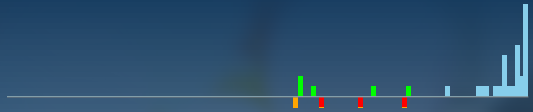
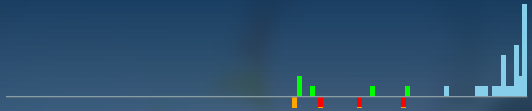


H: Hasty Haul

Michael Zündorf

Problem

Find an implicit matching on the set of n bit binary strings with k ones, or report that no such matching exists. Two binary strings are adjacent if one can be transformed into the other by swapping the values at two distinct indices.



H: Hasty Haul

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Problem

Find an implicit matching on the set of n bit binary strings with k ones, or report that no such matching exists. Two binary strings are adjacent if one can be transformed into the other by swapping the values at two distinct indices.

Impossible case

A matching does not exist if the number of states is odd, i.e. $\binom{n}{k} = 1 \pmod 2$. In all other cases a matching can be created.

H: Hasty Haul

Michael Zündorf

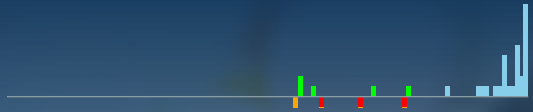
Construction

There are many solutions. One is to find a Hamiltonian path, then match the i-th value to the $(i \oplus 1)$-th.

- Build the Hamiltonian path $H(n, k)$ recursively.
- $H(n, k) = 0H(n-1, k) + 1H^R(n-1, k-1)$ where H^R is the reversed Hamiltonian path.

0	00001111
	$\cdots$ $H(n-1, k)$
0	10000111

1	10000011
	$\cdots$ $H^R(n-1, k-1)$
1	00000111



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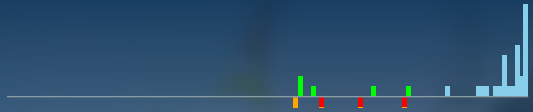
Runtime

Runtime $\mathcal{O}(n)$ if done well, $\mathcal{O}(n^2)$ also passes.



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Runtime

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Statistics: 37 submissions, 5 accepted, 28 unknown