

0 - 1 Knapsack Problem

Medium Accuracy: 47.21% Submissions: 48892 Points: 4

You are given weights and values of **N** items, put these items in a knapsack of capacity **W** to get the maximum total value in the knapsack. Note that we have only **one quantity of each item**.

In other words, given two integer arrays **val[0..N-1]** and **wt[0..N-1]** which represent values and weights associated with **N** items respectively. Also given an integer **W** which represents knapsack capacity, find out the maximum value subset of **val[]** such that sum of the weights of this subset is smaller than or equal to **W**. You cannot break an item, **either pick the complete item or don't pick it (0-1 property)**.

Example 1:

Input:

N = 3

W = 4

values[] = {1,2,3}

weight[] = {4,5,1}

Output: 3

Example 2:

Input:

N = 3

W = 3

values[] = {1,2,3}

weight[] = {4,5,6}

Output: 0

Your Task:

Complete the function **knapSack()** which takes maximum capacity **W**, weight array **wt[]**, value array **val[]**, and the number of items **n** as a parameter and returns the **maximum possible** value you can get.

Expected Time Complexity: $O(N*W)$.

Expected Auxiliary Space: $O(N*W)$

Constraints:

$$1 \leq N \leq 1000$$

$$1 \leq W \leq 1000$$

$$1 \leq wt[i] \leq 1000$$

$$1 \leq v[i] \leq 1000$$

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