

Solve the fractional knapsack problem for the following items (listed alphabetically) with the specified weight and benefits. Suppose you have a knapsack that can carry 11 lbs.

- A: 2 lb worth \$40 total
- B: 3 lb worth \$30 total
- C: 3 lb worth \$15 total
- D: 4 lb worth \$100 total
- E: 16 lb worth \$32 total
- F: 2 lb worth \$100 total
- G: 5 lb worth \$5 total
- H: 1 lb worth \$100 total

Solution: First, calculate the value per pound of each item, and sort them by descending value. Then, we will process items in this order:

1. H: 1 lb worth \$100 total. Values \$100 per lb.
2. F: 2 lb worth \$100 total. Values \$50 per lb.
3. D: 4 lb worth \$100 total. Values \$25 per lb.
4. A: 2 lb worth \$40 total. Values \$20 per lb.
5. B: 3 lb worth \$30 total. Values \$10 per lb.
6. C: 3 lb worth \$15 total. Values \$5 per lb.
7. E: 16 lb worth \$32 total. Values \$2 per lb.
8. G: 5 lb worth \$5 total. Values \$1 per lb.

We have 11 lbs that the knapsack can carry. Take as much of the most valuable items that we can. This includes: 1 lb of item H (adds \$100 worth), 2 lb of item F (adds \$100 worth), 4 lb of item D (adds \$100 worth), 2 lb of item A (adds \$40 worth), and only 2 lb of item B (adds \$20 worth).