Exercise 2:

z5099492@bongo00:~$ dig www.cecs.anu.edu.au

; <<>> DiG 9.7.3 <<>> www.cecs.anu.edu.au
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 2650
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 4, ADDITIONAL: 4

;; QUESTION SECTION:
;www.cecs.anu.edu.au.   IN   A

;; ANSWER SECTION:
www.cecs.anu.edu.au.   3056   IN   CNAME   rproxy.cecs.anu.edu.au.
rproxy.cecs.anu.edu.au.   1773   IN   A   150.203.161.98

;; AUTHORITY SECTION:
cecs.anu.edu.au. 1069   IN   NS ns1.cecs.anu.edu.au.
cecs.anu.edu.au. 1069   IN   NS ns2.cecs.anu.edu.au.
cecs.anu.edu.au. 1069   IN   NS ns3.cecs.anu.edu.au.
cecs.anu.edu.au. 1069   IN   NS ns4.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns1.cecs.anu.edu.au. 2563   IN   A   150.203.161.4
ns2.cecs.anu.edu.au. 2563   IN   A   150.203.161.36
ns3.cecs.anu.edu.au. 715 IN   A   150.203.161.50
ns4.cecs.anu.edu.au. 2563   IN   A   150.203.161.38

;; Query time: 1 msec
;; SERVER: 129.94.208.3#53(129.94.208.3)
;; WHEN: Fri Mar 24 13:42:33 2017
;; MSG SIZE   rcvd: 210

Question 1:
P address of   www. cecs.anu.edu.au is 150.203.161.98 , the DNS query is A.

Question 2:
rproxy.cecs.anu.edu.au. Is the canonical name. 150.203.161.98; easy for clients accessing the web.

Question 3:

Authority Section means the used authoritative name servers related to the DNS zone. Additional section is IP addresses of the authoritative name servers.

Question 4:

the IP address pf the local nameserver is 129.94.208.3. In the "SERVER".

Question 5:

z5099492@bongo00:~$ dig cecs.anu.edu.au

; <<>> DiG 9.7.3 <<>> cecs.anu.edu.au
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 48647
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 3, ADDITIONAL: 3

;; QUESTION SECTION:
;cecs.anu.edu.au.   IN   A

;; ANSWER SECTION:
cecs.anu.edu.au. 644 IN   A   150.203.161.98

;; AUTHORITY SECTION:
anu.edu.au.   3005   IN NS ns1.anu.edu.au.
anu.edu.au.   3005   IN NS ns.adelaide.edu.au.
anu.edu.au.   3005   IN NS una.anu.edu.au.

;; ADDITIONAL SECTION:
ns.adelaide.edu.au.   69136   IN A   129.127.40.3
ns1.anu.edu.au.   24216   IN A   150.203.1.10
una.anu.edu.au.   10291   IN A   150.203.22.28

;; Query time: 0 msec
;; SERVER: 129.94.208.3#53(129.94.208.3)
;; WHEN: Fri Mar 24 14:54:01 2017
;; MSG SIZE   rcvd: 159

They are
ns.adelaide.edu.au.   129.127.40.3
ns1.anu.edu.au.   50.203.1.10
una.anu.edu.au.   150.203.22.28

The type of DNS query is NS.

Question 6:
z5099492@bongo00:~$ dig anu.edu.au

; <<>> DiG 9.7.3 <<>> anu.edu.au
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 7931
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 3, ADDITIONAL: 3

;; QUESTION SECTION:
;anu.edu.au.   IN A

;; ANSWER SECTION:
anu.edu.au.   150 IN   A   130.56.60.81

;; AUTHORITY SECTION:
anu.edu.au.   2584   IN NS ns.adelaide.edu.au.
anu.edu.au.   2584   IN NS una.anu.edu.au.
anu.edu.au.   2584   IN NS ns1.anu.edu.au.

;; ADDITIONAL SECTION:
ns.adelaide.edu.au.   68715   IN A   129.127.40.3
ns1.anu.edu.au.   23795   IN A   150.203.1.10
una.anu.edu.au.   9870   IN A   150.203.22.28

;; Query time: 13 msec
;; SERVER: 129.94.208.3#53(129.94.208.3)
;; WHEN: Fri Mar 24 15:01:02 2017
;; MSG SIZE   rcvd: 154

They are
ns.adelaide.edu.au.   129.127.40.3
ns1.anu.edu.au.   150.203.1.10
una.anu.edu.au   150.203.22.28
The type of DNS query is NS.

Question 7:

z5099492@bongo00:~$ dig 149.171.158.109

; <<>> DiG 9.7.3 <<>> 149.171.158.109
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 20101
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 0

;; QUESTION SECTION:
;149.171.158.109.   IN   A

;; AUTHORITY SECTION:
.   5533   IN   SOA   a.root-servers.net. nstld.verisign-grs.com. 2017032302
1800 900 604800 86400

;; Query time: 5 msec
;; SERVER: 129.94.208.3#53(129.94.208.3)
;; WHEN: Fri Mar 24 15:03:55 2017
;; MSG SIZE   rcvd: 108

The DNS name is a.root-servers.net.   nstld.verisign-grs.com.
The type of DNS query is SOA.

Question 8:
z5099492@bongo00:~$ dig @129.94.242.33 yahoo.com

; <<>> DiG 9.7.3 <<>> @129.94.242.33 yahoo.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 12699
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 8

;; QUESTION SECTION:
;yahoo.com.   IN   A

;; ANSWER SECTION:
yahoo.com.   1800   IN   A   98.138.253.109
yahoo.com.   1800   IN   A   98.139.183.24
yahoo.com.   1800   IN   A   206.190.36.45

;; AUTHORITY SECTION:
yahoo.com.   63642   IN   NS   ns1.yahoo.com.
yahoo.com.   63642   IN   NS   ns5.yahoo.com.
yahoo.com.   63642   IN   NS   ns2.yahoo.com.
yahoo.com.   63642   IN   NS   ns4.yahoo.com.
yahoo.com.   63642   IN   NS   ns3.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.   1058   IN   A   68.180.131.16
ns1.yahoo.com.   1061   IN   AAAA 2001:4998:130::1001
ns2.yahoo.com.   278173 IN   A   68.142.255.16
ns2.yahoo.com.   7070   IN   AAAA 2001:4998:140::1002
ns3.yahoo.com.   341088 IN   A   203.84.221.53
ns3.yahoo.com.   7071   IN   AAAA 2406:8600:b8:fe03::1003
ns4.yahoo.com.   253282 IN   A   98.138.11.157
ns5.yahoo.com.   154088 IN   A   119.160.247.124

;; Query time: 161 msec
;; SERVER: 129.94.242.33#53(129.94.242.33)
;; WHEN: Fri Mar 24 15:21:50 2017
;; MSG SIZE   rcvd: 329

No,since the flags does not contain   "aa".

Question 9 :
z5099492@bongo00:~$ dig @150.203.22.28 yahoo.com

; <<>> DiG 9.7.3 <<>> @150.203.22.28 yahoo.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 31069
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 0
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;yahoo.com.   IN   A

;; Query time: 5 msec

;; SERVER: 150.203.22.28#53(150.203.22.28)
;; WHEN: Fri Mar 24 16:10:55 2017
;; MSG SIZE   rcvd: 27

Question 10:
z5099492@bongo00:~$ dig yahoo.com

; <<>> DiG 9.7.3 <<>> yahoo.com
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 35523
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 8

;; QUESTION SECTION:
;yahoo.com.   IN A

;; ANSWER SECTION:
yahoo.com.   93 IN A   98.138.253.109
yahoo.com.   93 IN A   98.139.183.24
yahoo.com.   93 IN A   206.190.36.45

;; AUTHORITY SECTION:
yahoo.com.   57166   IN NS ns5.yahoo.com.
yahoo.com.   57166   IN NS ns1.yahoo.com.
yahoo.com.   57166   IN NS ns4.yahoo.com.
yahoo.com.   57166   IN NS ns2.yahoo.com.
yahoo.com.   57166   IN NS ns3.yahoo.com.

;; ADDITIONAL SECTION:
ns1.yahoo.com.   271404 IN A   68.180.131.16
ns1.yahoo.com.   594 IN AAAA 2001:4998:130::1001
ns2.yahoo.com.   334612 IN A   68.142.255.16
ns2.yahoo.com.   594 IN AAAA 2001:4998:140::1002
ns3.yahoo.com.   63925   IN A   203.84.221.53
ns3.yahoo.com.   595 IN AAAA 2406:8600:b8:fe03::1003
ns4.yahoo.com.   246806 IN A   98.138.11.157
ns5.yahoo.com.   334612 IN A   119.160.247.124

;; Query time: 0 msec
;; SERVER: 129.94.208.3#53(129.94.208.3)

;; WHEN: Fri Mar 24 17:09:46 2017
;; MSG SIZE   rcvd: 329

z5099492@bongo00:~$ dig @68.180.131.16 yahoo.com

; <<>> DiG 9.7.3 <<>> @68.180.131.16 yahoo.com
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 63757
;; flags: qr aa rd; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 8
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;yahoo.com.   IN   A

;; ANSWER SECTION:
yahoo.com.   1800   IN   A   206.190.36.45
yahoo.com.   1800   IN   A   98.138.253.109
yahoo.com.   1800   IN   A   98.139.183.24

;; AUTHORITY SECTION:
yahoo.com.   172800 IN   NS   ns2.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.
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.   1209600   IN   A   203.84.221.53
ns4.yahoo.com.   1209600   IN   A   98.138.11.157
ns5.yahoo.com.   1209600   IN   A   119.160.247.124
ns1.yahoo.com.   86400   IN   AAAA 2001:4998:130::1001
ns2.yahoo.com.   86400   IN   AAAA 2001:4998:140::1002
ns3.yahoo.com.   86400   IN   AAAA 2406:8600:b8:fe03::1003

;; Query time: 145 msec
;; SERVER: 68.180.131.16#53(68.180.131.16)
;; WHEN: Fri Mar 24 17:00:54 2017

;; MSG SIZE   rcvd: 329

The type is NS.

Question 11:
z5099492@bongo00:~$ dig . ns

; <<>> DiG 9.7.3 <<>> . ns
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 58073
;; flags: qr rd ra; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 13

;; QUESTION SECTION:
;.   IN   NS

;; ANSWER SECTION:
.   232423 IN   NS   g.root-servers.net.
.   232423 IN   NS   j.root-servers.net.
.   232423 IN   NS   m.root-servers.net.
.   232423 IN   NS   c.root-servers.net.
.   232423 IN   NS   b.root-servers.net.
.   232423 IN   NS   k.root-servers.net.
.   232423 IN   NS   f.root-servers.net.
.   232423 IN   NS   e.root-servers.net.
.   232423 IN   NS   d.root-servers.net.
.   232423 IN   NS   a.root-servers.net.
.   232423 IN   NS   i.root-servers.net.
.   232423 IN   NS   h.root-servers.net.
.   232423 IN   NS   l.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net.   526694 IN   A   198.41.0.4
a.root-servers.net.   179347 IN   AAAA 2001:503:ba3e::2:30
b.root-servers.net.   235831 IN   A   192.228.79.201
b.root-servers.net.   91367   IN   AAAA 2001:500:84::b
c.root-servers.net.   91367   IN   A   192.33.4.12
c.root-servers.net.   62295   IN   AAAA 2001:500:2::c
d.root-servers.net.   331750 IN   A   199.7.91.13
d.root-servers.net.   496749 IN   AAAA 2001:500:2d::d

```
e.root-servers.net.     162130  IN   A    192.203.230.10
e.root-servers.net.     337947  IN   AAAA  2001:500:a8::e
f.root-servers.net.     178051  IN   A    192.5.5.241
f.root-servers.net.     152655  IN   AAAA  2001:500:2f::f
g.root-servers.net.     346056  IN   A    192.112.36.4

;; Query time: 0 msec
;; SERVER: 129.94.208.3#53(129.94.208.3)
;; WHEN: Fri Mar 24 16:28:46 2017
;; MSG SIZE   rcvd: 508

z5099492@bongo00:~$ dig @198.41.0.4 au. ns

; <<>> DiG 9.7.3 <<>> @198.41.0.4 au. ns
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 14269
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 8, ADDITIONAL: 15
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;au.                IN   NS

;; AUTHORITY SECTION:
au.          172800  IN   NS  a.au.
au.          172800  IN   NS  b.au.
au.          172800  IN   NS  u.au.
au.          172800  IN   NS  v.au.
au.          172800  IN   NS  w.au.
au.          172800  IN   NS  x.au.
au.          172800  IN   NS  y.au.
au.          172800  IN   NS  z.au.

;; ADDITIONAL SECTION:
a.au.            172800  IN   A    58.65.254.73
b.au.            172800  IN   A    58.65.253.73
u.au.            172800  IN   A    211.29.133.32
v.au.            172800  IN   A    202.12.31.141
w.au.            172800  IN   A    37.209.192.5
x.au.            172800  IN   A    37.209.194.5
```

```
y.au.              172800  IN   A     37.209.196.5
z.au.              172800  IN   A     37.209.198.5
a.au.              172800  IN   AAAA  2407:6e00:254:306::73
b.au.              172800  IN   AAAA  2407:6e00:253:306::73
v.au.              172800  IN   AAAA  2001:dc0:4001:1:0:1836:0:141
w.au.              172800  IN   AAAA  2001:dcd:1::5
x.au.              172800  IN   AAAA  2001:dcd:2::5
y.au.              172800  IN   AAAA  2001:dcd:3::5
z.au.              172800  IN   AAAA  2001:dcd:4::5

;; Query time: 171 msec
;; SERVER: 198.41.0.4#53(198.41.0.4)
;; WHEN: Fri Mar 24 16:28:58 2017
;; MSG SIZE   rcvd: 472


z5099492@bongo00:~$ dig @58.65.254.73 edu.au. ns


; <<>> DiG 9.7.3 <<>> @58.65.254.73 edu.au. ns
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 59141
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 4, ADDITIONAL: 8
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;edu.au.                    IN   NS

;; AUTHORITY SECTION:
edu.au.            86400   IN   NS  z.au.
edu.au.            86400   IN   NS  x.au.
edu.au.            86400   IN   NS  y.au.
edu.au.            86400   IN   NS  w.au.

;; ADDITIONAL SECTION:
w.au.              86400   IN   A    37.209.192.5
w.au.              86400   IN   AAAA  2001:dcd:1::5
x.au.              86400   IN   A    37.209.194.5
x.au.              86400   IN   AAAA  2001:dcd:2::5
y.au.              86400   IN   A    37.209.196.5
y.au.              86400   IN   AAAA  2001:dcd:3::5
```

```
z.au.            86400   IN   A    37.209.198.5
z.au.            86400   IN   AAAA  2001:dcd:4::5

;; Query time: 15 msec
;; SERVER: 58.65.254.73#53(58.65.254.73)
;; WHEN: Fri Mar 24 16:29:19 2017
;; MSG SIZE   rcvd: 264

z5099492@bongo00:~$ dig @37.209.192.5 unsw.edu.au ns

; <<>> DiG 9.7.3 <<>> @37.209.192.5 unsw.edu.au ns
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 41572
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 3, ADDITIONAL: 5
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;unsw.edu.au.             IN   NS

;; AUTHORITY SECTION:
unsw.edu.au.     14400   IN   NS  ns1.unsw.edu.au.
unsw.edu.au.     14400   IN   NS  ns2.unsw.edu.au.
unsw.edu.au.     14400   IN   NS  ns3.unsw.edu.au.

;; ADDITIONAL SECTION:
ns1.unsw.edu.au. 14400   IN   A    129.94.0.192
ns2.unsw.edu.au. 14400   IN   A    129.94.0.193
ns3.unsw.edu.au. 14400   IN   A    192.155.82.178
ns1.unsw.edu.au. 14400   IN   AAAA  2001:388:c:35::1
ns2.unsw.edu.au. 14400   IN   AAAA  2001:388:c:35::2

;; Query time: 2 msec
;; SERVER: 37.209.192.5#53(37.209.192.5)
;; WHEN: Fri Mar 24 16:29:29 2017
;; MSG SIZE   rcvd: 187

z5099492@bongo00:~$ dig @129.94.0.192 cse.unsw.edu.au a

; <<>> DiG 9.7.3 <<>> @129.94.0.192 cse.unsw.edu.au a
```

; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 10632
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 2, ADDITIONAL: 4
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;cse.unsw.edu.au.   IN A

;; 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:
maestro.orchestra.cse.unsw.edu.au. 10800 IN A 129.94.242.33
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
beethoven.orchestra.cse.unsw.edu.au. 10800 IN A   129.94.208.3

;; Query time: 3 msec
;; SERVER: 129.94.0.192#53(129.94.0.192)
;; WHEN: Fri Mar 24 16:41:14 2017
;; MSG SIZE   rcvd: 153

So there are 2 DNS servers to get the authoritative answer.

Question 12:
Yes!

Question 13:
Not case-sensitive.

Question 14:

.aaa	generic	American Automobile Association, Inc.
.aarp	generic	AARP
.abarth	generic	Fiat Chrysler Automobiles N.V.
.abb	generic	ABB Ltd
.abbott	generic	Abbott Laboratories, Inc.

.abbvie	generic	AbbVie Inc.
.abc	generic	Disney Enterprises, Inc.
.able	generic	Able Inc.