7914 Notes and GPS Chips

Suryansh, a nanophysics enthusiast, is studying about the GPS Chips present in the newly released Rs. 2000 note. After careful analysis, he has come to know that the GPS chips contain nanoparticles! In fact, there are 2 types of GPS Chips:

1. **Square Shaped:** These chips contain **square-shaped** nanoparticles. A square-shaped GPS Chip of size $Z \times Z$ contains Z^2 nanoparticles. See Figure 1 for a 4×4 sized square shaped chip.
2. **Hexagonal Beehive Shaped:** These chips contain **hexagon-shaped** nanoparticles arranged like a beehive. From nanoscopic analysis information, we know that the chip is divided into levels with **a hole in the middle**. The size of chip is defined as the number of layers it possesses where 1st level contains 6 nanoparticles, 2nd level contains 12 nanoparticles, ..., and so on. Hence, a chip of size 1 has 6 nanoparticles, a chip of size 2 has 18 nanoparticles (See Figure 2 for clarity), and so on.

Suryansh wishes to create his own Rs. 2000 note for experimental purposes, for which he needs to buy GPS Chips. From the popular Netcoin Shopping Website, he comes to know that for Z **Netcoins** he can either purchase a square-shaped chip of size $Z \times Z$ or a hexagon-shaped chip of size Z. For example, with 2 **Netcoins**, he can either buy square-shaped chip containing 4 nanoparticles or hexagon-shaped chip containing 18 nanoparticles.

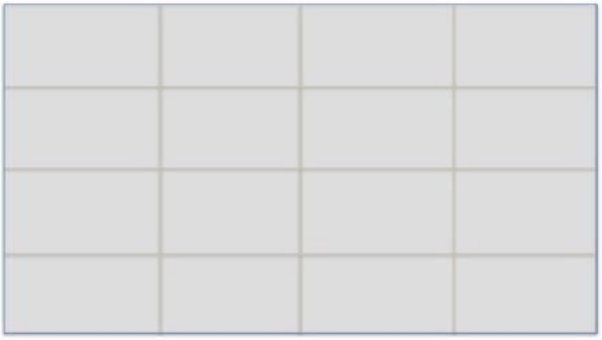

Figure 1: Square shaped chip of size 4×4.

Suryansh currently has N **Netcoins** which he wants to spend **entirely**. He needs to purchase exactly A square-shaped chips and B hexagon-shaped chips using his entire amout of N Netcoins. He wants to create this new note using all of these $A + B$ GPS Chips.

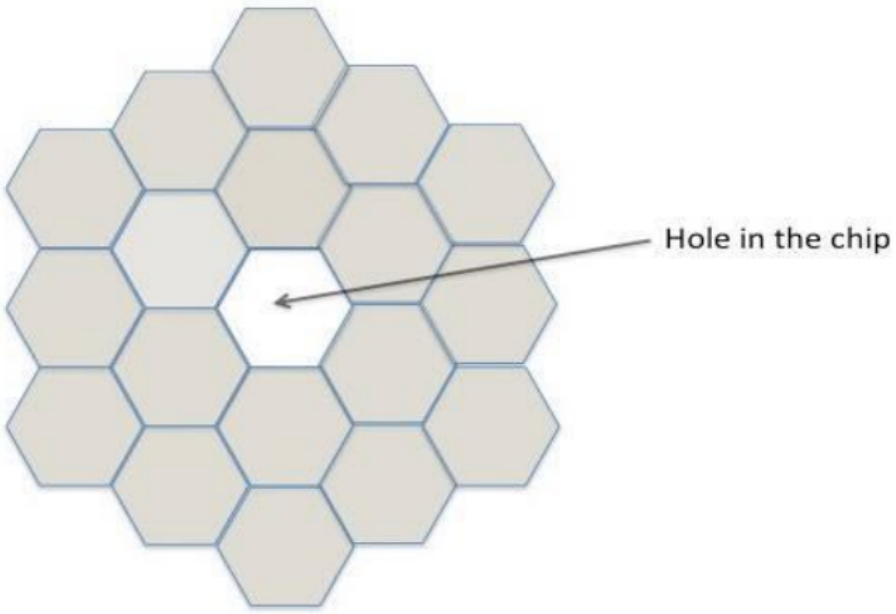

Figure 2: Hexagonal shaped chip of size 2.

Suryansh denoted the number of nanoparticles in the i-th chip that he bought as p_i. He knew that if he decides to buy chips such that they have $p_1, p_2, \ldots, p_{A+B}$ nanoparticles respectively, his new note will have signal level of: $p_1 * p_2 * p_3 * \cdots * p_{A+B}$. He calls this the sequence $p_1, p_2, \ldots, p_{A+B}$ a configuration.

Help him find **sum** of signal levels of all possible configurations **modulo 1234567891**. Two configurations are different if any of the p_i is different.

Input

First line contains a single integer T — the number of testcases.

T testcases follow which have the following format:

A single line of input contains 3 space-separated integers A, B and N, denoting the number of square-shaped chips, number of hexagonal beehive shaped chips and number of netcoins.

Output

For each testcase, print the sum of signal levels of all possible configurations modulo 1234567891.

Constraints

- $1 \leq T \leq 10$
- $1 \leq A, B \leq 10^5$
- $1 \leq N \leq 10^9$

Explanation:

Testcase 1:

$A = 1, B = 1, N = 3$.

Since N Netcoins have to be spent entirely, the only 2 ways in which chips can be bought are:

1. 1 square-shaped chip of size 2×2 and 1 hexagon-shaped chip of size 1 are bought. $p_1 = 4$, $p_2 = 6$. Signal Level$_1$ $= 4 * 6 = 24$
2. 1 square-shaped chip of size 1×1 and 1 hexagon-shaped chip that has levels uptil level 2 are bought. $p_1 = 1$, $p_2 = 18$. Signal Level$_2$ $= 1 * 18 = 18$

Testcase 2:

$A = 2, B = 1, N = 4$.

Let the 2 square-shaped chips be S_1 and S_2 respectively. Let the 1 hexagon-shaped chip be H_1. The ways in which the chips can be bought are:

- $S1 = 1, S2 = 1, H1 = 2 \Rightarrow$ Signal Level$_1$ $= 1 * 1 * 18 = 18$
- $S1 = 1, S2 = 2, H1 = 1 \Rightarrow$ Signal Level$_2$ $= 1 * 4 * 6 = 24$
- $S1 = 2, S2 = 1, H1 = 1 \Rightarrow$ Signal Level$_3$ $= 4 * 1 * 6 = 24$

Sum of signal levels = 18 + 24 + 24 = 66.

Sample Input

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2
1 1 3
2 1 4
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Sample Output

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42
66
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