Problem G. Generate, Sort and Search

Input: Standard
Output: Standard
Author(s):   Hugo Humberto Morales Peña - UTP Colombia

We have the following recursive function:

$f(1) = x$
$f(n) = (a \cdot f(n-1) + c) \ mod \ m$, with $n \geq 2$, $n \in \mathbb{Z}^+$

Remember that the operation *mod* calculates the remainder of the integer division.

With the previous recursive function you should generate a sequence containing the first n elements, which are: $f(1)$, $f(2)$, $f(3)$, $f(4)$, ..., $f(n)$. Then, you should sort those numbers in ascending order (with respect to its value), so you can tell which number is located in the ith position of the sorted sequence.

Input

There are several test cases. The first line of each test case has six integer numbers: a, c, m, x, q, n separated by spaces ($2 \leq a < m$, $0 \leq c < m$, $3 \leq m \leq 10^3$, $0 \leq x < m$, $1 \leq q \leq 10^4$, $1 \leq n \leq 10^8$). The remaining lines of each test case have q integer numbers. Each one corresponds to the position in the sorted sequence whose value wants to be known.

Output

For each query you should print a single line containing the integer number in the ith position of the sorted sequence.

Example

Input	Output
7 4 9 3 5 10	1
2	8
10	2
3	7
9	3
4	

Use fast I/O methods