Algorithms & Complexity 2/24/2017

0145-344-001

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ANNOUNCEMENTS

Topic: Greedy Algorithms & Minimum Spanning Tree

PowerPoint: <http://home.adelphi.edu/~siegfried/cs344/344l6.pdf>

* Optimization problems try to find the best solution from all feasible ones. (ex: shortest path).
* Greedy algorithms seek to take the best option it sees right away in hope of optimizing some outcome. (going for the best **local** option in hope of optimizing the **global** outcome). However, they only work in some cases.

Example Where Greedy Algorithm does **not work**:

Given coins of 4 cent, 3 cent, and 1 cent coin. find the minimum # of coins that make up 6 cents.

The greedy algorithm will choose the highest (4-cent coin) and then 2 1-cent coins, totaling 6 cents. However, two 3-cen coins would be a more optimal choice.

**Minimum Spanning Trees (MST)**

A **spanning tree** is a subset of a graph, G, which connects all vertices of G with the minimum possible number of edges.

A **minimum spanning tree** is a spanning tree that minimizes the weights of the edges.

**Kruskal’s Algorithm**

<https://www.tutorialspoint.com/data_structures_algorithms/kruskals_spanning_tree_algorithm.htm>

**Prim’s Algorithm** <https://www.tutorialspoint.com/data_structures_algorithms/prims_spanning_tree_algorithm.htm>

**Scheduling Problem**

**Knapsack Problem**