Question 1: How do you get from here to there?

In this question, you will attempt to identify how routes are constructed across the Internet. The standard tool to look at the route from your machine to some other machine is traceroute.

a. Use `man traceroute` and google to familiarise yourself with traceroute.
b. Try traceroute on an internal and an external site. e.g.,: `traceroute google.com` and `traceroute calcium.dcs.kcl.ac.uk` Explain the difference you see. Also count the number of hops between you and the other computer. Do you see any * * * entries? Why?
c. A different way is to see the list of ASes you need to pass through. You can look at the BGP tables from any number of so-called "looking glass" routers on the Internet. You can find a list here: https://www.bgp4.net/doku.php?id=tools:ipv4_route_servers. Pick a server and telnet to it. For example:

```
$ telnet route-server.ip.tiscali.net
```

d. Then at the prompt given by the looking glass router, you can type in a Cisco command. e.g.,

```
show ip bgp <ip address>
```

e. You really are at the command prompt of a real, live, router on the Internet! Type in show ? to see this. Try some of the other commands. (e.g., show cef interface).

Question 2: Who owns some interesting part of the Internet?

As discussed in the class, the Internet is made of a number of autonomous systems. It is sometimes interesting (as well as important) to figure out who owns some part of the Internet. One tool to use for this is the whois database.

a. Read the WHOIS primer: http://whois.icann.org/en/primer
b. RIPE NCC maintains the database within Europe. Read its FAQ: https://www.ripe.net/data-tools/db/faq
c. Figure out your machine's IP address (what command would you use, from previous practicals?). Then look up who owns that IP address, by looking up on the RIPE database: https://apps.db.ripe.net/search/query.html
d. You may issue a whois command from your linux command prompt: `$whois <IP-addr>`

Question 3: Who is called what?

DNS names map from human readable and more memorable names to IP addresses which are routable.

a. Read about DNS here: https://danielmiessler.com/study/dns/
b. You can fetch DNS information using the program dig.
c. Read about how to use dig here: https://www.madboa.com/geek/dig/ and use dig to demonstrate that KCL has outsourced its mail operations to outlook.com
d. DNS is critical to Internet security. One of the most sophisticated attacks on DNS was discovered by Dan Kaminsky. Read about this here: http://unixwiz.net/techtips/iguide-kaminsky-dns-vuln.html Also read about Dan Kaminsky on Wikipedia.

Question 4: A graphical view of the Internet

Go to http://bgp.he.net and explore! Enter your machine's IP address, and check out more information about KCL's AS number (what is it?), its upstream connectivity, etc.