CS208 · Algorithm Design and Analysis

Assignment 6

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Exercise 6.2

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(a) Consider the following situation:

	Week 1	Week 2	Week 3
l	1	1	1
h	1	3	100

Using the given algorithm, we will choose (no, high, low) in these 3 weeks with the revenue 4. However, when we choose (low, no, high) we will get the revenue of 101, which is optimized.

(b) We can solve it by dynamic programming easily. Let $f[i][j]$ means the maximum revenue at week i, while $j = 0$ means choosing no work at week i and $j = 1$ means choosing low-stress or high-stress work.

Then we have the following equations

$$\begin{cases} f[i][0] = \max\{f[i-1][0], f[i-1][1]\} \\ f[i][1] = \max\{f[i-1][0] + h[i], f[i-1][0] + l[i], f[i-1][1] + l[i]\} \end{cases}$$

with the initial value

$$\begin{cases} f[0][0] = -\infty \\ f[0][1] = 0 \end{cases}$$

Then the answer is $\max\{f[n][0], f[n][1]\}$.