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CSCI 406 Algorithms, Section A

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Project 3: Dynamic Programming

Describe the main idea of your approach including how you break the problem into smaller recursive problems

The main recursive problem is that finding the ideal solution for n days does not also give the ideal solution for n+1 days. Each day n has a projected demand of kn, so there are at most kn+1 order size possibilities. This means that day n-1 has kn-1+kn-tank size possibilities, as you can order additional gas for any given day as long it does not exceed the size of tank.

To find the optimal cost for n days, you find every possible cost for n-1 days, and modify the demand for the n-1th day for each possibility stated above. The optimal cost of all those solutions gives the optimal cost and solution for all n days.

The base case is the scenario of having to buy gas for a single day. This cost never changes as it is only the price of placing an order. Since the demand for that single day does not matter, only the overnight storage costs and orders for subsequent days are what change the overall solution costs. This is what allows us to go back and add days when determining the cost of any n number of days.

Write pseudocode for your dynamic programming algorithm

Insert Text Here

Develop a traceback algorithm that returns the days on which to place orders and how much.

Insert Text Here

Theory: Derive the complexity of your algorithm in terms of n.

Insert Text Here