Penguin Flicker

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3.5 seconds
Memory limit:	1024 megabytes

There is a long horizontal skating rink. The rink is divided into $L+2$ sections, numbered from left to right as $0, 1, 2, \ldots, L, L+1$. Sections 0 and $L+1$ contain holes that lead into the sea, while the other sections have no holes.

Among the sections without holes, N sections contain penguins. The i-th penguin is located in section P_i, and all sections containing penguins are distinct.

Puffin Pataro will now move the penguins until all of them have fallen into the sea. Specifically, the following operation is repeated until all penguins have fallen into the sea.

- Uniformly at random, choose one penguin that has not yet fallen into the sea.
- Uniformly at random, choose either left or right, and move the chosen penguin in that direction. The penguin continues moving in the chosen direction until one of the following conditions is satisfied:
  - It reaches the section immediately before a section that contains another penguin.
  - It reaches a section with a hole and falls into the sea.

A penguin that has fallen into the sea is considered to be in no section. All random choices are made independently.

When a penguin moves from section i to section j in a single operation, the distance moved in that operation is defined as $|i-j|$. Compute the expected value of the total distance moved by all penguins until all of them have fallen into the sea, modulo 998244353.

Solve this problem for T test cases.

Input

The input is given in the following format:

T
case_1
case_2
$\vdots$
case_T

Each test case is given in the following format:

$N\ L$
$P_1\ P_2\ \ldots\ P_N$

- $1 \leq T \leq 100$
- $1 \leq N \leq 5000$
- $N \leq L \leq 10^9$
- $1 \leq P_1 < P_2 < \cdots < P_N \leq L$
- All inputs are integers.

Output

Print T lines.

On the i-th line, output the answer for the i-th test case. More precisely, it can be shown that the expected value is always a rational number. Under the constraints of this problem, when the value is written as $\frac{p}{q}$ using coprime positive integers p and q, there exists a unique integer r such that $r \times q \equiv p \pmod{998244353}$ and $0 \leq r < 998244353$. Output this integer r.

Example

standard input	standard output
3 1 8 2 4 7638 7 66 333 888 5 21 2 4 9 15 17	499122181 308996191 485077673

Note

In the first test case, if Pataro moves the first penguin to the left, the distance moved is 2, and if he moves it to the right, the distance moved is 7. In either case, the penguin falls into the sea. Therefore, the expected distance moved is $\frac{9}{2}$. Since $499122181 \times 2 \equiv 9 \pmod{998244353}$, the answer is 499122181.

In the second testcase, for instance, if Pataro first moves the fourth penguin to the left, the fourth penguin moves to section 334, and the distance moved in this operation is 554. There are multiple possible ways to move the penguins, and Pataro chooses one of them uniformly at random.