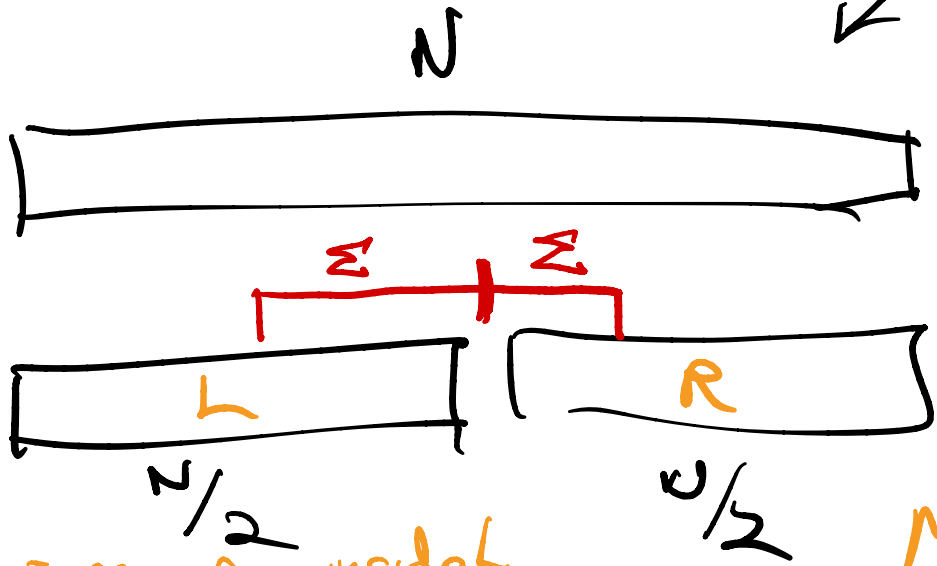


CS 252

W, 15 May 2024

Problem 1

$M =$ Biggest substring sum



$M_1 = \max$ for inside L

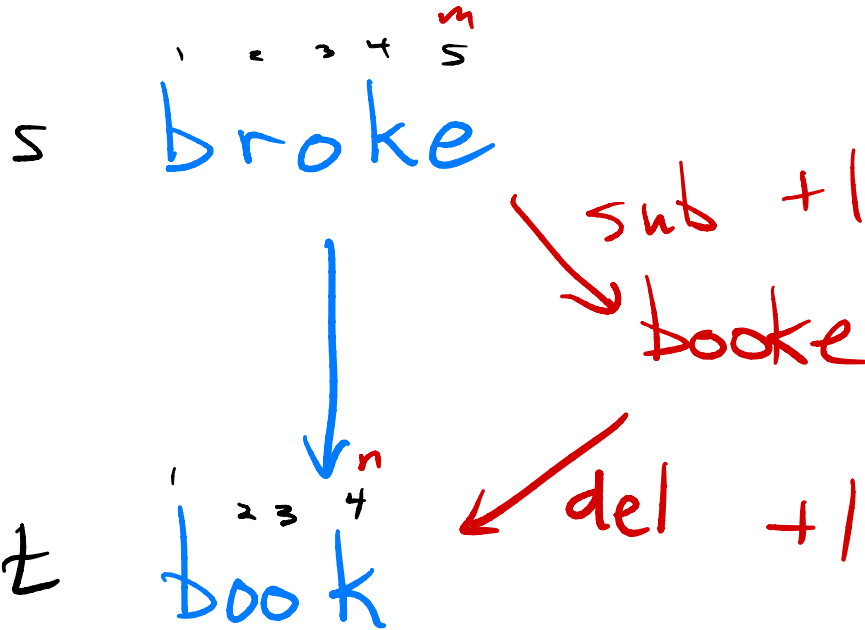
$M_2 = \max$ for inside R

$M_3 = \max$ that includes some of $L +$ some of R

Minimum edit distance

Costs

deletion: |
insertion: |
substitution: |



$D[j, k]$ = min. edit distance from
 $s[1..j]$ to $t[1..k]$

Recurrence?

Base cases?

$D[m, n]$

is the prob.
we're trying
to solve

	0	1	2	3	4	5
0	0	1	2	3	4	5
1	1					
2	2					
3	3					
4	4					

b
o
o
k

What's the
min cost of
brok → bo?

Strategies:

brok $\xrightarrow{4 \text{ deletes}}$ ~~brok~~ $\xrightarrow{2 \text{ inserts}}$ bo

brok $\xrightarrow{1 \text{ del}}$ bok $\xrightarrow{1 \text{ del}}$ bo

brok

	0	1	2	3	4	5
0	0	1	2	3	4	5
1	1	0				
2	2					
3	3					
4	4					

$$j=1, k=1$$

$$D[j, k]$$

$$= \min ($$

$$D[j-1, k-1] + 1 \text{ if } s[j] \neq t[k],$$

$$D[j-1, k-1] \text{ if } s[j] = t[k]$$

$$D[j-1, k] + 1, = 2 \quad \begin{matrix} 0+0 \\ 1+0 \end{matrix}$$

$$D[j, k-1] + 1 = 2 \quad \begin{matrix} 0+0 \\ 1+0 \end{matrix}$$

	0	1	2	3	4	5
0	0	1	2	3	4	5
1	1	0	1			
2	2					
3	3					
4	4					

A 5x5 grid representing a dynamic programming table for edit distance. The columns are labeled 0 to 5 and the rows are labeled 0 to 4. The diagonal elements are 0, 1, 2, 3, 4. A red box highlights the subgrid from row 1, column 1 to row 2, column 3. Red arrows indicate transitions: from (1,1) to (1,2), (1,2) to (1,3), (1,2) to (2,2), and (2,2) to (2,3).

$D[j, k]$

$= \min ($

$D[j-1, k-1] + 1$ if $s[j] \neq t[k]$,

$D[j-1, k-1]$ if $s[j] = t[k]$,

$D[j-1, k] + 1,$

$D[j, k-1] + 1$

)

	s	t	r	o	k	o
s	0	1	2	3	4	5
t	1	0	1	2	3	4
r	2	1	0	1	2	3
o	3	2	1	2	3	
k	4	3	2	1	2	

$D[j, k]$

$= \min ($

$D[j-1, k-1] + 1$ if $s[j] \neq t[k]$,

$D[j-1, k-1]$ if $s[j] = t[k]$,

$D[j-1, k] + 1,$

$D[j, k-1] + 1$

)

Longest palindromic substring of $S[1..n]$

$$P[j, k] = \begin{cases} \text{true if } s_j, \dots, s_k \text{ is a pal.} \\ \text{false if not} \end{cases}$$

Recurrence?

Base case?

S

1	2	3	4	5	6	7
b	a	n	a	n	a	s

D

	1	2	3	4	5	6	7
1	T	F	?				
2		T	F	?			
3			T	T	?		
4				T	T	?	
5					T	T	
6						T	T
7							T