Generalized Fibonacci

In this problem, we generalize the fibonacci sequence.

$G[n] = a*G[n-1] + b*G[n-2] + c$

where a,b,c are constants given in input. Also

G[1] = 1

G[2]=1

You need to evaluate the nth number module m in the generalized Fibonacci sequence where m is given in input.

Input

1st line contains number of test cases t. Each of the next t subsequent lines contain a,b,c,n and m.

t<=1000

0<=a,b,c<=1e9,

1<=m<=1e9,

1<=n<=1e18

Output

Print answer for each test case on a separate line.

Example

Input:
1

1 1 0 3 5

Output:
2