Problem 1: Recursion in the International Math Olympiad!

Problem Number: P1

In 2017, one of the problems in the prestigious International Math Olympiad had the following recurrence relation:

$$a_{n+1} = \begin{cases} \sqrt{a_n}\ if\ \sqrt{a_n}\ is\ an\ integer \\ a_n + 3\ otherwise \end{cases}$$

They had to find all values of $a_0 > 1$ such that the sequence eventually becomes cyclic.

Your problem however, is to simply give a_n given $a_0$and n.

Input:

The input stars with one line $t \leq 100$, denoting the number of test cases.

For each test case, there are two integers $0 \leq a_0, n \leq 10^6$.

Output:

For each test case, output a_n

Sample Input	Sample Output
1 1 100 2 5	1 17

Note: You do not have to use recursion as a solution, but using recursion works.

Problem 2: Cell Multiplication

Problem Number: P2

The cells in the superhuman body multiply over time. Let w_t, r_t, s_t be the number of white blood cells, red blood cells, and supercells at time t.

Scientists have recently discovered that there is a relationship between the cells, in that we have the following system of equations:

$$\begin{cases} w_{t+1} = w_t + s_t \\ r_{t+1} = r_t + 2w_t + 2s_t \\ s_{t+1} = 3s_t + 3r_t + 3w_t \end{cases}$$

The superhuman cells grow very fast, but fortunately, there is enough space in a superhuman body to have enough space.

Your task as AMC125 students is to find the number of each cell there is at time t modulo 100, since the number of cells may be too big after a while.

Input:

The input stars with one line $n \leq 100$, denoting the number of test cases.

For each test case, there is are four integers $0 \leq t, w_0, r_0, s_0 \leq 10^9$.

Output:

For each test case, output the number of white blood cells, red blood cells, and supercells at time t.

Sample Input	Sample Output
1 1 1 1 1	2 5 9