
DSC 190 - Discussion 05

Problem 1.

Modify the `DisjointSetForest` data structure so that it keeps track of the maximum and minimum keys within each disjoint set without adding to the time complexity of any of the operations.

Problem 2.

The *fractional knapsack* problem is as follows. You have a bag that can hold B liters. In front of you are n piles of gold dust, silver dust, etc. The i th pile contains s_i liters of dust, and the dust in the pile is worth w_i dollars in total. You may choose any amount of dust from any pile to put in your bag (up to s_i). Your goal is to maximize the value of the dust in your bag.

Describe a greedy algorithm for solving this problem. Is it guaranteed to find the optimal answer?