1 Practice Greedy 1

Given a 2 sequences of n integers: $\{a_1, a_2, \ldots, a_n\}$, and $\{b_1, b_2, \ldots, b_n\}$, find a re-arrangment of these integers $\langle a_{i_1}, a_{i_2}, \ldots, a_{i_n}\rangle$ and $\langle b_{i_1}, b_{i_2}, \ldots, b_{i_n}\rangle$ such that:

$$\sum_{j=1}^{n} a_j b_j$$

is minimised.

2 Practice Greedy 2

Given a set of coin denominations $\{1, c, c^2, c^3, \ldots, c^k\}$, show that finding change by using the following greedy algorithm is correct:

$$f(n) = f(n-c) + 1$$

where c is the largest denomination that is still less than or equals to n. (Hint: you might need the geometric progression somewhere.)

2.1 A few hints:

What can we saay about the optimal solution if $c^{i-1} \leq n < c^i$ for some i? What type of coin must it at least contain?

At most how many coins can it have of any denomination?

You might need the geometric progression somewhere.

3 Practice Greedy

There are many variants of Djkstra's algorithm. For the one in **Wikipedia (click on me!)**, given as input a positively weighted graph, identify the greedy choice that the algorithm is making, and show that the greedy choice does in fact lead to the algorithm finding the shortest path correctly from the source to any other vertex.