Lab 2 - User Datagram Protocol
Computer Networks

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Figure 1: UDP Fields Header

1 Select one UDP packet from your trace. From this packet, determine how many fields there are in the UDP header. Name these fields.

Answers: There are 4 fields in the UDP header above. These fields are Source Port, Destination Port, Length and 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.

Answer: The UDP header has fixed length of 8 bytes. Each of the UDP header fields is 2 bytes.

3 The value in the Length field is the length of what? Verify your claim with your captured UDP packet.

Answer: The value in the Length field is length of 8 bytes header and 58 - 8 = 50 bytes payload data.

4 What is the maximum number of bytes that can be included in a UDP payload?

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

5 What is the largest possible source port number?

Answer: The largest possible source port number is $2^{16} - 1 = 65535$ bytes.

6 What is the protocol number for UDP?

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▶ Frame 11: 92 bytes on wire (736 bits), 92 bytes captur
▶ Ethernet II, Src: Dell_4f:36:23 (00:08:74:4f:36:23), D
▼ Internet Protocol Version 4, Src: 192.168.1.102, Dst:
    0100 .... = Version: 4
    .... 0101 = Header Length: 20 bytes (5)
  ▶ Differentiated Services Field: 0x00 (DSCP: CS0, ECN:
    Total Length: 78
    Identification: 0x0308 (776)
  ▶ Flags: 0x0000
    Time to live: 128
    Protocol: UDP (17)
    Header checksum: 0x0000 [validation disabled]
    [Header checksum status: Unverified]
0010  00 4e 03 08 00 00 80 11   00 00 c0 a8 01 66 c0 a8
0020  01 68 10 f0 00 a1 00 3a   64 f6 30 30 02 01 00 04
```

Figure 2: Protocol Number for UDP

Answer: The protocol number for UDP is 17 (0x11).

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. Describe the relationship between the port numbers in the two packets.
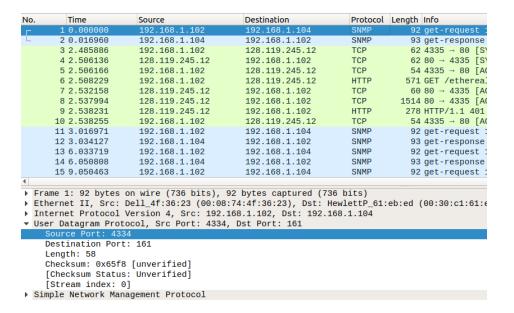
No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.102	192.168.1.104	SNMP	92	get-request
2	0.016960	192.168.1.104	192.168.1.102	SNMP	93	get-response
3	2.485886	192.168.1.102	128.119.245.12	TCP	62	4335 → 80 [SY
4	2.506136	128.119.245.12	192.168.1.102	TCP	62	80 → 4335 [SY
5	2.506166	192.168.1.102	128.119.245.12	TCP	54	4335 → 80 [AC
6	2.508229	192.168.1.102	128.119.245.12	HTTP	571	GET /ethereal
7	2.532158	128.119.245.12	192.168.1.102	TCP	60	80 → 4335 [AC
8	2.537994	128.119.245.12	192.168.1.102	TCP	1514	80 → 4335 [AC
9	2.538231	128.119.245.12	192.168.1.102	HTTP	278	HTTP/1.1 401
10	2.538255	192.168.1.102	128.119.245.12	TCP	54	4335 → 80 [AC
11	3.016971	192.168.1.102	192.168.1.104	SNMP	92	get-request
12	3.034127	192.168.1.104	192.168.1.102	SNMP	93	get-response
13	6.033719	192.168.1.102	192.168.1.104	SNMP	92	get-request
14	6.050808	192.168.1.104	192.168.1.102	SNMP	93	get-response
15	9.050463	192.168.1.102	192.168.1.104	SNMP	92	get-request

```
▶ Frame 1: 92 bytes on wire (736 bits), 92 bytes captured (736 bits)
▶ Ethernet II, Src: Dell_4f:36:23 (00:08:74:4f:36:23), Dst: HewlettP_61:eb:ed (00:30:c1:61:e
▶ Internet Protocol Version 4, Src: 192.168.1.102, Dst: 192.168.1.104
▼ User Datagram Protocol, Src Port: 4334, Dst Port: 161
    Source Port: 4334
    Destination Port: 161
    Length: 58
    Checksum: 0x65f8 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 0]
▶ Simple Network Management Protocol
```

Figure 3: UDP sender

No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	192.168.1.102	192.168.1.104	SNMP	92	get-request
2	0.016960	192.168.1.104	192.168.1.102	SNMP	93	get-response
3	2.485886	192.168.1.102	128.119.245.12	TCP	62	4335 → 80 [SY
4	2.506136	128.119.245.12	192.168.1.102	TCP	62	80 → 4335 [SY
5	2.506166	192.168.1.102	128.119.245.12	TCP	54	4335 → 80 [AC
6	2.508229	192.168.1.102	128.119.245.12	HTTP	571	GET /ethereal
7	2.532158	128.119.245.12	192.168.1.102	TCP	60	80 → 4335 [AC
8	2.537994	128.119.245.12	192.168.1.102	TCP	1514	80 → 4335 [AC
9	2.538231	128.119.245.12	192.168.1.102	HTTP	278	HTTP/1.1 401
10	2.538255	192.168.1.102	128.119.245.12	TCP	54	4335 → 80 [AC
11	3.016971	192.168.1.102	192.168.1.104	SNMP	92	get-request
12	3.034127	192.168.1.104	192.168.1.102	SNMP	93	get-response
13	6.033719	192.168.1.102	192.168.1.104	SNMP	92	get-request
14	6.050808	192.168.1.104	192.168.1.102	SNMP	93	get-response
15	9.050463	192.168.1.102	192.168.1.104	SNMP	92	get-request

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▶ Frame 1: 92 bytes on wire (736 bits), 92 bytes captured (736 bits)
▶ Ethernet II, Src: Dell_4f:36:23 (00:08:74:4f:36:23), Dst: HewlettP_61:eb:ed (00:30:c1:61:e
▶ Internet Protocol Version 4, Src: 192.168.1.102, Dst: 192.168.1.104
▼ User Datagram Protocol, Src Port: 4334, Dst Port: 161
    Source Port: 4334
    Destination Port: 161
    Length: 58
    Checksum: 0x65f8 [unverified]
    [Checksum Status: Unverified]
    [Stream index: 0]
▶ Simple Network Management Protocol
```

Figure 4: UDP receiver

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