Objective: As a team collaboratively finalize the traceroute code and network topology creation code, for the optimization of the project's success.

Manish Niure (@02969739)
Responsibilities:

- Create github repo and initiate trace_route.py
- Primary data collection from Mackey ,Ugl and LKD
- Contribute to the development of traceroute algorithms and topology algorithms
- Collaborate with the team members

Achievements:

- **Code Verification**
  Updated the trace_route.py in order to generate the correct ip address and save the data in the .txt format .
- **Data Collection**
  Collected the data from Mackey , Ugl and Lkd building with different subnets.
- **Creation Of Topology**
  Experimented with various Python functions to figure out the best ways to connect routers. Ultimately, decided to use the NetworkX library, which allowed us to visualize our network topology efficiently. Then wrote a program to process .txt files which contain data about our designed topology based on adjacent routers
- **Observation**
  Identified mesh-like topology in building traceroutes. Some areas exhibited a dense network due to numerous traceroutes.

Ujjwal Adhikari (@02962931)
Responsibilities:

- Primary data collection from Chemistry Building and Stokes Library
- Contribute to the development of traceroute algorithms
- Contribute to the development of network topology

- Collaborate with the team members

Achievements:

- **Data Collection from Chemistry building and Stokes Library**
    - Successfully gathered data of traceroute from both the Chemistry Building and Stokes Library, using trace_ip.py (used Scapy to perform traceroute operations on a range of IP addresses within the given subnet)
- **Explored the data to create the connection between the routers**
    - Implemented different Python functions to explore and experiment with various ways of establishing connections between routers. Finalized as a group to leverage the NetworkX library to create detailed graphs representing the network topology.
    - Used the parse_traceroute_file function to read the traceroute log file and extract intermediate routers IP address, and create_topology_graph function to create a network graph based on the routers given by parse_traceroute_file function.
- **Creation of Clear and Simplified Network Topology**
    - Created an initial network topology PNG file, but due to the abundance of routers, the visualization appeared congested and unclear.
    - Generated a simplified topology using a smaller subset of the data from the same file.
    - This approach aimed to enhance clarity of the topology, enabling a better understanding of the network's structure and connections.
- **Concluded that the network topology observed in these buildings adhered to a Mesh Topology structure.**

Sanjaya Subedi (@02988775)

Responsibilities:

- Initiated the start.py to get subnets of Howard university.
- Collected data from Howard University iLab under different subnets.

- Collaborated to find the traceroute algorithm and topology creation algorithm and used it to discover topology fragments.
- Collaborated with team members effectively and efficiently.

Achievements:

- **Conducted Data Collection Efforts at Howard University iLab**
    - Successfully acquired traceroute data from this location using trace_ip.py.
    - Explored the gathered data to establish connections between routers, fostering a deeper understanding of network architecture.
- **Development of Python Functions for Network Exploration**
    - Engineered various Python functions to experiment with different methods of router connections.
    - Collaboratively decided to leverage the NetworkX library to construct comprehensive network topology graphs.
- **Efficient Data Parsing and Network Visualization**
    - Utilized the parse_traceroute_file function to parse traceroute log files, extracting intermediate router IP addresses.
    - Employed the create_topology_graph function to build network graphs based on router information obtained from the traceroute data.
- **Mesh Topology Observation**
    - Concluded that the network topology in iLab buildings adhered to a Mesh Topology structure, highlighting the redundancy and interconnectivity of routers within the network.

Pradeep Lamichhane (@02967686)
Responsibilities:

- Primary data collection from Chemistry Building(subnet 10.116), UGL building(subnet 10.199) ,Building of social work(subnet 10.29), College of Architecture Building(subnet 10.53)- different locations of Howard University.
- Contributed to write trace_ip.py file which uses Scapy to perform traceroute operations on a range of IP addresses within the given subnet.

- Contributed to create the simplified network topology(network topology PNG file)
- Contributed to finding the connection between different routers
- Collaborated with the team members

Achievements:

- **Data Collection**
    - Successfully gathered data of traceroute from different Howard locations, using trace_ip.py
- **Creating the connection between the routers**
    - Implemented different Python functions to explore and experiment with various ways of establishing connections between routers.
    - Finalized as a group to leverage the NetworkX library to create detailed graphs representing the network topology.
    - Used the parse_traceroute_file function to read the traceroute log file and extract intermediate routers IP address
    - Used create_topology_graph function to create a network graph based on the routers given by parse_traceroute_file function.
- **Creation of Clear and Simplified Network Topology**
    - Created an initial network topology PNG file.
    - Enhanced the clarity of the topology, enabling a better understanding of the network's structure and connections.
- **Collaborated with the team members:**
    - Effective communication and collaboration with teammates throughout several weeks.
    - Proper work division and collaborative discussions among the team.
- **Concluded that the network topology observed in these buildings adhered to a Mesh Topology structure.**

Prem Raj Oli (@02992540)

Responsibilities

- Develop the python script files for the project
- Data collection for prefix: 10.127, 10.26, 138.238, 10.199, 10.3
- Gather knowledge and information about the packages and concepts related to the project. For example, subnet mask, packet-switching, network ping, etc.
- Collaborate with team member to find out the next step on finding the router/networking devices to build the topology after completion of data collection milestone.

Achievements

Data Collection:

- Collected data of traceroute for prefixes: 10.127, 10.26, 138.238, 10.199, 10.3 using **traceroute_prefix.py** script.

Development:

- Developed **traceroute_at_location.py** to find the prefixes to take data
- Developed **traceroute_prefix.py** to find the traceroute data for IP addresses from prefix.0.0 to prefix.255.255
- Analyzed the traceroute for the prefixes to find the routers/networking devices to be added in the topology. After that, developed the **all_active_ips.py** script for this purpose.
- Developed **topology.py** to generate the topology from the routes.txt file in a .png file and .md file.

Research:

· Did a thorough research to find the tools and packages to be used in the project. For example, scapy, network, etc.