

Knapsack Problem

A boy scout has to pack his knapsack, which has some certain capacity, by choosing from among a set of items. Each item has a certain size and a certain value (survival value). He must select items so that they fit in the knapsack (the total of the sizes cannot exceed the capacity) and they should have a maximum possible total value. Which items should be selected?

$$\text{Capacity} = 12$$

Item	Size	Value
Matches		
Knife		
Rope		

Each item is represented exactly once in the list. Each item will either be chosen or not chosen in its entirety (you can't bring a fractional part of an item). If you have more than one of the same type of item, they would each be represented as separate entries in the list (e.g., if you had 3 rolls of toilet paper that you were considering, you would have 3 separate listings `toiletPaperRoll #1`, `toiletPaperRoll #2`, `toiletPaperRoll#3`).

Knapsack Problem

Given a set S of n items, where the i^{th} item has size s_i and value v_i , and given a knapsack of capacity C , determine a subset $S' \subseteq S$ such that $\sum_{i \in S'} s_i \leq C$ and such that the total value $\sum_{i \in S'} v_i$ is a maximum.