2-2 Treasure Hunting

(Monday, April 2, 2018 $\sim$ Saturday, April 7, 2018)

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April 2, 2018


TREASURE
HUNT
on foot


Hints
&
Tips


Help
Wanted

Problem of the Week (Monday, April 2, 2018 $\sim$ Saturday, April 7, 2018)

(a) Given an array $A[0 \cdots n-1]$, to determine whether there is a value that *occurs more than* $\lfloor n/k \rfloor$ *times* in $\Theta(n \lg k)$ time and $\Theta(k)$ extra space.

(b) Prove that the *lower bound* of this problem is $\Theta(n \lg k)$.

TIP#1

(Monday, April 2, 2018)

Take $k = 2$.

$\Theta(n)$ time & $\Theta(1)$ space

TIP#2

(Tuesday, April 3, 2018)

Definition (k-simplified Multiset)

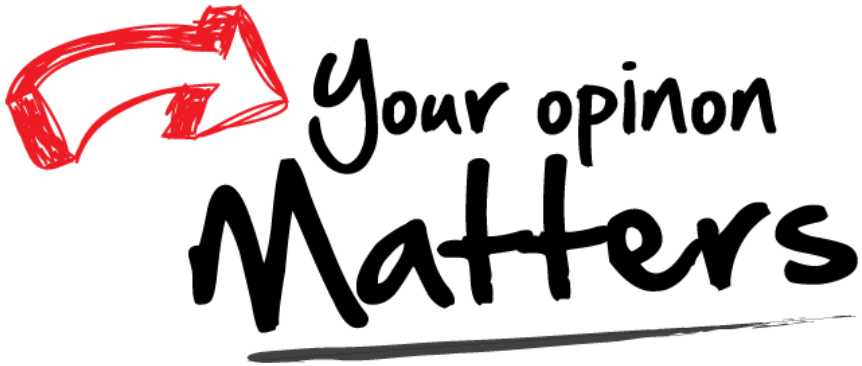
Consider a multiset $\mathcal{M}$. A *k-simplified multiset* for $\mathcal{M}$ is a multiset derived from $\mathcal{M}$ by repeating *deleting k distinct elements* from it until no longer possible.

Theorem

The only values that may occur more than $\lfloor n/k \rfloor$ times in $\mathcal{M}$ of n elements are the values in a k-simplified multiset for $\mathcal{M}$.

Prove this theorem. Take $k = 2$ again. Design an $\Theta(n)$ algorithm for $k = 2$. Generalize it to an algorithm for general k (ignoring $\Theta(n \lg k)$ for now).


Thank
You!



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