capacity -= item[1]

return knapsack

Example

Consider the following set of items - items = [(10, 2), (20, 5), (30, 10)], capacity = 15

The greedy method will first add the item with the highest profit-to-weight ratio, which is (30, 10). This item has a profit of 30 and a weight of 10, so the knapsack still has 5 units of capacity remaining.

The next item with a positive profit-to-weight ratio is (20, 5). This item has a profit of 20 and a weight of 5, so the knapsack can still fit it.

The last item, (10, 2), cannot fit in the knapsack, so it is not added.

The greedy method will therefore return the following items:

[(30, 10), (20, 5)]

The total profit of these items is 50, which is the maximum possible profit that can be obtained from a subset of these items with a total weight of 15.

Time complexity

The time complexity of the knapsack greedy method is O(n log n), where n is the number of items. This is because the sorting step takes O(n log n) time, and the remaining steps take O(n) time.

Advantages

- The knapsack greedy method is simple to implement and it can be used to solve knapsack problems quickly.
- It is also a good approximation to the optimal solution.

Disadvantages