CS430 HW7

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Problem 1.

Let M[i] be the maximum profit from ~~log~~ location 1 to i.

Generally speaking, we want to put more station thus ~~the dif~~ distances between should be k.

$$M[i] = \max \begin{cases} M[i] = M[j] + p_i & \text{if } (s_i - s_j) \geq k \\ \cancel{R[i]}\ M[i-1] & \text{otherwise} \end{cases}$$

Problem 2.

If ~~a~~ a sequence could be palindrome if it ~~a~~ meets X[i] = X[j] then we should try ~~X~~[i+1], and X[j-1] ~~u~~ till X[k] and X[k+1] for even ~~a~~ number of items, or: X[k-1], ~~a~~X[k+1] for odd number of items.

If X[i] ≠ X[j], ~~then~~ then we try X[i+1], X[j] and X[i], X[j-1]

~~$V[i,j] = \{$~~

$$L[i,j] = \max \begin{cases} L[i+1, j-1] + 2 & \text{if } X[i] = X[j] \\ \max\{L(x+1, j), L(x, j-1)\} \end{cases}$$

Problem 3

Let $D[i]$ donates the possiblitiyes of getting a value i
for $i \in [1, V]$. V is the our target value.

Let $X[j]$ donates the denominations ~~we g~~.
for $j \in [1, d]$.

$$D[i] = \begin{cases} D[i] \,\|\, D[i - X_j] & \text{for } j \in [1, n] \\ \text{base case: } ~~false~~ \; D[i - X_j] \text{ false} & \text{if } i < X_j \text{ for any } j \in [1, d] \\ D[i - X_j] \text{ true} & \text{if } i = X_j \text{ for any } j \in [1, d] \end{cases}$$

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Problem 4.

(1)

$M(i,j)$ be the result. $P_1, P_2 \cdots P_n$ be the sorted point by each x-coordinate, $\overrightarrow{P_j P_i}$ be the distance between points P_i, P_j

$\forall i,j \quad 1 \le j < i \le n$

$$M(i,j) = \begin{cases} M(i-1,j) + \overline{P_{i-1}P_i} & \text{for } (1 \le j \le i-2) \\ \min_{1 \le k \le i-2} \left(M(i-1,k) + \overline{P_k P_i} \right) & \text{if } (j = i-1) \end{cases}$$

Time Complexity = T(sorting) + T(matrix) + T(finding optimal path)

T(sorting) = $O(n \log n)$

T(matrix) = $O(n^2)$ for n^2 element in matrix $\frac{n(n-1)}{2} = O(n^2)$

T(finding path) = $O(n)$. we look $n-1$ values of j to get distance.

Thus: Time Complexity = $O(n^2)$