‹ **Back to all puzzles**

Director of Photography (Chapter 2)

Level 2   Time limit: 5s   Not started

Note: Chapter 1 is an easier version of this puzzle. The only difference is a smaller constraint on N.

A photography set consists of N cells in a row, numbered from 1 to N in order, and can be represented by a string C of length N. Each cell i is one of the following types (indicated by C_i, the ith character of C):

- If C_i = "P", it is allowed to contain a photographer
- If C_i = "A", it is allowed to contain an actor
- If C_i = "B", it is allowed to contain a backdrop
- If C_i = ".", it must be left empty

A *photograph* consists of a photographer, an actor, and a backdrop, such that each of them is placed in a valid cell, and such that the actor is between the photographer and the backdrop. Such a photograph is considered *artistic* if the distance between the photographer and the actor is between X and Y cells (inclusive), and the distance between the actor and the backdrop is also between X and Y cells (inclusive). The distance between cells i and j is $|i - j|$ (the absolute value of the difference between their indices).

Determine the number of different *artistic photographs* which could potentially be taken at the set. Two photographs are considered different if they involve a different photographer cell, actor cell, and/or backdrop cell.

Constraints

$1 \le N \le 300,000$
$1 \le X \le Y \le N$

Sample test case #1

```
N = 5
C = APABA
X = 1
Y = 2
```
| Expected Return Value = 1 |

Sample test case #2

```
N = 5
C = APABA
X = 2
Y = 3
```
| Expected Return Value = 0 |

Sample test case #3

```
N = 8
C = .PBAAP.B
X = 1
Y = 3
```
| Expected Return Value = 3 |

Sample Explanation

In the first case, the absolute distances between photographer/actor and actor/backdrop must be between 1 and 2. The only possible photograph that can be taken is with the 3 middle cells, and it happens to be artistic.

In the second case, the only possible photograph is again taken with the 3 middle cells. However, as the distance requirement is between 2 and 3, it is not possible to take an artistic photograph.

In the third case, there are 4 possible photographs, illustrated as follows:

```
.P.A...B
.P..A..B
..BA.P..
..B.AP..
```

All are artistic except the first, where the artist and backdrop exceed the maximum distance of 3.

The code editor for solving puzzles is only available on wider screens.

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