Levenshtein

Min # ins, del, rep to change A[1..m] to B[1..n]

What's in the last column?

ALGORITHM
ALGORITHM
ALGORITHM
ALGORITHM

ALGORITHM
ALGORITHM
ALGORITHM
ALGORITHM

replace
insert
deletion

ALGORITHM
ALGORITHM

ALGORITHM

Edit(i,j) = min # ins, del, rep to change A[1..i] into B[1..j]

We need Edit(m,n).

\[
Edit(i,j) = \begin{cases} 
  j & \text{if } i = 0 \\
  i & \text{if } j = 0 \\
  \min \left\{ \begin{array}{l}
  1 + Edit(i-1,j-1) \\
  1 + Edit(i-1,j) \\
  1 + Edit(i,j-1) \\
  \end{array} \right. \\
  \text{else}
\end{cases}
\]

A B C D M
X Y Z W M

A A B S B
A A B
Dynamic Programming

Memoize into 2D Array Edit[0...m, 0...n]

\[ O(mn) \text{ time} \]
\[ T(n) = 4T\left(\frac{n}{2}\right) = \Theta(n^2) \]