HackerRank City

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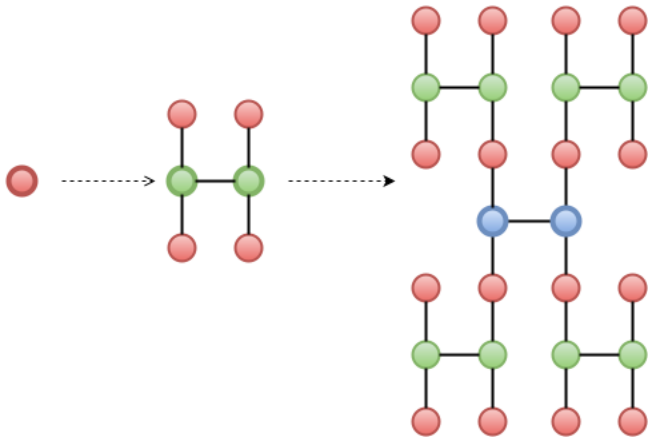
Problem Submissions Leaderboard Discussions Editorial

HackerRank-city is an acyclic connected graph (or tree). Its not an ordinary place, the construction of the whole tree takes place in N steps. The process is described below:

- It initially has 1 node.
- At each step, you must create 3 duplicates of the current tree, and create 2 new nodes to connect all 4 copies in the following `H` shape:



At each i^{th} step, the tree becomes 4 times bigger plus 2 new nodes, as well as 5 new edges connecting everything together. The length of the new edges being added at step i is denoted by input A_i.

Calculate the sum of distances between each pair of nodes; as these answers may run large, print your answer modulo 1000000007.

Input Format

The first line contains an integer, N (the number of steps). The second line contains N space-separated integers describing $A_0, A_1, \ldots, A_{N-2}, A_{N-1}$.

Constraints

$1 \leq N \leq 10^6$
$1 \leq A_i \leq 9$

Subtask

For 50% score $1 \leq N \leq 10$

Output Format

Print the sum of distances between each pair of nodes modulo 1000000007.

Sample Input 0

```
1
1
```

Sample Output 0

```
29
```

Sample Input 1

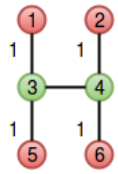
```
2
2 1
```

Sample Output 1

```
2641
```

Explanation

Sample 0
In this example, our tree looks like this:



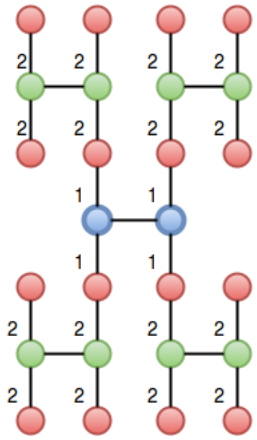
Let $d(u, v)$ denote the distance between nodes u and v.

$d(1,2) + d(1,3) + d(1,4) + d(1,5) + d(1,6) + d(2,3) + d(2,4) + d(2,5) + d(2,6) + d(3,4)$
$+ d(3,5) + d(3,6) + d(4,5) + d(4,6) + d(5,6) = 3 + 1 + 2 + 2 + 3 + 2 + 1 + 3 + 2 + 1 + 1 + 2 + 2 + 1 + 3 = 29$.

We print the result of $29 \ \% \ 1000000007$ as our answer.

Sample 1

In this example, our tree looks like this:



We calculate and sum the distances between nodes in the same manner as *Sample 0* above, and print the result of our $answer \ \% \ 1000000007$, which is 2641.

Submissions:550
Max Score:50
Difficulty: Medium

Rate This Challenge:

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Current Buffer (saved locally, editable)

Java 7

```
1  import java.io.*;
2  import java.util.*;
3  import java.text.*;
4  import java.math.*;
5  import java.util.regex.*;
6
7  public class Solution {
8      public static void main(String args[] ) throws Exception {
9          /* Enter your code here. Read input from STDIN. Print output to STDOUT */
10     }
11 }
12
```

Line: 1 Col: 1

Upload Code as File Test against custom input Run Code Submit Code