

Due by Feb 2, 11:59 pm.

1. (40 points) There are m types of coins available in infinite quantities where the value of each coin is given in the array $C = [c_0, \dots, c + m]$. Determine the number of ways of making change for n units using the given types of coins?

Write an algorithm that takes n, m and C , and returns number of ways to make change for n units using any number of coins having the values given in C .

2. (20 points) Given an array $A = [a_1, \dots, a_n]$, find the length of the longest subsequence such that all elements of the subsequence are sorted in strictly ascending order. Write the algorithm, and analyze its run-time and space usage.
3. (40 points) Let $P(n)$ denote number of ways to parenthesize n matrices. Write its recurrence relation and show it is $\Omega(4^n/n^{1.5})$. (To show the Ω notation, solve problem 12-4 of CLRS. Show your result for each step of 12-4.)