

Lab 3

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EXERCISE 3

Question1

IP address: 150.203.161.98

Type: A

dig www.cecs.anu.edu.au A

Question 2

Canonical name: rproxy.cecs.anu.edu.au

IP address: 150.203.161.98

Alias can prove convenient when running multiple services from a single IP address, for this server, www.cecs.anu.edu.au and rproxy.cecs.anu.edu.au to then DNS entry for cecs.anu.edu.au

Question 3

For the AUTHORITY SECTION: the output (these servers) is the ultimate authority for answering DNS queries about that domain

```
;; AUTHORITY SECTION:
cecs.anu.edu.au.      731      IN       NS       ns2.cecs.anu.edu.au.
cecs.anu.edu.au.      731      IN       NS       ns4.cecs.anu.edu.au.
cecs.anu.edu.au.      731      IN       NS       ns3.cecs.anu.edu.au.
```

For the ADDITIONAL SECTION: other information that is relevant to your question, here the additional section displays the ipv4 and ipv6 addresses of the authority section

```
;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.      247      IN      A       150.203.161.36
ns2.cecs.anu.edu.au.      247      IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.      2610     IN      A       150.203.161.50
ns3.cecs.anu.edu.au.      731      IN      AAAA    2001:388:1034:2905::32
ns4.cecs.anu.edu.au.      119      IN      A       150.203.161.38
ns4.cecs.anu.edu.au.      731      IN      AAAA    2001:388:1034:2905::26
```

Question 4

Type ipconfig in cmd, and I get

```
Wireless LAN adapter WLAN:

    Connection-specific DNS Suffix  . : 
    IPv6 Address. . . . . : fdf8:113:fe4:6900:b5de:e02:f699:e5c5
    Temporary IPv6 Address. . . . . : fdf8:113:fe4:6900:1d00:3c86:e863:9901
    Link-local IPv6 Address . . . . . : fe80::b5de:e02:f699:e5c5%7
    IPv4 Address. . . . . : 192.168.1.15
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.1.1

C:\Users\KayLa>
```

Hence the local ip address is 192.168.1.15

Question 5

```
;; ANSWER SECTION:
cecs.anu.edu.au.      309      IN      NS      ns3.cecs.anu.edu.au.
cecs.anu.edu.au.      309      IN      NS      ns2.cecs.anu.edu.au.
cecs.anu.edu.au.      309      IN      NS      ns4.cecs.anu.edu.au.
```

The IP address for ns3.cecs.anu.edu.au is 150.203.161.50

The IP address for ns2.cecs.anu.edu.au is 150.203.161.36

The IP address for ns4.cecs.anu.edu.au is 150.203.161.38

Type of DNS query: NS

Question 6

```
;; ANSWER SECTION:
109.158.171.149.in-addr.arpa. 2978 IN PTR engplws008.eng.unsw.edu.au.
109.158.171.149.in-addr.arpa. 2978 IN PTR www.engineering.unsw.edu.au.
109.158.171.149.in-addr.arpa. 2978 IN PTR engplws008.ad.unsw.edu.au.
```

Hence the DNS name associated with 149.171.158.109 is
www.engineering.unsw.edu.au

The type of DNS query sent to get the DNS name is PTR, “-x”
means reverse

Question 7

No, no authoritative answer displayed by using
dig @129.94.242.33 yahoo.com MX

```
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 17999
;; flags: qr rd ra; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 8

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

;; ANSWER SECTION:
yahoo.com.                 269     IN      MX      1 mta7.am0.yahoodns.net.
yahoo.com.                 269     IN      MX      1 mta5.am0.yahoodns.net.
yahoo.com.                 269     IN      MX      1 mta6.am0.yahoodns.net.
```

The reason is that in flags, no “aa” displayed

Question 8

For this question, it didn’t describe clearly, so

1. replace yahoo.com with ns2.cecs.anu.edu.au

I run dig @129.94.242.33 ns2.cecs.anu.edu.au MX

```
weber % dig @129.94.242.33 ns2.cecs.anu.edu.au MX

; <<>> DiG 9.7.3 <<>> @129.94.242.33 ns2.cecs.anu.edu.au MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 9814
;; flags: qr rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 0

;; QUESTION SECTION:
;ns2.cecs.anu.edu.au.          IN      MX

;; AUTHORITY SECTION:
cecs.anu.edu.au.              3129    IN      SOA      ns1.cecs.anu.edu.au. hostmaster.
cecs.anu.edu.au. 1534483959 10800 3600 604800 86400
```

No “aa” displayed, no authoritative answer

2. replace 129.94.242.33 with 150.203.161.50

I run dig @150.203.161.50 yahoo.com MX

```
weber % dig @150.203.161.50 yahoo.com MX

; <<>> DiG 9.7.3 <<>> @150.203.161.50 yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 5745
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 0
;; WARNING: recursion requested but not available

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

;; Query time: 7 msec
;; SERVER: 150.203.161.50#53(150.203.161.50)
;; WHEN: Fri Aug 17 22:43:17 2018
;; MSG SIZE rcvd: 27
```

No “aa” displayed, no authoritative answer

Question 9

MX is used to obtain the authoritative answer for mail server

```
weill % dig @ns1.yahoo.com yahoo.com MX

; <<>> DiG 9.7.3 <<>> @ns1.yahoo.com yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 3121
;; flags: qr aa rd; QUERY: 1, ANSWER: 3, AUTHORITY: 5, ADDITIONAL: 8
;; WARNING: recursion requested but not available

;; 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      ns3.yahoo.com.
yahoo.com.                 172800  IN      NS      ns1.yahoo.com.
yahoo.com.                 172800  IN      NS      ns2.yahoo.com.
yahoo.com.                 172800  IN      NS      ns5.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       119.160.253.83
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 Aug 17 14:43:10 2018
;; MSG SIZE rcvd: 360
```

Question 10

dig . NS

```
weber % dig . NS

; <<>> DiG 9.7.3 <<>> . NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 64598
;; flags: qr rd ra; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 13

;; QUESTION SECTION:
;.                               IN      NS

;; ANSWER SECTION:
.           412473  IN      NS      a.root-servers.net.
.           412473  IN      NS      f.root-servers.net.
.           412473  IN      NS      j.root-servers.net.
.           412473  IN      NS      d.root-servers.net.
.           412473  IN      NS      h.root-servers.net.
.           412473  IN      NS      g.root-servers.net.
.           412473  IN      NS      i.root-servers.net.
.           412473  IN      NS      m.root-servers.net.
.           412473  IN      NS      b.root-servers.net.
.           412473  IN      NS      l.root-servers.net.
.           412473  IN      NS      k.root-servers.net.
.           412473  IN      NS      e.root-servers.net.
.           412473  IN      NS      c.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net.  498943  IN      A        198.41.0.4
a.root-servers.net.  21960   IN      AAAA     2001:503:ba3e::2:30
b.root-servers.net.  406896  IN      A        199.9.14.201
b.root-servers.net.  168311  IN      AAAA     2001:500:200::b
c.root-servers.net.  153768  IN      A        192.33.4.12
c.root-servers.net.  391237  IN      AAAA     2001:500:2::c
d.root-servers.net.  217948  IN      A        199.7.91.13
d.root-servers.net.  217948  IN      AAAA     2001:500:2d::d
e.root-servers.net.  473544  IN      A        192.203.230.10
e.root-servers.net.  179211  IN      AAAA     2001:500:a8::e
f.root-servers.net.  57994   IN      A        192.5.5.241
f.root-servers.net.  22782   IN      AAAA     2001:500:2f::f
g.root-servers.net.  146106  IN      A        192.112.36.4
```

I got the address 198.41.0.4

then

dig @198.41.0.4 au. NS

```
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 10, ADDITIONAL: 15
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;au.                                IN      NS

;; AUTHORITY SECTION:
au.      172800 IN      NS      d.au.
au.      172800 IN      NS      v.au.
au.      172800 IN      NS      u.au.
au.      172800 IN      NS      q.au.
au.      172800 IN      NS      t.au.
au.      172800 IN      NS      s.au.
au.      172800 IN      NS      r.au.
au.      172800 IN      NS      b.au.
au.      172800 IN      NS      a.au.
au.      172800 IN      NS      c.au.

;; ADDITIONAL SECTION:
d.au.      172800 IN      A      162.159.25.38
d.au.      172800 IN      AAAA    2400:cb00:2049:1::a2
v.au.      172800 IN      A      202.12.31.53
v.au.      172800 IN      AAAA    2001:dd8:12::53
u.au.      172800 IN      A      211.29.133.32
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
b.au.      172800 IN      A      58.65.253.73
b.au.      172800 IN      AAAA    2407:6e00:253:306::7
```

dig @58.65.253.73 edu.au NS

```
weber % 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: 13063
;; 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      r.au.
edu.au.      86400 IN      NS      s.au.
edu.au.      86400 IN      NS      q.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
```

dig @65.22.196.1 unsw.edu.au NS

```
weber % dig @65.22.196.1 unsw.edu.au NS

; <<>> DiG 9.7.3 <<>> @65.22.196.1 unsw.edu.au NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 47701
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 3, ADDITIONAL:
;; WARNING: recursion requested but not available

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

;; AUTHORITY SECTION:
unsw.edu.au.                 900     IN      NS      ns1.unsw.edu.au.
unsw.edu.au.                 900     IN      NS      ns2.unsw.edu.au.
unsw.edu.au.                 900     IN      NS      ns3.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
```

dig @129.94.0.192 cse.unsw.edu.au NS

```
weber % dig @129.94.0.192 cse.unsw.edu.au NS

; <<>> DiG 9.7.3 <<>> @129.94.0.192 cse.unsw.edu.au NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 64037
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 2, ADDITIONAL: 4
;; WARNING: recursion requested but not available

;; QUESTION SECTION:
;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 129.94.172.11
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
maestro.orchestra.cse.unsw.edu.au. 10800 IN A 129.94.242.33
```


Last

dig @129.94.242.33 lyre00.cse.unsw.edu.au

```
;; 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
```

Get the answer 129.94.210.20

5 DNS servers have to be queried to get the authoritative answer

Question 11

Yes, one physical machine can have several names and/or IP addresses associated with it. Canonical names can be got by using type CNAME

EXERCISE 4

```
import sys
```

```
from socket import *
```

```
# allow to input server port
```

```
serverPort = int(sys.argv[1])
```

```
serverSocket = socket(AF_INET, SOCK_STREAM)
serverSocket.bind(('', serverPort))
serverSocket.listen(1)
print "The server is ready to receive"
while 1:
    connectionSocket, addr = serverSocket.accept()
    sentence = connectionSocket.recv(1024)

    try:
        # Because sentence = "GET /..... HTTP/...."
        # We need to split
        parts = sentence.split("/")
        file_name = parts[1].split(" ")
        # open file and read the content of the file
        f = open(file_name[0])
        data = f.read()
        # Header lines
        connectionSocket.send("HTTP/1.1 200 OK\n\n")
        connectionSocket.send(data)

        connectionSocket.close()
```

```
except IOError:
```

```
    connectionSocket.send("HTTP/1.1 404 NOT FOUND\n\n")
```

```
    r = "<html><body> 404 NOT FOUND </body></html>"
```

```
    connectionSocket.send(r)
```

```
    connectionSocket.close()
```