COMP3331 Lab03 Report

Exercise 3.

Question 1.

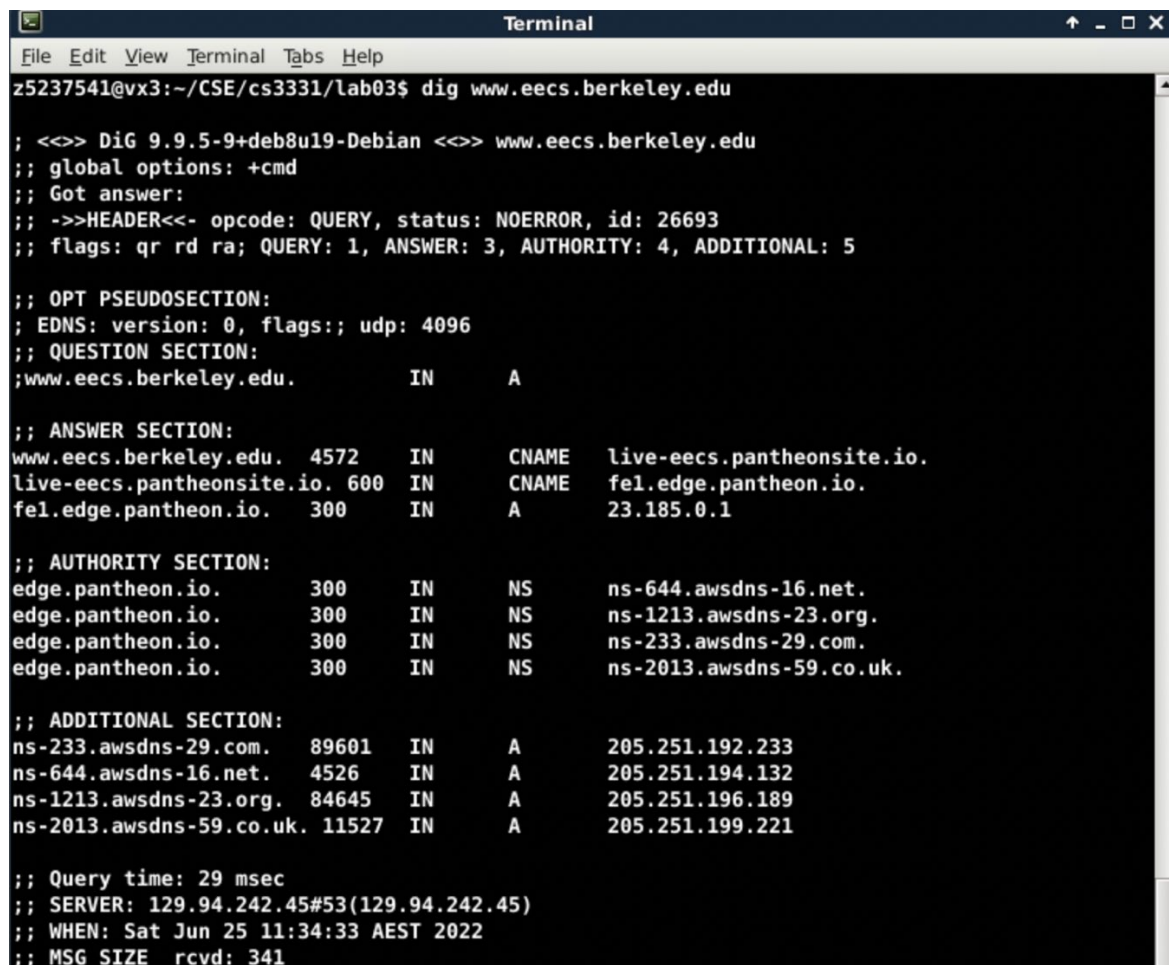The IP address of www.eecs.berkeley.edu is **23.185.0.1**. The type of DNS query is **A (address)**.

Question 2.

The canonical name of www.eecs.berkeley.edu is live-eecs.pantheon.io and fel.edge.pantheon.io. Although both Alias and Canonical Name are mapping a name to another name, Alias could co-exist with other records on that name while Canonical Name could not. Therefore, Alias would be flexible and has faster connectivity than Canonical Name.

Question 3.

In the authority section, it contains four different authoritative nameservers regarding the record (edge.pantheon.io). In the additional section, there are four different IP addresses of the nameservers we get it in the authority section.

Question 4.

The IP address of the local nameserver is **129.94.242.45** for CSE network.

```
z5237541@vx3:~/CSE/cs3331/lab03$ dig www.eecs.berkeley.edu

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> www.eecs.berkeley.edu
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 26693
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 4, ADDITIONAL: 5

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

;; ANSWER SECTION:
www.eecs.berkeley.edu.   4572    IN      CNAME    live-eecs.pantheonsite.io.
live-eecs.pantheonsite.io. 600   IN      CNAME    fel.edge.pantheon.io.
fel.edge.pantheon.io.    300     IN      A        23.185.0.1

;; AUTHORITY SECTION:
edge.pantheon.io.        300     IN      NS       ns-644.awsdns-16.net.
edge.pantheon.io.        300     IN      NS       ns-1213.awsdns-23.org.
edge.pantheon.io.        300     IN      NS       ns-233.awsdns-29.com.
edge.pantheon.io.        300     IN      NS       ns-2013.awsdns-59.co.uk.

;; ADDITIONAL SECTION:
ns-233.awsdns-29.com.    89601   IN      A        205.251.192.233
ns-644.awsdns-16.net.    4526    IN      A        205.251.194.132
ns-1213.awsdns-23.org.   84645   IN      A        205.251.196.189
ns-2013.awsdns-59.co.uk. 11527   IN      A        205.251.199.221

;; Query time: 29 msec
;; SERVER: 129.94.242.45#53(129.94.242.45)
;; WHEN: Sat Jun 25 11:34:33 AEST 2022
;; MSG SIZE  rcvd: 341
```

Question 5.

Nameservers	IPV4 (IP address version 4)	IPV6 (IP address version 6)
adns1. berkeley.edu	128.32.136.3	2607:f140:ffff:fffe::3
ns.eecs. berkeley.edu	169:229:60:153	2607:f140:8:1260::30
adns3. berkeley.edu	192.107.102.142	2607:f140:a000:d::abc
adns2. berkeley.edu	128.32.136.14	2607:f140:ffff:fffe::e
ns.CS.berkeley.edu	169.229.60.61	2607:f140:8:1260::30

NS (nameserver) query is sent to obtain the information below.

```
Terminal                                                              ↑ _ ☐ X

File  Edit  View  Terminal  Tabs  Help

z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$ 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: 15680
;; flags: qr rd ra; QUERY: 1, ANSWER: 5, AUTHORITY: 0, ADDITIONAL: 11

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

;; ANSWER SECTION:
eecs.berkeley.edu.     70209   IN      NS      adns1.berkeley.edu.
eecs.berkeley.edu.     70209   IN      NS      ns.eecs.berkeley.edu.
eecs.berkeley.edu.     70209   IN      NS      adns3.berkeley.edu.
eecs.berkeley.edu.     70209   IN      NS      adns2.berkeley.edu.
eecs.berkeley.edu.     70209   IN      NS      ns.CS.berkeley.edu.

;; ADDITIONAL SECTION:
ns.CS.berkeley.edu.    10082   IN      A       169.229.60.61
ns.CS.berkeley.edu.    10082   IN      AAAA    2607:f140:8:1260::30
ns.eecs.berkeley.edu.  68647   IN      A       169.229.60.153
ns.eecs.berkeley.edu.  80010   IN      AAAA    2607:f140:8:2160::30
adns1.berkeley.edu.    2750    IN      A       128.32.136.3
adns1.berkeley.edu.    323     IN      AAAA    2607:f140:ffff:fffe::3
adns2.berkeley.edu.    9995    IN      A       128.32.136.14
adns2.berkeley.edu.    323     IN      AAAA    2607:f140:ffff:fffe::e
adns3.berkeley.edu.    10600   IN      A       192.107.102.142
adns3.berkeley.edu.    323     IN      AAAA    2607:f140:a000:d::abc

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sat Jun 25 15:26:20 AEST 2022
;; MSG SIZE  rcvd: 363

z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$ ▌
```

Question 6.

To obtain the DNS name of the IP address 111.68.101.54, we used dig -x IP-address. The -x refers to the reverse lookups, mapping address to name.

The DNS name for 111.68.101.54 is **webser.seecs.nust.edu.pk**. **Pointer Record (PTR)** query is sent to obtain this information below.

```
Terminal
File  Edit  View  Terminal  Tabs  Help
z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$ 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: 20685
;; 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. 2590 IN      PTR      webserver.seecs.nust.edu.pk.

;; AUTHORITY SECTION:
101.68.111.in-addr.arpa. 1345    IN      NS       ns1.hec.gov.pk.
101.68.111.in-addr.arpa. 1345    IN      NS       ns2.hec.gov.pk.

;; ADDITIONAL SECTION:
ns1.hec.gov.pk.          2590    IN      A        103.4.93.5
ns2.hec.gov.pk.          2590    IN      A        103.4.93.6

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sat Jun 25 16:17:46 AEST 2022
;; MSG SIZE  rcvd: 172

z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Question 7.

The flags in the DNS Header do not contain **aa** which it will only be specified when the response is an authoritative answer. Therefore, we did not get the authoritative answer. The reason why we do not get it is because Yahoo prevent users who are not part of their network from accessing DNS queries to their network. Therefore, there is no authoritative answer when UNSW CSE network digs the mail server of Yahoo.

```
                                                   Terminal
File  Edit  View  Terminal  Tabs  Help
z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$ 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: 45142
;; 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.              660     IN      MX      1 mta5.am0.yahoodns.net.
yahoo.com.              660     IN      MX      1 mta6.am0.yahoodns.net.
yahoo.com.              660     IN      MX      1 mta7.am0.yahoodns.net.

;; AUTHORITY SECTION:
yahoo.com.              61612   IN      NS      ns3.yahoo.com.
yahoo.com.              61612   IN      NS      ns2.yahoo.com.
yahoo.com.              61612   IN      NS      ns4.yahoo.com.
yahoo.com.              61612   IN      NS      ns1.yahoo.com.
yahoo.com.              61612   IN      NS      ns5.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.          344420  IN      A       68.180.131.16
ns1.yahoo.com.          81073   IN      AAAA    2001:4998:1b0::7961:686f:6f21
ns2.yahoo.com.          327820  IN      A       68.142.255.16
ns2.yahoo.com.          707     IN      AAAA    2001:4998:1c0::7961:686f:6f21
ns3.yahoo.com.          634     IN      A       27.123.42.42
ns3.yahoo.com.          634     IN      AAAA    2406:8600:f03f:1f8::1003
ns4.yahoo.com.          152277  IN      A       98.138.11.157
ns5.yahoo.com.          3953    IN      A       202.165.97.53
ns5.yahoo.com.          3953    IN      AAAA    2406:2000:1d0::7961:686f:6f21

;; Query time: 0 msec
;; SERVER: 129.94.242.33#53(129.94.242.33)
;; WHEN: Sat Jun 25 16:54:03 AEST 2022
;; MSG SIZE  rcvd: 399

z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Question 8.

From the image below, we could see that the status is **REFUSED** and there is no **aa** flag when we used adns2.berkeley.edu as the query to dig the mail server of yahoo.com.

```
                                    Terminal
File  Edit  View  Terminal  Tabs  Help
z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$ dig @adns2.berkeley.edu yahoo.com MX

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @adns2.berkeley.edu yahoo.com MX
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 37107
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1220
;; QUESTION SECTION:
;yahoo.com.                     IN      MX

;; Query time: 165 msec
;; SERVER: 128.32.136.14#53(128.32.136.14)
;; WHEN: Sat Jun 25 17:00:05 AEST 2022
;; MSG SIZE  rcvd: 38

z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$
```

However, if we use adns2.berkeley.edu as the query to dig the server of eecs.berkeley.edu, the status is **NOERROR** and there is **aa** flag since both are under the same network.

Therefore, we could conclude that there will be authoritative answer only when both queries are under the same network.

```
                                    Terminal
File  Edit  View  Terminal  Tabs  Help
z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$ dig @adns2.berkeley.edu eecs.berkeley.edu

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @adns2.berkeley.edu eecs.berkeley.edu
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 64004
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1220
;; QUESTION SECTION:
;eecs.berkeley.edu.             IN      A

;; ANSWER SECTION:
eecs.berkeley.edu.      86400   IN      A       23.185.0.1

;; Query time: 165 msec
;; SERVER: 128.32.136.14#53(128.32.136.14)
;; WHEN: Sat Jun 25 16:58:00 AEST 2022
;; MSG SIZE  rcvd: 62

z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Question 9.

To obtain the authoritative answers of Yahoo! Mail, we could use the nameservers we obtained from authority section in Q7. Using **ns3.yahoo.com** as the query, we get the authoritative answer with **NOERROR** status and **aa** flag which are the followings:
1. mta6.am0.yahoodns.net
2. mta5.am0.yahoodns.net
3. mta7.am0.yahoodns.net

Mail Exchange (MX) query is sent to obtain the information below.

```
                                                    Terminal
 File  Edit  View  Terminal  Tabs  Help
z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$ dig @ns3.yahoo.com yahoo.com MX

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @ns3.yahoo.com yahoo.com MX
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 31593
;; 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 mta6.am0.yahoodns.net.
yahoo.com.              1800    IN      MX      1 mta5.am0.yahoodns.net.
yahoo.com.              1800    IN      MX      1 mta7.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      ns3.yahoo.com.
yahoo.com.              172800  IN      NS      ns1.yahoo.com.
yahoo.com.              172800  IN      NS      ns2.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    2001:4998:1b0::7961:686f:6f21
ns2.yahoo.com.          86400   IN      AAAA    2001:4998:1c0::7961:686f:6f21
ns3.yahoo.com.          1800    IN      AAAA    2406:8600:f03f:1f8::1003
ns5.yahoo.com.          86400   IN      AAAA    2406:2000:1d0::7961:686f:6f21

;; Query time: 398 msec
;; SERVER: 27.123.42.42#53(27.123.42.42)
;; WHEN: Sat Jun 25 17:06:15 AEST 2022
;; MSG SIZE  rcvd: 399

z5237541@vx8:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Question 10.

Command: dig . NS

```
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$ dig . NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> . NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 25530
;; 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:
.                     41098    IN      NS      c.root-servers.net.
.                     41098    IN      NS      h.root-servers.net.
.                     41098    IN      NS      l.root-servers.net.
.                     41098    IN      NS      k.root-servers.net.
.                     41098    IN      NS      a.root-servers.net.
.                     41098    IN      NS      g.root-servers.net.
.                     41098    IN      NS      j.root-servers.net.
.                     41098    IN      NS      f.root-servers.net.
.                     41098    IN      NS      e.root-servers.net.
.                     41098    IN      NS      m.root-servers.net.
.                     41098    IN      NS      d.root-servers.net.
.                     41098    IN      NS      i.root-servers.net.
.                     41098    IN      NS      b.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net.   222325   IN      A       198.41.0.4
a.root-servers.net.   111706   IN      AAAA    2001:503:ba3e::2:30
b.root-servers.net.   265706   IN      A       199.9.14.201
b.root-servers.net.   4284     IN      AAAA    2001:500:200::b
c.root-servers.net.   266274   IN      A       192.33.4.12
c.root-servers.net.   593177   IN      AAAA    2001:500:2::c
d.root-servers.net.   56095    IN      A       199.7.91.13
d.root-servers.net.   266299   IN      AAAA    2001:500:2d::d
e.root-servers.net.   56095    IN      A       192.203.230.10
e.root-servers.net.   265706   IN      AAAA    2001:500:a8::e
f.root-servers.net.   328824   IN      A       192.5.5.241
f.root-servers.net.   266299   IN      AAAA    2001:500:2f::f
g.root-servers.net.   307524   IN      A       192.112.36.4
g.root-servers.net.   593177   IN      AAAA    2001:500:12::d0d
h.root-servers.net.   5013     IN      A       198.97.190.53
h.root-servers.net.   266274   IN      AAAA    2001:500:1::53
i.root-servers.net.   593176   IN      A       192.36.148.17
i.root-servers.net.   265706   IN      AAAA    2001:7fe::53
j.root-servers.net.   328824   IN      A       192.58.128.30
j.root-servers.net.   265706   IN      AAAA    2001:503:c27::2:30
k.root-servers.net.   328824   IN      A       193.0.14.129
k.root-servers.net.   62273    IN      AAAA    2001:7fd::1
l.root-servers.net.   526059   IN      A       199.7.83.42
l.root-servers.net.   265706   IN      AAAA    2001:500:9f::42
m.root-servers.net.   214568   IN      A       202.12.27.33
m.root-servers.net.   266274   IN      AAAA    2001:dc3::35

;; Query time: 0 msec
;; SERVER: 129.94.242.45#53(129.94.242.45)
;; WHEN: Sat Jun 25 21:24:48 AEST 2022
;; MSG SIZE  rcvd: 811

z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Command: dig @a.root-servers.net. au. NS


```
File  Edit  View  Terminal  Tabs  Help
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$ dig @a.root-servers.net. au. NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @a.root-servers.net. au. NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 57544
;; 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:
;au.                              IN      NS

;; AUTHORITY SECTION:
au.                     172800  IN      NS      q.au.
au.                     172800  IN      NS      t.au.
au.                     172800  IN      NS      s.au.
au.                     172800  IN      NS      r.au.

;; ADDITIONAL SECTION:
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

;; Query time: 139 msec
;; SERVER: 198.41.0.4#53(198.41.0.4)
;; WHEN: Sat Jun 25 21:26:26 AEST 2022
;; MSG SIZE  rcvd: 271

z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Command: dig @q.au edu.au. NS


```
File  Edit  View  Terminal  Tabs  Help
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$ dig @q.au. edu.au. NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @q.au. edu.au. NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 21190
;; flags: qr aa rd; QUERY: 1, ANSWER: 4, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
;; QUESTION SECTION:
;edu.au.                              IN      NS

;; ANSWER SECTION:
edu.au.                 900     IN      NS      s.au.
edu.au.                 900     IN      NS      t.au.
edu.au.                 900     IN      NS      r.au.
edu.au.                 900     IN      NS      q.au.

;; Query time: 24 msec
;; SERVER: 65.22.196.1#53(65.22.196.1)
;; WHEN: Sat Jun 25 21:27:21 AEST 2022
;; MSG SIZE  rcvd: 99

z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Command: dig @q.au unsw.edu.au. NS

```
File  Edit  View  Terminal  Tabs  Help
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$ dig @q.au. unsw.edu.au. NS

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @q.au. unsw.edu.au. NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 43397
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 3, ADDITIONAL: 6
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
;; 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      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: 24 msec
;; SERVER: 65.22.196.1#53(65.22.196.1)
;; WHEN: Sat Jun 25 21:28:12 AEST 2022
;; MSG SIZE  rcvd: 198

z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Command: dig @ns1.unsw.edu.au cse.unsw.edu.au. NS

```
File  Edit  View  Terminal  Tabs  Help
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$ 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
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 1936
;; 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.        300      IN      NS      maestro.orchestra.cse.unsw.edu.au.
cse.unsw.edu.au.        300      IN      NS      beethoven.orchestra.cse.unsw.edu.au.

;; ADDITIONAL SECTION:
beethoven.orchestra.cse.unsw.edu.au. 300 IN A    129.94.242.2
beethoven.orchestra.cse.unsw.edu.au. 300 IN A    129.94.172.11
beethoven.orchestra.cse.unsw.edu.au. 300 IN A    129.94.208.3
maestro.orchestra.cse.unsw.edu.au. 300 IN A      129.94.242.33

;; Query time: 4 msec
;; SERVER: 129.94.0.192#53(129.94.0.192)
;; WHEN: Sat Jun 25 21:29:15 AEST 2022
;; MSG SIZE  rcvd: 164

z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$
```

The nameserver of the machine: vx5.orchestra.cse.unsw.edu.au

```
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$ hostname -f
vx5.orchestra.cse.unsw.EDU.AU
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$
```

Command: dig @maestro.orchestra.cse.unsw.edu.au. vx5.orchestra.cse.unsw.edu.au NS

```
File  Edit  View  Terminal  Tabs  Help
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$ dig @maestro.orchestra.cse.unsw.edu.au. vx5.orchestra.cse.unsw.edu.au. A

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @maestro.orchestra.cse.unsw.edu.au. vx5.orchestra.cse.unsw.edu.au. A
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 35836
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;vx5.orchestra.cse.unsw.edu.au. IN      A

;; ANSWER SECTION:
vx5.orchestra.cse.unsw.EDU.AU. 3600 IN  A       129.94.242.118

;; AUTHORITY SECTION:
orchestra.cse.unsw.EDU.AU. 3600 IN      NS      maestro.orchestra.cse.unsw.EDU.AU.
orchestra.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: 129.94.242.33#53(129.94.242.33)
;; WHEN: Sat Jun 25 21:32:55 AEST 2022
;; MSG SIZE  rcvd: 181

z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$
```

For finding the IP address of lyre01.cse.unsw.edu.au:
Command: dig @maestro.orchestra.cse.unsw.edu.au. lyre01.cse.unsw.edu.au A

```
File  Edit  View  Terminal  Tabs  Help
z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$ dig @maestro.orchestra.cse.unsw.edu.au. lyre01.cse.unsw.edu.au. A

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @maestro.orchestra.cse.unsw.edu.au. lyre01.cse.unsw.edu.au. A
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 22170
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;lyre01.cse.unsw.edu.au.                IN      A

;; ANSWER SECTION:
lyre01.cse.unsw.EDU.AU. 3600    IN      A       129.94.210.21

;; 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: 129.94.242.33#53(129.94.242.33)
;; WHEN: Sat Jun 25 21:35:55 AEST 2022
;; MSG SIZE  rcvd: 177

z5237541@vx5:/tmp_amd/kamen/export/kamen/5/z5237541$
```

The IP address of the CSE machine is **129.94.242.118**.

The IP address of lyre01.cse.unsw.edu.au is **129.94.210.21**.

To obtain the authoritative answer, we need to query **5 DNS servers** as the followings:
1. a.root-servers.net.
2. q.au.
3. q.au.
4. ns1.unsw.edu.au.
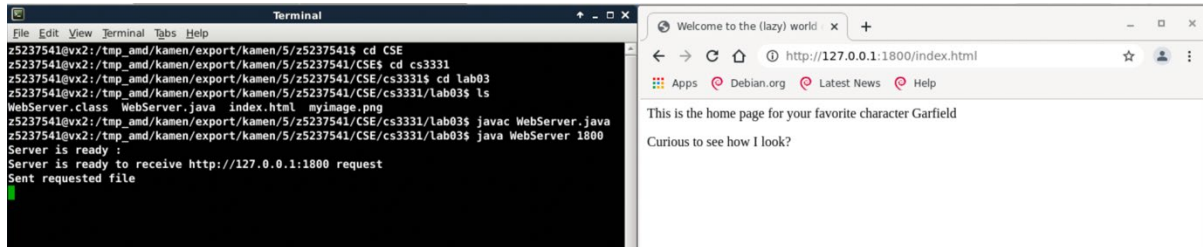5. maestro.orchestra.cse.unsw.edu.au.

Question 11.

One physical machine **could have** multiple names and IP addresses. The reason why it can have multiple names and IP addresses is because it is presented on more than one separate subnetwork or network.
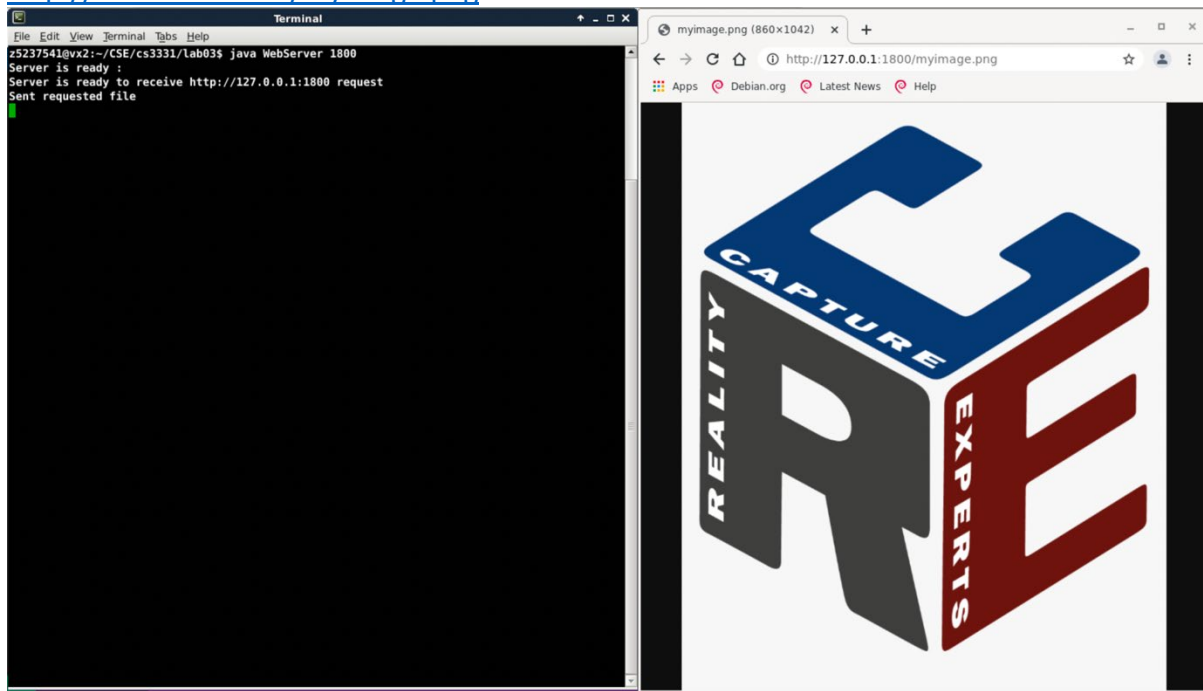
Exercise 4.

Using Java programming language
Port = 1800

http://127.0.0.1:1800/index.html

http://127.0.0.1:1800/myimage.png

http://127.0.0.1:1800/bio.html