

Next TTPC 3

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 1024 megabytes

The TokyoTech Programming Contest is a programming competition held once a year. There are four uppercase English strings, S_1, S_2, S_3, S_4 . Starting from next year, the abbreviation T_x for the TokyoTech Programming Contest held x years later is determined as follows:

- T_x is a string consisting of four uppercase English characters.
- The i -th character of T_x ($1 \leq i \leq 4$) is equal to the $((x-1) \bmod |S_i| + 1)$ -th character of S_i . (Here, $|S_i|$ represents the length of the string S_i).

You are given a positive integer N . After how many years will the abbreviation be TTPC for the N -th time?

Input

The input is given from Standard Input in the following format:

N
S_1
S_2
S_3
S_4

- N is an integer.
- $1 \leq N \leq 10^6$
- $1 \leq |S_i| \leq 10^3$ ($1 \leq i \leq 4$)
- S_i ($1 \leq i \leq 4$) consists of uppercase English characters.

Output

Output a positive integer x that satisfies the following two conditions. If there is no such x , output -1 instead.

- $T_x = \text{TTPC}$
- The string TTPC appears N times in T_1, T_2, \dots, T_x

Examples

standard input	standard output
3 TTPC TLE P AC	34
670055 TF OITFKONTO GFPPNPWTZP CCZFB	-1
910359 TOKYO TECH PROGRAMMING CONTEST	1401951321

Note

In the first example, the abbreviation becomes TTPC for the first time after 10 years, for the second time after 22 years, and for the third time after 34 years. Therefore, the answer is 34.

In the second example, the abbreviation TTPC never occurs.