

Name: Zi Xi Hong

Recommend: 50000-60000 ports

Exercise 3

Question 1:

```
julian — ssh z5521365@vlab.cse.unsw.edu.au — 80x24
[z5521365@vx13:~$ dig www.hi.is

; <<>> DiG 9.18.24-1-Debian <<>> www.hi.is
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 24887
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 2, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 59721fb9e20f47da01000000666fdc2e1c4bf12d8bfb5dca (good)
;; QUESTION SECTION:
;www.hi.is.                IN      A

;; ANSWER SECTION:
www.hi.is.                 275     IN      CNAME   web-lb.rhi.hi.is.
web-lb.rhi.hi.is.         7843    IN      A       130.208.165.186

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Mon Jun 17 16:48:14 AEST 2024
;; MSG SIZE rcvd: 112

z5521365@vx13:~$
```

IP address is 130.208.165.186, A(type)

2.

```
z5521365@vx18:~$ dig www.hi.is CNAME
```

```
; <<>> DiG 9.18.24-1-Debian <<>> www.hi.is CNAME
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 14114
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 6293cc8a95aae18d0100000066717112faca6c1c2c6bdb45 (good)
;; QUESTION SECTION:
;www.hi.is.                IN      CNAME

;; ANSWER SECTION:
www.hi.is.                 63      IN      CNAME    web-lb.rhi.hi.is.

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Tue Jun 18 21:35:46 AEST 2024
;; MSG SIZE rcvd: 96
```

Web-lb.rhi.hi.is is www.hi.is 's canonical record name.

Canonical name is allowing website administrator to change the Ip address under sever without affect the user-face domain name. Canonical name is also very useful in distributing traffic among multiple servers.

3.

```
;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 78a9abd459cd8a1d010000006671769d820d984957cab13d (good)
```

Cookie: it generates Random DNS Cookies code which is use for preventing replay and verification attack

EDNS: The size limit of UDP packets is 1232 and the version is 0 which use extend DNS(EDNS0)

```
;; Query time: 360 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Tue Jun 18 21:59:25 AEST 2024
;; MSG SIZE rcvd: 112
```

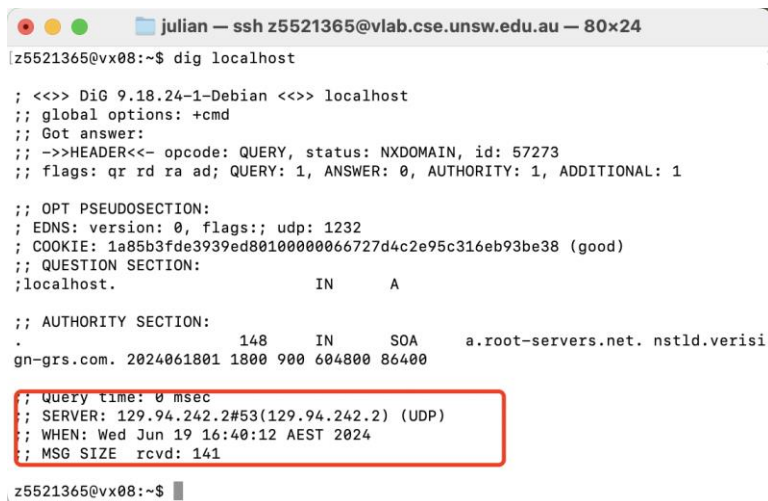
Query time: the time what it uses for querying.

DNS server IP address is 129.94.242.2, Port : 53

When: the time of query

MSG SIZE rcvd: The size of the received message is 112 bytes

4.



```
julian — ssh z5521365@vlab.cse.unsw.edu.au — 80x24
z5521365@vx08:~$ dig localhost

; <<>> DiG 9.18.24-1-Debian <<>> localhost
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 57273
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 1a85b3fde3939ed80100000066727d4c2e95c316eb93be38 (good)
;; QUESTION SECTION:
;localhost.                IN      A

;; AUTHORITY SECTION:
.                148     IN      SOA     a.root-servers.net. nstld.verisi
gn-grs.com. 2024061801 1800 900 604800 86400

; Query time: 0 msec
; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
; WHEN: Wed Jun 19 16:40:12 AEST 2024
; MSG SIZE rcvd: 141

z5521365@vx08:~$
```

Local Name server IP address is 129.94.242.2

5.

```
julian — ssh z5521365@vlab.cse.unsw.edu.au — 80x24

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 9c212caa86953cdd0100000066727f8c3a264bb3808b6bd3 (good)
;; QUESTION SECTION:
;hi.is.                IN      NS

;; ANSWER SECTION:
hi.is.                72457  IN      NS      borg.rhi.hi.is.
hi.is.                72457  IN      NS      info.rhi.hi.is.
hi.is.                72457  IN      NS      dvalinn.rhnet.is.

;; ADDITIONAL SECTION:
borg.rhi.hi.is.       72457  IN      A        130.208.165.54
info.rhi.hi.is.       73702  IN      A        130.208.143.33
dvalinn.rhnet.is.     73668  IN      A        130.208.16.21
info.rhi.hi.is.       5527   IN      AAAA     2a00:c88:4000:1431::143:33
dvalinn.rhnet.is.     2356   IN      AAAA     2a00:c88:10:16::21

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Wed Jun 19 16:49:48 AEST 2024
;; MSG SIZE rcvd: 243
```

DNS query Type is NS , A

NS is use for catching the name of nameserver.

A is use for obtaining the IP address of nameserver.

6.

```
<<>> DiG 9.18.24-1-Debian <<>> 18.67.93.67 A
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NXDOMAIN, id: 10026
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 195f8a83df1d34a301000000667281a9205b931a6093d0e6 (good)
;; QUESTION SECTION:
;18.67.93.67.          IN      A

;; AUTHORITY SECTION:
.                5226   IN      SOA      a.root-servers.net. nstld.verisi
gn-grs.com. 2024061801 1800 900 604800 86400

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Wed Jun 19 16:58:49 AEST 2024
;; MSG SIZE rcvd: 143
```

DNS name: a.root-servers.net. nstld.verisign-grs.com.

DNS query type : A

7.

```

julian — ssh z5521365@vlab.cse.unsw.edu.au — 80x24

; <<>> DiG 9.18.24-1-Debian <<>> @129.94.242.2 outlook.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 65457
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 955fbe4774d5e5b5010000006672c753eacaff9501c2d0d5 (good)
;; QUESTION SECTION:
;outlook.com.                IN      MX

;; ANSWER SECTION:
outlook.com.                 300     IN      MX      5 outlook-com.olc.protection.outlook.com.

;; Query time: 8 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Wed Jun 19 21:56:03 AEST 2024
;; MSG SIZE rcvd: 122

z5521365@vx22:~$
```

No, the flag in response message indicate that there is no “aa” which mean it’s not response from Authoritative name server.

8.

```

julian — ssh z5521365@vlab.cse.unsw.edu.au — 80x24

; <<>> DiG 9.18.24-1-Debian <<>> @129.94.242.2 hi.is MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 11670
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 02427db70995fc35010000006672c8c0389e3a505c76af6f (good)
;; QUESTION SECTION:
;hi.is.                      IN      MX

;; ANSWER SECTION:
hi.is.                      600     IN      MX      10 hi-is.mail.protection.outlook.com.

;; Query time: 332 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Wed Jun 19 22:02:08 AEST 2024
;; MSG SIZE rcvd: 111

z5521365@vx22:~$
```

Result(ad) : Data is authenticated by DNSSEC, it guarantee the integrity and realistic of data.

9.

```
z5521365@vx22:~$ dig outlook.com NS

;<> DiG 9.18.24-1-Debian <> outlook.com NS
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 43561
;; flags: qr rd ra; QUERY: 1, ANSWER: 8, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 1232
;; COOKIE: 8add18e2725f12801000006672cc0609232d93a0960a59 (good)
;; QUESTION SECTION:
;outlook.com.                IN      NS

;; ANSWER SECTION:
outlook.com.                300     IN      NS      ns3-38.azure-dns.org.
outlook.com.                300     IN      NS      ns4-38.azure-dns.info.
outlook.com.                300     IN      NS      nse12.o365filtering.com.
outlook.com.                300     IN      NS      nse13.o365filtering.com.
outlook.com.                300     IN      NS      nse21.o365filtering.com.
outlook.com.                300     IN      NS      ns1-38.azure-dns.com.
outlook.com.                300     IN      NS      ns2-38.azure-dns.net.
outlook.com.                300     IN      NS      nse24.o365filtering.com.

;; Query time: 12 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Wed Jun 19 22:16:06 AEST 2024
```

```
julian — ssh z5521365@vlab.cse.unsw.edu.au — 80x24

;<> DiG 9.18.24-1-Debian <> @ns4-38.azure-dns.info. outlook.com MX
(2 servers found)
;; global options: +cmd
;; Got answer:
;; ->HEADER<- opcode: QUERY, status: NOERROR, id: 37861
;; flags: qr aa rd ad; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
;; EDNS: version: 0, flags:; udp: 1232
;; QUESTION SECTION:
;outlook.com.                IN      MX

;; ANSWER SECTION:
outlook.com.                300     IN      MX      5 outlook-com.olc.protection.outlook.com.

;; Query time: 0 msec
;; SERVER: 13.107.206.38#53(ns4-38.azure-dns.info.) (UDP)
;; WHEN: Wed Jun 19 22:24:20 AEST 2024
;; MSG SIZE rcvd: 83

z5521365@vx22:~$
```

The type of query used to get the authoritative name server information is the NS record.

The query type used to obtain mail server information is MX record.

10.

Dig . NS

```
z5521365@vx22:~$ dig NS .

;<>> DiG 9.18.24-1-Debian <>> NS .
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 58439
;; flags: qr rd ra ad; QUERY: 1, ANSWER: 13, AUTHORITY: 0, ADDITIONAL: 27

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: 442ec9736afb6bf018080806672d68949695f8fb6eaf3bc (good)
;; QUESTION SECTION:
; .                IN      NS

;; ANSWER SECTION:
.                258846 IN      NS      m.root-servers.net.
.                258846 IN      NS      k.root-servers.net.
.                258846 IN      NS      b.root-servers.net.
.                258846 IN      NS      g.root-servers.net.
.                258846 IN      NS      e.root-servers.net.
.                258846 IN      NS      c.root-servers.net.
.                258846 IN      NS      i.root-servers.net.
.                258846 IN      NS      f.root-servers.net.
.                258846 IN      NS      l.root-servers.net.
.                258846 IN      NS      h.root-servers.net.
.                258846 IN      NS      j.root-servers.net.
.                258846 IN      NS      a.root-servers.net.
.                258846 IN      NS      d.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net. 48990  IN      A        198.41.0.4
b.root-servers.net. 402341 IN      A        170.247.170.2
c.root-servers.net. 340342 IN      A        192.33.4.12
d.root-servers.net. 340343 IN      A        199.7.91.13
e.root-servers.net. 402342 IN      A        192.283.230.10
f.root-servers.net. 481902 IN      A        192.5.5.241
g.root-servers.net. 340342 IN      A        192.112.36.4
h.root-servers.net. 255158 IN      A        198.97.198.53
i.root-servers.net. 402341 IN      A        192.36.148.17
j.root-servers.net. 402343 IN      A        192.58.128.30
k.root-servers.net. 402343 IN      A        193.0.14.129
l.root-servers.net. 308463 IN      A        199.7.83.42
m.root-servers.net. 402343 IN      A        202.12.27.33
n.root-servers.net. 164009 IN      AAAA     2001:503:ba3e::2:30
b.root-servers.net. 340342 IN      AAAA     2001:1b8:10::b
c.root-servers.net. 402341 IN      AAAA     2001:500:2::c
d.root-servers.net. 402341 IN      AAAA     2001:500:2d::d
e.root-servers.net. 481902 IN      AAAA     2001:500:a8::e
f.root-servers.net. 402342 IN      AAAA     2001:500:2f::f
g.root-servers.net. 41251  IN      AAAA     2001:500:12::d0d
h.root-servers.net. 402341 IN      AAAA     2001:500:11::53
i.root-servers.net. 402341 IN      AAAA     2001:7fe::53
j.root-servers.net. 402343 IN      AAAA     2001:503:c27::2:30
k.root-servers.net. 340341 IN      AAAA     2001:7fd::1
l.root-servers.net. 308463 IN      AAAA     2001:500:9f::42
n.root-servers.net. 402343 IN      AAAA     2001:dc3::35

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Wed Jun 19 22:58:49 AEST 2024
;; MSG SIZE rcvd: 851

-ERRNO: 0 0 0
```

dig @m.root-servers.net. au. NS

```
z5521365@vx22:~$ dig @m.root-servers.net. au. NS

;<>> DiG 9.18.24-1-Debian <>> @m.root-servers.net. au. NS
(2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 33423
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 5, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
;; QUESTION SECTION:
; au.              IN      NS

;; AUTHORITY SECTION:
au.                172800 IN      NS      s.au.
au.                172800 IN      NS      q.au.
au.                172800 IN      NS      r.au.
au.                172800 IN      NS      a.au.
au.                172800 IN      NS      t.au.

;; ADDITIONAL SECTION:
t.au.              172800 IN      A        65.22.199.1
s.au.              172800 IN      A        65.22.198.1
r.au.              172800 IN      A        65.22.197.1
q.au.              172800 IN      A        65.22.196.1
a.au.              172800 IN      A        58.65.254.1
t.au.              172800 IN      AAAA     2a01:8840:c1::1
s.au.              172800 IN      AAAA     2a01:8840:c0::1
r.au.              172800 IN      AAAA     2a01:8840:bf::1
q.au.              172800 IN      AAAA     2a01:8840:be::1
a.au.              172800 IN      AAAA     2407:6e00:254::1

;; Query time: 16 msec
;; SERVER: 202.12.27.33#53(m.root-servers.net.) (UDP)
;; WHEN: Wed Jun 19 23:05:26 AEST 2024
;; MSG SIZE rcvd: 331
```

dig @s.au. edu.au. NS

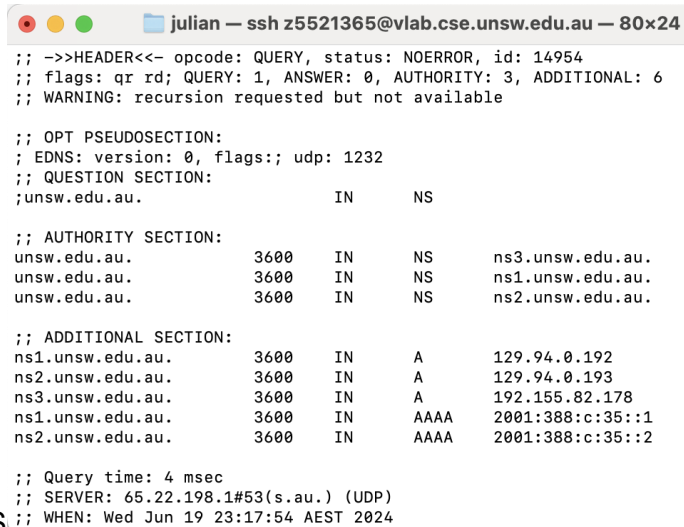
```
z5521365@vx22:~$ dig @s.au. edu.au. NS

; <<> DiG 9.18.24-1-Debian <<> @s.au. edu.au. NS
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; -->HEADER<-- opcode: QUERY, status: NOERROR, id: 40238
;; flags: qr aa rd; QUERY: 1, ANSWER: 5, AUTHORITY: 0, ADDITIONAL:
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
;; QUESTION SECTION:
;edu.au.                                IN      NS

;; ANSWER SECTION:
edu.au.      3600    IN      NS      q.au.
edu.au.      3600    IN      NS      a.au.
edu.au.      3600    IN      NS      r.au.
edu.au.      3600    IN      NS      t.au.
edu.au.      3600    IN      NS      s.au.

;; Query time: 4 msec
;; SERVER: 65.22.198.1#53(s.au.) (UDP)
;; WHEN: Wed Jun 19 23:07:50 AEST 2024
;; MSG SIZE rcvd: 115
```



```
;; -->HEADER<-- opcode: QUERY, status: NOERROR, id: 14954
;; 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.      3600    IN      NS      ns3.unsw.edu.au.
unsw.edu.au.      3600    IN      NS      ns1.unsw.edu.au.
unsw.edu.au.      3600    IN      NS      ns2.unsw.edu.au.

;; ADDITIONAL SECTION:
ns1.unsw.edu.au.  3600    IN      A        129.94.0.192
ns2.unsw.edu.au.  3600    IN      A        129.94.0.193
ns3.unsw.edu.au.  3600    IN      A        192.155.82.178
ns1.unsw.edu.au.  3600    IN      AAAA     2001:388:c:35::1
ns2.unsw.edu.au.  3600    IN      AAAA     2001:388:c:35::2

;; Query time: 4 msec
;; SERVER: 65.22.198.1#53(s.au.) (UDP)
;; WHEN: Wed Jun 19 23:17:54 AEST 2024
```

dig @s.au. unsw.edu.au. NS

dig @ns3.unsw.edu.au. cse.unsw.edu.au. NS


```

z5521365@vx22:~$ dig @ns3.unsw.edu.au. cse.unsw.edu.au. NS

; <<>> DiG 9.18.24-1-Debian <<>> @ns3.unsw.edu.au. cse.unsw.edu.au. NS
; (2 servers found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 54304
;; 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    129.94.208.3
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
maestro.orchestra.cse.unsw.edu.au. 300 IN A    129.94.242.33

;; Query time: 288 msec
;; SERVER: 192.155.82.178#53(ns3.unsw.edu.au.) (UDP)
;; WHEN: Wed Jun 19 23:19:21 AEST 2024
;; MSG SIZE rcvd: 164

```

```

julian — ssh z5521365@vlab.cse.unsw.edu.au — 80x24

[z5521365@vx22:~$ dig beethoven.orchestra.cse.unsw.edu.au.

; <<>> DiG 9.18.24-1-Debian <<>> beethoven.orchestra.cse.unsw.edu.au.
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 48111
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; COOKIE: e83c69113fbfb851010000006672db64041faf309bb13714 (good)
;; QUESTION SECTION:
;beethoven.orchestra.cse.unsw.edu.au. IN      A

;; ANSWER SECTION:
beethoven.orchestra.cse.unsw.EDU.AU. 3600 IN A    129.94.242.2

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2) (UDP)
;; WHEN: Wed Jun 19 23:21:40 AEST 2024
;; MSG SIZE rcvd: 143

```

6 DNS servers

11.

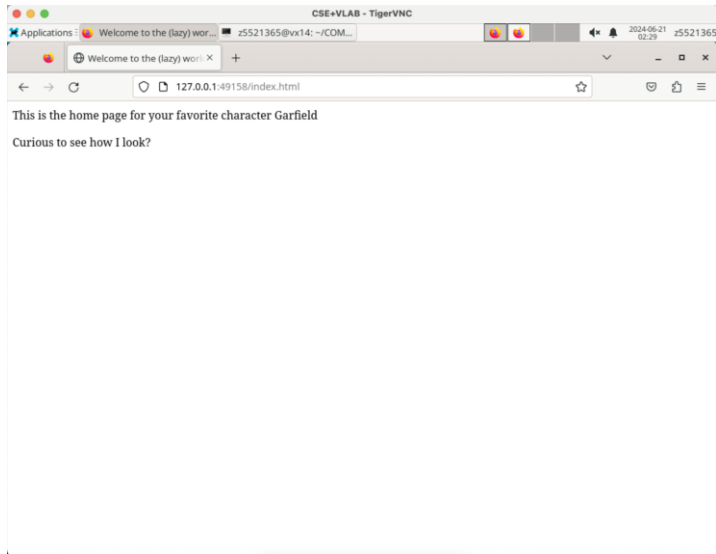
Yes , It can

The machine may have many domains under hosting or have multiple NIC. It cause that it has different IP address.

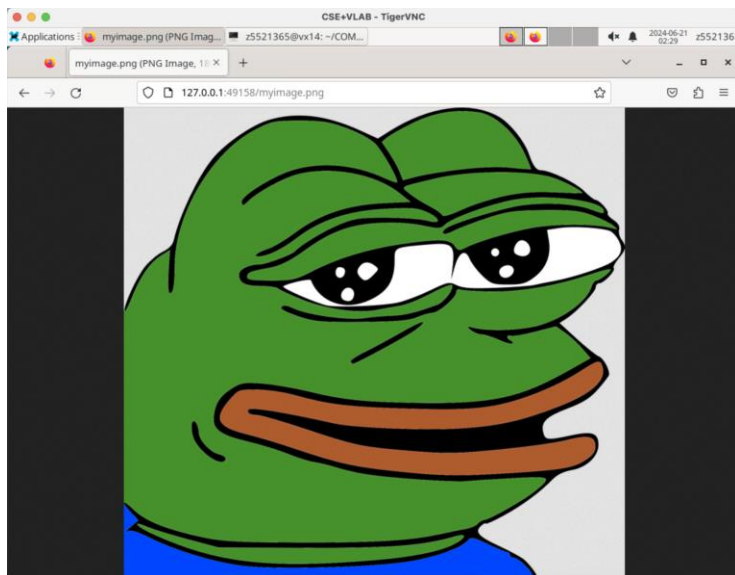
Exercise 4 :

Just set the port: 49158

Index.html



myimage.png



Bio.html

