Задача A. Milkshakes

Имя входного файла:	`milkshakes.in`
Имя выходного файла:	`milkshakes.out`
Ограничение по времени:	1 second
Ограничение по памяти:	64 MB

You own a milkshake shop. There are N different flavors that you can prepare, and each flavor can be prepared `malted` or `unmalted`. So, you can make $2N$ different types of milkshakes.

Each of your customers has a set of milkshake types that they like, and they will be satisfied if you have at least one of those types prepared. At most one of the types a customer likes will be a `malted` flavor.

You want to make N batches of milkshakes, so that:

- There is exactly one batch for each flavor of milkshake, and it is either `malted` or `unmalted`.
- For each customer, you make at least one milkshake type that they like.
- The minimum possible number of batches are `malted`.

Find whether it is possible to satisfy all your customers given these constraints, and if it is, what milkshake types you should make.

If it is possible to satisfy all your customers, there will be only one answer which minimizes the number of `malted` batches.

Формат входного файла

- One line containing an integer C, the number of test cases in the input file.

For each test case, there will be:

- One line containing the integer N, the number of milkshake flavors.
- One line containing the integer M, the number of customers.
- M lines, one for each customer, each containing:
  - An integer $T \geqslant 1$, the number of milkshake types the customer likes, followed by
  - T pairs of integers XY, one for each type the customer likes, where X is the milkshake flavor between 1 and N inclusive, and Y is either 0 to indicate `unmalted`, or 1 to indicated `malted`. Note that:
    - No pair will occur more than once for a single customer.
    - Each customer will have at least one flavor that they like ($T \geqslant 1$).
    - Each customer will like at most one `malted` flavor. (At most one pair for each customer has $Y = 1$).

All of these numbers are separated by single spaces.
$C \leqslant 100$
$1 \leqslant N \leqslant 2\,000$
$1 \leqslant M \leqslant 2\,000$
$\sum_{k=1}^{k=C} M \leqslant 10\,000$
The sum of all the T values for the customers in a test case will not exceed 3000.

Формат выходного файла

- C lines, one for each test case in the order they occur in the input file, each containing the string "Case #X: "where X is the number of the test case, starting from 1, followed by:
  - The string `IMPOSSIBLE`, if the customers' preferences cannot be satisfied; OR
  - N space-separated integers, one for each flavor from 1 to N, which are 0 if the corresponding flavor should be prepared `unmalted`, and 1 if it should be `malted`.

Пример

milkshakes.in	milkshakes.out
2 5 3 1 1 1 2 1 0 2 0 1 5 0 1 2 1 1 0 1 1 1	Case #1: 1 0 0 0 0 Case #2: IMPOSSIBLE

Задача B. Plus minus

Имя входного файла:	`plusminus.in`
Имя выходного файла:	`plusminus.out`
Ограничение по времени:	1 second
Ограничение по памяти:	64 MB

В каждой клетке поля $M \times N$ стоит либо плюс, либо минус. За один ход разрешается поменять знаки на противоположные в любом квадрате 2×2. Можно ли с помощью таких операций получить во всех клетках поля знаки плюс?

Формат входного файла

В первой строке числа M и N ($1 \leqslant N, M \leqslant 1000$). В следующих N строках содержится по M символов `+`, либо `-`.

Формат выходного файла

Ответ на вопрос задачи: слово `Yes` или `No`

Пример

plusminus.in	plusminus.out
3 3 -+- -+- ++-	No
3 3 -+- +++ -+-	Yes

Задача C. Про спрайт

Имя входного файла:	`sprite.in`
Имя выходного файла:	`sprite.out`
Ограничение по времени:	1 second
Ограничение по памяти:	64 MB

8б класс решил на слет взять много Спрайта. Для этого они собрались сконструировать переносной холодильник $a \times b \times c$, который будет вмещать ровно n кубических банок Спрайта размером $1 \times 1 \times 1$ Чтобы лимонад доехал как можно более холодным, они хотят минимизоровать теплопотери; то есть минимизировать площадь поверхности.

Например, если емкость холодильника должна равняться 12, то возможны следующие варианты:

$322 \to 32$
$431 \to 38$
$621 \to 40$
$1211 \to 50$
В этом примере оптимальным является холодильник 322.
Помогите 8б найти оптимальный холодильник в общем случае.

Формат входного файла

Число n ($1 \leqslant n \leqslant 10^6$)

Формат выходного файла

Три числа a, b, c ($1 \leqslant n \leqslant 10^6$) — размеры наилучшего холодильника.
Числа нужно выводить в порядке неубывания.

Пример

sprite.in	sprite.out
12	2 2 3
13	1 1 13
1000000	100 100 100

Задача D. Уникальное число

Имя входного файла:	`unique.in`
Имя выходного файла:	`unique.out`
Ограничение по времени:	1 second
Ограничение по памяти:	64 MB

Дано нечетное количество чисел, из которых все кроме одного разбиваются на пары одинаковых. Найдите единственное число без пары.

Формат входного файла

Число n ($1 \leqslant n \leqslant 10^5$). Далее n целых чисел, по модулю не превосходящие 10^{18}.

Формат выходного файла

Число без пары.

Пример

unique.in	unique.out
7 239 566 470 30 30 239 470	566
1 -30	-30

Задача E. Strange Digits

Имя входного файла:	`digits.in`
Имя выходного файла:	`digits.out`
Ограничение по времени:	2 seconds
Ограничение по памяти:	256 megabytes

In decimal notation we use digits from 0 to 9. If we didn't use some digit, we wouldn't be able to write down some numbers, for example, if we didn't use digit 1, there would be no way to write down number 10. On the other side, if we used more digits than necessary, for example, digit A (with weight equal to 10), there would be several ways to write down the same number. For example, the number 110 could also be written as AA. Similar argument can be applied to notation with any base b.

Consider a notation with base b and digits $c_1, c_2, \ldots, c_k$ chosen from the set $\{0, 1, \ldots, 9, A, B, \ldots, Z\}$ (the weights of digits 0 through 9 are equal to their ordinary weights, the weight of A is 10, the weight of B is 11, etc, the weight of Z is 35). You are given a number n. Find out whether you can write it down in the notation with base b using only given digits, and whether there is a unique way to do so.

Формат входного файла

The first line of the input file contains b ($2 \leqslant b \leqslant 36$). The second line of the input file contains $c_1, c_2, \ldots, c_k$ in the increasing order without spaces ($1 \leqslant k \leqslant 36$, $c_1 = 0$). The third line contains n ($1 \leqslant n \leqslant 10^{100}$), it is presented in ordinary decimal notation.

Формат выходного файла

If it is impossible to write down n in the described way, output "`Impossible`" at the first line of the output file.

If there is a unique way to write down n in the described way, output "`Unique`" at the first line of the output file. In this case print the presentation of n in the described notation at the second line.

If there are several ways to write down n in the described way, output "`Ambiguous`" at the first line of the output file. Print any presentation of n in the described notation at the second line.

Примеры

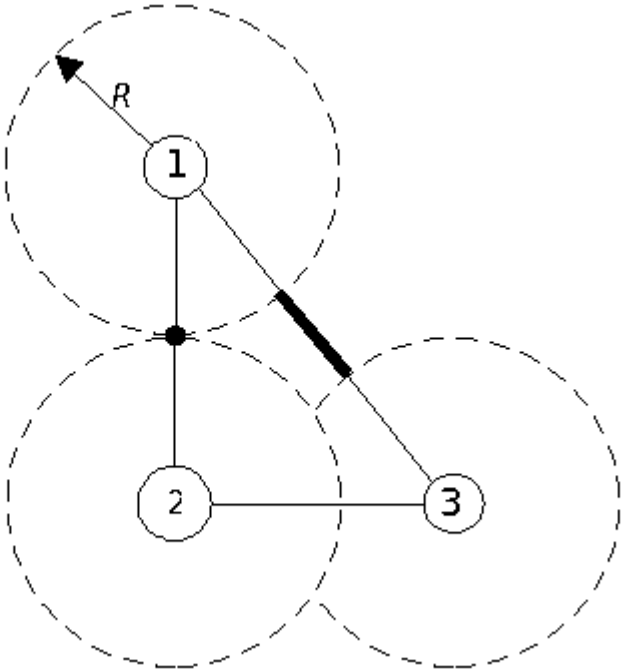
digits.in	digits.out
10 0123456789A 110	Ambiguous AA
10 023456789 10	Impossible
10 023456789A 10	Unique A

Задача F. Fire Station Building

Имя входного файла:	`fire.in`
Имя выходного файла:	`fire.out`
Ограничение по времени:	2 seconds
Ограничение по памяти:	256 Mebibytes

There is a country with N cities connected by M bidirectional roads, and you need to build a fire station somewhere. Of course, your problem would be too simple without the following restrictions:

- Firemen should be able to reach any city from fire station by roads only.
- You want to minimize expected distance from fire station to place of fire. For this purpose, probability of a fire is given to you for every city. Assume that firemen always choose the shortest way to fire.
- You can place fire station not only in cities but on the roads between them as well. Moreover, sanity regulations of the country forbid placement of a fire station closer than at a distance R from cities. Distances are measured on roads only, so you can place fire station on a road if its length is not less than $2R$, and you should not worry about distances to cities not adjacent to the given road. In particular, $R = 0$ means that you are allowed to place a fire station in cities.



Example of a country with three cities and three roads. Places where you can build fire station are marked with bold line and bold dot.

You are given a complete description of the country. Find the best place for a fire station in it.

Формат входного файла

The first line of input file contains integer numbers N, M and R ($1 \leqslant N \leqslant 100$, $0 \leqslant M \leqslant N(N-1)/2$, $0 \leqslant R \leqslant 10^4$). Second line contains N integer numbers — probabilities of a fire in each city. Numbers are non-negative integers given in hundredths of percent (that is, sum to 10^4). Each of the next M lines contains description of one road, namely three integer numbers A_i, B_i and L_i — endpoints of the road and its length in kilometers ($1 \leqslant A_i < B_i \leqslant N$, $1 \leqslant L_i \leqslant 10^4$). There can be at most one road between any two cities.

Формат выходного файла

Output only one number — expected length of a way to fire in kilometers assuming fire station is built optimally. This number should be precise up to 1 meter. If by some reason it is impossible to build fire station that fulfills all the requirements, write to the output file number -1 instead.

Примеры

fire.in	fire.out
3 3 20 3000 5000 2000 1 2 40 1 3 50 2 3 30	26.00000
3 1 20 3000 5000 2000 1 3 50	-1

In the first example (which corresponds to the picture above) it is optimal to build fire station in the middle of the first road. In the second example it is impossible to build fire station satisfying all the requirements. In particular, any fire station on the map will violate requirement one (since the country is disconnected).