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C:\Users\dj_z\Documents\GitHub\NSCOM02-MC02>python traceroute.py

Traceroute to google.com (142.251.220.206), 30 hops max:
TTL  IP Address / Info                                RTT (ms)
-----
1    192.168.1.1 (Time Exceeded)                      2
      (Private/Local IP)
2    10.0.34.1 (Time Exceeded)                        3
      (Private/Local IP)
3    172.16.17.1 (Time Exceeded)                      3
      (Private/Local IP)
4    172.16.250.6 (Time Exceeded)                    2
      (Private/Local IP)
5    61.245.0.40 (Time Exceeded)                     5
      City: Pasig | Region: Metro Manila | Country: Philippines
6    142.251.238.81 (Time Exceeded)                   8
      City: Montreal | Region: Quebec | Country: Canada | Organization: Google LLC
7    142.251.239.33 (Time Exceeded)                   6
      City: Mountain View | Region: California | Country: United States | Organization: Google LLC
8    142.251.220.206 (Echo Reply - Destination Reached) 22
      City: Manila | Region: Metro Manila | Country: Philippines | Organization: Google LLC
Traceroute completed successfully!
```

*Using google.com

```
Traceroute to dlsu.instructure.com (52.220.252.252), 30 hops max:
TTL  IP Address / Info                                RTT (ms)
-----
1    192.168.1.1 (Time Exceeded)                      2
      (Private/Local IP)
2    10.0.34.1 (Time Exceeded)                        5
      (Private/Local IP)
3    172.16.0.11 (Time Exceeded)                     25
      (Private/Local IP)
4    172.16.250.6 (Time Exceeded)                     8
      (Private/Local IP)
5    61.245.121.161 (Time Exceeded)                   8
      City: Manila | Region: Metro Manila | Country: Philippines | Organization: Infinivan Incorporated
6    126.209.2.110 (Time Exceeded)                    5
      City: Manila | Region: Metro Manila | Country: Philippines | Organization: Infinivan
7    *                                                  Timeout
8    *                                                  Timeout
9    *                                                  Timeout
10   *                                                  Timeout
11   *                                                  Timeout
12   *                                                  Timeout
13   *                                                  Timeout
14   *                                                  Timeout
15   *                                                  Timeout
16   52.220.252.252 (Echo Reply - Destination Reached) 38
      City: Singapore | Region: Central Singapore | Country: Singapore | Organization: AWS EC2 (ap-southeast-1)
Traceroute completed successfully!
```

*Using dlsu.instructure.com

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=====
Error during traceroute to dlsu.edu.ph: [Errno 11001] getaddrinfo failed
=====
```

*Using dlsu.edu.ph

```
Traceroute to my.dlsu.edu.ph (104.20.42.168), 30 hops max:
TTL  IP Address / Info                                RTT (ms)
-----
1    192.168.1.1 (Time Exceeded)                      0
      (Private/Local IP)
2    10.0.34.1 (Time Exceeded)                        9
      (Private/Local IP)
3    172.16.17.1 (Time Exceeded)                     4
      (Private/Local IP)
4    172.16.250.6 (Time Exceeded)                    3
      (Private/Local IP)
5    61.245.121.161 (Time Exceeded)                   11
      City: Manila | Region: Metro Manila | Country: Philippines | Organization: Infinivan Incorporated
6    126.209.1.110 (Time Exceeded)                   24
      City: Manila | Region: Metro Manila | Country: Philippines | Organization: Infinivan
7    61.245.29.198 (Time Exceeded)                   26
      City: Manila | Region: Metro Manila | Country: Philippines | Organization: Infinivan Incorporated
8    103.203.158.32 (Time Exceeded)                   54
      City: Minato | Region: Tokyo | Country: Japan | Organization: BBIX, Inc.
9    103.22.203.23 (Time Exceeded)                   50
      City: Hong Kong | Region: Central and Western District | Country: Hong Kong | Organization: Cloudflare WARP
10   104.20.42.168 (Echo Reply - Destination Reached) 53
      City: Toronto | Region: Ontario | Country: Canada | Organization: Cloudflare, Inc.
Traceroute completed successfully!
=====
```

*Using my.dlsu.edu.ph

Documentation for bonus feature:

1. def geo_loc(ip_addr):

- Returns the geolocation information string or an error message for an IP address from [IP-API.com](https://ip-api.com).

```
def get_geoloc(ip_addr):
    if ip_addr == "*" or ip_addr.startswith("192.168.") or ip_addr.startswith("10.") or ip_addr.startswith("172."):
        return " (Private/Local IP)"

    try:
        url = f"http://ip-api.com/json/{ip_addr}?fields=status,message,country,regionName,city,org,isp"
        response = requests.get(url, timeout=5)
        data = response.json()

        if data['status'] == 'success':
            city = data.get('city', 'Unknown')
            region = data.get('regionName', 'Unknown')
            country = data.get('country', 'Unknown')
            org = data.get('org', 'Unknown')
            isp = data.get('isp', 'Unknown')

            location = []
            if city != 'Unknown' and city:
                location.append(f"City: {city}")
            if region != 'Unknown' and region:
                location.append(f"Region: {region}")
            if country != 'Unknown' and country:
                location.append(f"Country: {country}")
            if org != 'Unknown' and org:
                location.append(f"Organization: {org}")

            if location:
                return " " + " | ".join(location)
            else:
                return " Geolocation data not available"
        else:
            return f" Geolocation error: {data.get('message', 'Unknown error')}"

    except Exception as e:
        return f" Geolocation error: {str(e)}"
```

- Uses the request module for querying the IP address in the specified site
- An IP Address query is used after each hop to be sent to [IP-API.com](https://ip-api.com). It should follow the format: <http://ip-api.com/json/{query}?fields=>

```
if types == 11:
    print(f"{ttl:<5} {addr[0]} + ' (Time Exceeded)':<50} {rtt_ping:<10}")
    geo_info = get_geoloc(addr[0])
    print(geo_info)
    hop_found = True
    time.sleep(REQUEST_DELAY)
```

- After requesting the query, it will print and respond along with the data (available city, region, country, and organization) with "print(geo_info)"
- Filters out local ip addresses since it cannot determine the information (192.168.x.x, 10.x.x.x, 172.x.x.x)
- Provides error handling
- Sample output:

```
City: Manila | Region: Metro Manila | Country: Philippines | Organization: Infinivan Incorporated
```