“Perfectly balanced as all things should be.”

You are a big fan of Thanos and his theory of balance. Alas, you don’t have an Infinity Gauntlet so you just try to apply his theory of perfect balance on a sequence of **UNIQUE and SORTED** integers. You try to form a balanced **binary search tree** using these numbers.
You have an integer **N** which tells you the size of the sequence. It was also observed that **N** was always in the form of $2^n - 1$.
Just like Gon Freecs, you want to find the parent of all the nodes in the balanced tree. For the root of the tree, the parents would be 0. Print the parent nodes for all the elements in the sequence.

Note
A balanced tree is a tree where for each node, the depth of the left and right subtree differ by at most 1.

Input
The first line of input consists of a single integer **N**.
The second line of input consists of **N** space separated unique integers in increasing order.
3 <= **N** <= 1000000
1 <= **Ai** <= 1000000

Output
N lines of output indicating the parent for each number in the sequence.

Sample Test
Input
7
3 4 6 7 11 13 20

Output
4
7
4
0
13
7
13

Explanation

The following would be the tree constructed for the above sequence.