PSO #6

Week 8

Warm-up #1

Given 3 arrays of positive numbers, you can remove one element at a time from any array, but it must be from the end of that array. Determine a greedy algorithm to remove the minimum number of elements from the end of the arrays such that the sum of the elements of the three arrays are all equal.

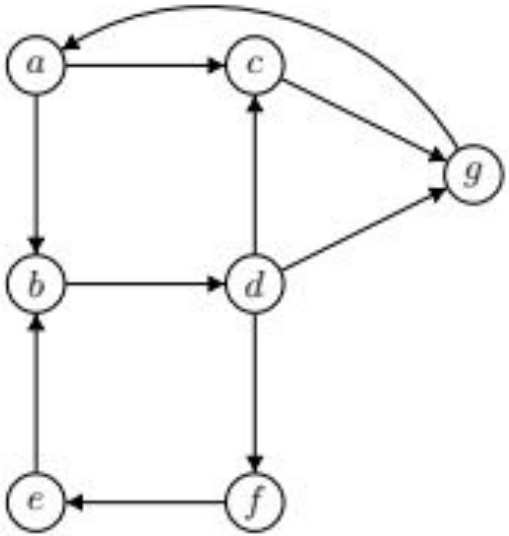
Warm-up #2

Consider m hard drives D1, D2, . . . , Dm, each with capacity Cm. You receive a stream of n requests for memory, one at a time, each requesting for memory of size k1, k2, . . . , kn. Memory must be allocated if possible, and freeing is not considered.

Develop a greedy algorithm to handle the stream of requests, and determine if it is optimal.

Problem #1

Run DFS and BFS on the following graph (start from vertex a)



Problem #2

Let G be a weighted directed graph with negative weights (but no negative cycles). We want to find the length of the shortest path from s to every vertex. Alice proposes the following in order to apply Dijkstra's:

- Find the minimum weight M in G
- Add |M| to the weight of every edge in G
- All edges are now positive, so apply Dijkstra's

Does this work?

Problem #3

Given an undirected graph G (positive weights only), determine a collection of edges to form G’ where each vertex is connected to each other vertex and the product of the edge weights is minimized.

Design a greedy algorithm to produce such a collection of edges.