## Name:

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

Consider the following algorithm:
Algorithm. We call this algorithm Mystery $\left(l_{1}, \ldots l_{n}\right)$. The input to this algorithm is simply any list of integers $\left(l_{1}, \ldots l_{n}\right)$. 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 $1+M y s t e r y\left(l_{2}, \ldots l_{n}\right)$ if $l_{1}$ is odd, and Mystery $\left(l_{2}, \ldots l_{n}\right)$ 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 $n$.
