

Lab3

Exercise 3:

```
z5261703@vx4:~$ 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: 32346
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 4, ADDITIONAL: 9

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

;; ANSWER SECTION:
www.eecs.berkeley.edu.  76729   IN      CNAME   live-eecs.pantheonsite.io.
live-eecs.pantheonsite.io. 442     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-233.awsdns-29.com.
edge.pantheon.io.       300     IN      NS       ns-2013.awsdns-59.co.uk.
edge.pantheon.io.       300     IN      NS       ns-1213.awsdns-23.org.

;; ADDITIONAL SECTION:
ns-233.awsdns-29.com.  117645  IN      A       205.251.192.233
ns-233.awsdns-29.com.  750     IN      AAAA    2600:9000:5300:e900::1
ns-644.awsdns-16.net.  67700   IN      A       205.251.194.132
ns-644.awsdns-16.net.  62195   IN      AAAA    2600:9000:5302:8400::1
ns-1213.awsdns-23.org. 60372   IN      A       205.251.196.189
ns-1213.awsdns-23.org. 60372   IN      AAAA    2600:9000:5304:bd00::1
ns-2013.awsdns-59.co.uk. 72938   IN      A       205.251.199.221
ns-2013.awsdns-59.co.uk. 56134   IN      AAAA    2600:9000:5307:dd00::1
```

```
;; Query time: 15 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sun Oct 10 21:13:05 AEDT 2021
;; MSG SIZE rcvd: 453

;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 64063
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

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

;; AUTHORITY SECTION:
.                3183    IN      SOA     a.root-servers.net. nstld.verisi
gn-grs.com. 2021101000 1800 900 604800 86400

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sun Oct 10 21:13:05 AEDT 2021
;; MSG SIZE rcvd: 103
```

Question 1. 23.185.0.1. A (address).

Question 2. live-eecs.pantheonsite.io. Canonical name is the actual name of the server. Alias name is user-friendly so it's easier for users to remember and use.

Question 3. The authority section shows the servers that have the ultimate authority for answering DNS queries about the domain. In the additional section, you can find other information that is relevant to your question such as the IP addresses of the name servers.

Question 4. 129.94.242.2.

```
z5261703@vx4:~$ dig ns eecs.berkeley.edu.

; <<> DiG 9.9.5-9+deb8u19-Debian <<> ns eecs.berkeley.edu.
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 17441
;; 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.          79292   IN      NS      ns.CS.berkeley.edu.
eecs.berkeley.edu.          79292   IN      NS      adns2.berkeley.edu.
eecs.berkeley.edu.          79292   IN      NS      ns.eecs.berkeley.edu.
eecs.berkeley.edu.          79292   IN      NS      adns3.berkeley.edu.
eecs.berkeley.edu.          79292   IN      NS      adns1.berkeley.edu.

;; ADDITIONAL SECTION:
ns.CS.berkeley.edu.         659     IN      A        169.229.60.61
ns.CS.berkeley.edu.         498     IN      AAAA     2607:f140:f000:1260::30
ns.eecs.berkeley.edu.       6570    IN      A        169.229.60.153
ns.eecs.berkeley.edu.       21275   IN      AAAA     2607:f140:f000:2160::30
adns1.berkeley.edu.         7596    IN      A        128.32.136.3
adns1.berkeley.edu.         7589    IN      AAAA     2607:f140:ffff:fffe::3
adns2.berkeley.edu.         7589    IN      A        128.32.136.14
adns2.berkeley.edu.         7589    IN      AAAA     2607:f140:ffff:fffe::e
adns3.berkeley.edu.         7596    IN      A        192.107.102.142
adns3.berkeley.edu.         7596    IN      AAAA     2607:f140:a000:d::abc

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sun Oct 10 21:24:24 AEDT 2021
```

Question 5. DNS nameservers for the “eecs.berkeley.edu.” domain and their IP addresses:

- ns.CS.berkeley.edu. (169.229.60.61)
- adns2.berkeley.edu. (128.32.136.14)
- ns.eecs.berkeley.edu. (169.229.60.153)
- adns3.berkeley.edu. (192.107.102.142)
- adns1.berkeley.edu. (128.32.136.3)

The type of query is “NS” to get all name servers of the domain.

Question 6. webserver.seecs.nust.edu.pk. The type of query is “dig -x IP_address” for reverse lookup.

```

z5261703@vx4:~$ dig @129.94.242.33 yahoo.com mx

; <<>> DiG 9.9.5-9+deb8u19-Dbian <<>> @129.94.242.33 yahoo.com mx
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 25383
;; 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.                462     IN      MX      1 mta5.am0.yahoodns.net.
yahoo.com.                462     IN      MX      1 mta6.am0.yahoodns.net.
yahoo.com.                462     IN      MX      1 mta7.am0.yahoodns.net.

;; AUTHORITY SECTION:
yahoo.com.                45981   IN      NS      ns1.yahoo.com.
yahoo.com.                45981   IN      NS      ns4.yahoo.com.
yahoo.com.                45981   IN      NS      ns3.yahoo.com.
yahoo.com.                45981   IN      NS      ns2.yahoo.com.
yahoo.com.                45981   IN      NS      ns5.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.            63883   IN      A       68.180.131.16
ns1.yahoo.com.            1594    IN      AAAA    2001:4998:1b0::7961:686f:6f21
ns2.yahoo.com.            96465   IN      A       68.142.255.16
ns2.yahoo.com.            20037   IN      AAAA    2001:4998:1c0::7961:686f:6f21
ns3.yahoo.com.            45      IN      A       27.123.42.42
ns3.yahoo.com.            45      IN      AAAA    2406:8600:f03f:1f8::1003
ns4.yahoo.com.            73265   IN      A       98.138.11.157
ns5.yahoo.com.            26774   IN      A       202.165.97.53
ns5.yahoo.com.            76416   IN      AAAA    2406:2000:1d0::7961:686f:6f21

;; Query time: 0 msec
;; SERVER: 129.94.242.33#53(129.94.242.33)
;; WHEN: Sun Oct 10 21:41:39 AEDT 2021
;; MSG SIZE rcvd: 399

```

Question 7. No, I didn't get an authoritative answer. Because there is no "aa" (authoritative answer) flag shown. We are asking for information about Yahoo but requesting from the CSE name server which is not related to Yahoo.

Question 8. Using ns.CS.berkeley.edu. (169.229.60.61) shows that recursion is not available (no "ra" flag) and there is no authority section. There is no 'aa' flag so it is not an authoritative

answer.

```
25261703@vx4:~$ dig @169.229.60.61 yahoo.com mx

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @169.229.60.61 yahoo.com mx
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 56607
;; 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: 169.229.60.61#53(169.229.60.61)
;; WHEN: Sun Oct 10 21:45:38 AEDT 2021
;; MSG SIZE rcvd: 38
```

Question 9.

- 1 mta5.am0.yahoodns.net.
- 1 mta7.am0.yahoodns.net.
- 1 mta6.am0.yahoodns.net.

It is a “MX” query.

```

z5261703@vx4:~$ dig @68.180.131.16 yahoo.com mx

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @68.180.131.16 yahoo.com mx
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 64961
;; 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      ns3.yahoo.com.
yahoo.com.      172800   IN      NS      ns5.yahoo.com.
yahoo.com.      172800   IN      NS      ns2.yahoo.com.
yahoo.com.      172800   IN      NS      ns1.yahoo.com.
yahoo.com.      172800   IN      NS      ns4.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: 142 msec
;; SERVER: 68.180.131.16#53(68.180.131.16)
;; WHEN: Sun Oct 10 21:54:22 AEDT 2021
;; MSG SIZE rcvd: 399
```

Question 10.

```
z5261703@vx4:~$ dig . ns

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> . ns
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 36124
;; 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:
.      217183 IN      NS      g.root-servers.net.
.      217183 IN      NS      j.root-servers.net.
.      217183 IN      NS      e.root-servers.net.
.      217183 IN      NS      f.root-servers.net.
.      217183 IN      NS      d.root-servers.net.
.      217183 IN      NS      l.root-servers.net.
.      217183 IN      NS      k.root-servers.net.
.      217183 IN      NS      m.root-servers.net.
.      217183 IN      NS      c.root-servers.net.
.      217183 IN      NS      i.root-servers.net.
.      217183 IN      NS      a.root-servers.net.
.      217183 IN      NS      h.root-servers.net.
.      217183 IN      NS      b.root-servers.net.
```


;; ADDITIONAL SECTION:

a.root-servers.net.	133974	IN	A	198.41.0.4
a.root-servers.net.	340381	IN	AAAA	2001:503:ba3e::2:30
b.root-servers.net.	139965	IN	A	199.9.14.201
b.root-servers.net.	139965	IN	AAAA	2001:500:200::b
c.root-servers.net.	58608	IN	A	192.33.4.12
c.root-servers.net.	58609	IN	AAAA	2001:500:2::c
d.root-servers.net.	469254	IN	A	199.7.91.13
d.root-servers.net.	58609	IN	AAAA	2001:500:2d::d
e.root-servers.net.	58609	IN	A	192.203.230.10
e.root-servers.net.	462163	IN	AAAA	2001:500:a8::e
f.root-servers.net.	58609	IN	A	192.5.5.241
f.root-servers.net.	58609	IN	AAAA	2001:500:2f::f
g.root-servers.net.	35785	IN	A	192.112.36.4
g.root-servers.net.	395272	IN	AAAA	2001:500:12::d0d
h.root-servers.net.	58609	IN	A	198.97.190.53
h.root-servers.net.	58609	IN	AAAA	2001:500:1::53
i.root-servers.net.	168022	IN	A	192.36.148.17
i.root-servers.net.	267921	IN	AAAA	2001:7fe::53
j.root-servers.net.	320519	IN	A	192.58.128.30
j.root-servers.net.	58609	IN	AAAA	2001:503:c27::2:30
k.root-servers.net.	232826	IN	A	193.0.14.129
k.root-servers.net.	58609	IN	AAAA	2001:7fd::1
l.root-servers.net.	58608	IN	A	199.7.83.42
l.root-servers.net.	58608	IN	AAAA	2001:500:9f::42
m.root-servers.net.	58609	IN	A	202.12.27.33
m.root-servers.net.	58609	IN	AAAA	2001:dc3::35

;; Query time: 0 msec

;; SERVER: 129.94.242.2#53(129.94.242.2)

;; WHEN: Sun Oct 10 22:54:08 AEDT 2021

;; MSG SIZE rcvd: 811

```

z5261703@vx4:~$ 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: 31641
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 9, ADDITIONAL: 19
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags;; udp: 1472
;; QUESTION SECTION:
;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      m.au.
au.      172800 IN      NS      n.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.

```

```

;; 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      37.209.192.5
n.au.      172800 IN      A      37.209.194.5
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:dcd:1::5
n.au.      172800 IN      AAAA   2001:dcd:2::5
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: 148 msec
;; SERVER: 198.41.0.4#53(198.41.0.4)
;; WHEN: Sun Oct 10 23:27:00 AEDT 2021
;; MSG SIZE rcvd: 571

```

```

z5261703@vx4:~$ dig @a.au. edu.au. ns

; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @a.au. edu.au. ns
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 19527
;; 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      q.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 10 23:28:15 AEDT 2021
;; MSG SIZE rcvd: 275

```



```
z5261703@vx4:~$ 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: 35218
;; 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      ns2.unsw.edu.au.
unsw.edu.au.                900     IN      NS      ns3.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: 23 msec
;; SERVER: 65.22.196.1#53(65.22.196.1)
;; WHEN: Sun Oct 10 23:30:37 AEDT 2021
;; MSG SIZE rcvd: 198
```

```

z5261703@vx4:~$ dig @ns2.unsw.edu.au. cse.unsw.edu.au. ns
; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @ns2.unsw.edu.au. cse.unsw.edu.au. ns
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 50080
;; 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      beethoven.orchestra.cse.unsw.edu.au.
cse.unsw.edu.au.                300     IN      NS      maestro.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: 129.94.0.193#53(129.94.0.193)
;; WHEN: Sun Oct 10 23:31:54 AEDT 2021
;; MSG SIZE rcvd: 164

```

```

z5261703@vx4:~$ dig @beethoven.orchestra.cse.unsw.edu.au. lyre00.cse.unsw.edu.au ns
; <<>> DiG 9.9.5-9+deb8u19-Debian <<>> @beethoven.orchestra.cse.unsw.edu.au. lyre00.cse.unsw.edu.au ns
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 20281
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

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

;; AUTHORITY SECTION:
cse.unsw.EDU.AU.                900     IN      SOA      maestro.orchestra.cse.unsw.EDU.AU. hostmaster.cse.unsw.edu.au. 2021093000 2000 300 1209600 900

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Sun Oct 10 23:33:28 AEDT 2021
;; MSG SIZE rcvd: 131

```

I have to query 6 DNS servers to get the authoritative answer.

Question 11. Yes. Each router can have several names and/or IP addresses.