

F. Clear The Matrix

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

You are given a matrix f with 4 rows and n columns. Each element of the matrix is either an asterisk (*) or a dot (.).

You may perform the following operation arbitrary number of times: choose a square submatrix of f with size $k \times k$ (where $1 \leq k \leq 4$) and replace each element of the chosen submatrix with a dot. Choosing a submatrix of size $k \times k$ costs a_k coins.

What is the minimum number of coins you have to pay to replace all asterisks with dots?

Input

The first line contains one integer n ($4 \leq n \leq 1000$) — the number of columns in f .

The second line contains 4 integers a_1, a_2, a_3, a_4 ($1 \leq a_i \leq 1000$) — the cost to replace the square submatrix of size $1 \times 1, 2 \times 2, 3 \times 3$ or 4×4 , respectively.

Then four lines follow, each containing n characters and denoting a row of matrix f . Each character is either a dot or an asterisk.

Output

Print one integer — the minimum number of coins to replace all asterisks with dots.

Examples

input
4 1 10 8 20 ***. ***. ***. ...*
output
9

input
7 2 1 8 2 .***.. .***.* .***.. ...*..
output
3

input
4 10 10 1 10 ***. *..* *..* .***
output

Note

In the first example you can spend 8 coins to replace the submatrix 3×3 in the top-left corner, and 1 coin to replace the 1×1 submatrix in the bottom-right corner.

1

In the second example the best option is to replace the 4×4 submatrix containing columns 2 – 5, and the 2×2 submatrix consisting of rows 2 – 3 and columns 6 – 7.

In the third example you can select submatrix 3×3 in the top-left corner and then submatrix 3×3 consisting of rows 2 – 4 and columns 2 – 4.