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

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

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

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

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
```