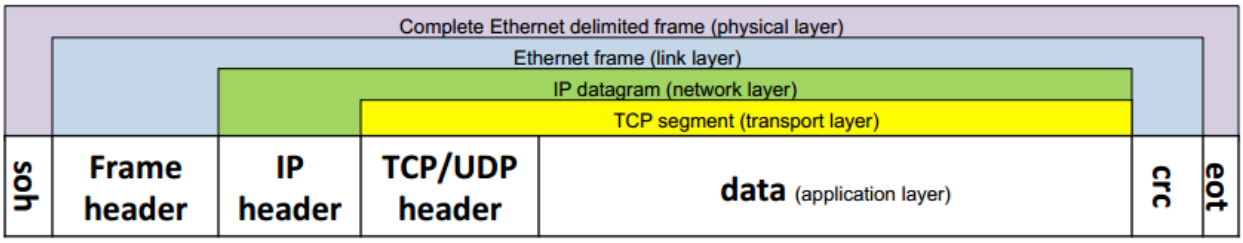
CS 372 Introduction to Computer Networks
Self-Check Exercises: Lecture 38 **Solutions**

1) Draw the Ethernet frame (with Ethernet services, but abstracting the lower layers to header/payload).



2) What are some issues with using non-printable ASCII as frame delimiters?
You may send data that looks like an EOT, but is actually usable data. If the receiver sees an EOT it assumes this is the end of the frame – so if you see this before the end of the frame, it would effectively destroy the frame.

3) Given the following "byte stuffing" scheme:

Character in data	Characters sent
soh	esc x
eot	esc y
esc	esc z

Data:

78h	04h	1Bh	7Ah	01h	1Bh

Character	Hex code
soh	01h
eot	04h
esc	1Bh
'x'	78h
'y'	79h
'z'	7Ah

Note: **soh** and **eot** are the framing characters.

If Ethernet-style byte stuffing is used to transmit *Data*, what is the byte sequence of the frame, including framing characters? (Assume that all headers are included in *Data*.)
01h 78h 1Bh 79h 1Bh 7Ah 7Ah 1Bh 78h 1Bh 7Ah 04h

4) With 100Mbps Ethernet (using CSMA/CD with "exponential backoff"), what is the maximum wait time before attempting to re-send a frame after the 6th collision on the same frame?
At 100Mbps, one "bit-time" = 0.00001 ms.
The largest number in the "collision set" is 2^6-1 = 63
63 x 512 x 0.00001 = 0.32256 ms ≈ 323 µs (micro-seconds)