Quiz 3

Question:

Can the same greedy algorithm, which was used for the fractional knapsack problem, be used for the 0/1 knapsack problem? Provide a proof or a counterexample.

Answer:

No, it cannot. Here is a counterexample. Assume W=50 and we have the following items:

Item	Value	Weight	Value / Weight
1	60	10	6
2	100	20	5
3	120	30	4

Greedy approach: We take item 1 and item 2 and skip item 3. This will give a total value of 160.

Optimal solution: We take item 2 and item 3 with a total value of 220.

As can be seen, the greedy approach doesn't yield an optimal solution.