EL9343 Homework 10

(Due Apr 22th, 2022)

No late assignments accepted

All problem/exercise numbers are for the third edition of CLRS text book

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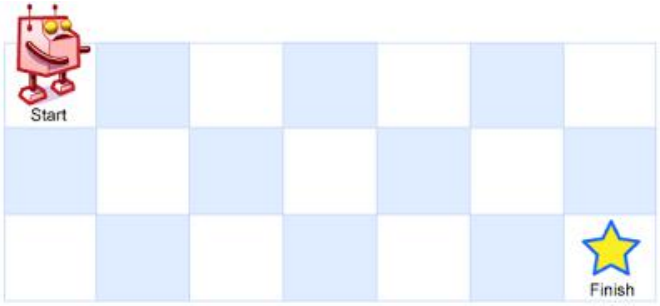
1. A robot is located at the top-left corner of a m x n grid (marked 'Start' in the diagram below).The robot can only move either down or right at any point in time. The robot is trying to reach the bottom-right corner of the grid (marked 'Finish' in the diagram below).How many possible unique paths are there?



2. Suppose that in a 0-1 knapsack problem, the order of the items when sorted by increasing weight is the same as their order when sorted by decreasing value. Give an efficient algorithm to find an optimal solution to this variant of the knapsack problem and argue that your algorithm is correct.

3. Design a greedy algorithm for making change consisting of quarters, dimes, nickels, and pennies.
   (a)Provide the pseudocode.
   (b)Write down the running time of your algorithm

4. The Fibonacci numbers are defifined by recurrence CLRS(3.22). Give an O(n)-time dynamic-programming algorithm to compute the nth Fibonacci number. Draw the subproblem graph for n=4. How many vertices and edges are in the graph?