Problem 399: Evaluate Division

Problem Information

Difficulty: Medium
Acceptance Rate: 63.73%
Paid Only: No
Tags: Array, String, Depth-First Search, Breadth-First Search, Union Find, Graph, Shortest Path

Problem Description

You are given an array of variable pairs `equations` and an array of real numbers `values`, where `equations[i] = [Ai, Bi]` and `values[i]` represent the equation `Ai / Bi = values[i]`. Each `Ai` or `Bi` is a string that represents a single variable.

You are also given some `queries`, where `queries[j] = [Cj, Dj]` represents the `jth` query where you must find the answer for `Cj / Dj = ?`.

Return _the answers to all queries_. If a single answer cannot be determined, return `-1.0`.

Note: The input is always valid. You may assume that evaluating the queries will not result in division by zero and that there is no contradiction.

**Note: **The variables that do not occur in the list of equations are undefined, so the answer cannot be determined for them.

Example 1:

Input: equations = [["a","b"],["b","c"]], values = [2.0,3.0], queries = [["a","c"],["b","a"],["a","e"],["a","a"],["x","x"]] **Output:** [6.00000,0.50000,-1.00000,1.00000,-1.00000] **Explanation:** Given: _a / b = 2.0_ , _b / c = 3.0_ queries are: _a / c = ?_ , _b / a = ?_ , _a / e = ?_ , _a / a = ?_ , _x / x = ?_ return: [6.0, 0.5, -1.0, 1.0, -1.0] note: x is undefined => -1.0

Example 2:

Input: equations = [["a","b"],["b","c"],["bc","cd"]], values = [1.5,2.5,5.0], queries = [["a","c"],["c","b"],["bc","cd"],["cd","bc"]] **Output:** [3.75000,0.40000,5.00000,0.20000]

Example 3:

Input: equations = [["a","b"]], values = [0.5], queries = [["a","b"],["b","a"],["a","c"],["x","y"]] **Output:** [0.50000,2.00000,-1.00000,-1.00000]

Constraints:

* `1 <= equations.length <= 20` * `equations[i].length == 2` * `1 <= Ai.length, Bi.length <= 5` * `values.length == equations.length` * `0.0 < values[i] <= 20.0` * `1 <= queries.length <= 20` * `queries[i].length == 2` * `1 <= Cj.length, Dj.length <= 5` * `Ai, Bi, Cj, Dj` consist of lower case English letters and digits.

Code Snippets

C++:

```
class Solution {
public:
vector<double> calcEquation(vector<vector<string>>& equations,
vector<double>& values, vector<vector<string>>& queries) {

}
};
```

Java:

```
class Solution {
public double[] calcEquation(List<List<String>> equations, double[] values,
List<List<String>> queries) {

}
}
```

Python3:

```
class Solution:
def calcEquation(self, equations: List[List[str]], values: List[float],
```

```
queries: List[List[str]]) -> List[float]:
```