

Exercise 3

Question 1

- IP Address: 150.203.161.98
- Command: dig www.cecs.anu.edu.au A

```
;; ANSWER SECTION:
www.cecs.anu.edu.au.      3600    IN      CNAME   rproxy.cecs.anu.edu.au.
rproxy.cecs.anu.edu.au.  3600    IN      A       150.203.161.98

;; AUTHORITY SECTION:
cecs.anu.edu.au.         3242    IN      NS      ns3.cecs.anu.edu.au.
cecs.anu.edu.au.         3242    IN      NS      ns4.cecs.anu.edu.au.
cecs.anu.edu.au.         3242    IN      NS      ns2.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.     3242    IN      A       150.203.161.36
ns3.cecs.anu.edu.au.     3242    IN      A       150.203.161.50
ns4.cecs.anu.edu.au.     3242    IN      A       150.203.161.38
ns2.cecs.anu.edu.au.     3242    IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.     3242    IN      AAAA    2001:388:1034:2905::32
ns4.cecs.anu.edu.au.     3242    IN      AAAA    2001:388:1034:2905::26

;; Query time: 50 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Thu Mar 12 22:56:28 AEDT 2020
;; MSG SIZE rcvd: 271
```

Question 2

- rproxy.cecs.anu.edu.au
- Command: dig www.cecs.anu.edu.au CNAME
- Alias is useful because people is better at remembering common format of names such as 'www' compared to the IP address of the server. Also if you have an alias you can run different services on same IP address using different domain names

```

; <=> DiG 9.10.6 <=> www.cecs.anu.edu.au cname
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 17119
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;www.cecs.anu.edu.au.          IN      CNAME

;; ANSWER SECTION:
www.cecs.anu.edu.au.  3588    IN      CNAME    rproxy.cecs.anu.edu.au.

;; Query time: 6 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Thu Mar 12 22:56:40 AEDT 2020
;; MSG SIZE rcvd: 69

```

Question 3

- Authority: There are 3 DNS servers responsible for the domain name (NS2, NS3, NS4)
 - Shows that these servers can provide authoritative answer to query
- Additional: Seems to be IP addresses of the name servers listed in the authority section

```

;; AUTHORITY SECTION:
cecs.anu.edu.au.      3213    IN      NS      ns3.cecs.anu.edu.au.
cecs.anu.edu.au.      3213    IN      NS      ns4.cecs.anu.edu.au.
cecs.anu.edu.au.      3213    IN      NS      ns2.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.  3213    IN      A       150.203.161.36
ns3.cecs.anu.edu.au.  3213    IN      A       150.203.161.50
ns4.cecs.anu.edu.au.  3213    IN      A       150.203.161.38
ns2.cecs.anu.edu.au.  3213    IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.  3213    IN      AAAA    2001:388:1034:2905::32
ns4.cecs.anu.edu.au.  3213    IN      AAAA    2001:388:1034:2905::26

```

Question 4

- Local IP: 192.168.1.1

```

;; Query time: 8 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Thu Mar 12 22:56:57 AEDT 2020
;; MSG SIZE rcvd: 271

```

Question 5

- ns2.cecs.amu.edu.au: 150.203.161.36
- ns3.cecs.amu.edu.au: 150.203.161.50
- ns4.cecs.amu.edu.au: 150.203.161.38
- DNS Query: An address mapping record was sent (A)

Same query used as Question 3

Question 6

- Name = webserver.seecs.nust.edu.pk
- DNS Query: Address mapping record was sent (A)

```
[192-168-1-112:~ edlyn$ nslookup 111.68.101.54
Server:      192.168.1.1
Address:     192.168.1.1#53

Non-authoritative answer: 20T1 | WebCMS3
54.101.68.111.in-addr.arpa      name = webserver.seecs.nust.edu.pk.
s.anu.edu.au" domain (note: the domain name is
Authoritative answers can be found from:

; <=> DiG 9.10.6 <=> webserver.seecs.nust.edu.pk
;; global options: +cmd
;; Got answer:
;;->HEADER<- opcode: QUERY, status: NOERROR, id: 45830
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;webserver.seecs.nust.edu.pk.    IN      A

;; ANSWER SECTION:
webserver.seecs.nust.edu.pk. 86380 IN      A      111.68.101.54

;; Query time: 7 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Thu Mar 12 23:08:11 AEDT 2020
;; MSG SIZE rcvd: 72
```

Question 7

- No because flags don't contain AA (authoritative answer)

```
; <<>> DiG 9.10.6 <<>> -x 111.68.101.54
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 63459
;; 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. 1824 IN      PTR      webserver.seecs.nust.edu.pk.

;; Query time: 8 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Thu Mar 12 23:36:38 AEDT 2020
;; MSG SIZE rcvd: 96
```

Question 8

- Dig @ns2.yahoo.com yahoo.com
- Yes there is authoritative answer

```
; <<>> DiG 9.10.6 <<>> @ns2.yahoo.com yahoo.com -t MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 6420
;; 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 mta7.am0.yahoodns.net.
yahoo.com. 1800 IN      MX      1 mta6.am0.yahoodns.net.
yahoo.com. 1800 IN      MX      1 mta5.am0.yahoodns.net.
```

Question 9

- DNS Query type is MX (mail exchange record). It returns list of message transfer agents assigned to target domain

Used command line from question 8

Question 10

1. Dig . -t NS

```
; <<> DiG 9.10.6 <<> . -t NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 44934
;; 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:
; .                IN      NS      m.root-servers.net.
; .                IN      NS      b.root-servers.net.
; .                IN      NS      c.root-servers.net.
; .                IN      NS      d.root-servers.net.
; .                IN      NS      e.root-servers.net.
; .                IN      NS      f.root-servers.net.
; .                IN      NS      g.root-servers.net.
; .                IN      NS      h.root-servers.net.
; .                IN      NS      a.root-servers.net.
; .                IN      NS      i.root-servers.net.
; .                IN      NS      j.root-servers.net.
; .                IN      NS      k.root-servers.net.
; .                IN      NS      l.root-servers.net.

;; ADDITIONAL SECTION:
m.root-servers.net. 3492742 IN      A      202.12.27.33
m.root-servers.net. 3493074 IN      AAAA   2001:dc3::35
b.root-servers.net. 3493795 IN      A      199.9.14.201
b.root-servers.net. 3477748 IN      AAAA   2001:500:200::b
c.root-servers.net. 3494351 IN      A      192.33.4.12
c.root-servers.net. 488954  IN      AAAA   2001:500:2::c
d.root-servers.net. 3494351 IN      A      199.7.91.13
d.root-servers.net. 488954  IN      AAAA   2001:500:2d::d
e.root-servers.net. 3494351 IN      A      192.203.230.10
e.root-servers.net. 3500409 IN      AAAA   2001:500:a8::e
f.root-servers.net. 3494351 IN      A      192.5.5.241
f.root-servers.net. 488954  IN      AAAA   2001:500:2f::f
g.root-servers.net. 3494351 IN      A      192.112.36.4
g.root-servers.net. 3500409 IN      AAAA   2001:500:12::d0d
h.root-servers.net. 3494351 IN      A      198.97.190.53
h.root-servers.net. 488954  IN      AAAA   2001:500:1::53
a.root-servers.net. 3497334 IN      A      198.41.0.4
a.root-servers.net. 3492732 IN      AAAA   2001:503:ba3e::2:30
i.root-servers.net. 3494351 IN      A      192.36.148.17
i.root-servers.net. 488954  IN      AAAA   2001:7fe::53
```


2. Dig @198.41.0.4 au. -t NS

```
;; global options: +cmd 171 - WebCMS3.pdf (page 4 of 8) -- Edited
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 34335
;; 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 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: 142 msec
;; SERVER: 198.41.0.4#53(198.41.0.4)
;; WHEN: Fri Mar 13 00:23:46 AEDT 2020
;; MSG SIZE rcvd: 571
```

3. dig @58.65.254.73 edu.au. -t NS

```
; <=> DiG 9.10.6 <=> @58.65.254.73 edu.au. -t NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 21924
;; 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: 20 msec
;; SERVER: 58.65.254.73#53(58.65.254.73)
;; WHEN: Fri Mar 13 00:32:18 AEDT 2020
;; MSG SIZE rcvd: 275

192-168-1-112:~ edlyn$
```

4. dig @65.22.196.1 unsw.edu.au. -t NS

```
; <<> DiG 9.10.6 <<> 65.22.196.1 unsw.edu.au. -t NS
;; global options: +cmd
;; Got answer:
;; -->HEADER<- opcode: QUERY, status: NOERROR, id: 19325
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;65.22.196.1.                IN      A

;; ANSWER SECTION:
65.22.196.1.                0       IN      A      65.22.196.1

;; Query time: 3 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Fri Mar 13 00:42:17 AEDT 2020
;; MSG SIZE rcvd: 56

;; Got answer:
;; -->HEADER<- opcode: QUERY, status: NOERROR, id: 27850
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 0, ADDITIONAL: 7
;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;unsw.edu.au.                IN      NS

;; ANSWER SECTION:
unsw.edu.au.                10800   IN      NS      ns3.unsw.edu.au.
unsw.edu.au.                10800   IN      NS      ns2.unsw.edu.au.
unsw.edu.au.                10800   IN      NS      ns1.unsw.edu.au.

;; ADDITIONAL SECTION:
ns3.unsw.edu.au.            9784    IN      A      192.155.82.178
ns3.unsw.edu.au.            7375    IN      AAAA   2600:3c01::f03c:91ff:fe73:5f10
ns2.unsw.edu.au.            6175    IN      A      129.94.0.193
ns2.unsw.edu.au.            2670    IN      AAAA   2001:388:c:35::2
ns1.unsw.edu.au.            6297    IN      A      129.94.0.192
ns1.unsw.edu.au.            1974    IN      AAAA   2001:388:c:35::1

;; Query time: 24 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Fri Mar 13 00:42:17 AEDT 2020
;; MSG SIZE rcvd: 226
```


5. dig @129.94.0.192 cse.unsw.edu.au. -t NS

```
192-168-1-112:~ edlyn$ dig @192.155.82.178 cse.unsw.edu.au. -t NS
; <=> DiG 9.10.6 <=> @192.155.82.178 cse.unsw.edu.au. -t NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 33051
;; 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      beethoven.orchestra.cse.unsw.edu.au.
cse.unsw.edu.au.          10800   IN      NS      maestro.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: 160 msec
;; SERVER: 192.155.82.178#53(192.155.82.178)
;; WHEN: Fri Mar 13 00:43:16 AEDT 2020
;; MSG SIZE rcvd: 164
```

6. dig @129.94.242.2 lyre00.cse.unsw.edu. -t NS

```
192-168-1-112:~edlyn$ dig @129.94.242.33 lyre00.cse.unsw.edu.au
; <--> DiG 9.10.6 <--> @129.94.242.33 lyre00.cse.unsw.edu.au
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<-- opcode: QUERY, status: NOERROR, id: 49350
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 5
;; WARNING: recursion requested but not available
;; 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 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
beethoven.orchestra.cse.unsw.edu.au. 3600 IN A 129.94.172.11
beethoven.orchestra.cse.unsw.edu.au. 3600 IN A 129.94.208.33

;; Query time: 36 msec
;; SERVER: 129.94.242.33#53(129.94.242.33)
;; WHEN: Fri Mar 13 00:47:49 AEDT 2020
;; MSG SIZE rcvd: 187
```

The IP address is 129.94.210.20

It took 5 server queries to get the answer

Question 11

- Yes. You can assign multiple IP address to a networking interface card connected to the machine