Problem E. Party

Time limit   3000 ms
Mem limit   262144 kB

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 <u>superior</u> 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 ($1 \leq n \leq 2000$) — the number of employees.

The next n lines contain the integers p_i ($1 \leq p_i \leq n$ 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.

Sample 1

Input	Output

Input	Output
5 -1 1 2 1 -1	3

Note

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

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