Universidad San Francisco de Quito

Redes + Lab.

Deber #3

NRC: 4797

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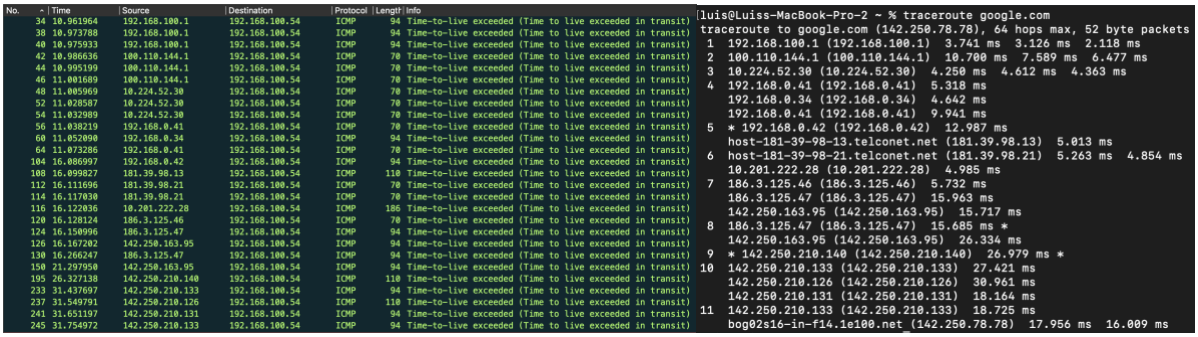
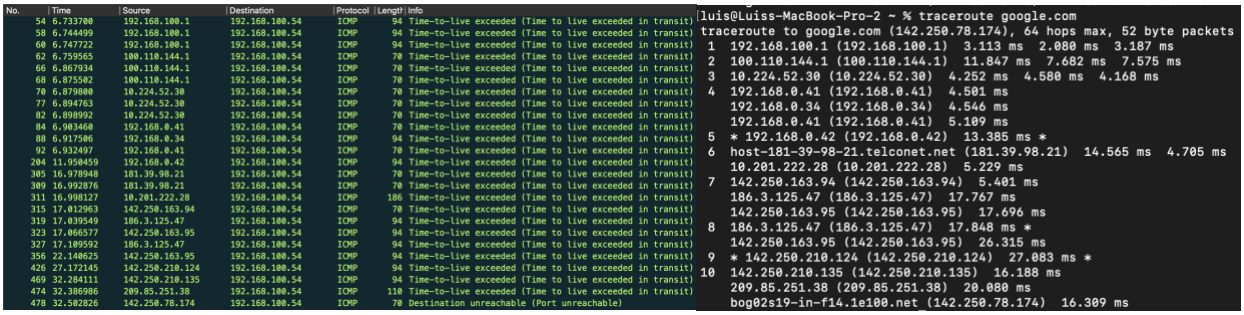
1. Read the following Wireshark tutorial, and use it to capture traffic from the following scenarios. Use screenshots to show your results.
    a. Run 10 traceroute commands against google.com



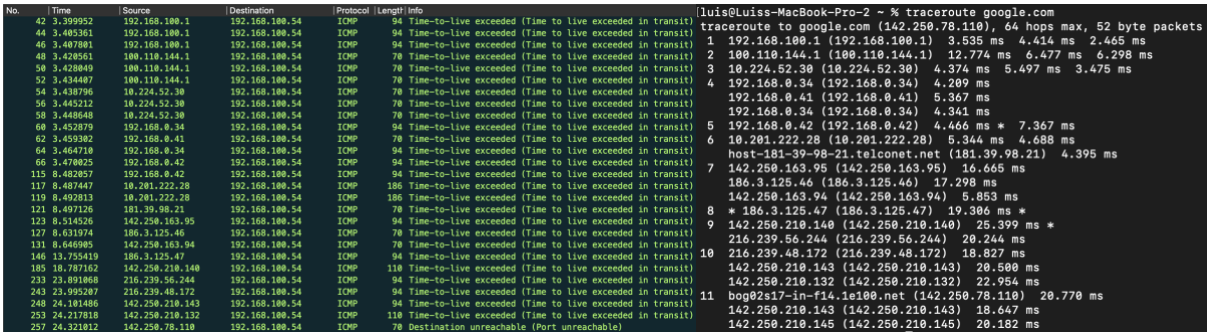
No.	Time	Source	Destination	Protocol	Length	Info
34	10.961964	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
38	10.973788	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
40	10.975933	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
42	10.986636	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
44	10.995199	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
46	11.001689	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
48	11.005969	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
52	11.028587	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
54	11.032989	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
56	11.038219	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
60	11.052090	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
64	11.073286	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
104	16.086997	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
108	16.099827	181.39.98.13	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
112	16.111696	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
114	16.117030	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
116	16.122036	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
120	16.128124	186.3.125.46	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
124	16.150996	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
126	16.167202	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
130	16.206247	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
150	21.207950	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
195	26.327138	142.250.210.140	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
233	31.437697	142.250.210.133	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
237	31.549791	142.250.210.126	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
241	31.651197	142.250.210.131	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
245	31.754972	142.250.210.133	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)

```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.78), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  3.741 ms  3.126 ms  2.118 ms
 2  100.110.144.1 (100.110.144.1)  10.700 ms  7.589 ms  6.477 ms
 3  10.224.52.30 (10.224.52.30)  4.250 ms  4.612 ms  4.363 ms
 4  192.168.0.41 (192.168.0.41)  5.318 ms
    192.168.0.34 (192.168.0.34)  4.642 ms
    192.168.0.41 (192.168.0.41)  9.941 ms
 5  * 192.168.0.42 (192.168.0.42)  12.987 ms
    host-181-39-98-13.telconet.net (181.39.98.13)  5.013 ms
 6  host-181-39-98-21.telconet.net (181.39.98.21)  5.263 ms  4.854 ms
    10.201.222.28 (10.201.222.28)  4.985 ms
 7  186.3.125.46 (186.3.125.46)  5.732 ms
    186.3.125.47 (186.3.125.47)  15.963 ms
    142.250.163.95 (142.250.163.95)  15.717 ms
 8  186.3.125.47 (186.3.125.47)  15.685 ms *
    142.250.163.95 (142.250.163.95)  26.334 ms
 9  * 142.250.210.140 (142.250.210.140)  26.979 ms *
10  142.250.210.133 (142.250.210.133)  27.421 ms
    142.250.210.126 (142.250.210.126)  30.961 ms
    142.250.210.131 (142.250.210.131)  18.164 ms
11  142.250.210.133 (142.250.210.133)  18.725 ms
    bog02s16-in-f14.1e100.net (142.250.78.78)  17.956 ms  16.009 ms
```



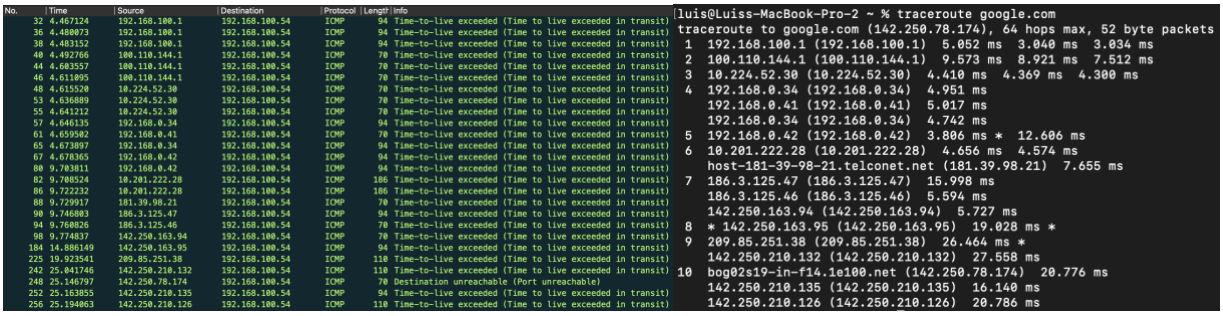
No.	Time	Source	Destination	Protocol	Length	Info
54	6.733700	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
58	6.744499	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
60	6.747722	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
62	6.759565	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
66	6.867934	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
68	6.875502	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
70	6.879800	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
77	6.894763	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
82	6.898992	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
84	6.903460	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
88	6.917506	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
92	6.932497	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
204	11.950459	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
305	16.978948	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
309	16.992876	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
311	16.998127	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
315	17.012963	142.250.163.94	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
319	17.039549	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
323	17.066577	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
327	17.109592	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
356	22.140625	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
426	27.172145	142.250.210.124	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
469	32.284111	142.250.210.135	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
474	32.386986	209.85.251.38	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
478	32.502826	142.250.78.174	192.168.100.54	ICMP	70	Destination unreachable (Port unreachable)

```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  3.113 ms  2.080 ms  3.187 ms
 2  100.110.144.1 (100.110.144.1)  11.847 ms  7.682 ms  7.575 ms
 3  10.224.52.30 (10.224.52.30)  4.252 ms  4.580 ms  4.168 ms
 4  192.168.0.41 (192.168.0.41)  4.501 ms
    192.168.0.34 (192.168.0.34)  4.546 ms
    192.168.0.41 (192.168.0.41)  5.109 ms
 5  * 192.168.0.42 (192.168.0.42)  13.385 ms *
 6  host-181-39-98-21.telconet.net (181.39.98.21)  14.565 ms  4.705 ms
    10.201.222.28 (10.201.222.28)  5.229 ms
 7  142.250.163.94 (142.250.163.94)  5.401 ms
    186.3.125.47 (186.3.125.47)  17.767 ms
    142.250.163.95 (142.250.163.95)  17.696 ms
 8  186.3.125.47 (186.3.125.47)  17.848 ms *
    142.250.163.95 (142.250.163.95)  26.315 ms
 9  * 142.250.210.124 (142.250.210.124)  27.083 ms *
10  142.250.210.135 (142.250.210.135)  16.188 ms
    209.85.251.38 (209.85.251.38)  20.080 ms
    bog02s19-in-f14.1e100.net (142.250.78.174)  16.309 ms
```



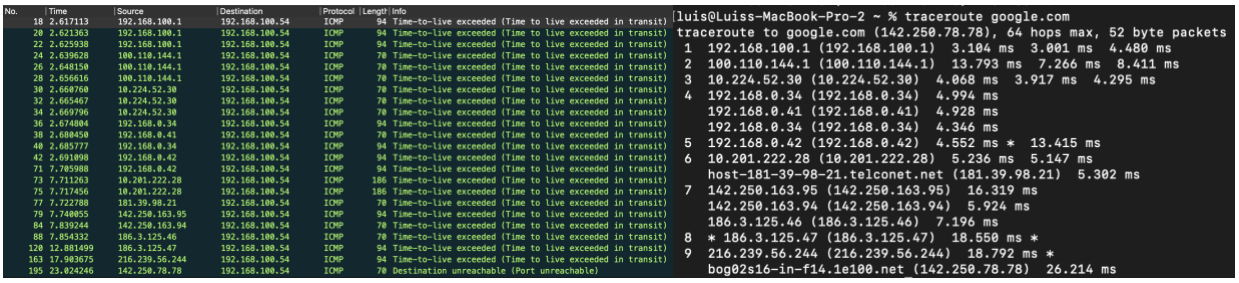
No.	Time	Source	Destination	Protocol	Length	Info
42	3.399952	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
44	3.405361	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
46	3.407801	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
48	3.420561	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
50	3.428049	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
52	3.434407	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
54	3.438796	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
56	3.445212	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
58	3.448648	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
60	3.452879	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
62	3.459302	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
64	3.464710	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
66	3.470025	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
115	8.402057	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
117	8.487447	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
119	8.492813	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
121	8.497126	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
123	8.514526	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
127	8.631974	186.3.125.46	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
131	8.646985	142.250.163.94	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
146	13.755419	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
185	18.787162	142.250.210.140	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
233	23.891068	216.239.56.244	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
243	23.995207	216.239.48.172	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
248	24.101486	142.250.210.143	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
253	24.217818	142.250.210.132	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
257	24.321012	142.250.78.110	192.168.100.54	ICMP	70	Destination unreachable (Port unreachable)

```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.110), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  3.535 ms  4.414 ms  2.465 ms
 2  100.110.144.1 (100.110.144.1)  12.774 ms  6.477 ms  6.298 ms
 3  10.224.52.30 (10.224.52.30)  4.374 ms  5.497 ms  3.475 ms
 4  192.168.0.34 (192.168.0.34)  4.209 ms
    192.168.0.41 (192.168.0.41)  5.367 ms
    192.168.0.34 (192.168.0.34)  4.341 ms
 5  192.168.0.42 (192.168.0.42)  4.466 ms *  7.367 ms
 6  10.201.222.28 (10.201.222.28)  5.344 ms  4.688 ms
    host-181-39-98-21.telconet.net (181.39.98.21)  4.395 ms
 7  142.250.163.95 (142.250.163.95)  16.665 ms
    186.3.125.46 (186.3.125.46)  17.298 ms
    142.250.163.94 (142.250.163.94)  5.853 ms
 8  * 186.3.125.47 (186.3.125.47)  19.306 ms *
 9  142.250.210.140 (142.250.210.140)  25.399 ms *
    216.239.56.244 (216.239.56.244)  20.244 ms
10  216.239.48.172 (216.239.48.172)  18.827 ms
    142.250.210.143 (142.250.210.143)  20.500 ms
    142.250.210.132 (142.250.210.132)  22.954 ms
11  bog02s17-in-f14.1e100.net (142.250.78.110)  20.770 ms
    142.250.210.143 (142.250.210.143)  18.647 ms
    142.250.210.145 (142.250.210.145)  20.182 ms
```



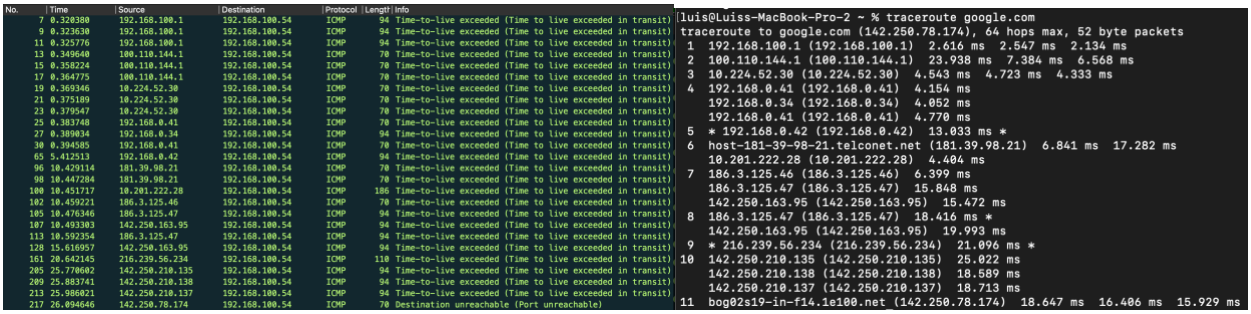
No.	Time	Source	Destination	Protocol	Length	Info
32	4.467124	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
36	4.480073	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
38	4.483152	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
40	4.492766	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
44	4.603557	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
46	4.611895	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
48	4.615520	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
53	4.636889	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
55	4.641212	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
57	4.646135	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
61	4.659042	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
65	4.673097	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
67	4.678365	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
80	9.703811	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
82	9.708524	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
86	9.722232	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
88	9.729917	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
90	9.746803	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
94	9.760826	186.3.125.46	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
98	9.774837	142.250.163.94	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
184	14.886149	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
225	19.932541	209.85.251.38	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
242	25.041746	142.250.210.132	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
248	25.146797	142.250.78.174	192.168.100.54	ICMP	70	Destination unreachable (Port unreachable)
252	25.163855	142.250.210.135	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
256	25.194063	142.250.210.126	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)

```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  5.052 ms  3.040 ms  3.034 ms
 2  100.110.144.1 (100.110.144.1)  9.573 ms  8.921 ms  7.512 ms
 3  10.224.52.30 (10.224.52.30)  4.410 ms  4.369 ms  4.300 ms
 4  192.168.0.34 (192.168.0.34)  4.951 ms
    192.168.0.41 (192.168.0.41)  5.017 ms
    192.168.0.34 (192.168.0.34)  4.742 ms
 5  192.168.0.42 (192.168.0.42)  3.806 ms *  12.606 ms
 6  10.201.222.28 (10.201.222.28)  4.656 ms  4.574 ms
    host-181-39-98-21.telconet.net (181.39.98.21)  7.655 ms
 7  186.3.125.47 (186.3.125.47)  15.998 ms
    186.3.125.46 (186.3.125.46)  5.594 ms
    142.250.163.94 (142.250.163.94)  5.727 ms
 8  * 142.250.163.95 (142.250.163.95)  19.028 ms *
 9  209.85.251.38 (209.85.251.38)  26.464 ms *
    142.250.210.132 (142.250.210.132)  27.558 ms
10  bog02s19-in-f14.1e100.net (142.250.78.174)  20.776 ms
    142.250.210.135 (142.250.210.135)  16.140 ms
    142.250.210.126 (142.250.210.126)  20.786 ms
```



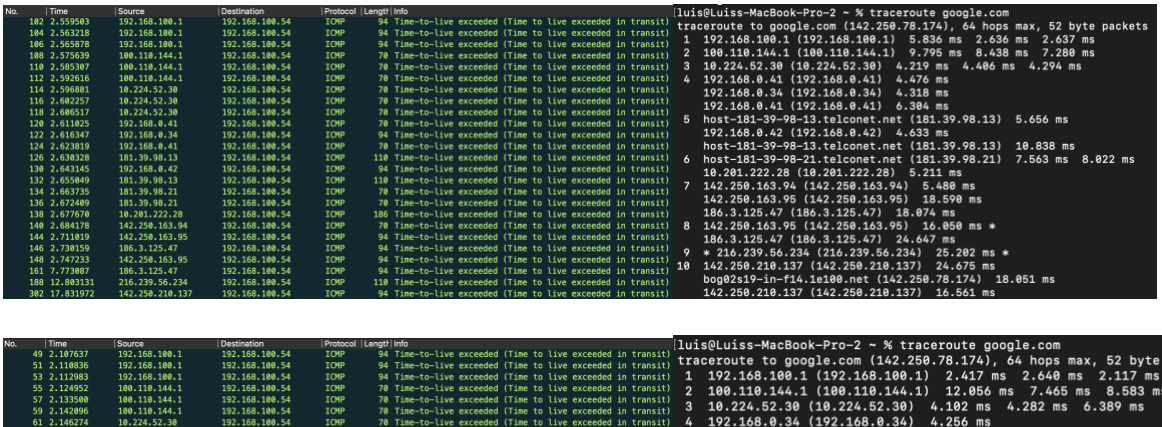
No.	Time	Source	Destination	Protocol	Length	Info
18	2.617113	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
20	2.621363	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
22	2.625938	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
24	2.639628	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
26	2.648150	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
28	2.656616	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
30	2.660760	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
32	2.665467	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
34	2.669796	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
36	2.674804	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
38	2.680450	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
40	2.685777	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
42	2.691098	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
71	7.705988	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
73	7.711263	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
75	7.717456	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
77	7.722788	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
79	7.740055	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
84	7.839244	142.250.163.94	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
88	7.854332	186.3.125.46	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
120	12.881499	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
163	17.903675	216.239.56.244	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
195	23.024246	142.250.78.78	192.168.100.54	ICMP	70	Destination unreachable (Port unreachable)

```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.78), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  3.104 ms  3.001 ms  4.480 ms
 2  100.110.144.1 (100.110.144.1)  13.793 ms  7.266 ms  8.411 ms
 3  10.224.52.30 (10.224.52.30)  4.068 ms  3.917 ms  4.295 ms
 4  192.168.0.34 (192.168.0.34)  4.994 ms
    192.168.0.41 (192.168.0.41)  4.928 ms
    192.168.0.34 (192.168.0.34)  4.346 ms
 5  192.168.0.42 (192.168.0.42)  4.552 ms *  13.415 ms
 6  10.201.222.28 (10.201.222.28)  5.236 ms  5.147 ms
    host-181-39-98-21.telconet.net (181.39.98.21)  5.302 ms
 7  142.250.163.95 (142.250.163.95)  16.319 ms
    142.250.163.94 (142.250.163.94)  5.924 ms
    186.3.125.46 (186.3.125.46)  7.196 ms
 8  * 186.3.125.47 (186.3.125.47)  18.550 ms *
 9  216.239.56.244 (216.239.56.244)  18.792 ms *
    bog02s16-in-f14.1e100.net (142.250.78.78)  26.214 ms
```



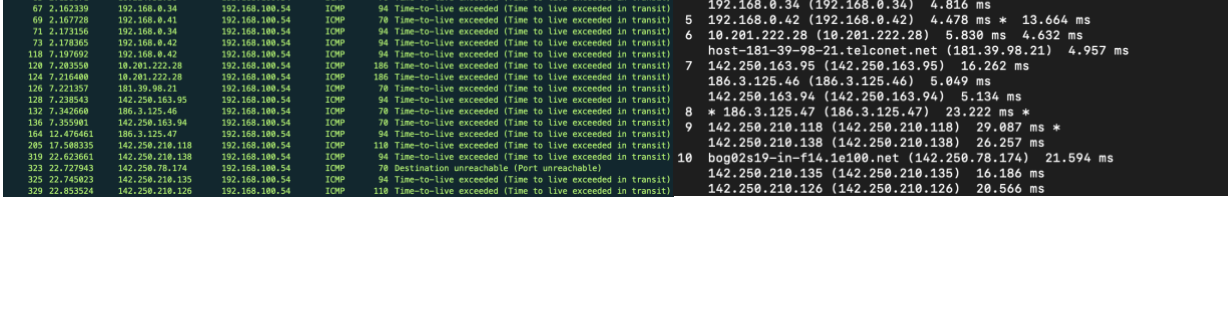
No.	Time	Source	Destination	Protocol	Length	Info
7	0.320380	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
9	0.323630	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
11	0.325776	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
13	0.349040	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
15	0.358224	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
17	0.364775	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
19	0.369346	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
21	0.375109	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
23	0.379547	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
25	0.383748	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
27	0.389034	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
30	0.394585	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
65	5.412513	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
96	10.429114	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
98	10.447284	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
100	10.451717	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
102	10.459221	186.3.125.46	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
105	10.476346	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
107	10.493303	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
113	10.592354	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
128	15.616957	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
161	20.642145	216.239.56.234	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
205	25.770602	142.250.210.135	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
209	25.883741	142.250.210.138	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
213	25.900821	142.250.210.137	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
217	26.094646	142.250.78.174	192.168.100.54	ICMP	70	Destination unreachable (Port unreachable)

```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  2.616 ms  2.547 ms  2.134 ms
 2  100.110.144.1 (100.110.144.1)  23.938 ms  7.384 ms  6.568 ms
 3  10.224.52.30 (10.224.52.30)  4.543 ms  4.723 ms  4.333 ms
 4  192.168.0.41 (192.168.0.41)  4.154 ms
    192.168.0.34 (192.168.0.34)  4.052 ms
    192.168.0.41 (192.168.0.41)  4.770 ms
 5  * 192.168.0.42 (192.168.0.42)  13.033 ms *
 6  host-181-39-98-21.telconet.net (181.39.98.21)  6.841 ms  17.282 ms
    10.201.222.28 (10.201.222.28)  4.404 ms
 7  186.3.125.46 (186.3.125.46)  6.399 ms
    186.3.125.47 (186.3.125.47)  15.848 ms
    142.250.163.95 (142.250.163.95)  15.472 ms
 8  186.3.125.47 (186.3.125.47)  18.416 ms *
    142.250.163.95 (142.250.163.95)  19.993 ms
 9  * 216.239.56.234 (216.239.56.234)  21.096 ms *
10  142.250.210.135 (142.250.210.135)  25.022 ms
    142.250.210.138 (142.250.210.138)  18.589 ms
    142.250.210.137 (142.250.210.137)  18.713 ms
11  bog02s19-in-f14.1e100.net (142.250.78.174)  18.647 ms  16.406 ms  15.929 ms
```



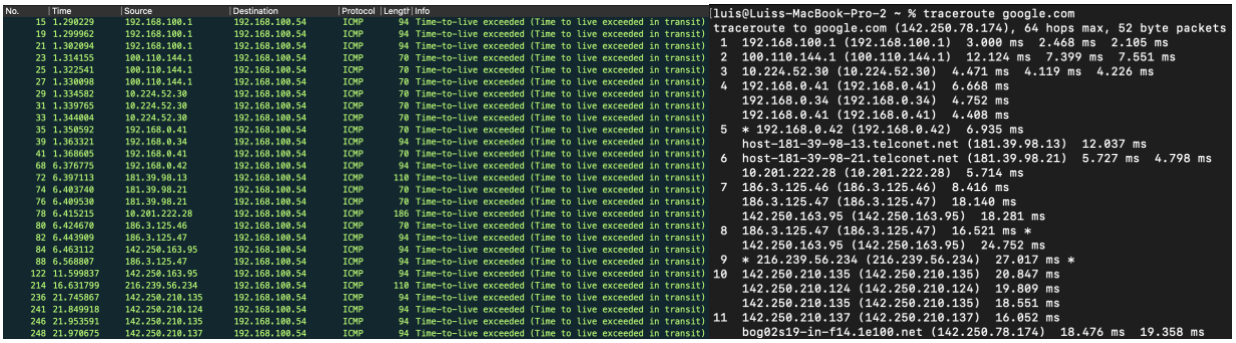
No.	Time	Source	Destination	Protocol	Length	Info
102	2.559503	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
104	2.563218	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
106	2.565878	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
108	2.575639	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
110	2.585307	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
112	2.592616	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
114	2.596881	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
116	2.602257	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
118	2.606517	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
120	2.611025	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
122	2.616347	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
124	2.621819	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
126	2.630328	181.39.98.13	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
130	2.643145	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
132	2.655049	181.39.98.13	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
134	2.663735	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
136	2.672409	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
138	2.677670	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
140	2.684178	142.250.163.94	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
144	2.711019	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
146	2.730159	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
148	2.747233	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
161	7.773087	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
188	12.803131	216.239.56.234	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
302	17.831972	142.250.210.137	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)

```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  5.836 ms  2.636 ms  2.637 ms
 2  100.110.144.1 (100.110.144.1)  9.795 ms  8.438 ms  7.280 ms
 3  10.224.52.30 (10.224.52.30)  4.219 ms  4.406 ms  4.294 ms
 4  192.168.0.41 (192.168.0.41)  4.476 ms
    192.168.0.34 (192.168.0.34)  4.318 ms
    192.168.0.41 (192.168.0.41)  6.304 ms
 5  host-181-39-98-13.telconet.net (181.39.98.13)  5.656 ms
    192.168.0.42 (192.168.0.42)  4.633 ms
    host-181-39-98-13.telconet.net (181.39.98.13)  10.838 ms
 6  host-181-39-98-21.telconet.net (181.39.98.21)  7.563 ms  8.022 ms
    10.201.222.28 (10.201.222.28)  5.211 ms
 7  142.250.163.94 (142.250.163.94)  5.480 ms
    142.250.163.95 (142.250.163.95)  18.590 ms
    186.3.125.47 (186.3.125.47)  18.074 ms
 8  142.250.163.95 (142.250.163.95)  16.050 ms *
    186.3.125.47 (186.3.125.47)  24.647 ms
 9  * 216.239.56.234 (216.239.56.234)  25.202 ms *
10  142.250.210.137 (142.250.210.137)  24.675 ms
    bog02s19-in-f14.1e100.net (142.250.78.174)  18.051 ms
    142.250.210.137 (142.250.210.137)  16.561 ms
```



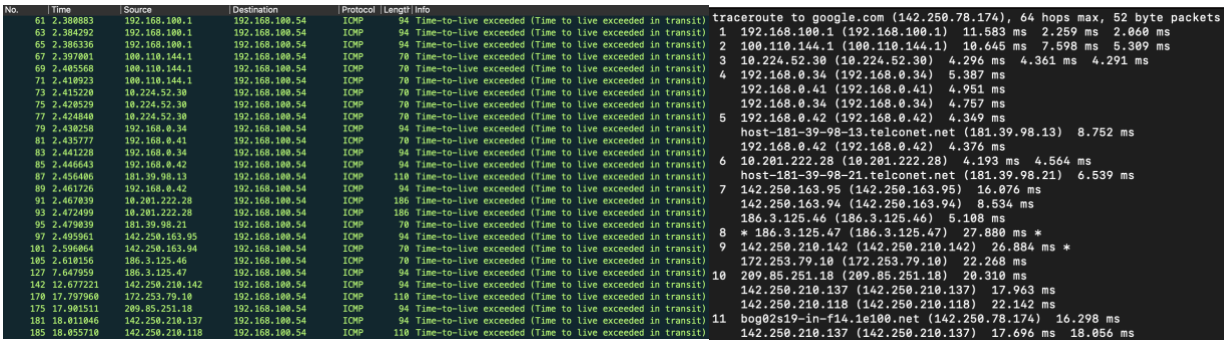
No.	Time	Source	Destination	Protocol	Length	Info
49	2.107637	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
51	2.110836	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
53	2.112983	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
55	2.124952	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
57	2.133500	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
59	2.142096	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
61	2.146274	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
63	2.151617	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
65	2.158071	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
67	2.162339	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
69	2.167728	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
71	2.173156	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
73	2.178365	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
118	7.197692	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
120	7.203550	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
124	7.216400	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
126	7.221357	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
128	7.238543	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
132	7.342660	186.3.125.46	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
136	7.355901	142.250.163.94	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
164	12.476461	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
205	17.580335	142.250.210.118	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
319	22.623661	142.250.210.138	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
323	22.727943	142.250.78.174	192.168.100.54	ICMP	70	Destination unreachable (Port unreachable)
325	22.745023	142.250.210.135	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
329	22.853524	142.250.210.126	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)

```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  2.417 ms  2.640 ms  2.117 ms
 2  100.110.144.1 (100.110.144.1)  12.056 ms  7.465 ms  8.583 ms
 3  10.224.52.30 (10.224.52.30)  4.102 ms  4.282 ms  6.389 ms
 4  192.168.0.34 (192.168.0.34)  4.256 ms
    192.168.0.41 (192.168.0.41)  4.676 ms
    192.168.0.34 (192.168.0.34)  4.816 ms
 5  192.168.0.42 (192.168.0.42)  4.478 ms *  13.664 ms
 6  10.201.222.28 (10.201.222.28)  5.830 ms  4.632 ms
    host-181-39-98-21.telconet.net (181.39.98.21)  4.957 ms
 7  142.250.163.95 (142.250.163.95)  16.262 ms
    186.3.125.46 (186.3.125.46)  5.049 ms
    142.250.163.94 (142.250.163.94)  5.134 ms
 8  * 186.3.125.47 (186.3.125.47)  23.222 ms *
 9  142.250.210.118 (142.250.210.118)  29.087 ms *
    142.250.210.138 (142.250.210.138)  26.257 ms
10  bog02s19-in-f14.1e100.net (142.250.78.174)  21.594 ms
    142.250.210.135 (142.250.210.135)  16.186 ms
    142.250.210.126 (142.250.210.126)  20.566 ms
```



No.	Time	Source	Destination	Protocol	Length	Info
15	1.290229	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
19	1.299962	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
21	1.302094	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
23	1.314155	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
25	1.322541	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
27	1.330098	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
29	1.334582	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
31	1.339765	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
33	1.344004	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
35	1.350592	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
39	1.363321	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
41	1.368605	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
68	6.376775	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
72	6.397113	181.39.98.13	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
74	6.403740	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
76	6.409530	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
78	6.415215	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
80	6.424670	186.3.125.46	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
82	6.443909	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
84	6.463112	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
88	6.568807	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
122	11.599837	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
214	16.631799	216.239.56.234	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
236	21.745867	142.250.210.135	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
241	21.849918	142.250.210.124	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
246	21.953591	142.250.210.135	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
248	21.970675	142.250.210.137	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)

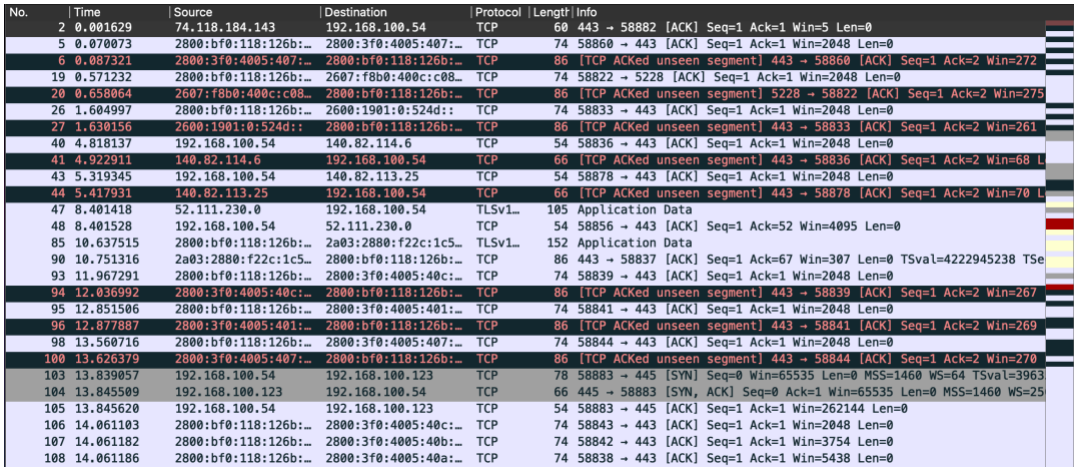
```
luis@Luiss-MacBook-Pro-2 ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  3.000 ms  2.468 ms  2.105 ms
 2  100.110.144.1 (100.110.144.1)  12.124 ms  7.399 ms  7.551 ms
 3  10.224.52.30 (10.224.52.30)  4.471 ms  4.119 ms  4.226 ms
 4  192.168.0.41 (192.168.0.41)  6.668 ms
    192.168.0.34 (192.168.0.34)  4.752 ms
    192.168.0.41 (192.168.0.41)  4.408 ms
 5  * 192.168.0.42 (192.168.0.42)  6.935 ms
    host-181-39-98-13.telconet.net (181.39.98.13)  12.037 ms
 6  host-181-39-98-21.telconet.net (181.39.98.21)  5.727 ms  4.798 ms
    10.201.222.28 (10.201.222.28)  5.714 ms
 7  186.3.125.46 (186.3.125.46)  8.416 ms
    186.3.125.47 (186.3.125.47)  18.140 ms
    142.250.163.95 (142.250.163.95)  18.281 ms
 8  186.3.125.47 (186.3.125.47)  16.521 ms *
    142.250.163.95 (142.250.163.95)  24.752 ms
 9  * 216.239.56.234 (216.239.56.234)  27.017 ms *
10  142.250.210.135 (142.250.210.135)  20.847 ms
    142.250.210.124 (142.250.210.124)  19.809 ms
    142.250.210.135 (142.250.210.135)  18.551 ms
11  142.250.210.137 (142.250.210.137)  16.052 ms
    bog02s19-in-f14.1e100.net (142.250.78.174)  18.476 ms  19.358 ms
```



No.	Time	Source	Destination	Protocol	Length	Info
61	2.380883	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
63	2.384292	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
65	2.386336	192.168.100.1	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
67	2.397001	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
69	2.405568	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
71	2.410923	100.110.144.1	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
73	2.415220	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
75	2.420529	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
77	2.424840	10.224.52.30	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
79	2.430250	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
81	2.435777	192.168.0.41	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
83	2.441228	192.168.0.34	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
85	2.446643	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
87	2.456406	181.39.98.13	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
89	2.461726	192.168.0.42	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
91	2.467039	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
93	2.472499	10.201.222.28	192.168.100.54	ICMP	186	Time-to-live exceeded (Time to live exceeded in transit)
95	2.479039	181.39.98.21	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
97	2.495961	142.250.163.95	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
101	2.596064	142.250.163.94	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
105	2.610156	186.3.125.46	192.168.100.54	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
127	7.647959	186.3.125.47	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
142	12.677221	142.250.210.142	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
170	17.797960	172.253.79.10	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
175	17.901511	209.85.251.18	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
181	18.011046	142.250.210.137	192.168.100.54	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
185	18.055710	142.250.210.118	192.168.100.54	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)

```
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1  192.168.100.1 (192.168.100.1)  11.583 ms  2.259 ms  2.060 ms
 2  100.110.144.1 (100.110.144.1)  10.645 ms  7.598 ms  5.309 ms
 3  10.224.52.30 (10.224.52.30)  4.296 ms  4.361 ms  4.291 ms
 4  192.168.0.34 (192.168.0.34)  5.387 ms
    192.168.0.41 (192.168.0.41)  4.951 ms
    192.168.0.34 (192.168.0.34)  4.757 ms
 5  192.168.0.42 (192.168.0.42)  4.349 ms
    host-181-39-98-13.telconet.net (181.39.98.13)  8.752 ms
    192.168.0.42 (192.168.0.42)  4.376 ms
 6  10.201.222.28 (10.201.222.28)  4.193 ms  4.564 ms
    host-181-39-98-21.telconet.net (181.39.98.21)  6.539 ms
 7  142.250.163.95 (142.250.163.95)  16.076 ms
    142.250.163.94 (142.250.163.94)  8.534 ms
    186.3.125.46 (186.3.125.46)  5.108 ms
 8  * 186.3.125.47 (186.3.125.47)  27.880 ms *
 9  142.250.210.142 (142.250.210.142)  26.884 ms *
    172.253.79.10 (172.253.79.10)  22.268 ms
10  209.85.251.18 (209.85.251.18)  20.310 ms
    142.250.210.137 (142.250.210.137)  17.963 ms
    142.250.210.118 (142.250.210.118)  22.142 ms
11  bog02s19-in-f14.1e100.net (142.250.78.174)  16.298 ms
    142.250.210.137 (142.250.210.137)  17.696 ms  18.056 ms
```

b. Watch a video from youtube.com. Capture the TCP handshake, and the congestion window.

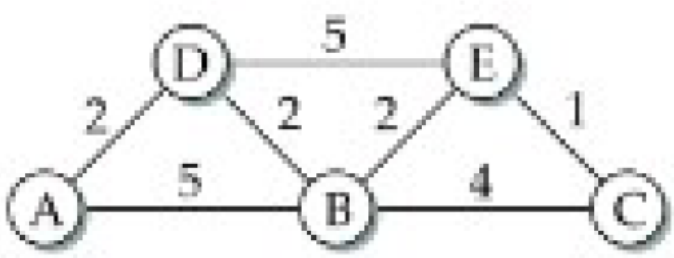


No.	Time	Source	Destination	Protocol	Length	Info
2	0.001629	74.118.184.143	192.168.100.54	TCP	60	443 → 58882 [ACK] Seq=1 Ack=1 Win=5 Len=0
5	0.070073	2800:bf0:118:126b:…	2800:3f0:4005:407:…	TCP	74	58860 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
6	0.087321	2800:3f0:4005:407:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58860 [ACK] Seq=1 Ack=2 Win=272
19	0.571232	2800:bf0:118:126b:…	2607:f8b0:400c:c08…	TCP	74	58822 → 5228 [ACK] Seq=1 Ack=1 Win=2048 Len=0
20	0.658064	2607:f8b0:400c:c08…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 5228 → 58822 [ACK] Seq=1 Ack=2 Win=275
26	1.604997	2800:bf0:118:126b:…	2600:1901:0:524d::	TCP	74	58833 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
27	1.630156	2600:1901:0:524d::	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58833 [ACK] Seq=1 Ack=2 Win=261
40	4.818137	192.168.100.54	140.82.114.6	TCP	54	58836 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
41	4.922911	140.82.114.6	192.168.100.54	TCP	66	[TCP ACKed unseen segment] 443 → 58836 [ACK] Seq=1 Ack=2 Win=68 L
43	5.319345	192.168.100.54	140.82.113.25	TCP	54	58878 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
44	5.417931	140.82.113.25	192.168.100.54	TCP	66	[TCP ACKed unseen segment] 443 → 58878 [ACK] Seq=1 Ack=2 Win=70 L
47	8.401418	52.111.230.0	192.168.100.54	TLSv1…	105	Application Data
48	8.401528	192.168.100.54	52.111.230.0	TCP	54	58856 → 443 [ACK] Seq=1 Ack=52 Win=4095 Len=0
85	10.637515	2800:bf0:118:126b:…	2a03:2880:f22c:1c5…	TLSv1…	152	Application Data
90	10.751316	2a03:2880:f22c:1c5…	2800:bf0:118:126b:…	TCP	86	443 → 58837 [ACK] Seq=1 Ack=67 Win=307 Len=0 TSval=4222945238 TSe
93	11.967291	2800:bf0:118:126b:…	2800:3f0:4005:40c:…	TCP	74	58839 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
94	12.036992	2800:3f0:4005:40c:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58839 [ACK] Seq=1 Ack=2 Win=267
95	12.851506	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TCP	74	58841 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
96	12.877887	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58841 [ACK] Seq=1 Ack=2 Win=269
98	13.560716	2800:bf0:118:126b:…	2800:3f0:4005:407:…	TCP	74	58844 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
100	13.626379	2800:3f0:4005:407:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58844 [ACK] Seq=1 Ack=2 Win=270
103	13.839057	192.168.100.54	192.168.100.123	TCP	78	58883 → 445 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=64 TSval=3963
104	13.845509	192.168.100.123	192.168.100.54	TCP	66	445 → 58883 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=25
105	13.845620	192.168.100.54	192.168.100.123	TCP	54	58883 → 445 [ACK] Seq=1 Ack=1 Win=262144 Len=0
106	14.061103	2800:bf0:118:126b:…	2800:3f0:4005:40c:…	TCP	74	58843 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
107	14.061182	2800:bf0:118:126b:…	2800:3f0:4005:40b:…	TCP	74	58842 → 443 [ACK] Seq=1 Ack=1 Win=3754 Len=0
108	14.061186	2800:bf0:118:126b:…	2800:3f0:4005:40a:…	TCP	74	58838 → 443 [ACK] Seq=1 Ack=1 Win=5438 Len=0

No.	Time	Source	Destination	Protocol	Length	Info
109	14.079107	192.168.100.54	192.168.100.123	TCP	78	58884 → 139 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=64 TSval=4289
110	14.079206	192.168.100.54	192.168.100.123	TCP	54	58883 → 445 [FIN, ACK] Seq=1 Ack=1 Win=262144 Len=0
111	14.079554	192.168.100.54	192.168.100.123	TCP	78	58885 → 445 [SYN] Seq=0 Win=65535 Len=0 MSS=1460 WS=128 TSval=223
112	14.081424	2800:3f0:4005:40a:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58838 [ACK] Seq=1 Ack=2 Win=294
113	14.082659	2800:3f0:4005:40b:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58842 [ACK] Seq=1 Ack=2 Win=275
114	14.083917	192.168.100.123	192.168.100.54	TCP	66	445 → 58885 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0 MSS=1460 WS=25
115	14.083957	192.168.100.54	192.168.100.123	TCP	54	58885 → 445 [ACK] Seq=1 Ack=1 Win=7406464 Len=0
116	14.083987	192.168.100.54	192.168.100.123	SMB	105	Negotiate Protocol Request
117	14.084777	192.168.100.123	192.168.100.54	TCP	66	139 → 58884 [SYN, ACK] Seq=0 Ack=1 Win=8192 Len=0 MSS=1460 WS=256
118	14.084777	192.168.100.123	192.168.100.54	TCP	54	445 → 58883 [ACK] Seq=1 Ack=2 Win=131328 Len=0
119	14.084777	192.168.100.123	192.168.100.54	TCP	54	445 → 58883 [RST, ACK] Seq=1 Ack=2 Win=0 Len=0
120	14.084801	192.168.100.54	192.168.100.123	TCP	54	58884 → 139 [RST] Seq=1 Win=0 Len=0
121	14.089282	192.168.100.123	192.168.100.54	SMB	463	Negotiate Protocol Response
122	14.089341	192.168.100.54	192.168.100.123	TCP	54	58885 → 445 [ACK] Seq=52 Ack=410 Win=7406080 Len=0
123	14.110047	192.168.100.54	192.168.100.123	SMB	236	Session Setup AndX Request, NTLMSSP_NEGOTIATE
124	14.117208	192.168.100.123	192.168.100.54	SMB	354	Session Setup AndX Response, NTLMSSP_CHALLENGE, Error: STATUS_MOR
125	14.117260	192.168.100.54	192.168.100.123	TCP	54	58885 → 445 [ACK] Seq=234 Ack=710 Win=7405824 Len=0
126	14.117890	192.168.100.54	192.168.100.123	SMB	97	Logoff AndX Request
127	14.121600	192.168.100.123	192.168.100.54	SMB	97	Logoff AndX Response
128	14.121681	192.168.100.54	192.168.100.123	TCP	54	58885 → 445 [ACK] Seq=277 Ack=753 Win=7405824 Len=0
129	14.121884	192.168.100.54	192.168.100.123	TCP	54	58885 → 445 [FIN, ACK] Seq=277 Ack=753 Win=7405824 Len=0
130	14.125817	192.168.100.123	192.168.100.54	TCP	54	445 → 58885 [ACK] Seq=753 Ack=278 Win=131072 Len=0
131	14.127880	192.168.100.123	192.168.100.54	TCP	54	445 → 58885 [RST, ACK] Seq=753 Ack=278 Win=0 Len=0
132	14.128962	2800:3f0:4005:40c:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58843 [ACK] Seq=1 Ack=2 Win=272
133	14.584167	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TCP	74	58845 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
134	14.607702	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58845 [ACK] Seq=1 Ack=2 Win=299
143	15.690101	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TCP	74	58852 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0

No.	Time	Source	Destination	Protocol	Length	Info
144	15.690227	2800:bf0:118:126b:…	2800:3f0:4005:40c:…	TCP	74	58850 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
145	15.708666	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58852 [ACK] Seq=1 Ack=2 Win=269
146	15.709930	2800:3f0:4005:40c:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58850 [ACK] Seq=1 Ack=2 Win=267
151	16.190550	2800:bf0:118:126b:…	2800:2a0:ffff:f::d	TCP	74	58854 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
152	16.190728	2800:bf0:118:126b:…	2800:2a0:ffff:f::d	TCP	74	58853 → 443 [ACK] Seq=1 Ack=1 Win=2048 Len=0
153	16.195040	2800:2a0:ffff:f::d	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58854 [ACK] Seq=1 Ack=2 Win=277
154	16.195041	2800:2a0:ffff:f::d	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58853 [ACK] Seq=1 Ack=2 Win=277
156	16.277749	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TLSv1…	156	[TCP Previous segment not captured] , Application Data
157	16.277785	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TLSv1…	125	Application Data
159	16.297930	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TCP	86	[TCP ACKed unseen segment] 443 → 58841 [ACK] Seq=1 Ack=72 Win=269
160	16.297930	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TCP	86	443 → 58841 [ACK] Seq=1 Ack=111 Win=269 Len=0 TSval=2542002937 TS
161	16.297930	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TLSv1…	125	Application Data
162	16.297985	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TCP	86	58841 → 443 [ACK] Seq=111 Ack=40 Win=2047 Len=0 TSval=1279277819
176	16.360119	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TLSv1…	162	Application Data
177	16.360119	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TLSv1…	359	Application Data
178	16.360158	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TCP	86	58841 → 443 [ACK] Seq=111 Ack=389 Win=2042 Len=0 TSval=1279277881
179	16.360598	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TLSv1…	121	Application Data
180	16.362414	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TLSv1…	287	Application Data
181	16.362415	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TLSv1…	125	Application Data
182	16.362456	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TCP	86	58841 → 443 [ACK] Seq=146 Ack=629 Win=2044 Len=0 TSval=1279277883
183	16.363110	2800:bf0:118:126b:…	2800:3f0:4005:401:…	TLSv1…	125	Application Data
191	16.379684	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TCP	86	443 → 58841 [ACK] Seq=629 Ack=146 Win=269 Len=0 TSval=2542003020
192	16.383995	2800:3f0:4005:401:…	2800:bf0:118:126b:…	TCP	86	443 → 58841 [ACK] Seq=629 Ack=185 Win=269 Len=0 TSval=2542003025
213	16.762074	2800:bf0:118:126b:…	2a03:2880:f22c:1c5…	TLSv1…	155	Application Data
751	16.834650	2a03:2880:f22c:1c5…	2800:bf0:118:126b:…	TCP	86	443 → 58837 [ACK] Seq=1 Ack=136 Win=307 Len=0 TSval=4222951322 TS
1092	16.859434	2a03:2880:f22c:1c5…	2800:bf0:118:126b:…	TLSv1…	157	Application Data
1093	16.859505	2800:bf0:118:126b:…	2a03:2880:f22c:1c5…	TCP	86	58837 → 443 [ACK] Seq=136 Ack=72 Win=2046 Len=0 TSval=2942961979

2. Use Dijkstra's to get the routing tables for nodes A, B and E.



Según el siguiente algoritmo:

```
class Graph():
    def __init__(self, nodes):
        self.distArray = [0 for i in range(nodes)]
        self.vistSet = [0 for i in range(nodes)]
        self.V = nodes
        self.INF = 1000000
        self.graph = [[0 for column in range(nodes)]
                      for row in range(nodes)]

    def dijkstra(self, srcNode):
        for i in range(self.V):
          self.distArray[i] = self.INF
          self.vistSet[i] = False
        self.distArray[srcNode] = 0
        for i in range(self.V):
            u = self.minDistance(self.distArray, self.vistSet)
            self.vistSet[u] = True
            for v in range(self.V):
                if self.graph[u][v] > 0 and self.vistSet[v] == False and self.distArray[v] > self.distArra
                        self.distArray[v] = self.distArray[u] + self.graph[u][v]

        self.printSolution(self.distArray)

    def minDistance(self, distArray, vistSet):

        min = self.INF

        for v in range(self.V):
            if distArray[v] < min and vistSet[v] == False:
                min = distArray[v]
                min_index = v

        return min_index

    def printSolution(self, distArray):
        print ("Node \tDistance from 4")
        for i in range(self.V):
            print (i, "\t", distArray[i])
```

Routing table for A:

Node	Distance
A	0
B	4
C	7
D	2
E	6

Routing table for B:

Node	Distance
A	4
B	0
C	3
D	2
E	2

Routing table for E:

Node	Distance
A	6
B	2
C	1
D	4
E	0

3. Suppose a host wants to establish the reliability of a link by sending packets and measuring the percentage that are received; routers, for example, do this. Explain the difficulty of doing this over a TCP connection.

La forma en la que TCP está configurado, hace que utilice herramientas para evitar al máximo la pérdida de paquetes y asegurar el envío de paquetes estable. Esto no asegura que el enlace sea confiable en sí, ya que al utilizar técnicas como slow start y otros algoritmos para evitar la congestión, aumentaría substancialmente el porcentaje de paquetes recibidos, lo que no proporcionaría los datos precisos para determinar si un enlace es confiable; esto hace que el porcentaje de paquetes recibidos no sea una buena métrica para este caso. Además, la velocidad a la que se envían estos paquetes puede verse limitada y no brindar la información completa para determinar si el enlace es estable. Sería mejor utilizar un protocolo como UDP.

4. Consider a simple congestion control algorithm that uses linear increase and multiplicative decrease (no slow start). Assume the congestion window size is in units of packets rather than bytes, and it is one packet initially.

    a. Give a detailed sketch of this algorithm.

Podemos expresar el problema con la siguiente tabla:

RTT (VC)	T (VC)	T+1 (VC+1)
Paquetes enviados	N	N(VC)

Además, asumiendo que el tamaño de la ventana de congestión (VC) está en paquetes: VC = 1

    b. Assume the delay is latency only, and that when a group of packets is sent, only a single ACK is returned.

Utilizamos la table para todos los paquetes:

VC = 1, y aumenta con cada RTT en 1, a menos que un paquete se pierda, en ese caso, disminuiría y se utilizaría 1 RTT para volver a enviar el paquete perdido*:

RTT	1 (1)	2 (2)	3 (3)	4 (4)
Paquetes enviados	1	2,3	4,5,6	7,8,9,10

5 *	6 (3)	7 (4)	8 (5)	9 (6)
9,10	11,12,13	14,15,16,17	18,19,20,21,22	23,24,25,26,27,28

10 *	11 (4)	12 *	13 (3)	14 (4)
25,26,27	28,29,30,31	30,31	32,33,34	35,36,37,38

15 *	16 (3)	17 (4)	18 (5)	19 *
38,39	40,41,42	43,44,45,46	47,48,49,50	50

c. Plot the congestion window as a function of RTT for the situation in which the following packets are lost: 9, 25, 30, 38, and 50. For simplicity, assume a perfect timeout mechanism that detects a lost packet exactly 1 RTT after it is transmitted.