EXERCISES ON DNS

1. Read about the Unix/Linux command `dig` (Domain Information Grooper). Dig provides lots of information about a DNS request, see below for some example output where we try to find the IP address of jewel.cs.man.ac.uk. Try to understand the format of the output.

   -bash-4.1$ dig jewel.cs.man.ac.uk

   ; <<>> DiG 9.8.2rc1-RedHat-9.8.2-0.62.rc1.el6_9.5 <<>> jewel.cs.man.ac.uk
   ;; global options: +cmd
   ;; Got answer:
   ;; <<HEADER>>
   ; opcode: QUERY, status: NOERROR, id: 5039
   ;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 3, ADDITIONAL: 3

   ;; QUESTION SECTION:
   ;jewel.cs.man.ac.uk.
   ;

   ;; ANSWER SECTION:
   ;jewel.cs.man.ac.uk. 300 IN A 130.88.196.55

   ;; AUTHORITY SECTION:
   ;cs.man.ac.uk. 300 IN NS ns0.cs.man.ac.uk.
   ;cs.man.ac.uk. 300 IN NS utserv.mcc.ac.uk.
   ;cs.man.ac.uk. 300 IN NS ns1.cs.man.ac.uk.

   ;; ADDITIONAL SECTION:
   ;ns0.cs.man.ac.uk. 300 IN A 130.88.192.9
   ;ns1.cs.man.ac.uk. 300 IN A 130.88.193.9
   ;utserv.mcc.ac.uk. 3190 IN A 130.88.200.6

   ;; Query time: 1 msec
   ;; SERVER: 130.88.192.9#53(130.88.192.9)
   ;; WHEN: Mon Feb 25 10:18:12 2019
   ;; MSG SIZE  rcvd: 161

2. Read about DNS root servers and then type from a Linux machine of your choice `dig . ns` What do you see?

3. You can use the syntax `dig @<server_name>` to query a specific server for an IP address, say `dig @d.ns.at univie.ac.at`. Starting from a root server of your choice, write down the names of the servers you need to query to find the IP address of jewel.cs.man.ac.uk (hint: including the root server you need to query 4 servers)

4. Type the following in the order given. Each time record the output.

   ```
   dig +norec www.unimelb.edu.au
   dig www.unimelb.edu.au
   dig +norec www.unimelb.edu.au
   ```

   Is the output from the third above the same with the output from the first? They should (as we type the same thing) but if not (most likely), why? Repeat the same with another internet address such as www.otago.ac.nz and www.bbc.co.uk What do you conclude? What is the +norec doing?

5. Prepare one slide to motivate and explain `dig` and how the DNS works.

   [indicative duration: 45 minutes]