

ICMP Program Lab
Ze He(zh700@nyu.edu)
127.0.0.1(localhost)

```
1. sudo python icmp.py (sudo)
Last login: Fri Nov 13 14:08:13 on ttys000
→ ~ git:(master) X cd desktop
→ desktop git:(master) X sudo python icmp.py
Pinging 127.0.0.1 using Python:

4.88758087158e-05
7.9870223999e-05
5.29289245605e-05
7.58171081543e-05
6.98566436768e-05
8.08238983154e-05
6.89029693604e-05
7.79628753662e-05
7.10487365723e-05
8.48770141602e-05
6.79492950439e-05
8.39233398438e-05
6.79492950439e-05
8.51154327393e-05
0.000146150588989
8.01086425781e-05
7.89165496826e-05
8.39233398438e-05
7.00950622559e-05
6.00814819336e-05
```

www.google.com(North America)

```
1. sudo python icmp.py (Python)
Last login: Fri Nov 13 13:57:55 on ttys000
→ ~ git:(master) X cd desktop
→ desktop git:(master) X sudo python icmp.py
Password:
Pinging 74.125.226.82 using Python:

0.0288951396942
0.0255391597748
0.0245108604431
0.0279569625854
0.0244989395142
0.0261518955231
0.0333590507507
0.0307319164276
0.026202917099
0.0394039154053
0.0310142040253
0.0412621498108
0.0246429443359
0.0375511646271
0.0351350307465
0.0232579708099
0.0291349887848
0.0287380218506
0.0248181819916
```

www.baidu.com(Asia)

```
1. sudo python icmp.py (sudo)
Last login: Fri Nov 13 14:10:54 on ttys000
→ ~ git:(master) ✗ cd desktop
→ desktop git:(master) ✗ sudo python icmp.py
Pinging 103.235.46.39 using Python:

0.195902109146
0.0538010597229
0.195471048355
0.106636047363
0.248982191086
0.100229978561
0.109913110733
0.000372171401978
0.235761880875
0.252944946289
0.0899000167847
0.124876022339
0.139527082443
0.291763067245
0.096225976944
0.22727894783
0.0499160289764
0.266039848328
0.0187969207764
0.14995598793
```

www.bbc.com(Europe)

```
1. sudo python icmp.py (sudo)
Last login: Fri Nov 13 14:12:26 on ttys000
→ ~ git:(master) ✗ cd desktop
→ desktop git:(master) ✗ sudo python icmp.py
Pinging 23.235.39.81 using Python:

0.0521697998047
0.0507850646973
0.0386581420898
0.0425119400024
0.00985717773438
0.0263378620148
0.0497620105743
0.0426640510559
0.0487139225006
0.0444819927216
0.039834022522
0.0413429737091
0.0296649932861
0.0459508895874
0.0571780204773
0.0445780754089
0.0379059314728
0.0514919757843
0.00942611694336
0.0449891090393
```

www.australia.com(Australia)

```
1. sudo python icmp.py (sudo)
Last login: Fri Nov 13 14:16:17 on ttys000
→ ~ git:(master) ✗ cd desktop
→ desktop git:(master) ✗ sudo python icmp.py
Pinging 107.14.41.129 using Python:

0.0271260738373
0.0120890140533
0.0271408557892
0.0246629714966
0.0276970863342
0.0264480113983
0.0259869098663
0.0250658988953
0.0269799232483
0.0279178619385
0.0248770713806
0.0262351036072
0.0400199890137
0.0354311466217
0.0268740653992
0.0254039764404
0.039263010025
0.0253019332886
0.0268537998199
0.029186964035
```

Code:

```
import socket
import os
import sys
import struct
import time
import select
import binascii

ICMP_ECHO_REQUEST = 8;

ERROR_DESCR = {
    1: ' - Note that ICMP messages can only be '
        'sent from processes running as root.',
    10013: ' - Note that ICMP messages can only be sent by'
        ' users or processes with administrator rights.'
}

def checksum(str):
    csum = 0
    countTo = (len(str)/2)*2

    count =0
```

```

while count<countTo:
    thisVal = ord(str[count+1])*256 + ord(str[count])
    csum = csum + thisVal
    csum = csum & 0xffffffffL
    count = count + 2

if countTo<len(str):
    csum = csum + ord(str[len(str)-1])
    csum = csum & 0xffffffffL

csum = (csum >> 16) + (csum & 0xffff)
csum = csum + (csum >> 16)
answer = ~csum
answer = answer & 0xffff
answer = answer >>8 | (answer <<8 & 0xff00)
return answer

def receiveOnePing(mySocket, ID, timeout, destAddr):
    timeLeft = timeout

    while 1:
        startedSelect = time.time()
        whatReady = select.select([mySocket],[],[],timeLeft)
        howLongInSelect = (time.time()- startedSelect)

        if whatReady[0]==[]:
            return "Request timed out."

        timeReceived = time.time()
        recPacket,addr =mySocket.recvfrom(1024)

        #Fill in start
        icmp_header = recPacket[20:28]
        type, code, checksum, p_id,sequence = struct.unpack('bbHHh',icmp_header)
        if p_id == ID:
            return timeReceived - startedSelect

        #Fill in end

        timeLeft = timeLeft - howLongInSelect
        if timeLeft <=0:
            return "Request timed out."

```

```

def sendOnePing(mySocket, destAddr, ID):
    myChecksum = 0
    header = struct.pack("bbHHh", ICMP_ECHO_REQUEST, 0, myChecksum, ID, 1)
    data = struct.pack("d", time.time())
    myChecksum = checksum(header + data)

    if sys.platform == 'darwin':
        myChecksum = socket.htons(myChecksum) & 0xffff
    else:
        myChecksum = socket.htons(myChecksum)

    header = struct.pack("bbHHh", ICMP_ECHO_REQUEST, 0, myChecksum, ID, 1)
    packet = header + data

    mySocket.sendto(packet, (destAddr, 1))

def doOnePing(destAddr, timeout):
    icmp = socket.getprotobyname("icmp")

    #Fill in start

    try:
        mySocket = socket.socket(socket.AF_INET, socket.SOCK_RAW, icmp)
    except socket.error as e:
        if e.errno in ERROR_DESCR:
            raise socket.error(''.join((e.args[1], ERROR_DESCR[e.errno])))
        raise
    try:
        host = socket.gethostbyname(destAddr)
    except socket.gaierror:
        return

    #Fill in end

    myID = os.getpid() & 0xFFFF
    sendOnePing(mySocket, destAddr, myID)
    delay = receiveOnePing(mySocket, myID, timeout, destAddr)

    mySocket.close()
    return delay

def ping(host, timeout=1):
    dest = socket.gethostbyname(host)

```

```
print "Pinging " + dest + " using Python:"
print ""
while 1 :
    delay = doOnePing(dest, timeout)
    print delay
    time.sleep(1)
    return delay

ping("127.0.0.1")
```