

## New Questions on Partial Orders and Sorting

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We pose new questions related to the  $1/3$ - $2/3$  conjecture, by considering the attempt to discover an underlying partial order rather than an underlying total order.

This leads to a natural question about sorting as well, which surprisingly does not seem to have been considered previously. Suppose that you randomly choose a pair of elements  $i$  and  $j$  to compare, with the restriction that the relation between  $i$  and  $j$  is not implied by the transitive closure of previous comparisons. In the worst case, this can clearly make  $\Omega(n^2)$  comparisons. We prove that this is not true for the average case, giving both experimental evidence of the likely exact bound, and a higher upper bound which we are able to prove.