Distillation

SEASON 10 - SECOND ROUND

Raya appreciates good whiskey very much. She has gathered information about **N** small distilleries, numbered from 1 to N, and wants to invest money in one of them. The process of making whiskey is complicated, but we can consider it simply in two phases:

1. First the barley and malt are roasted and left to ferment to obtain a liquor, which is then distilled and turned into whiskey.

2. After that the whiskey is left to age - the longer it ages, the better its quality is at the end of the process.

The second phase can't begin before the first one is finished, i.e. first some amount of whiskey is produced, then it's left in barrels to age and no more whiskey is produced after that.

Raya is looking very strictly after the quality of the whiskey, therefore she measures it with numbers. For the i-th distillery she has written down 4 real numbers A_i, B_i, C_i and D_i, for which the following conditions hold:

1. The distillery need A_i days for maintenance before it can start producing whiskey.

2. During the first phase the distillery will produce B_i liters of whiskey with quality C_i every day.

3. During the second phase the quality of the whiskey will increase with D_i units per day. The quality of the whiskey doesn't change before the start of the second phase.

Raya wants you to help her decide in which distillery to invest by answering **Q** questions of the following type: What is the maximum value of quantity (in liters) multiplied by quality, that one distillery can achieve for **T** days, if every distillery allocates the time optimally for itself, and which is the distillery that achieves the best result? Please note that T is not necessarily an integer and that both phases of making whiskey proceed evenly, i.e. if a distillery produces B liters per day, it will produce for example $\frac{B}{2}$ liters for half a day and if the quality of the whiskey improves with D units per day, it will improve with $\frac{D}{2}$ units for half a day.

Input (distillation.in)

The first line of the input contains the integer **N** - the number of distilleries. Each of the following N lines contain 4 real numbers A_i, B_i, C_i and D_i - the number Raya has written down for the i-th distillery. The next line contains the integer **Q** - the number of questions you have to answer. Each of the following Q lines contains a number T_j - the number of days for the j-th question.

Output (distillation.out)

For each question output on a separate line two numbers, separated by a single space. The first number should be equal to the greatest possible product of quality and quantity one distillery can achieve and the second number should be the index of the distillery that can achieve this product. If there are two or more such distilleries, output the smallest index of one of them. The first number will be considered correct if the absolute difference between it and the author's answer is not greater than 10^{-5}.

Constraints

$1 \le N, Q \le 100\,000$
$0 \le A_i, C_i \le 1\,000$
$0 < B_i, D_i, T_j \le 1\,000$
A_i, B_i, C_i, D_i and T_j are given with no more than 5 digits after the decimal point.

Example

Input

```
2
3 2.5 1.5 2
1 1.25 0 1.25
3
2
3.5
6
```

Output

```
0.390625 2
2.441406 2
17.578125 1
```