Turtle Puzzle: Rearrange and Negate

Neither of the operations change the absolute value of any a_i. Therefore, the maximum answer we can get is $|a_1| + |a_2| + \ldots + |a_n|$. Now we will show there is a way to obtain this sum.

The way is simple. Firstly use operation 1 to sort the array, so all the negative elements come before the non-negative elements. Then use operation 2 to invert the prefix of negative elements (or not perform the operation if all the elements are non-negative initially). Then we obtain an array of non-negative integers, hence the answer is indeed $|a_1| + |a_2| + \ldots + |a_n|$.