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Lab3

Exercise3：

Q1：

```
root@DESKTOP-GLGVIIU:~# dig www.cecs.anu.edu.au +short
rproxy.cecs.anu.edu.au.
150.203.161.98
root@DESKTOP-GLGVIIU:~#
```

The IP Address of www.cece.anu.edu.au is 150.203.161.98

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

The question type is A.

Q2:

```
root@DESKTOP-GLGVIIU:~# dig -t MX www.cecs.anu.edu.au +short
rproxy.cecs.anu.edu.au.
```

The canonical name is: rproxy.cecs.anu.edu.au.

The benefits of Alias analysis is: the server in the actual operation process, sometimes involves the replacement of IP address, if you use type A record , when changing the server IP, the IP also needs corresponding changes. But with the use of the alias analysis, due to using the second-level domain name, even point to server IP changes, do not need to modify.

Q3:

```
;; AUTHORITY SECTION:
cecs.anu.edu.au.        3100    IN      NS      ns3.cecs.anu.edu.au.
cecs.anu.edu.au.        3100    IN      NS      ns4.cecs.anu.edu.au.
cecs.anu.edu.au.        3100    IN      NS      ns2.cecs.anu.edu.au.

;; ADDITIONAL SECTION:
ns2.cecs.anu.edu.au.    3100    IN      A       150.203.161.36
ns3.cecs.anu.edu.au.    3100    IN      A       150.203.161.50
ns4.cecs.anu.edu.au.    3100    IN      A       150.203.161.38
ns2.cecs.anu.edu.au.    3100    IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.    3100    IN      AAAA    2001:388:1034:2905::32
ns4.cecs.anu.edu.au.    3100    IN      AAAA    2001:388:1034:2905::26

;; Query time: 19 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Tue Mar 10 22:36:29 AEDT 2020
;; MSG SIZE  rcvd: 271
```

In two sections, it also contain the TTL which is 3100, and the type in authority is NS; there are three domain server show above;

In additional section it contains the IP address of the domain server in authority section, the type AAAA is the IPv6 address for this domain server.

Q4:

```
;; ANSWER SECTION:
localhost.              10768   IN      A       127.0.0.1

;; Query time: 19 msec
;; SERVER: 192.168.1.1#53(192.168.1.1)
;; WHEN: Tue Mar 10 22:56:33 AEDT 2020
;; MSG SIZE  rcvd: 54
```

The IP of localhost is 192.168.1.1

Q5:

```
;; AUTHORITY SECTION:
cecs.anu.edu.au.        292     IN      NS      ns3.cecs.anu.edu.au.
cecs.anu.edu.au.        292     IN      NS      ns2.cecs.anu.edu.au.
cecs.anu.edu.au.        292     IN      NS      ns4.cecs.anu.edu.au.
```

The nameserver show above.

```
;; ADDITIONAL SECTION:
ns4.cecs.anu.edu.au.    1926    IN      A       150.203.161.38
ns4.cecs.anu.edu.au.    1608    IN      AAAA    2001:388:1034:2905::26
ns2.cecs.anu.edu.au.    1926    IN      A       150.203.161.36
ns2.cecs.anu.edu.au.    1608    IN      AAAA    2001:388:1034:2905::24
ns3.cecs.anu.edu.au.    300     IN      A       150.203.161.50
ns3.cecs.anu.edu.au.    1608    IN      AAAA    2001:388:1034:2905::32
```

And their IP address are 150.203.161.38;   150.203.161.36;   150.203.161.50 respectively.
The type of query is NS.

Q6:

```
root@DESKTOP-GLGVIIU:~# dig -x 111.68.101.54 +short
webserver.seecs.nust.edu.pk.
```

The DNS name is **webserver.seecs.nust.edu.pk.**
The query is : dig -x 111.68.101.54 +short
The type of query is PTR DNS

Q7:

```
root@DESKTOP-GLGVIIU:~# dig @129.94.242.33 yahoo.com NS

; <<>> DiG 9.11.3-1ubuntu1.9-Ubuntu <<>> @129.94.242.33 yahoo.com NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 13637
;; flags: qr rd ra; QUERY: 1, ANSWER: 5, AUTHORITY: 0, ADDITIONAL: 10

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

;; ANSWER SECTION:
yahoo.com.              110170  IN      NS      ns2.yahoo.com.
yahoo.com.              110170  IN      NS      ns1.yahoo.com.
yahoo.com.              110170  IN      NS      ns4.yahoo.com.
yahoo.com.              110170  IN      NS      ns5.yahoo.com.
yahoo.com.              110170  IN      NS      ns3.yahoo.com.
```

The answer show above, we didn't get the authoritative answer because in the flags of this query, there isn't contain 'aa', which means the CSE server has only authority on CSE domain instead yahoo.com domian

Q8:

```
root@DESKTOP-GLGVIIU:~# dig @150.203.161.38 yahoo.com MX

; <<>> DiG 9.11.3-1ubuntu1.9-Ubuntu <<>> @150.203.161.38 yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: REFUSED, id: 49737
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 0, ADDITIONAL: 1
;; WARNING: recursion requested but not available
```

The status is refused, the nameserver in Q5 didn't return any mail server for Yahoo Mail.

Q9:

```
root@DESKTOP-GLGVIIU:~# dig @ns4.yahoo.com yahoo.com MX

; <<>> DiG 9.11.3-1ubuntu1.9-Ubuntu <<>> @ns4.yahoo.com yahoo.com MX
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 25188
;; 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
; COOKIE: e231fde1507f27214697678a5e683da969d5b7d294023e02 (good)
;; QUESTION SECTION:
;yahoo.com.                     IN      MX

;; ANSWER SECTION:
yahoo.com.              1800    IN      MX      1 mta5.am0.yahoodns.net.
yahoo.com.              1800    IN      MX      1 mta7.am0.yahoodns.net.
yahoo.com.              1800    IN      MX      1 mta6.am0.yahoodns.net.
```

The type of this query is MX.

Q10:

First, we should get the root domain.The root server shows above.

Then choose 198.41.0.4 to get au nameserver, The au server shows above.

Then we use 162.159.24.179 to get the edu.au nameserver, The edu.au server shows above.

```
root@DESKTOP-GLGVIIU:~# dig @65.22.196.1 bongo01.cse.unsw.edu.au NS

; <<>> DiG 9.11.3-1ubuntu1.9-Ubuntu <<>> @65.22.196.1 bongo01.cse.unsw.edu.au NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 32729
;; flags: qr rd; QUERY: 1, ANSWER: 0, AUTHORITY: 3, ADDITIONAL: 6
;; WARNING: recursion requested but not available

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;bongo01.cse.unsw.edu.au.          IN      NS

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

Then we use 65.22.196.1 to get the unsw.edu.au nameserver. The unsw.edu.au server shows above.

```
root@DESKTOP-GLGVIIU:~# dig @129.94.0.192 bongo01.cse.unsw.edu.au NS

; <<>> DiG 9.11.3-1ubuntu1.9-Ubuntu <<>> @129.94.0.192 bongo01.cse.unsw.edu.au NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 43542
;; 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:
;bongo01.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.
```

Finally, we use 129.94.0.192 to get the bongo01 nameserver. The cse.unsw.edu.au server shows above

```
root@DESKTOP-GLGVIIU:~# dig @129.94.242.33 bongo01.cse.unsw.edu.au NS

; <<>> DiG 9.11.3-1ubuntu1.9-Ubuntu <<>> @129.94.242.33 bongo01.cse.unsw.edu.au NS
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 43682
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 0, AUTHORITY: 1, ADDITIONAL: 1

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 4096
;; QUESTION SECTION:
;bongo01.cse.unsw.edu.au.          IN      NS

;; AUTHORITY SECTION:
cse.unsw.edu.au.          900      IN      SOA     maestro.orchestra.cse.unsw.edu.au. hostmaster.cse.u
nsw.edu.au. 2020030900 2000 300 1209600 900
```

The nameservers of bongo01 shows above.
There are 6 DNS servers we query to get the authoritative answer.

Q11:

One physical machine can have several names and IP addresses according to the demands.