Experiment 2.2

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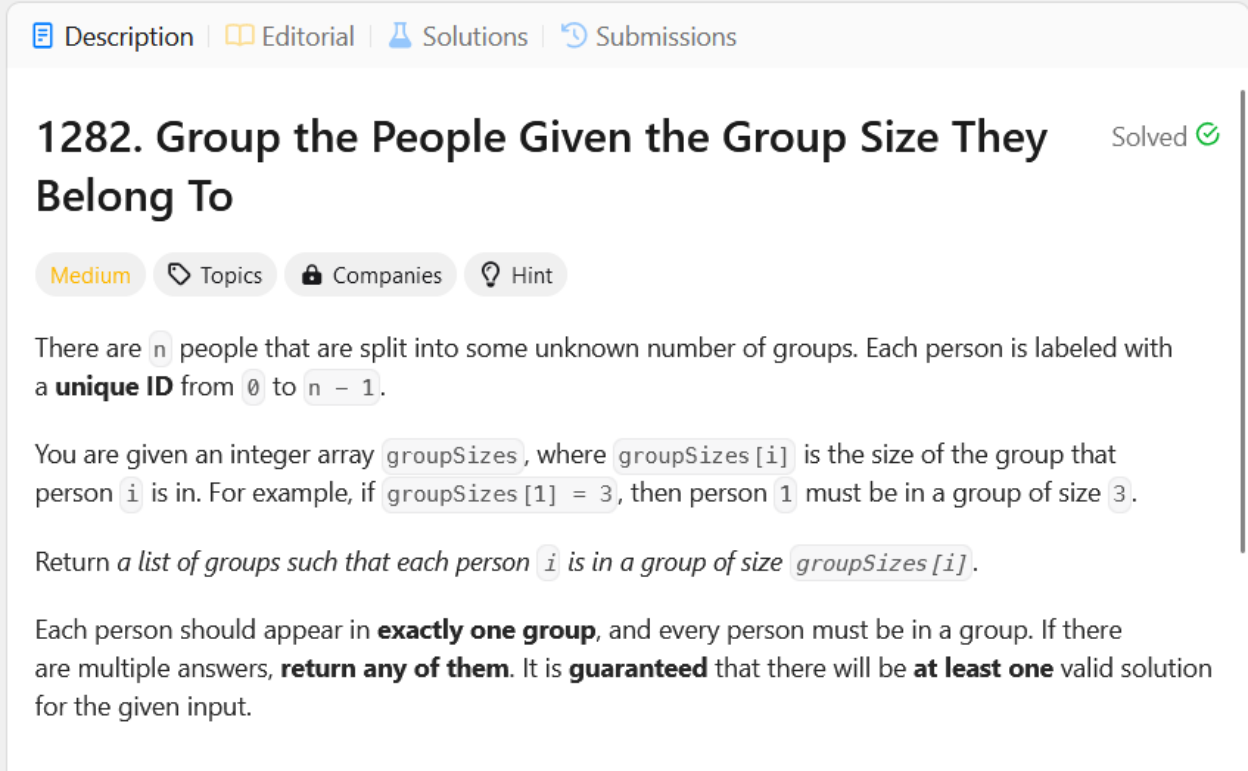
Branch: CSE **Section/Group: 646-A**
Semester: 6 **Date of Performance: 23-02-24**
Subject Name: Advanced Programming **Subject Code: 21CSP-351**

Aim: To demonstrate the concept of Graphs.

Problem 1: Is Graph Bipartite



Description | Editorial | Solutions | Submissions

1282. Group the People Given the Group Size They Belong To

Solved

Medium | Topics | Companies | Hint

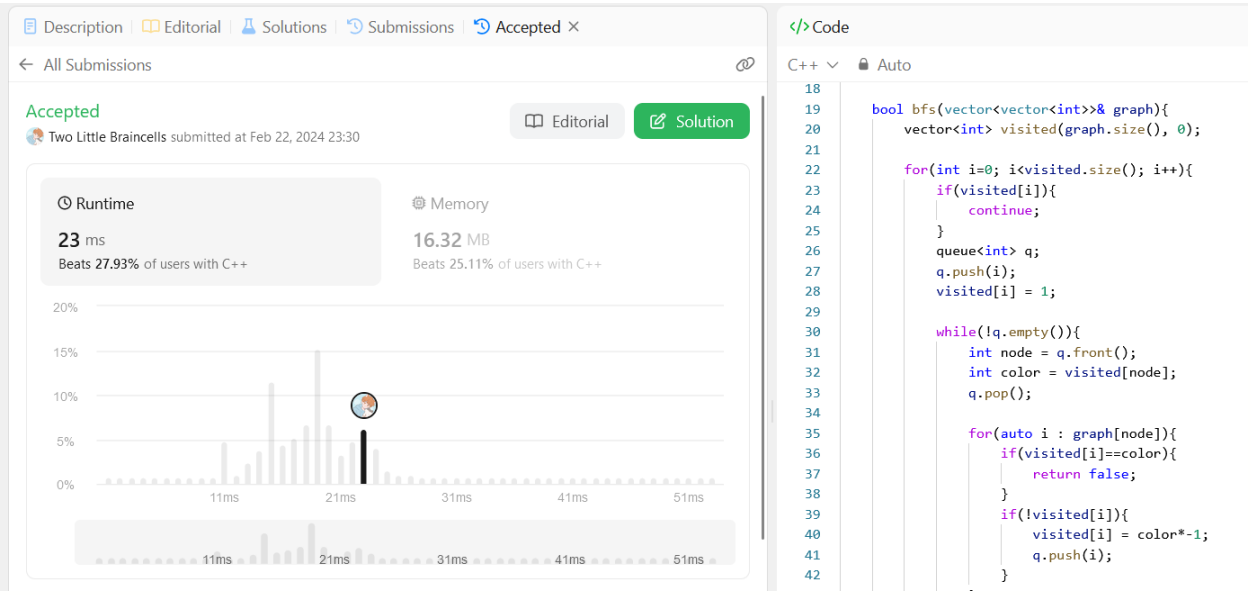
There are `n` people that are split into some unknown number of groups. Each person is labeled with a **unique ID** from `0` to `n - 1`.

You are given an integer array `groupSizes`, where `groupSizes[i]` is the size of the group that person `i` is in. For example, if `groupSizes[1] = 3`, then person `1` must be in a group of size `3`.

Return *a list of groups such that each person `i` is in a group of size `groupSizes[i]`*.

Each person should appear in **exactly one group**, and every person must be in a group. If there are multiple answers, **return any of them**. It is **guaranteed** that there will be **at least one** valid solution for the given input.

Code and output:




```
class Solution {
public:

    bool bfs(vector<vector<int>>& graph){
        vector<int> visited(graph.size(), 0);

        for(int i=0; i<visited.size(); i++){
            if(visited[i]){
                continue;
            }
            queue<int> q;
            q.push(i);
            visited[i] = 1;

            while(!q.empty()){
                int node = q.front();
                int color = visited[node];
                q.pop();

                for(auto i : graph[node]){
                    if(visited[i]==color){
                        return false;
```

```
                    }
                    if(!visited[i]){
                        visited[i] = color*-1;
                        q.push(i);
                    }
                }
            }
        }
        return true;
    }

    bool isBipartite(vector<vector<int>>& graph) {
        return bfs(graph);
    }
};
```

Problem 2: Group the people given the group size they belong to

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1282. Group the People Given the Group Size They Belong To

Solved

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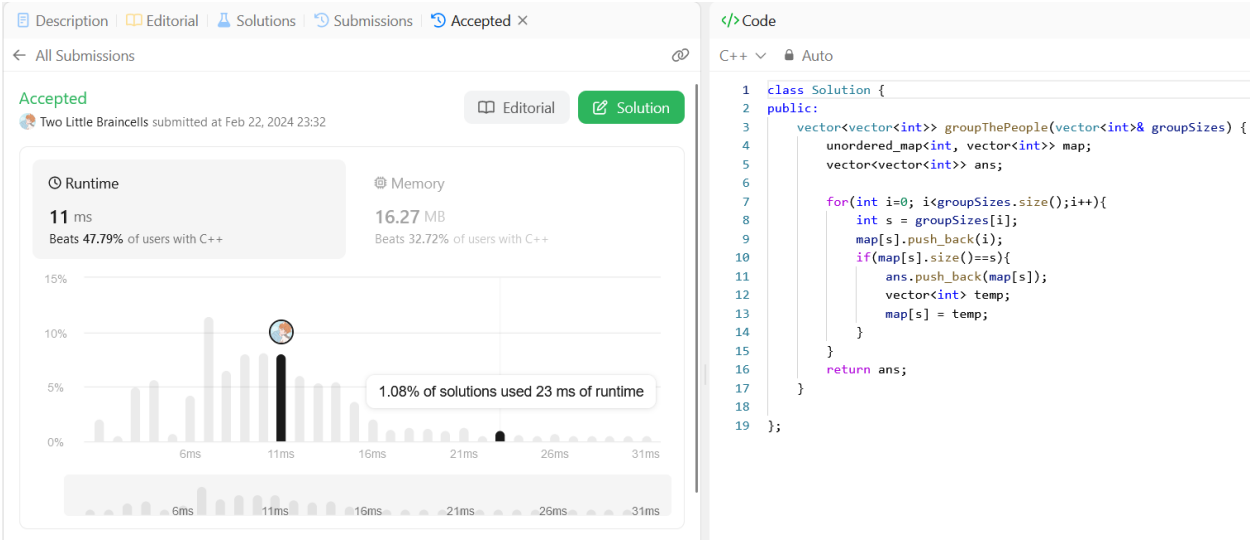
There are `n` people that are split into some unknown number of groups. Each person is labeled with a **unique ID** from `0` to `n - 1`.

You are given an integer array `groupSizes`, where `groupSizes[i]` is the size of the group that person `i` is in. For example, if `groupSizes[1] = 3`, then person `1` must be in a group of size `3`.

Return *a list of groups such that each person `i` is in a group of size `groupSizes[i]`.*

Each person should appear in **exactly one group**, and every person must be in a group. If there are multiple answers, **return any of them**. It is **guaranteed** that there will be **at least one** valid solution for the given input.

Code and output:




```
class Solution {
public:
    vector<vector<int>> groupThePeople(vector<int>& groupSizes) {
        unordered_map<int, vector<int>> map;
        vector<vector<int>> ans;

        for(int i=0; i<groupSizes.size();i++){
            int s = groupSizes[i];
            map[s].push_back(i);
            if(map[s].size()==s){
                ans.push_back(map[s]);
                vector<int> temp;
                map[s] = temp;
            }
        }
        return ans;
    }

};
```