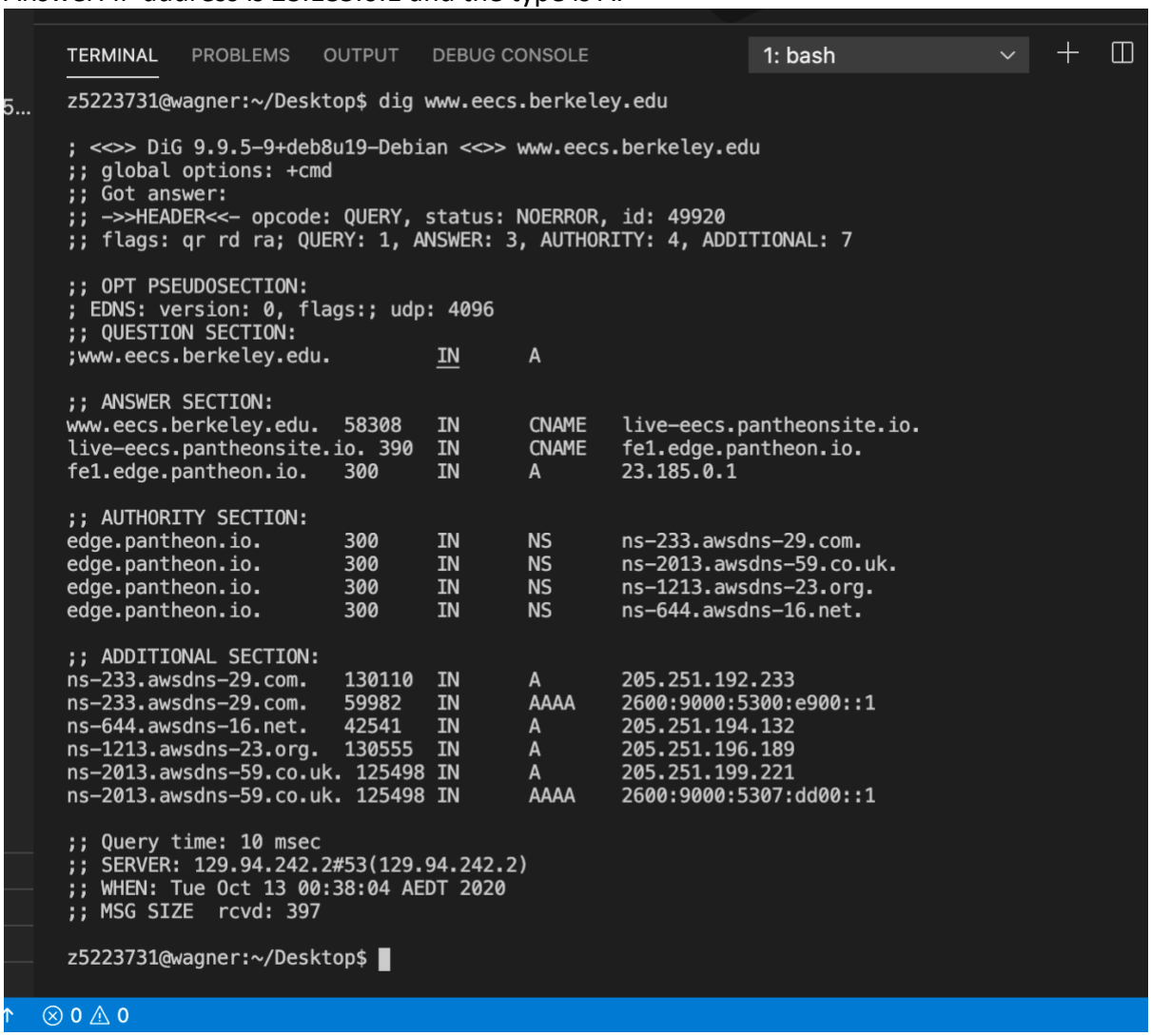
Written by XiaoHu z5223731
Exercise 3 Answer:

Question 1. What is the IP address of www.eecs.berkeley.edu . What type of DNS query is sent to get this answer?
Answer: IP address is 23.185.0.1 and the type is A.



Question 2. What is the canonical name for the eecs.berkeley web server (i.e. www.eecs.berkeley.edu)? Suggest a reason for having an alias for this server.
Answer: the canonical names are live-eecs.pantheonsite.io. and fe1.edge.pantheon.io. Unlike the alia name, canonical is more difficult to remember and alias can coexist with another records name.

Question 3. What can you make of the rest of the response (i.e. the details available in the Authority and Additional sections)?
Answer: the authority section contains all the authoritative name servers for edge.pantheon.io.
There are four names which are ns-233.awsdns-29.com., ns-2013.awsdns-59.co.uk., ns-1213.awsdns-23.org. and ns-644.awsdns-16.net.

The additional section contains all the IP addresses for the authoritative name servers.

Question 4. What is the IP address of the local nameserver for your machine?
Answer: 129.94.242.2

```
;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Tue Oct 13 01:18:59 AEDT 2020
;; MSG SIZE  rcvd: 397

z5223731@wagner:~/Desktop$
```

Question 5. What are the DNS nameservers for the "eecs.berkeley.edu." domain (note: the domain name is eecs.berkeley.edu and not www.eecs.berkeley.edu . This is an example of what is referred to as the apex/naked domain)? Find out their IP addresses? What type of DNS query is sent to obtain this information?

Answer: DNS nameservers	IP addresses	type
ns.CS.berkeley.edu.	169.229.60.61	IPV4
ns.eecs.berkeley.edu.	169.229.60.153	IPV4
adns1.berkeley.edu.	128.32.136.3	IPV4
adns2.berkeley.edu.	128.32.136.14	IPV4
adns3.berkeley.edu.	192.107.102.142	IPV4
adns1.berkeley.edu.	2607:f140:ffff:fffe::3	IPV6
adns2.berkeley.edu.	2607:f140:ffff:fffe::e	IPV6
adns3.berkeley.edu.	2607:f140:a000:d::abc	IPV6

```
z5223731@wagner:~/Desktop$ dig eecs.berkeley.edu NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> eecs.berkeley.edu NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 64433
;; flags: qr rd ra; QUERY: 1, ANSWER: 5, AUTHORITY: 0, ADDITIONAL: 9

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

;; ANSWER SECTION:
eecs.berkeley.edu.      78349   IN      NS      ns.CS.berkeley.edu.
eecs.berkeley.edu.      78349   IN      NS      ns.eecs.berkeley.edu.
eecs.berkeley.edu.      78349   IN      NS      adns3.berkeley.edu.
eecs.berkeley.edu.      78349   IN      NS      adns1.berkeley.edu.
eecs.berkeley.edu.      78349   IN      NS      adns2.berkeley.edu.

;; ADDITIONAL SECTION:
ns.CS.berkeley.edu.     63547   IN      A       169.229.60.61
ns.eecs.berkeley.edu.   84589   IN      A       169.229.60.153
adns1.berkeley.edu.     5235    IN      A       128.32.136.3
adns1.berkeley.edu.     5235    IN      AAAA    2607:f140:ffff:fffe::3
adns2.berkeley.edu.     10481   IN      A       128.32.136.14
adns2.berkeley.edu.     5235    IN      AAAA    2607:f140:ffff:fffe::e
adns3.berkeley.edu.     3355    IN      A       192.107.102.142
adns3.berkeley.edu.     5235    IN      AAAA    2607:f140:a000:d::abc

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Tue Oct 13 01:26:05 AEDT 2020
;; MSG SIZE  rcvd: 307
```

The type of DNS query sent is NS query.

Question 6. What is the DNS name associated with the IP address 111.68.101.54? What type of DNS query is sent to obtain this information?
Answer: DNS name is webserver.seecs.nust.edu.pk.
The type of DNS query sent is PTR.

```
z5223731@wagner:~/Desktop$ dig -x 111.68.101.54

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> -x 111.68.101.54
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 13987
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 3

;; 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. 3152 IN     PTR     webserver.seecs.nust.edu.pk.

;; AUTHORITY SECTION:
101.68.111.in-addr.arpa. 39934  IN      NS      ns1.hec.gov.pk.
101.68.111.in-addr.arpa. 39934  IN      NS      ns2.hec.gov.pk.

;; ADDITIONAL SECTION:
ns1.hec.gov.pk.         3593    IN      A       103.4.93.5
ns2.hec.gov.pk.         3593    IN      A       103.4.93.6

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Tue Oct 13 01:37:09 AEDT 2020
;; MSG SIZE  rcvd: 172
```

Question 7. 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? (HINT: Just because a response contains information in the authoritative part of the DNS response message does not mean it came from an authoritative name server. You should examine the flags in the response to determine the answer)

Answer: There is no authoritative answer because the flags field doesn't contain aa which stands for authoritative answer. The reason why is CSE nameserver doesn't have authority over yahoo domain.

```
z5223731@wagner:~/Desktop$ dig @129.94.242.33 yahoo.com MX

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @129.94.242.33 yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 59346
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 10

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

;; ANSWER SECTION:
yahoo.com.              1420    IN      MX      1 mta6.am0.yahoodns.net.
yahoo.com.              1420    IN      MX      1 mta7.am0.yahoodns.net.
yahoo.com.              1420    IN      MX      1 mta5.am0.yahoodns.net.

;; AUTHORITY SECTION:
yahoo.com.              34918   IN      NS      ns1.yahoo.com.
yahoo.com.              34918   IN      NS      ns4.yahoo.com.
yahoo.com.              34918   IN      NS      ns3.yahoo.com.
yahoo.com.              34918   IN      NS      ns2.yahoo.com.
yahoo.com.              34918   IN      NS      ns5.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.          29356   IN      A       68.180.131.16
ns1.yahoo.com.          44083   IN      AAAA    2001:4998:130::1001
ns2.yahoo.com.          46783   IN      A       68.142.255.16
ns2.yahoo.com.          69833   IN      AAAA    2001:4998:140::1002
ns3.yahoo.com.          273     IN      A       27.123.42.42
ns3.yahoo.com.          273     IN      AAAA    2406:8600:f03f:1f8::1003
ns4.yahoo.com.          41218   IN      A       98.138.11.157
ns5.yahoo.com.          8038    IN      A       202.165.97.53
ns5.yahoo.com.          8038    IN      AAAA    2406:2000:ff60::53

;; Query time: 1 msec
;; SERVER: 129.94.242.33#53(129.94.242.33)
;; WHEN: Tue Oct 13 01:41:18 AEDT 2020
;; MSG SIZE  rcvd: 399
```

Question 8. Repeat the above (i.e. Question 7) but use one of the nameservers obtained in Question 5. What is the result?

There is no response at total because the status is REFUSED.

```
z5223731@wagner:~/Desktop$ dig @ns.eecs.berkeley.edu yahoo.com MX

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @ns.eecs.berkeley.edu yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 44063
;; 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: 166 msec
;; SERVER: 169.229.60.153#53(169.229.60.153)
;; WHEN: Tue Oct 13 01:52:27 AEDT 2020
;; MSG SIZE  rcvd: 38
```

Question 9. Obtain the authoritative answer for the mail servers for Yahoo! mail. What type of DNS query is sent to obtain this information?

```
z5223731@wagner:~/Desktop$ dig @ns1.yahoo.com yahoo.com MX

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @ns1.yahoo.com yahoo.com MX
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 6281
;; flags: qr aa rd; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 10
;; 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 mta5.am0.yahoodns.net.
yahoo.com.              1800    IN      MX      1 mta7.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      ns5.yahoo.com.
yahoo.com.              172800  IN      NS      ns1.yahoo.com.
yahoo.com.              172800  IN      NS      ns2.yahoo.com.
yahoo.com.              172800  IN      NS      ns3.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.          86400   IN      A       202.165.97.53
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
ns5.yahoo.com.          86400   IN      AAAA    2406:2000:ff60::53

;; Query time: 155 msec
;; SERVER: 68.180.131.16#53(68.180.131.16)
;; WHEN: Tue Oct 13 01:56:46 AEDT 2020
;; MSG SIZE  rcvd: 399
```

Answer: using one of the nameservers from authority section in Q7 to send query to yahoo. The type of DNS query sent is MX

Question 10. 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). If you are using VLAB Then find the IP address of one of the following: lyre00.cse.unsw.edu.au, lyre01.cse.unsw.edu.au, drum00.cse.unsw.edu.au or drum01.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?

Answer: we send NS DNS query to our root

```
z5223731@wagner:~/Desktop$ dig . NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> . NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 42487
;; 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:
.                       378757  IN      NS      c.root-servers.net.
.                       378757  IN      NS      b.root-servers.net.
.                       378757  IN      NS      l.root-servers.net.
.                       378757  IN      NS      j.root-servers.net.
.                       378757  IN      NS      k.root-servers.net.
.                       378757  IN      NS      d.root-servers.net.
.                       378757  IN      NS      h.root-servers.net.
.                       378757  IN      NS      m.root-servers.net.
.                       378757  IN      NS      i.root-servers.net.
.                       378757  IN      NS      a.root-servers.net.
.                       378757  IN      NS      g.root-servers.net.
.                       378757  IN      NS      e.root-servers.net.
.                       378757  IN      NS      f.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net.     36768   IN      A       198.41.0.4
a.root-servers.net.     141567  IN      AAAA    2001:503:ba3e::2:30
b.root-servers.net.     150682  IN      A       199.9.14.201
b.root-servers.net.     517893  IN      AAAA    2001:500:200::b
c.root-servers.net.     591504  IN      A       192.33.4.12
c.root-servers.net.     591504  IN      AAAA    2001:500:2::c
d.root-servers.net.     591501  IN      A       199.7.91.13
d.root-servers.net.     591829  IN      AAAA    2001:500:2d::d
e.root-servers.net.     241874  IN      A       192.203.230.10
e.root-servers.net.     133153  IN      AAAA    2001:500:a8::e
f.root-servers.net.     204315  IN      A       192.5.5.241
f.root-servers.net.     604482  IN      AAAA    2001:500:2f::f
g.root-servers.net.     69082   IN      A       192.112.36.4
g.root-servers.net.     514137  IN      AAAA    2001:500:12::d0d
h.root-servers.net.     78576   IN      A       198.97.190.53
h.root-servers.net.     484406  IN      AAAA    2001:500:1::53
i.root-servers.net.     52335   IN      A       192.36.148.17
i.root-servers.net.     52335   IN      AAAA    2001:7fe::53
j.root-servers.net.     54201   IN      A       192.58.128.30
j.root-servers.net.     51173   IN      AAAA    2001:503:c27::2:30
k.root-servers.net.     53503   IN      A       193.0.14.129
k.root-servers.net.     223103  IN      AAAA    2001:7fd::1
l.root-servers.net.     115945  IN      A       199.7.83.42
l.root-servers.net.     483173  IN      AAAA    2001:500:9f::42
m.root-servers.net.     108167  IN      A       202.12.27.33
m.root-servers.net.     496562  IN      AAAA    2001:dc3::35

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Tue Oct 13 02:03:54 AEDT 2020
;; MSG SIZE  rcvd: 811

z5223731@wagner:~/Desktop$
```

```
z5223731@wagner:~/Desktop$ dig @a.root-servers.net. au. NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @a.root-servers.net. au. NS
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 8063
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 9, ADDITIONAL: 19
;; WARNING: recursion requested but not available

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

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

;; ADDITIONAL SECTION:
m.au.                   172800  IN      A       156.154.100.24
m.au.                   172800  IN      AAAA    2001:502:2eda::24
d.au.                   172800  IN      A       162.159.25.38
d.au.                   172800  IN      AAAA    2400:cb00:2049:1::a29f:1926
q.au.                   172800  IN      A       65.22.196.1
q.au.                   172800  IN      AAAA    2a01:8840:be::1
t.au.                   172800  IN      A       65.22.199.1
t.au.                   172800  IN      AAAA    2a01:8840:c1::1
s.au.                   172800  IN      A       65.22.198.1
s.au.                   172800  IN      AAAA    2a01:8840:c0::1
r.au.                   172800  IN      A       65.22.197.1
r.au.                   172800  IN      AAAA    2a01:8840:bf::1
n.au.                   172800  IN      A       156.154.101.24
n.au.                   172800  IN      AAAA    2001:502:ad09::24
a.au.                   172800  IN      A       58.65.254.73
a.au.                   172800  IN      AAAA    2407:6e00:254:306::73
c.au.                   172800  IN      A       162.159.24.179
c.au.                   172800  IN      AAAA    2400:cb00:2049:1::a29f:18b3

;; Query time: 119 msec
;; SERVER: 198.41.0.4#53(198.41.0.4)
;; WHEN: Tue Oct 13 02:10:31 AEDT 2020
;; MSG SIZE  rcvd: 571

z5223731@wagner:~/Desktop$
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```
z5223731@wagner:~/Desktop$ dig @m.au. edu.au. NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @m.au. edu.au. NS
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 61116
;; 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:
;edu.au.                                IN      NS

;; AUTHORITY SECTION:
edu.au.                 86400   IN      NS      s.au.
edu.au.                 86400   IN      NS      r.au.
edu.au.                 86400   IN      NS      q.au.
edu.au.                 86400   IN      NS      t.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: 156.154.100.24#53(156.154.100.24)
;; WHEN: Tue Oct 13 02:19:25 AEDT 2020
;; MSG SIZE  rcvd: 275
```

```
z5223731@wagner:~/Desktop$ dig @q.au. unsw.edu.au. NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @q.au. unsw.edu.au. NS
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 39237
;; 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:
;unsw.edu.au.                   IN      NS

;; AUTHORITY SECTION:
unsw.edu.au.            900     IN      NS      ns3.unsw.edu.au.
unsw.edu.au.            900     IN      NS      ns1.unsw.edu.au.
unsw.edu.au.            900     IN      NS      ns2.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: 24 msec
;; SERVER: 65.22.196.1#53(65.22.196.1)
;; WHEN: Tue Oct 13 02:20:21 AEDT 2020
;; MSG SIZE  rcvd: 198
```

```
z5223731@wagner:~/Desktop$ dig @ns1.unsw.edu.au. cse.unsw.edu.au. NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @ns1.unsw.edu.au. cse.unsw.edu.au. NS
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 4232
;; 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:
;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 129.94.172.11
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
maestro.orchestra.cse.unsw.edu.au. 10800 IN A   129.94.242.33

;; Query time: 4 msec
;; SERVER: 129.94.0.192#53(129.94.0.192)
;; WHEN: Tue Oct 13 02:21:29 AEDT 2020
;; MSG SIZE  rcvd: 164

z5223731@wagner:~/Desktop$
```

```
z5223731@wagner:~/Desktop$ dig @maestro.orchestra.cse.unsw.edu.au. lyre00.cse.unsw.edu.au

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @maestro.orchestra.cse.unsw.edu.au. lyre00.cse.unsw.edu.
au
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 20520
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;lyre00.cse.unsw.edu.au.                IN      A

;; ANSWER SECTION:
lyre00.cse.unsw.edu.au. 3600    IN      A       129.94.210.20

;; AUTHORITY SECTION:
cse.unsw.edu.au.        3600    IN      NS      beethoven.orchestra.cse.unsw.edu.au.
cse.unsw.edu.au.        3600    IN      NS      maestro.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: 2 msec
;; SERVER: 129.94.242.33#53(129.94.242.33)
;; WHEN: Tue Oct 13 02:25:31 AEDT 2020
;; MSG SIZE  rcvd: 155

z5223731@wagner:~/Desktop$
```

```
z5223731@wagner:~/Desktop$ hostname -f
wagner.orchestra.cse.unsw.EDU.AU
```

```
z5223731@wagner:~/Desktop$ hostname -f
wagner.orchestra.cse.unsw.EDU.AU
z5223731@wagner:~/Desktop$ dig @maestro.orchestra.cse.unsw.edu.au. wagner.orchestra.cse.unsw.ED
U.AU

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @maestro.orchestra.cse.unsw.edu.au. wagner.orchestra.cse
.unsw.EDU.AU
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 60547
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;wagner.orchestra.cse.unsw.EDU.AU. IN   A

;; ANSWER SECTION:
wagner.orchestra.cse.unsw.EDU.AU. 3600 IN A     129.94.242.19

;; AUTHORITY SECTION:
orchestra.cse.unsw.EDU.AU. 3600 IN      NS      beethoven.orchestra.cse.unsw.EDU.AU.
orchestra.cse.unsw.EDU.AU. 3600 IN      NS      maestro.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: 1 msec
;; SERVER: 129.94.242.33#53(129.94.242.33)
;; WHEN: Tue Oct 13 02:26:48 AEDT 2020
;; MSG SIZE  rcvd: 155

z5223731@wagner:~/Desktop$
```

There are 5 DNS servers: a.root-servers.net. m.au. q.au.
ns1.unsw.edu.au maestro.orchestra.cse.unsw.edu.au.

The IP of our own is 129.94.242.19

The IP of lyre00.cse.unsw.edu.au is 129.94.210.20

Question 11. Can one physical machine have several names and/or IP addresses associated with it?
Answer: definitely yes. One physical machine can have several names and/or IP addresses associated with it and one IP address can have several aliases but associated with one canonical name.