

Techniques for Greedy Algorithms

Winter 2023

1 Greedy Algorithm Design

Try and find a good decision criteria. Sometimes this will involve guessing and throwing out options that don't work. Sometimes it might help to try to find a single safe decision that you can make.

2 Exchange Arguments

The most general method of proof is the exchange argument. The idea is to show that any solution can be turned into a greedy solution one step at a time without making it any worse. In each step, you want to make your solution agree with one more decision made by your greedy algorithm. Also, remember here that somewhere you are going to have to make use of your greedy decision criteria.

3 Another Proof Method

The proofs that we used for the greedy algorithms for Huffman Codes and Kruskal's algorithm use the same idea. First find a *single decision* which can be assumed to be on the optimal solution. Then given this decision, reduce to a simpler version of the same problem and repeat.

4 Practice Problems

[[Some other Greedy algorithm examples]]