



2347 - A General Recurrence Relation

Asia - Dhaka - 2001/2002

Consider the following recurrence relation defined on nonnegative integral values of n :

$$F(n) = \begin{cases} f_0, & \text{if } n = 0 \\ f_1, & \text{if } n = 1 \\ a \times F(n-1) + b \times F(n-2), & \text{otherwise} \end{cases}$$

Here a and b are constants such that the following two conditions are satisfied:

$$\begin{aligned} (1) \quad & a^2 + 4b > 0 \\ (2) \quad & |a - \sqrt{a^2 + 4b}| \leq 2 \end{aligned}$$

Given the values of f_0, f_1, a, b and n , your job is to write a program that calculates the value of $F(n)$. You may safely assume that $F(n)$ will be an integer with absolute value not exceeding 10^9 .

Input

The first line of the input file contains an integer N ($1 \leq N \leq 10,000$) denoting the number of test cases to follow.

Each of the following N lines contains five (5) values in the following order: f_0, f_1, a, b and n . Here, f_0 and f_1 are integers with absolute values not exceeding 10^9 , and n is a nonnegative integer not greater than. On the other hand, a and b are floating-point numbers satisfying the two conditions stated in the problem description. Be assured that $|a|, |b| \leq 10^6$.

Output

For each test case in the input file print a separate line containing the value of $F(n)$.

Sample Input

```
3
0 1 1 1 20
0 1 -1 0 1000000000
-1 1 4 -3 18
```

Sample Output

6765
-1
387420487

Dhaka 2001-2002