Name:

| Math/CCS 103 | | Professor: Padraic Bartlett |
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| | Quiz 1: Algorithms | |
| Monday, Week 2 | | UCSB 2014 |

Consider the following algorithm:

Algorithm. We call this algorithm $Mystery(l_1, \ldots l_n)$. The input to this algorithm is simply any list of integers $(l_1, \ldots l_n)$. Given such a list, our algorithm does the following:

- (a) If our input list is a list of length 1, we return 1 if l_1 is odd, and 0 if it is even.
- (b) Otherwise, if our input list has length 2 or greater, we return $1 + Mystery(l_2, ..., l_n)$ if l_1 is odd, and $Mystery(l_2, ..., l_n)$ if l_2 is even.

Given this algorithm, complete the following problems:

1. Run this algorithm on a list of integers of length at least 4.

2. What does this algorithm do? I.e. if I give it a list of integers, what is the relation of its output to that list? (I.e. the sorting algorithms we looked at output "sorted lists;" the multiplication algorithms we looked at output "the product of two numbers." What is a short and simple interpretation of the output of this function?)

3. For a list of length n, exactly how many steps does this algorithm take?

4. Explain why this algorithm takes O(n) steps to run on a list of length n.