

## Exercise 3

Q1

The IP is 151.101.30.133 and we use type A query to get the answer.

```
z5378608@vx04:~$ dig www.stanford.edu A
; <<> DiG 9.16.37-Debian <<> www.stanford.edu A
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 28458
;; flags: qr rd ra; QUERY: 1, ANSWER: 2, AUTHORITY: 4, ADDITIONAL: 5

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

;; ANSWER SECTION:
www.stanford.edu. 1576 IN CNAME pantheon-systems.map.fastly.net.
pantheon-systems.map.fastly.net. 30 IN A 151.101.30.133
```

Q2

The canonical name is pantheon-systems.map.fastly.net. and having an alias can help people to remember and use the DNS.

Q3

The AUTHORITY SECTION is about the authority server for that [www.stanford.com](http://www.stanford.com) domain which maintain the information about the domain. The ADDITIONAL SECTION indicates the IP address corresponding to the NS server.

Q4

The server IP is 129.94.242.2.

```
z5378608@vx04:~$ dig .
; <<> DiG 9.16.37-Debian <<> .
;; global options: +cmd
;; Got answer:
;; ->HEADER<<- opcode: QUERY, status: NOERROR, id: 25484
;; 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:
. 5476 IN SOA a.root-servers.net. nst

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Mon Mar 13 13:54:14 AEDT 2023
;; MSG SIZE rcvd: 103
```

Q5

In answer section the right side are DNS nameservers.

```
;; ANSWER SECTION:
stanford.edu.      13008  IN      NS      ns6.dnsmadeeasy.com.
stanford.edu.      13008  IN      NS      ns7.dnsmadeeasy.com.
stanford.edu.      13008  IN      NS      ns5.dnsmadeeasy.com.
stanford.edu.      13008  IN      NS      argus.stanford.edu.
stanford.edu.      13008  IN      NS      atalante.stanford.edu.
stanford.edu.      13008  IN      NS      avallone.stanford.edu.

;; ADDITIONAL SECTION:
ns5.dnsmadeeasy.com. 16317  IN      A       208.94.148.13
ns5.dnsmadeeasy.com. 16317  IN      AAAA    2600:1800:5::1
ns6.dnsmadeeasy.com. 13264  IN      A       208.80.124.13
ns6.dnsmadeeasy.com. 13264  IN      AAAA    2600:1801:6::1
ns7.dnsmadeeasy.com. 60489  IN      A       208.80.126.13
ns7.dnsmadeeasy.com. 30133  IN      AAAA    2600:1802:7::1
argus.stanford.edu.  813    IN      A       171.64.7.115
argus.stanford.edu.  8467   IN      AAAA    2607:f6d0:0:9113::ab40:773
atalante.stanford.edu. 813    IN      A       171.64.7.61
avallone.stanford.edu. 82724  IN      AAAA    2620:6c:40c0:0:204:63:224:53
```

Their IP is in red circle, and we use NS query.

Q6

ece.drexel.edu is the DNS's name and we sent is PTR query.

Q7

```
z5378608@vx06:~$ dig @129.94.242.33 google.com MX

; <<>> DiG 9.16.37-Debian <<>> @129.94.242.33 google.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 53544
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 4, ADDITIONAL: 18
```

We can see in DNS header, there didn't have AA(Authoritative Answer) in flags section, so it's not an authoritative answer.

Q8

```

z5378608@vx06:~$ dig @ns6.dnsmadeeasy.com google.com MX

; <<>> DiG 9.16.37-Debian <<>> @ns6.dnsmadeeasy.com google.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 0
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1280
;; QUESTION SECTION:
;google.com.                IN      MX

;; Query time: 4 msec
;; SERVER: 208.80.124.13#53(208.80.124.13)
;; WHEN: Sun Mar 12 19:15:29 AEDT 2023
;; MSG SIZE  rcvd: 39

```

The query answer status change to REFUSED.

Q9

```

z5378608@vx06:~$ dig @ns2.google.com google.com MX

; <<>> DiG 9.16.37-Debian <<>> @ns2.google.com google.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 33694
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 10
;; WARNING: recursion requested but not available

```

We could send MX query to obtain this information.

Q10

```
z5378608@vx06:~$ dig . NS
```

```
; <<> DiG 9.16.37-Debian <<> . NS
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 1300
;; 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:
.      40521  IN      NS      g.root-servers.net.
.      40521  IN      NS      l.root-servers.net.
.      40521  IN      NS      j.root-servers.net.
.      40521  IN      NS      f.root-servers.net.
.      40521  IN      NS      m.root-servers.net.
.      40521  IN      NS      b.root-servers.net.
.      40521  IN      NS      d.root-servers.net.
.      40521  IN      NS      i.root-servers.net.
.      40521  IN      NS      c.root-servers.net.
.      40521  IN      NS      e.root-servers.net.
.      40521  IN      NS      a.root-servers.net.
.      40521  IN      NS      k.root-servers.net.
.      40521  IN      NS      h.root-servers.net.

;; ADDITIONAL SECTION:
a.root-servers.net.  299870 IN      A      198.41.0.4
```

```
z5378608@vx06:~$ dig NS au. @198.41.0.4
```

```
; <<> DiG 9.16.37-Debian <<> NS au. @198.41.0.4
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 49059
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 6, ADDITIONAL: 13
;; WARNING: recursion requested but not available

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

;; AUTHORITY SECTION:
au.      172800 IN      NS      d.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      c.au.

;; ADDITIONAL SECTION:
d.au.    172800 IN      A      162.159.25.38
```

```
z5378608@vx06:~$ dig NS edu.au. @162.159.25.38
```

```
;; <>> DiG 9.16.37-Debian <>> NS edu.au. @162.159.25.38
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 13697
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 4, ADDITIONAL: 9
;; WARNING: recursion requested but not available

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

;; AUTHORITY SECTION:
edu.au.      900      IN      NS      t.au.
edu.au.      900      IN      NS      s.au.
edu.au.      900      IN      NS      q.au.
edu.au.      900      IN      NS      r.au.

;; ADDITIONAL SECTION:
q.au.        900      IN      A      65.22.196.1
```

```
z5378608@vx06:~$ dig NS unsw.edu.au. @65.22.196.1
```

```
;; <>> DiG 9.16.37-Debian <>> NS unsw.edu.au. @65.22.196.1
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 62495
;; 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      ns3.unsw.edu.au.
unsw.edu.au.    900      IN      NS      ns1.unsw.edu.au.
unsw.edu.au.    900      IN      NS      ns2.unsw.edu.au.

;; ADDITIONAL SECTION:
ns1.unsw.edu.au. 900      IN      A      129.94.0.192
```

```

z5378608@vx06:~$ dig NS cse.unsw.edu.au. @129.94.0.192

; <<> DiG 9.16.37-Debian <<> NS cse.unsw.edu.au. @129.94.0.192
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 19175
;; 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      maestro.orchestra.cse.unsw.edu.au.
cse.unsw.edu.au.                300     IN      NS      beethoven.orchestra.cse.unsw.edu.au.

;; ADDITIONAL SECTION:
beethoven.orchestra.cse.unsw.edu.au. 300 IN A      129.94.242.2

z5378608@vx06:~$ dig A lyre00.cse.unsw.edu.au. @129.94.242.2

; <<> DiG 9.16.37-Debian <<> A lyre00.cse.unsw.edu.au. @129.94.242.2
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 7029
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 3

;; 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      beethoven.orchestra.cse.unsw.EDU.AU.
cse.unsw.EDU.AU.            3600    IN      NS      maestro.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

;; Query time: 0 msec
;; SERVER: 129.94.242.2#53(129.94.242.2)
;; WHEN: Mon Mar 13 00:13:29 AEDT 2023
;; MSG SIZE rcvd: 177

```

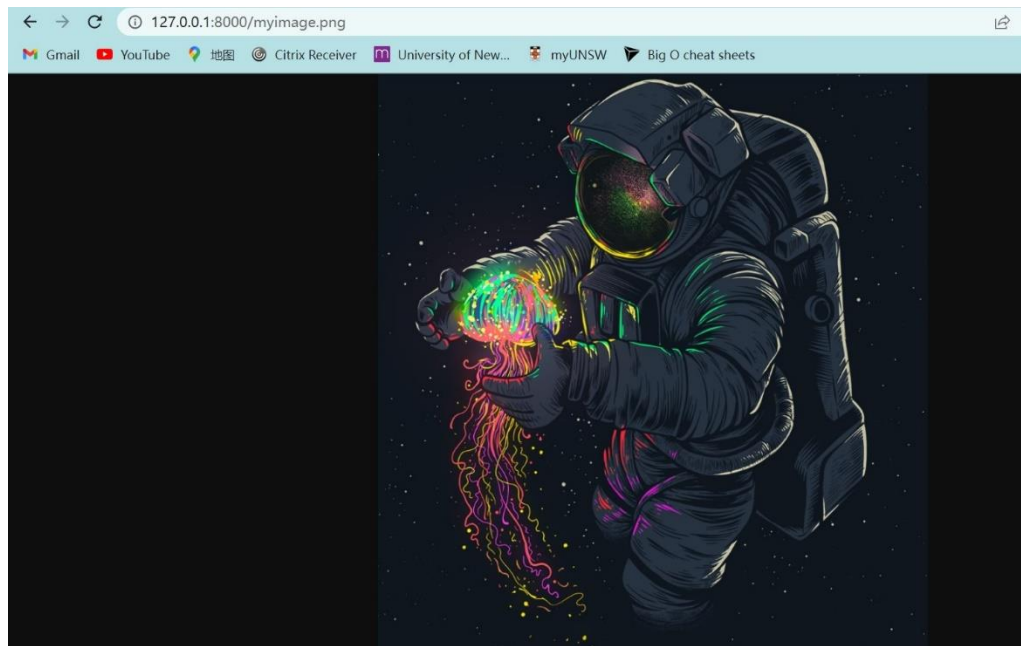
So, we need query 6 DNS servers.

Q11

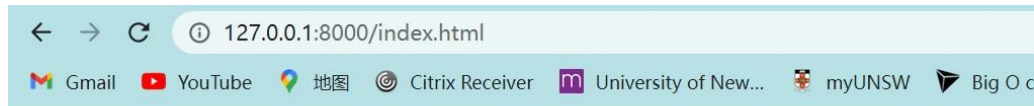
Yes, one physical device can have multiple IP addresses.

## Exercise 4

Return socket contain the .png file



Return socket contain the .html file



This is the home page for your favorite character Garfield

Curious to see how I look?

Return http 404 error.

