

A Time-Space Tradeoff for Element Distinctness

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Abstract

In a time-space tradeoff for sorting on non-oblivious machines, Borodin et. Al. [J. Comput. System Sci., 22(1981), pp. 351-364] proved that to sort n elements requires $TS = \Omega(n^2)$ where $T = \text{time}$ and $S = \text{space}$ on a comparison based branching program. Although element distinctness and sorting are equivalent problems on a computation tree, the stated tradeoff result does not immediately follow for element distinctness or indeed for any decision problem. In this paper, we are able to show that $TS = \Omega(n^{3/2} \sqrt{\log n})$ for deciding element distinctness (or the sign of a permutation).