

Lewenstein

~~NO~~ ~~IS~~
MONEY

Replace
Insert
Delete

ALGOR I THM
ALT RUISTIC
1 2 3 4 5 6

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

What's in the last column?

ALGOR I THM | replace
ALT RUISTIC

ALGOR I THM | insert
ALT RUISTIC

ALGOR I T HM | deletion
ALT RUISTIC

ALGOR
ALT | R

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

We need $Edit(m, n)$.

$$Edit(i, j) = \begin{cases} j \\ i \\ \min \left\{ \begin{array}{l} Edit(i-1, j-1) \\ 1 + Edit(i, j-1) \\ 1 + Edit(i-1, j) \end{array} \right\} \\ \min \left\{ \begin{array}{l} 1 + Edit(i-1, j-1) \\ 1 + Edit(i, j-1) \\ 1 + Edit(i-1, j) \end{array} \right\} \end{cases}$$

if $i=0$

if $j=0$

if $i > 0, j > 0$
if $A[i] = B[j]$

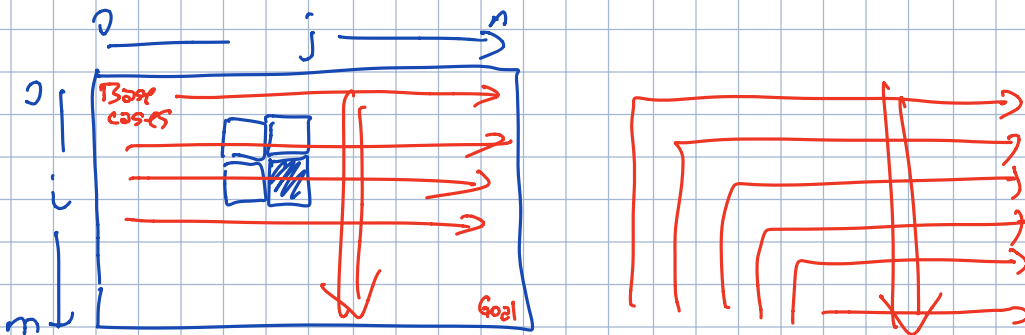
or

A B C D M
X Y Z W N

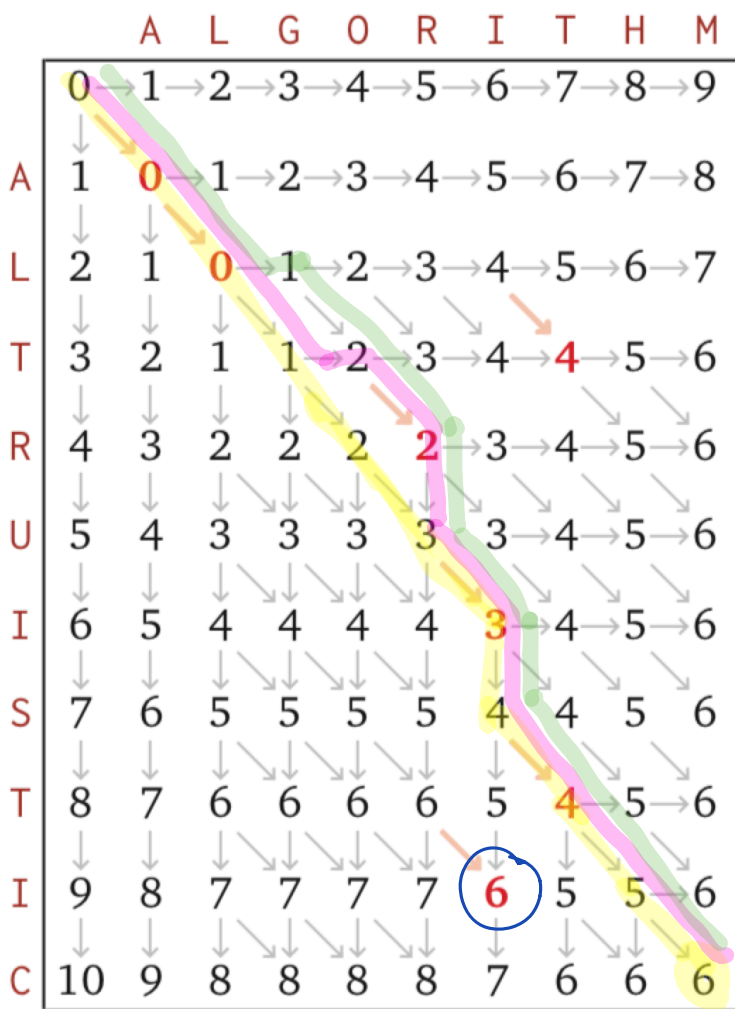
A A B B
A A B

~~GREEDY~~ DYNAMIC PROGRAMMING

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



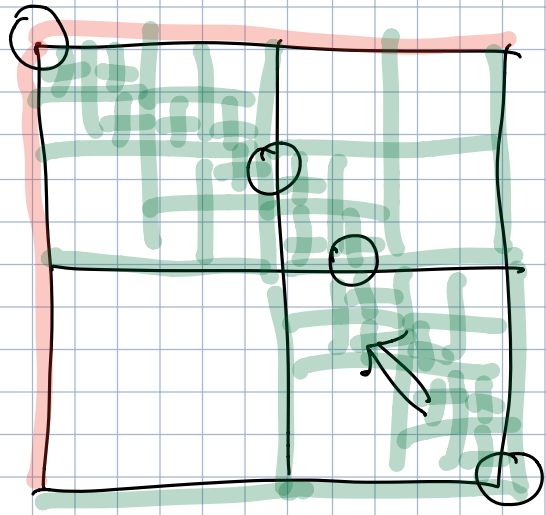
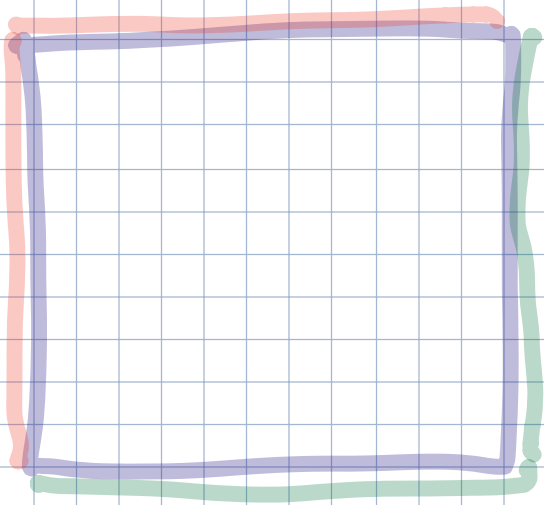
$O(mn)$ time



A L G O R I T H M
A L T R U I S T I C

A L G O R I T H M
A L T R U I S T I C

A L G O R I T H M
A L T R U I S T I C



$$T(n) = 4T\left(\frac{n}{2}\right) = O(n^2)$$