Homework 1 - Knapsack Problem

Suppose you have five items with a total weight of 100 lbs that you want to ship via USPS in a box. However, the maximum allowable weight for domestic shipping is 70 lbs so clearly you can't ship them all in one box. You can only afford to ship one box so you want to determine which are the best items to ship. Assume you have assigned a value to each item. The weight in pounds and value of each item is listed in the table below.

Item	Value	Weight
A	12	16
B	10	20
C	15	25
D	16	30
E	9	9

1. Obtain a solution to this problem using the Greedy Algorithm where the criteria for choosing the next item is the one with the highest value.
   (a) List the items in order from highest to lowest value.
   (b) Go through 5 loops of the algorithm where you consider an item and decide whether or not to add the item to the box or discard it. Tabulate your results in a table like the one below.

Loop	Item to check	Item Weight	Item Value	Action (add or discard)	Items in Box	Current weight of items in box	Current value of items in box
1	D	30	16				

2. Obtain a solution to this problem using the Greedy Algorithm where the criteria for choosing the next item is the one with the highest value to weight ratio.
   (a) First determine the ratio of value/weight for each item and them list them in order from highest to lowest ratios.
   (b) Go through 5 loops of the algorithm where you consider an item and decide whether or not to add the item to the box or discard it. Tabulate your results in a table like the one from part (1.)
   (c) Compare results with (1.)