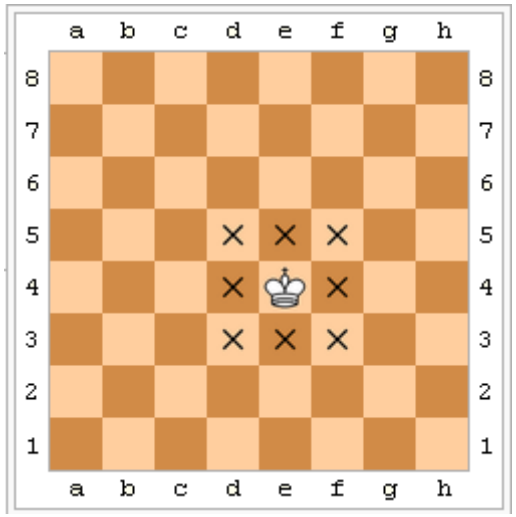
Educational Codeforces Round 16

A. King Moves

1 second, 256 megabytes

The only king stands on the standard chess board. You are given his position in format "cd", where c is the column from 'a' to 'h' and d is the row from '1' to '8'. Find the number of moves permitted for the king.

Check the king's moves here https://en.wikipedia.org/wiki/King_(chess).



King moves from the position e4

Input

The only line contains the king's position in the format "cd", where 'c' is the column from 'a' to 'h' and 'd' is the row from '1' to '8'.

Output

Print the only integer x — the number of moves permitted for the king.

input
e4
output
8

B. Optimal Point on a Line

1 second, 256 megabytes

You are given n points on a line with their coordinates x_i. Find the point x so the sum of distances to the given points is minimal.

Input

The first line contains integer n ($1 \le n \le 3 \cdot 10^5$) — the number of points on the line.

The second line contains n integers x_i ($-10^9 \le x_i \le 10^9$) — the coordinates of the given n points.

Output

Print the only integer x — the position of the optimal point on the line. If there are several optimal points print the position of the leftmost one. It is guaranteed that the answer is always the integer.

input
4 1 2 3 4
output
2

C. Magic Odd Square

1 second, 256 megabytes

Find an $n \times n$ matrix with different numbers from 1 to n^2, so the sum in each row, column and both main diagonals are odd.

Input

The only line contains odd integer n ($1 \le n \le 49$).

Output

Print n lines with n integers. All the integers should be different and from 1 to n^2. The sum in each row, column and both main diagonals should be odd.

input
1

output
1

input
3
output
2 1 4 3 5 7 6 9 8

D. Two Arithmetic Progressions

1 second, 256 megabytes

You are given two arithmetic progressions: $a_1k + b_1$ and $a_2l + b_2$. Find the number of integers x such that $L \le x \le R$ and $x = a_1k' + b_1 = a_2l' + b_2$, for some integers $k', l' \ge 0$.

Input

The only line contains six integers a_1, b_1, a_2, b_2, L, R ($0 < a_1, a_2 \le 2 \cdot 10^9$, $-2 \cdot 10^9 \le b_1, b_2, L, R \le 2 \cdot 10^9$, $L \le R$).

Output

Print the desired number of integers x.

input
2 0 3 3 5 21
output
3

input
2 4 3 0 6 17
output
2

E. Generate a String

2 seconds, 512 megabytes

`zscoder` wants to generate an input file for some programming competition problem.

His input is a string consisting of n letters 'a'. He is too lazy to write a generator so he will manually generate the input in a text editor.

Initially, the text editor is empty. It takes him x seconds to insert or delete a letter 'a' from the text file and y seconds to copy the contents of the entire text file, and duplicate it.

`zscoder` wants to find the minimum amount of time needed for him to create the input file of exactly n letters 'a'. Help him to determine the amount of time needed to generate the input.

Input

The only line contains three integers n, x and y ($1 \le n \le 10^7$, $1 \le x, y \le 10^9$) — the number of letters 'a' in the input file and the parameters from the problem statement.

Output

Print the only integer t — the minimum amount of time needed to generate the input file.

input
8 1 1
output
4

input
8 1 10
output
8

F. String Set Queries

3 seconds, 768 megabytes

You should process m queries over a set D of strings. Each query is one of three kinds:

1. Add a string s to the set D. It is guaranteed that the string s was not added before.
2. Delete a string s from the set D. It is guaranteed that the string s is in the set D.
3. For the given string s find the number of occurrences of the strings from the set D. If some string p from D has several occurrences in s you should count all of them.

Note that you should solve the problem in `online` mode. It means that you can't read the whole input at once. You can read each query only after writing the answer for the last query of the third type. Use functions `fflush` in `C++` and `BufferedWriter.flush` in `Java` languages after each writing in your program.

Input

The first line contains integer m ($1 \le m \le 3 \cdot 10^5$) — the number of queries.

Each of the next m lines contains integer t ($1 \le t \le 3$) and nonempty string s — the kind of the query and the string to process. All strings consist of only lowercase English letters.

The sum of lengths of all strings in the input will not exceed $3 \cdot 10^5$.

Output

For each query of the third kind print the only integer c — the desired number of occurrences in the string s.

input

```
5
1 abc
3 abcabc
2 abc
1 aba
3 abababc
```

output

```
2
2
```

input

```
10
1 abc
1 bcd
1 abcd
3 abcd
2 abcd
3 abcd
2 bcd
3 abcd
2 abc
3 abcd
```

output

```
3
2
1
0
```