Let $a_1, a_2, \ldots, a_{51}$ be non-zero elements of a field. We simultaneously replace each element with the sum of the 50 remaining ones. In this way we get a sequence $b_1, \ldots, b_{51}$. If this new sequence is a permutation of the original one, what can be the characteristic of the field? (The characteristic of a field is p, if p is the smallest positive integer such that $\underbrace{x + x + \cdots + x}_{p} =$ 0 for any element x of the field. If there exists no such p, the characteristic is 0.)