Problem 3372: Maximize the Number of Target Nodes After Connecting Trees I

Problem Information

Difficulty: Medium
Acceptance Rate: 0.00%
Paid Only: No

Problem Description

There exist two

undirected

trees with

n

and

m

nodes, with

distinct

labels in ranges

[0, n - 1]

and

[0, m - 1]

, respectively.

You are given two 2D integer arrays

edges1

and

edges2

of lengths

n - 1

and

m - 1

, respectively, where

edges1[i] = [a

i

, b

i

]

indicates that there is an edge between nodes

a

i

and

b

i

in the first tree and

edges2[i] = [u

i

, v

i

]

indicates that there is an edge between nodes

u

i

and

v

i

in the second tree. You are also given an integer

k

.

Node

u

is

target

to node

v

if the number of edges on the path from

u

to

v

is less than or equal to

k

.

Note

that a node is

always

target

to itself.

Return an array of

n

integers

answer

, where

answer[i]

is the

maximum

possible number of nodes

target

to node

i

of the first tree if you have to connect one node from the first tree to another node in the second tree.

Note

that queries are independent from each other. That is, for every query you will remove the added edge before proceeding to the next query.

Example 1:

Input:

edges1 = [[0,1],[0,2],[2,3],[2,4]], edges2 = [[0,1],[0,2],[0,3],[2,7],[1,4],[4,5],[4,6]], k = 2

Output:

[9,7,9,8,8]

Explanation:

For

i = 0

, connect node 0 from the first tree to node 0 from the second tree.

For

i = 1

, connect node 1 from the first tree to node 0 from the second tree.

For

i = 2

, connect node 2 from the first tree to node 4 from the second tree.

For

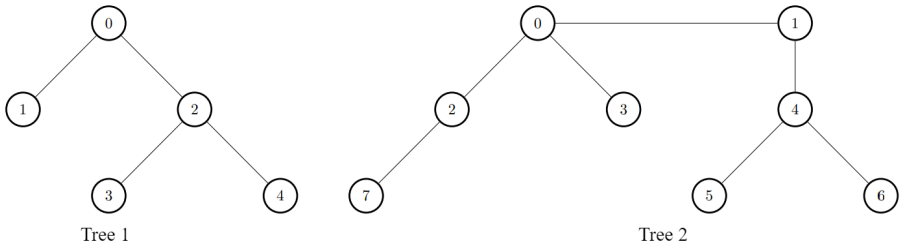
i = 3

, connect node 3 from the first tree to node 4 from the second tree.

For

i = 4

, connect node 4 from the first tree to node 4 from the second tree.



Example 2:

Input:

edges1 = [[0,1],[0,2],[0,3],[0,4]], edges2 = [[0,1],[1,2],[2,3]], k = 1

Output:

[6,3,3,3,3]

Explanation:

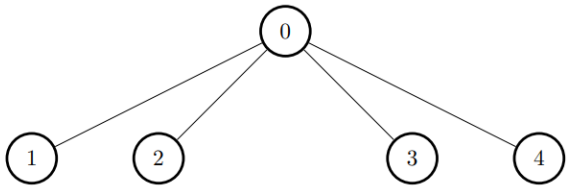
For every

i

, connect node

i

of the first tree with any node of the second tree.



Tree 1

Tree 2

Constraints:

2 <= n, m <= 1000

edges1.length == n - 1

edges2.length == m - 1

edges1[i].length == edges2[i].length == 2

edges1[i] = [a

i

, b

i

]

0 <= a

i

, b

i

< n

edges2[i] = [u

i

, v

i

]

0 <= u

i

, v

i

< m

The input is generated such that

edges1

and

edges2

represent valid trees.

0 <= k <= 1000

Code Snippets

C++:

```
class Solution {
public:
vector<int> maxTargetNodes(vector<vector<int>>& edges1, vector<vector<int>>&
edges2, int k) {

}
};
```

Java:

```
class Solution {
public int[] maxTargetNodes(int[][] edges1, int[][] edges2, int k) {

}
}
```

Python3:

```
class Solution:
def maxTargetNodes(self, edges1: List[List[int]], edges2: List[List[int]], k:
int) -> List[int]:
```

Python:

```
class Solution(object):
def maxTargetNodes(self, edges1, edges2, k):
```

```
"""
:type edges1: List[List[int]]
:type edges2: List[List[int]]
:type k: int
:rtype: List[int]
"""
```

JavaScript:

```
/**
* @param {number[][]} edges1
* @param {number[][]} edges2
* @param {number} k
* @return {number[]}
*/
var maxTargetNodes = function(edges1, edges2, k) {

};
```

TypeScript:

```
function maxTargetNodes(edges1: number[][], edges2: number[][], k: number):
number[] {

};
```

C#:

```
public class Solution {
public int[] MaxTargetNodes(int[][] edges1, int[][] edges2, int k) {

}
}
```

C:

```
/**
* Note: The returned array must be malloced, assume caller calls free().
*/
int* maxTargetNodes(int** edges1, int edges1Size, int* edges1ColSize, int**
edges2, int edges2Size, int* edges2ColSize, int k, int* returnSize) {
```

```
}
```

Go:

```
func maxTargetNodes(edges1 [][]int, edges2 [][]int, k int) []int {

}
```

Kotlin:

```
class Solution {
fun maxTargetNodes(edges1: Array<IntArray>, edges2: Array<IntArray>, k: Int):
IntArray {

}
}
```

Swift:

```
class Solution {
func maxTargetNodes(_ edges1: [[Int]], _ edges2: [[Int]], _ k: Int) -> [Int]
{

}
}
```

Rust:

```
impl Solution {
pub fn max_target_nodes(edges1: Vec<Vec<i32>>, edges2: Vec<Vec<i32>>, k: i32)
-> Vec<i32> {

}
}
```

Ruby:

```
# @param {Integer[][]} edges1
# @param {Integer[][]} edges2
# @param {Integer} k
# @return {Integer[]}
def max_target_nodes(edges1, edges2, k)
```

```
end
```

PHP:

```
class Solution {

/**
* @param Integer[][] $edges1
* @param Integer[][] $edges2
* @param Integer $k
* @return Integer[]
*/
function maxTargetNodes($edges1, $edges2, $k) {

}
}
```

Dart:

```
class Solution {
List<int> maxTargetNodes(List<List<int>> edges1, List<List<int>> edges2, int
k) {

}
}
```

Scala:

```
object Solution {
def maxTargetNodes(edges1: Array[Array[Int]], edges2: Array[Array[Int]], k:
Int): Array[Int] = {

}
}
```

Elixir:

```
defmodule Solution do
@spec max_target_nodes(edges1 :: [[integer]], edges2 :: [[integer]], k ::
integer) :: [integer]
def max_target_nodes(edges1, edges2, k) do
```

```
end
end
```

Erlang:

```
-spec max_target_nodes(Edges1 :: [[integer()]], Edges2 :: [[integer()]], K ::
integer()) -> [integer()].
max_target_nodes(Edges1, Edges2, K) ->
.
```

Racket:

```
(define/contract (max-target-nodes edges1 edges2 k)
(-> (listof (listof exact-integer?)) (listof (listof exact-integer?))
exact-integer? (listof exact-integer?))
)
```

Solutions

C++ Solution:

```
/*
* Problem: Maximize the Number of Target Nodes After Connecting Trees I
* Difficulty: Medium
* Tags: array, tree, search
*
* Approach: Use two pointers or sliding window technique
* Time Complexity: O(n) or O(n log n)
* Space Complexity: O(h) for recursion stack where h is height
*/

class Solution {
public:
vector<int> maxTargetNodes(vector<vector<int>>& edges1, vector<vector<int>>&
edges2, int k) {

}
};
```

Java Solution:

```
/**
* Problem: Maximize the Number of Target Nodes After Connecting Trees I
* Difficulty: Medium
* Tags: array, tree, search
*
* Approach: Use two pointers or sliding window technique
* Time Complexity: O(n) or O(n log n)
* Space Complexity: O(h) for recursion stack where h is height
*/

class Solution {
public int[] maxTargetNodes(int[][] edges1, int[][] edges2, int k) {

}
}
```

Python3 Solution:

```
"""
Problem: Maximize the Number of Target Nodes After Connecting Trees I
Difficulty: Medium
Tags: array, tree, search

Approach: Use two pointers or sliding window technique
Time Complexity: O(n) or O(n log n)
Space Complexity: O(h) for recursion stack where h is height
"""

class Solution:
def maxTargetNodes(self, edges1: List[List[int]], edges2: List[List[int]], k:
int) -> List[int]:
# TODO: Implement optimized solution
pass
```

Python Solution:

```
class Solution(object):
def maxTargetNodes(self, edges1, edges2, k):
"""
:type edges1: List[List[int]]
:type edges2: List[List[int]]
```

```
:type k: int
:rtype: List[int]
"""
```

JavaScript Solution:

```
/**
* Problem: Maximize the Number of Target Nodes After Connecting Trees I
* Difficulty: Medium
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*
* Approach: Use two pointers or sliding window technique
* Time Complexity: O(n) or O(n log n)
* Space Complexity: O(h) for recursion stack where h is height
*/

/**
* @param {number[][]} edges1
* @param {number[][]} edges2
* @param {number} k
* @return {number[]}
*/
var maxTargetNodes = function(edges1, edges2, k) {

};
```

TypeScript Solution:

```
/**
* Problem: Maximize the Number of Target Nodes After Connecting Trees I
* Difficulty: Medium
* Tags: array, tree, search
*
* Approach: Use two pointers or sliding window technique
* Time Complexity: O(n) or O(n log n)
* Space Complexity: O(h) for recursion stack where h is height
*/

function maxTargetNodes(edges1: number[][], edges2: number[][], k: number):
number[] {
```

```
};
```

C# Solution:

```
/*
* Problem: Maximize the Number of Target Nodes After Connecting Trees I
* Difficulty: Medium
* Tags: array, tree, search
*
* Approach: Use two pointers or sliding window technique
* Time Complexity: O(n) or O(n log n)
* Space Complexity: O(h) for recursion stack where h is height
*/

public class Solution {
public int[] MaxTargetNodes(int[][] edges1, int[][] edges2, int k) {

}
}
```

C Solution:

```
/*
* Problem: Maximize the Number of Target Nodes After Connecting Trees I
* Difficulty: Medium
* Tags: array, tree, search
*
* Approach: Use two pointers or sliding window technique
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*/

/**
* Note: The returned array must be malloced, assume caller calls free().
*/
int* maxTargetNodes(int** edges1, int edges1Size, int* edges1ColSize, int**
edges2, int edges2Size, int* edges2ColSize, int k, int* returnSize) {

}
```

Go Solution:

```
// Problem: Maximize the Number of Target Nodes After Connecting Trees I
// Difficulty: Medium
// Tags: array, tree, search
//
// Approach: Use two pointers or sliding window technique
// Time Complexity: O(n) or O(n log n)
// Space Complexity: O(h) for recursion stack where h is height

func maxTargetNodes(edges1 [][]int, edges2 [][]int, k int) []int {

}
```

Kotlin Solution:

```
class Solution {
fun maxTargetNodes(edges1: Array<IntArray>, edges2: Array<IntArray>, k: Int):
IntArray {

}
}
```

Swift Solution:

```
class Solution {
func maxTargetNodes(_ edges1: [[Int]], _ edges2: [[Int]], _ k: Int) -> [Int]
{

}
}
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Rust Solution:

```
// Problem: Maximize the Number of Target Nodes After Connecting Trees I
// Difficulty: Medium
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// Space Complexity: O(h) for recursion stack where h is height

impl Solution {
pub fn max_target_nodes(edges1: Vec<Vec<i32>>, edges2: Vec<Vec<i32>>, k: i32)
```

```
-> Vec<i32> {

}
}
```

Ruby Solution:

```
# @param {Integer[][]} edges1
# @param {Integer[][]} edges2
# @param {Integer} k
# @return {Integer[]}
def max_target_nodes(edges1, edges2, k)

end
```

PHP Solution:

```
class Solution {

/**
* @param Integer[][] $edges1
* @param Integer[][] $edges2
* @param Integer $k
* @return Integer[]
*/
function maxTargetNodes($edges1, $edges2, $k) {

}
}
```

Dart Solution:

```
class Solution {
List<int> maxTargetNodes(List<List<int>> edges1, List<List<int>> edges2, int
k) {

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object Solution {
def maxTargetNodes(edges1: Array[Array[Int]], edges2: Array[Array[Int]], k:
Int): Array[Int] = {

}
}
```

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```
defmodule Solution do
@spec max_target_nodes(edges1 :: [[integer]], edges2 :: [[integer]], k ::
integer) :: [integer]
def max_target_nodes(edges1, edges2, k) do

end
end
```

Erlang Solution:

```
-spec max_target_nodes(Edges1 :: [[integer()]], Edges2 :: [[integer()]], K ::
integer()) -> [integer()].
max_target_nodes(Edges1, Edges2, K) ->
.
```

Racket Solution:

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exact-integer? (listof exact-integer?))
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