C Language Programming: Homework #7
Assigned on 12/04/2018(Tuesday), Due on 12/18/2018(Tuesday)

Description:

This assignment allows you to practice processing packets stored in a file. You are required to do:

1. Use command line to input the filename
2. (70%) Read the packets in the input file, and according to the following pictures, you need to parse the packet fields. The fields include DST MAC, SRC MAC, protocol, SRC IP, DST IP, SRC Port, DST Port.(ICMP packet doesn't need Src Port, Dst Port) and count the Packet Length for each packets.
3. (10%) Count total number of packets, number of TCP packets, number of UDP packets, number of ICMP packets in the file
4. (20%) Report with right format should be both printed out and updated on server.

Figure 1 : packet layer

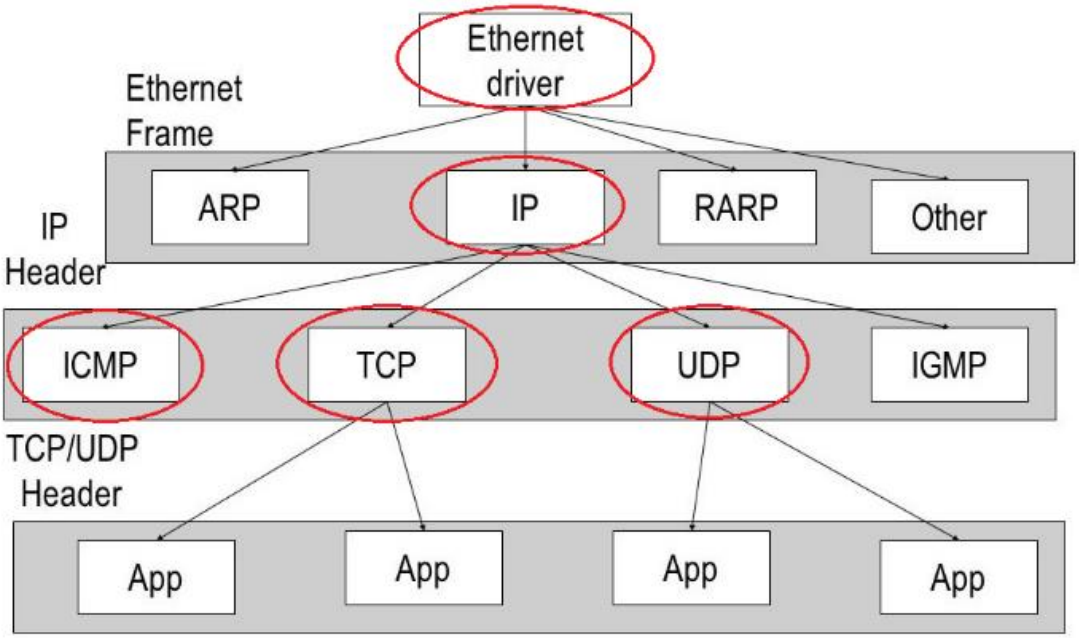
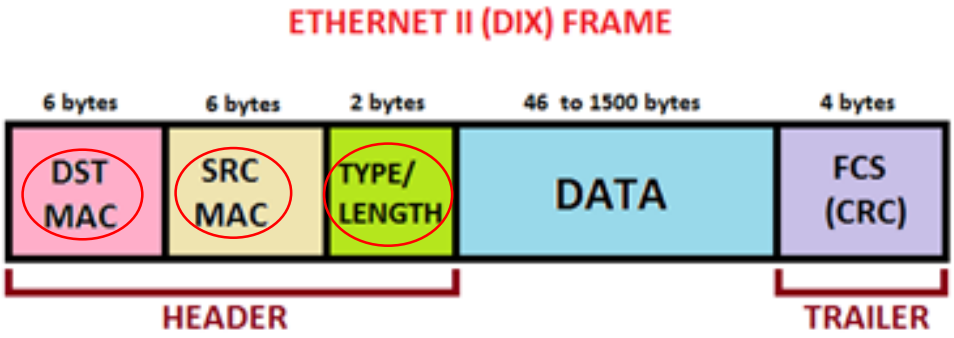
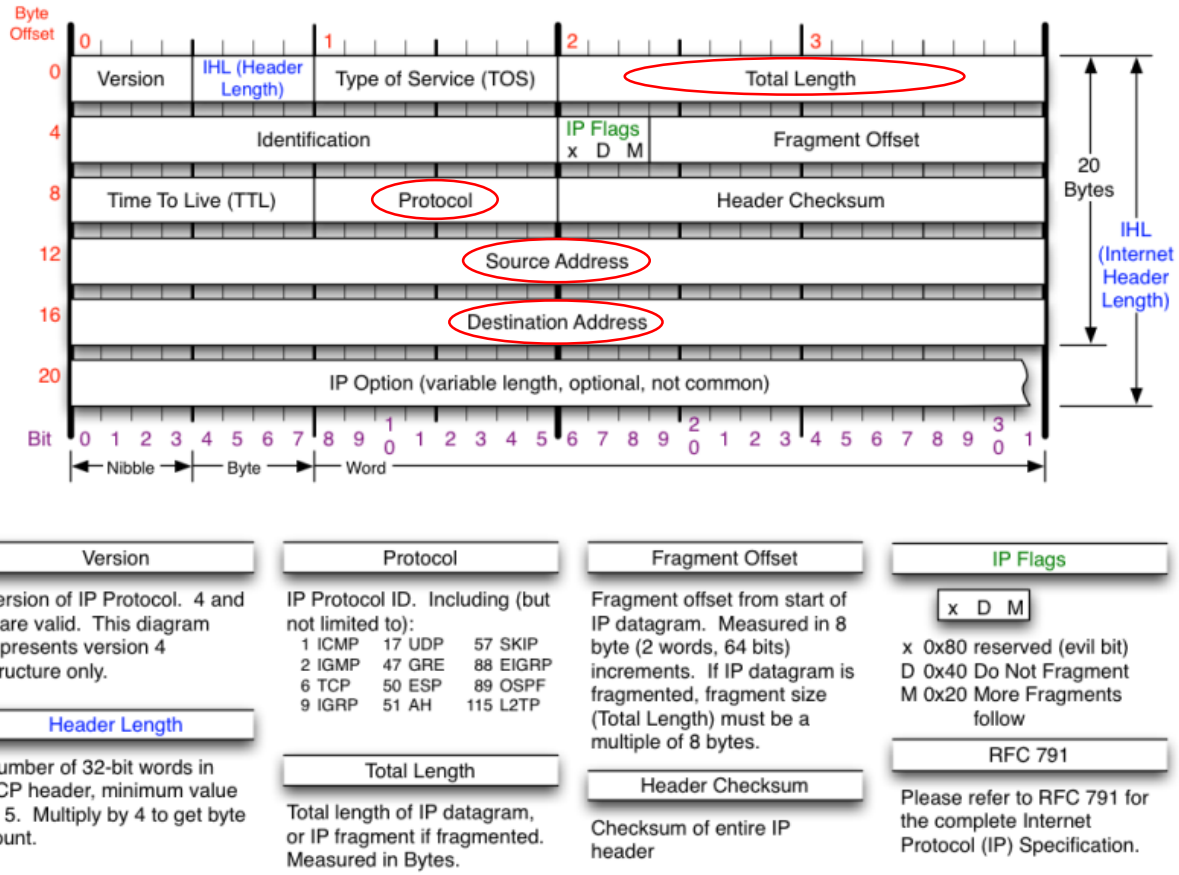


Figure 2 : Ethernet format



Filed TYPE: IPV4(0x0800)

Figure 3 : IPV4 Format



Field: Total Lengh+14 bytes=Packet Bytes and Protocol: TCP(0x06), UDP(0x11), ICMP(0x01)

Figure 4 TCP format

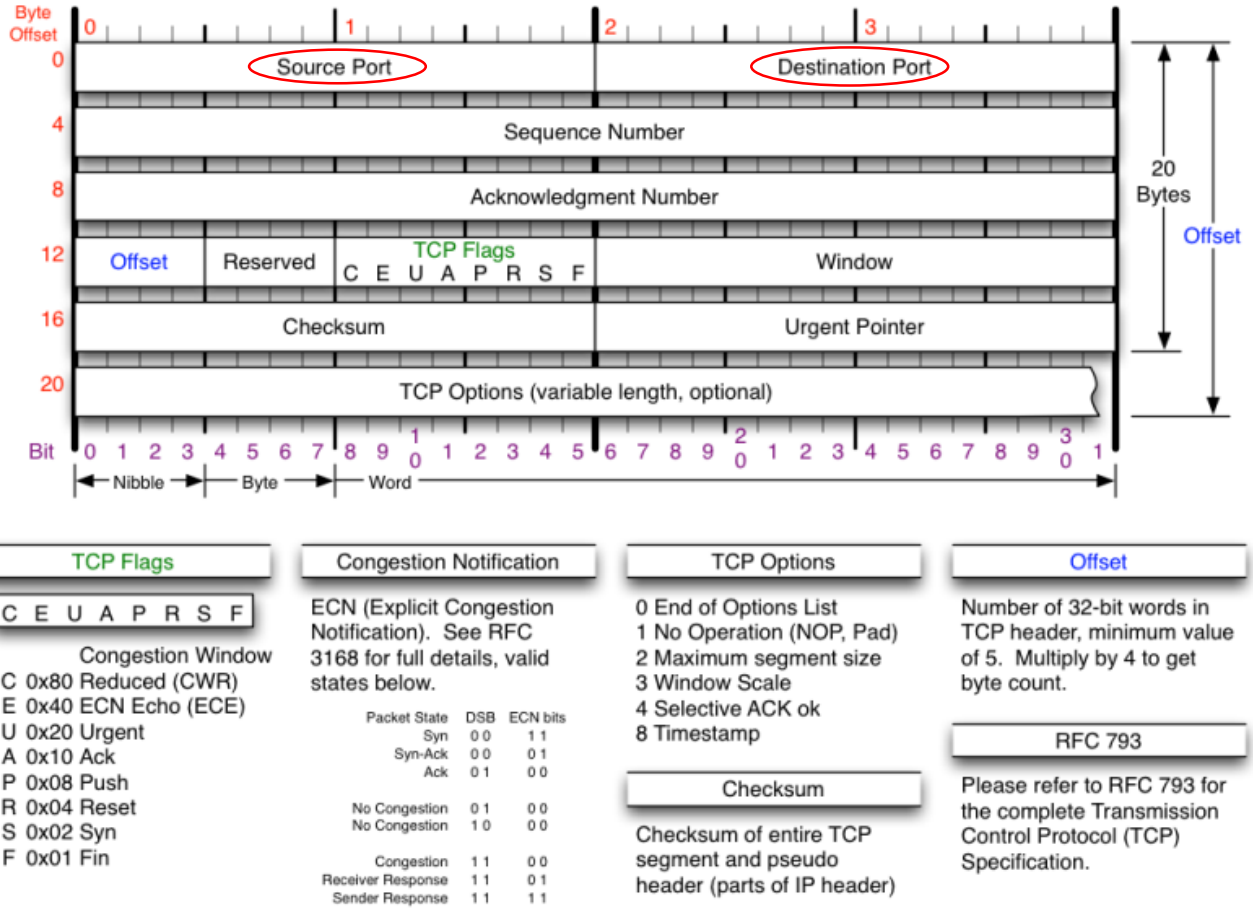


Figure 5 : UDP format

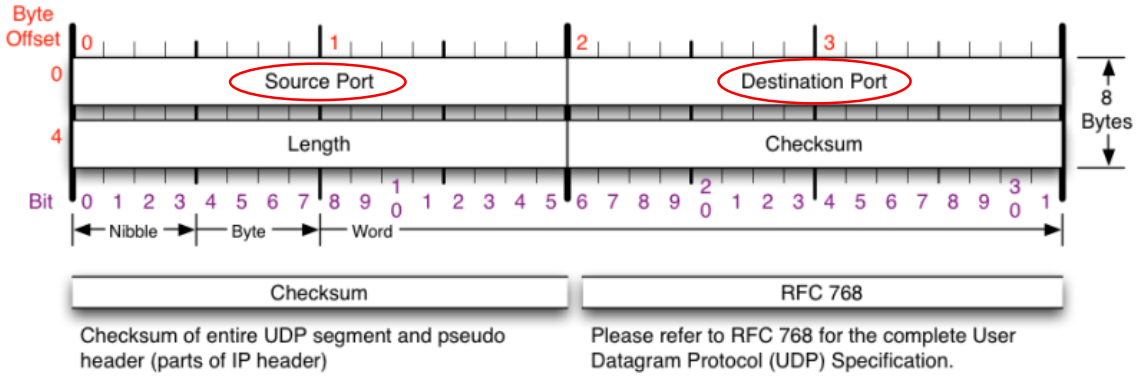
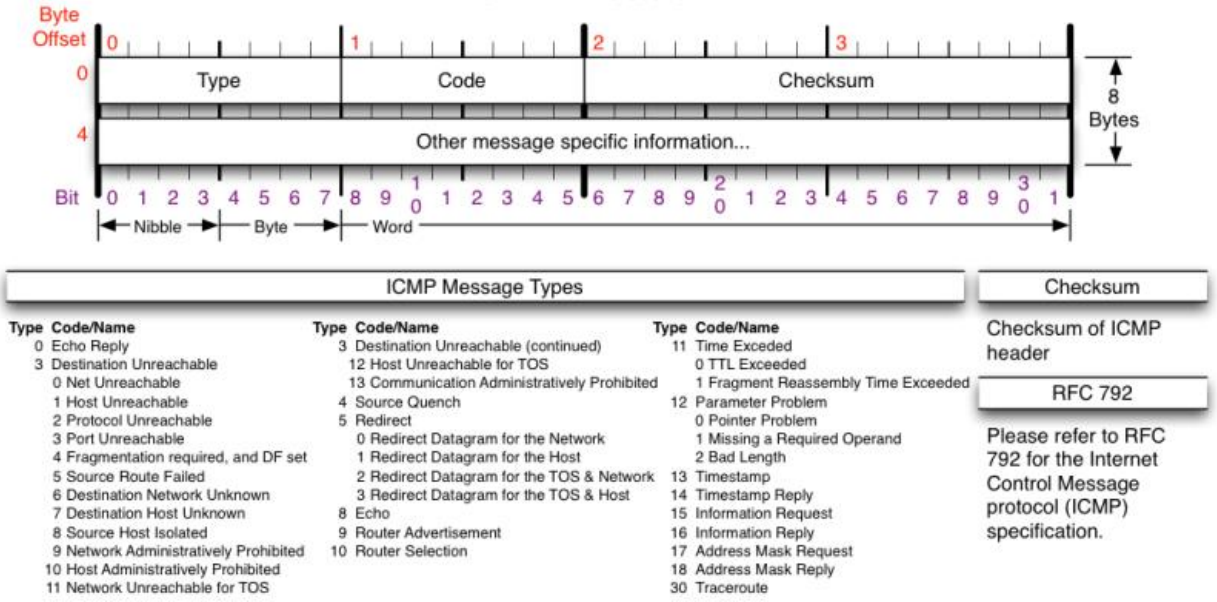
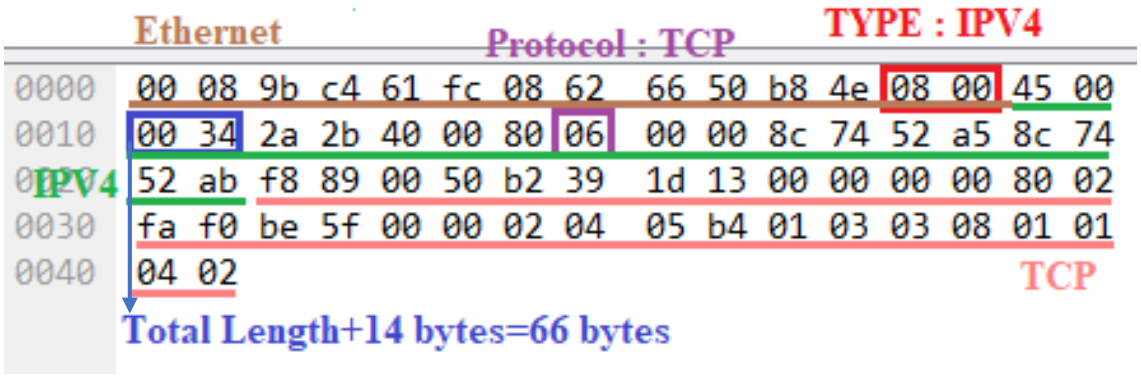


Figure 6 : ICMP format



e.g. A TCP packet of 66 bytes shown in **hexadecimal form**.



(NOTE: You are asked to make use of **"struct"** to save the fields of Ethernet, IPV4, TCP, UDP, ICMP.)

Remark

Attached file ***hw7_sample.c*** shows how to use **fread** to parse SRC MAC, SRC IP and SRC Port in ***input.out***, which is a **binary file**.

```
xts26951haya@CIAL-PROG6:~$ ./hw7_sample input.out
SRC MAC: 1a:2b:3c:4d:5f:66
SRC IP: 192.168.0.1
SRC Port: 65502
```

Moreover, if you want to check the content of a binary file, you can use **xxd –b *filename*** shown as follows.

```
xts26951haya@CIAL-PROG6:~$ xxd -b input.out
0000000: 00011010 00101011 00111100 01001101 01011111 01100110  .+<M_f
0000006: 11000000 10101000 00000000 00000001 11111111 11011110  ......
```

(NOTE: The actual content is 00011010001010 11……11011110, spaces and other marks can be ignored.)

Similarly, you can check it in **hexadecimal form** with **xxd *filename.***

Command Line:

./hw7 test.out

(Don’t use other names except ***test.out***, which is also a binary file.)

Example Output :

#1 *// the 1st packet*
DST MAC: 00:08:9b:c4:61:fc
SRC MAC: 08:62:66:50:b8:4e
Protocol: TCP
SRC IP: 140.116.82.165
DST IP: 140.116.82.171
SRC Port: 63625
DST Port: 80
Packet Length: 66

#2
……

#3
……

#n
……

Number of Packet: n
Number of TCP Packet: ?
Number of UDP Packet: ?
Number of ICMP Packet: ?

(You should follow above format as output **printed on screen**.)