A. Party

time limit per test: 3 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

A company has n employees numbered from 1 to n. Each employee either has no immediate manager or exactly one immediate manager, who is another employee with a different number. An employee A is said to be the *superior* of another employee B if at least one of the following is true:

- Employee A is the immediate manager of employee B
- Employee B has an immediate manager employee C such that employee A is the superior of employee C.

The company will not have a managerial cycle. That is, there will not exist an employee who is the superior of his/her own immediate manager.

Today the company is going to arrange a party. This involves dividing all n employees into several groups: every employee must belong to exactly one group. Furthermore, within any single group, there must not be two employees A and B such that A is the superior of B.

What is the minimum number of groups that must be formed?

Input

The first line contains integer n ($1 \le n \le 2000$) — the number of employees.

The next n lines contain the integers p_i ($1 \le p_i \le n$ or $p_i = -1$). Every p_i denotes the immediate manager for the i-th employee. If p_i is -1, that means that the i-th employee does not have an immediate manager.

It is guaranteed, that no employee will be the immediate manager of him/herself ($p_i \neq i$). Also, there will be no managerial cycles.

Output

Print a single integer denoting the minimum number of groups that will be formed in the party.

Examples

input
5 -1 1 2 1 -1
output
3

Note

For the first example, three groups are sufficient, for example:

- Employee 1
- Employees 2 and 4
- Employees 3 and 5

→ Attention

Package for this problem was not updated by the problem writer or Codeforces administration after we've upgraded the judging servers. To adjust the time limit constraint, solution execution time will be multiplied by 2. For example, if your solution works for 400 ms on judging servers, then value 800 ms will be displayed and used to determine the verdict.

Codeforces Beta Round #87 (Div. 1 Only)

Finished

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Problem tags

dfs and similar | graphs | trees

No tag edit access

→ Contest materials

- Announcement
- Tutorial

Desktop version, switch to mobile version.