Dynamic Programming (Contd.)

Edit Distance:

ASSIGNMENT
ALGORITHMS

AAD assignment deadline extended to Tue.

Qn: Min entries to be changed to get the other word.

$a_1\ a_2 \cdots a_m$
$b_1\ b_2 \cdots b_n$

ARUN
ARVL

$a_1\ a_2 \cdots a_m$
$b_1\ b_2 \cdots b_n$

AARON
ARONX
3 diff
+1

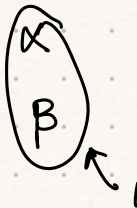
Optimal
↳ Sequence alignment.

A
A R O N
A R O N
↑ 1 edit

A[1, m]
B[1, n]

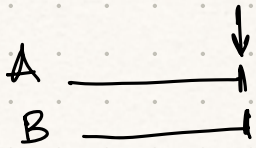
CHANDRA
SANDRA
1 1 2

Base case:

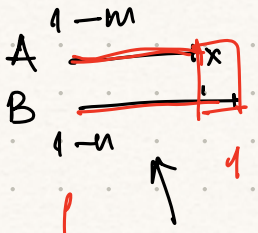


α = β edit = 0
α ≠ β = 1

CH
S
2 CH CH
S S
2 3



Move A to left



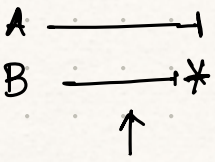
$\Delta(A[1,m], B[1,n-1])$ +1

Match end points

$\Delta(A[1,m-1], B[1,n-1])$ + b

where $b_i = 1$ if $A_m \neq B_n$, 0 o/w

Move A to right.

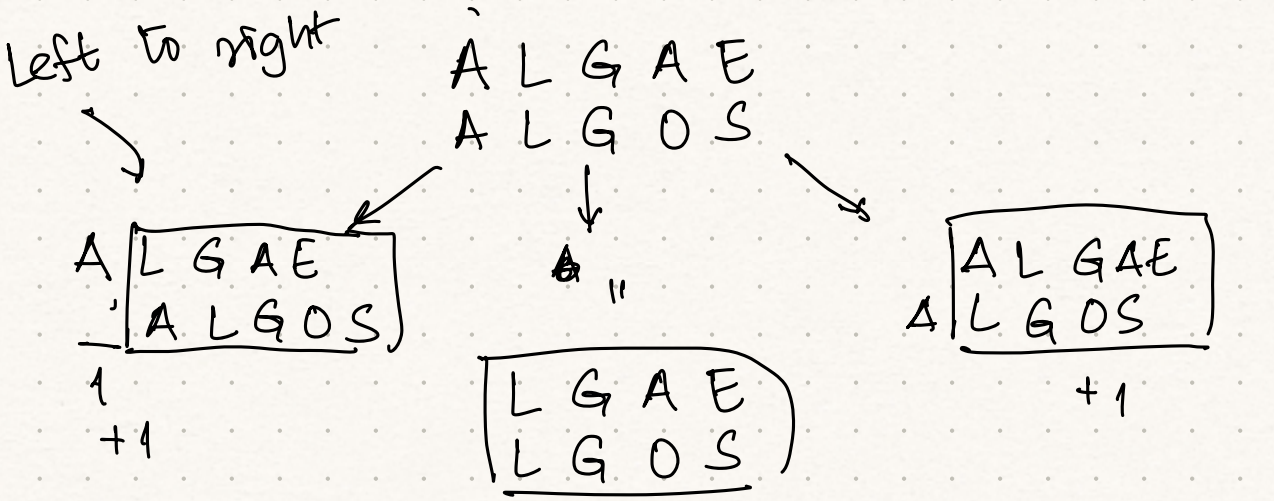


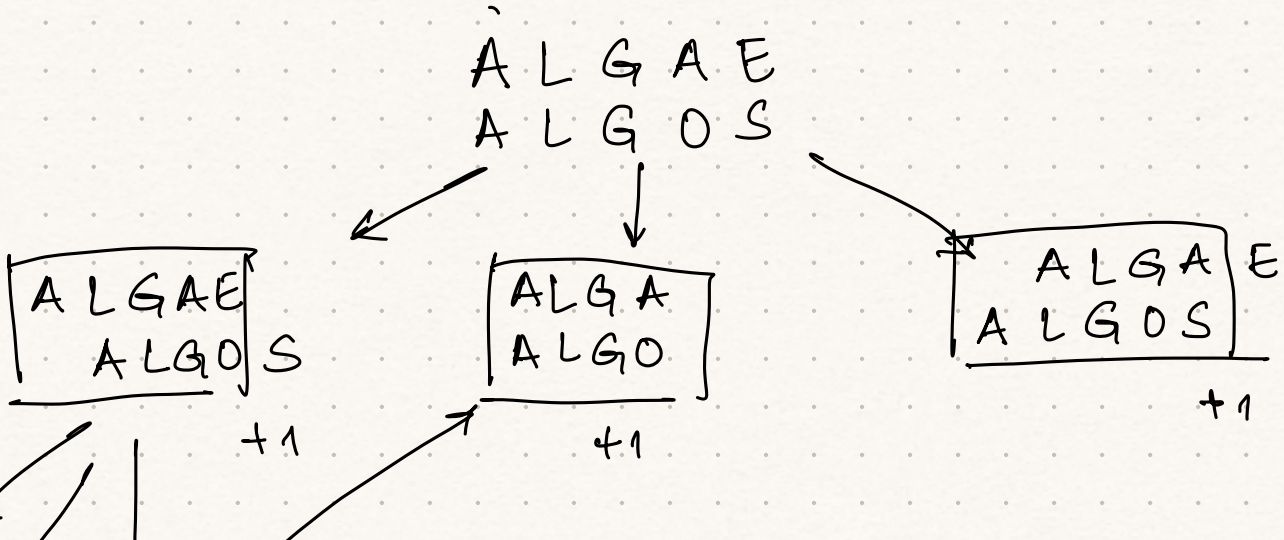
$\Delta(A[1,m-1], B[1,n])$ +1

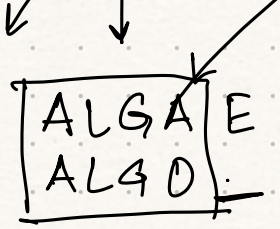
$$\Delta(A[1,m], B[1,n]) = \min \begin{cases} \Delta(A[1,m], B[1,n-1]) + 1 \\ \Delta(A[1,m-1], B[1,n]) + 1 \\ \Delta(A[1,m-1], B[1,n-1]) + b \end{cases}$$

↑ Right to left

Left to right






ALGA E
ALGO