Online Median

Let us define :

F[1] = 1

F[i] = (a*M[i] + b*i + c)%1000000007 for i > 1

where M[i] is the median of the array {F[1],F[2],..,F[i-1]}.

The median of an array is the middle element of that array when it is sorted. If there are even number of elements in the array, we choose the first of the middle two elements to be the median.

Given a,b,c and n, calculate the sum F[1] + F[2] + .. + F[n].

Input Format

The first line contains T the number of test cases. Each of the next T lines contains 4 integers : a, b, c and n.

Output Format

Output T lines, one for each test case, containing the required sum.

Constraints

1 <= T <= 100

0 <= a,b,c < 1000000007

1 <= n <= 200000

Example

Sample Input

2

1 0 0 3

3 1 2 6

Sample Output

3

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