

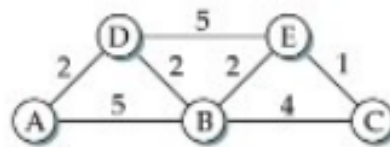
### DEBER 3 DE REDES

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NRC:4005

Answer the following questions.

- 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
  - b) Watch a video from youtube.com. Capture the TCP handshake, and the congestion window.
- 2) Use Dijkstra's to get the routing tables for nodes A, B and E.



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

## PREGUNTA 2

Correr 10 veces el traceroute y ver los paquetes en el wareshark

```
avindanielop@Kevin-MacBook-Pro ~ % traceroute google.com
raceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 4.083 ms 3.508 ms 3.524 ms
 2 * * *
 3 233.218.uio.satnet.net (200.63.218.233) 24.318 ms 23.848 ms 24.136 ms
 4 149.177.uio.satnet.net (200.69.177.149) 13.889 ms 31.815 ms 17.792 ms
 5 200.69.177.217 (200.69.177.217) 28.243 ms 22.785 ms 16.948 ms
 6 126.177.uio.satnet.net (200.69.177.126) 31.807 ms 43.711 ms 39.185 ms
 7 142.250.172.196 (142.250.172.196) 26.983 ms 36.189 ms 34.724 ms
 8 * * *
 9 74.125.252.68 (74.125.252.68) 30.116 ms
10 142.250.210.136 (142.250.210.136) 32.893 ms 37.975 ms
11 142.250.210.137 (142.250.210.137) 33.493 ms
12 142.250.210.138 (142.250.210.138) 146.892 ms
13 142.250.210.137 (142.250.210.137) 32.927 ms
14 bog0219-in-f14.1e100.net (142.250.78.174) 57.588 ms 38.176 ms 46.893 ms
avindanielop@Kevin-MacBook-Pro ~ %
```

Frame 178: 94 bytes on wire (752 bits), 94 bytes captured (752 bits) on interface en0, id 0

Ethernet II, Src: Zioncom\_E12:31:20 (48:ee:15:12:31:20), Dst: Apple\_ab64:df (c4:91:0c:ab:64:df)

No.	Time	Source	Destination	Protocol	Length	Info
178	11.598463	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
180	11.602589	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
182	11.606868	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
332	26.645588	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
334	26.670578	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
336	26.694772	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
338	26.708580	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
340	26.741379	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
342	26.759470	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
344	26.787654	200.69.177.126	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
346	26.811645	200.69.177.126	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
348	26.828659	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
350	26.859637	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
352	26.905655	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
354	26.944788	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
356	26.973697	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
358	26.997773	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
360	27.022553	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1468	58.377870	74.125.252.68	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1522	59.651372	142.250.210.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1589	68.841889	142.250.210.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1593	68.875395	142.250.210.137	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1594	70.624106	142.250.210.135	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
3220	79.574966	142.250.210.137	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
3222	79.633887	142.250.78.174	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
3224	79.672956	142.250.78.174	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
3226	79.719882	142.250.78.174	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)

```
kevindanielop@Kevin-MacBook-Pro ~ % traceroute google.com
raceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 4.266 ms 3.368 ms 3.445 ms
 2 * * *
 3 233.218.uio.satnet.net (200.63.218.233) 25.895 ms 19.443 ms 18.877 ms
 4 149.177.uio.satnet.net (200.69.177.149) 27.931 ms 21.166 ms 29.211 ms
 5 200.69.177.217 (200.69.177.217) 28.647 ms 38.898 ms 19.763 ms
 6 126.177.uio.satnet.net (200.69.177.126) 29.222 ms 48.822 ms 37.967 ms
 7 142.250.172.196 (142.250.172.196) 29.835 ms 35.175 ms 38.785 ms
 8 * * *
 9 142.250.210.116 (142.250.210.116) 31.448 ms
10 216.239.56.244 (216.239.56.244) 38.614 ms
11 74.125.252.68 (74.125.252.68) 34.399 ms
12 142.250.210.137 (142.250.210.137) 36.082 ms
13 bog0219-in-f14.1e100.net (142.250.78.174) 31.411 ms
14 142.250.210.136 (142.250.210.136) 36.205 ms
kevindanielop@Kevin-MacBook-Pro ~ %
```

Frame 178: 94 bytes on wire (752 bits), 94 bytes captured (752 bits) on interface en0, id 0

Ethernet II, Src: Zioncom\_E12:31:20 (48:ee:15:12:31:20), Dst: Apple\_ab64:df (c4:91:0c:ab:64:df)

No.	Time	Source	Destination	Protocol	Length	Info
13	1.175526	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
15	1.179474	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
17	1.182982	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
163	16.221740	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
168	16.242664	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
170	16.268712	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
172	16.288665	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
174	16.310689	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
176	16.339918	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
178	16.368677	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
180	16.392803	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
182	16.412734	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
184	16.441846	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
186	16.483829	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
189	16.521811	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
191	16.558982	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
202	17.680306	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
204	17.711076	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
387	32.756662	142.250.210.116	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
320	34.325288	216.239.56.244	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
332	34.929189	74.125.252.68	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
336	35.801697	142.250.210.137	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
522	50.616295	142.250.78.174	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
524	50.635693	142.250.210.135	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)

```
kevindanielop@Kevin-MacBook-Pro ~ % traceroute google.com
raceroute: unknown host google.com
kevindanielop@Kevin-MacBook-Pro ~ % traceroute google.com
raceroute to google.com (172.217.173.46), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 5.464 ms 3.768 ms 3.387 ms
 2 * * *
 3 233.218.uio.satnet.net (200.63.218.233) 26.795 ms 29.239 ms 14.942 ms
 4 149.177.uio.satnet.net (200.69.177.149) 17.968 ms 19.686 ms 16.957 ms
 5 * * *
 6 126.177.uio.satnet.net (200.69.177.126) 29.981 ms 38.858 ms 40.736 ms
 7 142.250.172.196 (142.250.172.196) 34.253 ms 32.579 ms 31.617 ms
 8 * * *
 9 142.250.231.160 (142.250.231.160) 43.888 ms
10 bog0212-in-f14.1e100.net (172.217.173.46) 35.817 ms
12 142.250.210.136 (142.250.210.136) 33.455 ms
kevindanielop@Kevin-MacBook-Pro ~ %
```

Frame 178: 94 bytes on wire (752 bits), 94 bytes captured (752 bits) on interface en0, id 0

Ethernet II, Src: Zioncom\_E12:31:20 (48:ee:15:12:31:20), Dst: Apple\_ab64:df (c4:91:0c:ab:64:df)

No.	Time	Source	Destination	Protocol	Length	Info
381	46.540621	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
383	46.545438	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
385	46.548857	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
538	61.586275	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
540	61.616171	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
542	61.631124	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
544	61.649124	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
546	61.669228	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
548	61.685196	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
792	76.721631	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
797	76.768663	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
801	76.801565	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
803	76.835666	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1270	102.580973	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1297	102.532657	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1716	117.574081	142.250.231.160	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1722	117.694753	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
1952	124.886840	192.168.0.5	192.168.0.1	ICMP	70	Destination unreachable (Port unreachable)
2070	124.958034	142.250.210.136	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)

```
kevindanielop@Kevins-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (172.217.173.46), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 3.656 ms 2.952 ms 9.161 ms
 2 * * *
 3 233.218.uio.satnet.net (200.63.218.233) 21.896 ms 19.584 ms 19.996 ms
 4 149.177.uio.satnet.net (200.69.177.149) 15.844 ms 16.180 ms 17.969 ms
 5 * * *
 6 126.177.uio.satnet.net (200.69.177.126) 29.120 ms 30.922 ms 40.796 ms
 7 142.250.172.196 (142.250.172.196) 37.938 ms 30.439 ms 34.376 ms
 8 * * *
 9 216.239.56.234 (216.239.56.234) 33.892 ms
 10 142.250.231.162 (142.250.231.162) 38.896 ms
 11 142.250.210.124 (142.250.210.124) 30.720 ms
 12 209.85.251.19 (209.85.251.19) 33.452 ms 36.364 ms 35.310 ms
 13 bog02s12-in-f14.1e100.net (172.217.173.46) 33.910 ms 38.157 ms 30.787 ms
kevindanielop@Kevins-MacBook-Pro ~ %
```

No.	Time	Source	Destination	Protocol	Length	Info
48	3.728778	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
49	3.722352	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
50	3.741520	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
51	18.796400	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
511	18.816395	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
514	18.822323	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
515	18.849345	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
520	18.867342	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
850	33.911746	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
854	33.943778	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
856	33.984639	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
860	34.022597	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1042	35.118850	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1044	35.153322	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1200	50.190357	216.239.56.234	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1571	66.584290	142.250.231.162	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1580	66.658537	142.250.210.124	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1592	67.524535	209.85.251.19	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1599	67.699212	209.85.251.19	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1601	67.724573	209.85.251.19	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1604	67.768501	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
1606	67.807917	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
1609	67.838660	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)

```
kevindanielop@Kevins-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (172.217.173.46), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 4.167 ms 3.507 ms 3.416 ms
 2 * * *
 3 233.218.uio.satnet.net (200.63.218.233) 26.118 ms 17.674 ms 25.340 ms
 4 149.177.uio.satnet.net (200.69.177.149) 12.876 ms 17.775 ms 18.940 ms
 5 200.69.177.217 (200.69.177.217) 16.658 ms 31.528 ms 11.497 ms
 6 126.177.uio.satnet.net (200.69.177.126) 33.179 ms 38.182 ms 39.122 ms
 7 142.250.172.196 (142.250.172.196) 33.768 ms 35.465 ms 32.014 ms
 8 * * *
 9 172.253.79.8 (172.253.79.8) 38.103 ms
 10 142.250.210.126 (142.250.210.126) 37.236 ms
 11 142.250.231.160 (142.250.231.160) 40.100 ms
 12 209.85.251.39 (209.85.251.39) 44.345 ms 35.739 ms
 13 209.85.251.19 (209.85.251.19) 29.015 ms
 14 bog02s12-in-f14.1e100.net (172.217.173.46) 33.841 ms 33.393 ms 33.956 ms
kevindanielop@Kevins-MacBook-Pro ~ %
```

No.	Time	Source	Destination	Protocol	Length	Info
35	3.045491	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
37	3.050551	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
39	3.053126	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
319	18.092359	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
321	18.111405	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
323	18.130786	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
327	18.140712	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
329	18.160486	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
331	18.187465	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
333	18.204059	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
335	18.236051	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
337	18.240412	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
339	18.261611	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
344	18.320698	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
346	18.359865	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
348	18.393640	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
352	18.470602	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
354	18.505612	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
478	33.555002	172.253.79.8	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
486	34.132166	142.250.210.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
492	34.340160	142.250.231.160	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
9352	48.290232	209.85.251.39	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
9375	48.441070	209.85.251.39	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
9378	48.470904	209.85.251.19	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
9380	48.505732	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
9385	48.540014	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
9387	48.573983	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)

Frame 35: 94 bytes on wire (752 bits), 94 bytes captured (752 bits) on interface en0, id 0 0000 c4 91 0c ab 64 df 40 ee 15 12 3

```
kevindanielop@Kevins-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (172.217.173.46), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 9.171 ms 6.438 ms 3.500 ms
 2 * * *
 3 233.218.uio.satnet.net (200.63.218.233) 24.420 ms 20.523 ms 27.345 ms
 4 149.177.uio.satnet.net (200.69.177.149) 16.621 ms 22.476 ms 20.317 ms
 5 200.69.177.217 (200.69.177.217) 21.046 ms 21.542 ms 21.886 ms
 6 126.177.uio.satnet.net (200.69.177.126) 34.585 ms 34.202 ms 42.082 ms
 7 142.250.172.196 (142.250.172.196) 32.232 ms 32.992 ms 42.879 ms
 8 * * *
 9 142.250.210.134 (142.250.210.134) 37.476 ms 41.552 ms
 10 142.250.231.162 (142.250.231.162) 52.144 ms
 11 bog02s12-in-f14.1e100.net (172.217.173.46) 31.649 ms
 12 209.85.251.19 (209.85.251.19) 30.769 ms 32.303 ms
kevindanielop@Kevins-MacBook-Pro ~ %
```

No.	Time	Source	Destination	Protocol	Length	Info
26	1.350412	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
27	1.405647	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
30	1.369212	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
232	16.404775	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
234	16.426702	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
236	16.454008	200.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
238	16.470706	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
240	16.494186	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
242	16.512708	200.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
244	16.535712	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
246	16.557059	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
248	16.579779	200.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
253	16.614391	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
255	16.649036	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
259	16.691900	200.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
265	16.724222	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
270	16.750946	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
272	16.801877	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
497	31.848205	142.250.210.134	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
504	32.018185	142.250.210.134	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
506	32.070249	142.250.231.162	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
517	32.820639	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
521	32.868621	209.85.251.19	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
525	32.929705	209.85.251.19	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
622	35.042072	192.168.0.5	192.168.0.1	ICMP	70	Destination unreachable (Port unreachable)

Frame 26: 94 bytes on wire (752 bits), 94 bytes captured (752 bits) on interface en0, id 0 0000 c4 91 0c ab 64 df 40 ee 15 12 3

```
kevindanielop@Kevins-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 4.287 ms 3.597 ms 3.142 ms
 2 * * *
 3 233.218.uio.satnet.net (208.63.218.233) 24.656 ms 17.513 ms 18.263 ms
 4 149.177.uio.satnet.net (208.69.177.149) 28.836 ms 20.412 ms 18.598 ms
 5 208.69.177.217 (208.69.177.217) 20.031 ms 13.444 ms 20.792 ms
 6 126.177.uio.satnet.net (208.69.177.126) 38.635 ms 44.622 ms 38.143 ms
 7 142.250.172.196 (142.250.172.196) 28.789 ms 31.048 ms 42.793 ms
 8 * * *
 9 209.85.251.38 (209.85.251.38) 186.988 ms
 10 216.239.48.172 (216.239.48.172) 30.451 ms
 11 142.250.210.124 (142.250.210.124) 44.166 ms
 12 142.250.210.135 (142.250.210.135) 35.974 ms 41.498 ms
 13 142.250.210.137 (142.250.210.137) 36.020 ms
 14 * * *
 15 bog92s19-in-f14.1e100.net (142.250.78.174) 37.580 ms 30.159 ms 54.323 ms
kevindanielop@Kevins-MacBook-Pro ~ %
```

No.	Time	Source	Destination	Protocol	Length	Info
25	2.252849	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
27	2.256839	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
29	2.260846	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
644	17.288808	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
652	17.317654	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
655	17.335872	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
659	17.363962	208.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
675	17.408317	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
663	17.483922	208.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
669	17.424082	208.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
671	17.438886	208.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
673	17.459655	208.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
731	21.672721	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
682	17.536832	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
684	17.574147	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
686	17.683042	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
729	21.629934	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
918	36.792925	209.85.251.38	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
962	48.187399	216.239.48.172	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
976	48.237443	142.250.210.124	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
984	48.872668	142.250.210.135	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
998	41.848667	142.250.210.135	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
995	41.084665	142.250.210.137	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
1000	41.691997	142.250.78.174	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
1002	41.723014	142.250.78.174	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
1004	41.777374	142.250.78.174	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)

```
kevindanielop@Kevins-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 27.832 ms 3.470 ms 3.369 ms
 2 * * *
 3 233.218.uio.satnet.net (208.63.218.233) 31.398 ms 23.245 ms 15.271 ms
 4 149.177.uio.satnet.net (208.69.177.149) 16.515 ms 17.088 ms 21.965 ms
 5 208.69.177.217 (208.69.177.217) 26.070 ms 17.787 ms *
 6 126.177.uio.satnet.net (208.69.177.126) 51.844 ms 34.180 ms 30.813 ms
 7 142.250.172.196 (142.250.172.196) 36.411 ms 36.283 ms 29.770 ms
 8 * * *
 9 bog92s19-in-f14.1e100.net (142.250.78.174) 36.776 ms
 10 209.85.251.18 (209.85.251.18) 33.781 ms
 11 142.250.210.138 (142.250.210.138) 32.821 ms
kevindanielop@Kevins-MacBook-Pro ~ %
```

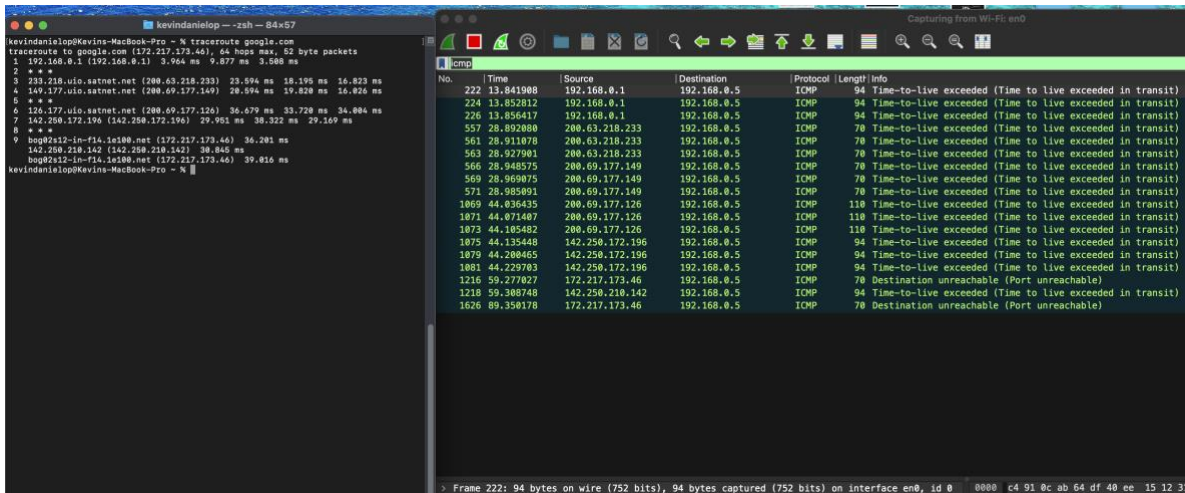
No.	Time	Source	Destination	Protocol	Length	Info
62	4.722291	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
65	4.726776	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
67	4.730209	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
268	19.778398	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
264	19.794865	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
266	19.810106	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
268	19.826758	208.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
270	19.844853	208.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
272	19.866827	208.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
274	19.892927	208.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
276	19.911919	208.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
335	24.948122	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
337	24.983071	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
339	25.013983	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
341	25.050426	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
343	25.087214	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
347	25.117108	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
476	48.164274	142.250.78.174	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
478	48.199284	209.85.251.18	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
496	41.447083	142.250.210.138	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)

> Frame 62: 94 bytes on wire (752 bits), 94 bytes captured (752 bits) on interface en0, id 0 8000 E4 01 0c ab 64 df 40 ee 15 12 3  
> Ethernet II, Src: ZingomE (12:31:20:40:15:12:31:20), Dst: Apple ab:64:df:c4:01:0c:ee:15

```
kevindanielop@Kevins-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.250.78.174), 64 hops max, 52 byte packets
 1 192.168.0.1 (192.168.0.1) 4.836 ms 3.492 ms 8.696 ms
 2 * * *
 3 233.218.uio.satnet.net (208.63.218.233) 25.813 ms 16.216 ms 17.781 ms
 4 149.177.uio.satnet.net (208.69.177.149) 26.378 ms 18.934 ms 17.744 ms
 5 208.69.177.217 (208.69.177.217) 32.280 ms 15.931 ms 28.981 ms
 6 126.177.uio.satnet.net (208.69.177.126) 38.127 ms 35.825 ms 33.589 ms
 7 142.250.172.196 (142.250.172.196) 30.693 ms 30.764 ms 28.808 ms
 8 * * *
 9 142.250.210.134 (142.250.210.134) 29.181 ms
 10 216.239.48.172 (216.239.48.172) 30.746 ms
 11 142.250.231.162 (142.250.231.162) 38.970 ms
 12 bog92s19-in-f14.1e100.net (172.217.173.46) 30.211 ms
 13 209.85.251.39 (209.85.251.39) 35.448 ms 32.113 ms
kevindanielop@Kevins-MacBook-Pro ~ %
```

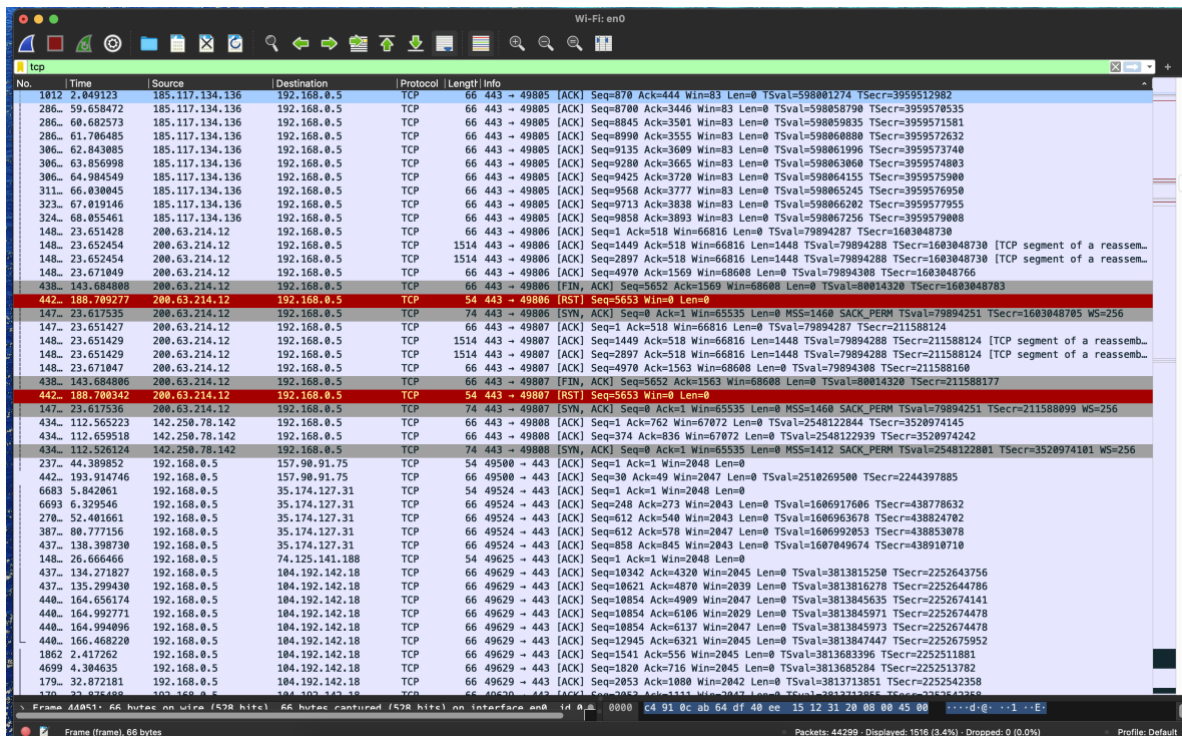
No.	Time	Source	Destination	Protocol	Length	Info
11	1.027222	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
13	1.031631	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
15	1.040304	192.168.0.1	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
268	16.078347	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
270	16.095868	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
272	16.113727	208.63.218.233	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
273	16.140862	208.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
281	16.159029	208.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
283	16.177663	208.69.177.149	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
287	16.209857	208.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
289	16.226847	208.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
291	16.258666	208.69.177.217	192.168.0.5	ICMP	70	Time-to-live exceeded (Time to live exceeded in transit)
293	16.285961	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
295	16.322985	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
297	16.356381	208.69.177.126	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
300	16.387166	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
649	32.580628	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
651	32.529325	142.250.172.196	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
801	47.570498	142.250.210.134	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
851	50.616411	216.239.48.172	192.168.0.5	ICMP	94	Time-to-live exceeded (Time to live exceeded in transit)
865	51.813423	142.250.231.162	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
869	51.949444	172.217.173.46	192.168.0.5	ICMP	70	Destination unreachable (Port unreachable)
871	51.985720	209.85.251.39	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1168	67.631166	209.85.251.39	192.168.0.5	ICMP	110	Time-to-live exceeded (Time to live exceeded in transit)
1348	83.354257	192.168.0.5	192.168.0.1	ICMP	70	Destination unreachable (Port unreachable)
1341	83.354320	192.168.0.5	192.168.0.1	ICMP	70	Destination unreachable (Port unreachable)





b. Abri un video en youtube de 3:25 minutos en 1080p y estos son los resultados:

No.	Time	Source	Destination	Protocol	Length	Info
442..	194.105377	157.90.91.75	192.168.0.5	TCP	66	443 -> 49500 [ACK] Seq=49 Ack=58 Win=501 Len=0 TSval=2244398078 TSecr=2510269500
6763	7.478858	35.174.127.31	192.168.0.5	TCP	66	443 -> 49524 [ACK] Seq=273 Ack=365 Win=251 Len=0 TSval=438779781 TSecr=1606918066
278..	52.401444	35.174.127.31	192.168.0.5	TCP	66	443 -> 49524 [ACK] Seq=273 Ack=612 Win=254 Len=0 TSval=438824702 TSecr=1606963552
23	0.751021	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1 Ack=194 Win=1031 Len=0 TSval=2252518235 TSecr=3813681616
24	0.751022	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1 Ack=233 Win=1031 Len=0 TSval=2252518235 TSecr=3813681616
106..	33.042642	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1111 Ack=2088 Win=1048 Len=0 TSval=2252542527 TSecr=3813713855
106..	34.452381	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1111 Ack=2170 Win=1048 Len=0 TSval=2252543935 TSecr=3813715312
106..	34.452382	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1111 Ack=3361 Win=1053 Len=0 TSval=2252543935 TSecr=3813715312
324..	68.294711	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1332 Ack=3554 Win=1059 Len=0 TSval=2252577780 TSecr=3813749160
324..	68.294712	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1332 Ack=3593 Win=1059 Len=0 TSval=2252577780 TSecr=3813749160
324..	68.737137	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1705 Ack=3628 Win=1059 Len=0 TSval=2252578215 TSecr=3813749549
324..	69.104885	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1705 Ack=3710 Win=1059 Len=0 TSval=2252578590 TSecr=3813749970
324..	69.104886	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1705 Ack=4901 Win=1064 Len=0 TSval=2252578590 TSecr=3813749970
387..	81.253311	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1889 Ack=4990 Win=1064 Len=0 TSval=2252590722 TSecr=3813762105
387..	81.253313	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1889 Ack=5029 Win=1064 Len=0 TSval=2252590729 TSecr=3813762105
388..	81.253313	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=1889 Ack=5307 Win=1070 Len=0 TSval=2252590730 TSecr=3813762105
388..	81.413523	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=2111 Ack=5422 Win=1070 Len=0 TSval=2252590809 TSecr=3813762267
427..	100.713093	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=2111 Ack=5654 Win=1076 Len=0 TSval=2252610196 TSecr=3813781580
427..	101.207116	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=3366 Ack=5689 Win=1076 Len=0 TSval=2252610691 TSecr=3813782031
427..	102.356815	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=3366 Ack=6558 Win=1081 Len=0 TSval=2252611842 TSecr=3813783219
427..	102.356817	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=3366 Ack=7749 Win=1087 Len=0 TSval=2252611843 TSecr=3813783219
433..	106.713488	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=3548 Ack=8329 Win=1093 Len=0 TSval=2252616198 TSecr=3813787585
433..	106.719414	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=3548 Ack=8523 Win=1098 Len=0 TSval=2252616284 TSecr=3813787585
1237	2.332615	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=374 Ack=1541 Win=1036 Len=0 TSval=2252511811 TSecr=3813683188
63	1.260100	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=374 Ack=2068 Win=1031 Len=0 TSval=2252510747 TSecr=3813682082
1236	2.332615	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=374 Ack=350 Win=1031 Len=0 TSval=2252511810 TSecr=3813683188
433..	106.921294	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=3741 Ack=8558 Win=1098 Len=0 TSval=2252616407 TSecr=3813787740
436..	133.251678	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=3741 Ack=8949 Win=1104 Len=0 TSval=2252642735 TSecr=3813814113
436..	133.251678	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=3741 Ack=8988 Win=1104 Len=0 TSval=2252642735 TSecr=3813814113
437..	134.156927	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=4136 Ack=10342 Win=1115 Len=0 TSval=2252643632 TSecr=3813815015
436..	133.626183	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=4136 Ack=9023 Win=1104 Len=0 TSval=2252643111 TSecr=3813814444
437..	134.156926	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=4136 Ack=9151 Win=1110 Len=0 TSval=2252643632 TSecr=3813815015
437..	135.264886	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=4320 Ack=10427 Win=1115 Len=0 TSval=2252644740 TSecr=3813816127
437..	135.264887	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=4320 Ack=10621 Win=1121 Len=0 TSval=2252644740 TSecr=3813816127
440..	164.656066	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=4870 Ack=10854 Win=1127 Len=0 TSval=2252674140 TSecr=3813845515
4695	4.259427	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=556 Ack=1626 Win=1036 Len=0 TSval=2252513735 TSecr=3813685113
4696	4.259428	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=556 Ack=1820 Win=1042 Len=0 TSval=2252513741 TSecr=3813685113
440..	165.157613	104.192.142.18	192.168.0.5	TCP	66	443 -> 49629 [ACK] Seq=6137 Ack=10889 Win=1127 Len=0 TSval=2252674643 TSecr=3813845973

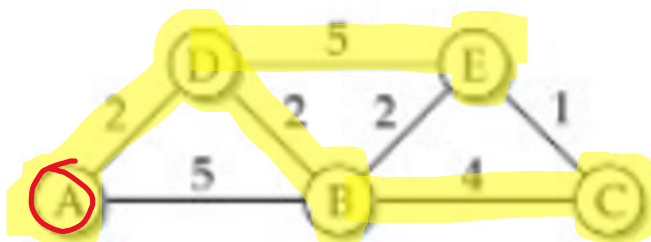


## PREGUNTA 2

Tabla para nodo a, b, e

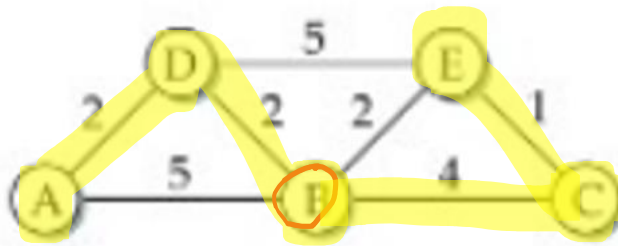
Nodo A

Destino	Peso / distancia	Salto siguiente
A	0	-
B	4	D
C	8	B
D	2	A
E	7	D



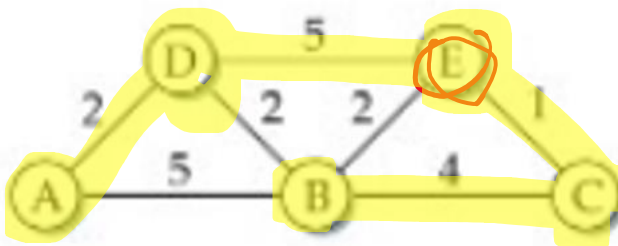
### Nodo B

Destino	Peso / distancia	Salto siguiente
A	4	D
B	0	-
C	4	B
D	2	B
E	5	C



### Nodo C

Destino	Peso / distancia	Salto siguiente
A	7	D
cB	5	C
C	1	E
D	5	E
E	0	-



### PREGUNTA 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

Al al tener una conexión TCP, no se puede saber si el paquete llegó bien a la primera vez, se perdió o retransmitió, por eso no se puede saber el porcentaje de los paquetes fueron transferidos perfectamente.

#### PREGUNTA 4

a)

- Se envían los paquetes
- Por cada ACK, se incrementa el tamaño de la ventana efectiva
- En el timeout, la ventana se reduce a la mitad

b,c)

El RTT inicial 0 y tamaño de ventana inicial 0 (1,0)

Los paquetes se reciben, y cuando hay una pérdida el tamaño de la ventana se reduce.

(1,2) primer paquete enviado

(2,3) se envía paquete 2,3, tamaño ventana 3

(3,4) se envía paquete 4,5, 6 y tamaño ventana 4

(4,2) se envía paquete 7,8,9,10. Error en el paquete 9 y tamaño ventana se reduce a la mitad: 2

..... así sucesivamente

