1130. Minimum Cost Tree From Leaf Values

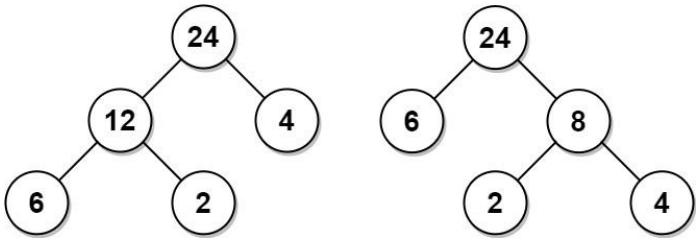
Given an array arr of positive integers, consider all binary trees such that:

- Each node has either 0 or 2 children;
- The values of arr correspond to the values of each **leaf** in an in-order traversal of the tree.
- The value of each non-leaf node is equal to the product of the largest leaf value in its left and right subtree, respectively.

Among all possible binary trees considered, return *the smallest possible sum of the values of each non-leaf node*. It is guaranteed this sum fits into a **32-bit** integer.

A node is a **leaf** if and only if it has zero children.

Example 1:



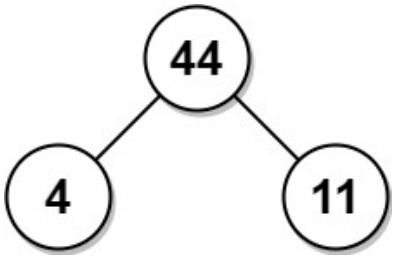
Input: arr = [6,2,4]

Output: 32

Explanation: There are two possible trees shown.

The first has a non-leaf node sum 36, and the second has non-leaf node sum 32.

Example 2:



Input: arr = [4,11]

Output: 44

Constraints:

- 2 <= arr.length <= 40
- 1 <= arr[i] <= 15
- It is guaranteed that the answer fits into a **32-bit** signed integer (i.e., it is less than 2^{31}).

```
class Solution(object):
    def mctFromLeafValues(self, arr):
        n = len(arr)
        res = 0
        while n>1:
            Min = float('inf')
            for i in range(n-1):
                prod = arr[i]*arr[i+1]
                if prod < Min:
                    Min = prod
                    if(arr[i] < arr[i+1]):
                        idx = i
                    else:
                        idx = i+1

            res+=Min
            arr.pop(idx)
            n = len(arr)
        return res
```