Task	TRIK	NATRIJ	TENIS	LIGA	IVANA	DVAPUT
Input	standard input (keyboard)					
Output	standard output (screen)					
Memory limit (heap)	32 MB	32 MB	32 MB	32 MB	32 MB	32 MB
Memory limit (stack)	8 MB	8 MB	8 MB	8 MB	8 MB	8 MB
Time limit (per test)	1 second	1 second	1 second	1 second	1 second	1 second
Number of tests	5	10	10	5	10	10
Points per test	3	2	4	11	7	10
Total points	**15**	**20**	**40**	**55**	**70**	**100**
	300					

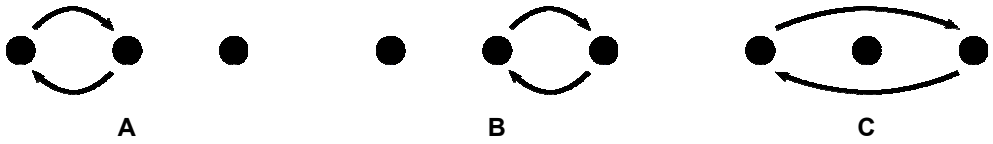
Note: The evaluation system has two Intel Pentium 4 3.0 GHz processors and is running the Linux operating system. The following compile options are used for different languages:

- C: –O2 –s –static –std=c99 –lm
- C++: –O2 –s –static –lm
- Pascal: –O1 –XS

1. TRIK

Jealous of Mirko's position as head of the village, Borko stormed into his tent and tried to demonstrate Mirko's incompetence for leadership with a trick.

Borko puts three opaque cups onto the table next to each other (opening facing down) and a small ball under the leftmost cup. He then swaps two cups in one of three possible ways a number of times. Mirko has to tell which cup the ball ends up under.



Wise Mirko grins with his arms crossed while Borko struggles to move the cups faster and faster. What Borko does not know is that programmers in the back are recording all his moves and will use a simple program to determine where the ball is. Write that program.

Input

The first and only line contains a string of at most 50 characters, Borko's moves.

Each of the characters is 'A', 'B' or 'C' (without quote marks).

Output

Output the index of the cup under which the ball is: 1 if it is under the left cup, 2 if it is under the middle cup or 3 if it is under the right cup.

Sample test data

input	**input**
AB	CBABCACCC
output	**output**
3	1

After an unsuccessful attempt at claiming power peacefully, Borko has decided to tear down Mirko's village hall, which was built for him out of cardboard by his loyal servants.

For this he will use Mirko's microprocessor (which was stolen from him by Borko's friend Zvonko), a bucket of water and a bag of sodium. He will enter the time of the "explosion" into the microprocessor, and it will drop the sodium in the water after the time is up.

Borko knows the current time and when he wants the explosion. He is not very fond of arithmetic and Zvonko is currently playing with marbles in his back yard so he can't help him.

Write a program that calculates the time to the explosion (this is the time Borko will enter into the microprocessor). The time Borko wants is at least one second and at most 24 hours.

Input

The first line of input contains the current time in hh:mm:ss format (hours, minutes, seconds). The hours will be between 0 and 23 (inclusive) and the minutes and seconds between 0 and 59.

The second line contains the time of the explosion in the same format.

Output

Output the desired time on a single line, in the same format as the times in the input.

Sample test data

input

```
20:00:00
04:00:00
```

output

```
08:00:00
```

input

```
12:34:56
14:36:22
```

output

```
02:01:26
```

3. TENIS

After Borko's second plan of taking over the village fell through (because Mirko's brother Stanko drank all the water), young Zvonko decided to relax with sports. For this purpose he stocked up on carrot juice and peanuts, and dived onto the couch, ready to watch the next tennis match on television.

While the two players are warming up, their statistics pop up on the screen. Zvonko noticed that the match history of the players contained invalid results. He had a brilliant idea where you write him a program that checks the validity of results, which he will then sell to the record keepers and enjoy a leisurely life.

A tennis match consists of sets, each set consisting of games. The following rules apply:

- A player wins a set if he has 6 or more games and at least two games more than his opponent.
- Additionally, if the result is 6:6 in the first or second set (but not the third set), a single final game is played to determine the winner of the set (the tie-break game).
- The match ends when either player has won 2 sets. That player is the winner.

A match result is valid if a match could have been played by the above rules and ended in the result.

Additionally, if one of the players is Roger Federer (designated as "federer" in the input), then a result in which he has lost a set can't be valid (Zvonko knows Federer is from outer space).

Write a program that checks the validity of all matches between two players.

Input

The first line of input contains the names of the two players separated by a single space. Both names will be strings of at most 20 lowercase letters of the English alphabet. The names will be different.

The second line contains an integer N ($1 \leq N \leq 50$), how many matches the two players have played.

Each of the following N lines contains the result of a single match, composed of the results of a number of sets separated by single spaces. Each match result will contain between 1 and 5 sets.

A set is given in the format "A:B", where A and B are games won by each player. These numbers will be integers between 0 and 99 (inclusive).

Output

For each match, in the order they're given in the input, output "da" if the result is valid, or "ne" if it isn't.

Sample test data

input	output	input	output
sampras agassi 6 6:2 6:4 3:6 7:5 2:6 6:5 7:4 7:6 7:6 6:2 3:6 6:2 1:6 6:8	da da ne da ne da	federer roddick 1 2:6 4:6	ne

While the players are resting between sets, the station puts on tedious commercials. Zvonko fires up the teletext feature on his TV set and is reviewing the latest scores and standings in the football league. Always sharp, he has come up with a new mathematical game.

The standings table contains five statistics for each team: the total number of games played, how many of those games the team won, drew and lost, and points earned. A team earns 3 points for every win and 1 point for every draw.

Zvonko noticed that the values of some fields can be determined from the others.

Write a program that takes in a table in which the values of some fields are unknown, and fills in the missing fields.

The data for different teams is not related. For example, it is possible that the table says all teams have won all their games (although that is not possible in a real league).

Each team will have played at most 100 games (even though that can be one of the missing fields).

Input

The first line contains an integer N ($1 \leq N \leq 1000$), the number of teams in the league.

Each of the following N lines contains the 5 fields for one team separated by single spaces, containing the 5 pieces of data as described in the problem statement. Each field contains an integer (at least 0), or the character '?' (question mark) if the value is not known.

The input will be consistent and there will be a unique way to determine the values of the missing fields.

Output

Output the table with the missing fields filled in.

Note: For each test case, your program will receive a score linearly proportional to the number of correctly solved teams, rounded down. If your program exceeds the time limit or another error occurs, the score for that test case will be 0.

Sample test data

input

```
5
27 21 3 3 66
27 18 6 3 ?
? 15 5 7 50
? 14 7 5 ?
? 14 ? 8 47
```

output

```
27 21 3 3 66
27 18 6 3 60
27 15 5 7 50
26 14 7 5 49
27 14 5 8 47
```

5. IVANA

Even though she saw Zvonko steal Mirko's microprocessor in the second task, Mirko's sister Ivana did not tell Mirko because she likes Zvonko. She suggested to him that they go see a movie together so that she would "forget" about the incident.

Zvonko does not care much for girls because they take away precious time he usually spends practicing his math-fu. He suggested that the two of them play a game and, if Ivana wins, they will go see a movie together. Ivana agreed, being good at jump rope and she sometimes even kicks a football around with her two brothers.

Zvonko laid N positive integers in a circle on the floor and explained the rules:

- The first player takes any number.
- The second player takes either of the two numbers adjacent to the one the first player took.
- The next player takes a number adjacent to any of the numbers taken so far, and so on until they run out of numbers. The player to take more odd numbers (not divisible by 2) wins.

Zvonko plays optimally; he always looks for a strategy that leads to certain victory or a draw. Zvonko does not know how well Ivana plays. Being a true cavalier, he let Ivana have the first move.

But Ivana only cares about sitting next to Zvonko in front of the big screen so she seeks help playing.

Write a program that finds how many different first moves Ivana can make, so that she has a chance of winning afterwards.

Input

The first line of input contains an integer N ($1 \leq N \leq 100$), how many numbers there are in the circle.

The second line contains N integers separated by single spaces. All numbers will be between 1 and 1000 (inclusive). No two numbers will be the same.

Output

Output the desired number on a single line.

Sample test data

input	input	input
3 3 1 5	4 1 2 3 4	8 4 10 5 2 9 8 1 7
output	**output**	**output**
3	2	5

First example: Whichever number Ivana takes first, she'll end up with two odd numbers, and Zvonko will have gotten only one.

Second example: If Ivana takes one of the even numbers, Zvonko will take one of the odd numbers and ensure a draw. If she takes an odd number, Zvonko will have to take an even number and then lose because Ivana can take the other odd number.

Ivana won the bet (Zvonko hadn't foreseen this and suspects that it is due to outside interference) and now Zvonko is waiting for her at the movies. While he is waiting, he is observing messages on a screen above him.

As Ivana is running late, Zvonko has been looking at the screen for a while and noticed that some messages appeared on the screen more than once. Naturally, he's been writing down all messages on a piece of paper. He wants to know the length of the longest string that appeared at least twice (appears in two different positions on the paper).

Input

The first line of input contains an integer L ($1 \leq L \leq 200\,000$), the length of the string Zvonko wrote down.

The second line contains a string of L lowercase letter of the English alphabet.

Output

Output the length of the longest string that appears twice on a single line. If there is no such string, output zero.

Sample test data

input	**input**	**input**
11 sabcabcfabc	18 trutrutiktiktappop	6 abcdef
output	**output**	**output**
3	4	0