Wabbit osu!taiko

Input file:	standard input
Output file:	standard output
Time limit:	1 second
Memory limit:	256 megabytes

As some of you may know, blerargh is an osu!taiko god. Interestingly, Benson the (arguably old) wabbit plays osu!taiko too.

Today, they will play a simplified version of the game, where the beatmap S will have a sequence of 0s and 1s. Due to wabbit vision being less sharp than human vision, Benson finds it easier to play when there are more long sequences of the same key. In particular, he defines a beatmap's (a sequence of 0s and 1s) easiness E to be the longest contiguous sequence of the same key.

For example, 0111110 has easiness 5, while 001011 has easiness 2.

Blerargh has created the beatmap S, and it has length N. You want to carry out some operations to make it less easy. In each operation, you can pick any contiguous segment of S (including the entire beatmap) and flip each key in the segment (0 becomes 1, 1 becomes 0).

For each $1 \leq i \leq N$, you wonder what is the minimum easiness E_i that can be achieved if you were to carry out i operations.

Input

The first line contains the integer N.

The second line contains a beatmap S of length N. You are guaranteed that there are no spaces between any of the characters, and that every character is either '0' or '1' (without quotation marks).

Output

Output N space-separated integers in one line.

Each integer E_i ($1 \leq i \leq N$) represents the minimum possible "unrandomness" of S after i flips.

Scoring

For all subtasks, it is guaranteed that $N \leq 500\,000$

Subtask	Score	N	Additional constraints
1	0		Sample Testcases
2	8	-	Binary string S will consist of only zeroes, or only ones
3	6	$N \leq 4$	-
4	22	$N \leq 200$	-
5	23	$N \leq 2000$	-
6	41	-	-

Examples

standard input	standard output
5 00111	2 1 1 1 1
6 000000	2 2 1 1 1 1