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Program 1: ICMP Pinger

1. The code fully works for pinging and ponging to and from the localhost, but has timeout issues with other hosts, as the code gets stuck on the packet receive until a timeout occurs. This is likely due to a packet never being sent back, as all of the averages and packet information is correctly calculated, sent and received when communicating with localhost. This may be an issue with the at-home internet set-up that the program was tested on and the virtual machine environment used for development. The functionality on localhost suggests that the program should be functional for outside hosts, but are not too sure why a packet is never sent back to be received.

**Links**

<https://wiki.python.org/moin/BeginnersGuide>

<https://www.geeksforgeeks.org/socket-programming-cc/>

1. Group Meetings

4/3/20 (2 hours) - Initial research and chose design language

4/5/20 (4 hours) - Function implementation, testing, and bug fixes

4/7/20 (4 hours) - Finished source code and tested inter-continental server ping

1. N/A

**Individual Report:** Michael Mandulak

Contributions

* Implementation through collaboration in writing the source code
* Research on topics of sockets and implementation in Python
* Coordinating group meeting times (approximately 10 hours total)
* Contributed to the group report and the documentation of the code

Difficulties

* Pinging hosts other than localhost/debugging logical errors
* Learning how socket programming functions in Python (syntax and logic)
* Building the checksum through bit operations in Python

What I learned

This project focused on the basics of socket programming, requiring the involvement in the basics of Python as a coding language and how the network interacts with code to build packets and send data. All of these ideas were main points of focus for the project and were explored by all of the team members.

**Individual Report:** Daniel Weitman

Contributions

* Researched information about sockets, ports, and ping programs.
* Assisted with source code development
* Worked on program report
* Approx. 10 hours of group meetings

Difficulties

* Configuring the icmp protocol sockets
* Pinging destination hosts other than 127.0.0.1 (localhost)
* Python was an unfamiliar language that I had to learn its syntax

What I learned

I learned how a ‘ping program’ builds a packet from scratch, sends it to a specified destination, and calculates RTT statistics based on time acknowledgement was received. Sockets were also a new concept to work with for me and interesting to learn about. Most insignificantly, I learned about Python syntax.

**Individual Report:** William Wolf

Contributions

* Applied the researched topics about networks to assist in the implementation of the protocol
* Commented the program to make it easier to understand the concepts of code
* Applied testing and bug fixing to the program as well as met with group often to discuss the problems and solutions to the protocol
* Group and hours are approximately 10 hours with overall problem solving and researching the topics so the transition to coding would be simple

Difficulties: Some difficulties to this program were understanding the errors that occur since the network problems require difficult to problem solve

What I learned: This project allowed me to understand the various concepts revolving around the concept of packets. This includes packing, sending, receiving, and unpacking them to send a message reliably across network connections. Also learned a bit of different styles of coding in python since I am not as familiar with the language.