1. Let be the function solving the problem.

We can see that this problem is just the minimization variant of the knapsack problem if we restate the algorithm as follows:

Minimize

Subject to and

We can prove the correctness using proof by induction.

Base case:

Induction step: When we compute where and , we already have and computed correctly. The algorithm only has to considering the current item s either not added to the knapsack, represented by , or added to the knapsack, represented by . Therefore, the computed value for would be correct.