Problem of the Month

Problem 7: Smooth lists

April 2025

Hint

1. Consider lists that only contain the integers 0 and 1.
2. As with part (a), construct a list L so that all of its entries are either 0 or 1. If the number of 1s in L is a positive even number, what can you say about the number of 1s in $f(L)$?
3. If L is a list of three integers, how do the *parities* (parity refers to whether an integer is even or odd) of the integers in L compare to the parities of integers in $f(L)$? You might want to consider what happens to lists with various combinations of even and odd integers. It may also be helpful to think about how things can be simplified if the integers a, b, and c have a common factor.
4. There are only 16 such lists, so you could show this by checking all of them.
5. Compute $f^4(a, b, c, d)$ for a few lists (a, b, c, d). What do you notice?