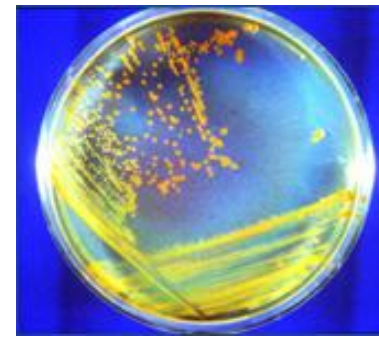

An experiment is being conducted to find out how different colonies of bacteria behave when they collide with each other. The individual colonies are placed on a large dish and the dish can be modeled in a 2D plane. Initially, each colony occupies a rectangular area (sides parallel to axis) and the sizes of these colonies grow with time. The growth of the colonies occurs in the following manner:

1. The x and y coordinate of the lower-left corner decrease.
2. The x coordinate of lower-right corner increases and the y coordinate decreases.
3. The x and y coordinate of upper-right corner increase.
4. The x coordinate of upper-left corner decreases and the y coordinate increases.

All the increments/decrements mentioned above occur at a constant rate r with respect to time. In this problem, you have to determine the smallest unit of time that elapses when there are at least two colonies that are not more than d distance apart. Here the distance refers to the shortest Euclidean distance between the rectangular areas occupied by the colonies.

Input

The first line of input will contain T (≤ 100) denoting the number of cases.

Each case starts with an integer n ($2 \leq n \leq 50$) denoting the number of colonies. Each of the next n lines contains 4 integers x_1 y_1 x_2 y_2 ($0 \leq x_1, y_1, x_2, y_2 \leq 10000$, $x_1 < x_2$, $y_1 < y_2$) where (x_1, y_1) and (x_2, y_2) denote the lower-left and upper-right corner of the colony respectively. Next line contains two integers, r and d ($1 \leq r, d \leq 50$).

Output

For each case, print the case number and the desired result rounded to 3 places after the decimal point. If two colonies overlap or just touch each other, they are considered to be zero distance apart.

Sample Input

```
2
2
0 0 1 1
3 0 4 1
1 1
2
0 0 1 1
0 1 3 2
1 1
```

Sample Output

```
Case 1: 0.500
Case 2: 0.000
```