksum.
Received from 127.0.0.1: PING id:3617 seqno:4 timestamp:1558727720147
Received from 127.0.0.1: PING id:3617 seqno:5 timestamp:1558727721147
    Reply has invalid checksum.
Received from 127.0.0.1: PING id:3617 seqno:6 timestamp:1558727722147
    Reply has invalid checksum.
Received from 127.0.0.1: PING id:3617 seqno:7 timestamp:1558727723147
Received from 127.0.0.1: PING id:3617 seqno:8 timestamp:1558727724148
Received from 127.0.0.1: PING id:3617 seqno:9 timestamp:1558727725147
    Reply has invalid checksum.
Received from 127.0.0.1: PING id:3617 seqno:10
timestamp:1558727726148
    Reply has invalid checksum.
```

ping client output

```
PING 127.0.0.1
Checksum verification failed for echo reply seqno=1
Checksum verification failed for echo reply seqno=2
Checksum verification failed for echo reply seqno=3
PONG 127.0.0.1: seq=4 time=116 ms
Checksum verification failed for echo reply seqno=5
Checksum verification failed for echo reply seqno=6
PONG 127.0.0.1: seq=7 time=18 ms
PONG 127.0.0.1: seq=8 time=104 ms
Checksum verification failed for echo reply seqno=9
Checksum verification failed for echo reply seqno=10

--- 127.0.0.1 ping statistics ---
10 transmitted, 3 received, 70% loss, time 9016 ms
rtt min/avg/max = 18/79/116
```

Short Timeout

ping server command

```
java -jar pingserver.jar --port=56789 --loss_rate=0.0 \
                         --bit_error_rate=0.0 --avg_delay=10000
```

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=10 --period=1000 --timeout=2000
```

ping server output

```
Received from 127.0.0.1: PING id:3761 seqno:1 timestamp:1558728263681
Received from 127.0.0.1: PING id:3761 seqno:2 timestamp:1558728264682
Received from 127.0.0.1: PING id:3761 seqno:3 timestamp:1558728265681
Received from 127.0.0.1: PING id:3761 seqno:4 timestamp:1558728266681
Received from 127.0.0.1: PING id:3761 seqno:5 timestamp:1558728267681
Received from 127.0.0.1: PING id:3761 seqno:6 timestamp:1558728268681
Received from 127.0.0.1: PING id:3761 seqno:7 timestamp:1558728269681
Received from 127.0.0.1: PING id:3761 seqno:8 timestamp:1558728270681
    Reply sent.
Received from 127.0.0.1: PING id:3761 seqno:9 timestamp:1558728271681
    Reply sent.
Received from 127.0.0.1: PING id:3761 seqno:10 timestamp:1558728272681
    Reply sent.
    Reply sent.
    Reply sent.
    Reply sent.
    Reply sent.
    Reply sent.
    Reply sent.
    Reply sent.
```

ping client output

```
PING 127.0.0.1

--- 127.0.0.1 ping statistics ---
10 transmitted, 0 received, 100% loss, time 11005 ms
rtt min/avg/max = 0/0/0
```

Long Timeout

ping server command

```
java -jar pingserver.jar --port=56789 --loss_rate=0.0 \
                         --bit_error_rate=0.0 --avg_delay=2000
```

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=10 --period=1000 --timeout=20000
```

ping client output

```
PING 127.0.0.1
PONG 127.0.0.1: seq=1 time=1353 ms
PONG 127.0.0.1: seq=2 time=477 ms
PONG 127.0.0.1: seq=4 time=92 ms
PONG 127.0.0.1: seq=3 time=1547 ms
PONG 127.0.0.1: seq=6 time=89 ms
PONG 127.0.0.1: seq=5 time=3404 ms
PONG 127.0.0.1: seq=9 time=821 ms
PONG 127.0.0.1: seq=7 time=3102 ms
PONG 127.0.0.1: seq=8 time=2704 ms
PONG 127.0.0.1: seq=10 time=3947 ms

--- 127.0.0.1 ping statistics ---
10 transmitted, 10 received, 0% loss, time 12947 ms
rtt min/avg/max = 89/1753/3947
```

Timeout (No Server)

ping client command

```
<ping client cmd> --server_ip=127.0.0.1 --server_port=56789 \
                  --count=10 --period=1000 --timeout=100
```

ping client output

```
PING 127.0.0.1

--- 127.0.0.1 ping statistics ---
10 transmitted, 0 received, 100% loss, time 9104 ms
rtt min/avg/max = 0/0/0
```