Assignment 6

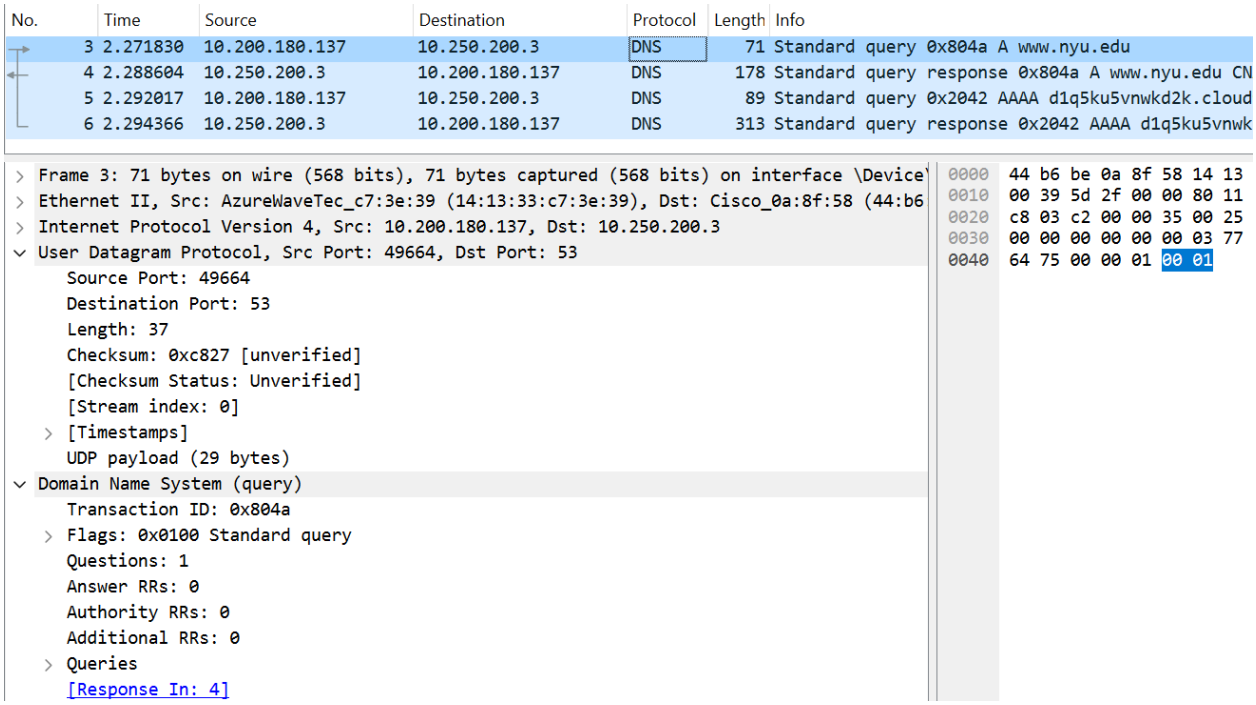
Part-1

1. Packet number: **3**

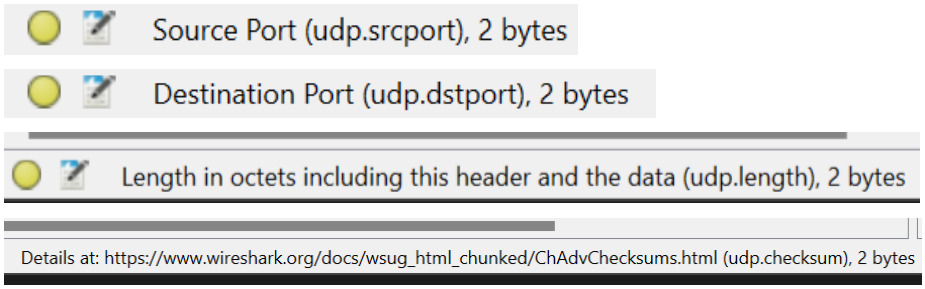
The type of application-layer protocol message being carried is: **DNS**

The number of fields in the UDP header is **4** and they are:

● Source Port ● Destination Port ● Length ● Checksum



2. The length of each of the UDP header fields is: **2 bytes** (The UDP header has a fixed length of 8 bytes)



3. The value of the length field is: **37**

The length of the entire UDP datagram, including the header and data, is indicated by the Length field of a UDP packet. The length of UDP payload for the selected packet is 29 bytes. 37 bytes - 8 bytes = 29 bytes.

```
User Datagram Protocol, Src Port: 49664, Dst Port: 53
    Source Port: 49664
    Destination Port: 53
    Length: 37
    Checksum: 0xc827 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 0]
  > [Timestamps]
    UDP payload (29 bytes)
```

4. The maximum number of bytes that can be included in a UDP payload will be:
Maximum UDP packet size - UDP header size = (2^16 - 1) - 8 = **65527 bytes**
5. The largest possible source port number is 2^16-1 = **65535**
6. The protocol number for UDP is **17** in decimal notation which in hexadecimal notation is **0x11**.

```
Protocol: UDP (17)
```

```
0000  44 b6 be 0a 8f 58 14 13  33 c7 3e 39 08 00 45 00   D····X·· 3·>9··E·
0010  00 39 5d 2f 00 00 80 11  4b 36 0a c8 b4 89 0a fa   ·9]/···· K6·····
0020  c8 03 c2 00 00 35 00 25  c8 27 80 4a 01 00 00 01   ·····5·% ·'·J····
0030  00 00 00 00 00 00 03 77  77 77 03 6e 79 75 03 65   ·······w ww·nyu·e
0040  64 75 00 00 01 00 01                              du·····
```

7. The packet number for the 1st UDP segment is: **3**
The packet number for the 2nd UDP segment is: **4**
For the UDP packet sent by the host, the source port is **49664** and the destination port is **53**
For the UDP packet sent as the reply of the first packet, the source port is **53**, and the destination port is: **49664**
Hence the source and destination ports for the 1st packet become the destination and source ports for the reply packet respectively. Thus, the port works as a source as well as a destination depending on the request or response packet.

```
    3 2.271830  10.200.180.137  10.250.200.3      DNS   71 Standard query 0x804a A www.nyu.edu
    4 2.288604  10.250.200.3     10.200.180.137    DNS   178 Standard query response 0x804a A www.r
    5 2.292017  10.200.180.137  10.250.200.3      DNS   89 Standard query 0x2042 AAAA d1q5ku5vnwk
    6 2.294366  10.250.200.3     10.200.180.137    DNS   313 Standard query response 0x2042 AAAA d1
```

```
> Frame 3: 71 bytes on wire (568 bits), 71 bytes captured (568 bits) on interface \Device\
> Ethernet II, Src: AzureWaveTec_c7:3e:39 (14:13:33:c7:3e:39), Dst: Cisco_0a:8f:58 (44:b6
> Internet Protocol Version 4, Src: 10.200.180.137, Dst: 10.250.200.3
v User Datagram Protocol, Src Port: 49664, Dst Port: 53
    Source Port: 49664
    Destination Port: 53
```

```
0000  44 b6 be 0a 8f
0010  00 39 5d 2f 00
0020  c8 03 c2 00 00
0030  00 00 00 00 00
0040  64 75 00 00 01
```

```
    3 2.271830  10.200.180.137  10.250.200.3      DNS   71 Standard query 0x804a A www.nyu.edu
    4 2.288604  10.250.200.3     10.200.180.137    DNS   178 Standard query response 0x804a A www.
    5 2.292017  10.200.180.137  10.250.200.3      DNS   89 Standard query 0x2042 AAAA d1q5ku5vnw
    6 2.294366  10.250.200.3     10.200.180.137    DNS   313 Standard query response 0x2042 AAAA d
```

```
> Frame 4: 178 bytes on wire (1424 bits), 178 bytes captured (1424 bits) on interface \Dev
> Ethernet II, Src: Cisco_13:2a:c2 (f8:7a:41:13:2a:c2), Dst: AzureWaveTec_c7:3e:39 (14:13
> Internet Protocol Version 4, Src: 10.250.200.3, Dst: 10.200.180.137
v User Datagram Protocol, Src Port: 53, Dst Port: 49664
    Source Port: 53
    Destination Port: 49664
```

```
0000  14 13 33 c7 3e
0010  00 a4 f5 97 40
0020  b4 89 00 35 c2
0030  00 05 00 00 00
0040  64 75 00 00 01
0050  35 00 1f 0e 64
0060  32 6b 0a 63 6c
```