E2:

```
z5340468@vx06:~$ ping -4 ec.ho
ping: ec.ho: Name or service not known
z5340468@vx06:~$ ping -4 pin.gs
ping: pin.gs: Name or service not known
z5340468@vx06:~$ ping -4 nasa.gov
PING nasa.gov (52.0.14.116) 56(84) bytes of data.
^C
--- nasa.gov ping statistics ---
9 packets transmitted, 0 received, 100% packet loss, time 8112ms
```

1. For ec.ho, the result for ping is “Name or service not know”. I think it is that this host is not exist as I also cannot open it in browser.
2. For pin.gs, same as ec.ho.
3. For nasa.gov, This is obviously the official NASA website, can be open in browser. But 100% packet loss means there is a communication failure between two communicating devices, my local computer and NASA’s server. One possibility is that NASA's servers do not allow ping access to unknown computers for security reasons and another reason is the packet loss which causes by the queue. When the queue is full, the coming package will loss, but it is basically impossible to lose 59 packages together.

All other hosts are reachable.

E3:

1.

```
z5340468@vx08:~/cs3331/lab1$ traceroute www.tu-berlin.de
traceroute to www.tu-berlin.de (130.149.7.201), 30 hops max, 60 byte packets
 1  cserouter1-server.orchestra.cse.unsw.EDU.AU (129.94.242.251)  0.064 ms  0.052 ms  0.059 ms
 2  129.94.39.17 (129.94.39.17)  0.938 ms  0.944 ms  0.950 ms
 3  * * *
 4  po-3-1902.ombcr1.gw.unsw.edu.au (129.94.24.20)  1.152 ms  1.181 ms  1.261 ms
 5  unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105)  1.235 ms  1.201 ms  1.266 ms
 6  138.44.5.0 (138.44.5.0)  1.425 ms  1.358 ms  1.371 ms
 7  et-2-0-5.bdr1.sing.sin.aarnet.net.au (113.197.15.233)  93.137 ms  92.985 ms  92.880 ms
 8  138.44.226.7 (138.44.226.7)  258.585 ms  258.622 ms  258.587 ms
 9  ae9.mx1.ams.nl.geant.net (62.40.98.128)  263.438 ms  263.408 ms  263.447 ms
10  ae1.mx1.ham.de.geant.net (62.40.98.61)  270.945 ms  270.986 ms  270.952 ms
11  dfn-gw.mx1.ham.de.geant.net (62.40.125.171)  274.775 ms  274.998 ms  275.023 ms
12  kr-tub248.x-win.dfn.de (188.1.235.118)  274.418 ms  274.303 ms  274.355 ms
13  enc-fp.gate.tu-berlin.de (130.149.126.189)  274.698 ms  275.010 ms  275.015 ms
14  e-n-dist2-e-n-c.gate.tu-berlin.de (130.149.126.150)  274.960 ms  274.824 ms  274.828 ms
15  e-ns-e-n.gate.tu-berlin.de (130.149.126.78)  275.090 ms  274.831 ms  275.736 ms
16  tu-berlin.de (130.149.7.201)  274.659 ms  274.705 ms  275.442 ms
```

How many routers are there between your workstation and www.tu-berlin.de ?

A: 15(first one is not my workstation and the last one is www.tu-berlin.de)

How many routers along the path are part of the UNSW network?

A: 5

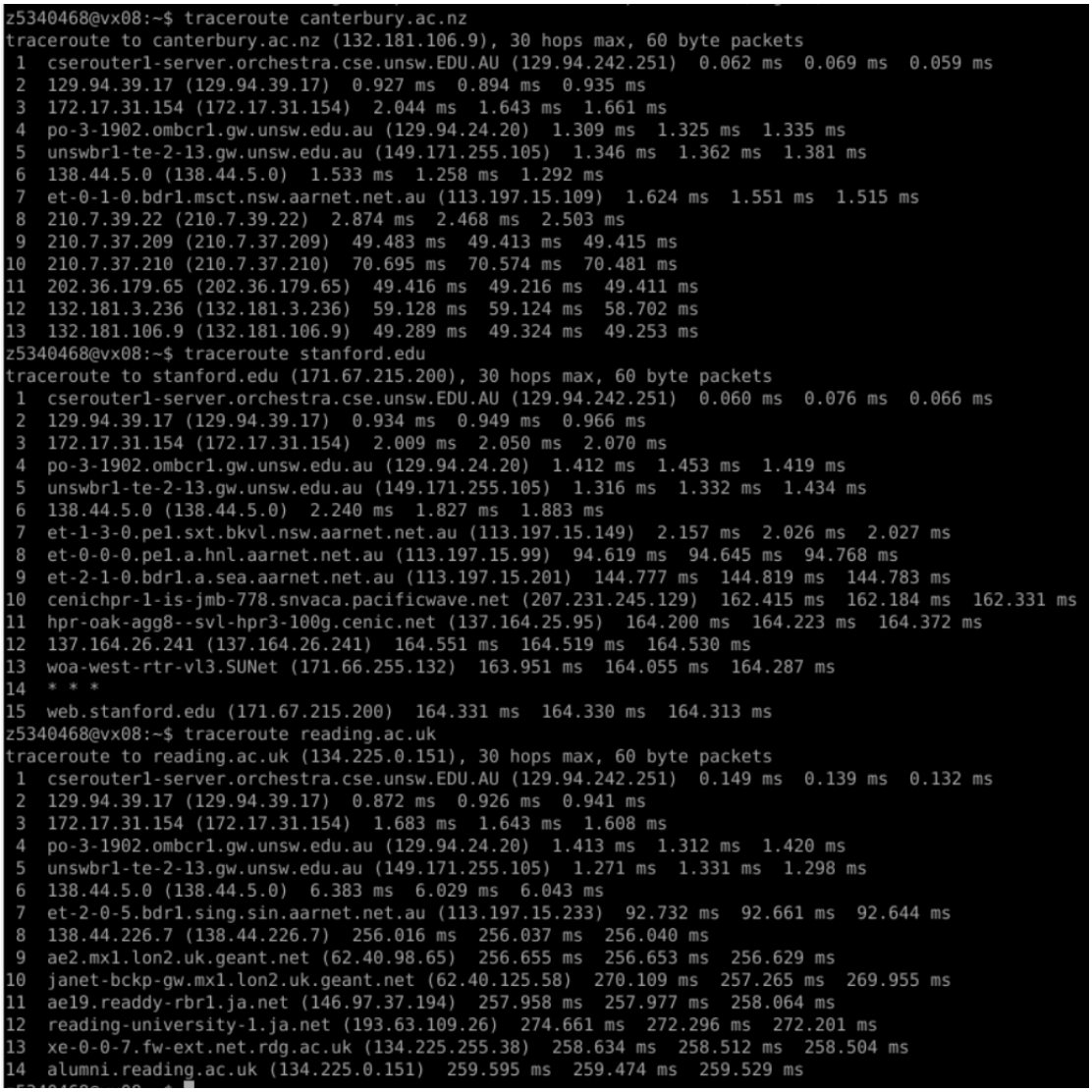
Which router is the first router outside of Australia?

A: router 10

Which router is the first router in Europe?

A: router 7(sing means Singapore)

2.



At which router do the paths from your machine to these three destinations diverge

A: At router 7

Find out further details about this router.

A: Abuse contact for '113.197.15.0 - 113.197.15.255' is 'abuse@aarnet.edu.au', so at route 7, it is in a same server.

Is the number of hops on each path proportional to the physical distance?

A: Not at all, the connection between them is not absolute.

3.

```
z5340468@vx08:~$ traceroute www.speedtest.com.sg
traceroute to www.speedtest.com.sg (202.150.221.170), 30 hops max, 60 byte packets
 1  cserouter1-server.orchestra.cse.unsw.EDU.AU (129.94.242.251)  0.054 ms  0.062 ms  0.053 ms
 2  129.94.39.17 (129.94.39.17)  0.892 ms  0.906 ms  0.922 ms
 3  172.17.31.154 (172.17.31.154)  1.622 ms  2.062 ms  2.079 ms
 4  po-3-1902.ombcr1.gw.unsw.edu.au (129.94.24.20)  1.256 ms  1.306 ms  1.343 ms
 5  unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105)  1.402 ms  1.369 ms  1.411 ms
 6  138.44.5.0 (138.44.5.0)  1.479 ms  1.460 ms  1.229 ms
 7  et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153)  1.710 ms  1.716 ms  1.791 ms
 8  xe-0-2-7.bdr1.a.lax.aarnet.net.au (202.158.194.173)  147.607 ms  147.682 ms  147.656 ms
 9  singtel.as7473.any2ix.coresite.com (206.72.210.63)  147.801 ms  147.778 ms  148.088 ms
10  203.208.172.133 (203.208.172.133)  334.569 ms 203.208.149.253 (203.208.149.253)  155.971 ms 203.208.171.117 (20
3.208.171.117)  148.136 ms
11  203.208.177.110 (203.208.177.110)  347.323 ms  347.079 ms 203.208.151.217 (203.208.151.217)  269.284 ms
12  203.208.182.250 (203.208.182.250)  343.409 ms * 203.208.182.253 (203.208.182.253)  328.851 ms
13  202.150.221.170 (202.150.221.170)  229.186 ms 203.208.177.110 (203.208.177.110)  325.854 ms 203.208.153.246 (20
3.208.153.246)  347.839 ms
z5340468@vx08:~$ traceroute www.traceroute.org
traceroute to www.traceroute.org (193.141.43.158), 30 hops max, 60 byte packets
 1  cserouter1-server.orchestra.cse.unsw.EDU.AU (129.94.242.251)  0.057 ms  0.064 ms  0.082 ms
 2  129.94.39.17 (129.94.39.17)  0.886 ms  0.901 ms  0.945 ms
 3  172.17.31.154 (172.17.31.154)  1.644 ms  1.980 ms  2.010 ms
 4  po-3-1902.ombcr1.gw.unsw.edu.au (129.94.24.20)  1.382 ms  1.400 ms  1.227 ms
 5  unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105)  1.300 ms  1.266 ms  1.324 ms
 6  138.44.5.0 (138.44.5.0)  1.549 ms  1.272 ms  1.227 ms
 7  et-2-0-5.bdr1.sing.sin.aarnet.net.au (113.197.15.233)  93.678 ms  93.273 ms  93.227 ms
 8  ae1.bdr2.sing.sin.aarnet.net.au (113.197.15.235)  92.888 ms  92.970 ms  92.946 ms
 9  unknown.telstraglobal.net (202.126.129.213)  92.942 ms  93.108 ms  93.143 ms
10  * i-92.sgcn-core01.telstraglobal.net (202.84.219.174)  95.838 ms  95.842 ms
11  i-92.sgcn-core01.telstraglobal.net (202.84.219.174)  95.160 ms i-93.istt04.telstraglobal.net (202.84.224.190)
94.257 ms i-92.sgcn-core01.telstraglobal.net (202.84.219.174)  95.195 ms
12  i-91.istt04.telstraglobal.net (202.84.224.197)  93.730 ms  94.154 ms ae10.cr4-sin1.ip4.gtt.net (67.199.139.109)
  104.846 ms
13  ae2.cr2-dus6.ip4.gtt.net (89.149.143.98)  263.588 ms  263.728 ms  263.681 ms
14  traceroute.org (193.141.43.158)  261.100 ms !X ae2.cr2-dus6.ip4.gtt.net (89.149.143.98)  263.684 ms traceroute.
org (193.141.43.158)  261.121 ms !X
```

```
z5340468@vx08:~$ traceroute --back www.speedtest.com.sg
traceroute to www.speedtest.com.sg (202.150.221.170), 30 hops max, 60 byte packets
 1  cserouter1-server.orchestra.cse.unsw.EDU.AU (129.94.242.251)  0.104 ms  0.107 ms  0.128 ms
 2  129.94.39.17 (129.94.39.17)  0.961 ms  1.036 ms  1.051 ms
 3  172.17.31.154 (172.17.31.154)  12.276 ms  12.244 ms  12.285 ms
 4  po-3-1902.ombcr1.gw.unsw.edu.au (129.94.24.20)  1.398 ms  1.414 ms  1.492 ms
 5  unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105)  1.417 ms  1.434 ms  1.452 ms
 6  138.44.5.0 (138.44.5.0)  1.606 ms  1.291 ms  1.315 ms
 7  et-0-3-0.pe1.alxd.nsw.aarnet.net.au (113.197.15.153)  1.791 ms  1.779 ms  1.747 ms
 8  xe-0-2-7.bdr1.a.lax.aarnet.net.au (202.158.194.173)  147.711 ms  147.753 ms  147.716 ms
 9  singtel.as7473.any2ix.coresite.com (206.72.210.63)  147.834 ms  147.754 ms  147.844 ms
10  203.208.171.117 (203.208.171.117)  148.116 ms 203.208.149.253 (203.208.149.253)  156.161 ms *
11  203.208.172.225 (203.208.172.225) '-15'  263.160 ms 203.208.182.41 (203.208.182.41) '-15'  253.204 ms *
12  * * *
13  203.208.153.246 (203.208.153.246) '-10'  347.879 ms  353.824 ms *
14  202.150.221.170 (202.150.221.170) '-10'  226.799 ms  221.353 ms *
z5340468@vx08:~$ traceroute --back www.traceroute.org
traceroute to www.traceroute.org (193.141.43.158), 30 hops max, 60 byte packets
 1  cserouter1-server.orchestra.cse.unsw.EDU.AU (129.94.242.251)  0.055 ms  0.065 ms  0.055 ms
 2  129.94.39.17 (129.94.39.17)  0.934 ms  0.950 ms  0.967 ms
 3  172.17.31.154 (172.17.31.154)  2.028 ms  1.618 ms  1.649 ms
 4  po-3-1902.ombcr1.gw.unsw.edu.au (129.94.24.20)  1.325 ms  1.343 ms  1.378 ms
 5  unswbr1-te-2-13.gw.unsw.edu.au (149.171.255.105)  11.331 ms  11.290 ms  11.356 ms
 6  138.44.5.0 (138.44.5.0)  1.443 ms  1.226 ms  1.337 ms
 7  et-2-0-5.bdr1.sing.sin.aarnet.net.au (113.197.15.233)  93.161 ms  93.117 ms  93.122 ms
 8  ae1.bdr2.sing.sin.aarnet.net.au (113.197.15.235)  105.267 ms  92.895 ms  92.903 ms
 9  unknown.telstraglobal.net (202.126.129.213) '-8'  123.775 ms  123.808 ms  93.321 ms
10  i-92.sgcn-core01.telstraglobal.net (202.84.219.174) '-9'  94.819 ms *  95.373 ms
11  i-92.sgcn-core01.telstraglobal.net (202.84.219.174)  94.774 ms  102.869 ms  94.503 ms
12  ae10.cr4-sin1.ip4.gtt.net (67.199.139.109) '-14'  106.114 ms  105.406 ms i-91.istt04.telstraglobal.net (202.84.
224.197) '-10'  94.125 ms
13  ae10.cr4-sin1.ip4.gtt.net (67.199.139.109) '-14'  105.533 ms  105.323 ms ae2.cr2-dus6.ip4.gtt.net (89.149.143.9
8)  261.151 ms
14  ae2.cr2-dus6.ip4.gtt.net (89.149.143.98) '-13'  261.662 ms  261.143 ms  261.665 ms
15  traceroute.org (193.141.43.158) '-12'  261.276 ms !X  261.430 ms !X  261.133 ms !X
```

What are the IP addresses of the two servers that you have chosen?

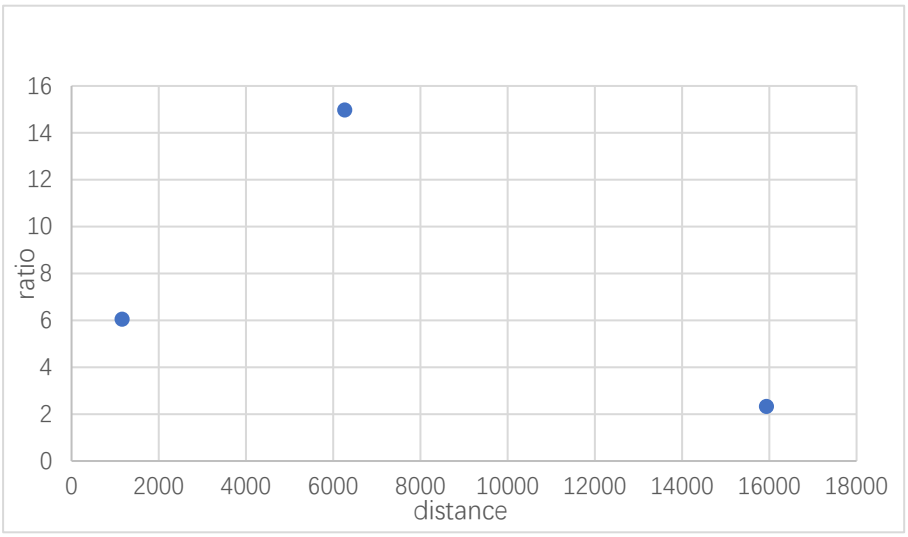
A: www.speedtest.com.sg (202.150.221.170), www.traceroute.org (193.141.43.158)

Does the reverse path go through the same routers as the forward path?

A: So, traceroute is just guessing the reverse path and it is nearly same. But in the real situation, there will be plenty of paths to choose from, depending on the traffic jam etc., it may same or quite different.

E4:

1.



Can you think of at least two reasons why the y-axis values that you plot are greater than 2?

A: In a real transmission, there would be non-physical delays, where queueing delays could be the cause. In the transmission process of these data, some busy routes may have passed, resulting in a long queue time.

Is the delay to the destinations constant, or does it vary over time? Explain why.

A: Basic certainty, first If choose the same path the physical distance doesn't change, even change the path as it travels in light speed, the delay will not change a lot. zSecond, the length of the queue is uncertain during each transmission, which may be none or a little too long, leading to fluctuations in latency.

Which of these delays depend on the packet size and which do not?

A: Transmission delay and queuing delay depend on packet size, propagation delay and processing delay are not