

Reconstructing the Solution

The array only stores the value of the solution, not the actual choices made.

To reconstruct the choices, start from the final answer and repeatedly identify which subproblem led to each answer.

- running time = $O(\text{branching factor} \times \text{longest path})$
 - (which is less than it took to fill in the table in the first place, so it doesn't change the big-Oh of solving the problem)

$$V[k][w] = \max \{ V[k+1][w-w_k] + v_k, V[k+1][w] \} \quad \text{if } w_k \leq w$$
$$V[k][w] = V[k+1][w] \quad \text{otherwise}$$

BRUTE-FORCE SOLUTION: $O(n!)$

DYNAMIC PROGRAMMING ALGORITHMS: $O(n^2 2^n)$

SELLING ON EBAY: $O(1)$

STILL WORKING ON YOUR ROUTE?

SHUT THE HELL UP.

<https://xkcd.com/399/>