There is a **hidden** integer array arr that consists of n non-negative integers.

It was encoded into another integer array encoded of length n - 1, such that encoded[i] = arr[i] XOR arr[i + 1]. For example, if arr = [1,0,2,1], then encoded = [1,2,3].

You are given the encoded array. You are also given an integer first, that is the first element of arr, i.e. arr[0].

Return *the original array* arr. It can be proved that the answer exists and is unique.

**Example 1:**

**Input:** encoded = [1,2,3], first = 1

**Output:** [1,0,2,1]

**Explanation:** If arr = [1,0,2,1], then first = 1 and encoded = [1 XOR 0, 0 XOR 2, 2 XOR 1] = [1,2,3]

**Example 2:**

**Input:** encoded = [6,2,7,3], first = 4

**Output:** [4,2,0,7,4]

**Constraints:**

* 2 <= n <= 104
* encoded.length == n - 1
* 0 <= encoded[i] <= 105
* 0 <= first <= 105