Problem G. Game Manipulation

Input file:	*standard input*
Output file:	*standard output*
Time limit:	1 second
Memory limit:	1024 mebibytes

Are you tired of solving all the problems about boring two-player games in programming competitions? Don't worry, this time, Teacher Chou and Teacher Tseng are playing one that is actually fun!

The game is played on a long whiteboard. Initially, N numbers $a_1, \ldots, a_N$ between L and R are written on it. The two teachers take turns making moves, with Teacher Chou starting first. In each turn, the player can "collect" an integer x currently written on the whiteboard. Then, he needs to remove the integer x he chose from the whiteboard and replace every remaining integer with their absolute difference with x. In other words, each integer y is replaced by $|x - y|$. Note that if there are multiple integers on the whiteboard equal to x, then only one will be removed and the others will be replaced by zeroes.

The game will end in N rounds when all the integers on the whiteboard are removed. At this point, the two teachers will calculate the sum of the integers that each of them collected throughout the game. Naturally, the goal of Teacher Chou is to maximize the difference between his sum and Teacher Tseng's, and vice versa. Equivalently, since their objectives sum up to zero, they define the score of a game to be Teacher Chou's sum minus Teacher Tseng's sum, and Teacher Chou wants to maximize the score while Teacher Tseng wants to minimize it.

In the beginning, the game was only meant as a fun event between the two teachers to kill time after they solve everything in an online contest with more than an hour to spare. However, due to the fame of the teachers and the fact that the game is just too fun to play and watch, the gameplay between them has become progressively more popular, and people even start betting on their results.

You are a student of the teachers and thus they always ask you to set up the games by writing down the initial N numbers before they start playing. Taking advantage of their trust, you want to make a profit from the games by manipulating their outcomes. You already know that, as the teachers are extraordinarily smart, they will always make optimal moves to maximize their respective objectives. You have also chosen to bet on C as the final score of the game. Now, to make the result go your way, you plan to secretly change some numbers on the initial whiteboard before the teachers arrive. Obviously, the new numbers you put can only be integers from L to R, otherwise the teachers would immediately spot it. You also want to make as few changes as possible to reduce the risk of being caught.

What is the minimum number of integers you need to change on the initial whiteboard so that the final score of the game becomes your bet, C?

Input

The first line contains the number of test cases T.

Each test case is described by two lines of input. The first line contains four integers, N, L, R, and C, separated by spaces ($1 \le N \le 10^6$; $1 \le L \le R \le 10^9$; $|C| \le 10^{18}$). The second line contains N integers $a_1, \ldots, a_N$ ($L \le a_i \le R$).

The sum of N in all test cases does not exceed 10^6.

Output

For each test case, output a line with a single integer: the minimum number of changes needed to make the final score of the game become C. If it is impossible to do so, output -1 instead.

Example

standard input	*standard output*
5 1 1 2 1 2 5 1 3 1 1 1 1 1 1 5 1 4 1 1 1 2 3 4 5 1 4 3 1 1 2 3 4 6 1 3 4 1 1 2 2 3 3	1 0 1 1 -1