Assignment 3- Analysis of Algorithm

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1. The worst-case running time of this algorithm is Θ(n2 ). There are n − 1 for-loops and each has Θ(i) running time.

The dynamic programming using memoized cut rod algorithm solves the problem of optimal solution and bring down the exponantial run time to Θ(n2 ).

In total there are n-1 choices in a particular permutation of combination of cuts.

This problems makes use of memorization of overlapping problems and uses already sored value for optimal solution rather than calculating again and again. Other approach is to use Bottom up approach where smaller problems are solved first and then stored. The sasymptotic running time of both of them are similar i.e Θ(n2 ). But Bottom up approach proves to me more simpler and efficient as its approach botom up solving smaller problems and storing proves optimally better than top-down.

1. The analysis of optimality is similar to the binary Huffman coding case. We take the 3 lowest frequent characters in the alphabet and replace them with one a single node with frequency equal to the sum of frequency of three least occuring characters. Using Lemma 16.2 and 16.3 of the textbook, we replace x , y with x , y and z in order to represent the three nodes of a single node.