ABABABAB X76690_en

Consider the following formula:

$$A + B * A + B * A + B * A + B$$

We can obtain many different values by replacing each A with an arbitrary number from set $\mathcal{A}$, and each B with an arbitrary number from set $\mathcal{B}$.
Even more, in this problem we are allowed to place parentheses in any way we want. For example, $(A + B) * (A + B) * (A + B) * (A + B)$ can be a very big number. We don't like very big numbers.
Output the number of ways we can obtain a result which is at most M.

Input

The first line of input contains four numbers: N, M, Q_A, Q_B. We have $1 \leq N \leq 16$, $1 \leq M \leq 1000$, $1 \leq Q_A, Q_B \leq 1000$. N is the number of operands (8 in the formula above, it always starts with A).
The second line contains Q_A non-negative integers — these are the elements of $\mathcal{A}$. Each of them is different, and in range from 0 to 10000.
The third line contains Q_B non-negative integers — these are the elements of $\mathcal{B}$. Each of them is different, and in range from 0 to 10000.

Output

Output the number of ways of obtaining at most M, modulo 1000003.

Sample input 1

```
8 1000 1 1
1
1
```

Sample output 1

```
429
```

Sample input 2

```
8 1000 2 2
1 2
1 2
```

Sample output 2

```
109824
```

Sample input 3

```
2 1000 3 3
400 500 600
400 500 600
```

Sample output 3

```
6
```

Problem information

Author: Eryk Kopczynski

Generation: 2026-01-25T22:30:00.552Z