Problem 2497: Maximum Star Sum of a Graph

Problem Information

Difficulty: Medium
Acceptance Rate: 41.62%
Paid Only: No
Tags: Array, Greedy, Graph, Sorting, Heap (Priority Queue)

Problem Description

There is an undirected graph consisting of `n` nodes numbered from `0` to `n - 1`. You are given a **0-indexed** integer array `vals` of length `n` where `vals[i]` denotes the value of the `ith` node.

You are also given a 2D integer array `edges` where `edges[i] = [ai, bi]` denotes that there exists an **undirected** edge connecting nodes `ai` and `bi.`

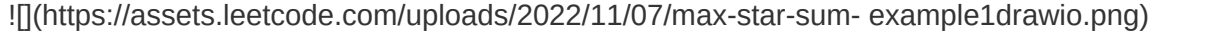
A **star graph** is a subgraph of the given graph having a center node containing `0` or more neighbors. In other words, it is a subset of edges of the given graph such that there exists a common node for all edges.

The image below shows star graphs with `3` and `4` neighbors respectively, centered at the blue node.

The **star sum** is the sum of the values of all the nodes present in the star graph.

Given an integer `k`, return _the**maximum star sum** of a star graph containing **at most** _`k` _edges._

Example 1:



Input: vals = [1,2,3,4,10,-10,-20], edges = [[0,1],[1,2],[1,3],[3,4],[3,5],[3,6]], k = 2 **Output:** 16 **Explanation:** The above diagram represents the input graph. The star graph with the maximum star sum is denoted by blue. It is centered at 3 and includes its neighbors 1 and 4. It can be shown it is not possible to get a star graph with a sum greater than 16.

Example 2:

Input: vals = [-5], edges = [], k = 0 **Output:** -5 **Explanation:** There is only one possible star graph, which is node 0 itself. Hence, we return -5.

Constraints:

* `n == vals.length` * `1 <= n <= 105` * `-104 <= vals[i] <= 104` * `0 <= edges.length <= min(n * (n - 1) / 2``, 105)` * `edges[i].length == 2` * `0 <= ai, bi <= n - 1` * `ai != bi` * `0 <= k <= n - 1`

Code Snippets

C++:

```
class Solution {
public:
int maxStarSum(vector<int>& vals, vector<vector<int>>& edges, int k) {

}
};
```

Java:

```
class Solution {
public int maxStarSum(int[] vals, int[][] edges, int k) {

}
}
```

Python3:

```
class Solution:
def maxStarSum(self, vals: List[int], edges: List[List[int]], k: int) -> int:
```