Assignment 4

1. You would like to build a circuit to generate a random bit stream that has a period (does not repeat for) at least one day. The data rate is 1.544 Mb/s. If the bit stream is a ML PRBS generated using a linear-feedback shift register, what is the minimum length of shift register (number of flip-flops) required?

2. Why are start and stop bits not required on a synchronous interface? How could the receiver using a synchronous interface detect the start of each frame? How would it detect the start of each character?

3. Which standard organization publishes the 802.3af specification? The V.21 modem specification?

4. An 802.3 (Ethernet) frame as captured by a network protocol analyzer is shown below. All numeric values are in hex. There are 16 bytes per line. The first column is the offset from the start of the frame. The next 16 bytes in each line are the transmitted data. The characters at the end show the ASCII characters for the bytes in the frame. The CRC trailer is not included because it is removed by the network card hardware.

```
0000  00 1d 7e 2f b5 9b 08 00  27 88 fd 91 08 00 45 00  ..~/.... '.....E.
0010  00 3d 7d 8d 40 00 40 11  a8 54 0a 00 00 ce 0a 00  .=}.@.@. .T......
0020  00 01 ec 93 00 35 00 29  15 09 8b 47 01 00 00 01  .....5.) ...G....
0030  00 00 00 00 00 00 03 77  77 77 07 6d 6f 7a 69 6c  .......w ww.mozil
0040  6c 61 03 6f 72 67 00 00  01 00 01                la.org.. ...
```

   Answer the following questions:

   - what are the 802.3 source and destination addresses?
   - what are the source and destination OUIs?
   - what is the value of the length/type field?
   - is this field a length or a type value (it is in big-endian order)?
   - what is the value of the first byte of the MSDU?
   - how many bytes total would have been transmitted for this frame, including the CRC?