A. Merging Boxs

Description

N magic boxes $1, 2, \ldots, N$ line up from left to right. The i^{th} box weighs w_i.

Two adjacent boxes x, y can be merged into a new box z weighing $w_z = w_x + w_y$. Box z appears at the place where x and y were. A such operation costs $w_x + w_y$ energy.

Tom wants to merge N boxes into a single box with $N - 1$ operations. Help him find the minimal energy cost.

Input format

The first line contains an integer N.

The second line contains N integers $w_1, w_2, \ldots, w_N$.

Output format

Output the minimal energy cost.

Samples

Sample 1 Input

```
5
3 2 5 1 7
```

Sample 1 Output

```
40
```

Sample 2 Input

```
10
9 4 5 2 1 1 3 8 3 2
```

Sample 2 Output

```
116
```

Limitations & Hints

For 100% testcases:

- $1 \le N \le 100$
- $1 \le w_i \le 10^9$

B. Sly Bunny

Description

One day, FluffyBunny received a secret mail with three secret integers: n, m, k. She then came up with a game:

The game consists of n turns and has a score that FluffyBunny tries to maximize, and Satori tries to minimize. Initially, the score is 0. In each turn, FluffyBunny first picks a **real** number from $[0, k]$ which Satori chooses to either add or subtract from the score of the game. Throughout the whole game, Satori must choose to add at least m times.

> Satori has agreed that if the final score >= 0 , she will offer FluffyBunny a free lunch.

Suppose the two girls play optimally, please tell them the final score.

Note that the integers n, m, k and the choices that the two players make are open to both players at any time.

Input format

The first line of the input contains a single integer T — the number of test cases.

Each test case consists of a single line containing the three integers n, m, k.

Output format

For each test case output a single line containing an **integer** number — the score of the optimal game modulo $10^9 + 7$.

It can be shown that the answer can be expressed as an irreducible fraction $\frac{p}{q}$, where p and q are integers and $q \not\equiv 0 (\mod 10^9 + 7)$. Then output the integer equal to $p \times q^{-1} (\mod 10^9 + 7)$.

Samples

Sample Input

```
7
3 3 2
2 1 10
6 3 10
6 4 10
100 1 1
4 4 0
69 4 20
```

Sample Output

```
6
5
375000012
500000026
958557139
0
49735962
```

Explanation

In the first test case, the entire game has 3 turns, and since $m = 3$, Satori has to add in each of them. Therefore FluffyBunny would pick the biggest number, which is $k = 2$, every turn.

In the third test case, FluffyBunny has a strategy to guarantee a score of $\frac{75}{8} \equiv 375000012 (\mod 10^9 + 7)$

In the fourth test case, FluffyBunny has a strategy to guarantee a score of $\frac{45}{2} \equiv 500000026 (\mod 10^9 + 7)$

Limitations & Hints

For all test cases:

- $1 \le T \le 1000$
- $1 \le n \le 1000, 0 \le m \le n$
- $0 \le k < 10^9 + 7$

It is guaranteed that the sum of n over all test cases does not exceed 2000.

```
Can you solve n <= 1000000 ?
```