Petrozavodsk Winter-2019. Petrozavodsk SU Contest

Contest Info

Contest Name: Petrozavodsk Winter-2019. Petrozavodsk SU Contest

Practicing Date: 2019.4.09

Contest Link: Petrozavodsk Winter-2019. Petrozavodsk SU Contest (http://opentrains.snarknews.info/~ejudge/team.cgi?contest_id=001538)

PDF Statements: Statements

Participants: sy_chen, calabash_boy, Roundgod

Solution Link: Code for Petrozavodsk Winter-2019. Petrozavodsk SU Contest

Editorials

Below are the editorials provided by the problem solver/upsolver, refer to the solution link for more details.

A. DIY Radar

solved by Roundgod (1:31 +1)

With two repeated query at point $(-1000, 0)$(of course many other query points are fine) and checking the difference between the answer to the first query and the second query, one can uniquely determine the original position.

B. Word Squared

solved by sy_chen (0:05)

The matrix has size $(2n-1) \times (2n-1)$ and can be explicitly written as $A_{ij} = P_{(i+j) \bmod n}$.

C. Quoridor

unsolved

D. Game X

solved by Roundgod (0:23)

The problem can be restated as follows: given n, find a, b such that $a+b=n$, $\binom{a}{2} \le k \le \binom{a}{2} + ab$, maximizing $\binom{a}{2} + \binom{b}{2}$. Since the maximum point of the function lies on the border, we only need to compute the border of the given constraints. Two binary searches will do for this problem.

E. 5-Path

solved by sy_chen (2:39 +7)

Binary search on the answer, then test if there is a simple path of length 5 in between a and b.

F. Nightmare

upsolved by sy_chen

For each pothole, find the earliest time of hitting, if any. This can be solved by finding the intersection of a half-line and a segment. The $k+1$-th smallest time is the answer.

G. String Transformation

unsolved

H. Employees

solved by Roundgod (2:37)

Using the linearity of expectations, one just need to compute, for each pair of i, j, what is the probability that the employee i leaves before the employee j, which is simply a combinatorics argument that can be computed in $O(n)$ time. Thus the overall complexity is $O(n^3)$.

I. Modulo-magic squares

unsolved

J. Count the Sequences

unsolved

Replay

To be added.