CS 312: Algorithm Analysis

Homework Assignment #21 – Local Search

Design a local search algorithm for the 0-1 knapsack problem. Assume there are \( n \) items \( x_1 \ldots x_n \) each with weight \( w_i \) and value \( v_i \). The knapsack can have at most one of each item and the total weight cannot exceed \( W \). You want to maximize the total value in the knapsack.

**Question 1:** (7 points) Show the pseudocode/explanation for your algorithm.

**Question 2.** (3 points) Is it guaranteed to find an optimal solution? Justify your answer.