CS 372 Introduction to Computer Networks
Self-Check Exercises: Lecture 34 **Solutions**

1) The data-link layer provides logical communication between ___adjacent nodes__.

2) What are some of the responsibilities of the link layer?
   - Providing hardware addresses (usable between adjacent nodes)
   - Encapsulation of network-layer datagram into link-layer frame.
   - Medium access control (air, wire, …)
   - Possible collision avoidance/detection/resolution (part of access control)
   - Possibly reliability (ACKs, error detection/correction, etc…)

3) Is it possible for one datagram to be encapsulated into multiple different types of frames as it transits the internet?
   This is almost always the case! Each link-layer protocol has its own frame format.

4) On a home computer, where is the link layer implemented?
   In the network interface controller (NIC).

5) On a link with devices 1, 2, … *i*, … N attached, how does device *i* know that a received frame is intended for it?
   The NIC will compare the destination address to the device address. If they are the same, it is processed. If it does not match, it is discarded.

6) For an odd-parity machine, the following bytes are received. For each, indicate whether (E) there is at least one error, (N) there is no error, or (?) there may be an error, but it would go undetected. The last bit is the parity bit.

10010110	_E_
10111011	_E_
11110001	_?_
10000011	_?_

7) Here are 7 consecutive bytes in a datagram that uses 2-dimensional even parity for error detection/correction.

Byte #	Code	Parity
1	1001110	0
2	1000101	1
3	1010100	1
4	1010111	1
5	1000011	0
6	1010010	1
7	1001011	0
Parity	1011010	0

a. Which byte has an error?
Byte #5 has an odd number of 1-bits

b. Show the corrected byte.
The 4's place column has an odd number of 1-bits, so the error bit in in the 4's place of byte #5:
1001011 0.