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Question 5:

To ensure the maximum profit, since all the jobs take the same unit of time ,so there's no time interleaving,then suppose totally we have n unit of time to work, we only need to find the job with highest profit gi which deadline ti >= n unit.

In order to fulfill the requirement, it can first sort dictionary by ti from smallest to latest ,then for each unit find the job with largest gi before with n unit <= ti. In the worst case it take O(n*n) time

In order to get more efficient , can sort job dictionary by using max priority .

first sort jobs by ending time from latest to (O(n*logn))
Assume T is the latest ending time, use a pointer point to T , If for any job i it have ti>=T ,inset i into queue, pointer point to the next job until ti < T, at this time pop a value from queue , T = T -1, pointer point to the next again and so on.
Insert and pop both takes O(logn) time and there are n jobs.
So this part takes O(nlogn)+ O(nlogn)

Totally it takes O(nlogn)+ O(nlogn) + O(nlogn) = O(nlogn) which is more efficient than O(n*n)