【LeetCode】886. Possible Bipartition 解题报告（Python）

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题目地址：https://leetcode.com/problems/possible-bipartition/description/

题目描述：

Given a set of `N` people (numbered `1, 2, ..., N`), we would like to split everyone into two groups of any size.

Each person may dislike some other people, and they should not go into the same group.

Formally, if `dislikes[i] = [a, b]`, it means it is not allowed to put the people numbered `a` and `b` into the same group.

Return `true` if and only if it is possible to split everyone into two groups in this way.

Example 1:

```
Input: N = 4, dislikes = [[1,2],[1,3],[2,4]]
Output: true
Explanation: group1 [1,4], group2 [2,3]
```

Example 2:

```
Input: N = 3, dislikes = [[1,2],[1,3],[2,3]]
Output: false
```

Example 3:

```
Input: N = 5, dislikes = [[1,2],[2,3],[3,4],[4,5],[1,5]]
Output: false
```

Note:

1. 1 <= N <= 2000
2. 0 <= dislikes.length <= 10000
3. 1 <= dislikes[i][j] <= N
4. dislikes[i][0] < dislikesi
5. There does not exist i != j for which dislikes[i] == dislikes[j].

题目大意

一群人中有些人不喜欢对方因此不能放到同一个组里，问所有的人能否划分成两个组。

解题方法

这个题还是要抽象出来，抽象出一个二分图的模型。即不喜欢对方的两个人属于二分图中不同的部分。所以，这个题和785. Is Graph Bipartite?一模一样的。

同样使用dfs去做，需要把每个节点都当做起始节点去染色，这样判断是否有冲突。染色的方式是0-未染色，1-染了红色，-1代表染了蓝色。

时间复杂度是O(V + E)，空间复杂度是O(V + E).

代码如下：

```
class Solution(object):
    def possibleBipartition(self, N, dislikes):
        """
        :type N: int
        :type dislikes: List[List[int]]
        :rtype: bool
        """
        graph = collections.defaultdict(list)
        for dislike in dislikes:
            graph[dislike[0] - 1].append(dislike[1] - 1)
            graph[dislike[1] - 1].append(dislike[0] - 1)
        color = [0] * N
        for i in range(N):
            if color[i] != 0: continue
            bfs = collections.deque()
            bfs.append(i)
            color[i] = 1
            while bfs:
                cur = bfs.popleft()
                for e in graph[cur]:
                    if color[e] != 0:
                        if color[cur] == color[e]:
                            return False
                    else:
                        color[e] = -color[cur]
                        bfs.append(e)
        return True
```

参考资料：

https://www.youtube.com/watch?v=VlZiMD7Iby4

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