

Lab3

ZID: Z5239803

Exercise 3:

Q1: The IP address of www.eecs.berkeley.edu is 23.185.0.1, and the DNS query type is type A.

```
z5239803@vx2:/tmp_amd/glass/export/glass/1/z5239803/Desktop$ 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: 24252
;; 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.  55798  IN      CNAME   live-eecs.pantheonsite.io.
live-eecs.pantheonsite.io. 600    IN      CNAME   fe1.edge.pantheon.io.
fe1.edge.pantheon.io.    300    IN      A       23.185.0.1
```

Q2: The canonical name is live-eeecs.pantheonsite.io, a reason would be alias could be simpler for clients to remember.

```
z5239803@vx2:/tmp_amd/glass/export/glass/1/z5239803/Desktop$ dig www.eecs.berkeley.edu CNAME
```

```
; <<> DiG 9.9.5-9+deb8u19-Debian <<> www.eecs.berkeley.edu CNAME
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 46262
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 5, ADDITIONAL: 9

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

;; ANSWER SECTION:
www.eecs.berkeley.edu.  53058  IN      CNAME   live-eecs.pantheonsite.io.
```

Q3: The authority section contains the domain and different name servers.

```
;; AUTHORITY SECTION:
eecs.berkeley.edu.      74300   IN      NS      ns.CS.berkeley.edu.
eecs.berkeley.edu.      74300   IN      NS      adns2.berkeley.edu.
eecs.berkeley.edu.      74300   IN      NS      ns.eecs.berkeley.edu.
eecs.berkeley.edu.      74300   IN      NS      adns1.berkeley.edu.
eecs.berkeley.edu.      74300   IN      NS      adns3.berkeley.edu.
```

The additional section contains different name servers and their corresponding IP address. 'A' represents Ipv4 and 'AAAA' represents Ipv6.

```
;; ADDITIONAL SECTION:
ns.CS.berkeley.edu.    35713   IN      A       169.229.60.61
ns.eecs.berkeley.edu.  35096   IN      A       169.229.60.153
adns1.berkeley.edu.    4749    IN      A       128.32.136.3
adns1.berkeley.edu.    6565    IN      AAAA    2607:f140:ffff:fffe::3
adns2.berkeley.edu.    6565    IN      A       128.32.136.14
adns2.berkeley.edu.    4749    IN      AAAA    2607:f140:ffff:fffe::e
adns3.berkeley.edu.    6565    IN      A       192.107.102.142
adns3.berkeley.edu.    4749    IN      AAAA    2607:f140:a000:d::abc
```

The server is local name server IP address with port number. The 'WHEN' means the query time and the 'MSG' means message size.

```
;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sun Oct 11 01:54:57 AEDT 2020
;; MSG SIZE rcvd: 350
```

Q4: The IP address of the local nameserver for my machine is 129.94.242.2.

```
;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sun Oct 11 01:54:57 AEDT 2020
;; MSG SIZE rcvd: 350
```

Q5: The query type is NS query

```
;; ANSWER SECTION:
eecs.berkeley.edu.      32973   IN      NS      ns.CS.berkeley.edu.
eecs.berkeley.edu.      32973   IN      NS      adns2.berkeley.edu.
eecs.berkeley.edu.      32973   IN      NS      ns.eecs.berkeley.edu.
eecs.berkeley.edu.      32973   IN      NS      adns3.berkeley.edu.
eecs.berkeley.edu.      32973   IN      NS      adns1.berkeley.edu.

;; ADDITIONAL SECTION:
ns.CS.berkeley.edu.    79975   IN      A       169.229.60.61
ns.eecs.berkeley.edu.  18972   IN      A       169.229.60.153
adns1.berkeley.edu.    6950    IN      A       128.32.136.3
adns2.berkeley.edu.    6951    IN      A       128.32.136.14
adns2.berkeley.edu.    6951    IN      AAAA    2607:f140:ffff:fffe::e
adns3.berkeley.edu.    6951    IN      A       192.107.102.142

;; Query time: 0 msec
;; SERVER: 129.94.242.45#53(129.94.242.45)
;; WHEN: Sun Oct 11 13:48:48 AEDT 2020
;; MSG SIZE rcvd: 251
```

z5239803@vx7:/tmp_and/glass/export/glass/1/z5239803/Desktop\$ █

The DNS nameservers are:

ns.CS.berkeley.edu (IP:169.229.60.61)

ns.eecs.berkeley.edu (IP:169.229.60.153)

adns1.berkeley.edu (IP:128.32.136.3)

adns2.berkeley.edu (IP:128.32.136.14)

adns3.berkeley.edu (IP:192.107.102.142)

Q6: The DNS name is webserver.seecs.nust.edu.pk, and query type is PTR.

```
z5239803@vx7:/tmp_amd/glass/export/glass/1/z5239803/Desktop$ dig -x 111.68.101.54 PTR

; <<> DiG 9.9.5-9+deb8u19-Debian <<> -x 111.68.101.54 PTR
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 44432
;; 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. 1664 IN      PTR      webserver.seecs.nust.edu.pk.
```

Q7: I didn't get the authoritative answer, because the character of flags is 'ra', rather than 'aa'. So, it means I did not get the authoritative answer. The deep reason is that CSE is not authoritative to give the answer of mail servers for yahoo.

```
z5239803@vx7:/tmp_amd/glass/export/glass/1/z5239803/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: 53337
;; 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.      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.
```

Q8: I didn't get the response answer. A possible reason would be the Berkeley isn't responsible for UNSW CSE.

```
z5239803@vx7:/tmp_amd/glass/export/glass/1/z5239803/Desktop$ dig @128.32.136.3 yahoo.com MX

; <<> DiG 9.9.5-9+deb8u19-Debian <<> @128.32.136.3 yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 49401
;; 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
```

Q9: I used the one IP address (98.138.11.157) of the name servers of yahoo.com. This type query is MX query.

```
z5239803@vx7:/tmp_amd/glass/export/glass/1/z5239803/Desktop$ dig @98.138.11.157 yahoo.com MX

; <<> DiG 9.9.5-9+deb8u19-Debian <<> @98.138.11.157 yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 46961
;; 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 mta6.am0.yahoodns.net.
yahoo.com.                1800    IN      MX      1 mta7.am0.yahoodns.net.

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

Q10:

First, I used 'dig . NS' command to find the root server.

```
z5239803@vx7:/tmp_amd/glass/export/glass/1/z5239803/Desktop$ dig . NS
```

```
; <<> DiG 9.9.5-9+deb8u19-Debian <<> . NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 16259
;; flags: qr rd ra; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 17

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

;; ANSWER SECTION:
.                               72937   IN      NS      b.root-servers.net.
.                               72937   IN      NS      i.root-servers.net.
.                               72937   IN      NS      g.root-servers.net.
.                               72937   IN      NS      h.root-servers.net.
.                               72937   IN      NS      e.root-servers.net.
.                               72937   IN      NS      l.root-servers.net.
.                               72937   IN      NS      f.root-servers.net.
.                               72937   IN      NS      c.root-servers.net.
.                               72937   IN      NS      m.root-servers.net.
.                               72937   IN      NS      a.root-servers.net.
.                               72937   IN      NS      k.root-servers.net.
.                               72937   IN      NS      d.root-servers.net.
.                               72937   IN      NS      j.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net. 162399 IN      A       198.41.0.4
a.root-servers.net. 248212 IN      AAAA    2001:503:ba3e::2:30
b.root-servers.net. 193477 IN      A       199.9.14.201
c.root-servers.net. 113273 IN      A       192.33.4.12
d.root-servers.net. 113273 IN      A       199.7.91.13
e.root-servers.net. 243666 IN      A       192.203.230.10
f.root-servers.net. 330891 IN      A       192.5.5.241
f.root-servers.net. 123326 IN      AAAA    2001:500:2f::f
g.root-servers.net. 195658 IN      A       192.112.36.4
h.root-servers.net. 205152 IN      A       198.97.190.53
i.root-servers.net. 178911 IN      A       192.36.148.17
i.root-servers.net. 178911 IN      AAAA    2001:7fe::53
j.root-servers.net. 347422 IN      A       192.58.128.30
k.root-servers.net. 277257 IN      A       193.0.14.129
l.root-servers.net. 277257 IN      A       199.7.83.42
m.root-servers.net. 234743 IN      A       202.12.27.33

;; Query time: 0 msec
;; SERVER: 129.94.242.45#53(129.94.242.45)
;; WHEN: Sun Oct 11 14:54:18 AEDT 2020
;; MSG SIZE rcvd: 531
```

Then I queried the second nameserver 199.9.14.201 and I have been led to au name servers.

```
z5239803@vx7:/tmp_and/glass/export/glass/1/z5239803/Desktop$ dig @199.9.14.201 lyre01.cse.unsw.edu.au
```

```
; <<> DiG 9.9.5-9+deb8u19-Debian <<> @199.9.14.201 lyre01.cse.unsw.edu.au
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 46183
;; 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:
;lyre01.cse.unsw.edu.au.          IN      A
```

```
;; AUTHORITY SECTION:
au.          172800 IN      NS      d.au.
au.          172800 IN      NS      t.au.
au.          172800 IN      NS      r.au.
au.          172800 IN      NS      s.au.
au.          172800 IN      NS      m.au.
au.          172800 IN      NS      q.au.
au.          172800 IN      NS      n.au.
au.          172800 IN      NS      c.au.
au.          172800 IN      NS      a.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
m.au.        172800 IN      A        156.154.100.24
n.au.        172800 IN      A        156.154.101.24
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
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
m.au.        172800 IN      AAAA     2001:502:2eda::24
n.au.        172800 IN      AAAA     2001:502:ad09::24
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
```

```
;; Query time: 166 msec
;; SERVER: 199.9.14.201#53(199.9.14.201)
;; WHEN: Sun Oct 11 15:37:08 AEDT 2020
;; MSG SIZE rcvd: 591
```

Next, I queried the first name address of au, and got reference about edu.au:

```
z5239803@vx7:/tmp_amd/glass/export/glass/1/z5239803/Desktop$ dig @58.65.254.73 lyre01.cse.unsw.edu.au NS

; <<> DiG 9.9.5-9+deb8u19-Debian <<> @58.65.254.73 lyre01.cse.unsw.edu.au NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 28218
;; 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:
;lyre01.cse.unsw.edu.au.          IN      NS

;; AUTHORITY SECTION:
edu.au.          86400   IN      NS      q.au.
edu.au.          86400   IN      NS      s.au.
edu.au.          86400   IN      NS      r.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: 158 msec
;; SERVER: 58.65.254.73#53(58.65.254.73)
;; WHEN: Sun Oct 11 15:43:19 AEDT 2020
;; MSG SIZE rcvd: 291
```

I continued to query the second name server, and got the name servers of unsw.edu.au.

```
z5239803@vx7:/tmp_and/glass/export/glass/1/z5239803/Desktop$ dig @65.22.197.1 lyre01.cse.unsw.edu.au NS
```

```
; <<> DiG 9.9.5-9+deb8u19-Debian <<> @65.22.197.1 lyre01.cse.unsw.edu.au NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 52204
;; 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:
;lyre01.cse.unsw.edu.au.          IN      NS

;; AUTHORITY SECTION:
unsw.edu.au.          900     IN      NS      ns1.unsw.edu.au.
unsw.edu.au.          900     IN      NS      ns3.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: 65.22.197.1#53(65.22.197.1)
;; WHEN: Sun Oct 11 15:45:49 AEDT 2020
;; MSG SIZE rcvd: 209
```


Then, I queried the first name server:

```
z5239803@vx7:/tmp_and/glass/export/glass/1/z5239803/Desktop$ dig @129.94.0.192 lyre01.cse.unsw.edu.au NS
```

```
; <<> DiG 9.9.5-9+deb8u19-Debian <<> @129.94.0.192 lyre01.cse.unsw.edu.au NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 22901
;; 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:
lyre01.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: 4 msec
;; SERVER: 129.94.0.192#53(129.94.0.192)
;; WHEN: Sun Oct 11 15:52:26 AEDT 2020
;; MSG SIZE rcvd: 171
```

Last, I approached the IP address: 129.94.210.21

```
z5239803@vx7:/tmp_and/glass/export/glass/1/z5239803/Desktop$ dig @129.94.208.3 lyre01.cse.unsw.edu.au
```

```
; <<> DiG 9.9.5-9+deb8u19-Debian <<> @129.94.208.3 lyre01.cse.unsw.edu.au
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 5965
;; 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: 129.94.208.3#53(129.94.208.3)
;; WHEN: Sun Oct 11 15:59:55 AEDT 2020
;; MSG SIZE rcvd: 155
```

There are 5 DNS servers in total to query.

Q11:

Yes, a physical machine can have multiple network interfaces, which means it can have many IP address. Each IP address can have several names(alias).

Exercise 4:

The WebServer is in the Lab3.tar

