

Faculty of Engineering and Technology   
Department of Electrical and Computer Engineering

Computer Networks

ENCS3320 – Section 1  
Project 1 Report

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# Part 1

## In your own words, what are ping, tracert, nslookup, and telnet?

* The ping command operates by transmitting a single datagram per second and generating a line of output for each received response. This command computes round-trip times, packet loss statistics, and provides a concise summary upon completion.
* The tracert command identifies the path to a destination by dispatching Internet Control Message Protocol (ICMP) echo packets to the specified destination.
* Nslookup communicates with a DNS server to retrieve details about a specific domain or IP. The DNS server, tasked with converting domain names to IP addresses and vice versa, provides the requested information in response.
* Telnet is a network protocol that enables users to remotely access and control a computer or network device through a text-based interface, allowing execution of commands as if physically present.

## Make sure that your computer is connected to the internet and then run the following commands:

* Ping a device in the same network, in **Figure 1**.

The picture shows that we got a reply from 192.168.1.123 after sending 4 packets. They all had the same TTL (time to live), but they arrived at different times. On average, it took 35 milliseconds. This helps us check if the device is connected to the network.

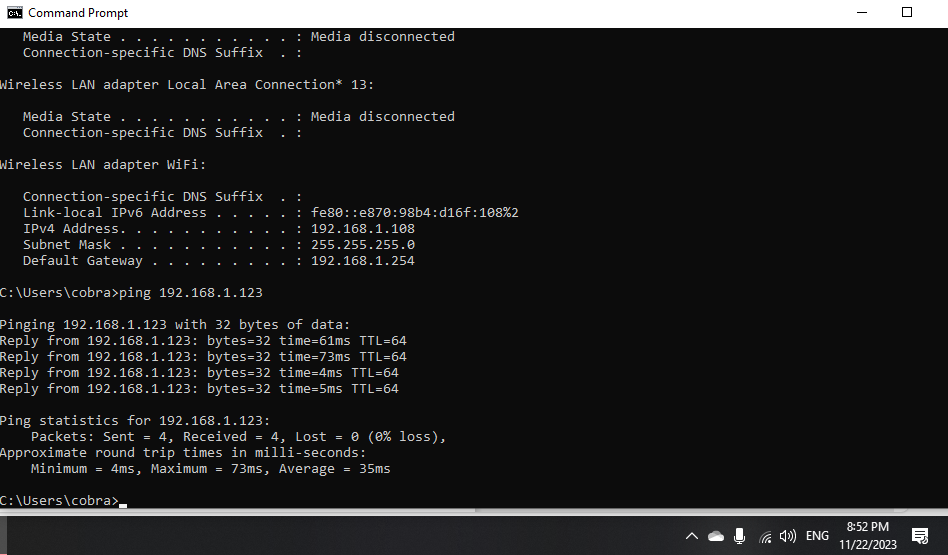


Figure : pinging device in same network

* ping <www.cornell.edu> in **Figure 2**.

The ping command sends a packet to the web server hosting the Cornell University website. Subsequently, the server responds to the ping, and the command shows the response time in milliseconds.

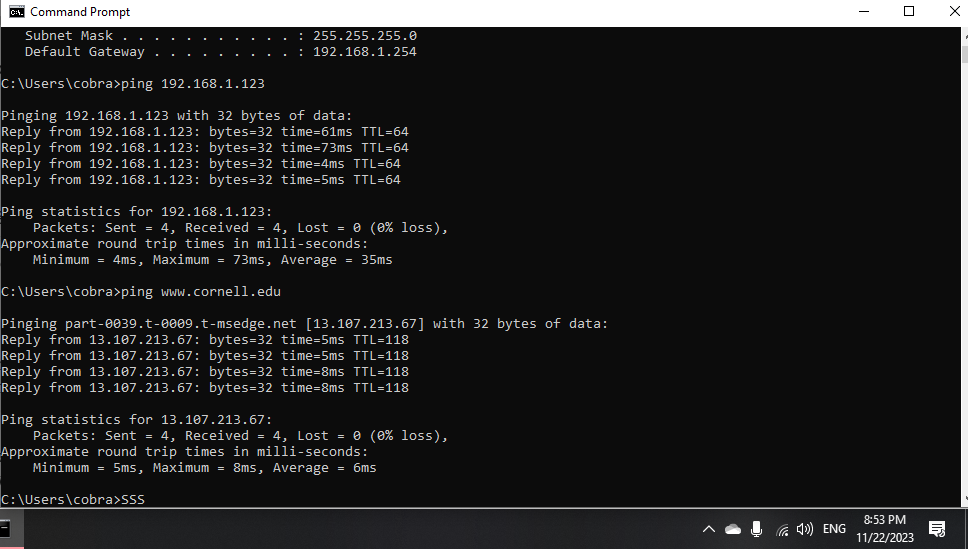


Figure : pinging cornell

* Tracert [www.cornell.edu](http://www.cornell.edu) in **Figure 3**.

It follows the path from my computer to the Cornell University website server, revealing a series of middle routers and their respective response times.

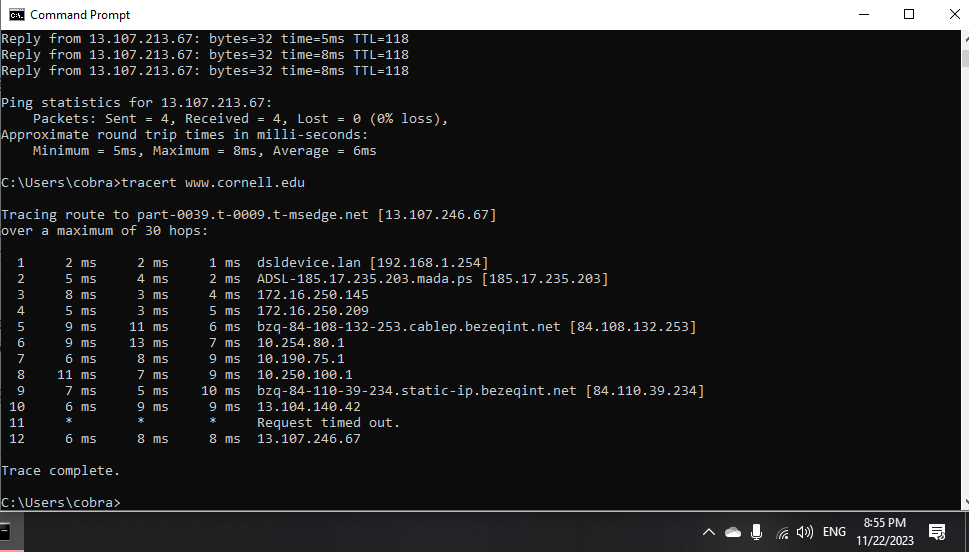


Figure : Tracert cornell

* Nslookup [www.cornell.edu](http://www.cornell.edu) in **Figure 4**.
* **Server**: This line displays the DNS server used for the lookup, indicating the server as “dsldevice.lan” with its corresponding IP address “192.168.1.254”.
* **Non-authoritative answer**: This denotes that the response is obtained from a DNS server not serving as the authoritative server for the domain.
* **Name**: The queried domain name, which is “[www.cornell.edu](http://www.cornell.edu)”.
* **Addresses**: The IP addresses linked to the domain name. In this case, there are IP addresses:

2620:1ec:bdf::67

2620:1ec:46::67

13.107.246.67

13.107. 213.67

* **Aliases**: This section lists alternative names for the queried domain “[www.cornell.edu](http://www.cornell.edu)”, such as www.cornell.edu, cornell-edge-ekhkdhg5czdmb2bf.z01.azurefd.net, and others. Aliases contribute to flexibility and backup options in domain identification across diverse network configurations.

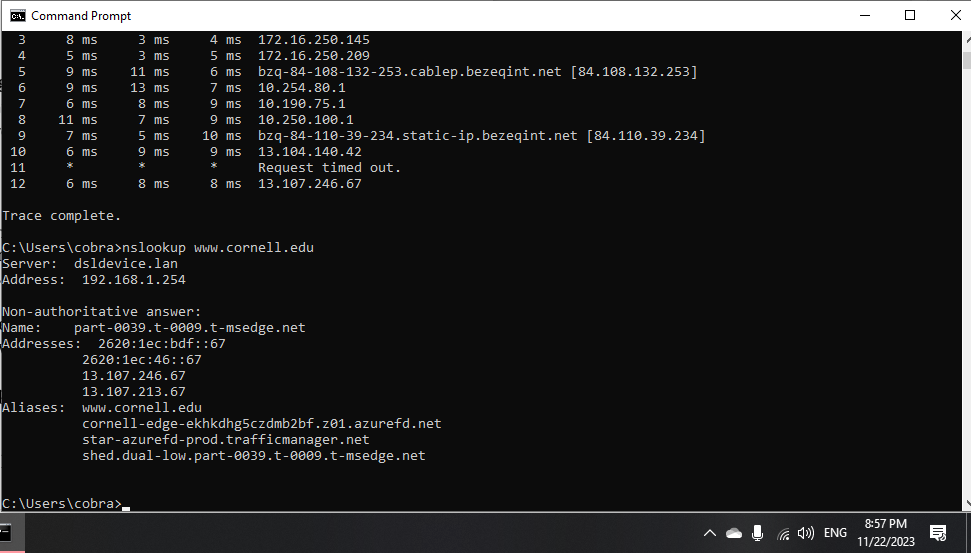


Figure : nslookup cornell

1. Use Wireshark to capture some DNS messages. Provide a screenshot of the runs and brief explanation of the output.

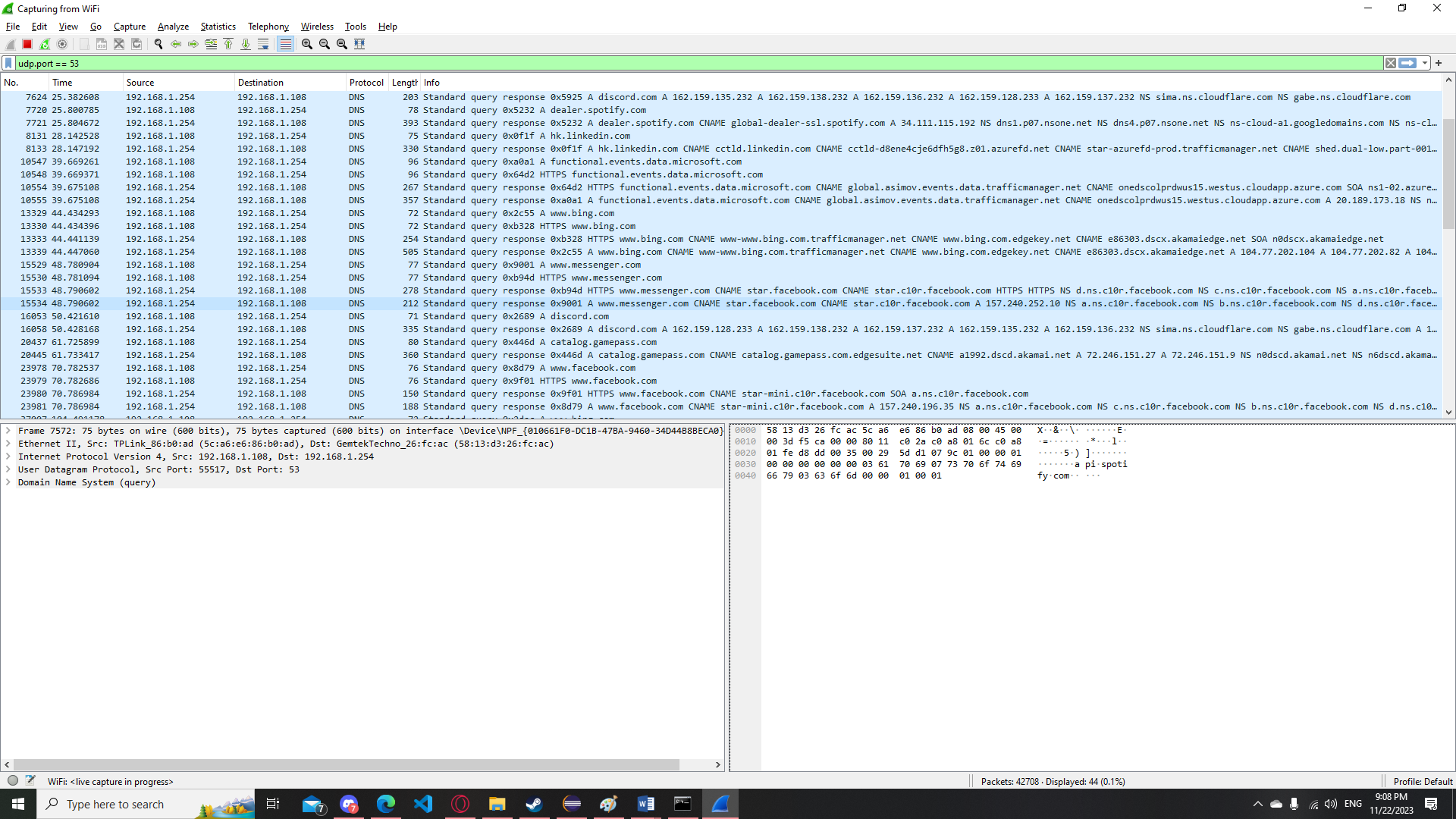


Figure : Wireshark capture

* The output is DNS messages captured by Wireshark using the DNS filter, revealing transactions, queries, and responses, supporting effective troubleshooting.

1. From the ping results, do you think the response you have got is from USA? Explain your answer briefly.

* For www.cornell.edu, while Cornell University is based in the USA, the ping response time alone cannot definitively confirm that the server is physically in the USA. It's important to note that websites can use content delivery networks (CDNs) or have servers in various locations worldwide to improve performance and reliability. So, a low or high ping time might not directly correlate to the server being in a specific country without using specialized geolocation tools.

# Part 2

Using socket programming, implement TCP client and server applications in go, python, java or C. The server should listen on port 9955. The server waits for a message from a client. If the message is with one of the students ID, the sever should do the following:

* **Server Code**: The code sets up a TCP server, actively listening for incoming messages, and promptly sends a response back to the client.

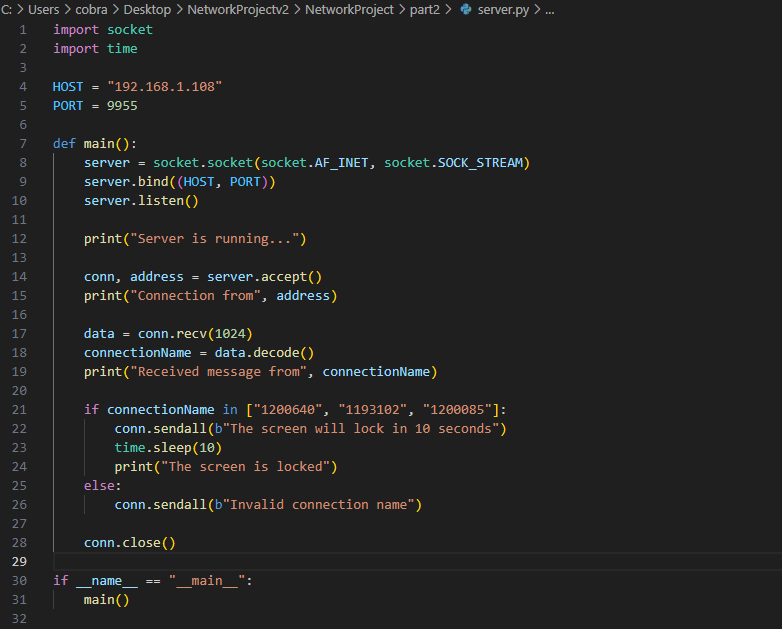


Figure : Server code

* **Client Code**: This client TCP code in **Figure 7** connects to the server, sends a student ID in this example (1200640), receives a response, and after a 10-second pause, locks the screen. The process repeats indefinitely.



Figure : Client code

* **Example Run**: In figures below example run to the server and client.

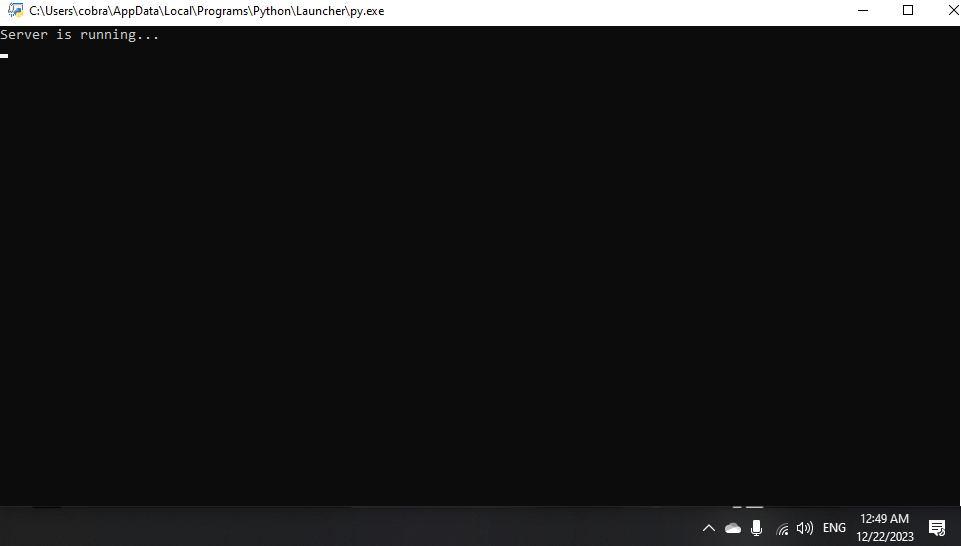


Figure : Running server

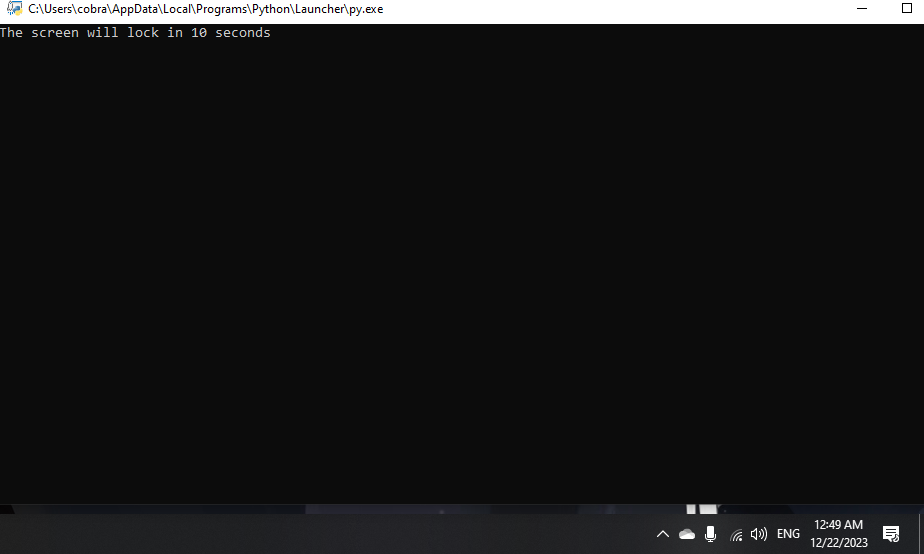


Figure : Receiving a message from client

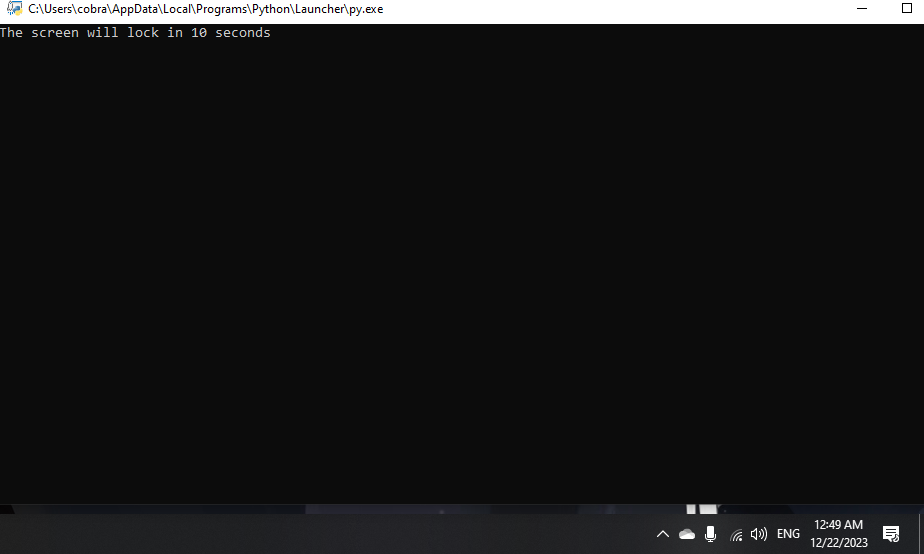


Figure : Response from server