**Algorithmic Thinking in Problem Solving**

**Fall 2020**

**Final Exam**

1. **Solve 4 of the following LeetCode problems.**

* <https://leetcode.com/problems/network-delay-time/>
* <https://leetcode.com/problems/evaluate-division/>
* <https://leetcode.com/problems/redundant-connection/>
* <https://leetcode.com/problems/count-servers-that-communicate/>
* <https://leetcode.com/problems/keys-and-rooms/>
* <https://leetcode.com/problems/is-graph-bipartite/>
* <https://leetcode.com/problems/regions-cut-by-slashes/>

1. **Select 1 of your solutions and create a video where do the following:**
   1. Before explaining your code, explain the main idea behind it. That is, explain the algorithm at an abstract level. Use a couple of instances of the problem (draw them) to guide you.
   2. Explain how your algorithm was translated into code. Walk us through it.
   3. Talk about edge cases and how you handled them
   4. Talk about the time and auxiliary space complexity of your solution. If your problem can be solved by brute force, compare your solution to the brute force solution.
   5. Reflect on what learnt from solving all the problems in the set. What was added to your toolbox? How are you a better problem solver?
   6. Talk about how IDEAL, Duke 7, and your personalized framework helped you tackle this problem.

e. Its been a while since I have not revisited the topic(algorithms) and I have already taken these classes. Honestly I was feeling that it will be a long path in order to understand it again, however, solving again and using algorithms helped me with confidence and game me the motivation to study all the topics. It was difficult to solve this problem however, I gained knowledge about the algorithm for future use.

f. duke7:

1. Work some small instances by hand

2. Write down what you did

1. Find Patterns
2. Check by hand (trace it using small instances with the algorithm)
3. Translate it to code
4. Run test case
5. Debug Failed Test Cases

IDEAL:  
I. identify the problem

D: Define your goals

E: Explore possible strategies or solutions

A: Anticipate outcomes and Act

L: Look and Learn