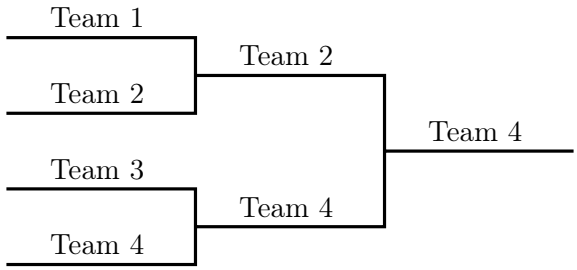
D2 – Ultimate Loser

In single-elimination tournaments (for example, the NCAA Basketball tournament), teams that win play each other until there is only one team left, and that team is named the champion. For the pessimists among us, it's also fun to figure out who the worst team is. Since half of the entrants will lose their first game, choosing between them is difficult. Consider the following algorithm:

- Find the team that lost in the championship
- Find the team that lost to that team in the semifinals
- Find the team that lost to that team in the previous round
- Continue this process until you get back to the first round. That team is the "ultimate loser", because they are the end of a chain of teams that lost as soon as possible.

Here is a small example:



In this case, team 4 is the champion, and team 1 is the ultimate loser, because 2 lost to 4, and 1 lost to 2.

Input:

There will be several input instances. The input starts with a number, n, indicating the number of teams. A value of $n = 0$ will indicate end of input, otherwise n will be a power of 2, between 2 and 64 (inclusive). The value of n will indicate a bracket similar to the 4-team one above, with teams numbered from 1 to n, listed in the bracket sequentially. Teams 1 and 2 will always play in the first round, and will play the winner of teams 3 and 4 in the next round, and so on. The next line contains $n - 1$ integers, indicating the winners of each game, reading the bracket from top to bottom. All first round winners will be listed first (there will be $n/2$ of these), then the $n/4$ second round winners, and so on until the champion is listed. So, for example the first number listed will either be a 1 or 2, since the first game is always between teams 1 and 2.

Output:

Print a line with the text "The ultimate loser is team x.", where x is the number of the team that is the ultimate loser.

Input and output samples:

Input:
4 2 4 4

Output:
The ultimate loser is team 1.

Input:
8 2 4 5 7 2 7 2

Output:
The ultimate loser is team 6.