Suppose that you have one machine and a set of $n$ jobs $a_1, \ldots, a_n$ to process on that machine. Each job $a_j$ has a processing time $t_j$ and a profit $p_j$, and a deadline $d_j$. The machine can process only one job at a time, and a job $a_j$ must run uninterruptedly for $t_j$ consecutive time units. If job $a_j$ is completed by its deadline $d_j$, you receive a profit $p_j$, but if it is completed after its deadline, you receive a profit of 0. Give an efficient algorithm to find the schedule that obtains the maximum amount of profit, assuming that all processing times are integers between 1 and $n$. State and prove time complexity of your algorithm.
2. (10 points)

Let $A = \{A_1, \ldots, A_n\}$ be a set of distinct coin types, where $A_1 < A_2 < \ldots < A_n$. The coin-changing problem is defined as follows. Given an integer $C$, find the smallest number of coins from $A$, that add up to $C$, given that unlimited number of coins of each type is available. Design an efficient dynamic programming algorithm that on inputs $A$ and $C$, outputs the minimum number of coins needed to solve the coin-changing problem. State and prove time complexity of your algorithm.