0/1 Knapsack Problem

Given N items where each item has some weight and profit associated with it and also given a bag with capacity W. The task is to put the items into the bag such that the sum of profits associated with them is the maximum possible.

① ② ③

Examples: $N = 3$, Max capacity $(W) = 4$, profits [] = $\{1, 2, 3\}$

weights [] = $\{4, 5, 1\}$

Output will be **3**.   [Note: We either need to take an item completely on leave it behind]

Explanation: ① There are two items for which weight ≤ 4.

    ⊢→ if we choose item $(w = 4)$, profit $= 1$

    ⊢→ if we choose item $(w = 1)$, profit $= 3$

② Among them, maximum possible profit is 3.

[Because we cannot put both the items as it will exceed ④]