

Computer Network HW4

1.

Finish time:

$$A: 0 + 8 = 8$$

$$B: 5 + 3 = 8$$

$$C: 5 + 10 = 15$$

$$D: 8 + 9/2 = 12.5$$

$$E: 15 + 8 = 23$$

$$F: 10 + 6 = 16$$

$$G: 23 + 10 = 33$$

$$H: 20 + 4 = 24$$

A->B->D->C->F->E->H->G

2.

$$T = \frac{1}{\mu} * \frac{1}{1 - \frac{\lambda}{\mu}}$$

$$\lambda = 1.5, \mu = 2$$

$$T = 10 * \frac{1}{2} * \frac{1}{1 - \frac{1.5}{2}} = 20\mu sec$$

3.

a. Interface 1

b. Interface 0

c. Router 2

d. Router 1

e. Router 2

4.

將ipv6封包作為ipv4的text，在外面包一層ipv4在傳出去

5.

$$37.60.64.0/18 = 00100101.00111100.01\ 000000.00000000$$

$$37.60.96.0/19 = 00100101.00111100.011\ 00000.00000000$$

$$37.60.128.0/17 = 00100101.00111100.1\ 0000000.00000000$$

Ans: 37.60.0.0/16

6.

192.168.0.1(DHCP Server IP)

7.

a. Ethernet, Brand: Intel(Search by Mac Address)

```
Frame 64: 54 bytes on wire (432 bits), 54 bytes captured (432 bits) on interface wlan0s20f3, id 0
Ethernet II, Src: 2c:db:07:07:3f:c8 (2c:db:07:07:3f:c8), Dst: 08:55:31:6e:18:ff (08:55:31:6e:18:ff)
  Destination: 08:55:31:6e:18:ff (08:55:31:6e:18:ff)
  Source: 2c:db:07:07:3f:c8 (2c:db:07:07:3f:c8)
  Type: IPv4 (0x0800)
Internet Protocol Version 4, Src: 192.168.88.194, Dst: 162.159.133.234
  0100 .... = Version: 4
  .... 0101 = Header Length: 20 bytes (5)
  Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
  Total Length: 40
  Identification: 0x847d (33917)
  Flags: 0x4000, Don't fragment
  Fragment offset: 0
  Time to live: 64
  Protocol: TCP (6)
  Header checksum: 0x745e [validation disabled]
  [Header checksum status: Unverified]
  Source: 192.168.88.194
  Destination: 162.159.133.234
Transmission Control Protocol, Src Port: 34038, Dst Port: 443, Seq: 1, Ack: 226, Len: 0
```

8.

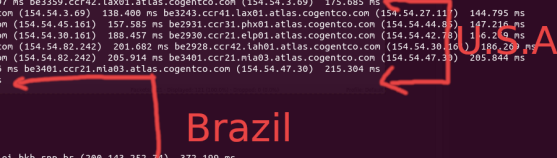
```
blast@blast-Ubuntu:~$ traceroute www.csie.ncku.edu.tw
traceroute to www.csie.ncku.edu.tw (140.116.246.4), 30 hops max, 60 byte packets
 1  router.lan (192.168.88.1)  5.477 ms  5.353 ms  5.311 ms
 2  192.168.1.99 (192.168.1.99)  6.601 ms  6.565 ms  6.529 ms
 3  * * *
 4  218-35-171-254.cm.dynamic.apol.com.tw (218.35.171.254)  8.536 ms  8.504 ms  8.471 ms
 5  10.254.0.97 (10.254.0.97)  9.915 ms  9.883 ms  10.002 ms
 6  10.254.0.213 (10.254.0.213)  9.818 ms  4.232 ms  4.296 ms
 7  10.254.0.61 (10.254.0.61)  13.063 ms  25.830 ms  26.031 ms
 8  10.254.0.229 (10.254.0.229)  6.677 ms  7.134 ms  7.099 ms
 9  202-178-245-195.cm.static.apol.com.tw (202.178.245.195)  7.065 ms  7.033 ms  6.999 ms
10  203-79-250-210.static.apol.com.tw (203.79.250.210)  6.961 ms  203-79-250-202.static.apol.com.tw (203.79.250.202)  7.240 ms  6.842 ms
11  211.76.96.77 (211.76.96.77)  7.338 ms  18.356 ms  18.242 ms
12  il203-79-251-73.static.apol.com.tw (203.79.251.73)  17.886 ms  il203-79-251-65.static.apol.com.tw (203.79.251.65)  17.802 ms  17.762 ms
13  192.192.61.33 (192.192.61.33)  17.806 ms  192.192.61.145 (192.192.61.145)  26.031 ms  192.192.61.37 (192.192.61.37)  25.611 ms
14  192.192.61.145 (192.192.61.145)  28.266 ms  140.116.243.178 (140.116.243.178)  120.990 ms  192.192.61.25 (192.192.61.25)  28.584 ms
15  140.116.243.178 (140.116.243.178)  103.158 ms  103.029 ms  140.116.243.90 (140.116.243.90)  19.360 ms
16  140.116.243.90 (140.116.243.90)  19.619 ms  * 140.116.243.178 (140.116.243.178)  102.806 ms
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```
blast@blast-Ubuntu:~$ traceroute www.stanford.edu
traceroute to www.stanford.edu (151.101.194.133), 30 hops max, 60 byte packets
 1  router.lan (192.168.88.1)  1.381 ms  1.975 ms  1.935 ms
 2  192.168.1.99 (192.168.1.99)  3.169 ms  3.131 ms  3.097 ms
 3  * * *
 4  218-35-171-254.cm.dynamic.apol.com.tw (218.35.171.254)  8.810 ms  8.776 ms  8.994 ms
 5  10.254.0.158 (10.254.0.158)  10.608 ms  10.555 ms  10.517 ms
 6  10.254.0.41 (10.254.0.41)  10.489 ms  7.867 ms  7.690 ms
 7  10.254.0.5 (10.254.0.5)  7.627 ms  21.973 ms  22.100 ms
 8  10.254.0.249 (10.254.0.249)  6.320 ms  6.167 ms  6.127 ms
 9  202-178-245-195.cm.static.apol.com.tw (202.178.245.195)  6.088 ms  6.056 ms  6.474 ms
10  203-79-250-202.static.apol.com.tw (203.79.250.202)  5.049 ms  203-79-250-201.static.apol.com.tw (203.79.250.201)  6.359 ms  203-79-250-210.static.apol.com.tw (203.79.250.210)  6.328 ms
11  211.76.96.91 (211.76.96.91)  6.332 ms  211.76.96.191 (211.76.96.191)  6.713 ms  211.76.96.91 (211.76.96.91)  5.626 ms
12  unknown.telstraglobal.net (210.176.44.13)  6.040 ms  5.999 ms  6.462 ms
13  l-92.tpel-core01.telstraglobal.net (202.84.137.249)  6.222 ms  10.049 ms  7.098 ms
14  * * *
15  202.84.153.177 (202.84.153.177)  21.166 ms  20.119 ms  l-15652.hkck-core01.telstraglobal.net (202.84.141.89)  25.029 ms
16  l-97.hkqg01.telstraglobal.net (202.84.156.54)  24.364 ms  202.84.157.225 (202.84.157.225)  24.713 ms  l-97.hkqg01.telstraglobal.net (202.84.156.54)  24.097 ms
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```
blast@blast-Ubuntu: ~$ traceroute www.uffrj.br
Command 'traceroute' not found, did you mean:
  command 'traceroute' from deb inetutils-traceroute (2:1.9.4-1ubuntu0.1)
  command 'traceroute' from deb traceroute (1:1.2.10-2)
Try: sudo apt install <deb name>

blast@blast-Ubuntu: ~$ traceroute www.uffrj.br
traceroute to www.uffrj.br (146.164.84.216), 30 hops max, 60 byte packets
 1 router.lan (192.168.88.1)  0.970 ms  1.915 ms  1.871 ms
 2 192.168.1.99 (192.168.1.99)  3.257 ms  3.214 ms  3.175 ms
 3 * * *
 4 218-35-171-254.cn.dynamic.apol.com.tw (218.35.171.254)  5.638 ms  5.601 ms  5.617 ms
 5 10.254.0.141 (10.254.0.141)  5.266 ms  6.284 ms  6.242 ms
 6 10.254.0.29 (10.254.0.29)  6.528 ms  4.305 ms  7.758 ms
 7 10.254.0.253 (10.254.0.253)  7.653 ms  7.607 ms  7.567 ms
 8 202-178-245-195.cn.static.apol.com.tw (202.178.245.195)  7.522 ms  7.484 ms  7.332 ms
 9 203-79-250-218.static.apol.com.tw (203.79.250.218)  7.291 ms  203-79-250-209.static.apol.com.tw (203.79.250.209)  7.253 ms  203-79-250-201.static.apol.com.tw (203.79.250.201)  7.325 ms
10 203-78-187-77.twgate-lp.twgate.net (203.78.187.77)  7.287 ms  211.76.96.67 (211.76.96.67)  7.144 ms  211.76.96.167 (211.76.96.167)  7.289 ms
11 203-78-187-77.twgate-lp.twgate.net (203.78.187.77)  6.068 ms  6.018 ms  203-78-181-133.twgate-lp.twgate.net (203.78.181.133)  6.323 ms
12 203-78-181-202.twgate-lp.twgate.net (203.78.181.202)  142.003 ms  142.989 ms  203-78-181-140.twgate-lp.twgate.net (203.78.181.140)  134.475 ms
13 203-78-181-202.twgate-lp.twgate.net (203.78.181.202)  140.502 ms  38.19.141.25 (38.19.141.25)  140.268 ms  203-78-181-206.twgate-lp.twgate.net (203.78.181.206)  148.802 ms
14 38.19.141.25 (38.19.141.25)  150.771 ms  be3243.ccr41.lax01.atlas.cogentco.com (154.54.27.117)  141.697 ms  be3359.ccr42.lax01.atlas.cogentco.com (154.54.3.69)  175.685 ms
15 be3243.ccr41.lax01.atlas.cogentco.com (154.54.27.117)  142.132 ms  be3359.ccr42.lax01.atlas.cogentco.com (154.54.3.69)  138.488 ms  be3343.ccr41.lax01.atlas.cogentco.com (154.54.27.11)  144.795 ms
16 be2929.ccr21.elp01.atlas.cogentco.com (154.54.42.66)  154.640 ms  be2932.ccr32.phx01.atlas.cogentco.com (154.54.45.161)  157.585 ms  be2931.ccr31.phx01.atlas.cogentco.com (154.54.44.61)  147.216 ms
17 be2930.ccr21.elp01.atlas.cogentco.com (154.54.42.78)  161.201 ms  be2928.ccr42.lah01.atlas.cogentco.com (154.54.30.161)  188.457 ms  be2930.ccr21.elp01.atlas.cogentco.com (154.54.42.78)  162.206 ms
18 be2927.ccr41.lah01.atlas.cogentco.com (154.54.29.221)  183.569 ms  be3669.ccr21.mla01.atlas.cogentco.com (154.54.82.242)  201.682 ms  be2928.ccr42.lah01.atlas.cogentco.com (154.54.30.161)  186.267 ms
19 be3400.ccr21.mla03.atlas.cogentco.com (154.54.47.18)  199.249 ms  be3669.ccr21.mla01.atlas.cogentco.com (154.54.82.242)  205.914 ms  be3401.ccr21.mla03.atlas.cogentco.com (154.54.47.30)  205.844 ms
20 be3401.ccr21.mla03.atlas.cogentco.com (154.54.47.30)  210.286 ms  38.88.165.74 (38.88.165.74)  218.106 ms  be3401.ccr21.mla03.atlas.cogentco.com (154.54.47.30)  215.304 ms
21 mla2-mia1.bkb.rnp.br (200.143.252.26)  214.482 ms  38.88.165.74 (38.88.165.74)  208.772 ms  216.830 ms
22 170.79.213.46 (170.79.213.46)  266.896 ms  266.852 ms  275.774 ms
23 170.79.213.64 (170.79.213.64)  269.256 ms  266.744 ms  170.79.213.46 (170.79.213.46)  267.985 ms
24 170.79.213.64 (170.79.213.64)  305.002 ms  304.884 ms  304.834 ms
25 dfz-df-bkb.rnp.br (200.143.253.30)  304.780 ms  304.743 ms *
26 * * *
27 170.79.213.95 (170.79.213.95)  372.334 ms  372.305 ms  170.79.213.100 (170.79.213.100)  372.275 ms
28 mg-sp2-ol.bkb.rnp.br (200.143.252.74)  372.259 ms  170.79.213.100 (170.79.213.100)  372.215 ms  mg-sp2-ol.bkb.rnp.br (200.143.252.74)  372.199 ms
29 mg-sp2-ol.bkb.rnp.br (200.143.252.74)  372.170 ms  358.117 ms  357.593 ms
30 mg2-mg.bkb.rnp.br (200.143.253.226)  359.229 ms  170.79.213.80 (170.79.213.80)  357.890 ms  mg-sp2-ol.bkb.rnp.br (200.143.252.74)  357.869 ms

blast@blast-Ubuntu: ~$
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```
blast@blast-Ubuntu: ~$ traceroute www.vu.nl
traceroute to www.vu.nl (52.232.69.102), 30 hops max, 60 byte packets
 1 router.lan (192.168.88.1)  1.285 ms  2.205 ms  2.169 ms
 2 192.168.1.99 (192.168.1.99)  3.583 ms  3.543 ms  3.504 ms
 3 * * *
 4 218-35-171-254.cn.dynamic.apol.com.tw (218.35.171.254)  5.873 ms  5.835 ms  10.132 ms
 5 10.254.0.37 (10.254.0.37)  6.163 ms  6.721 ms  6.683 ms
 6 10.254.0.41 (10.254.0.41)  28.403 ms  23.805 ms  16.245 ms
 7 10.254.0.61 (10.254.0.61)  6.525 ms  6.507 ms  6.688 ms
 8 10.254.0.253 (10.254.0.253)  5.464 ms  5.299 ms  5.395 ms
 9 202-178-245-195.cn.static.apol.com.tw (202.178.245.195)  5.659 ms  5.833 ms  5.948 ms
10 203-79-250-218.static.apol.com.tw (203.79.250.218)  6.184 ms  203-79-250-201.static.apol.com.tw (203.79.250.201)  6.508 ms  203-79-250-202.static.apol.com.tw (203.79.250.202)  6.808 ms
11 211.76.96.191 (211.76.96.191)  6.723 ms  211.76.96.91 (211.76.96.91)  6.540 ms  6.732 ms
12 ae01-0.tpe31-96cbe-1b.ntwk.msn.net (104.44.12.82)  11.285 ms  11.228 ms  12.725 ms
13 ae32-0.lcr02.hkg20.ntwk.msn.net (104.44.41.219)  21.063 ms  21.024 ms  17.717 ms
14 be-102-0.lbr01.hkg20.ntwk.msn.net (104.44.11.131)  204.785 ms  204.611 ms  210.351 ms
15 be-1-0.lbr01.hkg21.ntwk.msn.net (104.44.7.253)  210.034 ms  212.606 ms  be-10-0.lbr01.sq3.ntwk.msn.net (104.44.18.234)  211.766 ms
16 be-3-0.lbr01.sq2.ntwk.msn.net (104.44.29.0)  213.226 ms  be-17-0.lbr01.sln30.ntwk.msn.net (104.44.28.37)  211.595 ms  be-1-0.lbr01.sq2.ntwk.msn.net (104.44.7.13)  213.121 ms
17 be-14-0.lbr01.mrs20.ntwk.msn.net (104.44.17.67)  210.377 ms  206.244 ms  208.148 ms
18 be-19-0.lbr01.mrs20.ntwk.msn.net (104.44.28.185)  205.072 ms  208.828 ms  be-21-0.lbr01.mrs21.ntwk.msn.net (104.44.28.162)  207.129 ms
19 be-7-0.lbr01.gva20.ntwk.msn.net (104.44.29.69)  207.717 ms * *
20 be-3-0.lbr01.zrh20.ntwk.msn.net (104.44.18.40)  208.851 ms  be-7-0.lbr01.gva20.ntwk.msn.net (104.44.29.69)  208.374 ms  be-4-0.lbr01.zrh20.ntwk.msn.net (104.44.18.50)  209.758 ms
21 be-6-0.lbr01.fra21.ntwk.msn.net (104.44.18.79)  208.327 ms * *
22 * * be-6-0.lbr01.fra21.ntwk.msn.net (104.44.18.79)  211.960 ms
23 ae106-0.lcr04.ams30.ntwk.msn.net (104.44.23.217)  209.709 ms  ae104-0.lcr03.ams30.ntwk.msn.net (104.44.23.197)  209.829 ms *
24 * ae106-0.lcr04.ams21.ntwk.msn.net (104.44.23.245)  220.968 ms *
25 * ae108-0.lcr01.ams21.ntwk.msn.net (104.44.22.234)  206.856 ms
26 * * *
27 * * *
28 * * *
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30 * * *
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blast@blast-Ubuntu: ~$ traceroute www.ltd.ac.in
traceroute to www.ltd.ac.in (103.27.9.24), 30 hops max, 60 byte packets
 1 router.lan (192.168.88.1)  3.544 ms  3.384 ms  3.332 ms
 2 192.168.1.99 (192.168.1.99)  4.582 ms  4.543 ms  4.504 ms
 3 * * *
 4 218-35-171-254.cn.dynamic.apol.com.tw (218.35.171.254)  19.491 ms  19.453 ms  19.419 ms
 5 10.254.0.97 (10.254.0.97)  8.948 ms  8.912 ms  8.874 ms
 6 10.254.0.85 (10.254.0.85)  19.254 ms  13.951 ms  13.842 ms
 7 10.254.0.5 (10.254.0.5)  31.434 ms  24.268 ms  24.150 ms
 8 10.254.0.249 (10.254.0.249)  5.986 ms  5.868 ms  5.817 ms
 9 202-178-245-195.cn.static.apol.com.tw (202.178.245.195)  5.875 ms  5.339 ms  5.245 ms
10 203-79-250-209.static.apol.com.tw (203.79.250.209)  5.204 ms  5.171 ms  203-79-250-202.static.apol.com.tw (203.79.250.202)  5.072 ms
11 103.41.129.145 (103.41.129.145)  59.177 ms  211.76.96.67 (211.76.96.67)  5.408 ms  103.41.129.145 (103.41.129.145)  59.184 ms
12 124.6.32.74 (124.6.32.74)  59.394 ms  60.293 ms  59.189 ms
13 sggs.sgix.sg (103.16.102.30)  95.338 ms  124.6.32.74 (124.6.32.74)  59.138 ms  sggs.sgix.sg (103.16.102.30)  95.627 ms
14 reliance-jto.sgix.sg (103.16.102.95)  60.793 ms  sggs.sgix.sg (103.16.102.30)  94.857 ms  reliance-jto.sgix.sg (103.16.102.95)  61.260 ms
15 reliance-jto.sgix.sg (103.16.102.95)  56.863 ms  103.198.140.88 (103.198.140.88)  89.133 ms  reliance-jto.sgix.sg (103.16.102.95)  57.454 ms
16 103.198.140.14 (103.198.140.14)  90.300 ms  94.179 ms  49.45.4.87 (49.45.4.87)  90.572 ms
17 * 49.44.220.8 (49.44.220.8)  89.067 ms  103.198.140.185 (103.198.140.185)  91.400 ms
18 103.198.140.65 (103.198.140.65)  93.757 ms * *
19 * * *
20 * 136.232.148.254.static.jio.com (136.232.148.254)  129.336 ms *
21 136.232.148.254.static.jio.com (136.232.148.254)  125.340 ms * *
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