

Project #2: Traceroute

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Instructions

- There is one main program file: Traceroute.py
- To run this program, for my personal machine (macOS) I had to type in the command:
 - `sudo python Traceroute.py`
- However with permissions enabled on a windows machine, sudo may not be required
- Note: this program is written in python 3

Screenshots

Traceroute to Google, USA (Max TTL set to 200):

```
Pinging (www.google.com) 172.217.14.196

DETERMING VALIDITY:
Sequence Number - sent: 199
Sequence Number - recieved: 199
Is Sequence Number Equal: True
Packet Identifier - sent: 2021
Packet Identifier - recieved: 2021
Is Packet Identifier Equal: True
Raw Data - sent: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
Raw Data - recieved: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
Is Raw Data Equal: True

VALID RESPONSE:
Recieved Values: TTL=199 RTT=19 ms Type=0 Code=0 Identifier=2021 Sequence Number=199 Raw Data=ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz 172.217.14.196

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PING METRICS
average RTT: 20.1993191242218
min RTT: 17.2579288482666
max RTT: 45.4709529876709
packet loss: 5.5 %
packets lost: 11
total data sent: 19089 bytes
```

Traceroute to Amazon, USA (Max TTL set to 200):

```
Pinging (www.amazon.com) 162.219.225.118

DETERMING VALIDITY:
Sequence Number - sent: 199
Sequence Number - recieved: 199
Is Sequence Number Equal: True
Packet Identifier - sent: 2088
Packet Identifier - recieved: 2088
Is Packet Identifier Equal: True
Raw Data - sent: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
Raw Data - recieved: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz
Is Raw Data Equal: True

VALID RESPONSE:
Recieved Values: TTL=199 RTT=15 ms Type=0 Code=0 Identifier=2088 Sequence Number=199 Raw Data=ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxyz 162.219.225.118

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PING METRICS
average RTT: 18.17407488822937
min RTT: 13.445138931274414
max RTT: 58.557987213134766
packet loss: 3.500000000000004 %
packets lost: 7
total data sent: 19493 bytes
```

Traceroute to OLX, India (Max TTL set to 200):

```

Pinging (www.olx.in) 104.100.168.179

DETERMING VALIDITY:
Sequence Number - sent: 199
Sequence Number - recieved: 199
Is Sequence Number Equal: True
Packet Identifier - sent: 2175
Packet Identifier - recieved: 2175
Is Packet Identifier Equal: True
Raw Data - sent: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxy
Raw Data - recieved: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxy
Is Raw Data Equal: True

VALID RESPONSE:
Recieved Values:  TTL=199    RTT=16 ms    Type=0    Code=0    Identifier=2175    Sequence Number=199    Raw Data=ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxy    104.100.168.179

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PING METRICS
average RTT: 16.068984699249268
min RTT: 12.289047241210938
max RTT: 41.68868064880371
packet loss: 4.0 %
packets lost: 8
total data sent: 19392 bytes

```

Traceroute to Naver, South Korea (Max TTL set to 200):

```

Pinging (www.naver.com) 23.207.40.183

DETERMING VALIDITY:
Sequence Number - sent: 199
Sequence Number - recieved: 199
Is Sequence Number Equal: True
Packet Identifier - sent: 2197
Packet Identifier - recieved: 2197
Is Packet Identifier Equal: True
Raw Data - sent: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxy
Raw Data - recieved: ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxy
Is Raw Data Equal: True

VALID RESPONSE:
Recieved Values:  TTL=199    RTT=18 ms    Type=0    Code=0    Identifier=2197    Sequence Number=199    Raw Data=ABCDEFGHIJKLMNOPQRSTUVWXYZabcdefghijklmnopqrstuvwxy    23.207.40.183

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PING METRICS
average RTT: 17.8486967086792
min RTT: 14.611005783081055
max RTT: 30.032873153686523
packet loss: 4.0 %
packets lost: 8
total data sent: 19392 bytes

```

Additional Comments

This code has implemented a lot of the requirements both through the output itself, but also in hidden layers that will only be visible during times of errors. For instance, the ICMP response error parsing functionality only occurs when an error occurs; therefore it isn't present within the code itself. Additionally, this code has been slightly modified to allow for a variable TTL number (this allows for better debugging). The variable "packets_sent" within the "__sendIcmpTraceRoute" function represents this max TTL limit.