

Easter Eggs

Description

DestinyLand is a really fun place for kids. It is composed of N islands, numbered from 1 to N . The company is planning to divide these N islands into exactly M area, such that, each island will belong to one of the M areas, and each area will contain at least one island.

For selling easter eggs, the company is going to build bridges between the islands. Each area should be isolated from another. So the bridges can be built, only if both the endpoint islands belong to the same area. That is, in total they will build exactly $N - M$ bridges to maintain connectivity within each area. (Of course, they won't build more than $N - M$ bridges because that cost too much!)

Moreover, the company planned to build a huge market on one chosen island per area selling special kind of eggs. Due to heavy traffic, each of the chosen islands should NOT directly connect with more than K bridges. Can you help the company figure out how many bridge and harbor construction layouts are possible?

Note that all markets are the same, all bridges are the same, but islands are distinct.

Input

There is an integer in the first line, indicating the number of test cases. For each test case, there are four space separated integers N, M, K, MOD .

- $1 \leq T \leq 120$
- $1 \leq N \leq 10^9$
- $1 \leq M, K \leq \min(N, 100)$
- $1 \leq MOD \leq 2 \times 10^9$

Output

For each test case, print the number of layouts modulo MOD.

Sample Input

```
3
3 2 1 1000003
3 1 2 1234567891
3 1 1 314159
```

Sample Output

```
6
9
6
```