Anti Hash II

Given a base **B** and a modulo **M**, the polynomial hash of a string **S** consisting of only lowercase letters is defined as below.

Let $\mathbf{S = S_0S_1...S_{N-1}}$ be a string of length **N** containing only the lowercase letters (**a-z**).

$$\mathbf{Hash(S) = \sum B^{N-i-1} * D(S_i) \% M}$$

D(S) = Lexicographical position of character **S** among the letters **a-z**, indexed from **0**. **D(a) = 0, D(b) = 1, … , D(z) = 25**.

In other words, first the letters of the string are replaced by numbers (equivalent to their position). This is then considered to be a number in base **B**, and the value of this number in **base 10** modulo **M** is called the polynomial hash of the string.

Calculating the hash of a string using the above method seems easy enough. What about the opposite? You are given a base **B**, a modulo **M**, a positive integer N, and a hash value **H**. Calculate how many strings are there such that their hash is equal to **H**, consisting of only lowercase letters and their length not exceeding **N**. Since the answer can be rather huge, output it modulo $\mathbf{10^9 + 7 (1000000007)}$.

Input

The first line contains an integer **T**, denoting the number of test cases. Each test case starts with four integers **B, M, N, Q**. The numbers **B, M, N** denotes the base, modulus and the maximum length of any string as stated above. The number **Q** indicates the number of queries. Each of the next **Q** lines contain a single integer, denoting **H**, the required hash value.

Constraints

- $\mathbf{1 \le T \le 150}$
- $\mathbf{26 \le B \le 30000}$
- $\mathbf{1 \le M, N \le 30000}$
- $\mathbf{1 \le Q \le 300}$
- $\mathbf{0 \le H < M}$
- **For 95% of the test cases, B, M, N ≤ 300**

Output

For each case, first output a line of the format **Case X:**, where **X** is the case number, starting from **1**. And then, for each query, output the number of different strings with the given hash value modulo $\mathbf{10^9 + 7 (1000000007)}$ in a single line.

Print a blank line after every test case.

Sample Input

```
3
26 97 2 3
0
1
96
147 147 147 3
0
10
100
100 110 120 1
35
```

Sample Output

```
Case 1:
8
8
6

Case 2:
944164777
944164777
0

Case 3:
110169522
```

Challenge

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