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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**

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Generation : 2013-09-02 16:01:55

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