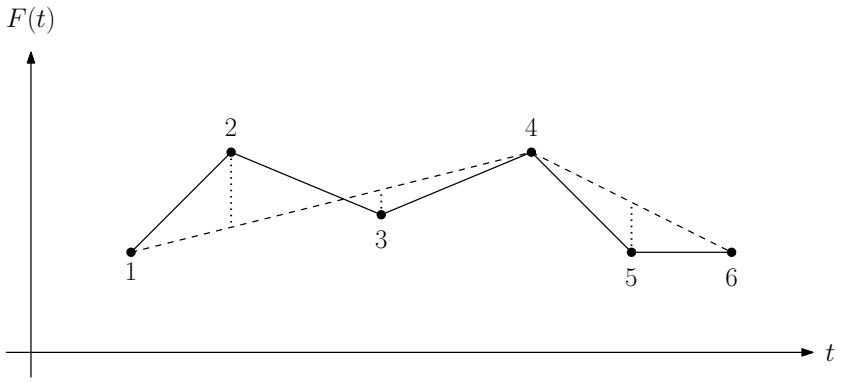
Problem C : Simplification

Amin records the price of his stock every now and then as a data point (t_i, p_i) in his notebook, where p_i is the price of his stock at day t_i. The sequence of these data points represents a piecewise-linear function F displaying the history of prices over a period of time. Indeed, F connects every pair of consecutive points by a straight line segment. If the price is not recorded for some day t, $F(t)$ can be used as an estimate instead.

His collected data is getting larger and larger as he has been tracking the price of his stock over a long period of time. Therefore, he has decided to reduce his data by throwing away some of his recoded data points and constructing a new piecewise-linear function F' with the remaining points. F' is a so-called "simplification" of F. Amin wants to create the simplification in such a way that F' is a good approximation for F. To this end, he has defined an error measure as follows.

Let F be defined over a strictly increasing sequence $L = \langle t_1, \ldots, t_n \rangle$ of days, and F' be defined over a subsequence $L' = \langle t'_1, \ldots, t'_m \rangle$ of L, where $t'_1 = t_1$, $t'_m = t_n$, and $F'(t'_i) = F(t'_i)$ for $1 \leqslant i \leqslant m$. (We call m the size of F'.) The error of F' is defined as the maximum of $|F'(t_k) - F(t_k)|$ for all $1 \leqslant k \leqslant n$. For example, in the following figure, we have 6 data points, labeled 1 through 6, whose coordinates are the same as those presented in the second sample input, and F' is a simplification of F of size 3 with data points 1, 4 and 6. In this figure, F is depicted by solid lines, and F' by dashed lines. The error measure for F' is realized by the vertical distance of point 2 to F'.



Amin's goal is to minimize the size of F', while the error of F' is bounded by a given value δ.

Input

The first line of input contains a positive integer n ($2 \leqslant n \leqslant 2000$) that shows the size of F. Each of the next n lines contains two integers t_i, p_i ($1 \leqslant t_i, p_i \leqslant 10^6$), where p_i is the price of the stock at day t_i. The last line contains the error limit δ which is a non-negative integer at most 10^6.

Output

In the output, print the minimum possible size of F'.

Example

Standard Input	Standard Output
3 1 10 3 100 10 20 90	2

Standard Input	Standard Output
6 10 10 20 20 35 14 50 20 60 10 70 10 8	3