

② Suppose n activities apply for using a common resource. Activity a_i ($1 \leq i \leq n$) has a starting time $S[i]$ and a finish time $F[i]$ such that $0 < S[i] < F[i]$. Two activities a_i and a_j ($1 \leq i, j \leq n$) are compatible if intervals $[S[i], F[i])$ and $[S[j], F[j])$ do not overlap. We assume the activities have been sorted such that $S[1] \leq S[2] \leq \dots \leq S[n]$.

A Design an $\mathcal{O}(n^2)$ dynamic programming algorithm to find a set of compatible activities such that the total amount of time the resource is used by these compatible activities is maximized. You need to define the subproblems, establish the inductive formula and show the initial conditions. Pseudocode is not required.

B Apply your algorithm to the following set of activities:

i	1	2	3	4	5	6	7	8	9	10	11
S[i]	2	3	5	6	7	9	10	12	13	14	16
F[i]	6	5	7	10	8	13	16	14	14	18	20