20140040 Keonil Kim

[Problem 1.]

a. 5/2.5 = 2 (users)

b. two or fewer users transmit at the same time, each user requires 2.5Mbps. Total 5Mbps is available through shared link, there will be no queueing delay. However, if three users transmit at the same time, it require 7.5Mbps bandwidth, which is not available through 5Mbps link, thus, queueing delay occurs.

c. Probability would be 0.15^3 = 0.003375. The queue will grow when all three users transmit at the same time, the fraction of time will be 0.003375.

[Problem 2.]

a. d_{prop} = m/s

b. d_{trans} = L/R

c. d_{prop}+ d_{trans} = m/s + L/R

d. Just being transmitted from A

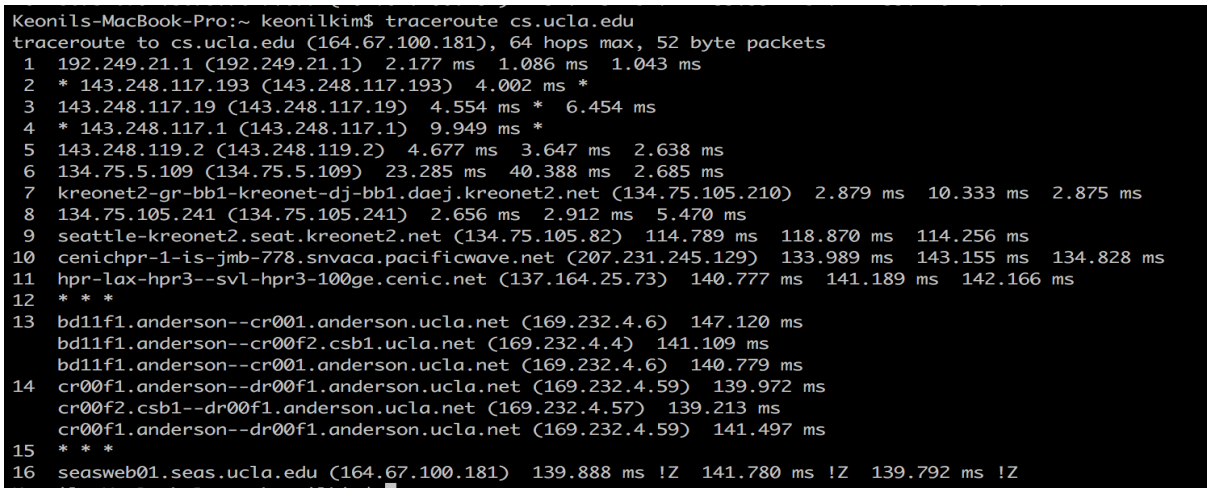
e. Still in the link

f. Already arrived at Host B

g. m = s*L/R = 2.5*10^8 * 120/56 * 10^3 = 5.36*10^5(meter)

[Problem 3.]

a. Average delay is 140, 141, 144 for each trial



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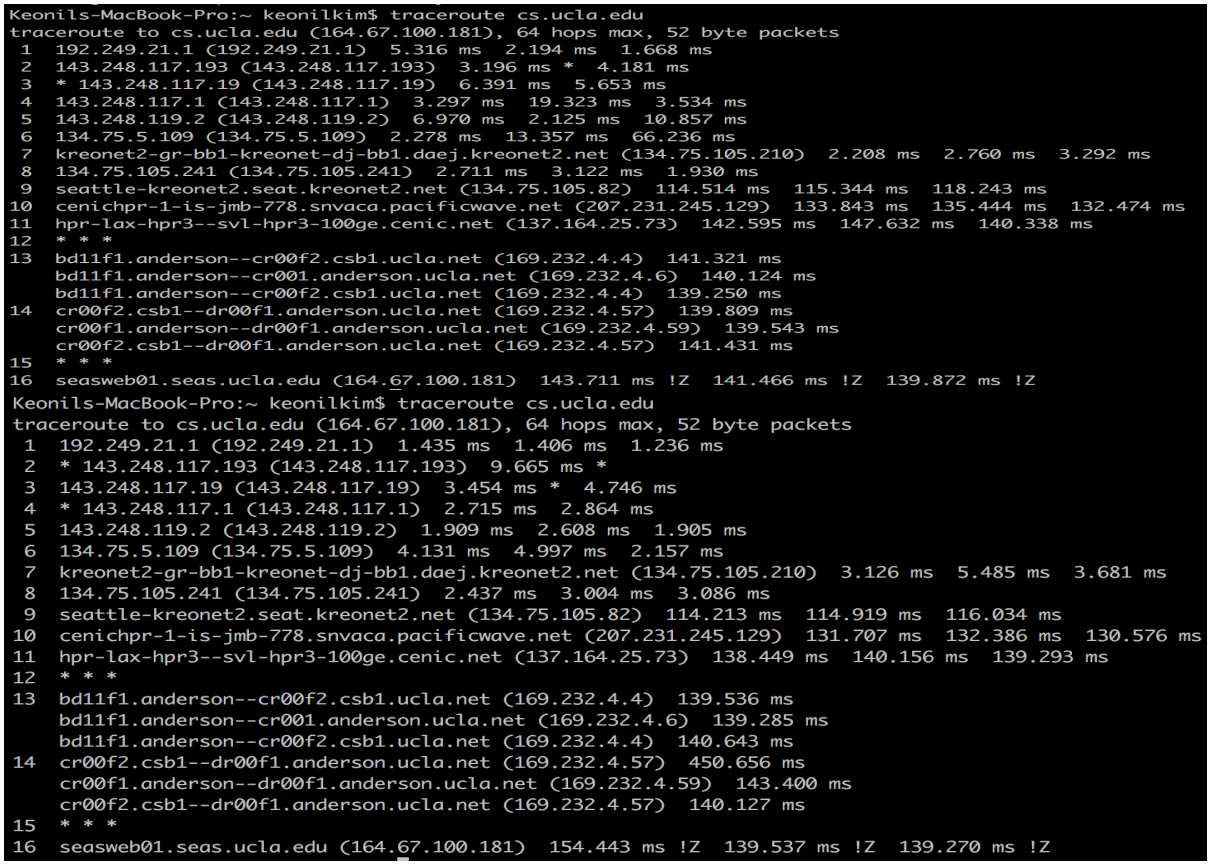
Keonils-MacBook-Pro:~ keonilkim$ traceroute cs.ucla.edu
traceroute to cs.ucla.edu (164.67.100.181), 64 hops max, 52 byte packets
 1  192.249.21.1 (192.249.21.1)  2.177 ms  1.086 ms  1.043 ms
 2  * 143.248.117.193 (143.248.117.193)  4.002 ms *
 3  143.248.117.19 (143.248.117.19)  4.554 ms *  6.454 ms
 4  * 143.248.117.1 (143.248.117.1)  9.949 ms *
 5  143.248.119.2 (143.248.119.2)  4.677 ms  3.647 ms  2.638 ms
 6  134.75.5.109 (134.75.5.109)  23.285 ms  40.388 ms  2.685 ms
 7  kreonet2-gr-bb1-kreonet-dj-bb1.daej.kreonet2.net (134.75.105.210)  2.879 ms  10.333 ms  2.875 ms
 8  134.75.105.241 (134.75.105.241)  2.656 ms  2.912 ms  5.470 ms
 9  seattle-kreonet2.seat.kreonet2.net (134.75.105.82)  114.789 ms  118.870 ms  114.256 ms
10  cenichpr-1-is-jmb-778.snvaca.pacificwave.net (207.231.245.129)  133.989 ms  143.155 ms  134.828 ms
11  hpr-lax-hpr3--svl-hpr3-100ge.cenic.net (137.164.25.73)  140.777 ms  141.189 ms  142.166 ms
12  * * *
13  bd11f1.anderson--cr001.anderson.ucla.net (169.232.4.6)  147.120 ms
    bd11f1.anderson--cr00f2.csb1.ucla.net (169.232.4.4)  141.109 ms
    bd11f1.anderson--cr001.anderson.ucla.net (169.232.4.6)  140.779 ms
14  cr00f1.anderson--dr00f1.anderson.ucla.net (169.232.4.59)  139.972 ms
    cr00f2.csb1--dr00f1.anderson.ucla.net (169.232.4.57)  139.213 ms
    cr00f1.anderson--dr00f1.anderson.ucla.net (169.232.4.59)  141.497 ms
15  * * *
16  seasweb01.seas.ucla.edu (164.67.100.181)  139.888 ms !Z  141.780 ms !Z  139.792 ms !Z
```



```
Keonils-MacBook-Pro:~ keonilkim$ traceroute cs.ucla.edu
traceroute to cs.ucla.edu (164.67.100.181), 64 hops max, 52 byte packets
 1  192.249.21.1 (192.249.21.1)  5.316 ms  2.194 ms  1.668 ms
 2  143.248.117.193 (143.248.117.193)  3.196 ms *  4.181 ms
 3  * 143.248.117.19 (143.248.117.19)  6.391 ms  5.653 ms
 4  143.248.117.1 (143.248.117.1)  3.297 ms  19.323 ms  3.534 ms
 5  143.248.119.2 (143.248.119.2)  6.970 ms  2.125 ms  10.857 ms
 6  134.75.5.109 (134.75.5.109)  2.278 ms  13.357 ms  66.236 ms
 7  kreonet2-gr-bb1-kreonet-dj-bb1.daej.kreonet2.net (134.75.105.210)  2.208 ms  2.760 ms  3.292 ms
 8  134.75.105.241 (134.75.105.241)  2.711 ms  3.122 ms  1.930 ms
 9  seattle-kreonet2.seat.kreonet2.net (134.75.105.82)  114.514 ms  115.344 ms  118.243 ms
10  cenichpr-1-is-jmb-778.snvaca.pacificwave.net (207.231.245.129)  133.843 ms  135.444 ms  132.474 ms
11  hpr-lax-hpr3--svl-hpr3-100ge.cenic.net (137.164.25.73)  142.595 ms  147.632 ms  140.338 ms
12  * * *
13  bd11f1.anderson--cr00f2.csb1.ucla.net (169.232.4.4)  141.321 ms
    bd11f1.anderson--cr001.anderson.ucla.net (169.232.4.6)  140.124 ms
    bd11f1.anderson--cr00f2.csb1.ucla.net (169.232.4.4)  139.250 ms
14  cr00f2.csb1--dr00f1.anderson.ucla.net (169.232.4.57)  139.809 ms
    cr00f1.anderson--dr00f1.anderson.ucla.net (169.232.4.59)  139.543 ms
    cr00f2.csb1--dr00f1.anderson.ucla.net (169.232.4.57)  141.431 ms
15  * * *
16  seasweb01.seas.ucla.edu (164.67.100.181)  143.711 ms !Z  141.466 ms !Z  139.872 ms !Z
Keonils-MacBook-Pro:~ keonilkim$ traceroute cs.ucla.edu
traceroute to cs.ucla.edu (164.67.100.181), 64 hops max, 52 byte packets
 1  192.249.21.1 (192.249.21.1)  1.435 ms  1.406 ms  1.236 ms
 2  * 143.248.117.193 (143.248.117.193)  9.665 ms *
 3  143.248.117.19 (143.248.117.19)  3.454 ms *  4.746 ms
 4  * 143.248.117.1 (143.248.117.1)  2.715 ms  2.864 ms
 5  143.248.119.2 (143.248.119.2)  1.909 ms  2.608 ms  1.905 ms
 6  134.75.5.109 (134.75.5.109)  4.131 ms  4.997 ms  2.157 ms
 7  kreonet2-gr-bb1-kreonet-dj-bb1.daej.kreonet2.net (134.75.105.210)  3.126 ms  5.485 ms  3.681 ms
 8  134.75.105.241 (134.75.105.241)  2.437 ms  3.004 ms  3.086 ms
 9  seattle-kreonet2.seat.kreonet2.net (134.75.105.82)  114.213 ms  114.919 ms  116.034 ms
10  cenichpr-1-is-jmb-778.snvaca.pacificwave.net (207.231.245.129)  131.707 ms  132.386 ms  130.576 ms
11  hpr-lax-hpr3--svl-hpr3-100ge.cenic.net (137.164.25.73)  138.449 ms  140.156 ms  139.293 ms
12  * * *
13  bd11f1.anderson--cr00f2.csb1.ucla.net (169.232.4.4)  139.536 ms
    bd11f1.anderson--cr001.anderson.ucla.net (169.232.4.6)  139.285 ms
    bd11f1.anderson--cr00f2.csb1.ucla.net (169.232.4.4)  140.643 ms
14  cr00f2.csb1--dr00f1.anderson.ucla.net (169.232.4.57)  450.656 ms
    cr00f1.anderson--dr00f1.anderson.ucla.net (169.232.4.59)  143.400 ms
    cr00f2.csb1--dr00f1.anderson.ucla.net (169.232.4.57)  140.127 ms
15  * * *
16  seasweb01.seas.ucla.edu (164.67.100.181)  154.443 ms !Z  139.537 ms !Z  139.270 ms !Z
```

b. All three trial results in 15 routers in the path without change.

c. It looks like 9, 10, 11 routers are ISPs.

[Problem 4.]

a. 8*10^6bits = 8*10^3Kb = 8Mb, since link is 2Mbps, it takes 8/2=4 seconds from the source to the first packet switch. Totally, it takes 4*3 = 12 seconds from the source to the destination.

b. 10Kb/2Mbps = 5ms, second packet will be fully received at the first switch at 2*5=10ms

c. It takes 15ms + 799*5ms = 4010ms = 4.01 seconds. It is much faster to use segmentation , comparing to the answer in part (a).

[Problem 5.]

a. http://gaia.cs.umass.edu/cs341/index.html (Host is the server name, /cs341/index.html is the file name)

b. 1.1 (HTTP/1.1)

c. Persistent (Connection:keep-alive)

d. Can't be found in the message

e. Mozilla/5.0 (User-Agent:Mozilla/5.0) For Server to deal with different types of browsers with sending the object with different versions.

[Problem 6.]

a. Δ = average time required to send an object over the access link = average object size / transmission rate = 850000b/15Mbps = 0.85Mb/15Mbps = 0.056 seconds

β = the arrival rate of objects to the access link = the average request rate = 16/sec

b. When cache hit, response time could be considered as 0. Also β =16*0.4 = 6.4since cache hits doesn't require to servers. The total average response time = 3 + 0.056/(1-0.056*6.4) = 3 + 0.09 seconds = 3.09 seconds, when cahche missed. Therefore, the total average response time will be 0.4*3.09 = 1.24 seconds.

[Problem 7.] My favorite human protocol is to decide the lunch menu. Suppose there are two people. First one of them suggests his/her choice. If the other satisfies with that or feels so-so while nothing really coming to mind, he/she accepts it and the protocol is done. If not, the other suggests a new menu and the same process is going. The point of this process is that it is sometimes really difficult to start at first if no one gives any suggestion.

[Problem 8.]

FingerIO uses SONAR, SkinTrack uses electric pulse. SkinTrack needs an ring emitting the electric pulses. Personally FingerIO is better owing to the requirement of an additional ring of SkinTrack. Even though FingerIO has comparatively lower accuracy issue, it is definitely handy to implement same function without additional gadgets or subsystem.

[Essay]

1. Hire lecturer: At least for CS major, most important courses are offered very rarely(such as Automata class) and honestly, some classes are really unhelpful, disorganized and some professors are not motivated at all to improve it. If hiring lecturer is not feasible, I still believe it is necessary to provide the core courses once a year.
2. Stop forcing English lecture: Of course it is important to study and debate in English. However, at least some basic courses and concepts is better to be delivered with Korean, which is easier for student, and more importantly, for professors. Honestly, quite many professors are not fluent with English. It results in inefficient lecture even if professors' knowledge and teaching skill is good enough. I saw many professors who gave great explanation only in Korean. English lecture should be provided and I agree that we all should be familiar with English when we graduate. However, just forcing English lecture is definitely the worst policy for both students and professors.
3. More meeting with advisors: The regular meeting with advisors should be encouraged more, since many students and professors only have meeting for paperwork or getting signatures of advisors. Although some professors make a lot of efforts to be friendly with students, most professors, and of course students do not even try to meet each other, other than official st uffs. Some forced meeting should be organized for them to at least know each other.