3068. Find the Maximum Sum of Node Values

Description

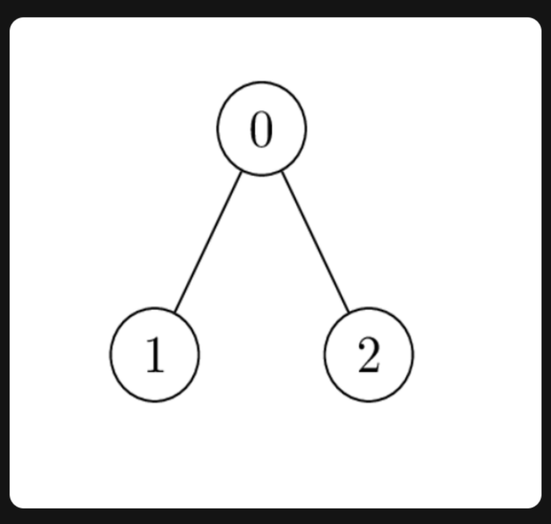
There exists an **undirected** tree with `n` nodes numbered `0` to `n - 1`. You are given a **0-indexed** 2D integer array `edges` of length `n - 1`, where `edges[i] = [u_i, v_i]` indicates that there is an edge between nodes `u_i` and `v_i` in the tree. You are also given a **positive** integer `k`, and a **0-indexed** array of **non-negative** integers `nums` of length `n`, where `nums[i]` represents the **value** of the node numbered `i`.

Alice wants the sum of values of tree nodes to be **maximum**, for which Alice can perform the following operation **any** number of times (**including zero**) on the tree:

- Choose any edge `[u, v]` connecting the nodes `u` and `v`, and update their values as follows:
  - `nums[u] = nums[u] XOR k`
  - `nums[v] = nums[v] XOR k`

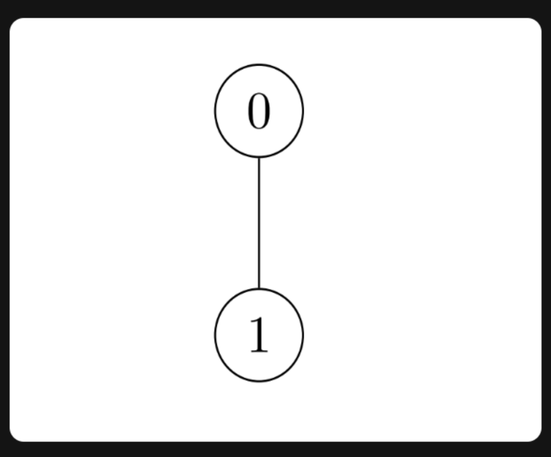
Return *the **maximum** possible **sum** of the **values** Alice can achieve by performing the operation **any** number of times*.

Example 1:



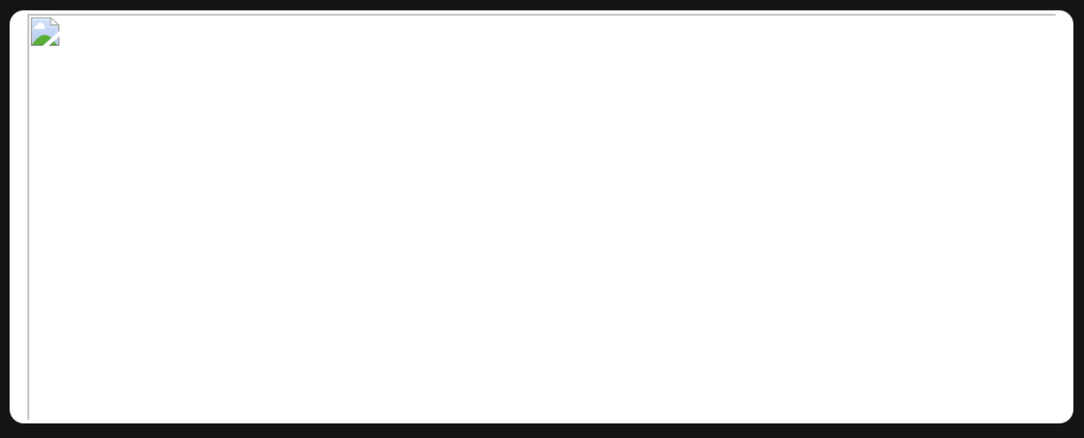

```
Input: nums = [1,2,1], k = 3, edges = [[0,1],[0,2]]
Output: 6
Explanation: Alice can achieve the maximum sum of 6 using a single operation:
- Choose the edge [0,2]. nums[0] and nums[2] become: 1 XOR 3 = 2, and the array nums becomes: [1,2,1] -> [2,2,2].
The total sum of values is 2 + 2 + 2 = 6.
It can be shown that 6 is the maximum achievable sum of values.
```

Example 2:




```
Input: nums = [2,3], k = 7, edges = [[0,1]]
Output: 9
Explanation: Alice can achieve the maximum sum of 9 using a single operation:
- Choose the edge [0,1]. nums[0] becomes: 2 XOR 7 = 5 and nums[1] become: 3 XOR 7 = 4, and the array nums becomes: [2,3] -> [5,4].
The total sum of values is 5 + 4 = 9.
It can be shown that 9 is the maximum achievable sum of values.
```

Example 3:



```
Input: nums = [7,7,7,7,7,7], k = 3, edges = [[0,1],[0,2],[0,3],[0,4],[0,5]]
Output: 42
Explanation: The maximum achievable sum is 42 which can be achieved by Alice performing no operations.
```

Constraints:

- `2 <= n == nums.length <= 2 * 10^4`
- `1 <= k <= 10^9`
- `0 <= nums[i] <= 10^9`
- `edges.length == n - 1`
- `edges[i].length == 2`
- `0 <= edges[i][0], edges[i][1] <= n - 1`
- The input is generated such that `edges` represent a valid tree.