CLPERM - Editorial

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PROBLEM LINK:

Practice
Contest

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DIFFICULTY:

MEDIUM

PRE-REQUISITES:

Maths

PROBLEM:

K numbers denoted by array **B** from set **S = [1,2,...N]** are removed. Find the minimum number **X** such that **X** cannot be formed by picking a set of numbers from **S**.

$1 \le N \le 10^9$

$1 \le K \le 5*10^5$

EXPLANATION:

If the minimum **X** is odd, second player wins, else first player wins.
So, we just need to find **X**.

If **k == 0**, then all numbers from 1 to **(N * (N + 1)) / 2** are possible to form.
Consider a special case, **X = 1** if 1 has been removed from set **[1..N]**.

Based on this observation, we can first sort the array **B** in ascending order.
Fact: Let's say all numbers from 1 to **i** are available, then we can form every number till **(i * (i + 1)) / 2**.

Let's consider last reachable number till now is **M**. So now we want to form numbers **M + 1**, **M + 2** and so on.
We have generated all numbers till **M** now and now we want to generate **M + 1** and the new number that available number we get is say B_i **+ 1**, we can't generate **M + 1**, if B_i **+ 1 > M + 1**. In such a case **X** will be **M + 1**.
Or else, we know that all numbers between B_i **+ 1** and B_{i+1} **- 1**(both inclusive) are available. So, we know that all numbers from **M + 1** to **M + S** are also available, where **S** = sum of all numbers between B_i **+ 1** and B_{i+1} - 1(both inclusive).

We do this for all unavailable numbers in sorted traversal to get the maximum unachievable sum **M**.

Complexity: **O(K log K)**

You might want to read this, for better clarity.

SOLUTIONS:

Setter's solution
Tester's solution

jan15 maths medium clperm editorial

This question is marked "community wiki".

edited 06 Feb, 01:35

asked 12 Jan, 16:02

darkshadows ♦♦
2.9k●88●131●145
accept rate: 6%

Will the links to setter's and tester's solutions be updated ever?

tijoforyou (05 Feb, 11:07)

16 Answers: oldest newest most voted

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http://www.codechef.com/viewsolution/5717014 This problem can be solved with (sqrt(n)) complexity too.

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