Outline

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Problem (Timus Online Judge)

1024. Permutations

We remind that the permutation of some final set is a one-to-one mapping of the set onto itself. Less formally, that is a way to reorder elements of the set.

For example, one can define a permutation of the set \{1,2,3,4,5\} as follows:

\[
\begin{pmatrix}
1 & 2 & 3 & 4 & 5 \\
4 & 1 & 5 & 2 & 3
\end{pmatrix}
\]

What is the value of the expression \(P(P(1))\)? It’s clear, that \(P(P(1)) = P(4) = 2\). And \(P(P(3)) = P(5) = 3\). One can easily see that if \(P(n)\) is a permutation then \(P(P(n))\) is a permutation as well. In our example (check it by yourself)

\[
(Pn)^2 = 
\begin{pmatrix}
1 & 2 & 3 & 4 & 5 \\
2 & 4 & 3 & 1 & 5
\end{pmatrix}
\]

\((Pn)^k = Pn.\)

k = ?

time limit = 2 sec
Solution

1. Using Recursion

1.1 Make input data form

2.2 Copy original permutation to other variable

2.3 Changing permutation by Recursive function

2.4 Compare between original permutation and changed permutation

2.5 Recursively, Repeat function

Therefore, it is too slow that over time limit
Solution

2. Using Number Cycle

1.1 Make input data form

2.2 Set variable of condition

2.3 Find all of number cycle in permutation

2.4 Calculate greatest common divisor

2.5 Calculate least common multiple

2.6 Get answer
```python
import copy, sys
sys.setrecursionlimit(640000)
n=input();
n=int(n);
per=raw_input();
per=map(int,per.split());
goal=copy.deepcopy(per);
def is_goal(n):
    global goal
    for i in range(len(goal)):
        if n[i]!=goal[i]:
            return False
    return True
def function(n,c):
    global form
    if c!=0 and is_goal(n):
        return c
    else:
        for i in range(len(n)):
            n[i]=goal[n[i]-1]
            c+=1
        return function(n,c)
print function(per,0)
```
def gcd(a,b):
    while a%b!=0:
        a%=b;
        a,b=b,a
    return b;

n=input();
n=int(n);
per=raw_input();
per=map(int,per.split());
per=map(lambda x: x-1, per)
visited=[-1]*(n+1);
ans=1;
for i in range(n):
    if (visited[i]==0):
        continue
    else:
        pos=i;
        sz=0;
        while(visited[pos]==-1):
            visited[pos]=0
            pos =per[pos]
            sz+=1
        max=gcd(ans,sz);
        ans=(ans/max)*(sz/max)*max;
print ans
### Solution 1 Result

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## Solution 2 Result

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