1)
1. 192.168.1.1
2. dns1.ox.ac.uk ns2.ja.net dns2.ox.ac.uk
3. Например ox.ac.uk. У СПбГУ 1 IP-адрес

```
marat@tiberius: ~                                    ⌄  ⌃  ✕

Файл  Правка  Вид  Поиск  Терминал  Справка

marat@tiberius:~$ nslookup www.u-tokyo.ac.jp
Server:         192.168.1.1
Address:        192.168.1.1#53

Non-authoritative answer:
Name:   www.u-tokyo.ac.jp
Address: 210.152.243.234

marat@tiberius:~$ nslookup -type=NS ox.ac.uk
Server:         192.168.1.1
Address:        192.168.1.1#53

Non-authoritative answer:
ox.ac.uk         nameserver = dns0.ox.ac.uk.
ox.ac.uk         nameserver = dns2.ox.ac.uk.
ox.ac.uk         nameserver = dns1.ox.ac.uk.
ox.ac.uk         nameserver = auth4.dns.ox.ac.uk.
ox.ac.uk         nameserver = auth5.dns.ox.ac.uk.
ox.ac.uk         nameserver = ns2.ja.net.
ox.ac.uk         nameserver = auth6.dns.ox.ac.uk.

Authoritative answers can be found from:
dns1.ox.ac.uk   internet address = 129.67.1.191
ns2.ja.net      internet address = 193.63.105.17
dns2.ox.ac.uk   internet address = 163.1.2.190

marat@tiberius:~$ nslookup spbu.ru
Server:         192.168.1.1
Address:        192.168.1.1#53

Non-authoritative answer:
Name:   spbu.ru
Address: 82.202.190.112

marat@tiberius:~$ nslookup ox.ac.uk
Server:         192.168.1.1
Address:        192.168.1.1#53

Non-authoritative answer:
Name:   ox.ac.uk
Address: 151.101.130.216
Name:   ox.ac.uk
Address: 151.101.194.216
Name:   ox.ac.uk
Address: 151.101.66.216
Name:   ox.ac.uk
Address: 151.101.2.216
```

2)
1. UDP

2. 53
3. 192.168.1.1, совпадает
4. Запись типа А, ответов нет
5. 3 ответа. В каждом из них них содержатся имя, тип, класс, время жизни, размер данных и IP-адрес
6. Соответствует
7.


```
No.    Time            Source           Destination      Protocol Lengt Info
  1290 3.326773887     192.168.1.94     192.168.1.1      DNS        72 Standard query 0x7007 A
  1291 3.326818655     192.168.1.94     192.168.1.1      DNS        72 Standard query 0x4a0c AA
  1292 3.328633288     144.195.85.79    192.168.1.94     UDP       755 8801 → 52912 Len=713
  1293 3.329832404     144.195.85.79    192.168.1.94     UDP       755 8801 → 52912 Len=713
  1294 3.329833312     144.195.85.79    192.168.1.94     UDP       755 8801 → 52912 Len=713
  1295 3.330502887     144.195.85.79    192.168.1.94     TCP        66 443 → 40458 [ACK] Seq=10
  1296 3.330500023     144.195.85.79    192.168.1.94     UDP       199 8801 → 58415 Len=157
  1297 3.332380129     192.168.1.94     144.195.85.79    UDP       308 8801 → 58415 Len=266
  1298 3.333871433     144.195.85.79    192.168.1.94     UDP        69 8801 → 55520 Len=27
  1299 3.339375047     144.195.85.79    192.168.1.94     UDP       755 8801 → 52912 Len=713
  1300 3.339375955     144.195.85.79    192.168.1.94     UDP       755 8801 → 52912 Len=713
  1301 3.339376932     144.195.85.79    192.168.1.94     UDP       786 8801 → 52912 Len=744
  1302 3.343873426     192.168.1.1      192.168.1.94     DNS       149 Standard query response
  1303 3.345796104     192.168.1.94     144.195.85.79    UDP       798 55520 → 8801 Len=756
  1304 3.345825857     192.168.1.94     144.195.85.79    UDP       798 55520 → 8801 Len=756
  1305 3.347779754     192.168.1.1      192.168.1.94     DNS       173 Standard query response
  1306 3.348272140     192.168.1.94     104.16.44.99     TCP        74 45476 → 80 [SYN] Seq=0 W
  1307 3.349337090     144.195.85.79    192.168.1.94     UDP       786 8801 → 52912 Len=744
  1308 3.350721357     144.195.85.79    192.168.1.94     UDP       204 8801 → 58415 Len=162
  1309 3.352102136     192.168.1.94     144.195.85.79    UDP       204 58415 → 8801 Len=252
```

```
         [Time since previous frame: 0.017054771 seconds]
      UDP payload (107 bytes)
▼ Domain Name System (response)
      Transaction ID: 0x7007
   ▶ Flags: 0x8180 Standard query response, No error
      Questions: 1
      Answer RRs: 3
      Authority RRs: 0
      Additional RRs: 0
   ▼ Queries
      ▼ www.ietf.org: type A, class IN
            Name: www.ietf.org
            [Name Length: 12]
            [Label Count: 3]
            Type: A (Host Address) (1)
            Class: IN (0x0001)
   ▼ Answers
      ▼ www.ietf.org: type CNAME, class IN, cname www.ietf.org.cdn.cloudflare.net
            Name: www.ietf.org
            Type: CNAME (Canonical NAME for an alias) (5)
            Class: IN (0x0001)
            Time to live: 102 (1 minute, 42 seconds)
            Data length: 33
            CNAME: www.ietf.org.cdn.cloudflare.net
      ▼ www.ietf.org.cdn.cloudflare.net: type A, class IN, addr 104.16.44.99
            Name: www.ietf.org.cdn.cloudflare.net
            Type: A (Host Address) (1)
            Class: IN (0x0001)
            Time to live: 300 (5 minutes)
            Data length: 4
            Address: 104.16.44.99
      ▼ www.ietf.org.cdn.cloudflare.net: type A, class IN, addr 104.16.45.99
            Name: www.ietf.org.cdn.cloudflare.net
            Type: A (Host Address) (1)
            Class: IN (0x0001)
            Time to live: 300 (5 minutes)
            Data length: 4
            Address: 104.16.45.99
      [Request In: 1290]
```

3)
1. И порт назначения, и порт источника 53
2. На адрес 192.168.1.1, совпадает
3. Запрашивается запись типа АААА, ответов нет

4. 1 ответ, в нём содержатся имя, тип, класс, время жизни, размер данных и т.д.

No.	Time	Source	Destination	Protoc▼	Length	Info
560	1.602785952	192.168.1.94	192.168.1.1	DNS	71	Standard query 0xc
564	1.612285330	192.168.1.1	192.168.1.94	DNS	101	Standard query res
567	1.612990736	192.168.1.94	192.168.1.1	DNS	67	Standard query 0xe
569	1.625331015	192.168.1.1	192.168.1.94	DNS	120	Standard query res
413	1.192995879	192.168.1.94	224.0.0.251	MDNS	205	Standard query 0xC
419	1.208490370	192.168.1.94	201.49.148.135	NTP	90	NTP Version 4, cli
520	1.539631119	201.49.148.135	192.168.1.94	NTP	90	NTP Version 4, ser
59	0.185363341	144.195.85.79	192.168.1.94	TCP	66	443 → 40458 [ACK]
80	0.226115511	192.168.1.94	144.195.85.79	TCP	66	40458 → 443 [ACK]
130	0.404089552	144.195.85.79	192.168.1.94	TCP	66	443 → 40458 [ACK]
157	0.408885170	192.168.1.94	93.186.225.201	TCP	66	60652 → 443 [ACK]
166	0.434711858	93.186.225.201	192.168.1.94	TCP	66	443 → 60652 [ACK]
274	0.757954222	192.168.1.94	144.195.85.79	TCP	66	40458 → 443 [ACK]
340	0.986892431	144.195.85.79	192.168.1.94	TCP	66	443 → 40458 [ACK]
437	1.237229853	192.168.1.94	209.85.233.194	TCP	66	37432 → 443 [ACK]
438	1.237265892	192.168.1.94	209.85.233.194	TCP	66	37432 → 443 [ACK]
439	1.237275531	192.168.1.94	209.85.233.194	TCP	66	37432 → 443 [ACK]
443	1.247851340	209.85.233.194	192.168.1.94	TCP	66	443 → 37432 [ACK]
468	1.331235360	192.168.1.94	144.195.85.79	TCP	66	40458 → 443 [ACK]
545	1.563245499	144.195.85.79	192.168.1.94	TCP	66	443 → 40458 [ACK]

```
        Source Port: 53
        Destination Port: 49391
        Length: 86
        Checksum: 0xd754 [unverified]
        [Checksum Status: Unverified]
        [Stream index: 11]
      ▼ [Timestamps]
           [Time since first frame: 0.012340279 seconds]
           [Time since previous frame: 0.012340279 seconds]
        UDP payload (78 bytes)
 ▼ Domain Name System (response)
        Transaction ID: 0xebb4
      ▶ Flags: 0x8180 Standard query response, No error
        Questions: 1
        Answer RRs: 0
        Authority RRs: 1
        Additional RRs: 0
      ▼ Queries
         ▼ spbu.ru: type AAAA, class IN
              Name: spbu.ru
              [Name Length: 7]
              [Label Count: 2]
              Type: AAAA (IPv6 Address) (28)
              Class: IN (0x0001)
      ▼ Authoritative nameservers
         ▼ spbu.ru: type SOA, class IN, mname ns.pu.ru
              Name: spbu.ru
              Type: SOA (Start Of a zone of Authority) (6)
              Class: IN (0x0001)
              Time to live: 902 (15 minutes, 2 seconds)
              Data length: 41
              Primary name server: ns.pu.ru
              Responsible authority's mailbox: hostmaster.pu.ru
              Serial Number: 2022012028
              Refresh Interval: 7200 (2 hours)
              Retry Interval: 3600 (1 hour)
              Expire limit: 604800 (7 days)
              Minimum TTL: 3600 (1 hour)
        [Request In: 567]
        [Time: 0.012340279 seconds]
```

4)
1. На адрес 192.168.1.1, совпадает
2. Тип NS, ответов нет
3. ns.pu.ru ns7.spbu.ru ns2.pu.ru, адреса отсутствуют

```
108 2.036131580   192.168.1.94     87.240.185.193    TCP      78 [TCP Window Update] 46662 →
110 2.036139193   192.168.1.94     87.240.185.193    TCP      78 [TCP Window Update] 46662 →
111 2.036146456   87.240.185.193   192.168.1.94      TLSv1.2 1514 Ignored Unknown Record
113 2.036147434   87.240.185.193   192.168.1.94      TLSv1.2 1514 [TCP Previous segment not c
112 2.036151694   192.168.1.94     87.240.185.193    TCP      78 [TCP Window Update] 46662 →
114 2.036159237   192.168.1.94     87.240.185.193    TCP      86 [TCP Window Update] 46662 →
115 2.038949521   192.168.1.94     192.168.1.1       DNS      67 Standard query 0x6766 NS sp
116 2.140051780   87.240.185.193   192.168.1.94      TLSv1.2 2962 [TCP Previous segment not c
118 2.140053177   87.240.185.193   192.168.1.94      TLSv1.2 2962 Ignored Unknown Record
120 2.140054085   87.240.185.193   192.168.1.94      TLSv1.2 2962 Ignored Unknown Record
122 2.140055551   87.240.185.193   192.168.1.94      TCP     1514 [TCP Out-Of-Order] 443 → 46
124 2.140056459   87.240.185.193   192.168.1.94      TLSv1.2 2962 Ignored Unknown Record
117 2.140108770   192.168.1.94     87.240.185.193    TCP      94 [TCP Window Update] 46662 →
119 2.140139989   192.168.1.94     87.240.185.193    TCP      94 [TCP Window Update] 46662 →
121 2.140161430   192.168.1.94     87.240.185.193    TCP      94 [TCP Window Update] 46662 →
123 2.140186782   192.168.1.94     87.240.185.193    TCP      86 46662 → 443 [ACK] Seq=219 A
125 2.140199074   192.168.1.94     87.240.185.193    TCP      86 [TCP Dup ACK 123#1] 46662 →
126 2.140530958   87.240.185.193   192.168.1.94      TCP     1514 [TCP Out-Of-Order] 443 → 46
127 2.140551841   192.168.1.1      192.168.1.94      DNS     171 Standard query response 0x6
128 2.140599123   192.168.1.94     87.240.185.193    TCP      78 46662 → 443 [ACK] Seq=219 A
```

▶ Frame 127: 171 bytes on wire (1368 bits), 171 bytes captured (1368 bits) on interface wlp2s0, id 0
▶ Ethernet II, Src: Keenetic_4c:27:e2 (50:ff:20:4c:27:e2), Dst: IntelCor_bd:4a:9d (e0:d4:64:bd:4a:9d)
▶ Internet Protocol Version 4, Src: 192.168.1.1, Dst: 192.168.1.94
▶ User Datagram Protocol, Src Port: 53, Dst Port: 38397
▼ Domain Name System (response)
    Transaction ID: 0x6766
   ▶ Flags: 0x8180 Standard query response, No error
    Questions: 1
    Answer RRs: 3
    Authority RRs: 0
    Additional RRs: 3
   ▼ Queries
     ▼ spbu.ru: type NS, class IN
       Name: spbu.ru
       [Name Length: 7]
       [Label Count: 2]
       Type: NS (authoritative Name Server) (2)
       Class: IN (0x0001)
   ▼ Answers
     ▶ spbu.ru: type NS, class IN, ns ns.pu.ru
     ▶ spbu.ru: type NS, class IN, ns ns7.spbu.ru
     ▼ spbu.ru: type NS, class IN, ns ns2.pu.ru
       Name: spbu.ru
       Type: NS (authoritative Name Server) (2)
       Class: IN (0x0001)
       Time to live: 3600 (1 hour)
       Data length: 6
       Name Server: ns2.pu.ru
   ▶ Additional records
    [Request In: 115]
    [Time: 0.101602320 seconds]

5)
1. 195.70.196.210, не совпадает. Это адрес ns2.pu.ru
2. Запрашивается запись типа AAAA, ответов нет
3. 1 ответ, , в нём содержатся имя, тип, класс, время жизни, размер данных и т.д.

```
Total Length: 106
Identification: 0x40b1 (16561)
▸ Flags: 0x00
Fragment Offset: 0
Time to Live: 51
Protocol: UDP (17)
Header Checksum: 0xfcb2 [validation disabled]
[Header checksum status: Unverified]
Source Address: 195.70.196.210
Destination Address: 192.168.1.94
▸ User Datagram Protocol, Src Port: 53, Dst Port: 47626
▾ Domain Name System (response)
    Transaction ID: 0x81b1
    ▸ Flags: 0x8500 Standard query response, No error
    Questions: 1
    Answer RRs: 0
    Authority RRs: 1
    Additional RRs: 0
    ▾ Queries
        ▾ spbu.ru: type AAAA, class IN
            Name: spbu.ru
            [Name Length: 7]
            [Label Count: 2]
            Type: AAAA (IPv6 Address) (28)
            Class: IN (0x0001)
    ▾ Authoritative nameservers
        ▾ spbu.ru: type SOA, class IN, mname ns.pu.ru
            Name: spbu.ru
            Type: SOA (Start Of a zone of Authority) (6)
            Class: IN (0x0001)
            Time to live: 3600 (1 hour)
            Data length: 41
            Primary name server: ns.pu.ru
            Responsible authority's mailbox: hostmaster.pu.ru
            Serial Number: 2022012028
            Refresh Interval: 7200 (2 hours)
            Retry Interval: 3600 (1 hour)
            Expire limit: 604800 (7 days)
            Minimum TTL: 3600 (1 hour)
    [Request In: 17]
    [Time: 0.060535819 seconds]
0000   e0 d4 64 bd 4a 9d 50 ff 20 4c 27 e2 08 00 45 00   ··d·J·P· L'··E·
```

6)
   1. База данных, в которой хранится информация о доменах
   2. У dnd.su сервера dns1.hothat.ru. и dns2.hothat.ru., у emkn.ru сервера ns-1205.awsdns-22.org. ns-1975.awsdns-54.co.uk. ns-348.awsdns-43.com. и ns-975.awsdns-57.net.

```
marat@tiberius:~$ whois dnd.su
% By submitting a query to TCI's Whois Service
% you agree to abide by the following terms of use:
% https://www.tcinet.ru/documents/whois.pdf (in Russian)

domain:        DND.SU
nserver:       dns1.hothat.ru.
nserver:       dns2.hothat.ru.
state:         REGISTERED, DELEGATED
person:        Private Person
e-mail:        igor.unbat@gmail.com
registrar:     REGRU-SU
created:       2017-07-04T16:28:08Z
paid-till:     2022-07-04T16:28:08Z
free-date:     2022-08-06
source:        TCI

Last updated on 2022-03-19T17:31:30Z

marat@tiberius:~$ whois emkn.ru
% By submitting a query to TCI's Whois Service
% you agree to abide by the following terms of use:
% https://www.tcinet.ru/documents/whois.pdf (in Russian)

domain:        EMKN.RU
nserver:       ns-1205.awsdns-22.org.
nserver:       ns-1975.awsdns-54.co.uk.
nserver:       ns-348.awsdns-43.com.
nserver:       ns-975.awsdns-57.net.
state:         REGISTERED, DELEGATED, UNVERIFIED
org:           ANO DPO Nauchno-issledovatelskii i obrazovatelnyi centr DzhetBreyns
registrar:     RU-CENTER-RU
admin-contact: https://www.nic.ru/whois
created:       2019-09-02T11:35:27Z
paid-till:     2022-09-02T11:35:27Z
free-date:     2022-10-03
source:        TCI

Last updated on 2022-03-19T17:31:30Z
```

```
marat@tiberius:~$ nslookup dns1.hothat.ru
Server:         192.168.1.1
Address:        192.168.1.1#53

Non-authoritative answer:
Name:   dns1.hothat.ru
Address: 178.57.216.242
Name:   dns1.hothat.ru
Address: 2a09:c140:3::4:1:1

marat@tiberius:~$ nslookup ns-975.awsdns-57.net.
Server:         192.168.1.1
Address:        192.168.1.1#53

Non-authoritative answer:
Name:   ns-975.awsdns-57.net
Address: 205.251.195.207
Name:   ns-975.awsdns-57.net
Address: 2600:9000:5303:cf00::1
```