

USA Computing Olympiad



OVERVIEW

TRAINING

CONTESTS

HISTORY

STAFF

RESOURCES

USACO 2024 US OPEN CONTEST, GOLD PROBLEM 1. COWREOGRAPHY

[Return to Problem List](#)

Contest has ended.

[Log in to allow submissions in analysis mode](#)
[English \(en\)](#)

The cows have formed a dance team, and Farmer John is their choreographer! The team's latest and greatest dance involves N cows ($2 \leq N \leq 10^6$) standing in a line. Each move in the dance involves two cows, up to K positions apart ($1 \leq K < N$), gracefully jumping and landing in each other's position.

There are two types of cows in the line – Guernseys and Holsteins. As such, Farmer John has documented the dance as a sequence of **length- N binary strings**, where a 0 represents a Guernsey, a 1 represents a Holstein, and the overall string represents how the cows are arranged in the line.

Unfortunately, Farmer Nhoj (who choreographs for a rival team) has sabotaged the dance and erased all but the first and last binary strings! With a big competition quickly approaching, Farmer John must waste no time in reconstructing the dance.

Given these two binary strings, help Farmer John find the minimum number of moves in the dance!

INPUT FORMAT (input arrives from the terminal / stdin):

The first line contains N and K .

The second line contains the first binary string.

The third line contains the last binary string.

It is guaranteed that both binary strings contain the same number of ones.

OUTPUT FORMAT (print output to the terminal / stdout):

The minimum number of moves in the dance.

SAMPLE INPUT:

```
4 1
0111
1110
```

SAMPLE OUTPUT:

```
3
```

One possible dance:

```
0111 -> 1011 -> 1101 -> 1110
```

SAMPLE INPUT:

```
5 2
11000
00011
```

SAMPLE OUTPUT:

```
3
```

One possible dance:

```
11000 -> 01100 -> 00110 -> 00011
```

SAMPLE INPUT:

```
5 4
11000
00011
```

SAMPLE OUTPUT:

2

One possible dance:

11000 → 10010 → 00011

SCORING:

- Inputs 4-5: $K = 1$
- Inputs 6-7: Both strings have at most 8 ones.
- Inputs 8-15: $N \leq 5000$
- Inputs 16-23: No additional constraints.

Problem credits: Benjamin Qi

Contest has ended. No further submissions allowed.