

Exercise 08

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1 Counting Distinct Elements Deterministically

Prove that any deterministic streaming algorithm that computes the exact number of distinct elements requires space n bits.

2 Deterministic Approximate Counting

Show that any deterministic algorithm that computes a 1.1 approximation of the number of distinct elements requires space $\Omega(n)$ bits.

Hint: You might want to use the probabilistic method.