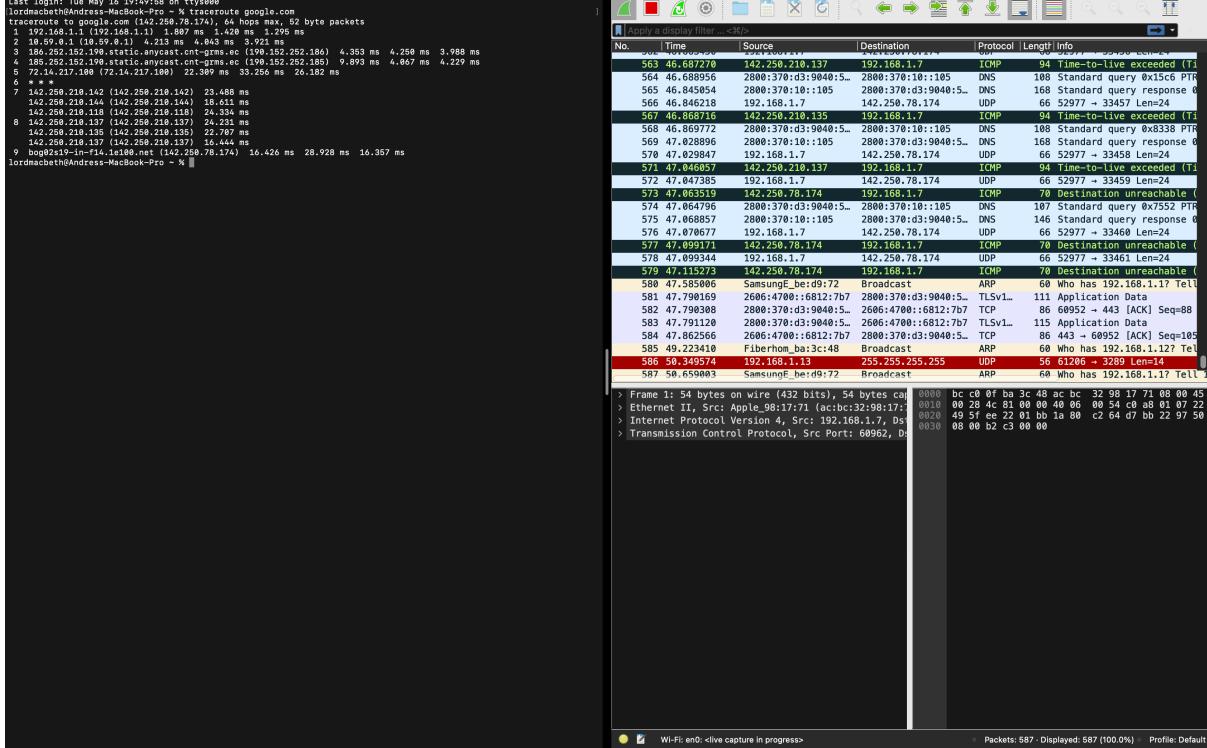


HW 3

1. Read the following Wireshark tutorial, and use it to capture traffic from the following scenarios. Use screenshots to show your results.



Apply a display filter: <None>						
No.	Time	Source	Destination	Protocol	Length	Info
1	19.16.8.1.1 (192.168.1.1) 1.887 ms	1.428 ms	1.295 ms			
2	19.16.8.1.1 (192.168.1.1) 1.231 ms	1.043 ms	1.043 ms			
3	19.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186)	4.363 ms	4.258 ms	3.988 ms		
4	19.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186)	9.893 ms	4.867 ms	4.229 ms		
5	72.14.217.100 (72.14.217.100)	22.369 ms	35.256 ms	26.182 ms		
6	*					
7	142.258.210.142 (142.258.210.142)	23.488 ms				
142.258.210.144 (142.258.210.144)	18.611 ms					
142.258.210.146 (142.258.210.146)	18.611 ms					
8	142.258.210.135 (142.258.210.135)	22.707 ms				
142.258.210.137 (142.258.210.137)	24.231 ms					
9	hong219-in-t14-1e180.net (142.258.78.174)	16.426 ms	28.928 ms	16.357 ms		
lordmacheathAddress-MacBook-Pro ~ % traceroute google.com						
traceroute to google.com (142.258.78.174), 64 hops max, 62 byte packets						
1 192.168.1.1 (192.168.1.1) 1.887 ms	1.428 ms	1.295 ms				
2 19.16.8.1.1 (192.168.1.1) 1.231 ms	1.043 ms	1.043 ms				
3 19.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186)	4.363 ms	4.258 ms	3.988 ms			
4 19.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186)	9.893 ms	4.867 ms	4.229 ms			
5 72.14.217.100 (72.14.217.100)	22.369 ms	35.256 ms	26.182 ms			
6 *						
7 bog219-in-t14-1e180.net (142.258.78.174)	28.951 ms					
142.258.210.114 (142.258.210.114)	20.431 ms					
142.258.210.116 (142.258.210.116)	20.431 ms					
142.258.231.168 (142.258.231.168)	16.587 ms					
lordmacheathAddress-MacBook-Pro ~ %						
;						
Frame 1: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface en0, link-layer type Ethernet II (0x0806), source Apple-98:17:71 (acb:13:98:17:71:00), destination 00:0c:0f:ba:3c:48 (Fiberhom_be:3c:48)						
Ethernet II, Src: Apple-98:17:71 (acb:13:98:17:71:00), Dst: Fiberhom_be:3c:48 (00:0c:0f:ba:3c:48)						
Internet Protocol Version 4, Src: 192.168.1.7, Dst: 192.168.1.7						
Transmission Control Protocol, Src Port: 60962, Dst Port: 60962						
;						
00:00:00:00:00:00 Wi-Fi: en0: <live capture in progress>						
Packets: 820 - Displayed: 820 (100.0%) - Profile: Default						

Apply a display filter: <None>						
No.	Time	Source	Destination	Protocol	Length	Info
1	19.16.8.1.1 (192.168.1.1) 1.887 ms	1.428 ms	1.295 ms			
2	19.16.8.1.1 (192.168.1.1) 1.231 ms	1.043 ms	1.043 ms			
3	19.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186)	4.363 ms	4.258 ms	3.988 ms		
4	19.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186)	9.893 ms	4.867 ms	4.229 ms		
5	*					
7	142.258.210.142 (142.258.210.142)	23.488 ms				
142.258.210.144 (142.258.210.144)	18.611 ms					
142.258.210.146 (142.258.210.146)	18.611 ms					
8	142.258.210.135 (142.258.210.135)	22.707 ms				
142.258.210.137 (142.258.210.137)	24.231 ms					
9	hong219-in-t14-1e180.net (142.258.78.174)	16.426 ms	28.928 ms	16.357 ms		
lordmacheathAddress-MacBook-Pro ~ % traceroute google.com						
traceroute to google.com (142.258.78.174), 64 hops max, 62 byte packets						
1 192.168.1.1 (192.168.1.1) 1.887 ms	1.428 ms	1.295 ms				
2 19.16.8.1.1 (192.168.1.1) 1.231 ms	1.043 ms	1.043 ms				
3 19.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186)	4.363 ms	4.258 ms	3.988 ms			
4 19.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186)	9.893 ms	4.867 ms	4.229 ms			
5 72.14.217.100 (72.14.217.100)	22.369 ms	35.256 ms	26.182 ms			
6 *						
7 bog219-in-t14-1e180.net (142.258.78.174)	28.951 ms					
142.258.210.114 (142.258.210.114)	20.431 ms					
142.258.210.116 (142.258.210.116)	20.431 ms					
142.258.231.168 (142.258.231.168)	16.587 ms					
lordmacheathAddress-MacBook-Pro ~ %						
;						
Frame 1: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface en0, link-layer type Ethernet II (0x0806), source Apple-98:17:71 (acb:13:98:17:71:00), destination 00:0c:0f:ba:3c:48 (Fiberhom_be:3c:48)						
Ethernet II, Src: Apple-98:17:71 (acb:13:98:17:71:00), Dst: Fiberhom_be:3c:48 (00:0c:0f:ba:3c:48)						
Internet Protocol Version 4, Src: 192.168.1.7, Dst: 192.168.1.7						
Transmission Control Protocol, Src Port: 60962, Dst Port: 60962						
;						
00:00:00:00:00:00 Wi-Fi: en0: <live capture in progress>						
Packets: 694 - Displayed: 694 (100.0%) - Profile: Default						

```

2 10.69.8.1 [10.69.8.1] 4.406 ns 5.833 ms 4.402 ms
3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.184 ms 4.148 ms 4.176 ms
4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 5.098 ms 4.197 ms 4.314 ms
5 72.14.217.100 ([72.14.217.100]) 23.156 ms 22.168 ms 29.398 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.210.116) 28.798 ms
142.258.210.116 ([142.258.210.116]) 22.514 ms
1 * [■]
lordmache[nAddress-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (102.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 ([192.168.1.1]) 1.753 ms 1.176 ms 0.865 ms
 2 10.69.8.1 ([10.69.8.1]) 4.420 ms 4.420 ms 4.420 ms
 3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 5.499 ms 5.543 ms 4.962 ms
 4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.279 ms 4.253 ms 4.682 ms
 5 72.14.217.100 ([72.14.217.100]) 22.184 ms 22.239 ms
6 * [■]
7 bog2x19-in-T14.le108.net (209.85.251.38) 27.496 ms 26.814 ms
142.258.210.116 ([142.258.210.116]) 22.514 ms
8 10.69.8.1 ([10.69.8.1]) 4.420 ms 4.420 ms 4.420 ms
 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 5.499 ms 5.543 ms 4.962 ms
 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.279 ms 4.253 ms 4.682 ms
 5 72.14.217.100 ([72.14.217.100]) 22.074 ms 22.029 ms 22.029 ms
6 * [■]
7 bog2x19-in-T14.le108.net (209.85.251.38) 27.496 ms 26.814 ms
142.258.210.116 ([142.258.210.116]) 22.514 ms
8 10.69.8.1 ([10.69.8.1]) 4.420 ms 4.420 ms 4.420 ms
 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 5.499 ms 5.543 ms 4.962 ms
 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.279 ms 4.253 ms 4.682 ms
 5 72.14.217.100 ([72.14.217.100]) 22.074 ms 22.029 ms 22.029 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.210.116) 17.057 ms
142.258.210.116 ([142.258.210.116]) 22.793 ms
209.85.251.38 ([209.85.251.38]) 24.913 ms
8 10.69.8.1 ([10.69.8.1]) 4.420 ms 4.420 ms 4.420 ms
 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 5.499 ms 5.543 ms 4.962 ms
 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.279 ms 4.253 ms 4.682 ms
 5 72.14.217.100 ([72.14.217.100]) 22.853 ms 24.887 ms 24.458 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.78.78) 22.853 ms
lordmache[nAddress-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (102.258.78.78), 64 hops max, 52 byte packets
 1 192.168.1.1 ([192.168.1.1]) 3.445 ms 1.547 ms
 2 10.69.8.1 ([10.69.8.1]) 4.238 ms 3.954 ms 4.698 ms
 3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.014 ms 4.532 ms 4.378 ms
 4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.167 ms 4.331 ms 4.186 ms
 5 72.14.217.100 ([72.14.217.100]) 22.074 ms 22.029 ms 22.029 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.78.78) 23.588 ms 22.549 ms 23.867 ms
lordmache[nAddress-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (102.258.78.78), 64 hops max, 52 byte packets
 1 192.168.1.1 ([192.168.1.1]) 3.493 ms 1.336 ms 3.680 ms
 2 10.69.8.1 ([10.69.8.1]) 4.420 ms 4.768 ms 5.424 ms
 3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.099 ms 4.549 ms 5.165 ms
 4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 6.934 ms 4.758 ms 4.182 ms
 5 72.14.217.100 ([72.14.217.100]) 33.538 ms 22.849 ms 22.314 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.78.78) 23.588 ms 22.549 ms 23.867 ms
lordmache[nAddress-MacBook-Pro ~ % [■]

```

```

142.258.210.136 ([142.258.210.136]) 22.797 ms
142.258.210.137 ([142.258.210.137]) 16.444 ms
9 bog2x19-in-T14.le108.net (142.258.78.174) 16.426 ms 28.928 ms 16.397 ms
lordmache[nAddress-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (102.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 ([192.168.1.1]) 2.758 ms 1.248 ms 1.153 ms
 2 10.69.8.1 ([10.69.8.1]) 16.394 ms 4.958 ms 5.293 ms
 3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.399 ms 4.517 ms 4.314 ms
 4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.931 ms 4.179 ms 4.648 ms
 5 72.14.217.100 ([72.14.217.100]) 41.815 ms 44.514 ms 25.808 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.210.136) 28.981 ms
142.258.210.136 ([142.258.210.136]) 22.382 ms
127.253.78.8 ([172.253.78.174]) 26.431 ms
142.258.210.126 ([142.258.210.126]) 17.888 ms
1 * [■]
9 bog2x19-in-T14.le108.net (142.258.78.174) 23.807 ms 22.289 ms 24.998 ms
lordmache[nAddress-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (102.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 ([192.168.1.1]) 2.747 ms 1.248 ms 1.153 ms
 2 10.69.8.1 ([10.69.8.1]) 16.394 ms 4.958 ms 5.293 ms
 3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.399 ms 4.517 ms 4.314 ms
 4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.931 ms 4.179 ms 4.648 ms
 5 72.14.217.100 ([72.14.217.100]) 41.815 ms 44.514 ms 25.808 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.78.174) 28.981 ms
142.258.210.136 ([142.258.210.136]) 22.382 ms
127.253.78.8 ([172.253.78.174]) 26.431 ms
142.258.210.126 ([142.258.210.126]) 17.888 ms
1 * [■]
9 bog2x19-in-T14.le108.net (142.258.78.174) 23.807 ms 22.289 ms 24.998 ms
lordmache[nAddress-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (102.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 ([192.168.1.1]) 2.458 ms 1.697 ms 4.151 ms
 2 10.69.8.1 ([10.69.8.1]) 4.455 ms 5.833 ms 4.862 ms
 3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.184 ms 4.148 ms 4.176 ms
 4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 5.098 ms 4.179 ms 4.314 ms
 5 72.14.217.100 ([72.14.217.100]) 23.158 ms 22.168 ms 29.398 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.78.174) 28.981 ms
142.258.210.136 ([142.258.210.136]) 22.382 ms
127.253.78.8 ([172.253.78.174]) 26.431 ms
142.258.210.126 ([142.258.210.126]) 17.888 ms
1 * [■]
9 bog2x19-in-T14.le108.net (142.258.78.174) 23.807 ms 22.289 ms 24.998 ms
lordmache[nAddress-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (102.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 ([192.168.1.1]) 1.753 ms 1.176 ms 0.865 ms
 2 10.69.8.1 ([10.69.8.1]) 4.420 ms 4.768 ms 5.424 ms
 3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.014 ms 4.532 ms 4.378 ms
 4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.167 ms 4.331 ms 4.186 ms
 5 72.14.217.100 ([72.14.217.100]) 22.074 ms 22.029 ms 22.029 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.78.174) 23.588 ms 22.549 ms 23.867 ms
lordmache[nAddress-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (102.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 ([192.168.1.1]) 3.843 ms 1.336 ms 3.680 ms
 2 10.69.8.1 ([10.69.8.1]) 4.420 ms 4.768 ms 5.424 ms
 3 106.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.014 ms 4.532 ms 4.378 ms
 4 105.252.152.198.static.ansible.cnt-grms.ec [190.152.252.186] 4.167 ms 4.331 ms 4.186 ms
 5 72.14.217.100 ([72.14.217.100]) 33.538 ms 22.849 ms 22.314 ms
6 * [■]
7 bog2x19-in-T14.le108.net (142.258.78.174) 23.588 ms 22.549 ms 23.867 ms
lordmache[nAddress-MacBook-Pro ~ % [■]

```



```
Last login: Tue May 14 19:49:59 on ttys000
lordmacheth@Address-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.258.78.174), 64 hops max, 52 byte packets
1 192.168.1.1 (192.168.1.1) 1.887 ms 1.428 ms 1.295 ms
2 10.0.9.0.1 (10.0.9.0.1) 4.258 ms 4.043 ms 4.151 ms
3 106.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186) 4.363 ms 4.258 ms 3.988 ms
4 106.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186) 9.893 ms 4.867 ms 4.229 ms
5 72.14.217.100 (72.14.217.100) 22.389 ms 35.256 ms 26.182 ms
6 * *
7 142.258.210.142 (142.258.210.142) 23.488 ms
142.258.210.144 (142.258.210.144) 18.611 ms
142.258.210.146 (142.258.210.146) 18.611 ms
8 142.258.210.135 (142.258.210.135) 22.707 ms
142.258.210.137 (142.258.210.137) 24.231 ms
142.258.210.138 (142.258.210.138) 24.231 ms
9 106.252.152.198.net (142.258.78.174) 16.426 ms 28.928 ms 16.357 ms
lordmacheth@Address-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.258.78.174), 64 hops max, 52 byte packets
1 192.168.1.1 (192.168.1.1) 1.887 ms 1.428 ms 1.295 ms
2 10.0.9.0.1 (10.0.9.0.1) 4.258 ms 4.043 ms 4.151 ms
3 106.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186) 4.398 ms 4.517 ms 4.314 ms
4 106.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186) 4.931 ms 4.179 ms 4.648 ms
5 72.14.217.100 (72.14.217.100) 23.158 ms 22.358 ms 27.398 ms
6 * *
7 106.252.152.198.net (142.258.78.174) 28.951 ms
142.258.210.116 (142.258.210.116) 16.431 ms
142.258.210.118 (142.258.210.118) 16.431 ms
142.258.210.120 (142.258.210.120) 16.431 ms
142.258.210.122 (142.258.210.122) 16.431 ms
142.258.210.124 (142.258.210.124) 16.431 ms
142.258.210.126 (142.258.210.126) 16.431 ms
142.258.210.128 (142.258.210.128) 16.431 ms
142.258.210.130 (142.258.210.130) 16.431 ms
142.258.210.132 (142.258.210.132) 16.431 ms
142.258.210.134 (142.258.210.134) 16.431 ms
142.258.210.136 (142.258.210.136) 16.431 ms
142.258.210.138 (142.258.210.138) 16.431 ms
142.258.210.140 (142.258.210.140) 16.431 ms
142.258.210.142 (142.258.210.142) 23.488 ms
142.258.210.144 (142.258.210.144) 18.611 ms
142.258.210.146 (142.258.210.146) 18.611 ms
8 142.258.210.135 (142.258.210.135) 22.707 ms
142.258.210.137 (142.258.210.137) 24.231 ms
142.258.210.138 (142.258.210.138) 24.231 ms
9 106.252.152.198.net (142.258.78.174) 16.426 ms 28.928 ms 16.357 ms
lordmacheth@Address-MacBook-Pro ~ %
```

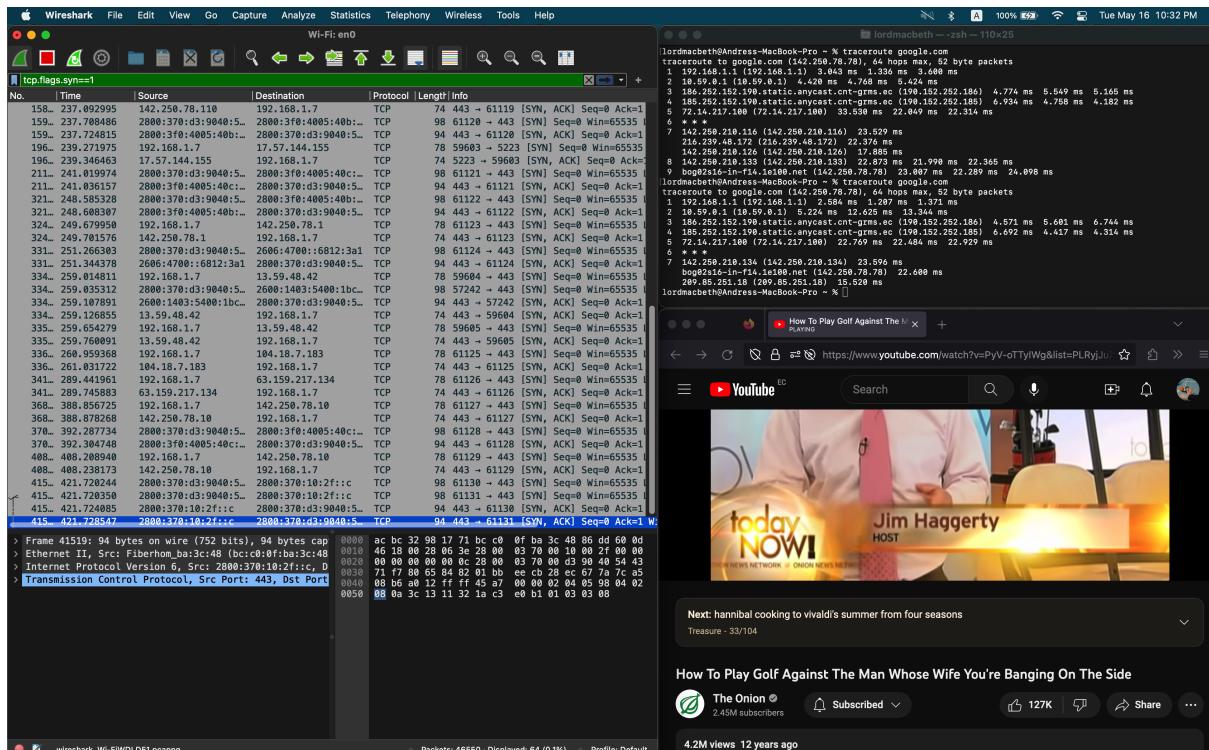
```
Last login: Tue May 14 19:49:59 on ttys000
lordmacheth@Address-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.258.78.174), 64 hops max, 52 byte packets
1 192.168.1.1 (192.168.1.1) 1.887 ms 1.428 ms 1.295 ms
2 10.0.9.0.1 (10.0.9.0.1) 4.258 ms 4.043 ms 4.151 ms
3 106.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186) 4.363 ms 4.258 ms 3.988 ms
4 106.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186) 9.893 ms 4.867 ms 4.229 ms
5 72.14.217.100 (72.14.217.100) 22.389 ms 35.256 ms 26.182 ms
6 * *
7 142.258.210.142 (142.258.210.142) 23.488 ms
142.258.210.144 (142.258.210.144) 18.611 ms
142.258.210.146 (142.258.210.146) 18.611 ms
8 142.258.210.135 (142.258.210.135) 22.707 ms
142.258.210.137 (142.258.210.137) 24.231 ms
142.258.210.138 (142.258.210.138) 24.231 ms
9 106.252.152.198.net (142.258.78.174) 16.426 ms 28.928 ms 16.357 ms
lordmacheth@Address-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.258.78.174), 64 hops max, 52 byte packets
1 192.168.1.1 (192.168.1.1) 1.887 ms 1.428 ms 1.295 ms
2 10.0.9.0.1 (10.0.9.0.1) 4.258 ms 4.043 ms 4.151 ms
3 106.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186) 4.398 ms 4.517 ms 4.314 ms
4 106.252.152.198.static.ayncast.cnt-grns.ec (190.152.252.186) 4.931 ms 4.179 ms 4.648 ms
5 72.14.217.100 (72.14.217.100) 23.158 ms 22.358 ms 27.398 ms
6 * *
7 106.252.152.198.net (142.258.78.174) 28.951 ms
142.258.210.116 (142.258.210.116) 16.431 ms
142.258.210.118 (142.258.210.118) 16.431 ms
142.258.210.120 (142.258.210.120) 16.431 ms
142.258.210.122 (142.258.210.122) 16.431 ms
142.258.210.124 (142.258.210.124) 16.431 ms
142.258.210.126 (142.258.210.126) 16.431 ms
142.258.210.128 (142.258.210.128) 16.431 ms
142.258.210.130 (142.258.210.130) 16.431 ms
142.258.210.132 (142.258.210.132) 16.431 ms
142.258.210.134 (142.258.210.134) 16.431 ms
142.258.210.136 (142.258.210.136) 16.431 ms
142.258.210.138 (142.258.210.138) 16.431 ms
142.258.210.140 (142.258.210.140) 16.431 ms
142.258.210.142 (142.258.210.142) 23.488 ms
142.258.210.144 (142.258.210.144) 18.611 ms
142.258.210.146 (142.258.210.146) 18.611 ms
8 142.258.210.135 (142.258.210.135) 22.707 ms
142.258.210.137 (142.258.210.137) 24.231 ms
142.258.210.138 (142.258.210.138) 24.231 ms
9 106.252.152.198.net (142.258.78.174) 16.426 ms 28.928 ms 16.357 ms
lordmacheth@Address-MacBook-Pro ~ %
```

```

2 10.69.6.1 4.606 ms 5.833 ms 4.602 ms
3 146.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 4.184 ms 4.148 ms 4.176 ms
4 185.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 5.098 ms 4.197 ms 4.314 ms
5 72.14.217.100 (72.14.217.100) 23.156 ms 22.168 ms 29.398 ms
6 * *
7 bog2z19-in-T14.le108.net (142.258.210.174) 28.708 ms
142.258.210.116 (142.258.210.116) 22.514 ms
142.258.210.116 (142.258.210.116) 22.514 ms
lordmache@Address-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 (192.168.1.1) 1.753 ms 1.176 ms 0.865 ms
 2 192.168.1.1 (192.168.1.1) 2.216 ms 1.888 ms 1.588 ms
 3 146.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 5.499 ms 5.543 ms 4.962 ms
 4 185.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 4.279 ms 4.253 ms 4.682 ms
 5 72.14.217.100 (72.14.217.100) 22.074 ms 22.239 ms 22.092 ms
6 * *
7 299.85.251.38 (209.85.251.38) 27.496 ms 26.814 ms
142.258.210.116 (142.258.210.116) 17.481 ms
8 142.258.210.116 (142.258.210.116) 16.642 ms
bog2z19-in-T14.le108.net (142.258.78.174) 28.473 ms
lordmache@Address-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 (192.168.1.1) 3.748 ms 3.445 ms 1.547 ms
 2 10.69.6.1 (10.69.6.1) 0.238 ms 3.954 ms 4.698 ms
 3 146.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 4.014 ms 4.532 ms 4.378 ms
 4 185.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 4.167 ms 4.331 ms 4.196 ms
 5 72.14.217.100 (72.14.217.100) 22.074 ms 22.092 ms 22.092 ms
6 * *
7 142.258.210.136 (142.258.210.136) 17.687 ms
142.258.210.136 (142.258.210.136) 22.793 ms
209.85.251.38 (209.85.251.38) 24.913 ms
142.258.210.133 (142.258.210.133) 22.099 ms 24.558 ms
142.258.210.133 (142.258.210.133) 22.099 ms
9 bog2z19-in-T14.le108.net (142.258.78.174) 22.853 ms 24.887 ms 24.458 ms
lordmache@Address-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 (192.168.1.1) 3.484 ms 3.473 ms 4.895 ms
 2 10.69.6.1 (10.69.6.1) 0.214 ms 3.868 ms 3.837 ms
 3 146.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 4.282 ms 4.645 ms 4.419 ms
 4 185.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 4.554 ms 4.418 ms 4.485 ms
 5 72.14.217.100 (72.14.217.100) 33.538 ms 22.849 ms 22.314 ms
6 * *
7 142.258.210.136 (142.258.210.136) 23.529 ms
236.239.48.172 (236.239.48.172) 22.376 ms
142.258.210.126 (142.258.210.126) 17.888 ms
8 142.258.210.126 (142.258.210.126) 21.990 ms 22.365 ms
9 bog2z19-in-T14.le108.net (142.258.78.174) 23.007 ms 22.289 ms 24.998 ms
lordmache@Address-MacBook-Pro ~ % traceroute google.com
traceroute to google.com (142.258.78.174), 64 hops max, 52 byte packets
 1 192.168.1.1 (192.168.1.1) 3.843 ms 1.336 ms 3.680 ms
 2 10.69.6.1 (10.69.6.1) 0.420 ms 4.768 ms 5.424 ms
 3 146.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 4.774 ms 5.549 ms 5.165 ms
 4 185.252.152.198.static.unicast.cnt-grms.ec (190.152.252.186) 6.934 ms 4.758 ms 4.182 ms
 5 72.14.217.100 (72.14.217.100) 22.723 ms 22.314 ms
6 * *
7 142.258.210.136 (142.258.210.136) 23.529 ms
236.239.48.172 (236.239.48.172) 22.376 ms
142.258.210.126 (142.258.210.126) 17.888 ms
8 142.258.210.126 (142.258.210.126) 21.990 ms 22.365 ms
9 bog2z19-in-T14.le108.net (142.258.78.174) 23.007 ms 22.289 ms 24.998 ms
209.85.251.18 (209.85.251.18) 15.528 ms
lordmache@Address-MacBook-Pro ~ %

```

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

Round	A	B	C	D	E
1	0, -	$\infty, -$	$\infty, -$	$\infty, -$	$\infty, -$
2		2, A	$\infty, -$	2, A	$\infty, -$
3			6, B	2, A	4, B
4			6, B		4, B
5			5, E		

Round	A	B	C	D	E
1	$\infty, -$	0, -	$\infty, -$	$\infty, -$	$\infty, -$
2	2, B		4, B	2, B	2, B
3			4, B	2, B	2, B
4			4, B		2, B
5			3, E		

Round	A	B	C	D	E
1	$\infty, -$	$\infty, -$	$\infty, -$	$\infty, -$	0, -
2	$\infty, -$	2, E	1, E	5, E	
3	$\infty, -$	2, E		5, E	
4	4, B			4, B	
5				4, B	

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.

Medir la confiabilidad de un enlace enviando paquetes y midiendo el porcentaje que se recibe puede ser complicado en una conexión TCP ya que garantiza la entrega confiable de paquetes mediante la retransmisión de paquetes perdidos, la verificación de errores y la secuenciación de paquetes. Estos mecanismos, aunque útiles para la confiabilidad, dificultan la medición de la pérdida de paquetes. Por ejemplo, la retransmisión automática de paquetes perdidos puede ocultar la cantidad real de pérdida de paquetes. Además, el control de flujo y el control de congestión de TCP pueden ajustar la tasa de transmisión de datos en función de las condiciones de la red, lo que puede afectar la tasa de pérdida de paquetes y, por lo tanto, la percepción de la confiabilidad del enlace.

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

when you say a detailed sketch i suppose you mean pseudo code

```
# Funcion para manejar los acks
def handle_ack():
    global winSize, alpha
    winSize += alpha

# Funcion en caso de que hay packet loss
def handle_loss():
    global winSize, ssth, beta
    ssth = max(winSize/2, 1)
    winSize *= beta

# Main loop
while True:
    send_packets(winSize)
    if received_ack():
        handle_ack()
    elif detected_loss():
        handle_loss()
```

En este ejemplo winSize es el tamaño de la ventana de congestión, ssth es el threshold antes de pasar de incremento lineal a multiplicativo, alpha el factor aditivo lineal, beta el factor aditivo multiplicativo.

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

```
def handle_ack():
    global cwnd, alpha
    cwnd += alpha

def handle_loss():
    global cwnd, beta
    cwnd *= beta
```

```
while True:  
    send_packets(cwnd)  
    ack = wait_for_ack()  
    if ack:  
        handle_ack()  
    else:  
        handle_loss()
```