Set Sequence

Input file:	`standard input`
Output file:	`standard output`
Time limit:	4 seconds
Memory limit:	1024 megabytes

You are given a positive integer N, a prime number P, and a sequence of positive integers $A = (A_1, A_2, \ldots, A_N)$ of length N, where each element is less than P. Let $S = \{1, 2, \ldots, N\}$.

Find the number of sequences T of sets with length at least 1 that satisfy all of the following conditions, and output the result modulo P.

- Every element of T is a **non-empty** subset of S.
- For each $i = 1, 2, \ldots, N$, the following holds:
  - Among the elements of T, exactly A_i of them contain i.

Input

The input is given in the following format:

N P
A_1 A_2 $\ldots$ A_N

- $1 \leq N \leq 2 \times 10^5$
- $113 \leq P \leq 500009$
- P is a prime number
- $1 \leq A_i < P$ $(1 \leq i \leq N)$
- All input values are integers

Output

Print the answer.

Examples

standard input	standard output
2 113 1 2	5
4 8191 7 6 3 8	4477

Note

For the first example, the possible sequences T are $(\{1,2\},\{2\})$, $(\{2\},\{1,2\})$, $(\{1\},\{2\},\{2\})$, $(\{2\},\{1\},\{2\})$, $(\{2\},\{2\},\{1\})$, for a total of 5.

For the second example, do not forget to find the number of valid sequences T modulo P.