

## Answers to Exercise 3: Ethernet and IP

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Data Communication

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1. First packet 1500 B, second packet 46 B
2. a) 08 00 20 7c 94 1c  
b) 00 00 39 51 90 37  
“c”) The 08 00 of the PDU Type/Length Field means  $8 \cdot 16^2 = 2048$ .  
 $2048 > 1536$  so this field indicates a particular type (not length) of the PDU data.
3. a) /24  
b) /8  
c) /19  
d) /20
4. a) 123.56.77.32 -> 123.56.77.39  
b) 200.17.21.128 -> 200.17.21.159  
c) 17.34.16.0 -> 17.34.17.255  
d) 180.34.64.64 -> 180.34.64.67
5. a) 130.235.18.10 (82EB120A)  
b) 130.235.18.127 (82EB127F)  
c) 4  
d) 20 B  
e) 62 B  
f) 128
6. Check the protocol field (should be 01).
7. a) IP may be carried by a network with restricted MTU.  
b) Check the flags+fragmentation field; this packet is not fragmented.  
c) The TCP header contains the port number. When a packet is fragmented, the TCP header ends up in the first packet only and the other packets contain only TCP data.

8. a) Frame
  - 1: More flag
  - 2: More flag
  - 3: Noneb) Identical (i.e., they come from the same original IP packet)
9. a) 255.255.255.248
  - b) 6
  - c) 211.17.180.0, 211.17.180.7
  - d) 211.17.180.248, 211.17.180.255
10. a) 2340:1ABC:119A:A000::0
  - b) 0:AA::119A:A231
  - c) 2340::119A:A001:0
  - d) 0:0:0:2340::0
11. a) 0000:0000:0000:0000:0000:0000:0000:0000
  - b) 0000:00AA:0000:0000:0000:0000:0000:0000
  - c) 0000:1234:0000:0000:0000:0000:0000:0003
  - d) 0123:0000:0000:0000:0000:0000:0001:0002
12.  $2^{96}$  times more
13. Frame 1: Correct; Frame 2: Corrupted
14. 45 00 01 3E 00 AB 40 00 80 06 73 41 C0 A8 02 54 C0 A8 02 29