Sequences

SEASON 8 – FOURTH ROUND

Tsveti like playing with number and sequences of numbers. Now she has two infinitely long sequences of whole numbers. She constructed a new sequence which consists of the numbers in these two but sorted. After that she wondered which is the n-th number in this new sequence. In fact, Tsveti doesn't have only two sequences, but actually many such pairs and she is asking such a question for each pair.

The sequences aren't just any sequences (how would we store infinite sequences), but are actually the results of calculating $x^2 + bx + c$ for each whole $x \geq s$, meaning that each sequences is described by three numbers – b, c and s and each query – by 7 numbers (the parameters of the two sequences and n).

Help Tsveti by writing a program which accepts a number of queries of the type described above and for each answers which the n-th number in the sequence made of the other two is.

Input

From the first line of the file `sequences.in` one number Q is inputted – the number of queries. From each of the next Q lines 7 numbers are inputted – b_1, c_1, s_1, b_2, c_2, s_2 and n.

Output

In the output file `sequences.out` print the answers to the queries on a separate lines.

Constraints

$1 \leq Q \leq 4 \times 10^4$
$0 \leq b_1, b_2, s_1, s_2 \leq 10^9$
$-10^{12} \leq c_1, c_2 \leq 10^{12}$
$1 \leq n \leq 10^9$

Time limit: 1 sec
Memory limit: 256 MB

Sample test

Input (sequences.in)	Output (sequences.out)
2 0 1 1 1 0 2 3 2 -2 0 1 1 0 4	6 3

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Explanation of the sample test

In the first query the first few numbers in the constructed sequence are: $2, 5, 6, 10, 12$.

In the second one the first few numbers are: $-2, 1, 1, 3, 6, 7$.