

Exercise3:

Q1: What is the IP address of `www.cecs.anu.edu.au` . What type of DNS query is sent to get this answer?

The IP address of `www.cecs.aun.edu.au` is 150.203.161.98. A type of DNS query is sent to get this answer.

```
z5184142@vx3:/tmp_amd/cage/export/cage/4/z5184142$ dig www.cecs.anu.edu.au

; <<> DiG 9.7.3 <<> www.cecs.anu.edu.au
;; global options: +cmd
;; Got answer:
;; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 2622
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 3, ADDITIONAL: 6

;; QUESTION SECTION:
;www.cecs.anu.edu.au.      IN      A

;; ANSWER SECTION:
www.cecs.anu.edu.au.     2036    IN      CNAME   rproxy.cecs.anu.edu.au.
rproxy.cecs.anu.edu.au.  593     IN      A       150.203.161.98

;; AUTHORITY SECTION:
cecs.anu.edu.au.         234     IN      NS       ns3.cecs.anu.edu.au.
cecs.anu.edu.au.         234     IN      NS       ns2.cecs.anu.edu.au.
cecs.anu.edu.au.         234     IN      NS       ns4.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.     2106    IN      A       150.203.161.36
ns2.cecs.anu.edu.au.     234     IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.     2106    IN      A       150.203.161.50
ns3.cecs.anu.edu.au.     2106    IN      AAAA    2001:388:1034:2905::32
ns4.cecs.anu.edu.au.     2106    IN      A       150.203.161.38
ns4.cecs.anu.edu.au.     2106    IN      AAAA    2001:388:1034:2905::26

;; Query time: 0 msec
;; SERVER: 129.94.242.45#53(129.94.242.45)
;; WHEN: Tue Aug 14 14:15:08 2018
;; MSG SIZE rcvd: 260
```

Q2: What is the canonical name for the CECS ANU web server? What is its IP address? Suggest a reason for having an alias for this server.

The canonical name for the CECS ANU web server is `rproxy.cecs.anu.edu.au` and its IP address is 150.203.161.98.

Reason: The reason why having an alias is that alias hostnames are typically more mnemonic than canonical names and DNS can be invoked by an application to obtain the canonical hostname for a supplied alias hostname as well as the IP address of the host.

Q3: What can you make of the rest of the response (i.e. the details available in the Authority and Additional sections)?

Authority sections contains the host name of the authoritative servers and the time to live is 234s on DNS Cache, and additional sections contains the IPV4 and IPV6 addresses of these authoritative servers.

Q4: What is the IP address of the local nameserver for your machine?

The IP address of the local nameserver for my machine is 129.94.242.45.

```
z5184142@vx3:/tmp_amd/cage/export/cage/4/z5184142$ dig www.cecs.anu.edu.au
```

```
;; <> DiG 9.7.3 <> www.cecs.anu.edu.au
;; global options: +cmd
;; Got answer:
;; ->>HEADER<- opcode: QUERY, status: NOERROR, id: 2622
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 3, ADDITIONAL: 6

;; QUESTION SECTION:
;www.cecs.anu.edu.au.      IN      A

;; ANSWER SECTION:
www.cecs.anu.edu.au.     2036    IN      CNAME   rproxy.cecs.anu.edu.au.
rproxy.cecs.anu.edu.au.  593     IN      A       150.203.161.98

;; AUTHORITY SECTION:
cecs.anu.edu.au.         234     IN      NS       ns3.cecs.anu.edu.au.
cecs.anu.edu.au.         234     IN      NS       ns2.cecs.anu.edu.au.
cecs.anu.edu.au.         234     IN      NS       ns4.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.     2106    IN      A       150.203.161.36
ns2.cecs.anu.edu.au.     234     IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.     2106    IN      A       150.203.161.50
ns3.cecs.anu.edu.au.     2106    IN      AAAA    2001:388:1034:2905::32
ns4.cecs.anu.edu.au.     2106    IN      A       150.203.161.38
ns4.cecs.anu.edu.au.     2106    IN      AAAA    2001:388:1034:2905::26

;; Query time: 0 msec
;; SERVER: 129.94.242.45#53(129.94.242.45)
;; WHEN: Tue Aug 14 14:15:08 2018
;; MSG SIZE rcvd: 260
```

Q5: What are the DNS nameservers for the “cecs.anu.edu.au” domain (note: the domain name is cecs.anu.edu.au and not www.cecs.anu.edu.au)? Find out their IP addresses? What type of DNS query is sent to obtain this information?

DNS nameservers: ns3.cecs.anu.edu.au, ns4.cecs.anu.edu.au, ns2.cecs.anu.edu.au.

IPv4 address: 150.203.161.50 150.203.161.38. 150.203.161.36.

IPv6 address: 2001:388:1034:2905::32 2001:388:1034:2905::26

2001:388:1034:2905::24

The type of DNS query is NS type.

```
z5184142@vx3:/tmp_and/cage/export/cage/4/z5184142$ dig cecs.anu.edu.au NS
```

```
; <> DiG 9.7.3 <> cecs.anu.edu.au NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 45459
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 6

;; QUESTION SECTION:
;cecs.anu.edu.au.          IN      NS

;; ANSWER SECTION:
cecs.anu.edu.au.          1011    IN      NS      ns2.cecs.anu.edu.au.
cecs.anu.edu.au.          1011    IN      NS      ns4.cecs.anu.edu.au.
cecs.anu.edu.au.          1011    IN      NS      ns3.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.      2883    IN      A        150.203.161.36
ns2.cecs.anu.edu.au.      1011    IN      AAAA     2001:388:1034:2905::24
ns3.cecs.anu.edu.au.      2883    IN      A        150.203.161.50
ns3.cecs.anu.edu.au.      2883    IN      AAAA     2001:388:1034:2905::32
ns4.cecs.anu.edu.au.      2883    IN      A        150.203.161.38
ns4.cecs.anu.edu.au.      2883    IN      AAAA     2001:388:1034:2905::26

;; Query time: 5 msec
;; SERVER: 129.94.242.45#53(129.94.242.45)
;; WHEN: Tue Aug 14 14:02:11 2018
;; MSG SIZE rcvd: 219
```

Q6: What is the DNS name associated with the IP address 149.171.158.109? What type of DNS query is sent to obtain this information?

The DNS name associated with the IP address 149.171.158.109 is engplws008.eng.unsw.edu.au, www.engineering.unsw.edu.au, engplws008.ad.unsw.edu.au. PTR type query is sent to obtain this information.

```
z5184142@vx2:/tmp_amd/cage/export/cage/4/z5184142$ dig -x 149.171.158.109

; <<> DiG 9.7.3 <<> -x 149.171.158.109
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 23892
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 3, ADDITIONAL: 6

;; QUESTION SECTION:
;109.158.171.149.in-addr.arpa. IN PTR

;; ANSWER SECTION:
109.158.171.149.in-addr.arpa. 591 IN PTR engplws008.eng.unsw.edu.au.
109.158.171.149.in-addr.arpa. 591 IN PTR www.engineering.unsw.edu.au.
109.158.171.149.in-addr.arpa. 591 IN PTR engplws008.ad.unsw.edu.au.

;; AUTHORITY SECTION:
158.171.149.in-addr.arpa. 7791 IN NS ns1.unsw.edu.au.
158.171.149.in-addr.arpa. 7791 IN NS ns3.unsw.edu.au.
158.171.149.in-addr.arpa. 7791 IN NS ns2.unsw.edu.au.

;; ADDITIONAL SECTION:
ns1.unsw.edu.au. 5760 IN A 129.94.0.192
ns1.unsw.edu.au. 2315 IN AAAA 2001:388:c:35::1
ns2.unsw.edu.au. 5760 IN A 129.94.0.193
ns2.unsw.edu.au. 5760 IN AAAA 2001:388:c:35::2
ns3.unsw.edu.au. 5760 IN A 192.155.82.178
ns3.unsw.edu.au. 9067 IN AAAA 2600:3c01::f03c:91ff:fe73:5f10

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Tue Aug 14 14:18:36 2018
;; MSG SIZE rcvd: 330
```

Q7: Run dig and query the CSE nameserver (129.94.242.33) for the mail servers for Yahoo! Mail (again the domain name is yahoo.com, not www.yahoo.com). Did you get an authoritative answer? Why?

I did not get an authoritative answer because there is no AA in flags of the header. The reason why I did not get the authoritative answer is that the dig command is sent from CSE nameserver to yahoo.com DNS server, and CSE nameserver is not the authoritative DNS server of yahoo, so yahoo's server do not give the authoritative answer to CSE nameserver.

```
z5184142@vx1:/tmp_amd/cage/export/cage/4/z5184142$ dig MX @129.94.242.33 yahoo.com

; <<> DiG 9.7.3 <<> MX @129.94.242.33 yahoo.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 17067
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 8

;; QUESTION SECTION:
;yahoo.com.                IN      MX

;; ANSWER SECTION:
yahoo.com.                 631     IN      MX      1 mta7.am0.yahoodns.net.
yahoo.com.                 631     IN      MX      1 mta5.am0.yahoodns.net.
yahoo.com.                 631     IN      MX      1 mta6.am0.yahoodns.net.

;; AUTHORITY SECTION:
yahoo.com.                 68121   IN      NS      ns3.yahoo.com.
yahoo.com.                 68121   IN      NS      ns2.yahoo.com.
yahoo.com.                 68121   IN      NS      ns4.yahoo.com.
yahoo.com.                 68121   IN      NS      ns1.yahoo.com.
yahoo.com.                 68121   IN      NS      ns5.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.             242955  IN      A       68.180.131.16
ns1.yahoo.com.             30934   IN      AAAA    2001:4998:130::1001
ns2.yahoo.com.             225837  IN      A       68.142.255.16
ns2.yahoo.com.             37449   IN      AAAA    2001:4998:140::1002
ns3.yahoo.com.             416821  IN      A       203.84.221.53
ns3.yahoo.com.             58645   IN      AAAA    2406:8600:b8:fe03::1003
ns4.yahoo.com.             232641  IN      A       98.138.11.157
ns5.yahoo.com.             218712  IN      A       119.160.253.83

;; Query time: 0 msec
;; SERVER: 129.94.242.33#53(129.94.242.33)
;; WHEN: Tue Aug 14 20:17:34 2018
;; MSG SIZE rcvd: 360
```

Q8: Repeat the above (i.e. Question 7) but use one of the nameservers obtained in Question 5.
What is the result?

The result is that I was refused to do dig command.

```
z5184142@vx2:/tmp_amd/cage/export/cage/4/z5184142$ dig MX @150.203.161.50 yahoo.com

; <<> DiG 9.7.3 <<> MX @150.203.161.50 yahoo.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 6139
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 0
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;yahoo.com.                IN      MX

;; Query time: 7 msec
;; SERVER: 150.203.161.50#53(150.203.161.50)
;; WHEN: Tue Aug 14 21:08:54 2018
;; MSG SIZE  rcvd: 27

z5184142@vx2:/tmp_amd/cage/export/cage/4/z5184142$ █
```

Q9: Obtain the authoritative answer for the mail servers for Yahoo! mail. What type of DNS query is sent to obtain this information?

MX DNS query is sent to obtain this information.

z5184142@vx2:/tmp_amd/cage/export/cage/4/z5184142\$ dig NS yahoo.com

```
; <<>> DiG 9.7.3 <<>> NS yahoo.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 20859
;; flags: qr rd ra; QUERY: 1, ANSWER: 5, AUTHORITY: 0, ADDITIONAL: 8

;; QUESTION SECTION:
yahoo.com.                IN      NS

;; ANSWER SECTION:
yahoo.com.                103208  IN      NS      ns1.yahoo.com.
yahoo.com.                103208  IN      NS      ns5.yahoo.com.
yahoo.com.                103208  IN      NS      ns4.yahoo.com.
yahoo.com.                103208  IN      NS      ns3.yahoo.com.
yahoo.com.                103208  IN      NS      ns2.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.            189596  IN      A        68.180.131.16
ns1.yahoo.com.            78280   IN      AAAA     2001:4998:130::1001
ns2.yahoo.com.            165693  IN      A        68.142.255.16
ns2.yahoo.com.            68747   IN      AAAA     2001:4998:140::1002
ns3.yahoo.com.            356677  IN      A        203.84.221.53
ns3.yahoo.com.            36500   IN      AAAA     2406:8600:b8:fe03::1003
ns4.yahoo.com.            172497  IN      A        98.138.11.157
ns5.yahoo.com.            162220  IN      A        119.160.253.83

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Wed Aug 15 12:59:58 2018
;; MSG SIZE rcvd: 281
```

```
z5184142@vx2:/tmp_amd/cage/export/cage/4/z5184142$ dig MX @ns1.yahoo.com yahoo.com
```

```
; <<> DiG 9.7.3 <<> MX @ns1.yahoo.com yahoo.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 23090
;; flags: qr aa rd: QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 8
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
yahoo.com.                IN      MX

;; ANSWER SECTION:
yahoo.com.                1800    IN      MX      1 mta7.am0.yahoodns.net.
yahoo.com.                1800    IN      MX      1 mta5.am0.yahoodns.net.
yahoo.com.                1800    IN      MX      1 mta6.am0.yahoodns.net.

;; AUTHORITY SECTION:
yahoo.com.                172800  IN      NS      ns4.yahoo.com.
yahoo.com.                172800  IN      NS      ns1.yahoo.com.
yahoo.com.                172800  IN      NS      ns3.yahoo.com.
yahoo.com.                172800  IN      NS      ns2.yahoo.com.
yahoo.com.                172800  IN      NS      ns5.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.            1209600 IN      A       68.180.131.16
ns2.yahoo.com.            1209600 IN      A       68.142.255.16
ns3.yahoo.com.            1209600 IN      A       203.84.221.53
ns4.yahoo.com.            1209600 IN      A       98.138.11.157
ns5.yahoo.com.            1209600 IN      A       119.160.253.83
ns1.yahoo.com.            86400   IN      AAAA    2001:4998:130::1001
ns2.yahoo.com.            86400   IN      AAAA    2001:4998:140::1002
ns3.yahoo.com.            86400   IN      AAAA    2001:4998:140::1003

;; Query time: 145 msec
;; SERVER: 68.180.131.16#53(68.180.131.16)
;; WHEN: Wed Aug 15 13:00:17 2018
;; MSG SIZE rcvd: 360
```

Q10: In this exercise you simulate the iterative DNS query process to find the IP address of your machine (e.g. lyre00.cse.unsw.edu.au). First, find the name server (query type NS) of the "." domain (root domain). Query this nameserver to find the authoritative name server for the "au." domain. Query this second server to find the authoritative nameserver for the "edu.au." domain. Now query this nameserver to find the authoritative nameserver for "unsw.edu.au". Next query the nameserver of unsw.edu.au to find the authoritative name server of cse.unsw.edu.au. Now query the nameserver of cse.unsw.edu.au to find the IP address of your host. How many DNS servers do you have to query to get the authoritative answer?

Six DNS Servers.


```
z5184142@vx4:/tmp_amd/cage/export/cage/4/z5184142$ dig NS .
```

```
; <<> DiG 9.7.3 <<> NS .
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 5862
;; flags: qr rd ra; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 12

;; QUESTION SECTION:
;                          IN      NS

;; ANSWER SECTION:
.                12977    IN      NS      c.root-servers.net.
.                12977    IN      NS      j.root-servers.net.
.                12977    IN      NS      b.root-servers.net.
.                12977    IN      NS      h.root-servers.net.
.                12977    IN      NS      k.root-servers.net.
.                12977    IN      NS      i.root-servers.net.
.                12977    IN      NS      a.root-servers.net.
.                12977    IN      NS      d.root-servers.net.
.                12977    IN      NS      l.root-servers.net.
.                12977    IN      NS      g.root-servers.net.
.                12977    IN      NS      f.root-servers.net.
.                12977    IN      NS      e.root-servers.net.
.                12977    IN      NS      m.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net. 22275    IN      A        198.41.0.4
a.root-servers.net. 140523   IN      AAAA     2001:503:ba3e::2:30
b.root-servers.net. 525459   IN      A        199.9.14.201
b.root-servers.net. 286874   IN      AAAA     2001:500:200::b
c.root-servers.net. 272331   IN      A        192.33.4.12
c.root-servers.net. 509800   IN      AAAA     2001:500:2::c
d.root-servers.net. 336511   IN      A        199.7.91.13
d.root-servers.net. 336511   IN      AAAA     2001:500:2d::d
e.root-servers.net. 297774   IN      AAAA     2001:500:a8::e
f.root-servers.net. 176557   IN      A        192.5.5.241
f.root-servers.net. 354328   IN      AAAA     2001:500:2f::f
g.root-servers.net. 264669   IN      A        192.112.36.4

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Thu Aug 16 14:04:18 2018
;; MSG SIZE  rcvd: 492
```

```

z5184142@vx4:/tmp_amd/cage/export/cage/4/z5184142$ dig NS @c.root-servers.net au
*
; <<>> DiG 9.7.3 <<>> NS @c.root-servers.net au.
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 19183
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 10, ADDITIONAL: 16
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;au.                                IN      NS

;; AUTHORITY SECTION:
au.      172800  IN      NS      u.au.
au.      172800  IN      NS      r.au.
au.      172800  IN      NS      c.au.
au.      172800  IN      NS      b.au.
au.      172800  IN      NS      d.au.
au.      172800  IN      NS      s.au.
au.      172800  IN      NS      a.au.
au.      172800  IN      NS      q.au.
au.      172800  IN      NS      t.au.
au.      172800  IN      NS      v.au.

;; ADDITIONAL SECTION:
a.au.    172800  IN      A       58.65.254.73
b.au.    172800  IN      A       58.65.253.73
c.au.    172800  IN      A       162.159.24.179
d.au.    172800  IN      A       162.159.25.38
q.au.    172800  IN      A       65.22.196.1
r.au.    172800  IN      A       65.22.197.1
s.au.    172800  IN      A       65.22.198.1
t.au.    172800  IN      A       65.22.199.1
u.au.    172800  IN      A       211.29.133.32
v.au.    172800  IN      A       202.12.31.53
a.au.    172800  IN      AAAA    2407:6e00:254:306::73
b.au.    172800  IN      AAAA    2407:6e00:253:306::73
c.au.    172800  IN      AAAA    2400:cb00:2049:1::a29f:18b3
d.au.    172800  IN      AAAA    2400:cb00:2049:1::a29f:1926
q.au.    172800  IN      AAAA    2a01:8840:be::1
r.au.    172800  IN      AAAA    2a01:8840:bf::1

;; Query time: 165 msec
;; SERVER: 192.33.4.12#53(192.33.4.12)
;; WHEN: Thu Aug 16 14:05:02 2018
;; MSG SIZE rcvd: 508

z5184142@vx4:/tmp_amd/cage/export/cage/4/z5184142$ dig NS @u.au edu.au.

; <<>> DiG 9.7.3 <<>> NS @u.au edu.au.
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 55688
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 4, ADDITIONAL: 8
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;edu.au.                            IN      NS

;; AUTHORITY SECTION:
edu.au.   86400  IN      NS      t.au.
edu.au.   86400  IN      NS      q.au.
edu.au.   86400  IN      NS      s.au.
edu.au.   86400  IN      NS      r.au.

;; ADDITIONAL SECTION:
q.au.     86400  IN      A       65.22.196.1
q.au.     86400  IN      AAAA    2a01:8840:be::1
r.au.     86400  IN      A       65.22.197.1
r.au.     86400  IN      AAAA    2a01:8840:bf::1
s.au.     86400  IN      A       65.22.198.1
s.au.     86400  IN      AAAA    2a01:8840:c0::1
t.au.     86400  IN      A       65.22.199.1
t.au.     86400  IN      AAAA    2a01:8840:c1::1

;; Query time: 5 msec
;; SERVER: 211.29.133.32#53(211.29.133.32)
;; WHEN: Thu Aug 16 14:06:41 2018
;; MSG SIZE rcvd: 264

```

```
z5184142@vx4:/tmp_amd/cage/export/cage/4/z5184142$ dig NS @t.au unsw.edu.au
```

```
; <<>> DiG 9.7.3 <<>> NS @t.au unsw.edu.au
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 49522
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 3, ADDITIONAL: 5
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;tunsw.edu.au.                IN      NS

;; AUTHORITY SECTION:
unsw.edu.au.                 900     IN      NS      ns3.unsw.edu.au.
unsw.edu.au.                 900     IN      NS      ns2.unsw.edu.au.
unsw.edu.au.                 900     IN      NS      ns1.unsw.edu.au.

;; ADDITIONAL SECTION:
ns1.unsw.edu.au.             900     IN      A        129.94.0.192
ns2.unsw.edu.au.             900     IN      A        129.94.0.193
ns3.unsw.edu.au.             900     IN      A        192.155.82.178
ns1.unsw.edu.au.             900     IN      AAAA     2001:388:c:35::1
ns2.unsw.edu.au.             900     IN      AAAA     2001:388:c:35::2

;; Query time: 3 msec
;; SERVER: 65.22.199.1#53(65.22.199.1)
;; WHEN: Thu Aug 16 14:07:06 2018
;; MSG SIZE rcvd: 187
```

```
z5184142@vx4:/tmp_amd/cage/export/cage/4/z5184142$ dig NS @ns3.unsw.edu.au cse.unsw.edu.au.
```

```
; <<>> DiG 9.7.3 <<>> NS @ns3.unsw.edu.au cse.unsw.edu.au.
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 52434
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 2, ADDITIONAL: 4
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;cse.unsw.edu.au.            IN      NS

;; AUTHORITY SECTION:
cse.unsw.edu.au.            10800   IN      NS      beethoven.orchestra.cse.unsw.edu.au.
cse.unsw.edu.au.            10800   IN      NS      maestro.orchestra.cse.unsw.edu.au.

;; ADDITIONAL SECTION:
beethoven.orchestra.cse.unsw.edu.au. 10800 IN A 129.94.242.2
beethoven.orchestra.cse.unsw.edu.au. 10800 IN A 129.94.172.11
beethoven.orchestra.cse.unsw.edu.au. 10800 IN A 129.94.208.3
maestro.orchestra.cse.unsw.edu.au. 10800 IN A 129.94.242.33

;; Query time: 161 msec
;; SERVER: 192.155.82.178#53(192.155.82.178)
;; WHEN: Thu Aug 16 14:07:30 2018
;; MSG SIZE rcvd: 153
```

```

z5184142@vx4:/tmp_amd/cage/export/cage/4/z5184142$ dig A @beethoven.orchestra.cse.unsw.edu.au. vx4.cse.unsw.edu.au.

; <<> DiG 9.7.3 <<> A @beethoven.orchestra.cse.unsw.edu.au. vx4.cse.unsw.edu.au.
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 62308
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 2

;; QUESTION SECTION:
vx4.cse.unsw.edu.au.      IN      A

;; ANSWER SECTION:
vx4.cse.unsw.edu.au.  3600    IN      A      129.94.242.117

;; AUTHORITY SECTION:
cse.unsw.edu.au.      3600    IN      NS      maestro.orchestra.cse.unsw.edu.au.
cse.unsw.edu.au.      3600    IN      NS      beethoven.orchestra.cse.unsw.edu.au.

;; ADDITIONAL SECTION:
maestro.orchestra.cse.unsw.edu.au. 3600 IN A      129.94.242.33
beethoven.orchestra.cse.unsw.edu.au. 3600 IN A      129.94.242.2

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Fri Aug 17 17:50:14 2018
;; MSG SIZE rcvd: 141

```

Q11: Can one physical machine have several names and/or IP addresses associated with it?

Yes, because one physical machine can have multiple Network Interface Cards, so one physical machine can have several IP addresses, and several domain names can point to one IP address, which means that one physical machine can also have several names.