

Problem A. Everlasting...?

Input file: a.in
Output file: a.out
Time limit: 2 seconds
Memory limit: 256 megabytes

Everlasting Sa-Ga, a new, hot and very popular role-playing game, is out on October 19, 2008. Fans have been looking forward to a new title of Everlasting Sa-Ga.

Little Jimmy is in trouble. He is a seven-year-old boy, and he obtained the Everlasting Sa-Ga and is attempting to reach the end of the game before his friends. However, he is facing difficulty solving the riddle of the first maze in this game — Everlasting Sa-Ga is notorious in extremely hard riddles like Neverending Fantasy and Forever Quest.

The riddle is as follows. There are two doors on the last floor of the maze: the door to the treasure repository and the gate to the hell. If he wrongly opens the door to the hell, the game is over and his save data will be deleted. Therefore, he should never open the wrong door.

So now, how can he find the door to the next stage? There is a positive integer given for each door — it is a great hint to this riddle. The door to the treasure repository has the integer that gives the larger *key number*. The key number of a positive integer n is the largest prime factor minus the total sum of any other prime factors, where the prime factors are the prime numbers that divide into n without leaving a remainder. Note that each prime factor should be counted only once.

As an example, suppose there are doors with integers 30 and 20 respectively. Since 30 has three prime factors 2, 3 and 5, its key number is $5 - (2 + 3) = 0$. Similarly, since 20 has two prime factors 2 and 5, its key number 20 is $5 - 2 = 3$. Jimmy therefore should open the door with 20.

Your job is to write a program to help Jimmy by solving this riddle.

Input

The input consists of a line that contains two integers a and b separated by a space ($2 \leq a, b \leq 10^6$). It is guaranteed that key numbers of these integers are always different.

Output

Print in a line 'a' (without quotes) if the door with the integer a is connected to the treasure repository; print 'b' otherwise.

Examples

a.in	a.out
10 15	a
30 20	b

Problem B. Headstrong Student

Input file: b.in
Output file: b.out
Time limit: 2 seconds
Memory limit: 256 megabytes

You are a teacher at a cram school for elementary school pupils.

One day, you showed your students how to calculate division of fraction in a class of mathematics. Your lesson was kind and fluent, and it seemed everything was going so well — except for one thing. After some experiences, a student Max got so curious about how precise he could compute the quotient. He tried many divisions asking you for a help, and finally found a case where the answer became an infinite fraction. He was fascinated with such a case, so he continued computing the answer. But it was clear for you the answer was an infinite fraction — no matter how many digits he computed, he wouldn't reach the end.

Since you have many other things to tell in today's class, you can't leave this as it is. So you decided to use a computer to calculate the answer in turn of him. Actually you succeeded to persuade him that he was going into a loop, so it was enough for him to know how long he could compute before entering a loop.

Your task now is to write a program which computes where the recurring part starts and the length of the recurring part, for given dividend/divisor pairs. All computation should be done in decimal numbers. If the specified dividend/divisor pair gives a finite fraction, your program should treat the length of the recurring part as 0.

Input

The input consists of a line containing two positive integers x and y , which specifies the dividend and the divisor, respectively. You may assume that $1 \leq x, y \leq 1,000,000$.

Output

Your program should output a line containing two integers separated by exactly one blank character.

The former describes the number of digits after the decimal point before the recurring part starts. And the latter describes the length of the recurring part.

Examples

b.in	b.out
1 3	0 1
1 6	1 1
5 3	0 1
5 4	2 0
200 2	0 0
25000 99	0 2

Problem C. Dig or Climb

Input file: `c.in`
Output file: `c.out`
Time limit: 2 seconds
Memory limit: 256 megabytes

Benjamin Forest VIII is a king of a country. One of his best friends Nod lives in a village far from his castle. Nod gets seriously sick and is on the verge of death. Benjamin orders his subordinate Red to bring good medicine for him as soon as possible. However, there is no road from the castle to the village. Therefore, Red needs to climb over mountains and across canyons to reach the village. He has decided to get to the village on the shortest path on a map, that is, he will move on the straight line between the castle and the village. Then his way can be considered as polyline with n points $(x_1, y_1) \dots (x_n, y_n)$ as illustrated in the following figure.



Figure 1: An example route from the castle to the village

Here, x_i and y_i are coordinates of point i . The castle is located on the point (x_1, y_1) , and the village is located on the point (x_n, y_n) .

Red can walk with speed v_w . Also, since he has a skill to cut a tunnel through a mountain horizontally, he can move strictly inside the mountain with speed v_c .

Your job is to write a program to find the minimum time to get to the village.

Input

The input is given in the following format:

```
 $n$   
 $v_w$   $v_c$   
 $x_1$   $y_1$   
 $\dots$   
 $x_n$   $y_n$ 
```

You may assume all the following: $1 \leq n \leq 1,000$, $1 \leq v_w, v_c \leq 10$, $-10,000 \leq x_i, y_i \leq 10,000$, and $x_i < x_j$ for all $i < j$.

Output

You should print the minimum time required to get to the village in a line. Each minimum time should be given as a decimal with an arbitrary number of fractional digits and with an absolute error of at most

10^{-6} .

Examples

c.in	c.out
3 2 1 0 0 50 50 100 0	70.710678
3 1 1 0 0 50 50 100 0	100.000000
3 1 2 0 0 50 50 100 0	50.000000
3 2 1 0 0 100 100 150 50	106.066017
6 1 2 0 0 50 50 100 0 150 0 200 50 250 0	150.000000
2 1 2 0 0 100 0	100.000000

Problem D. Rotation Estimation

Input file: d.in
Output file: d.out
Time limit: 2 seconds
Memory limit: 256 megabytes

Mr. Nod is an astrologist and has defined a new constellation. He took two photos of the constellation to foretell a future of his friend. The constellation consists of n stars. The shape of the constellation in these photos are the same, but the angle of them are different because these photos were taken on a different day. He foretells a future by the difference of the angle of them.

Your job is to write a program to calculate the difference of the angle of two constellation.

Input

The input is given in the following format:

```
n
x1,1 y1,1
...
x1,n y1,n
x2,1 y2,1
...
x2,n y2,n
```

The first line of the input contains a positive integer n ($n \leq 1,000$). The next n lines contain two real numbers $x_{1,i}$ and $y_{1,i}$ ($|x_{1,i}|, |y_{1,i}| \leq 100$), where $(x_{1,i}, y_{1,i})$ denotes the coordinates of the i -th star of the constellation in the first photo. The next n lines contain two real numbers $x_{2,i}$ and $y_{2,i}$ ($|x_{2,i}|, |y_{2,i}| \leq 100$), where $(x_{2,i}, y_{2,i})$ denotes the coordinates of the i -th star of the constellation in the second photo.

Note that the ordering of the stars does *not* matter for the sameness. It is guaranteed that distance between every pair of stars in each photo is larger than 10^{-5} .

Output

You should print a non-negative real number which is the difference of the angle of the constellation in the first photo and in the second photo. The difference should be in radian, and should not be negative. If there are two or more solutions, you should print the smallest one, i.e. your solution should be an angle between 0 and π radians, inclusive. The difference may be printed with any number of digits after decimal point, provided the absolute error does not exceed 10^{-7} .

Example

d.in	d.out
3 0.0 0.0 1.0 1.0 0.0 1.0 3.0 3.0 2.0 2.0 3.0 2.0	3.14159265359

Problem E. Optimal Rest

Input file: `e.in`
Output file: `e.out`
Time limit: 2 seconds
Memory limit: 256 megabytes

Music Macro Language (MML) is a language for textual representation of musical scores. Although there are various dialects of MML, all of them provide a set of commands to describe scores, such as commands for notes, rests, octaves, volumes, and so forth.

In this problem, we focus on rests, i.e. intervals of silence. Each rest command consists of a command specifier 'R' followed by a duration specifier. Each duration specifier is basically one of the following numbers: '1', '2', '4', '8', '16', '32', and '64', where '1' denotes a whole (1), '2' a half (1/2), '4' a quarter (1/4), '8' an eighth (1/8), and so on. This number is called the *base duration*, and optionally followed by one or more dots. The first dot adds the duration by the half of the base duration. For example, '4.' denotes the duration of '4' (a quarter) plus '8' (an eighth, i.e. the half of a quarter), or simply 1.5 times as long as '4'. In other words, 'R4.' is equivalent to 'R4R8'. In case with two or more dots, each extra dot extends the duration by the half of the previous one. Thus '4..' denotes the duration of '4' plus '8' plus '16', '4...' denotes the duration of '4' plus '8' plus '16' plus '32', and so on. The duration extended by dots cannot be shorter than '64'. For example, neither '64.' nor '16...' will be accepted since both of the last dots indicate the half of '64' (i.e. the duration of 1/128).

In this problem, you are required to write a program that finds the shortest expressions equivalent to given sequences of rest commands.

Input

The input consists of a line containing a non-empty sequence of valid rest commands. You may assume that the sequence does not contain more than 100,000 characters.

Output

Your program should output the shortest expression in one line. If there are multiple expressions of the shortest length, output the lexicographically smallest one.

Examples

<code>e.in</code>	<code>e.out</code>
R2R2	R1
R1R2R4R8R16R32R64	R1.....
R1R4R16	R16R1R4

Problem F. Controlled Tournament

Input file: `f.in`
Output file: `f.out`
Time limit: 2 seconds
Memory limit: 256 megabytes

National Association of Tennis is planning to hold a tennis competition among professional players. The competition is going to be a knockout tournament, and you are assigned the task to make the arrangement of players in the tournament.

You are given the detailed report about all participants of the competition. The report contains the results of recent matches between all pairs of the participants. Examining the data, you've noticed that it is only up to the opponent whether one player wins or not.

Since one of your special friends are attending the competition, you want him to get the best prize. So you want to know the possibility where he wins the gold medal. However it is not so easy to figure out because there are many participants. You have decided to write a program which calculates the number of possible arrangements of tournament in which your friend wins the gold medal.

In order to make your trick hidden from everyone, you need to avoid making a factitive tournament tree. So you have to consider only such tournaments that the height of your tournament tree is minimal possible.

Input

The input has the format as described below.

```
N M
R11 R12 ... R1N
R21 R22 ... R2N
...
RN1 RN2 ... RNN
```

N is the number of players ($1 \leq N \leq 16$), and M is your friend's ID (numbered from 1). R_{ij} is the result of a match between the i -th player and the j -th player. When i -th player always wins, $R_{ij} = 1$. Otherwise, $R_{ij} = 0$. It is guaranteed that the matrix is consistent: for all $i \neq j$, $R_{ij} = 0$ if and only if $R_{ji} = 1$. The diagonal elements R_{ii} are just given for convenience and are always 0.

Output

Your program should output in a line the number of possible tournaments in which your friend wins the first prize.

Examples

f.in	f.out
2 1 0 1 0 0	1
2 1 0 0 1 0	0

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f.in	f.out
3 3 0 1 1 0 0 1 0 0 0	0
3 3 0 1 0 0 0 0 1 1 0	3
3 1 0 1 0 0 0 0 1 1 0	0
3 3 0 1 0 0 0 1 1 0 0	1
4 1 0 0 0 1 1 0 0 1 1 1 0 0 0 0 1 0	0
6 4 0 0 0 0 0 1 1 0 1 0 1 0 1 0 0 1 1 0 1 1 0 0 1 0 1 0 0 0 0 0 0 1 1 1 1 0	11
7 2 0 1 0 0 0 1 0 0 0 1 0 1 1 1 1 0 0 1 1 0 0 1 1 0 0 0 1 0 1 0 0 1 0 0 1 0 0 1 0 1 0 0 1 0 1 1 0 1 0	139
8 6 0 0 0 0 1 0 0 0 1 0 1 1 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 0 1 0 1 0 1 0 1 0 0 1 0 1 1 1 0 1 0 0 1 1 1 1 1 0 1 0 0 1 1 1 0 1 0 1 0	78

Problem G. Dendrograms

Input file: `g.in`
Output file: `g.out`
Time limit: 2 seconds
Memory limit: 256 megabytes

Nod Ishimatsu is a student majoring computer science. He has wrote a program that performs hierarchical clustering, for the end-term project in a class of *Introduction to Artificial Intellegence*.

Clustering is the process of grouping a set of objects into subsets called *clusters*, so that each cluster contains those similar in some sense. Hierarchical clustering is a way to do this indirectly; it produces trees (or in this problem collections of trees) called *dendrograms*. A dendrogram represents similarity among objects. The figure below shows an example dendrogram.

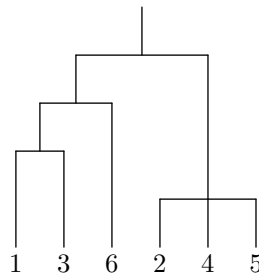


Figure 2: An example dendrogram

Leaves (at the bottom) denote objects. The horizontal lines split the objects into two or more subgroups and indicate objects in different subgroups are less similar than those in the same subgroup. Thus, basically, the upper the line is located, the less similar the objects or the sets of objects connected by it. We can have, for example, three clusters by using the top two horizontal lines.

Nod's program also outputs dendrograms, but it has two problems. Firstly, output dendrograms are sometimes not fully connected, i.e. output can contain multiple trees. We don't deal with this problem here. Secondly, the produced dendrograms are fairly messy. Here is an example:

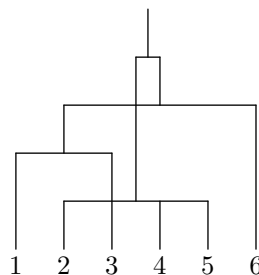


Figure 3: A messy dendrogram

Maybe we want to change the order of the objects and have a clean diagram like the one shown above. Your task is to write a program for this purpose, i.e. reordering the objects for a clean diagram. Here, by *clean diagrams*, we mean those with no crosses of vertical and horizontal lines. There is usually more than one clean diagram; among them your program should pick the one in which the object of the smaller number comes to the left (in a lexicographical manner).

Refer to the sections of Input and Output for the detailed specification.

Input

The input is given in the following format:

```
N M Q
split_info_1
split_info_2
...
split_info_M
query_1
query_2
...
query_Q
```

The first line contains three integers N ($1 \leq N \leq 100\,000$), M ($0 \leq M < N$), and Q ($1 \leq Q \leq 1000$, $Q \leq N$), which represents the numbers of objects, horizontal lines, and queries respectively.

Then M lines follow to describe horizontal lines. Each line is given in the following format:

$Y \ L \ V_1 \ V_2 \ \dots \ V_L$

Y ($0 \leq Y \leq 10^9$) denotes the vertical position of the horizontal line; the smaller value indicates the upper position (or the less similarity). L is the number of vertical lines (i.e. objects or subgroups of objects) connected by the line. V_i (for $1 \leq i \leq L$) indicates each of the vertical lines. Each object is indicated by its identifier, a unique number from 1 to N . Each subgroup of objects is indicated by the identifier of an arbitrary object in the subgroup.

Following the description of horizontal lines, there are Q lines each of which indicates a leaf index at which your program should report which object should be placed. The index is given by a number from 1 (leftmost) to N (rightmost).

Output

Print Q lines where the i -th line indicates the identifier of the object at the i -th queried position.

Examples

g.in	g.out
3 2 3	1
10 2 1 2	2
20 2 3 2	3
1	
2	
3	

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g.in	g.out
5 2 5 10 3 1 2 4 20 3 2 3 5 1 2 3 4 5	1 2 3 5 4
4 1 4 10 2 1 4 1 2 3 4	1 4 2 3
4 3 4 30 2 1 4 20 2 2 4 10 2 3 4 1 2 3 4	1 4 2 3
4 3 4 10 2 1 4 20 2 2 4 30 2 3 4 1 2 3 4	1 2 3 4
4 3 4 10 2 1 2 15 2 1 4 20 2 2 3 1 2 3 4	1 4 2 3
3 2 3 10 2 2 3 20 2 1 2 1 2 3	1 2 3
1 0 1 1	1

Problem H. Ramen Shop

Input file: `h.in`
Output file: `h.out`
Time limit: 2 seconds
Memory limit: 256 megabytes

Ron is a master of a ramen shop.

Recently, he has noticed some customers wait for a long time. This has been caused by lack of seats during lunch time. Customers lose their satisfaction if they wait for a long time, and some of them will even give up waiting and go away. For this reason, he has decided to increase seats in his shop. To determine how many seats are appropriate, he has asked you, an excellent programmer, to write a simulator of customer behavior.

Customers come to his shop in groups, each of which is associated with the following four parameters:

- T_i : when the group comes to the shop
- P_i : number of customers
- W_i : how long the group can wait for their seats
- E_i : how long the group takes for eating

The i -th group comes to the shop with P_i customers together at the time T_i . If P_i successive seats are available at that time, the group takes their seats immediately. Otherwise, they wait for such seats being available. When the group fails to take their seats within the time W_i (inclusive) from their coming and strictly before the closing time, they give up waiting and go away. In addition, if there are other groups waiting, the new group cannot take their seats until the earlier groups are taking seats or going away.

The shop has N counters numbered uniquely from 1 to N . The i -th counter has C_i seats. A group cannot spread over multiple counters. The group prefers “seats with a greater distance to the nearest group.” Precisely, the group takes their seats according to the criteria listed below. For each block of seats of appropriate size within each counter, values S_L and S_R are calculated. Here, S_L denotes the number of successive empty seats on the left side of the group after their seating, and S_R the number on the right side. S_L and S_R are considered to be infinity if there are no other customers on the left side and on the right side respectively. Note that these numbers don’t take into account people in other counters.

1. Prefers seats maximizing $\min\{S_L, S_R\}$.
2. If there are multiple alternatives meeting the first criterion, prefers seats maximizing $\max\{S_L, S_R\}$.
3. If there are still multiple alternatives, prefers the counter of the smallest number.
4. If there are still multiple alternatives, prefers the leftmost seats.

When multiple groups are leaving the shop at the same time and some other group is waiting for available seats, seat assignment for the waiting group should be made after all the finished groups leave the shop. If a customer starts eating, he is allowed to finish even after the shop closes.

Your task is to calculate the average satisfaction over customers. The satisfaction of a customer in the i -th group is given as follows:

- If the group goes away without eating, -1 .

- Otherwise, $(W_i - t_i)/W_i$ where t_i is the actual waiting time for the i -th group (the value ranges between 0 to 1 inclusive).

Input

The input has the following format:

```
N M T
C1 C2 ... CN
T1 P1 W1 E1
T2 P2 W2 E2
...
TM PM WM EM
```

N indicates the number of counters, M indicates the number of groups and T indicates the closing time. The shop always opens at the time 0. All input values are integers.

You can assume that $1 \leq N \leq 100$, $1 \leq M \leq 10000$, $1 \leq T \leq 10^9$, $1 \leq C_i \leq 100$, $0 \leq T_1 < T_2 < \dots < T_M < T$, $1 \leq P_i \leq \max C_i$, $1 \leq W_i \leq 10^9$ and $1 \leq E_i \leq 10^9$.

Output

Output the average satisfaction over all customers in a line. The output value may be printed with an arbitrary number of fractional digits, but may not contain an absolute error greater than 10^{-9} .

Examples

h.in	h.out
1 4 100 7 10 1 50 50 15 2 50 50 25 1 50 50 35 3 50 50	0.7428571428571429
1 2 100 5 30 3 20 50 40 4 40 50	0.4285714285714285
1 2 100 5 49 3 20 50 60 4 50 30	0.5542857142857143
1 2 100 5 50 3 20 50 60 4 50 30	-0.1428571428571428
2 3 100 4 2 10 4 20 20 30 2 20 20 40 4 20 20	0.8000000000000000

Problem I. Cousin's Aunt

Input file: `i.in`
Output file: `i.out`
Time limit: 2 seconds
Memory limit: 256 megabytes

Sarah is a girl who likes reading books.

One day, she wondered about the relationship of a family in a mystery novel. The story said,

- B is A's father's brother's son, and
- C is B's aunt.

Then she asked herself, "So how many degrees of kinship are there between A and C?"

There are two possible relationships between B and C, that is, C is either B's father's sister or B's mother's sister in the story. If C is B's father's sister, C is in the third degree of kinship to A (A's father's sister). On the other hand, if C is B's mother's sister, C is in the fifth degree of kinship to A (A's father's brother's wife's sister).

You are a friend of Sarah's and good at programming. You can help her by writing a general program to calculate the maximum and minimum degrees of kinship between A and C under given relationship.

The relationship of A and C is represented by a sequence of the following basic relations: father, mother, son, daughter, husband, wife, brother, sister, grandfather, grandmother, grandson, granddaughter, uncle, aunt, nephew, and niece. Here are some descriptions about these relations:

- X 's brother is equivalent to X 's father's or mother's son not identical to X .
- X 's grandfather is equivalent to X 's father's or mother's father.
- X 's grandson is equivalent to X 's son's or daughter's son.
- X 's uncle is equivalent to X 's father's or mother's brother.
- X 's nephew is equivalent to X 's brother's or sister's son.
- Similar rules apply to sister, grandmother, granddaughter, aunt and niece.

In this problem, you can assume there are none of the following relations in the family: adoptions, marriages between relatives (i.e. the family tree has no cycles), divorces, remarriages, bigamous marriages and same-sex marriages.

The degree of kinship is defined as follows:

- The distance from X to X 's father, X 's mother, X 's son or X 's daughter is one.
- The distance from X to X 's husband or X 's wife is zero.
- The degree of kinship between X and Y is equal to the shortest distance from X to Y deduced from the above rules.

Input

The input is given by one line in the following format:

`C is A('s relation)*`

Here, *relation* is one of the following: **father**, **mother**, **son**, **daughter**, **husband**, **wife**, **brother**, **sister**, **grandfather**, **grandmother**, **grandson**, **granddaughter**, **uncle**, **aunt**, **nephew**, **niece**. An asterisk denotes zero or more occurrence of portion surrounded by the parentheses. The number of relations is at most ten.

Output

Print a line containing the maximum and minimum degrees of kinship separated by space.

Examples

i.in	i.out
C is A's father's brother's son's aunt	5 3
C is A's mother's brother's son's aunt	5 1
C is A's son's mother's mother's son	2 2
C is A's aunt's niece's aunt's niece	6 0
C is A's father's son's brother	2 0
C is A's son's son's mother	1 1
C is A	0 0

Problem J. Colony Maintenance

Input file: `j.in`
Output file: `j.out`
Time limit: 2 seconds
Memory limit: 256 megabytes

It is the year of 2xxx. Human beings have migrated out of the Earth and resided in space colonies. Because of the severe environment of the space, which comes from cosmic rays and meteorites, those colonies have to be continuously repaired by maintenance robots. In this problem, you are requested to write a program that calculates the shortest distance for a robot to move from the present point to the next repair point on a colony.

Each colony can be modeled as a polycube, that is, one or more cubes of the same size all joined by their faces. Note that, as forming a polycube, all cubes of each colony are connected. This implies every cube has at least one face coincident with a face of another cube, except for colonies with a single cube. The figure below illustrates a couple of example colonies.

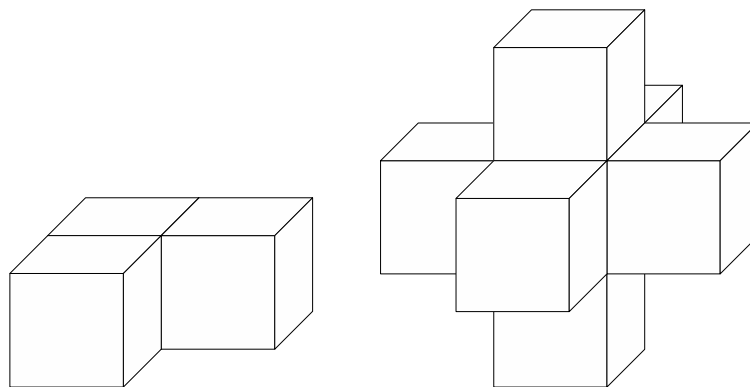


Figure 4: Example colonies

The maintenance robot can move only on the surface of the polycubes, that is, on faces not in common with other cubes. In addition, due to the structure of the colonies, move of the robot beyond a face is restricted to the following cases: (a) the robot is moving between adjacent faces of the same cube; (b) the robot is moving between adjacent faces of adjacent cubes; and (c) the robot is moving along the inner side of an L-shape, namely, the robot is moving between adjacent faces of two cubes that have the common adjacent cube. Here, adjacent faces denote those with the common edge, and adjacent cubes denote those with the common face.

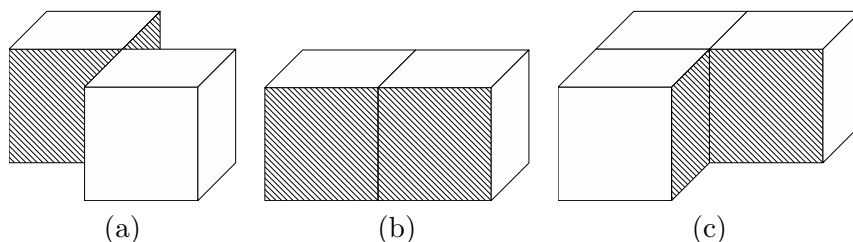


Figure 5: Possible moves

For the purpose of this problem, we consider an xyz -space (i.e. a three-dimensional space with the Cartesian coordinate system) where all cubes are placed in such a way that each edge is parallel to

x -axis, y -axis, or z -axis. Also, the edge length of the cubes is scaled to 100.

Input

The input has the following format:

```
n
x1 y1 z1
...
xn yn zn
sx sy sz dx dy dz
```

n is the number of cubes of a colony ($1 \leq n \leq 16$). (x_i, y_i, z_i) represents the coordinates of the center of the i -th cube, where each coordinate value is guaranteed to be a multiple of 100 (i.e. the edge length of the cubes). (sx, sy, sz) and (dx, dy, dz) represent the robot's present point and the next repair point respectively. You may assume that these two points are always different and that neither of them lies on any edge. All coordinate values are integers between -2000 and 2000 inclusive.

Output

For each dataset, print the distance of the shortest route from the present point to the next repair point. The distance may be printed with any number of digits after the decimal point, provided the absolute error does not exceed 10^{-8} .

Examples

j.in	j.out
1 0 0 0 0 0 50 30 40 50	50.0
1 0 0 0 50 0 0 0 50 0	100.0
2 0 0 0 100 0 0 0 0 50 100 0 50	100.0
3 0 0 0 100 0 0 0 100 0 100 50 0 50 100 0	100.0

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j.in	j.out
7 0 0 0 100 0 0 -100 0 0 0 100 0 0 -100 0 0 0 100 0 0 -100 150 0 0 -150 0 0	416.2277660168
6 0 0 0 100 0 0 0 100 0 100 100 0 0 0 100 100 100 100 100 0 50 0 100 50	141.4213562373
6 0 0 0 100 0 0 0 100 0 100 100 0 0 0 100 100 100 100 100 100 150 0 0 150	316.2277660168
6 0 0 0 100 0 0 0 100 0 100 100 100 100 0 100 0 100 100 0 0 50 100 100 50	341.4213562373
8 0 0 0 -100 0 0 -100 100 0 -100 200 0 0 200 0 100 200 0 100 200 100 100 100 100 0 0 50 100 100 50	341.4213562373

The figure below shows how the robot will move in the last example:

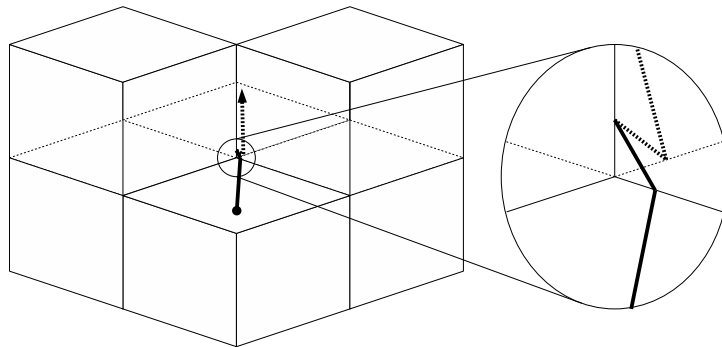


Figure 6: The robot's move in the 6th case