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

Copy

```
5
-1
1
2
1
-1
```

output

Copy

```
3
```

Note

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

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