

A. Flip Permutation

Flippy the Bird is interested in permutations. A permutation of length n is an array containing each integer from 1 to n exactly once. For example, $q = [1, 3, 2, 5, 4]$ is a permutation of length 5.

For a permutation q , the k -th power of the permutation (also denoted by q^k) is defined as the permutation p such that $p[i] = q[q[q[\dots q[i]\dots]]]$ (there are k q s, so if $k = 3$ then $p[i] = q[q[q[i]]]$) for all $1 \leq i \leq n$.

For a permutation q , the period of q is the minimum positive integer P such that the $q^{P+1} = q$. For example, you can verify that the period of the permutation $q = [1, 3, 2, 5, 4]$ is 2.

Flippy the Bird has a permutation p of length N . He can choose any two positive integers i, j such that $1 \leq i, j \leq n$ and swaps the elements in positions i and j . (note that if $i = j$ then nothing happens)

For example, for the permutation $q = [1, 3, 2, 5, 4]$, if Flippy chooses $i = 2, j = 4$, then this permutation becomes $q = [1, 5, 2, 3, 4]$.

Now, for every pair of integers i, j such that $1 \leq i, j \leq n$, Flippy swaps the elements in positions i and j . Then, he calculate the period for the resulting permutation. Since the period might be too large, Flippy the Bird will take the value modulo $10^9 + 7$. He will record the final value in his notebook.

Now, he wants to know what is the maximum number that he has recorded in his notebook. Can you help him?

Task

You are given a positive integer N and a permutation of length N . Your task is to calculate the maximum number Flippy the Bird has recorded. You need to implement the function *flip*:

int flip(int N, int P[])

- N - length of the permutation
- P[] - the permutation itself. P[i] is the i-th element of the permutation for $1 \leq i \leq N$.
- Returns a single integer, the answer to the problem.

Subtasks

Subtask	Points	N	Notes
1	6	$N \leq 10$	No additional limits
2	17	$N \leq 100$	No additional limits
3	33	$N \leq 1000$	For all i, p[i], p[p[i]] and p[p[p[i]]] are all not equal to i.
4	44	$N \leq 3000$	No additional limits

Implementation details

You have to submit exactly one file, called flippermutation.cpp. This file implements the subprogram described above using the following signatures. You also need to include a header file flippermutation.h.

int flip(int N, int P[])

Sample Grader

The sample grader reads the input in the following format:

Line 1 : N

Line 2 : P[1], P[2], ..., P[N]

For example, the following is a valid input :

5

2 1 5 3 4

It should provide the following output :

6