# COMP9331 Computer Networks and Applications
# Lab3

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Exercise 3
Q1:
The IP address of www.cecs.anu.edu.au is 150.203.161.98
The type of this DNS query is address record: A.

Q2:
The canonical name for the CECS ANU web server is: rproxy.cecs.anu.edu.au.
For the multiple web servers running on different ports on a single IP address, the CName aliases allow different servers to have their own entry in the DNS. Sometimes, the aliases can be shorter and easier to memorise. (Ref:https://www.pickaweb.co.uk/kb/cname-can-use-domain/)

The response screenshot from command: dig www.cecs.anu.edu.au is shown below:

```
→ ~ dig www.cecs.anu.edu.au

; <<>> DiG 9.10.6 <<>> www.cecs.anu.edu.au
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 41310
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 3, ADDITIONAL: 7

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;www.cecs.anu.edu.au.            IN      A

;; ANSWER SECTION:
www.cecs.anu.edu.au.    29      IN      CNAME   rproxy.cecs.anu.edu.au.
rproxy.cecs.anu.edu.au. 2942    IN      A       150.203.161.98

;; AUTHORITY SECTION:
cecs.anu.edu.au.        11      IN      NS      ns2.cecs.anu.edu.au.
cecs.anu.edu.au.        11      IN      NS      ns4.cecs.anu.edu.au.
cecs.anu.edu.au.        11      IN      NS      ns3.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.    11      IN      A       150.203.161.36
ns3.cecs.anu.edu.au.    11      IN      A       150.203.161.50
ns4.cecs.anu.edu.au.    11      IN      A       150.203.161.38
ns2.cecs.anu.edu.au.    11      IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.    11      IN      AAAA    2001:388:1034:2905::32
ns4.cecs.anu.edu.au.    11      IN      AAAA    2001:388:1034:2905::26

;; Query time: 16 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Sun Oct 13 17:25:59 AEDT 2019
;; MSG SIZE  rcvd: 271
```

Q3:
Authority section: a list of nameservers that are authoritative for the request domain name cecs.anu.edu.au. There are three nameservers: ns2.cecs.anu.edu.au., ns4.cecs.anu.edu.au., ns3.cecs.anu.edu.au..

Additional section: IPv4(type A) and IPv6(type AAAA) addresses of the nameservers in the authority section.

Q4:
The IP address of the local nameserver for my machine is 192.168.1.1 which is shown in the last section of response screenshot above. I am using my own PC at home and 192.168.1.1 is the default gateway of my wireless router.

Q5:
The DNS nameservers for the "cecs.anu.edu.au" domain are: ns2.cecs.anu.edu.au., ns3.cecs.anu.edu.au., ns4.cecs.anu.edu.au..

Their IPv4 addresses are: 150.203.161.36, 150.203.161.50, 150.203.161.38 respectively.
Their IPv6 addresses are: 2001:388:1034:2905::24, 2001:388:1034:2905::32, 2001:388:1034:2905::26 respectively.

The type of DNS query sent is nameserver: NS.

The response screenshot from command: dig cecs.anu.edu.au NS is shown below:

```
➜  ~ dig cecs.anu.edu.au NS

; <<>> DiG 9.10.6 <<>> cecs.anu.edu.au NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 50763
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 7

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;cecs.anu.edu.au.               IN      NS

;; ANSWER SECTION:
cecs.anu.edu.au.        3600    IN      NS      ns2.cecs.anu.edu.au.
cecs.anu.edu.au.        3600    IN      NS      ns3.cecs.anu.edu.au.
cecs.anu.edu.au.        3600    IN      NS      ns4.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.    96      IN      A       150.203.161.36
ns3.cecs.anu.edu.au.    96      IN      A       150.203.161.50
ns4.cecs.anu.edu.au.    96      IN      A       150.203.161.38
ns2.cecs.anu.edu.au.    96      IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.    96      IN      AAAA    2001:388:1034:2905::32
ns4.cecs.anu.edu.au.    96      IN      AAAA    2001:388:1034:2905::26

;; Query time: 38 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Sun Oct 13 18:36:55 AEDT 2019
;; MSG SIZE  rcvd: 230
```

Q6:
The DNS name associated with the IP address 111.68.101.54 is webserver.seecs.nust.edu.pk.
The type of DNS query is sent is: PTR (pointer to a canonical name).

The response screenshot from command: dig -x 111.68.101.54 is shown below:



```
➜  ~ dig -x 111.68.101.54

; <<>> DiG 9.10.6 <<>> -x 111.68.101.54
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 29965
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;54.101.68.111.in-addr.arpa.     IN      PTR

;; ANSWER SECTION:
54.101.68.111.in-addr.arpa. 3600 IN     PTR     webserver.seecs.nust.edu.pk.

;; Query time: 403 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Sun Oct 13 19:01:20 AEDT 2019
;; MSG SIZE  rcvd: 96
```

Q7:
No, the response is not authoritative. From the third line 'flag' of the response we can see that there is no aa flag, only response with aa flag means the answer is authoritative. Since we are querying from CSE nameserver, it does not has authority for yahoo domain. If we request something like 'dig cse.unsw.edu.au MX' from CSE machines, then, the answer is authoritative(i.e. has aa flag).
The response screenshot from command: dig yahoo.com MX is shown below:
Q8:



```
uxterm
z5230655@vx1:/tmp_amd/reed/export/reed/3/z5230655$ dig yahoo.com MX

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> yahoo.com MX
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 57974
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 8

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;yahoo.com.                     IN      MX

;; ANSWER SECTION:
yahoo.com.              160     IN      MX      1 mta6.am0.yahoodns.net.
yahoo.com.              160     IN      MX      1 mta7.am0.yahoodns.net.
yahoo.com.              160     IN      MX      1 mta5.am0.yahoodns.net.

;; AUTHORITY SECTION:
yahoo.com.              53148   IN      NS      ns5.yahoo.com.
yahoo.com.              53148   IN      NS      ns1.yahoo.com.
yahoo.com.              53148   IN      NS      ns3.yahoo.com.
yahoo.com.              53148   IN      NS      ns4.yahoo.com.
yahoo.com.              53148   IN      NS      ns2.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.          316136  IN      A       68.180.131.16
ns1.yahoo.com.          3698    IN      AAAA    2001:4998:130::1001
ns2.yahoo.com.          80771   IN      A       68.142.255.16
ns2.yahoo.com.          69386   IN      AAAA    2001:4998:140::1002
ns3.yahoo.com.          772     IN      A       27.123.42.42
ns4.yahoo.com.          140212  IN      A       98.138.11.157
ns5.yahoo.com.          143410  IN      A       119.160.253.83

;; Query time: 2 msec
;; SERVER: 129.94.242.45#53(129.94.242.45)
;; WHEN: Sun Oct 13 19:20:05 AEDT 2019
;; MSG SIZE  rcvd: 343
```

When I use the nameserver got in Question 5: ns2.cecs.anu.edu.au, there is no answer section in the response, the result has the status: REFUSED. This is probably because that the ANU nameserver does not respond to the requests that are not sent from ANU network.

The response screenshot from command dig @ns2.cecs.anu.edu.au yahoo.com MX is shown below:

```
                                    uxterm                          ↑ _ □ ✕

z5230655@vx2:/tmp_amd/reed/export/reed/3/z5230655$ dig @ns2.cecs.anu.edu.au yahoo.com MX

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> @ns2.cecs.anu.edu.au yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 26340
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;yahoo.com.                     IN      MX

;; Query time: 7 msec
;; SERVER: 150.203.161.36#53(150.203.161.36)
;; WHEN: Sun Oct 13 20:56:45 AEDT 2019
;; MSG SIZE  rcvd: 38
```

Q9:
The authoritative answer can get by querying using yahoo nameserver, e.g. ns1.yahoo.com.
For querying mail server, MX type query is used.

The authoritative response screenshot from command dig @ns1.yahoo.com yahoo.com MX is shown below:

```
                                    uxterm                          ↑ _ □ ✕

z5230655@vx2:/tmp_amd/reed/export/reed/3/z5230655$ dig @ns1.yahoo.com  yahoo.com MX

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> @ns1.yahoo.com yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 39674
;; flags: qr aa rd; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 9
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1272
;; 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      ns5.yahoo.com.
yahoo.com.              172800  IN      NS      ns2.yahoo.com.
yahoo.com.              172800  IN      NS      ns3.yahoo.com.
yahoo.com.              172800  IN      NS      ns4.yahoo.com.
yahoo.com.              172800  IN      NS      ns1.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.          1800    IN      A       27.123.42.42
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.          1800    IN      AAAA    2406:8600:f03f:1f8::1003

;; Query time: 146 msec
;; SERVER: 68.180.131.16#53(68.180.131.16)
;; WHEN: Sun Oct 13 21:18:07 AEDT 2019
;; MSG SIZE  rcvd: 371
```

Q10:

I am using Vlab to connect to cse lab machine, in this question, I assume my machine is bongo01.cse.unsw.edu.au for querying.

Step1, find the name server of the root domain:

```
z5230655@vx2:/tmp_amd/reed/export/reed/3/z5230655$ dig . NS

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> . NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 51389
;; flags: qr rd ra; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 27

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;.                              IN      NS

;; ANSWER SECTION:
.                       40928   IN      NS      f.root-servers.net.
.                       40928   IN      NS      d.root-servers.net.
.                       40928   IN      NS      l.root-servers.net.
.                       40928   IN      NS      a.root-servers.net.
.                       40928   IN      NS      b.root-servers.net.
.                       40928   IN      NS      i.root-servers.net.
.                       40928   IN      NS      j.root-servers.net.
.                       40928   IN      NS      m.root-servers.net.
.                       40928   IN      NS      c.root-servers.net.
.                       40928   IN      NS      h.root-servers.net.
.                       40928   IN      NS      e.root-servers.net.
.                       40928   IN      NS      g.root-servers.net.
.                       40928   IN      NS      k.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net.     62350   IN      A       198.41.0.4
a.root-servers.net.     62350   IN      AAAA    2001:503:ba3e::2:30
b.root-servers.net.     166603  IN      A       199.9.14.201
b.root-servers.net.     152956  IN      AAAA    2001:500:200::b
c.root-servers.net.     88848   IN      A       192.33.4.12
c.root-servers.net.     152956  IN      AAAA    2001:500:2::c
d.root-servers.net.     250214  IN      A       199.7.91.13
d.root-servers.net.     499590  IN      AAAA    2001:500:2d::d
e.root-servers.net.     384485  IN      A       192.203.230.10
e.root-servers.net.     314223  IN      AAAA    2001:500:a8::e
f.root-servers.net.     226306  IN      A       192.5.5.241
f.root-servers.net.     492873  IN      AAAA    2001:500:2f::f
g.root-servers.net.     65155   IN      A       192.112.36.4
g.root-servers.net.     314223  IN      AAAA    2001:500:12::d0d
h.root-servers.net.     309996  IN      A       198.97.190.53
h.root-servers.net.     499590  IN      AAAA    2001:500:1::53
i.root-servers.net.     134876  IN      A       192.36.148.17
i.root-servers.net.     34433   IN      AAAA    2001:7fe::53
j.root-servers.net.     170792  IN      A       192.58.128.30
j.root-servers.net.     178758  IN      AAAA    2001:503:c27::2:30
k.root-servers.net.     250207  IN      A       193.0.14.129
k.root-servers.net.     34433   IN      AAAA    2001:7fd::1
l.root-servers.net.     325895  IN      A       199.7.83.42
l.root-servers.net.     145041  IN      AAAA    2001:500:9f::42
m.root-servers.net.     226574  IN      A       202.12.27.33
m.root-servers.net.     579134  IN      AAAA    2001:dc3::35

;; Query time: 1 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sun Oct 13 21:35:00 AEDT 2019
;; MSG SIZE  rcvd: 811
```

Step2, Query the a.root-servers.net. server with IP address: 198.41.0.4 to find the authoritative nameserver of the au. domain:

```
z5230655@vx2:/tmp_amd/reed/export/reed/3/z5230655$ dig @198.41.0.4 bongo01.cse.unsw.edu.au. NS

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> @198.41.0.4 bongo01.cse.unsw.edu.au. NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 2207
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 9, ADDITIONAL: 18
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1472
;; QUESTION SECTION:
;bongo01.cse.unsw.edu.au.        IN      NS

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

;; ADDITIONAL SECTION:
a.au.                   172800  IN      A       58.65.254.73
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
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
s.au.                   172800  IN      AAAA    2a01:8840:c0::1
t.au.                   172800  IN      AAAA    2a01:8840:c1::1
v.au.                   172800  IN      AAAA    2001:dd8:12::53

;; Query time: 177 msec
;; SERVER: 198.41.0.4#53(198.41.0.4)
;; WHEN: Sun Oct 13 21:52:44 AEDT 2019
;; MSG SIZE  rcvd: 564
```

Step3, query the server a.au. with IP address 58.65.254.73 to find the authoritative nameserver of edu.au. domain:

```
z5230655@vx2:/tmp_amd/reed/export/reed/3/z5230655$ dig @58.65.254.73 bongo01.cse.unsw.edu.au. NS

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> @58.65.254.73 bongo01.cse.unsw.edu.au. NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 47218
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 4, ADDITIONAL: 9
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;bongo01.cse.unsw.edu.au.        IN      NS

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

;; Query time: 14 msec
;; SERVER: 58.65.254.73#53(58.65.254.73)
;; WHEN: Sun Oct 13 22:03:48 AEDT 2019
;; MSG SIZE  rcvd: 292
```

Step4, query the server q.au. with IP address 65.22.196.1 to find the authoritative nameserver of unsw.edu.au domain:

```
z5230655@vx1:/tmp_amd/reed/export/reed/3/z5230655$ dig @65.22.196.1 bongo01.cse.
unsw.edu.au. NS

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> @65.22.196.1 bongo01.cse.unsw.edu.au. NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 32943
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 3, ADDITIONAL: 6
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;bongo01.cse.unsw.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: 7 msec
;; SERVER: 65.22.196.1#53(65.22.196.1)
;; WHEN: Sun Oct 13 23:57:55 AEDT 2019
;; MSG SIZE  rcvd: 210
```

Step5, query the server ns1.unsw.edu.au. with IP address 129.94.0.192 to find the authoritative nameserver of cse.unsw.edu.au domain:

```
z5230655@vx1:/tmp_amd/reed/export/reed/3/z5230655$ dig @129.94.0.192 bongo01.cse.unsw.edu.au. NS

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> @129.94.0.192 bongo01.cse.unsw.edu.au. NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 25520
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 2, ADDITIONAL: 5
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;bongo01.cse.unsw.edu.au.        IN      NS

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

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

;; Query time: 3 msec
;; SERVER: 129.94.0.192#53(129.94.0.192)
;; WHEN: Mon Oct 14 01:31:08 AEDT 2019
;; MSG SIZE  rcvd: 172
```

Step6, query the server beethoven.orchestra.cse.unsw.edu.au with IP address 129.94.208.3 to find the IP address of my machine bongo01.cse.unsw.edu.au.
(this query require the IP address directly so the query type is A not NS, whereas A is the default type so we don't need to specify)

From the answer section in the response below, the IP address of the machine bongo01.cse.unsw.edu.au. is 129.94.208.136.

In conclusion, five DNS servers were queried to get the authoritative answer. They are: the root domain a.root-servers.net, a.au, q.au, ns1.unsw.edu.au and beethoven.orchestra.cse.unsw.edu.au.

```
z5230655@vx1:/tmp_amd/reed/export/reed/3/z5230655$ dig @129.94.208.3 bongo01.cse.unsw.edu.au.

; <<>> DiG 9.9.5-9+deb8u18-Debian <<>> @129.94.208.3 bongo01.cse.unsw.edu.au.
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 7859
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;bongo01.cse.unsw.edu.au.        IN      A

;; ANSWER SECTION:
bongo01.cse.unsw.edu.au. 3600   IN      A       129.94.208.136

;; 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: 129.94.208.3#53(129.94.208.3)
;; WHEN: Mon Oct 14 01:33:00 AEDT 2019
;; MSG SIZE  rcvd: 156
```

 Q11:
Yes, one physical machine can have several names and/or IP addresses associated with it.
- One IP address can have multiple names as aliases.
- One machine can have multiple network interfaces, for example, one machine can have different network interfaces for bluetooth and WIFI, etc.
- Each network interface can also have multiple IP addresses. For example, one network interface card may have multiple ports, each port is associated with one IP address.