A - Abnormal Server

As you know Amirkabir Local Contest was ruined due to server issues and this is the recontest. After the contest the organizing committee spent a lot of time studying the issues and they found the problem. You may have noticed from previous contest that three different kinds of teams attended the contest, teams that attended onsite, foreign teams and online teams. Each type of teams are served with a different judgehost, so there are three different judgehosts and all of them are on the same server. A judgehost is responsible for the teams of a kind.

The organizing committee found that they have two restrictions for each type of teams. When at most a_1 teams attend onsite, the situation for the onsite judgehost is safe, when the number of onsite teams is in range $[a_1 + 1, a_2]$ it is risky and when more than a_2 teams attend onsite contest the onsite judgehost will crash. In the same way when at most b_1 teams attend the online contest the situation for the online teams' judgehost is safe, when the number of online teams is in range $[b_1 + 1, b_2]$ it is risky and when more than b_2 teams attend online contest the online teams' judgehost will crash. In the same way c_1 and c_2 have been calculated for foreign teams.

They also found that if one judgehost crashes or at least two judgehosts are in risky situation, the server will crash, otherwise if all of the judgehosts are in safe mode the server will be in safe mode too, in other possible cases the server will be in risky mode.

You are given the restrictions and the number of teams in each section, would you please predict what would the situation of the server be during the contest?

Input Format

First line of input contains six integers, a_1, a_2, b_1, b_2, c_1 and c_2, as described in the problem statement.

Second line of input contains three integers, k_1, k_2 and k_3, the number of onsite teams, the number of online teams and the number of foreign teams, respectively.

Constraints

$0 \leq a_1 < a_2 \leq 123$
$0 \leq b_1 < b_2 \leq 456$
$0 \leq c_1 < c_2 \leq 789$
$0 \leq k_1, k_2, k_3 \leq 123{,}456{,}789$

Output Format

Print one line of output containing the situation of the server during the contest. Print "Safe", "Risky" or "Crashed", whatever the situation would be.

Sample Input	Sample Output
5 10 5 10 5 10 5 5 5	Safe
5 10 5 10 5 10 5 5 15	Crashed

B - Balloons

This is the recontest of Amirkabir University of Technology ICPC 2016. After preparing the problems of this contest, the jury estimated $\boldsymbol{K_j}$ balloons would be needed for the j-th problem and they gave these numbers to Amir.

Amir had bought a bag of balloons for the previous contest that contained 10 different colors of balloons. According to Amir's calculations, there were $\boldsymbol{A_i}$ balloons of the i-th color in the bag which $\boldsymbol{B_i}$ of them were used in the first contest and are not usable anymore. Now Amir wants to use the previous balloons for the second contest and buy as few balloons as possible.

As you know he can't use the same color for two different problems in the contest and he can't use two different colors for the same problem either. Though he can reorder the colors of the balloons assigned to the problems completely. For example if red was assigned to the first problem in the previous contest now he can assign it to the third problem.

Amir has given you the data, what is the minimum number of balloons he has to buy?

Input Format

First line of input contains ten space separated integers which describes the number of balloons needed for the problems of the new contest.

Each of the next ten lines contains two integers A_i and B_i, the number of available balloons in the first contest and the number of them which were used in that contest.

Constraints

$0 \leq K_j \leq 100$

$0 \leq B_i \leq A_i \leq 100$

Output Format

Print one line of output containing the minimum number of balloons which have to be bought.

Sample Input	Sample Output
4 4 5 1 6 8 2 3 4 8 3 3 2 1 3 1 7 5 4 1 9 1 1 0 2 2 5 5 7 3	24

C - Minimum Neighbor Method

Minimum Neighbor Method is an encryption method which you can see its definition here. String S is given. In one go, replace each character of S with minimum of its left character, itself and its right character. The first and the last characters remain intact. Character comparison is based on the ASCII values (0...9 < A...Z < a...z). (e.g. minimum(a, Z, 0) = 0, minimum(b, c, a) = a).
For example if S = “AmirKabir2016” then the encryption result will be “AAiKKKab20006”.

As you can see, the Minimum Neighbor Method is not a one-to-one encryption method.
Now for a given string T, we want to know how many different strings S exist that if we apply *Minimum Neighbor Method* on them we would get string T?

Input Format

The only line of input contains a string T.

Constraints

$1 \leq |T| \leq 10{,}000$
The input string contains only alphanumeric characters.

Output Format

Print one line of output which contains the answer modulo 1,000,000,007.

Sample Input	Sample Output
baab	51
BBBAAABBB	58537801

D - Contest Scoreboard

In a programming contest team A gets a higher rank than team B if team A solves more problems than team B, or both solve the same number of problems and team A has less penalty than team B.
Rank of a team T is equal to the number of teams that have been better than team T plus one. Teams are shown according to their rank in scoreboard. If two or more teams have the same rank, they will be sorted alphabetically according to their team names.
Penalty of each team is sum of the penalties they get on each problem. For each problem if they get an AC, the time of their first accept on that problem plus the number of times they have attempted that problem before they get accepted multiplied by 20 will be added to their penalty. For the problems they haven't got accepted, no penalty is added to their total penalty.
As you know every team which gets the first accept of each problem gets a prize of $200. When more than one team get the first accept on a problem, all of them receive $200 (i.e. they solve a problem correctly for the first time at the same time).
Some teams are crazy; they may submit solutions even after they get an AC for a problem. And please note that one team can submit several times in one minute, even for the same problem but you have to calculate the scoreboard regarding the order of submissions. For example if one team gets a WA for problem G, then an AC for the same problem and then another WA for the same problem all in minute 5, only the WA before the AC is calculated in penalty.
You are given the submissions of Amirkabir University of Technology ICPC 2016 contest and you have to calculate the scoreboard and also the prizes.

Input Format

First line of input contains an integer N, the number of submissions.
Each of the next N lines contains description of a submission with the following format:
submissionTime teamName problemId judgeVerdict

Constraints

$1 \leq N \leq 5000$
$1 \leq submissionTime \leq 300$
There are at most 200 teams in the contest.
Team names are strings consisted of alphanumeric characters.
Team names are at most 20 characters long.
*problemId*s are uppercase English letters.
judgeVerdict is one of {"AC", "WA", "TLE", "RJ", "MLE", "CE"}
submissionTime's are in non-decreasing order (look at sample input).

Output Format

Print the scoreboard as follows.

First column is team rank, second column is team name, third column is number of problems solved, fourth column is the penalty, fifth column is the prize they won. You should separate values in a row with a single space.

For more details look closely at sample output.

Sample Input	Sample Output
24 12 PMP C TLE 27 PMP B WA 38 DeadlyArmyofAUT C AC 42 DeadlyArmyofAUT A RJ 67 DeadlyArmyofAUT C WA 71 TeamA D RJ 108 PMP C MLE 111 PMP A RJ 124 Team222 C MLE 139 TeamA C CE 175 DeadlyArmyofAUT B MLE 191 PMP D MLE 205 TeamA D MLE 209 PMP C WA 209 PMP C AC 209 PMP C WA 223 Team222 A RJ 238 Team222 A CE 248 DeadlyArmyofAUT C AC 253 PMP B AC 265 Team222 B WA 280 Team222 A MLE 284 PMP A CE 298 PMP C TLE	1 PMP 2 542 200 2 DeadlyArmyofAUT 1 38 200 3 Team222 0 0 0 3 TeamA 0 0 0

E - Perfect Coverage

As you know we didn't have enough time to come up with a good story for this problem. We could have copied and pasted some info about Amirkabir University of Technology from Wikipedia or just copy and paste some paragraphs of Paulo Coelho's "The Alchemist" and waste your precious time, but we are not that kind of judges. So we will tell you what we want straightly.
We have set S of N closed intervals, and an interval B. A subset of S is perfect if union of its intervals covers B completely. You are given S and B. Your task is to count the number of perfect subsets of S.

Input Format

First line of input contains an integer N, the number of intervals in S. Each of the following N lines contains two integers L_i R_i, the left point and the right point of i-th interval. Last line of input contains two integers L_B R_B, which determines the interval B.

Constraints

$1 \leq N \leq 2000$
$0 \leq L_i \leq R_i \leq 1{,}000{,}000$
$0 \leq L_B \leq R_B \leq 1{,}000{,}000$

Output Format

Print one line of output containing the number of perfect subsets of S. Print your answer modulo 1,000,000,007.

Sample Input	Sample Output
5 0 2 1 3 2 4 3 5 4 6 1 5	13

F - The Circles

A new game has been invented by the judges of this contest. There are P dots and C circles on the plane. MeHdi wants to draw some segments between some points so that one can start from point ***s***, follow some connected straight segments and arrive at point *t* (s ≠ t). Each time a segment touches or cuts a circle's boundary he has to pay the cost of that circle. Given the coordinates of the circles and the points, can you figure out the minimum cost MeHdi has to pay to do this job?
Notice that for any two points P_1 and P_2, he can only draw a straight segment between them and he has to draw only segments that their endpoints are on the given points. Also if he touches or cuts the same circle several times he has to pay the cost of that circle several times.

Input Format

First line of input contains four positive integers C, P, s and t, the number of circles, the number of points, the indexes of starting point and target point, respectively.
Each of the following C lines contains four integers describing a circle in format $X_{ci}\ Y_{ci}\ R_i\ K_i$, the coordinates of its center, its radius and the cost of cutting or touching that circle, respectively.
i-th line of the following P lines contains two integers, the coordinates of the i-th point in format $X_i\ Y_i$.

Constraints

$0 \leq C \leq 25$
$2 \leq P \leq 1000, 1 \leq s, t \leq P$
$1 \leq K_i \leq 1{,}000{,}000$
All coordinates are in range [-1000, 1000].
It is guaranteed that no two points coincide and there is no point on a circle's boundary.

Output Format

Print one line of output containing the minimum cost that MeHdi has to pay.

Sample Input	Sample Output
3 3 1 2 0 2 1 100 3 2 1 1 2 -1 1 1 0 0 0 5 5 0	3

G - Moving Segments

"Would you please tell me what kind of story can I create for this problem? How the hell do I create a story that fits into this problem?" MeHdi said loudly, and I had no answer so I decided to continue writing the statement, by the way this is Poopi.

We have some segments in a 2D environment and each of them is moving in a direction with constant speed. The segments can pass through each other, so when segments collide, their speed or their direction doesn't change.

At a moment in time, two segments are connected if they have at least one common point. A connected component of segments is a maximal subset of segments that one can draw all of them on a paper without lifting the pen (i.e. any two segments in a connected component are connected to each other directly or via other segments of that component). Size of a component is the number of segments in it.

You are given the coordinates of the endpoints of the segments and their velocity. At some moments in time we would have a component with maximum size, can you figure out what would the size of the largest component be?

P.S. MeHdi was right! How can we generate a good enough story for any problem in such a little time?

Input Format

First line of input contains a positive integer N, the number of segments.

Each of the following N lines contains description of a segment in format $X_A\ Y_A\ X_B\ Y_B\ X_V\ Y_V$, coordinates of the segment's endpoints and vector of its speed (velocity), respectively.

Constraints

$1 \leq N \leq 88$

All other values are integers and do not exceed 100,000 by their absolute value.

Output Format

Print one line of output with an integer denoting the size of the largest component.

Sample Input	Sample Output
2 3 3 5 3 0 -1 -3 -1 -3 -2 2 0	2

H - Balanced Sequence

Reza and Dehghan are playing with a balanced sequence of brackets. The sequence of brackets is composed of '{', '}', '[', ']', '(', ')'. To be honest we don't know why they are not playing FIFA17 or World of Warcraft and they have decided to play this nonsense game. We even don't know what the goal of this game is, by "We" I mean Poopi & Me! Reza starts the game and Dehghan continues. In the first round of the game Reza removes one character of the sequence and then Dehghan removes another character from the sequence.

Since we have no idea about the goal of this game, we just want to know in how many ways they can play the first round so that when the round is finished the sequence of brackets remains balanced. Note that the order of deleting characters does not matter for us, we only care about index of deleted characters.

Here is definition of balanced sequence:

- An empty sequence is a balanced sequence.
- If B be a balanced sequence then (B), [B] and {B} are balanced sequences.
- If A and B are balanced sequences then AB is a balanced sequence.

Input Format

First line of input contains a string containing these six characters: '{', '}', '[', ']', '(', ')'.

Constraints

$1 \leq length\ of\ input \leq 100{,}000$

It is guaranteed that input string is a balanced sequence.

Output Format

Print one line of output containing the number of different ways they can delete two characters of the string so that the remaining string is still a balanced sequence.

Sample Input	Sample Output
(((())))	16
()[]{}	3

I - Total Sum

We have a tree (not in the farm but in graph theory). Its vertices are numbered from 1 to n. For vertex *v* and integer *k*, an interesting move is defined as follows. First we set vertex *v* as the root of the tree, and then we start the move from *v*. Each time that we are in a vertex, if it has at least *k* children we will enter it's *k*-th smallest child (by index) but if it has less than *k* children then we will stuck there. So for a vertex *v*, *f(v, k)* is defined as the index of the vertex that we will stuck there, if we select *v* as the root of the tree and start our interesting move from it.
With this explanation of *f(v, k)* would you please calculate this value:

$$\Sigma_{v \in V} \Sigma_{k=1}^{n} f(v,k)$$

Input Format

First line of input contains a positive integer n, the number of vertices of the tree.
Each of the following n-1 lines contains two positive integers x_i and y_i describing an edge of the tree.

Constraints

$1 \leq n \leq 100{,}000$
$1 \leq x_i, y_i \leq n$

Output Format

Print one line of output which contains the answer.

Sample Input	Sample Output
4 1 2 1 3 3 4	43
5 1 5 1 3 2 3 3 4	83

J - Subway System

Poopi is an old man. When he entered university, Tehran's subway had only two lines. Poopi is an emotional person and has a lot of memories from those two lines, so he uses the only two lines from back then! Line one connects the southern part of the city to the northern part of the city and has n stations numbered from 1 to n, and line two connects west to east and has m stations numbered from 1 to m. These two lines have only one intersection which is in the p-th station of the first line and the q-th station of the second line. It means that if you are in line one and you want to change your line you can do that in the p-th station and if you are in line two and you want to change your line you can do that in the q-th station.

Since two different companies have built the two lines of subway, using each one of them has its own cost. If you get in the first line in s-th station and get out in the t-th station it would cost you $|s - t| \times C_1$ and if you get in the second line in s-th station and get out in the t-th station it would cost you $|s - t| \times C_2$. Poopi doesn't know the values of C_1 and C_2 but he knows that they are positive integers.

Poopi gives you the start station, the end station and cost of two journeys that he has had using subway. He also gives you the start station and the end station of his new trip. Can you calculate cost of his new trip?

Input Format

The first line of input contains four integers n, m, p and q, as described in the problem statement.

The next two lines of input each contains information of one of Poopi's previous trips in format $L_S\ S_S\ L_E\ S_E\ k$, which means for a trip from S_S-th station in line L_S to S_E-th station in line L_E, he has to pay k tomans.

In the fourth and final line of input there are four integers $L_a\ S_a\ L_b\ S_b$ which mean Poopi's new trip starts from S_a-th station of line L_a to S_b-th station of line L_b.

Constraints

$1 \leq n, m \leq 100$

$1 \leq p \leq n$

$1 \leq q \leq m$

$1 \leq k \leq 10^7$

It is guaranteed that all line numbers are 1 or 2 and all station numbers are valid (in range [1, n] or [1, m] depending on the line number)

It is guaranteed that start and end stations in each trip are different.

It is guaranteed that there is no inconsistency in the input data.

Output Format

In the first and only line of output print the cost of Poopi's new trip if you can calculate it uniquely according to the input data, and print "can not calculate", otherwise. For more details look at the sample output.

Sample Input	Sample Output
10 7 5 3 1 1 2 1 80 1 1 2 4 60 1 1 2 6	100
10 7 5 3 1 1 1 10 90 1 1 1 2 10 1 1 2 6	can not calculate

K – The Gift!

Last Monday, November 8th, was MeHdi's birthday. Since MeHdi likes intervals a lot, Poopi bought him two closed intervals as his birthday's gift!
Next week, MeHdi is attending a ceremony where everybody brings one of his/her intervals with him/her. The more prime numbers one's interval has the more valuable he/she is in the ceremony. A prime number is an integer greater than 1, whose only two positive integer factors are 1 and itself, e.g. 2, 3, 5, 7, … .
MeHdi wants to take one of these two intervals with him to the ceremony. Which one he has to take with him to be more valuable in the ceremony?

Input Format

First and only line of input contains four positive integers a, b, c and d, which describes the two intervals [a, b] and [c, d].

Constraints

$1 \leq a \leq b \leq 1000$
$1 \leq c \leq d \leq 1000$

Output Format

Print one line of output containing the answer. Print "First" if the first interval contains more primes. Print "Second" if the second interval contains more primes. And if both of them have the same number of primes, print "Any".

Sample Input	Sample Output
1 5 5 10	First
5 10 1 5	Second
7 8 10 11	Any