FiberNazi Numbers

Problem code: BYCO17H

SUCCESSFUL SUBMISSIONS ⊞

You are given **m** ranges, $[a_i, b_i]$. From each range you need to pick a number k_i such that the minimum distance ***l*** between any two such k_i and k_j is maximum. Once you determine ***l***, you need to maximize **G(*x*)** for a given ***x*** which is defined as:

$$G(x) = k_{j1}G(x-1) + k_{j2}G(x-2) + k_{j3}G(x-3) + ... + k_{jm}G(x-m)$$

The k_{j1}, k_{j2} **...** in the above expression are chosen by you, subject to the constraint that the minimum distance between any two of them is ***l*** (determined by you earlier). They needn't be in the same order as the given ranges. Note that **G(1), G(2),...G(m)** are all given to be **1**.

Input

- The first line of the input contains an integer **T** denoting the number of test cases. The description of **T** test cases follows.
- The first line of each test case contains a single integer **m** denoting the number of ranges. The second line contains **m** space-separated integers a_1, a_2, ..., a_m denoting the start of each of the range. The third line contains **m** space-separated integers b_1, b_2, ..., b_m denoting the end of each of the range.
- The fourth line contains ***x***.

Output

- For each test case, output a single line containing 2 space separated integers ***l*** and the maximum value of **G(*x*) mod 10^9+7**.

Constraints

- $1 \le T \le 10$
- $1 \le m \le 10$
- $0 \le a_i \le b_i \le 10^6$
- $1 \le x \le 10^6$

Example

Input:
2
2
1 1
1 1
20
2
0 0
2 2
10

Output:
0 6765
2 256

Explanation

Example case 1. Here **m=2**, so our **G(*x*)** is a second order recursive function. The ranges of the parameters given are **[1,1]** and **[1,1]**, so we don't have much of a choice, and both parameters have to be **1**. Therefore **G(x) = 1.G(x-1) + 1.G(x-2)**. Since **x=20**, we have **G(20)** is the 20th Fibonacci number (starting the numbers from 1,1,2... instead of 0,1,1,2...)

Example case 2. Here **m=2** again, so our **G(*x*)** is again a second order recursive function. The ranges of the parameters given are **[0,2]** and **[0,2]**, so we can only have our parameters as **0** and **2**. Therefore **G(x)** can be **G(x) = 0.G(x-1) + 2.G(x-2)** or **G(x) = 2.G(x-1) + 0.G(x-2)**. But since we want to maximize **G(x)**, we'll choose the latter. Since **x=10**, we have **G(10)=256**.

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