

1. Run *nslookup* to obtain the IP address of a Web server in Asia. What is the IP address of that server?
202.115.47.176

```
C:\Users\Z1588>nslookup cc.scu.edu.cn
服务器: UnKnown
Address: 192.168.43.1

非权威应答:
名称: cc.scu.edu.cn
Address: 202.115.47.176
```

2. Run *nslookup* to determine the authoritative DNS servers for a university in Europe.

```
C:\Windows\system32\cmd.exe

Microsoft Windows [版本 10.0.18362.476]
(c) 2019 Microsoft Corporation。保留所有权利。

C:\Users\Z1588>nslookup -type=NS cam.ac.uk
服务器: dart.scu.edu.cn
Address: 202.115.32.39

非权威应答:
cam.ac.uk      nameserver = dns0.cl.cam.ac.uk
cam.ac.uk      nameserver = sns-pb.isc.org
cam.ac.uk      nameserver = authdns0.csx.cam.ac.uk
cam.ac.uk      nameserver = ns2.ic.ac.uk
cam.ac.uk      nameserver = dns0.eng.cam.ac.uk

authdns0.csx.cam.ac.uk internet address = 131.111.8.37
authdns0.csx.cam.ac.uk AAAA IPv6 address = 2001:630:212:8::d:a0
dns0.cl.cam.ac.uk    internet address = 128.232.0.19
dns0.cl.cam.ac.uk    AAAA IPv6 address = 2001:630:212:200::d:a0
sns-pb.isc.org       internet address = 192.5.4.1
sns-pb.isc.org       AAAA IPv6 address = 2001:500:2e::1
dns0.eng.cam.ac.uk   internet address = 129.169.8.8
ns2.ic.ac.uk         internet address = 155.198.142.82
ns2.ic.ac.uk         AAAA IPv6 address = 2001:630:12:600:1::82
```

3. Run *nslookup* so that one of the DNS servers obtained in Question 2 is queried for the mail servers for Yahoo! mail. What is its IP address?
IP 地址是 192.168.1.1 和 192.168.1.5

```

C:\Users\Z1588>nslookup -type=MX www.yahoo.com
服务器:  dart.scu.edu.cn
Address:  202.115.32.39

非权威应答:
www.yahoo.com    canonical name = atsv2-fp-shed.wgl.b.yahoo.com
wgl.b.yahoo.com
    primary name server = yf1.yahoo.com
    responsible mail addr = hostmaster.yahoo-inc.com
    serial = 1574580664
    refresh = 30 (30 secs)
    retry = 30 (30 secs)
    expire = 86400 (1 day)
    default TTL = 300 (5 mins)

C:\Users\Z1588>nslookup www.yahoo.com dns9.hichina.com
服务器:  UnKnown
Address:  140.205.81.25

名称:      www.yahoo.com
Addresses:  192.168.1.1
            192.168.1.5

```

4. Locate the DNS query and response messages. Are then sent over UDP or TCP?

udp No.	Time	Source	Destination	Protocol
20	0.144442	10.132.10.226	202.115.32.39	DNS
21	0.152962	202.115.32.39	10.132.10.226	DNS
22	0.189245	10.132.10.226	40.90.185.223	TCP
23	0.189246	10.132.10.226	40.90.185.223	TLSv1
24	0.189392	10.132.10.226	40.90.185.223	TCP
25	0.189393	10.132.10.226	40.90.185.223	TCP
26	0.189396	10.132.10.226	40.90.185.223	TLSv1
32	0.605690	10.132.10.226	61.135.185.193	TCP
33	0.605889	10.132.10.226	61.135.185.193	TCP
34	0.629696	40.90.185.223	10.132.10.226	TCP
35	0.673459	40.90.185.223	10.132.10.226	TCP

Total Length: 66
 Identification: 0x8de1 (36321)
 > Flags: 0x0000
 ...0 0000 0000 0000 = Fragment offset: 0
 Time to live: 128
 Protocol: UDP (17)
 Header checksum: 0xacc9 [validation disabled]
 [Header checksum status: Unverified]
 Source: 10.132.10.226

5. What is the destination port for the DNS query message? What is the source port of DNS response message?

53; 53

```
> Frame 20: 80 bytes on wire (640 bits), 80 bytes captured (640 bits) on interface
> Ethernet II, Src: IntelCor_6f:1b:70 (34:f6:4b:6f:1b:70), Dst: RuijieNe_4c:47:53 (
> Internet Protocol Version 4, Src: 10.132.10.226, Dst: 202.115.32.39
> User Datagram Protocol, Src Port: 58899, Dst Port: 53
> Domain Name System (query), ..., ..
v User Datagram Protocol, Src Port: 53, Dst Port: 58899
    Source Port: 53
    Destination Port: 58899
    Length: 266
    Checksum: 0x6cf9 [unverified]
    [Checksum Status: Unverified]
```

6. To what IP address is the DNS query message sent? Use ipconfig to determine the IP address of your local DNS server. Are these two IP addresses the same?

202.115.32.39; 一样的

20	0.144442	10.132.10.226	202.115.32.39	DNS	80 Standard query 0x15b0 A suggestion.
21	0.152962	202.115.32.39	10.132.10.226	DNS	300 Standard query response 0x15b0 A su

无线局域网适配器 WLAN:

```
连接特定的 DNS 后缀 . . . . . :
描述. . . . . : Intel(R) Dual Band Wireless-AC 3165
物理地址. . . . . : 34-F6-4B-6F-1B-70
DHCP 已启用. . . . . : 是
自动配置已启用. . . . . : 是
本地链接 IPv6 地址. . . . . : fe80::acc2:5ea1:b289:db45%3(首选)
IPv4 地址 . . . . . : 10.132.10.226(首选)
子网掩码 . . . . . : 255.255.240.0
获得租约的时间 . . . . . : 2019年11月24日 15:18:57
租约过期的时间 . . . . . : 2019年11月24日 17:18:57
默认网关. . . . . : 10.132.15.254
DHCP 服务器 . . . . . : 10.132.15.254
DHCPv6 IAID . . . . . : 53802571
DHCPv6 客户端 DUID . . . . . : 00-01-00-01-24-ED-C8-A9-34-F6-4B-6F-1B-70
DNS 服务器 . . . . . : 202.115.32.39
                        202.115.32.36
TCP/IP 上的 NetBIOS . . . . . : 已启用
```

7. Examine the DNS query message. What “Type” of DNS query is it? Does the query message contain any “answers”?

类型为 A，没有应答

```

  v Flags: 0x0100 Standard query
    0... .. = Response: Message is a query
    .000 0... .. = Opcode: Standard query (0)
    .... ..0. .... = Truncated: Message is not truncated
    .... ..1 .... = Recursion desired: Do query recursively
    .... ..0.. .... = Z: reserved (0)
    .... ..0 .... = Non-authenticated data: Unacceptable
Questions: 1
Answer RRs: 0
Authority RRs: 0
Additional RRs: 0
  v Queries
    v suggestion.baidu.com: type A, class IN
      Name: suggestion.baidu.com
      [Name Length: 20]
      [Label Count: 3]
      Type: A (Host Address) (1)
      Class: IN (0x0001)
\[Response In: 21\]

```

8. Examine the DNS response message. How many “answers” are provided? What do each of these answers contain?

2 个 RRs 被提供，每个应答的 RRS 都包含下面的这些信息，name、type、class、time to live、data length。第一个 RR 包含 CNAME 信息，第二个包含 Address 信

息。

```
.... .... 0 .... = Non-authenticated data: Unacceptable
.... .... 0000 = Reply code: No error (0)
Questions: 1
Answer RRs: 2
Authority RRs: 5
Additional RRs: 5
> Queries
v Answers
  v suggestion.baidu.com: type CNAME, class IN, cname suggestion.a.shifen.com
    Name: suggestion.baidu.com
    Type: CNAME (Canonical NAME for an alias) (5)
    Class: IN (0x0001)
    Time to live: 5600
    Data length: 22
    CNAME: suggestion.a.shifen.com
  v suggestion.a.shifen.com: type A, class IN, addr 157.255.77.80
    Name: suggestion.a.shifen.com
    Type: A (Host Address) (1)
    Class: IN (0x0001)
    Time to live: 49
    Data length: 4
    Address: 157.255.77.80
> Authoritative nameservers
```

9. Consider the subsequent TCP SYN packet sent by your host. Does the destination IP address of the SYN packet correspond to any of the IP addresses provided in the DNS response message?

不一致

32	0.605690	10.132.10.226	61.135.185.193	TCP	66 58211 → 80 [SYN] Seq=0 Win=65535
33	0.605889	10.132.10.226	61.135.185.193	TCP	66 58210 → 80 [SYN] Seq=0 Win=65535

10. This web page contains images. Before retrieving each image, does your host issue new DNS queries?

没有。

11. What is the destination port for the DNS query message? What is the source port of DNS response message?

53; 53

36	1.431475	202.115.32.39	10.132.10.226	DNS	484 Sta
37	1.442998	10.132.10.226	202.115.32.39	DNS	71 Sta
38	1.500415	202.115.32.39	10.132.10.226	DNS	524 Sta
56	2.172989	10.132.10.226	40.90.185.223	TCP	1428 559
57	2.172991	10.132.10.226	40.90.185.223	TLSv1.2	229 App
58	2.173543	10.132.10.226	40.90.185.223	TCP	1428 559
59	2.173546	10.132.10.226	40.90.185.223	TCP	1428 559
60	2.173548	10.132.10.226	40.90.185.223	TLSv1.2	902 App
61	2.387212	10.132.10.226	202.108.23.152	TCP	55 559
63	2.660295	40.90.185.223	10.132.10.226	TCP	60 443
64	2.661099	40.90.185.223	10.132.10.226	TCP	1448 443
65	2.662091	40.90.185.223	10.132.10.226	TCP	1448 443

> Frame 37: 71 bytes on wire (568 bits), 71 bytes captured (568 bits) on interface > Ethernet II, Src: IntelCor_6f:1b:70 (34:f6:4b:6f:1b:70), Dst: RuijieNe_4c:47:53 > Internet Protocol Version 4, Src: 10.132.10.226, Dst: 202.115.32.39 > User Datagram Protocol, Src Port: 57851, Dst Port: 53 > Domain Name System (query)					
---	--	--	--	--	--

37	1.442998	10.132.10.226	202.115.32.39	DNS	71 Standard query 0
38	1.500415	202.115.32.39	10.132.10.226	DNS	524 Standard query r
56	2.172989	10.132.10.226	40.90.185.223	TCP	1428 55955 → 443 [ACK
57	2.172991	10.132.10.226	40.90.185.223	TLSv1.2	229 Application Data
58	2.173543	10.132.10.226	40.90.185.223	TCP	1428 55955 → 443 [ACK
59	2.173546	10.132.10.226	40.90.185.223	TCP	1428 55955 → 443 [ACK
60	2.173548	10.132.10.226	40.90.185.223	TLSv1.2	902 Application Data
61	2.387212	10.132.10.226	202.108.23.152	TCP	55 55970 → 443 [ACK
63	2.660295	40.90.185.223	10.132.10.226	TCP	60 443 → 55955 [ACK
64	2.661099	40.90.185.223	10.132.10.226	TCP	1448 443 → 55955 [ACK
65	2.662091	40.90.185.223	10.132.10.226	TCP	1448 443 → 55955 [ACK

> Frame 38: 524 bytes on wire (4192 bits), 524 bytes captured (4192 bits) on interface 0 > Ethernet II, Src: RuijieNe_4c:47:53 (58:69:6c:4c:47:53), Dst: IntelCor_6f:1b:70 (34:f6:4b:6f: > Internet Protocol Version 4, Src: 202.115.32.39, Dst: 10.132.10.226 > User Datagram Protocol, Src Port: 53, Dst Port: 57851 > Domain Name System (response)					
--	--	--	--	--	--

12. To what IP address is the DNS query message sent? Is this the IP address of your default local DNS server?

202.115.32,39; 一样

37	1.442998	10.132.10.226	202.115.32.39	DNS	71 Standard query 0x0003 AAAA www.mit.edu
38	1.500415	202.115.32.39	10.132.10.226	DNS	524 Standard query response 0x0003 AAAA www.mit.edu
56	2.172989	10.132.10.226	40.90.185.223	TCP	1428 55955 → 443 [ACK] Seq=1 Ark=1 Win=257 Len=1374

无线网络适配器 WLAN:

```

连接特定的 DNS 后缀 . . . . . : 
描述 . . . . . : Intel(R) Dual Band Wireless-AC 3165
物理地址. . . . . : 34-F6-4B-6F-1B-70
DHCP 已启用 . . . . . : 是
自动配置已启用. . . . . : 是
本地链接 IPv6 地址. . . . . : fe80::acc2:5ea1:b289:db45%3(首选)
IPv4 地址 . . . . . : 10.132.10.226(首选)
子网掩码 . . . . . : 255.255.240.0
获得租约的时间 . . . . . : 2019年11月24日 15:18:57
租约过期的时间 . . . . . : 2019年11月24日 17:18:57
默认网关 . . . . . : 10.132.15.254
DHCP 服务器 . . . . . : 10.132.15.254
DHCPv6 IAID . . . . . : 53802571
DHCPv6 客户端 DUID . . . . . : 00-01-00-01-24-ED-C8-A9-34-F6-4B-6F-1B-70
DNS 服务器 . . . . . : 202.115.32.39
                        202.115.32.36
TCP/IP 上的 NetBIOS . . . . . : 已启用
  
```

13. Examine the DNS query message. What “Type” of DNS query is it? Does the query message contain any “answers”?

AAAA; 没有应答

37	1.442998	10.132.10.226	202.115.32.39	DNS	71 Standard
38	1.500415	202.115.32.39	10.132.10.226	DNS	534 Standard

> Frame 37: 71 bytes on wire (568 bits), 71 bytes captured (568 bits) on interface 0

> Ethernet II, Src: IntelCor_6f:1b:70 (34:f6:4b:6f:1b:70), Dst: RuijieNe_4c:47:53 (58:6f:4c:47:53)

> Internet Protocol Version 4, Src: 10.132.10.226, Dst: 202.115.32.39

> User Datagram Protocol, Src Port: 57851, Dst Port: 53

▼ Domain Name System (query)

Transaction ID: 0x0003

▼ Flags: 0x0100 Standard query

0... .. = Response: Message is a query

.000 0... .. = Opcode: Standard query (0)

.... ..0. = Truncated: Message is not truncated

.... ..1 = Recursion desired: Do query recursively

.... ..0.. = Z: reserved (0)

.... ..0 = Non-authenticated data: Unacceptable

Questions: 1

Answer RRs: 0

Authority RRs: 0

Additional RRs: 0

▼ Queries

▼ www.mit.edu: type AAAA, class IN

Name: www.mit.edu

[Name Length: 11]

[Label Count: 3]

Type: AAAA (IPv6 Address) (28)

Class: IN (0x0001)

[\[Response In: 38\]](#)

14. Examine the DNS response message. How many “answers” are provided? What do each of these answers contain?

四个回答;

38	1.500415	202.115.32.39	10.132.10.226
56	2.173080	10.132.10.226	10.00.185.222
<			
> Frame 38: 524 bytes on wire (4192 bits), 524 bytes captured			
> Ethernet II, Src: RuijieNe_4c:47:53 (58:69:6c:4c:47:53), Ds			
> Internet Protocol Version 4, Src: 202.115.32.39, Dst: 10.13			
> User Datagram Protocol, Src Port: 53, Dst Port: 57851			
v Domain Name System (response)			
Transaction ID: 0x0003			
> Flags: 0x8180 Standard query response, No error			
Questions: 1			
Answer RRs: 4			
Authority RRs: 8			
Additional RRs: 9			

第一个回答包括: name、type、class、time to alive、data length、CNAME

```
v www.mit.edu: type CNAME, class IN, cname www.mit.edu.edgekey.net
  Name: www.mit.edu
  Type: CNAME (Canonical NAME for an alias) (5)
  Class: IN (0x0001)
  Time to live: 1305
  Data length: 25
  CNAME: www.mit.edu.edgekey.net
```

第二个回答包括: name、type、class、time to alive、data length、CNAME

```
v www.mit.edu.edgekey.net: type CNAME, class IN, cname e9566.dscb.akamaiedge.net
  Name: www.mit.edu.edgekey.net
  Type: CNAME (Canonical NAME for an alias) (5)
  Class: IN (0x0001)
  Time to live: 59
  Data length: 24
  CNAME: e9566.dscb.akamaiedge.net
```

第三个回答包括: name、type、class、time to alive、data length、AAAA address

```
v e9566.dscb.akamaiedge.net: type AAAA, class IN, addr 2600:1417:8000:4be::255e
  Name: e9566.dscb.akamaiedge.net
  Type: AAAA (IPv6 Address) (28)
  Class: IN (0x0001)
  Time to live: 20
  Data length: 16
  AAAA Address: 2600:1417:8000:4be::255e
```


第四个回答包括 name、type、class、time to alive、data length、AAAA address

```
▼ e9566.dscb.akamaiedge.net: type AAAA, class IN, addr 2600:1417:8000:4a2::255e
  Name: e9566.dscb.akamaiedge.net
  Type: AAAA (IPv6 Address) (28)
  Class: IN (0x0001)
  Time to live: 20
  Data length: 16
  AAAA Address: 2600:1417:8000:4a2::255e
```

15. Provide a screenshot.

实验截图已附在每题的下面

16. To what IP address is the DNS query message sent? Is this the IP address of your default local DNS server?

202.115.32.39; 一样。

23	0.297816	10.132.10.226	202.115.32.39	DNS	67 Standard query 0x0002 NS mit.edu
24	0.301169	202.115.32.39	10.132.10.226	DNS	446 Standard query response 0x0002 NS mit.edu NS eur5.ak

无线局域网适配器 WLAN:

```
连接特定的 DNS 后缀 . . . . . :
描述. . . . . : Intel(R) Dual Band Wireless-AC 3165
物理地址. . . . . : 34-F6-4B-6F-1B-70
DHCP 已启用 . . . . . : 是
自动配置已启用. . . . . : 是
本地链接 IPv6 地址. . . . . : fe80::acc2:5ea1:b289:db45%3(首选)
IPv4 地址 . . . . . : 10.132.10.226(首选)
子网掩码 . . . . . : 255.255.240.0
获得租约的时间 . . . . . : 2019年11月24日 15:18:57
租约过期的时间 . . . . . : 2019年11月24日 17:18:57
默认网关. . . . . : 10.132.15.254
DHCP 服务器 . . . . . : 10.132.15.254
DHCPv6 IAID . . . . . : 53802571
DHCPv6 客户端 DUID . . . . . : 00-01-00-01-24-ED-C8-A9-34-F6-4B-6F-1B-70
DNS 服务器 . . . . . : 202.115.32.39
                        202.115.32.36
TCP/IP 上的 NetBIOS . . . . . : 已启用
```

17. Examine the DNS query message. What “Type” of DNS query is it? Does the query message contain any “answers”?

NS; 没有应答

23	0.297816	10.132.10.226	202.115.32.39	DNS	
24	0.301169	202.115.32.39	10.132.10.226	DNS	
119	3.947796	10.132.10.226	40.81.26.225	TCP	1.

> Frame 23: 67 bytes on wire (536 bits), 67 bytes captured (536 bits) on in

> Ethernet II, Src: IntelCor_6f:1b:70 (34:f6:4b:6f:1b:70), Dst: RuijieNe_4c

> Internet Protocol Version 4, Src: 10.132.10.226, Dst: 202.115.32.39

> User Datagram Protocol, Src Port: 53366, Dst Port: 53

Domain Name System (query)

Transaction ID: 0x0002

> Flags: 0x0100 Standard query

Questions: 1

Answer RRs: 0

Authority RRs: 0

Additional RRs: 0

Queries

mit.edu: type NS, class IN

Name: mit.edu

[Name Length: 7]

[Label Count: 2]

Type: NS (authoritative Name Server) (2)

Class: IN (0x0001)

[\[Response In: 24\]](#)

18. Examine the DNS response message. What MIT nameservers does the response message provide? Does this response message also provide the IP addresses of the MIT nameservers?

提供了 8 个，并在额外的 RRS 记录中提供了域名服务器的 IP 地址。

Domain Name System (response)
Transaction ID: 0x0002
> Flags: 0x8180 Standard query response, No error
Questions: 1
Answer RRs: 8
Authority RRs: 0
Additional RRs: 11

```
Data length: 9
Name Server: ns1-37.akam.net
v mit.edu: type NS, class IN, ns asia1.akam.net
  Name: mit.edu
  Type: NS (authoritative Name Server) (2)
  Class: IN (0x0001)
  Time to live: 165
  Data length: 8
  Name Server: asia1.akam.net
v mit.edu: type NS, class IN, ns use5.akam.net
  Name: mit.edu
  Type: NS (authoritative Name Server) (2)
  Class: IN (0x0001)
  Time to live: 165
  Data length: 7
  Name Server: use5.akam.net
v mit.edu: type NS, class IN, ns usw2.akam.net
  Name: mit.edu
  Type: NS (authoritative Name Server) (2)
  Class: IN (0x0001)
  Time to live: 165
  Data length: 7
  Name Server: usw2.akam.net
v Additional records
  v usw2.akam.net: type A, class IN, addr 184.26.161.64
    Name: usw2.akam.net
    Type: A (Host Address) (1)
    Class: IN (0x0001)
    Time to live: 34140
    Data length: 4
    Address: 184.26.161.64
  v ns1-37.akam.net: type A, class IN, addr 193.108.91.37
    Name: ns1-37.akam.net
    Type: A (Host Address) (1)
    Class: IN (0x0001)
    Time to live: 86163
    Data length: 4
    Address: 193.108.91.37
  v ns1-37.akam.net: type AAAA, class IN, addr 2600:1401:2::25
    Name: ns1-37.akam.net
    Type: AAAA (IPv6 Address) (28)
    Class: IN (0x0001)
    Time to live: 86163
```

19. Provide a screenshot.

截图已附在每个题后面。

20. To what IP address is the DNS query message sent? Is this the IP address of your default local DNS server? If not, what does the IP address correspond to?

21. Examine the DNS query message. What “Type” of DNS query is it? Does the query message contain any “answers”?

22. Examine the DNS response message. How many “answers” are provided? What does each of these answers contain?

23. Provide a screenshot.

```
C:\Users\Z1588>nslookup www.aiit.or.kr dns9.hichina.com
服务器: UnKnown
Address: 140.205.81.25

*** UnKnown 找不到 www.aiit.or.kr: Query refused
```

C:\Windows\system32\cmd.exe

```
Microsoft Windows [版本 10.0.18362.476]
(c) 2019 Microsoft Corporation。保留所有权利。
```

```
C:\Users\Z1588>nslookup www.aiit.or.kr ns1.hwclouds-dns.com
服务器: ecs-43-254-0-68.compute.hwclouds-dns.com
Address: 43.254.0.68

*** ecs-43-254-0-68.compute.hwclouds-dns.com 找不到 www.aiit.or.kr: Query refused
```

```
C:\Users\Z1588>
```

换用国内域名服务器找不到该记录。