Problem E. Ear Teleportation

Input file:	*standard input*
Output file:	*standard output*
Time limit:	3 seconds
Memory limit:	256 mebibytes

Rabbit loves to move around a magical labyrinth. The labyrinth has N rooms. In every room, a picture of a rabbit is drawn on the floor. When Rabbit steps on the right ear or the left ear of the rabbit in this picture, he is teleported to one of the N rooms.

Cat controls the teleportation system. For each ear in each picture, she chooses one of the N rooms as the destination of the teleportation. Note that the destination can be the same room as the room where the picture is located.

Among the N^{2N} possible configurations of the teleporation system, Cat is interested in ones satisfying the following condition: For any room r, if Rabbit starts at room r, and steps on the right ear of the picture in his current room X times, steps on the left ear once, steps on the right ear Y times, steps on the left ear once, steps on the right ear Z times, then he will be in the room r. Write a program that finds the number of such configurations, modulo 1 000 000 007.

Input

The input is given in the following format:

$N\ X\ Y\ Z$

The first line contains four integers N, X, Y and Z ($1 \le N \le 1\,000$, $0 \le X \le 10^{18}$, $0 \le Y \le 10^{18}$, $0 \le Z \le 10^{18}$).

Output

Your program should output an integer: the number of configurations satisfying the condition, modulo 1 000 000 007.

Examples

standard input	standard output
3 1 0 1	18
5 8 5 8	120