9/10/14

Suppose now that we must cut stick into exactly \( k \) pieces.
\[ f(x) = \max \left\{ \sum_{\ell} f_{\ell}(x), f(x) \right\} \]

place to cut

k-1 piece

1st cut
Each path in tree has a value

Break up tree into vertex disjoint paths to maximize total value.
First decision: choose path containing root.

Maximize over choices to pull.

Evaluate trees with lowest root first order.

Need to know value.
\[ f(l) = \max_{x_i} \left[ \nu x_i + f(x_i) \right] \]
Combinatorial Optimization:

1. Minimum length spanning tree
2. Shortest path
3. Assignment problem.
Minimum Spanning Tree

Connected

Given a graph $G$ with edge weights

Problem: find spanning tree of minimum total weight
Kruskal's Algorithm:

Greedy Algorithm:

Take edge $e_i$ in order $e_1, e_2, \ldots$

where $w(e_i) \leq w(e_j)$

Include edge if does not make cycle.
Dijkstra's Algorithm

Having constructed partial tree $T$

Added shortest edge from $T$ to $T$
More general algorithm: Having chosen
\[ F = \{ e_1, e_2, \ldots, e_k \} \]
\[ \text{collection of disjoint sub-liee} \ T_1, T_2, \ldots, T_k \]
Choose any \( T_i \) and add the shortest edge from \( T_i \) to \( \overline{T_i} \).