Taeyong Lee

DP Assignment

Glass falling

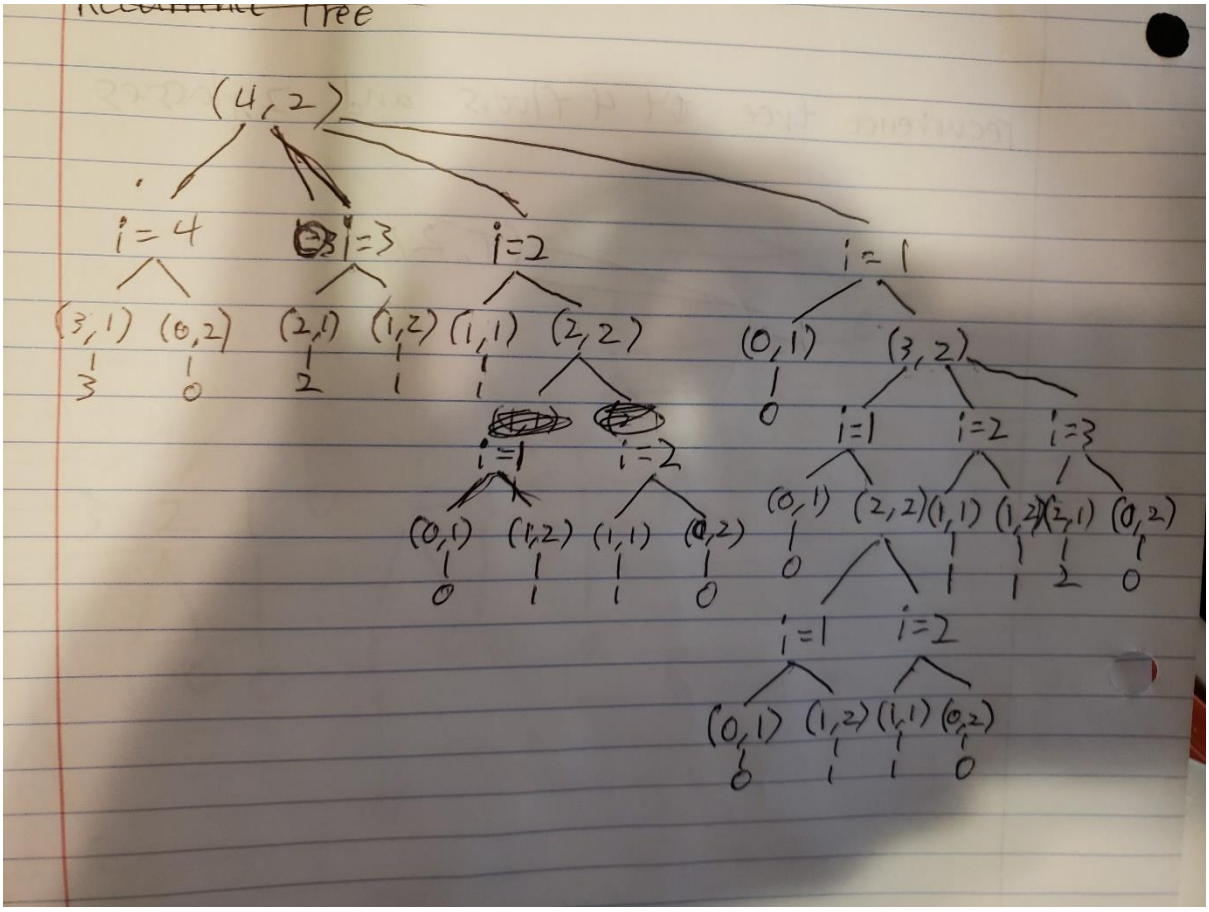
(a) There are 2 cases when you drop glass at floor i.

Case 1 : glass shattered. you have to try drop test again with less than i floors and one less glasses

Cass 2 : glass doesn't shattered. you have to try drop test again with more than i floors and same number of glasses.

In either cases, problem to solve become smaller subproblems from original by recursive solution.

(b) Recurrence Tree of 4 floors and 2 sheets




(c) Please check my pull request on GitHub.

(d) (0,1), (0,2), (1,1), (1,2), (2,1), (2,2), (3,1), (3,2)
8 distinct subproblems

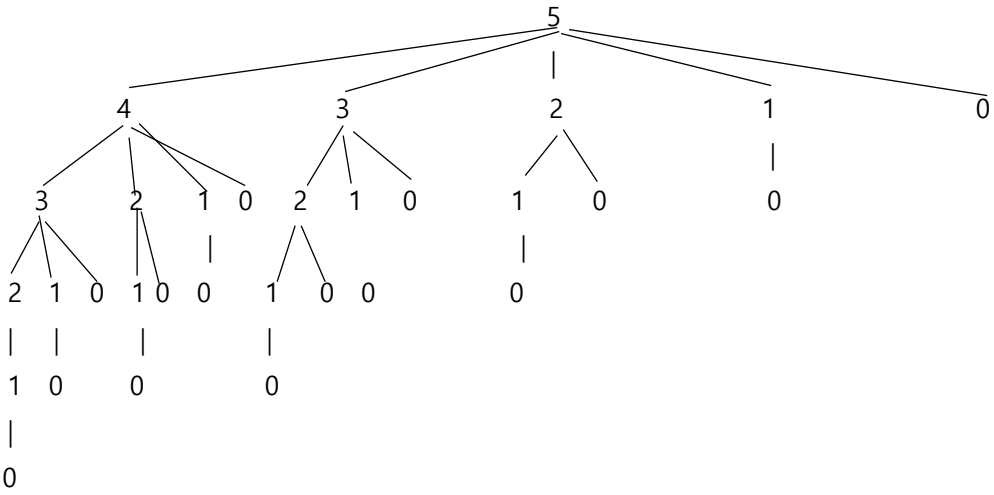
(e) m*n distinct subproblems.

(f) Add 2-dimension array to recursive to save value of subproblem calculated and return it when it is necessary instead calculate it again. So, you don't need to calculate same problem twice or more and a lot of time will be saved.

(g) Please check my pull request on GitHub.

Rod Cutting

(a) Recursion Tree of length 5




(b) Let the p1 = 1, p2 = 5 p3 = 7, and n = 4. The greedy algorithm will cut the rod to 3 first because p3 has largest value. And there's remaining rod p1 is 1. So total value will be 8. However, this is not the largest value possible because total value can be 10 which is more than 8 if I cut the rod to 2 and 2 with optimal algorithm.