### **L1 (Introduction to Graphs and Trees)**

1. NA

### **L2 (Tree Traversal Techniques and DP on Trees)**

1. Getting the nearest leaf node from the root in an undirected rooted tree. (Bonus: Print the Path)
2. Find Minimum Vertex Cover of a tree
3. <https://codeforces.com/problemset/problem/982/C> (hw)
4. <https://codeforces.com/problemset/problem/1139/C> (hw)
5. <https://www.codechef.com/problems/SUBREM> (hw)
6. <https://www.interviewbit.com/problems/largest-distance-between-nodes-of-a-tree/> (hw)

### **L3 (Mixed Problem Solving - 1)**

1. <https://www.codechef.com/problems/FAMTREE>
2. <https://www.codechef.com/problems/TREEVERS>
3. <https://codeforces.com/problemset/problem/1143/C> (hw)
4. <https://codeforces.com/problemset/problem/1139/C> (hw)
5. <https://codeforces.com/problemset/problem/1404/B> (hw)

### **L4 (Doubt Clearing Session + Problem Solving)**

1. Discussed previous practice problems
2. <https://codedrills.io/contests/amrita-icpc-practice-session-1/problems/aliens-attack>
3. <https://cses.fi/problemset/task/1133>
4. <https://codeforces.com/problemset/problem/1324/F> (hw)

### **L5 (Disjoint Set Union)**

1. Given N people, it is given that these all are friends, then after each day, a pair of friends stops being friends, so find the number of friend groups after each day.
2. Given N and Q. Answer q queries of type (g,a,b)
   1. In a query (g,a,b), we need to imagine a graph with N nodes, s.t. there is an edge between (i,j) iff gcd(i,j) >= g, now we need to answer if a and b will be in the same connected component in this graph or not?
3. <https://www.codechef.com/problems/PERCAPTA> (hw)
4. <https://codeforces.com/problemset/problem/1263/D> (hw - added later)

### **L6 (Graphs Traversals)**

1. Given an undirected unweighted graph, a source and a destination. Find all the nodes which come in at least one shortest path from source to destination.
2. <https://codeforces.com/problemset/problem/1093/D>
3. <https://codeforces.com/problemset/problem/1093/D> (hw)
4. <https://codeforces.com/contest/913/problem/B> (hw)
5. <https://cses.fi/problemset/task/1669/> (hw)
6. <https://cses.fi/problemset/task/1676> (hw)
7. <https://codeforces.com/problemset/problem/1213/G> (hw)
8. <https://leetcode.com/problems/shortest-path-in-a-grid-with-obstacles-elimination/> (hw - added later - do try)

### **L7 (Mixed Problem Solving - 2)**

1. Given a directed graph. Every edge has a value and only a person having rank >= value can cross that edge. Now, given a source and a destination, find the minimum rank required by a person to go to destination from source and then come back to source.
2. Given an undirected, unweighted graph with red/blue edges. Find shortest distance between given source and destination when:

* You have to start from the red edge and finish at the blue edge.
* No self loops, multiple edges.
* You can switch from red to blue only once

1. <https://leetcode.com/problems/path-with-minimum-effort/> (hw)

### **L8 (Doubt Clearing Session + Problem Solving)**

1. <https://www.hackerrank.com/challenges/kundu-and-tree/problem> (hw)
2. <https://codedrills.io/contests/icpc-gwalior-pune-2020-regional-round/problems/buy-n-large> (hw)
3. <https://codeforces.com/problemset/problem/1324/F> (hw)
4. <https://codeforces.com/edu/course/2/lesson/7/1/practice/contest/289390/problem/E> (hw)
5. <https://www.spoj.com/problems/KOICOST/> (hw)
6. Sol to KOIKOST - <https://www.youtube.com/watch?v=XaVUt9pC3t0>

### **L9 (Multi-source BFS, 0-1 BFS and Cyclic Graphs)**

1. <https://www.codechef.com/problems/SNSOCIAL>
2. <https://www.codechef.com/problems/REVERSE>
3. <https://codeforces.com/contest/612/problem/E>
4. <https://www.codechef.com/UATG001> (for practice of questions till L9)
5. <https://leetcode.com/problems/minimum-cost-to-make-at-least-one-valid-path-in-a-grid/> (hw - added later)

### **L10 (DFS in Directed Graphs and Topological Sorting)**

1. <https://cses.fi/problemset/task/1680> (Longest path in DAG)
2. Find lexicographically smallest Topological Sorting of a given DAG.
3. <https://codeforces.com/problemset/problem/1217/D> (hw - added later)
4. <https://codeforces.com/problemset/problem/510/C> (hw - added later - do try)
5. <https://codeforces.com/contest/1388/problem/D> (hw - added later - good one)

### **L11 (Mixed Problem Solving - 3)**

1. <https://www.spoj.com/problems/PPATH/>
2. Given a directed unweighted network of cities. It is also given that some cities have hospitals in them. Find the distance to the nearest city with a hospital from every city.
3. Given a rectangle, and N circles (lying inside or on the boundary of the rectangle). Find if there exists a path from the left edge of the rectangle to its right edge without touching any circle.
4. <https://www.codechef.com/COLE2020/problems/CLLEXO>
5. <https://leetcode.com/problems/largest-color-value-in-a-directed-graph/> (hw)
6. <https://www.codechef.com/problems/SEGDIR> (hw - do try)
7. <https://www.codechef.com/problems/DIGJUMP> (hw)
8. <https://codeforces.com/problemset/problem/1106/D> (hw)
9. <https://codeforces.com/contest/1214/problem/D> (hw)

### **L12 (Doubt Clearing Session + Problem Solving)**

1. <https://www.codechef.com/INOIPRAC/problems/TINOI17A>
2. <https://cses.fi/problemset/task/1669>
3. <https://cses.fi/problemset/task/1194>
4. <https://www.spoj.com/problems/KOICOST/>
5. <https://cses.fi/problemset/task/1680>

### **L13 (Dijkstra's Algorithm and its Applications)**

1. An infinite matrix is given. There are 2\*N teleportation machines in N different pairs of cities. You can either use any number of those machines. Teleporting will take K seconds, otherwise going from (x1,y1) to (x2,y2) will take manhattan dist. seconds. Find min time to reach dest from src. (N<=1000, 1<=K,x,y<=1e9)
2. <https://www.hackerearth.com/practice/algorithms/graphs/shortest-path-algorithms/practice-problems/algorithm/shortest-path-revisited-9e1091ea/> (hw)
3. <https://codeforces.com/contest/938/problem/D> (hw - do try)
4. <https://codeforces.com/problemset/problem/1433/G> (hw - do try)
5. <https://codeforces.com/contest/1579/problem/F> (try to think with graph)

### **L14 (Bellman Ford and Floyd Washall Algorithms)**

1. <https://www.codechef.com/problems/BESTPATH>
2. <https://codeforces.com/problemset/problem/295/B>

### **L15 (Mixed Problem Solving - 4)**

1. <https://codeforces.com/contest/1473/problem/E>
2. 1 <= N, M <= 100000, 1 <= Stations <= 30, 1 <= Capacity <= 100000. A and B are given. A will have a fuel station, it is guaranteed. Initial fuel is 0
3. <https://codeforces.com/problemset/problem/1196/F>
4. <https://codeforces.com/problemset/problem/1486/E> (hw)

### **L16 (Doubt Clearing Session + Problem Solving)**

### **L17 (Prim's and Kruskal's Algorithms (Minimum Spanning Trees))**

### **L18 (Strongly Connected Components and Condensation Graph (Journey back to Directed Graphs))**

1. <https://www.codechef.com/FFC12019/problems/AERTS>

### **L19 (Mixed Problem Solving - 5)**

1. <https://www.codechef.com/problems/GALACTIK>
2. <https://codedrills.io/contests/icpc-amritapuri-2020-preliminary-round/problems/minimum-weight-bi-partition>
3. <https://www.codechef.com/HK362020/problems/ONELAND>
4. <https://www.codechef.com/problems/MCO16405>

### **L20 (Doubt Clearing Session + Problem Solving)**

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