Problem A. Minimize GCD

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

You are given an integer number N. Your task is to find two integers x and y such that $lcm(x, y) = N$, $gcd(x, y) = 1$ and $x, y > 1$.

Input

Input contatins the only integer N $(1 \leqslant N \leqslant 10^{12})$.

Output

Print two integer numbers x and y such that $lcm(x, y) = N$, $gcd(x, y) = 1$ and $x, y > 1$. If there is no such pair of integers, print "-1" (without quotes).

Examples

standard input	standard output
12	3 4
343	-1

Note

Hint: Try to recall properties of GCD and LCM of (x, y).

Problem B. Primetopia

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

Primetopia is the land where only prime numbers live. Unfortunately, not all citizens can find friends, because two primes can be friends if and only if they differ by 2. You are given the number of citizens in Primetopia. Your task is to find how many primes will be without any friends.

Input

Input consists of the only integer N - population of Primetopia ($2 \leqslant N \leqslant 3 \cdot 10^5$).

Output

Print the only integer x - number of citizens without friends.

Examples

standard input	standard output
2	2
5	2
10	3

Note

In the first sample there are 2 citizens in Primetopia: 2 and 3. They differ by 1, so each of them has no friends and answer is 2.

In the second sample citizens of Primetopia are 2, 3, 5, 7, 11. 2 and 11 have no friends, so answer is 2.

In the third sample 2, 3, 5, 7, 11, 13, 17, 19, 23, 29 live in Primetopia. 2, 23 and 29 have no friends, so asnwer is 3.

Hint: Use sieve of Eratosthenes to obtain first N primes. Write them out and check neigbouring primes whether their difference is equal to 2 or not.

Problem C. Every day I'm shufflin'

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

Another boring day is going, so you decide to dilute daily routine with playing cards. You have a deck consisting of 52 cards. You start to shuffle this deck N times, each time you pull a_i cards from top and push them to bottom. After that you start the game. You take one card from top of the deck, and your oppenent takes the next card. Your task is to determine which card will be taken by you and by your opponent.

Input

The first line of input consists of 52 cards from the top of the deck to it's bottom. Each card is described by string, where value is either a number from 2 to 10 or 'K' for king, 'Q' for queen, 'J' for jack, 'A' for ace and suit is 'S' for spades, 'D' for diamonds, 'C' for clubs or 'H' for hearts). The second line is the only integer N - number of shuffles ($1 \leqslant N \leqslant 10^5$). The third line contains N integers a_i - amount of cards you will move at the ith time ($1 \leqslant a_i \leqslant 52$).

Output

In the first line print the card you will take first and in the second one print the card that will be taken by your opponent.

Example

standard input	standard output
2H 7H 9C 4C 8S 5D QC KC 9S 7D 8D 9D QS JS AH JC AC KH 4D 10H 5C 10D 10C 2C 8H 3S 7S 3D AD 6S 2S 5H KS 8C JH 3H 10S 6D AS 3C 4S 9H 5S KD 2D 6H 6C JD QD 4H QH 7C 2 5 2	KC 9S

Note

Hint: Think about data structure in which your deck will be stored and then just follow all shuffles.

Problem D. Dishes

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

After a working day, the dishwasher Azamat must wash all the dishes stacked in a pile. As you know, Azamat is very lazy and does not want to wash everything. But Azamat noted that among them there are both clean and dirty. He, as a person who completed the statistics course, wanted to know how many dirty and clean dishes there are.

A clean dish is that which have both sides are clean. For example, 1,0,0,0,1 there is a 1 absolutely clean dish. So answer will be 1(clean) and 4(dirty).

Input

The first line contains the single integer T the number of dishes. In the next line contain numbers 0 or 1.

Output

Print two integers. Count of "clean"and "dirty"dishes.

Examples

standard input	standard output
5 1 0 0 0 1	1 4
6 0 0 1 1 0 0	2 4

Note

Task must be solved by stack;