

Choosing a Compatible Set of Activities with a Profit

You could order the jobs a by deadline d . From here you place the maximum profit p in the matrix and optimize your path through the jobs. Which would yield $O(n^3)$ running time based upon the size of the table n^2 and then the recovery of the optimal path n .

First we initialize the table T with

$$T[1, t] = \begin{cases} 0 & \text{if } t \neq t_1 \\ p_1 & \text{if } t = t_1 \leq d_1 \\ 0 & \text{if } t = t_1 > d_1 \end{cases}$$

In table T , we have the choice of performing job i . If we decide not to perform job i , then our profit is $T[i - 1, t]$. If we perform the job it will take t_i units to complete. The maximum profit is selected based upon the following recurrence.

$$T[i, t] = \max \begin{cases} T[i - 1, t] \\ T[i - 1, t - t_i] + p_i & \text{if } t \leq d_i \\ T[i - 1, t - t_i] & \text{if } t > d_i \end{cases}$$