Sad Cuts

Max. Marks: 100

Are you sad ? Don't be, unlike me

You are given a sad array A of size N and an additional sad integer K. Now, we create a new sad array B, of size $N \cdot K$, where $B[i] = A[i]$, for $0 \leq i \leq N-1$ and $B[i] = B[i-N]$ for $N \leq i \leq (N \cdot K) - 1$.

Now, we define an inversion to be a pair of indices $(E1, E2)$ lying in the same subsequence S, such that $E1 < E2$, but $B[E1] > B[E2]$

Now, you need to cut this sad array B into any number of sad **non-empty** non-intersecting subsequences. Each element from the given array should belong to exactly one of the subsequences. Let the array be cut into the **set of subsequences** $\{S_0, S_1, \ldots S_{k-1}\}$. Let Z be the sum of the number of inversions in each individual subsequence.

You know what's next right? Considering the array can be cut into each distinct set of subsequences with equal probability, you need to find the Expected Value of Z. What this means is that let the array be cut into the set of subsequences $\{S_0, S_1 .. S_{k-1}\}$ or into subsequences $\{C_0, C_1 .. C_{l-1}\}$, where $S \neq C$. The probability of array being in state S or in state C is equal to the probability of the array being cut into any other set of subsequences.

Let the answer be an irreducible fraction P/Q. You need to print $P \cdot Q^{-1}$ Modulo a given prime number M. It is guaranteed, that for all of the given tests, $Q \neq 0$ Modulo M. So, the answer will always exist and is unique for the given test-set, since M is prime.

Input Format:

The first line contains 3 space separated integers N, K and M. The next line contains N space-separated integers, where the i^{th} integer denotes $A[i]$.

Output Format:

Print the given answer on a single line

Constraints :

$1 \leq N \leq 2000$

$1 \leq A[i] \leq 10^9$

$1 \leq K \leq 10^{10}$

$3 \leq M \leq 5 \cdot 10^4$

M is a prime number

SAMPLE INPUT	SAMPLE OUTPUT
3 1 97 3 2 1	40

Explanation

The array can be in any of the following final states, each with equal probability :

$\{(3), (2), (1)\}$

$\{(32), (1)\}$

$\{(3, 1), (2)\}$

$\{(3), (2, 1)\}$

$\{(3, 2, 1)\}$

So, $\mathbb{E}(Z) = \frac{1}{5} \cdot (0 + 1 + 1 + 1 + 3) = \frac{6}{5} = 40$ Modulo 97

Time Limit:	6.0 sec(s) for each input file.
Memory Limit:	512 MB
Source Limit:	1024 KB
Marking Scheme:	Marks are awarded if any testcase passes.
Allowed Languages:	Bash, C, C++, C++14, Clojure, C#, D, Erlang, F#, Go, Groovy, Haskell, Java, Java 8, JavaScript(Rhino), JavaScript(Node.js), Julia, Kotlin, Lisp, Lisp (SBCL), Lua, Objective-C, OCaml, Octave, Pascal, Perl, PHP, Python, Python 3, Racket, Ruby, Rust, Scala, Swift, Swift-4.1, Visual Basic

RECENT SUBMISSIONS

DEVELOPERS	RESULT	LANGUAGE
Bunget Mihai	✗	C++14
Bunget Mihai	✗	C++14
Bunget Mihai	✗	C++14
Bunget Mihai	✗	C++14
Bunget Mihai	✗	C++14
Bunget Mihai	⚠	C++14
Bunget Mihai	✗	C++14

View All

CODE EDITOR

Enter your code or Upload your code as file. Save Bash (GNU bash, version 4.3

```
1 # Sample bash code
2
```

1:1

Press Ctrl/Command+Spacebar for autocomplete suggestions (accuracy dependent on connection stability).

Provide custom input

COMPILE & TEST SUBMIT

Tip: You can submit any number of times you want. Your best submission is considered for computing total score.

Your Rating:

View all comments