Problem A. About Grisha N.

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

Grisha N. told his two teammates that he was going to solve all given problems at the quarter-finals, even if all his teammates wouldn't show up at the competition. The teammates didn't believe Grisha so he told them the plan how he was going to do this.

During the first hour he wants to solve f problems. If there is still some time left to the end of the first hour, Grisha will simply walk along the hall. Beginning from the second hour Grisha wants to spend exactly 45 minutes on each of the problems left. If the plan is a success, will Grisha be able to solve all 12 given problems for 5 hours?

Input

The only line contains an integer f — the number of problems Grisha wants to solve during the first hour of the competition ($1 \le f \le 11$).

Output

Output "`YES`", if Grisha manages to solve all the given problems alone, and "`NO`" if he don't.

Examples

standard input	standard output
7	YES
5	NO

Problem B. Neither shaken nor stirred

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

The ACM ICPC regional contest in St. Petersburg is a stressful event even for veterans of competetive programming. That's why for the last four years programmer Denchik and his coach Vova go to their favorite bars to relax after the event. Having entered a bar, Denchik immediately orders cocktail "B-52". If there is no such cocktail on the menu he drinks nothing. On the other hand, in places, where the cocktail is good, Denchik can repeat his order several times.

Vova, as an elder friend, tries to control his trainee drunkenness degree. When entering and leaving bars, Vova asks Denchik how many cocktails he has drunk in the last bar where B-52 was served. If Denchik is not sure about the answer, Vova considers Denchik's drinking enough for this day and takes him to the hotel.

This year the story repeats again. Denchik has the experience of four previous regional contests and knows which bars serve B-52 and how many cocktails he's going to drink in each bar at one visit. He also knows where they can go after leaving every bar on their route. For which bars Denchik may prepare right answers to Vova's questions in advance, no matter what route they choose?

Input

The first line contains an integer n which is the number of bars ($1 \le n \le 100\,000$). Next n lines describe these bars. The i-th line contains integers k_i, m_i, n_{i1}, n_{i2}, ..., n_{im_i} ($0 \le k_i \le 100\,000$; $0 \le m_i \le n$). If k_i equals zero, then in bar i B-52 is not served, and if k_i is positive, it means that Denchik will drink k_i cocktails at one visit to bar i. n_{i1}, n_{i2}, ..., n_{im_i} are the numbers of the bars friends can go to right after leaving bar i ($1 \le n_{ij} \le n$; $n_{ij} < n_{i,j+1}$). There can be number i among the numbers n_{ij}, and it means that after leaving bar i friends can hang around and enter the same bar again. The sum of all numbers m_i does not exceed 100 000.

The bars are numbered in the order they are in the input data. Bar with number 1 is the bar from which Vova and Denchik begin their journey. It is guaranteed that during the night friends can reach every bar listed in the input.

Output

In the i-th of n lines output Denchik's answers to Vova's question on entering bar i and leaving it. Every answer should have one of the following forms:

- `sober`, if Denchik hasn't drunk any B-52 yet
- X, if during the last visit to the bar where B-52 was served Denchik drunk X cocktails (X is an integer from 1 to 100 000)
- `unknown`, if with different routes to the i-th bar different situations are possible

Examples

standard input	standard output
5 0 2 2 3 6 1 4 5 2 4 5 5 1 5 0 0	sober sober sober 6 sober 5 unknown 5 5 5
2 0 2 1 2 0 2 1 2	sober sober sober sober

Problem C. Zhenya moves from parents

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

Zhenya moved from his parents' home to study in other city. He didn't take any cash with him, he only took his father's credit card with zero balance on it. Zhenya succeeds in studies at the University and sometimes makes a little money on the side as a Maths tutor. As he makes his own money he spends only it, and when it is over he uses the credit card. Every time he gets or spends money, he sends a letter to his father, where he puts the following two things.

1. The date when it took place
2. The sum of earned or spent money

Every time receiving a letter from Zhenya, his father calculates the debt on the credit card at the moment. But here a problem arises. The point is that Russian Post delivers letters in an order different to the one they were sent in.

For example, in the first Zhenya's letter the father read that on September 10 Zhenya spent one thousand rubles. He thought that his son had used the credit card, and now the debt is one thousand rubles. However the next day came a letter with the information that on September 9 Zhenya earned five hundred rubles. It means that half of the money he spent on September 10 was his own, and the debt on the credit card is just five hundred rubles.

Help Zhenya's father with his account management.

Input

The first line contains an integer n which is the number of Zhenya's letters ($1 \le n \le 100\,000$). These letters are listed in the next n lines. Description of each letter consists of the amount of money Zhenya spent or earned (in the form `-c` or `+c` accordingly, where `c` is an integer, $1 \le c \le 50\,000$) followed by both date and time when it took place (in the form of `dd.MM hh:mm`). All dates belong to the same year, which is not leap (i. e. there are 365 days in it). Any two letters contain either different dates or different time. The letters are listed in the order the father received them.

Output

After each received letter output what Zhenya's father thinks the amount of the debt on the credit card is.

Example

standard input	standard output
5 -1000 10.09 21:00 +500 09.09 14:00 +1000 02.09 00:00 -1000 17.09 21:00 +500 18.09 13:00	-1000 -500 0 -500 -500

Problem D. Zhenya moves from the dormitory

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

After moving from his parents' place Zhenya has been living in the University dormitory for a month. However, he got pretty tired of the curfew time and queues to the shower room so he took a fancy for renting an apartment. It turned out not the easiest thing in the world to make a choice. One can live in a one bedroom apartment or in a two bedroom apartment, alone or share it with a friend. Zhenya can afford to rent an apartment of any type alone, but he can share only a two bedroom apartment. If two people share an apartment, each pays half of the rent. Every apartment has its own advantages like part of the town, floor, view from the windows, etc., which Zhenya is going to take into account to make a decision.

Besides that, his friends, he's ready to share an apartment with, also have certain advantages. For example, Igor is a good cook, Dima is tidy, Kostya is a good cook and at the same time can explain how to solve functional analysis problems. And do not forget that living alone has its own bright sides.

Zhenya has already prepared the list of suitable apartments and possible housemates. Zhenya has estimated in units the advantages of each apartment and each friend and also the advantages of living alone. Besides, he knows the maximum sum of money he and each of his friends is ready to pay for the apartment. Help Zhenya to make a decision.

Input

The first line contains three integers: the maximum sum Zhenya is ready to pay monthly, the advantages of living alone in a one bedroom apartment and the advantages of living alone in a two bedroom apartment.

The second line contains an integer n that is the number of Zhenya's friends ($0 \le n \le 256$). Next n lines describe the friends, two integers in every line: the maximum sum the corresponding friend is ready to pay monthly and the advantages of sharing an apartment with him.

The next line contains an integer m that is the number of suitable apartments ($1 \le m \le 256$). Next m lines describe the apartments, three integers in every line: the number of bedrooms in an apartment (1 or 2), monthly rent and the advantages of living there.

All the advantages are estimated in the same units and lie in the range from 0 to 100 000. All sums of money are in rubles and lie in the range from 1 to 100 000.

Output

Output the variant with maximum sum of advantages, Zhenya (and his friend in case of sharing apartments) can afford. If Zhenya should rent an apartment number i alone, output "`You should rent the apartment #i alone.`". If he should share an apartment number i with a friend j output "`You should rent the apartment #i with the friend #j.`". Friends and apartments are numbered from 1 in order they are given in the input. If there are several optimal alternatives, output any of them. If Zhenya can't afford to rent any apartment at all, output "`Forget about apartments. Live in the dormitory.`".

Examples

standard input
10000 50 70 1 10000 100 2 1 10000 200 2 30000 500
standard output
You should rent the apartment #1 alone.

standard input
30000 0 1 1 10000 1001 3 1 20000 2000 2 30000 2000 2 10000 1001
standard output
You should rent the apartment #3 with the friend #1.

standard input
1000 0 0 0 1 1 10000 1000
standard output
Forget about apartments. Live in the dormitory.

Note

In the first example Zhenya can't afford even to share the second apartment. That is why he has to rent the first one. The sum of advantages in this case will be 250 (50 + 200).

In the second example Zhenya can afford any apartment but he can share only the third one. If he chooses this variant, the sum of advantages will be 2002 (1001 + 1001), and if he chooses to live alone it will not be more than 2001 (1 + 2000 in case of living alone in the second apartment).

In the third example Zhenya can't afford the only possible variant.

Problem E. Magic and Science

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

Scientists who specialize in witchcraft have recently discovered a new elementary particle called a magion. Studying the laws of magions' movement, a group of three scientists conducts the following experiment.

The scientists created positvie homogeneous aura in the laboratory. The force of interaction with this aura has constant value and is up-directed. If no other force affects the magion, the aura will make the magion move with constant acceleration $(0, 0, a)$.

A magion with initial speed equal to zero is placed to the point $M_1 = (0, 0, 0)$. At the beginning the first scientist creates a bundle of mana at the point O_1. Magion is immediately affected by the bundle and while the latter exists it will be at the distance O_1M_1 from the point O_1. As a result, the magion starts moving along the arc of the circle ω_1 with the center at O_1.

At some moment the first scientist annihilates the bundle of mana at O_1, and the second scientist at the same time creates his own bundle at the point O_2. The moment for this is being chosen in the following way.

1. At this moment the magion has to be at the point of the circle ω_1 which is the nearest to O_2. Let's denote it M_2.
2. The magion has to be at the point M_2 for the first time, i. e. a new bundle will appear before the magion makes the full circle along ω_1.

The position of the point O_2 is being chosen so that the point M_2 is uniquely determined and does not coincide with the point M_1. Affected by the second bundle, the magion continues its movement along the circle ω_2 with the center at the point O_2 and with the point M_2 on it.

After that the procedure is repeated, i. e. the second scientist annihilates his bundle of mana, and the third one creates his own bundle at the point O_3. The magion, being at this moment at the point M_3, now starts moving along the circle ω_3 with the center in O_3. The third scientist waits until the magion finishes the full circle along ω_3 and returns to the point M_3. This moment is considered the end of the experiment.

All scientists choose moments and points to create bundles of mana so that the point M_i does not coincide neither with M_{i-1} nor O_i, and the distance from O_i to any point of the circle ω_{i-1}, other than M_i, is strictly greater than O_iM_i. Apart from that, at every moment except the initial one the scientists don't allow the magion's speed to be zero.

At any moment of time the magion is affected by exactly two forces: the force of interaction with the bundle of mana and the force of interaction with the aura. The first one is always directed perpendicularly to the magion's path of motion and therefore doesn't affect the absolute value of magion's speed.

Knowing the coordinates of the points O_i and the value of the acceleration a being imparted to the magion by the positive aura, will you be able to define the overall length of the magion's path segments where its speed is not less than v?

Input

The first line contains an integer t that is the number of experiments ($1 \le t \le 1000$). Then the description of the experiments follows, each of them is described by a block of four lines.

The first line of each block contains integers v and a ($1 \le v \le 50\,000$; $1 \le a \le 1000$). Each of the following three lines contains integers x_i, y_i, z_i, which are the coordinates of the point O_i ($-10^6 \le x_i, y_i, z_i \le 10^6$; $x_1^2 + y_1^2 > 0$). It is guaranteed that the magion's path won't have a horizontal arc it will follow with the speed exactly v.

Output

For each experiment output in a separate line the overall length of the magion's path segments where its speed is not less than v. The answers should be output with an absolute of relative error not more than 10^{-6}.

Example

standard input	standard output
1 10 100 4 0 -3 4 16 2 21 16 2	35.3929206868

Note

There is one experiment in the example. The path looks the following way:
from point $(0, 0, 0)$ to point $(4, 0, 2)$: an arc with measure equal to $\arcsin(0.8)$ of the circle with the radius 5;
from point $(4, 0, 2)$ to point $(20, 16, 2)$: a quarter of the circle with the radius 16;
from point $(20, 16, 2)$ to point $(20, 16, 2)$: a full circle with the radius 1.

Problem F. Best of a bad lot

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

A cruise liner hasn't moved away from the land even for three miles when it became apparent that somebody has drowned one of the stewards in the swimming pool. The captain promised to make an investigation personally and to throw the villains overboard. He is going to find the group of murderers by asking each of n passengers two following questions.

1. Where were you at the moment of departure?
2. Who did you see there?

The captain will make his decision based on contradictions in passengers' testimonies. For example, if one passenger says that he was in his room, and another passenger says that he saw the first one near the swimming pool, then one of these two is for sure mixed up with murder. However, if passenger A didn't see some other passenger B at the place, where passenger B really was, the captain wouldn't consider it a contradiction, because passenger B could have just been unnoticed there.

The investigation is unlikely to be reliable, because the murderers have agreed that their testimonies will have no contradictions between them. As for the honest people, they have nothing to hide and will tell only the truth. You volunteered to compare the mismatches in the passengers' answers and reveal a group of suspects. Moreover, you want to give out to the captain the smallest possible group of passengers. If somebody has to become the feeding stuff for sharks today, let as few people as possible suffer.

Input

The first line contains an integer n that is the number of the passengers ($2 \le n \le 400$). Next n lines contain the testimonies of each of the passengers. The i-th line starts with the place where the i-th passenger said he was at the moment of departure that is a non-empty string up to twenty lowercase Latin letters long. The place is followed by the list of the passengers the i-th passenger saw there in the form $m\ n_1\ n_2 \ldots\ n_m$ ($0 \le m \le n-1$; $1 \le n_j \le n$; $n_j \ne i$; $n_j < n_{j+1}$).

Output

In the first line output a positive integer that is the number of the passengers in the suspect group. In the second line output the numbers of these suspects in any order. If the problem has several solutions, output any of them. It is guaranteed that at least one solution exists.

Examples

standard input	standard output
3 bar 0 bar 1 1 pool 2 1 2	1 3
3 pool 2 2 3 pool 2 1 3 pool 2 1 2	1 1

Note

In the first example it is possible that both the first and the second passengers are murderers, and the third one tells the truth. But it is also possible that the first two tell the truth and the third one is a murderer. It is needed to output the second possibility since the group of suspects in it is smaller.

In the second example all passengers do not have testimony contradictions, so any of them could be a murderer.

Problem G. The Debut Album

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	64 megbiytes

Pop-group "Pink elephant" entered on recording their debut album. In fact they have only two songs: "My love" and "I miss you", but each of them has a large number of remixes.

The producer of the group said that the album should consist of n remixes. On second thoughts the musicians decided that the album will be of interest only if there are no more than a remixes on "My love" in a row and no more than b remixes on "I miss you" in a row. Otherwise, there is a risk that even the most devoted fans won't listen to the disk up to the end.

How many different variants to record the album of interest from n remixes exist? A variant is a sequence of integers 1 and 2, where ones denote remixes on "My love" and twos denote remixes on "I miss you". Two variants are considered different if for some i in one variant at i-th place stands one and in another variant at the same place stands two.

Input

The only line contains integers n, a, b ($1 \le a, b \le 300$; $\max(a, b) + 1 \le n \le 50\,000$).

Output

Output the number of different record variants modulo $10^9 + 7$.

Example

standard input	standard output
3 2 1	4

Explanation

In the example there are the following record variants: 112, 121, 211, 212.

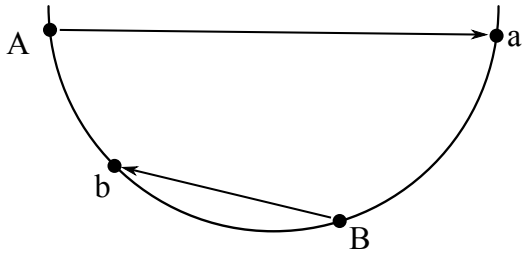
Problem H. Pair: normal and paranormal

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

If you find yourself in Nevada at an abandoned nuclear range during Halloween time, you'll become a witness of an unusual show. Here Ghostbusters hold annual tests for new versions of their proton packs. There are n Ghostbusters and n portable traps with ghosts, all are located on a semicircle. Each trap contains exactly one ghost. The ghosts may be of different types, but each Ghostbuster can neutralize with his weapon only one type of the evil spirits.

On the count of three all ghost traps open at once and all Ghostbusters start to fire. Of course, each Ghostbuster shoots at the ghost, which his proton gun is able to neutralize. The most important thing here is not to cross proton beams of the guns.

You know positions of all Ghostbusters and all the traps in this year's tests. For each Ghostbuster determine which ghost he should shoot at, so that all the ghosts are neutralized and no two gun beams cross. You can assume that all proton beams are in the same horizontal plane and they don't shoot ghosts through in case of a hit.



Input

In the first line there is an integer n that is the number of Ghostbusters ($1 \le n \le 5\,000$). In the second line the sequence of $2n$ Latin letters is written, describing the allocation of the Ghostbusters and the traps on the semicircle. Uppercase letters correspond to the Ghostbusters and lowercase letters correspond to the traps. For example, '`a`' stands for a trap with the ghost of type '`a`', while '`A`' stands for the Ghostbuster with the gun neutralizing ghosts of type '`a`'. The sequence has exactly n lowercase letters and exactly n uppercase letters.

Output

If the problem has a solution, output n space-separated integers $g_1, g_2, \ldots, g_n$, where g_i is the number of the ghost i-th Ghostbuster should shoot at. Both Ghostbusters and ghosts are numbered with integers from 1 to n in the order of their positions along the semicircle. All g_i must be pairwise different. If the problem has several solutions, output any of them. If the problem has no solution, output "`Impossible`".

Examples

standard input	standard output
2 AbBa	2 1
2 AbaB	Impossible
1 Ab	Impossible

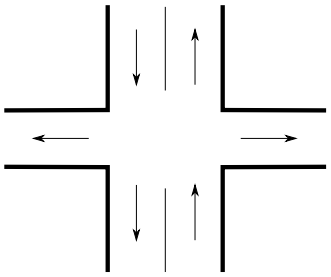
Problem I. Traffic Jam in Flower Town

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

Having returned from Sun City, Dunno told all his friends that every shorty may have a personal automobile. Immediately after that so many citizens took a fancy of becoming road-users, that Bendum and Twistum had to make a mass production of cars on soda water with syrup. Now traffic jams from several cars occasionally appear on the crossing of Bell-flower Street and Daisy Street.

Bell-flower Street goes from the South to the North and has two driving paths. It has the right driving, i. e. automobiles move from the South to the North on the Eastern path and from the North to the South on the Western path. Daisy Street is single-pathed, and it is perpendicular to Bell-flower Street. There is one-way movement on it, but its driving direction is organized in such a way that automobiles drive away from the crossroad in two opposite directions (see the picture).

Yesterday on his way home Dunno saw cars standing in a traffic jam on Bell-flower Street from different sides of the crossing with Daisy Street. Some of the drivers wanted to go forward, some wanted to turn right or left. An automobile can pass the crossing in one second, but if the driver is turning left, he first have to let pass all oncoming vehicles, going forward and to the right. How many seconds did it take all the cars to pass the crossing, providing that no other cars drove up to the crossing?



Input

The first line contains the sequence of symbols '`F`', '`L`' and '`R`', describing directions in which drivers who arrived to the crossing from the South wanted to go. '`F`' stands for those drivers who were going forward, '`L`' is for those who were turning left, and '`R`' is for those who were turning right. Automobiles are listed in the order from the closest to the crossing to the farthest one. The second line contains the description of the cars, arrived to the crossing from the North, in the same form. Both sequences have length from 1 to 1 000.

Output

Output time in seconds, which took all the cars to pass the crossing.

Examples

standard input	standard output
RLF FF	4
L L	1

Note

In the first example we number the cars from 1 to 5 in the order described in the input data. Then in the first second the crossing was passed by the first and the fourth cars because they didn't cause an obstruction to each other. Then the second car was turning left and had to let the fifth car pass. As a result, at each of the following three seconds only one car passed the crossing, and their order was as follows: the fifth one, the second one and the third one.

In the second example the cars didn't cause any obstruction to each other and turned simultaneously.

Problem J. Scarily interesting!

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

This year at Monsters University it is decided to arrange Scare Games. At the Games all campus gathers at the stadium stands, and the Scare program students divide into two teams to compete in their abilities of scaring children. This year the two teams will be "Oozma Kappa" and "Roar Omega Roar".

Each team has n monsters, and the Games consist of n challenges. During each challenge Dean Hardscrabble, the chair of the Scare program, invites one monster from each team to demonstrate his mastery. Each of the monsters is invited only once and scores from 0 to 6 points, depending on how much a child is scared. The results of each challenge are announced at the same time for both monsters right after the end of this challenge. The winning team will be identified by the sum of the points scored by all its members.

Sports competition is an unpredictable process. But the Dean wants to keep all the course of the Games under control, so that the identity of the winning team will have been unclear for the audience as long as possible. For example, if six challenges until the end "Oozma Kappa" is forty points ahead, the audience at the stadium stands will just lose interest to the game. The Dean knows the skill level of all her students, and she wants to decide beforehand the order in which both teams' members will be participating in the challenges. In what order should monsters from "Oozma Kappa" and from "Roar Omega Roar" show up to keep the audience in suspense as long as possible?

Input

The first line contains an integer n ($2 \le n \le 1\,000$). The second line contains n integers within the range from 0 to 6, which are the points monsters from "Oozma Kappa" will score. The third line contains the points, monsters from "Roar Omega Roar" will score, written in the same manner.

Output

Output n lines, each containing integers o_i and r_i, which are the numbers of monsters from "Oozma Kappa" and "Roar Omega Roar" respectively, who should be called by the Dean to take part in the i-th challenge. In each team monsters are numbered with integers from 1 to n in the order they appear in the input data. If the problem has several solutions, output any of them.

Example

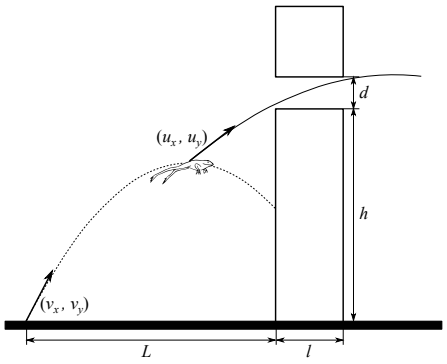
standard input	standard output
5 0 1 4 3 6 6 5 1 3 0	5 1 1 5 4 4 2 3 3 2

Problem K. Riding a Toad

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

A tribe of leafmen live in the old forest. Leafmen are very tiny and fast, that's why we can't notice them even when they are under our very nose. Leafmen guard the forest unceasingly, protecting it from evil creatures.

A young leafman Nod has occasionally found out that hostile tribe of fasiqs is planning to make a raid to leafmen' palace and kidnap their queen. It's urgent to warn general Ronin about this to make him send his warriors and tighten security of the palace. Nod whistled for his tame Calibri, but it didn't appear, it must have had gone hunting on blackflies. Then Nod saddled up a big toad and rode it towards the general's garrison.



The garrison is surrounded by a wall with width l. On the height h from the ground the wall has a small cylindrical hole with diameter d. This hole is used by leafmen to get inside flying on Calibri. But it's not an easy thing for a toad to jump into it. Then to draw the guards' attention Nod decides to take a small stone and throw it into the hole while the toad is jumping. The toad is at distance L from the wall and can make one jump with initial speed (v_x, v_y). At any moment while the toad is in the air and its x coordinate is less than x coordinate of the wall outer surface. Nod can throw a stone with an absolute initial speed (u_x, u_y). The stone should fly into the hole not touching its floor or ceiling. Determine the moment when Nod should throw the stone.

You may assume that neither the toad nor the stone are not affected by any powers except gravity, giving it down-directed acceleration g.

Input

The first line contains integers L, h, l, d $(1 \le L, h, l, d \le 1000)$. The second line contains integers v_x, v_y, u_x, u_y $(1 \le v_x, v_y, u_x, u_y \le 1000)$. X-axis is horizontal and directed towards the wall, Y-axis is up-directed. Let's assume gravity acceleration equal 10. All distances are given in meters, all speeds in meters per second.

Output

If Nod can throw the stone into the hole output the moment of time when he should throw it with absolute or relative precision 10^{-6}. The moment of the toad's take-off should be taken as the initial moment. If there are several moments when it is possible to throw the stone output any of them. Your answer should be such that throwing the stone 10^{-6} second sooner or later it won't touch the wall. It is guaranteed that if some answer exists then there is the answer satisfying this constraint. If it is not possible to throw the stone into the hole, output -1.

Examples

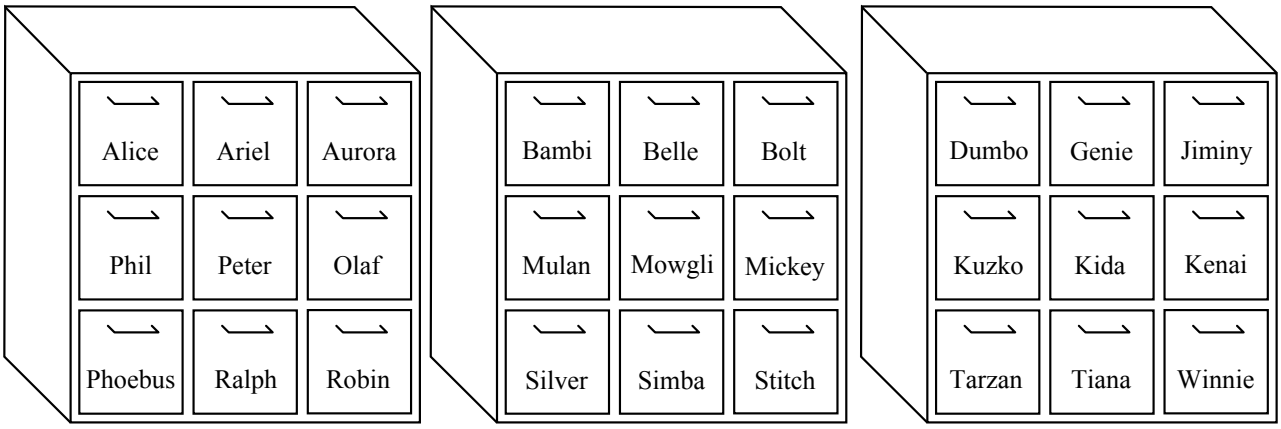
standard input	standard output
4 2 2 4 1 1 5 10	0.1
30 15 5 5 10 10 20 10	-1

Problem L. Donald is a postman

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	64 mebibytes

Donald Duck works as a postman for the Walt Disney Studios. He delivers children's letters from all over the world to his friends, which are cartoon characters. The Studios has three cases for the letters, with nine sections in each case. Every section has the name of the receiver on it. All cases stand in a row as it is shown at the picture below.

Donald Duck have brought n letters today. Initially, he stands near the leftmost case. He has to make one step to go to the neighboring case or to the previous one. How many steps will he make until he puts all the letters into the respective sections, if he does this in the order they are in his bag?



Input

The first line contains an integer n that is the amount of letters in Donald's bag ($1 \le n \le 1\,000$). The following n lines contain receivers of the letters in the order they are in the bag.

Output

Output the number of steps Donald should make to put all the letters into the cases.

Example

standard input	standard output
4 Aurora Tiana Ariel Mulan	5