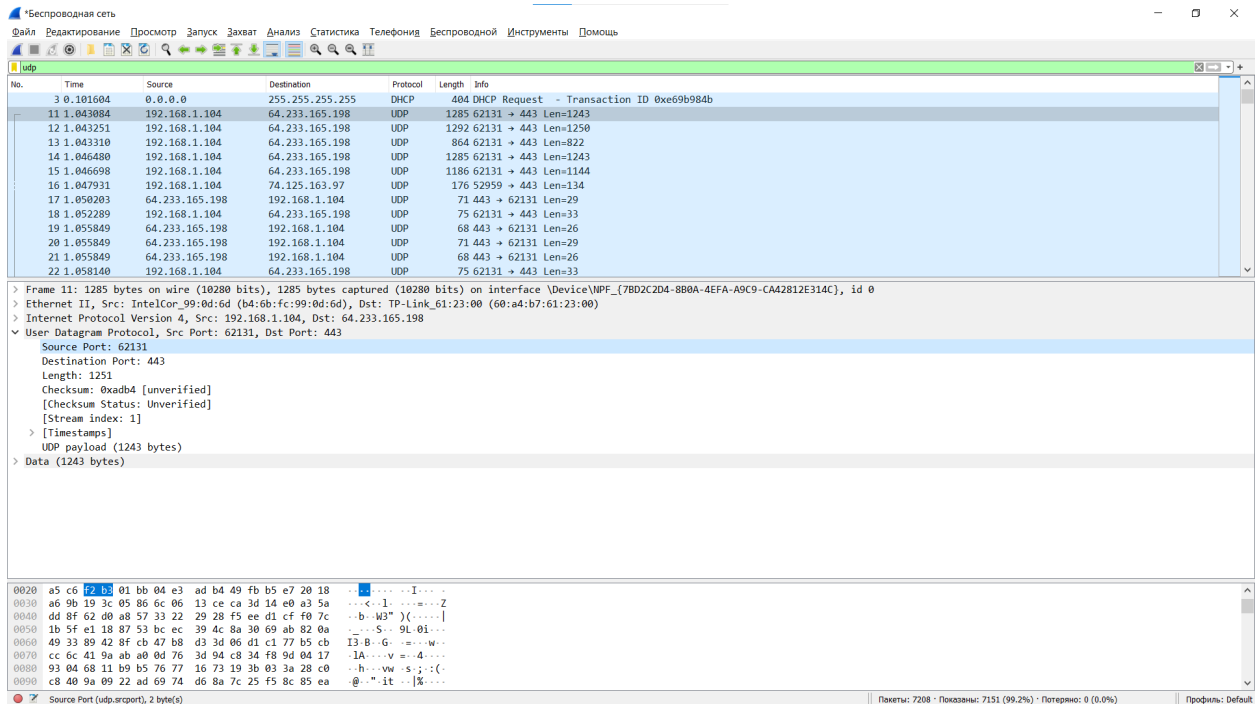


Wireshark

Задание 1.

1. 4 заголовка: порты (2), длину, checksum



2. Под каждый заголовок выделено 8 байтов
3. Length - кол-во байтов равное сумме размеров заголовка и тела сообщения (Data)
4. Максимальная длина = 65535 байтов, значит полезной информации может быть 65527 байт
5. 65535

6. В шестнадцатеричной 11, в десятичной 17

```
> Frame 11: 1285 bytes on wire (10280 bits), 1285 bytes captured (10280 bits) on interface \Device\NPF_{7BD2C2D4-8B0A-4EFA-A9C9-CA42812E314C}, id 0
> Ethernet II, Src: IntelCor_99:0d:6d (b4:6b:fc:99:0d:6d), Dst: TP-Link_61:23:00 (60:a4:b7:61:23:00)
▼ Internet Protocol Version 4, Src: 192.168.1.104, Dst: 64.233.165.198
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
    > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
        Total Length: 1271
        Identification: 0x6bc9 (27593)
    > Flags: 0x40, Don't fragment
        ...0 0000 0000 0000 = Fragment Offset: 0
        Time to Live: 128
        Protocol: UDP (17)
        Header Checksum: 0x0000 [validation disabled]
        [Header checksum status: Unverified]
        Source Address: 192.168.1.104
        Destination Address: 64.233.165.198
▼ User Datagram Protocol, Src Port: 62131, Dst Port: 443
    Source Port: 62131
    Destination Port: 443
    Length: 1251
    Checksum: 0xadba [unverified]
0010 04 f7 6b c9 40 00 80 11 00 00 c0 a8 01 68 40 e9 ..k@..|....h@.
0020 a5 c6 f2 b3 01 bb 04 e3 ad b4 49 fb b5 e7 20 18 .....-I....
0030 a6 9b 19 3c 05 86 6c 06 13 ce ca 3d 14 e0 a3 5a ...<..l...=...Z
0040 dd 8f 62 d0 a8 57 33 22 29 28 f5 ee d1 cf f0 7c ..b..W3" )(...|
0050 1b 5f e1 18 87 53 bc ec 39 4c 8a 30 69 ab 82 0a _...S...9L·0i...
0060 49 33 89 42 8f cb 47 b8 d3 3d 06 d1 c1 77 b5 cb I3·B·G·-...w...
0070 cc 6c 41 9a ab a0 0d 76 3d 94 c8 34 f8 9d 04 17 ·1A...v =·4....
0080 93 04 68 11 b9 b5 76 77 16 73 19 3b 03 3a 28 c0 ..h...vw ·s·;·(·
Protocol (ip.proto), 1 byte(s)
```

7. Порты совпадают

Программирование

Задание А, Б.

```
Received: PING 1 07.04.2022 01:40:27
RTT: 0.006s
Received: PING 2 07.04.2022 01:40:27
RTT: 0.001s
Received: PING 3 07.04.2022 01:40:27
RTT: 0.0s
Request timed out
Received: PING 5 07.04.2022 01:40:28
RTT: 0.0s
Received: PING 6 07.04.2022 01:40:28
RTT: 0.0s
Request timed out
Received: PING 8 07.04.2022 01:40:30
RTT: 0.001s
Received: PING 9 07.04.2022 01:40:30
RTT: 0.0s
Received: PING 10 07.04.2022 01:40:30
RTT: 0.001s

Process finished with exit code 0
```

Задание В.

```
Received: PING 6 07.04.2022 02:28:48
RTT: 1ms
Statistics:
  Sent: 6, Received: 5, Lost: 1 (0.17% loss)
  RTT min = 0ms, RTT max = 5ms, RTT avg = 1.40ms

Request timed out
Statistics:
  Sent: 7, Received: 5, Lost: 2 (0.29% loss)
  RTT min = 0ms, RTT max = 5ms, RTT avg = 1.40ms

Received: PING 8 07.04.2022 02:28:49
RTT: 1ms
Statistics:
  Sent: 8, Received: 6, Lost: 2 (0.25% loss)
  RTT min = 0ms, RTT max = 5ms, RTT avg = 1.33ms

Received: PING 9 07.04.2022 02:28:49
RTT: 0ms
Statistics:
  Sent: 9, Received: 7, Lost: 2 (0.22% loss)
  RTT min = 0ms, RTT max = 5ms, RTT avg = 1.14ms

Received: PING 10 07.04.2022 02:28:49
RTT: 0ms
Statistics:
  Sent: 10, Received: 8, Lost: 2 (0.20% loss)
  RTT min = 0ms, RTT max = 5ms, RTT avg = 1.00ms

Process finished with exit code 0
```

Задание Г.

```
ServerHeartbeatKt x ClientHeartbeatKt x ClientHeartbeatKt x ClientHeartbeatKt x
/127.0.0.1:61732: lost number = 2 (0.25% loss), time diff = 2007ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 0ms
/127.0.0.1:61732: lost number = 2 (0.22% loss), time diff = 1012ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1017ms
/127.0.0.1:61732: lost number = 2 (0.20% loss), time diff = 1016ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1000ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1000ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1010ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1012ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1011ms
/127.0.0.1:54404: lost number = 1 (0.50% loss), time diff = 0ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1010ms
/127.0.0.1:54404: lost number = 1 (0.33% loss), time diff = 1011ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1003ms
/127.0.0.1:54404: lost number = 1 (0.25% loss), time diff = 1003ms
/127.0.0.1:54403: lost number = 0 (0.00% loss), time diff = 1004ms
/127.0.0.1:54404: lost number = 1 (0.20% loss), time diff = 1003ms
/127.0.0.1:54404: lost number = 1 (0.17% loss), time diff = 1015ms
/127.0.0.1:54403: lost number = 1 (0.08% loss), time diff = 2030ms
/127.0.0.1:54404: lost number = 1 (0.14% loss), time diff = 1000ms
/127.0.0.1:54403: lost number = 1 (0.08% loss), time diff = 1013ms
/127.0.0.1:54404: lost number = 1 (0.13% loss), time diff = 1013ms
/127.0.0.1:54404: lost number = 1 (0.11% loss), time diff = 1014ms
/127.0.0.1:54403: lost number = 2 (0.13% loss), time diff = 2021ms
/127.0.0.1:54403: lost number = 2 (0.13% loss), time diff = 1012ms
Client /127.0.0.1:61732 stopped.
/127.0.0.1:54403: lost number = 3 (0.17% loss), time diff = 2013ms
/127.0.0.1:54403: lost number = 3 (0.16% loss), time diff = 1009ms
/127.0.0.1:54403: lost number = 3 (0.15% loss), time diff = 1013ms
Client /127.0.0.1:54404 stopped.
Client /127.0.0.1:54403 stopped.
```