

Mutating DNA

Zadanie z IOI - International Olympiad in Informatics

<https://mirror.ioi2021.sg/statement/dna-ISC.pdf>

Mutating DNA

Grace is a biologist working in a bioinformatics firm in Singapore. As part of her job, she analyses the DNA sequences of various organisms. A DNA sequence is defined as a string consisting of characters "A", "T", and "C". Note that in this task DNA sequences **do not contain character "G"**.

We define a mutation to be an operation on a DNA sequence where two elements of the sequence are swapped. For example a single mutation can transform "ACTA" into "AATC" by swapping the highlighted characters "A" and "C".

The mutation distance between two sequences is the minimum number of mutations required to transform one sequence into the other, or -1 if it is not possible to transform one sequence into the other by using mutations.

Grace is analysing two DNA sequences a and b , both consisting of n elements with indices from 0 to $n - 1$. Your task is to help Grace answer q questions of the form: what is the mutation distance between the substring $a[x..y]$ and the substring $b[x..y]$? Here, a substring $s[x..y]$ of a DNA sequence s is defined to be a sequence of consecutive characters of s , whose indices are x to y inclusive. In other words, $s[x..y]$ is the sequence $s[x]s[x + 1] \dots s[y]$.