Extremely Lagged Fibonacci

Let $(\ a_i\ )_{i=0}^\infty$ be the integer sequence such that: $$a_n = \begin{cases} 0 & (0 \le n < k - 1) \\ 1 & (n = k - 1)\\ b \cdot a_{n-j} + c \cdot a_{n-k} & (n \ge k) \end{cases}, $$ where j, k, b and c is integer.

For each n, j, k, b and c, find a_n **modulo** $1\,000\,000\,037$.

Input

The first line contains T, the number of test cases.

Each of the next T lines contains five integers n, j, k, b and c.

Output

For each test case, print a_n **modulo** $1\,000\,000\,037$.

Constraints

- $1 \le T \le 10^2$
- $0 \le n \le 10^9$
- $10^5 \le k \le 10^8$, $1 \le j < k$
- $1 \le b \le 10^9$, $1 \le c \le 10^9$

Example

Input:
2
1000000 1 100000 1 1
1000000000 1 100000000 1 1

Output:
372786243
994974348