Group no. 4

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Assignment 6:

Our first dynamic programming assignment, on dynamic alignment (i.e., measuring differences between strings).

Ans...

Let M be the alignment. m,n be the position of symbols in X and Y respectively. We are considering min(i,j) to be the minimum cost. For M at least one of the following is required to be true:

I. (m,n) ε M ->
   if this holds true then $\alpha_{x_m y_n}$ is required to be paid. Along with this, align $x_1 x_2 x_3 \ldots x_{m-1}$ with $y_1 y_2 y_3 \ldots y_{n-1}$.
   min(m,n) = $\alpha_{x_m y_n}$ + min(m-1,n-1)

II. mth position of X is not matched ->
   If this holds true, then a gap cost of δ is paid. Along with this, align $x_1 x_2 x_3 \ldots x_{m-1}$ with $y_1 y_2 y_3 \ldots y_n$.
   min(m,n) = δ + min(m-1,n)

III. nth position of Y is not matched ->
   If this holds true, then a gap cost of δ is paid. Along with this, align $x_1 x_2 x_3 \ldots x_m$ with $y_1 y_2 y_3 \ldots y_n$.
   min(m,n) = δ + min(m,n-1)

The minimum alignment costs can be given as:

min(i,j) = min{ $\alpha_{x_m y_n}$ + min(m-1,n-1), δ + min(m-1,n), δ + min(m,n-1)}

Algorithm:

1. Considering Array M[0...m,0...n]
2. Initialising M[i,0] = i δ for all i and M[0,j] = j δ for all j
   ...(M[i,0]=i δ and M[0,j]=j δ ... we are lining i,j-letter word to 0-letter word is to use i,j-gap)
3. For j = 1 -> n do
   a. For i = 1 -> m do
      i. min(i,j) = min{ $\alpha_{x_m y_n}$ + min(m-1,n-1), δ + min(m-1,n), δ + min(m,n-1)}
   b. End
4. End