

Is it possible that the best solution doesn't fill the knapsack completely?

Yes. Suppose you could also steal a diamond.

This is a big diamond: it weighs 3.5 pounds. It's worth a million dollars, way more than anything else. You should definitely steal it! But there's half a pound of space left, and nothing will fit in that space.



EXERCISE

9.2 Suppose you're going camping. You have a knapsack that will hold 6 lb, and you can take the following items. Each has a value, and the higher the value, the more important the item is:

- Water, 3 lb, 10
- Book, 1 lb, 3
- Food, 2 lb, 9
- Jacket, 2 lb, 5
- Camera, 1 lb, 6

What's the optimal set of items to take on your camping trip?

Longest common substring

You've seen one dynamic programming problem so far. What are the takeaways?

- Dynamic programming is useful *when you're trying to optimize something given a constraint*. In the knapsack problem, you had to maximize the value of the goods you stole, constrained by the size of the knapsack.
- You can use dynamic programming when the problem can be broken into discrete subproblems, and they don't depend on each other.

