

Design and Analysis of Algorithm

Homework # 7

Due Date: 5th June 2021

Total Marks: 350 (15%+85% = 100%)

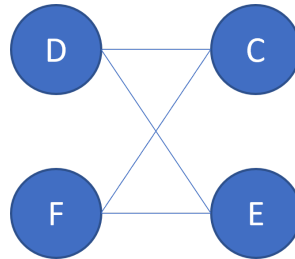
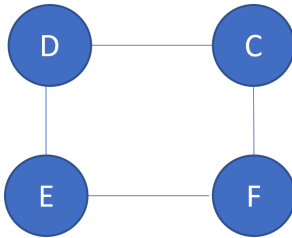
WE WILL CHECK PLAGIARISM IN THIS HOMEWORK - If we found a cheating case in this, there will be serious consequences. Make sure you work properly on this.

PART 1 - Due on Friday 28th May Night 11.59pm

Problem 1: Union-Find Application (Require C++ Code)

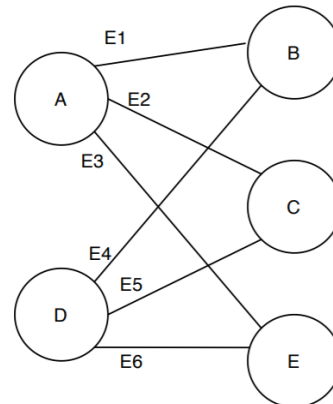
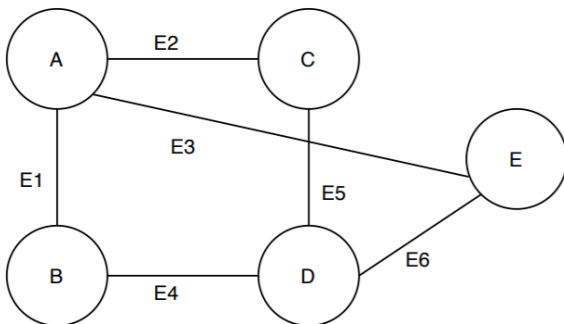
Marks 50 (15% of 100%)

There are two types of professional wrestlers: “Anglo Pehlwan” (“Pakistani Players”) and “Baanglo Pehlwan” (“Indian Players”). Between any pair of professional wrestlers, there may or may not be a rivalry. Suppose we have n professional wrestlers and we have a list of r pairs of wrestlers for which there are rivalries. Give an $O(n + r)$ - time algorithm that determines whether it is possible to designate some of the wrestlers as “Anglo Pehlans” and the remainder as “Baanglo Pehlwaans” such that each rivalry is between an Anglo and a Banglo. If it is possible to perform such a designation, your algorithm should produce it.



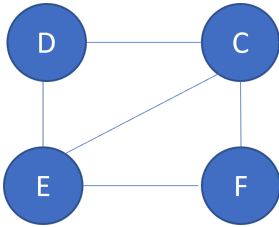
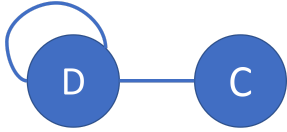
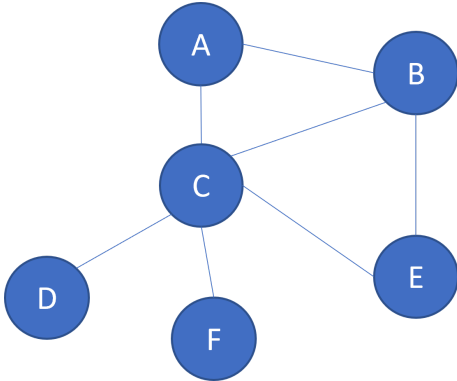
Yes, we can designate as (D,F) as Anglo Pehlwan and (C,E) as Baanglo Pehlwan **OR**

(D,F) as Baanglo Pehlwan and (C,E) as Anglo Pehlwan



Yes, we can designate as (A,D) as Anglo Pehlwan and (B,C,E) as Baanglo Pehlwan **OR**

(A,D) as Baanglo Pehlwan and (B,C,E) as Anglo Pehlwan

	We can not designate (D,C,E,F) as Anglo Pehlwan and Baanglo Pehlwan. Our condition did not meet that each rivalry (edge) is between an Anglo and a Banglo only
	We can not designate (C,D,) as Anglo Pehlwan and Baanglo Pehlwan. Our condition did not meet that each rivalry (edge) is between an Anglo and a Banglo only
	We can not designate (A,B,C,D,E,F) as Anglo Pehlwan and Baanglo Pehlwan. Our condition did not meet that each rivalry (edge) is between an Anglo and a Banglo only

Problem 2:
Solve 20 Problems of LeetCode and Test your solutions there.

Marks 5x(4x15) = 300 (85% of 100%)

Section 1: Select any 4 problems

Marks 4x15 = 60 (17%)

1	Clone Graph	https://leetcode.com/problems/clone-graph/
2	Course Schedule II	https://leetcode.com/problems/course-schedule-ii/
3	Graph Valid Tree	https://leetcode.jp/problemdetail.php?id=261
4	Alien Dictionary	https://leetcode.jp/problemdetail.php?id=269
5	Minimum Height Tree	https://leetcode.com/problems/minimum-height-trees/
6	Reconstruct Itinerary	https://leetcode.com/problems/reconstruct-itinerary/
7	Evaluate Division	https://leetcode.com/problems/evaluate-division/
8	Sequence Reconstruction	https://leetcode.jp/problemdetail.php?id=444
9	Redundant Connection	https://leetcode.com/problems/redundant-connection/
10	Redundant Connection II	https://leetcode.com/problems/redundant-connection-ii/
11	All Paths from Source lead to Destination	https://leetcode.jp/problemdetail.php?id=1059

PART 2 - Due on SATURDAY 5th June Night 11.59pm

Section 2: Select any 6 problems

Marks 6×20 = 120 (34%)

1	Network Delay Time	https://leetcode.com/problems/network-delay-time/
2	Couples Holding Hands	https://leetcode.com/problems/couples-holding-hands/
3	Is Graph Bipartite?	https://leetcode.com/problems/is-graph-bipartite/
4	Find Eventual Safe States	https://leetcode.com/problems/find-eventual-safe-states/
5	Similar String Groups	https://leetcode.com/problems/similar-string-groups/
6	Keys and Rooms	https://leetcode.com/problems/keys-and-rooms/
7	K-Similar Strings	https://leetcode.com/problems/k-similar-strings/
8	Possible Bipartition	https://leetcode.com/problems/possible-bipartition/
9	Minimize Malware Spread II	https://leetcode.com/problems/minimize-malware-spread-ii/
10	Regions Cut By Slashes	https://leetcode.com/problems/regions-cut-by-slashes/

Section 3: Select any 6 problems

Marks 6×20 = 120 (34%)

1	Satisfiability of Equality Equations	https://leetcode.com/problems/satisfiability-of-equality-equations/
2	Number of Squareful Arrays	https://leetcode.com/problems/number-of-squareful-arrays/
3	Path with Minimum Maximum Value	https://leetcode.jp/problemdetail.php?id=1102
4	Connecting Cities with Minimum Cost	https://leetcode.jp/problemdetail.php?id=1135
5	As Far from Land as Possible	https://leetcode.com/problems/as-far-from-land-as-possible/
6	Flower Planting With No Adjacent	https://leetcode.com/problems/flower-planting-with-no-adjacent/
7	Shortest Path with Alternating Colors	https://leetcode.com/problems/shortest-path-with-alternating-colors/
8	Validate Binary Tree Nodes	https://leetcode.com/problems/validate-binary-tree-nodes/
9	Parallel Courses	https://leetcode.jp/problemdetail.php?id=1136
10	Sort Items by Groups Respecting Dependencies	https://leetcode.com/problems/sort-items-by-groups-respecting-dependencies/
11	Path with Maximum Probability	https://leetcode.com/problems/path-with-maximum-probability/