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BBM 453 Computer Networks Lab - UDP Lab Assignment

Group ID: 1

- 1) Select one UDP packet from your trace. From this packet, determine how many fields there are in the UDP header. (You shouldn't look in the textbook! Answer these questions directly from what you observe in the packet trace.) Name these fields.

Ans:

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
4	0.021047	192.168.1.43	213.163.86.146	UDP	224	51381 → 50006 Len=182
5	0.042984	192.168.1.43	213.163.86.146	UDP	226	51381 → 50006 Len=184
7	0.058988	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
9	0.081176	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
11	0.104203	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
13	0.121142	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
14	0.142732	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
16	0.160970	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
18	0.182794	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
19	0.199745	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
22	0.222581	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
23	0.239700	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179
25	0.259911	192.168.1.43	213.163.86.146	UDP	221	51381 → 50006 Len=179

Wireshark - Packet 13 - Ethernet	
> Frame 13: 221 bytes on wire (1768 bits), 221 bytes captured (1768 bits) on interface \Device\NPF_{D7A6458E-FA4F-47A4-81AE-6F992169F9E7}, Id 0	
> Ethernet II, Src: HewlettP_1a:d2:10 (a0:8c:fd:1a:d2:10), Dst: zte_19:98:fe (e0:19:54:19:98:fe)	
> Internet Protocol Version 4, Src: 192.168.1.43, Dst: 213.163.86.146	
> User Datagram Protocol, Src Port: 51381, Dst Port: 50006	
Source Port:	51381
Destination Port:	50006
Length:	187
Checksum:	0xeed5 [unverified]
[Checksum Status: Unverified]	
[Stream index: 0]	

- 1- Source port
- 2- Destination port
- 3- Length
- 4- Checksum

- 2) By consulting the displayed information in Wireshark's packet content field for this packet, determine the length (in bytes) of each of the UDP header fields.

Ans: UDP header has fixed length and it has 8 bytes. As you can see below, each header field has 2 bytes and total header fields is 4.

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> Frame 13: 221 bytes on wire (1768 bits), 221 bytes captured (1768 bits) on interface \Device\NPF_{D7A6458E-FA4F-47A4-81AE-6F992169F9E7}, Id 0
> Ethernet II, Src: HewlettP_1a:d2:10 (a0:8c:fd:1a:d2:10), Dst: zte_19:98:fe (e0:19:54:19:98:fe)
> Internet Protocol Version 4, Src: 192.168.1.43, Dst: 213.163.86.146
User Datagram Protocol, Src Port: 51381, Dst Port: 50006
  Source Port: 51381
  Destination Port: 50006
  Length: 187
  Checksum: 0xeed5 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 0]
  [Timestamps]
Data (179 bytes)
  Data: 9078396ef747fa3700109e73d37954ef2f5ed8b16bd3663c...

```


0000	e0 19 54 19 98 fe a0 8c fd 1a d2 10 08 00 45 00	..T....E..
0010	00 cf 6a 5a 00 00 80 11 00 00 c0 a8 01 2b d5 a3	..jZ.....+
0020	56 92 c8 b5 c3 56 00 bb ee d5 90 78 39 6e f7 47	V...V...x9n.G
0030	fa 37 00 10 9e 73 d3 79 54 ef 2f 5e d8 b1 6b d3	..7...s.y T/^..k.
0040	66 3c 37 9e 53 64 7b 67 75 70 19 d4 26 3e a8 45	f<7.Sd{g up.&>.E
0050	c0 c6 15 43 dc ea 4f 11 7d b2 5c 84 76 30 2a 7d	...C...O...}\..v0*}
0060	3b e2 23 f0 be c2 f4 ae 05 b1 f0 2a cf 80 fc 5d	;.#...*...]
0070	54 91 2f cb b6 4b fb 2a 33 63 33 36 63 92 6f fe	T./..K.* 3c36c.o
0080	ad f7 c1 4c 5a 13 8e 25 92 4f 22 a0 ca d8 21 6b	..LZ.% "0"...!k
0090	94 d9 ab 9f 40 6c b1 f3 c9 60 13 8d 43 c7 fb b5	...@l...C...
00a0	4b 55 4b bd 0d 82 ac 90 c9 24 2d f7 68 d7 f3 ac	KUK...\$--h...
00b0	c8 cf 70 04 6b e5 89 52 f2 6c d7 ee 45 83 5c 0b	..p.k.R.l..E.\
00c0	47 d8 02 e1 d8 89 bb 0f 3a b9 ef b8 44 05 c8 d6	G.....:..D...
00d0	e1 05 d2 df f1 2d 80 61 9a 67 00 00 80a.g...

- 3) The value in the Length field is the length of what? (You can consult the text for this answer). Verify your claim with your captured UDP packet.

Ans: The value in the length field is the sum of the 8 header bytes, plus the 179 encapsulated data bytes.

```
> Frame 13: 221 bytes on wire (1768 bits), 221 bytes captured (1768 bits) on interface \Device\NPF_{D7A6458E-FA4F-47A4-
> Ethernet II, Src: HewlettP_1a:d2:10 (a0:8c:fd:1a:d2:10), Dst: zte_19:98:fe (e0:19:54:19:98:fe)
> Internet Protocol Version 4, Src: 192.168.1.43, Dst: 213.163.86.146
▼ User Datagram Protocol, Src Port: 51381, Dst Port: 50006
    Source Port: 51381
    Destination Port: 50006
    Length: 187
    Checksum: 0xee05 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 0]
    > [Timestamps]
▼ Data (179 bytes)
    Data: 9078396ef747fa3700109e73d37954ef2f5ed8b16bd3663c...
```

- 4) What is the maximum number of bytes that can be included in a UDP payload? (Hint: the answer to this question can be determined by your answer to 2. above)

Ans: The maximum number of bytes that can be included in a UDP payload is $2^{16} - 1$ less the header bytes. This gives $65535 - 8 = 65527$ bytes.

- 5) What is the largest possible source port number? (Hint: see the hint in 4.)

Ans: The largest possible source port number is $(2^{16} - 1) = 65535$.

- 6) What is the protocol number for UDP? Give your answer in both hexadecimal and decimal notation. To answer this question, you'll need to look into the Protocol field of the IP datagram containing this UDP segment (see Figure 4.13 in the text, and the discussion of IP header fields).

Ans: The IP protocol number for UDP is 0x11 hex, which is 17 in decimal value.

```
> Frame 13: 221 bytes on wire (1768 bits), 221 bytes captured (1768 bits) on interface \Device\NPF_{D7A6458E-FA4F-47A4-
> Ethernet II, Src: HewlettP_1a:d2:10 (a0:8c:fd:1a:d2:10), Dst: zte_19:98:fe (e0:19:54:19:98:fe)
> Internet Protocol Version 4, Src: 192.168.1.43, Dst: 213.163.86.146
  0100 .... = Version: 4
  .... 0101 = Header Length: 20 bytes (5)
  > Differentiated Services Field: 0x00 (DSCP: CS0, ECN: Not-ECT)
    Total Length: 207
    Identification: 0x6a5a (27226)
  > Flags: 0x0000
    Fragment offset: 0
    Time to live: 128
    Protocol: UDP (17)
    Header checksum: 0x0000 [validation disabled]
  .....
```

0000	e0 19 54 19 98 fe a0 8c	fd 1a d2 10 08 00 45 00	..T....E.
0010	00 cf 6a 5a 00 00 80 11	00 00 c0 a8 01 2b d5 a3	..jZ...+..
0020	56 92 c8 b5 c3 56 00 bb	ee d5 90 78 39 6e f7 47	V...V...x9n.G
0030	fa 37 00 10 9e 73 d3 79	54 ef 2f 5e d8 b1 6b d3	.7...s.y T./^..k
0040	66 3c 37 9e 53 64 7b 67	75 70 19 d4 26 3e a8 45	f<7.Sd{g up.>E
0050	c0 c6 15 43 dc ea 4f 11	7d b2 5c 84 76 30 2a 7d	...C.O. }.\v0*}
0060	3b e2 23 f0 be c2 f4 ae	05 b1 f0 2a cf 80 fc 5d	;.#.....*...]
0070	54 91 2f cb b6 4b fb 2a	33 63 33 36 63 92 6f fe	T./..K.* 3c36c.o
0080	ad f7 c1 4c 5a 13 8e 25	92 4f 22 a0 ca d8 21 6b	...LZ..% 0"....!k
0090	94 d9 ab 9f 40 6c b1 f3	f9 60 13 8d 43 c7 fb b5	...@l...`..C...
00a0	4b 55 4b bd 0d 82 ac 90	c9 24 2d f7 68 d7 f3 ac	KUK...\$-h...
00b0	c8 cf 70 04 6b e5 89 52	f2 6c d7 ee 45 83 5c 0b	..p.k..R .l.E.\
00c0	47 d8 02 e1 d8 89 bb 0f	3a b9 ef b8 44 05 c8 d6	G.....:..D...
00d0	e1 05 d2 df f1 2d 80 61	9a 67 00 00 80a g...

- 7) Examine a pair of UDP packets in which your host sends the first UDP packet and the second UDP packet is a reply to this first UDP packet. (Hint: for a second packet to be sent in response to a first packet, the sender of the first packet should be the destination of the second packet). Describe the relationship between the port numbers in the two packets.

Ans : The source port of the UDP packet sent by the host is the same as the destination port of the reply packet, and the destination port of the UDP packet sent by the host is the same as the source port of the reply packet.

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> Frame 255: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface \Device\NPF_{D7A6458E-FA4F-47A4-81AE-6F992169F9E7}, id 0
> Ethernet II, Src: zte_19:98:fe (e0:19:54:19:98:fe), Dst: HewlettP_1a:d2:10 (a0:8c:fd:1a:d2:10)
> Internet Protocol Version 4, Src: 213.163.86.146, Dst: 192.168.1.43
> User Datagram Protocol, Src Port: 50006, Dst Port: 51381
  Source Port: 50006
  Destination Port: 51381
  Length: 16
  Checksum: 0x83b8 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 0]
  > [Timestamps]
  > Data (8 bytes)

> Frame 254: 224 bytes on wire (1792 bits), 224 bytes captured (1792 bits) on interface \Device\NPF_{D7A6458E-FA4F-47A4-81AE-6F992169F9E7}, id 0
> Ethernet II, Src: HewlettP_1a:d2:10 (a0:8c:fd:1a:d2:10), Dst: zte_19:98:fe (e0:19:54:19:98:fe)
> Internet Protocol Version 4, Src: 192.168.1.43, Dst: 213.163.86.146
> User Datagram Protocol, Src Port: 51381, Dst Port: 50006
  Source Port: 51381
  Destination Port: 50006
  Length: 190
  Checksum: 0xeed8 [unverified]
  [Checksum Status: Unverified]
  [Stream index: 0]
  > [Timestamps]
  > Data (182 bytes)
```