

Alignment

Review

Edit Distance

	B	A	L	L	C	A	P
B							
A							
S							
E							
B							
A							
L							
L							

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

Whats the edit distance between two empty strings?

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A	P
B	0						
A							
S							
E							
B							
A							
L							
L							

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C	A	P
B	0							
A								
S								
E								
B								
A								
L								
L								

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A	P
B	0						
A							
S							
E							
B							
A							
L							
L							

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

Whats the edit distance between the empty string and any other string?

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C	A	P
B	0							
A	1							
S	2							
E	3							
B	4							
A	5							
L	6							
L	7							
	8							

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

These are the number of operations to insert or delete all of the characters in the string.

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C	A	P
B	0	1	2	3	4	5	6	7
A	1	"Delete B"						
S	2							
E	3							
B	4							
A	5							
L	6							
L	7							
L	8							

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

These are the number of operations to insert or delete all of the characters in the string.

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C	A	P
B	0	1	2	3	4	5	6	7
A	1	"Delete B"						
S	2	"Delete B, Delete A"						
E	3							
B	4							
A	5							
L	6							
L	7							
L	8							

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

These are the number of operations to insert or delete all of the characters in the string.

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C	A	P
	0							
B	1							
A	2							
S	3							
E	4							
B	5							
A	6							
L	7							
L	8							

"Delete B"

"Delete B, Delete A"

"Delete B, Delete A, Delete S, ..., Delete L, Delete L"

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

These are the number of operations to insert or delete all of the characters in the string.

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C	A	P
	0							
B	1							
A	2							
S	3							
E	4							
B	5							
A	6							
L	7							
L	8							

"Insert B"
 "Delete B"
 "Delete B, Delete A"
 "Delete B, Delete A, Delete S, ..., Delete L, Delete L"

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

These are the number of operations to insert or delete all of the characters in the string.

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C	A	P
	0							
B	1		"Delete B"	"Insert B"				
A	2			"Delete B, Insert A"				
S	3			"Delete B, Delete A"				
E	4							
B	5							
A	6							
L	7							
L	8							"Delete B, Delete A, Delete S,, Delete L, Delete L"

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

These are the number of operations to insert or delete all of the characters in the string.

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

			B
			"Insert B"
	0	1	
"Delete B"			
B	1		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

			B
			"Insert B"
	0	1	
"Delete B"			
B	1		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{""} & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{""} & \text{if } s_1[i] = s_2[j] \\ \text{"Replace B with B"} & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{""} & \text{if } s_1[i] = s_2[j] \\ \text{"Replace B with B"} & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{""} & \text{if } s_1[i] = s_2[j] \\ \text{"Replace B with B"} & \text{if } s_1[i] \neq s_2[j] \\ \text{"Insert B"} + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{""} & \text{if } s_1[i] = s_2[j] \\ \text{"Replace B with B"} & \text{if } s_1[i] \neq s_2[j] \\ \text{"Insert B"} + \text{"Delete B"} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} "" & \text{if } s_1[i] = s_2[j] \\ ~~"Replace B with B"~~ & \text{if } s_1[i] \neq s_2[j] \\ "Insert B" + "Delete B" \\ "Delete B" + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} "" & \text{if } s_1[i] = s_2[j] \\ ~~"Replace B with B"~~ & \text{if } s_1[i] \neq s_2[j] \\ "Insert B" + "Delete B" \\ "Delete B" + "Insert B" \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} "" & \text{if } s_1[i] = s_2[j] & \mathbf{0} \\ ~~"Replace B with B"~~ & \text{if } s_1[i] \neq s_2[j] \\ "Insert B" + "Delete B" \\ "Delete B" + "Insert B" \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} "" & \text{if } s_1[i] = s_2[j] & 0 \\ ~~"Replace B with B"~~ & \text{if } s_1[i] \neq s_2[j] \\ "Insert B" + "Delete B" & & 2 \\ "Delete B" + "Insert B" & & \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	

"Delete B" (pointing to the cell containing 1 in the bottom-left)

"Insert B" (pointing to the cell containing 1 in the top-right)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} "" & \text{if } s_1[i] = s_2[j] & 0 \\ ~~"Replace B with B"~~ & \text{if } s_1[i] \neq s_2[j] & \\ "Insert B" + "Delete B" & & 2 \\ "Delete B" + "Insert B" & & 2 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B
	0	1
B	1	0

"Delete B" (pointing to the cell containing 1 in the first row, second column)

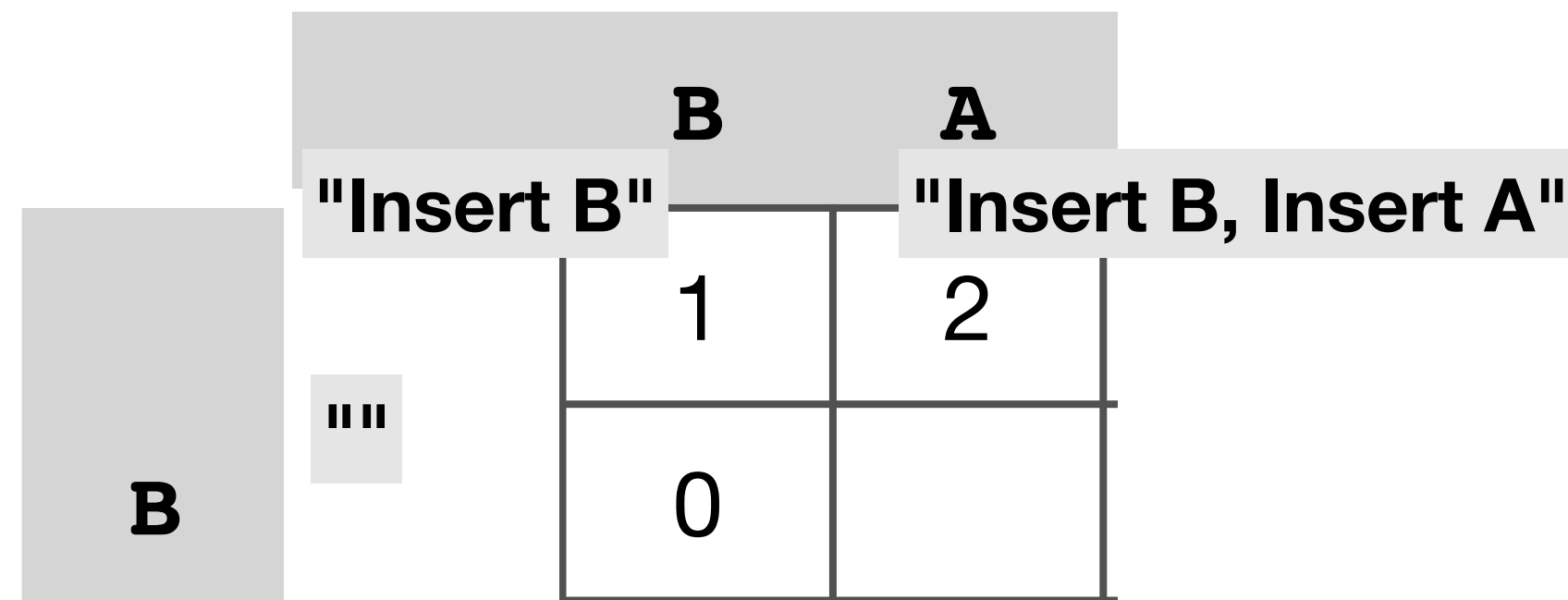
"Insert B" (pointing to the cell containing 1 in the second row, third column)

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} "" & \text{if } s_1[i] = s_2[j] & 0 \\ ~~"Replace B with B"~~ & \text{if } s_1[i] \neq s_2[j] & \\ "Insert B" + "Delete B" & & 2 \\ "Delete B" + "Insert B" & & 2 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

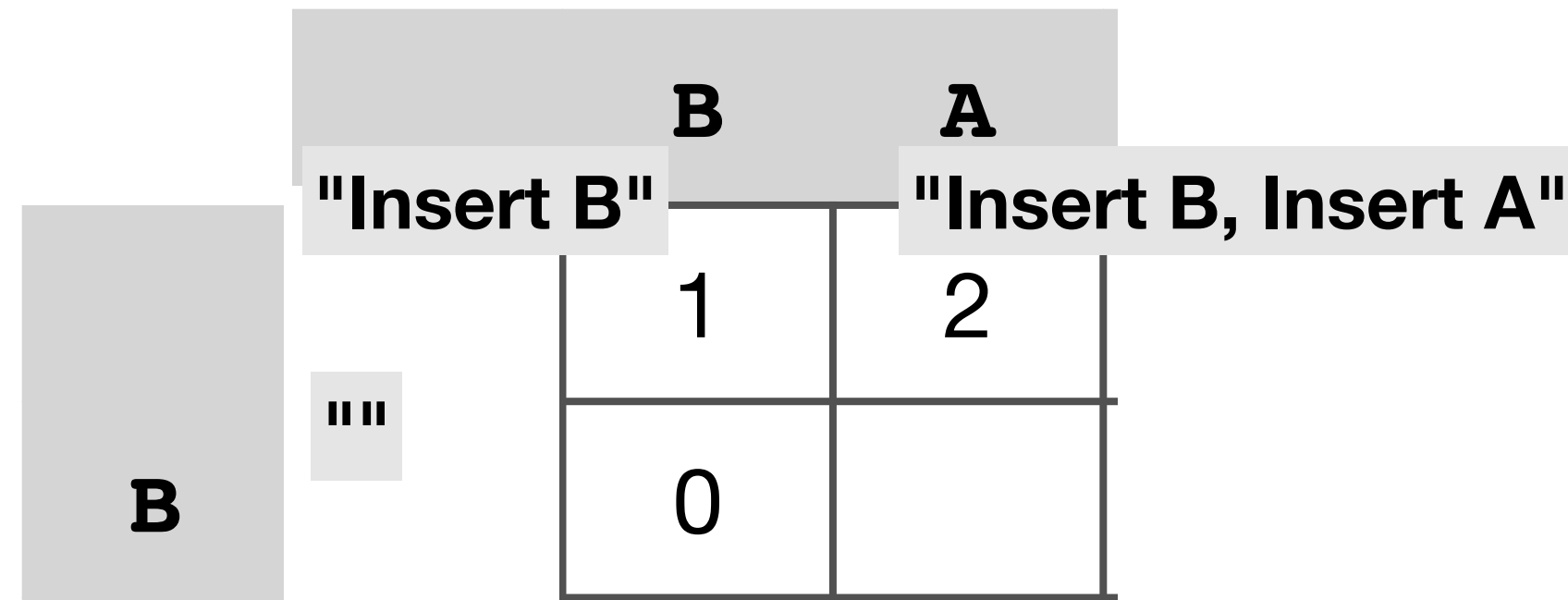


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

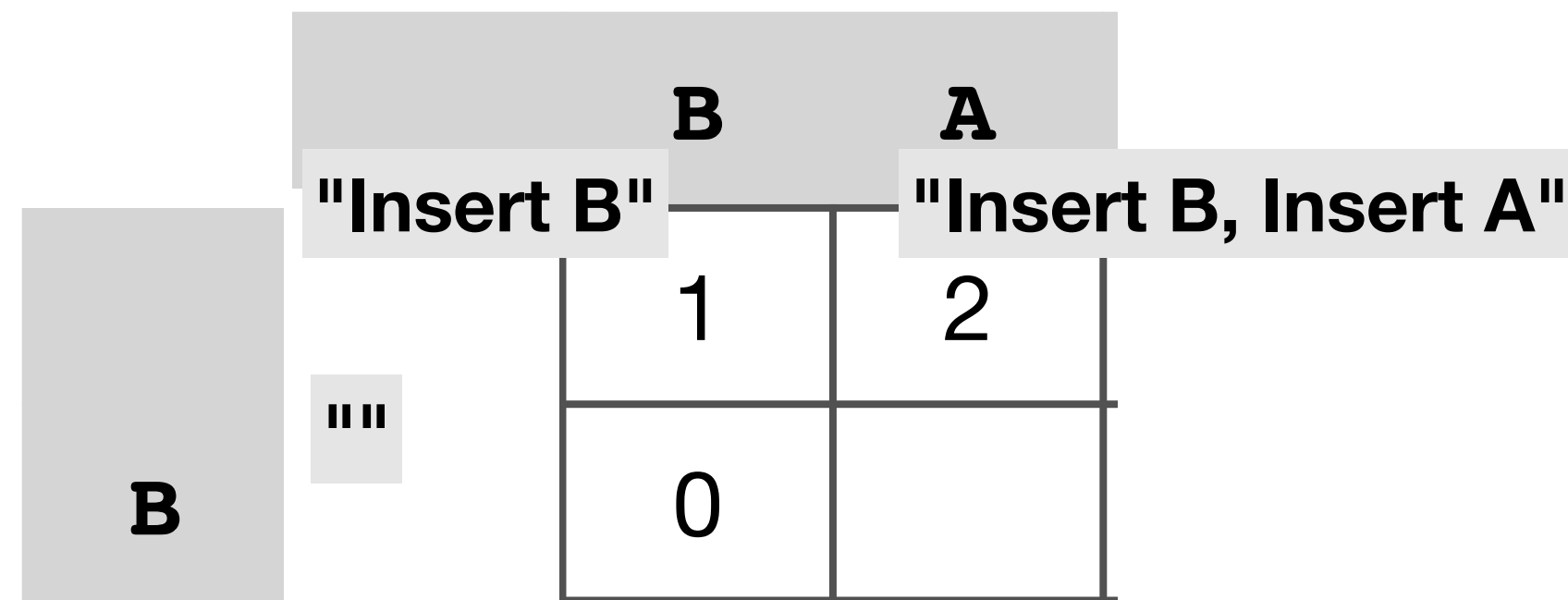


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance



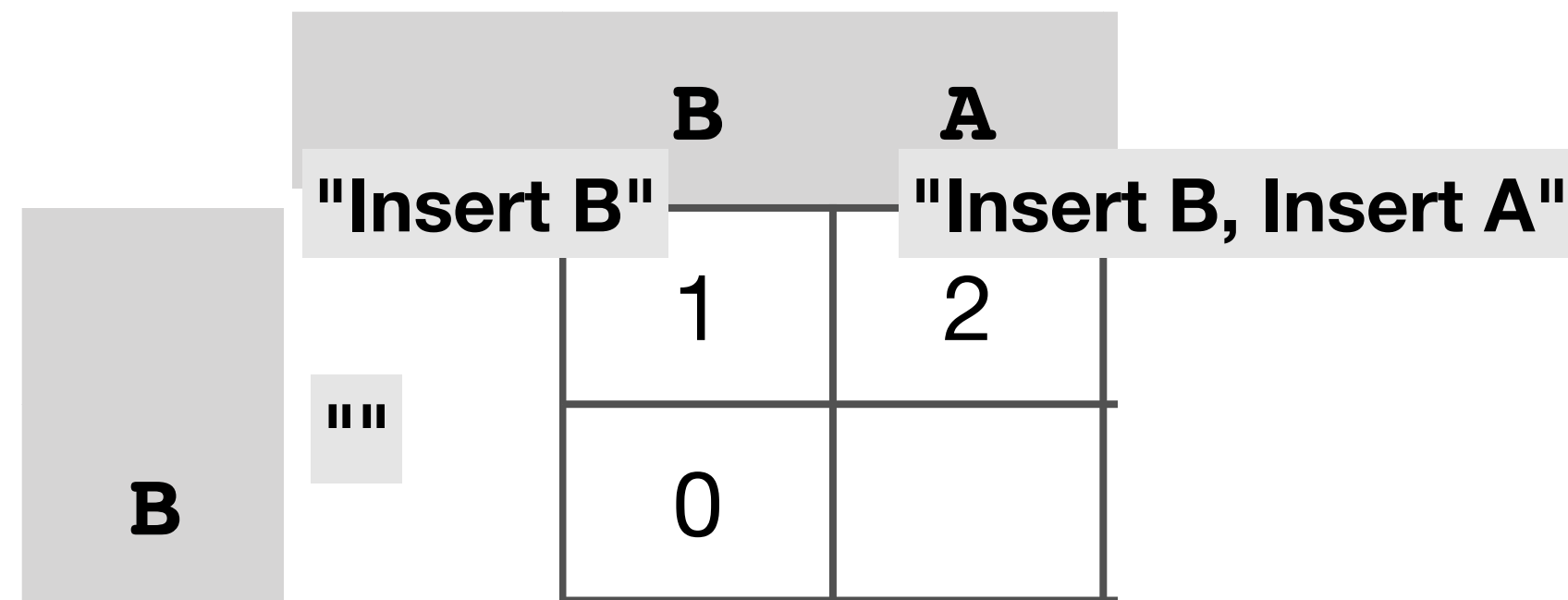
$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B

$$V[i, j] := \min \begin{cases} \text{"Insert B"} & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance



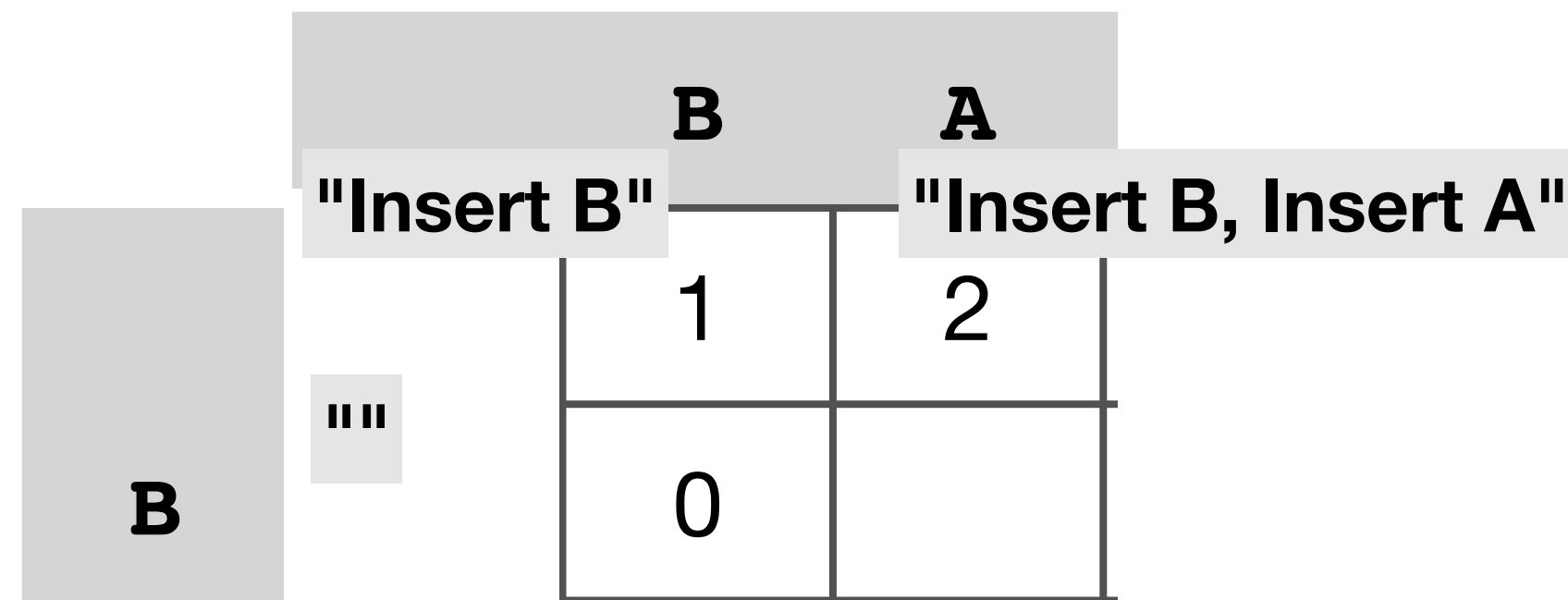
$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

BB

$$V[i, j] := \min \begin{cases} \text{"Insert B"} & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance



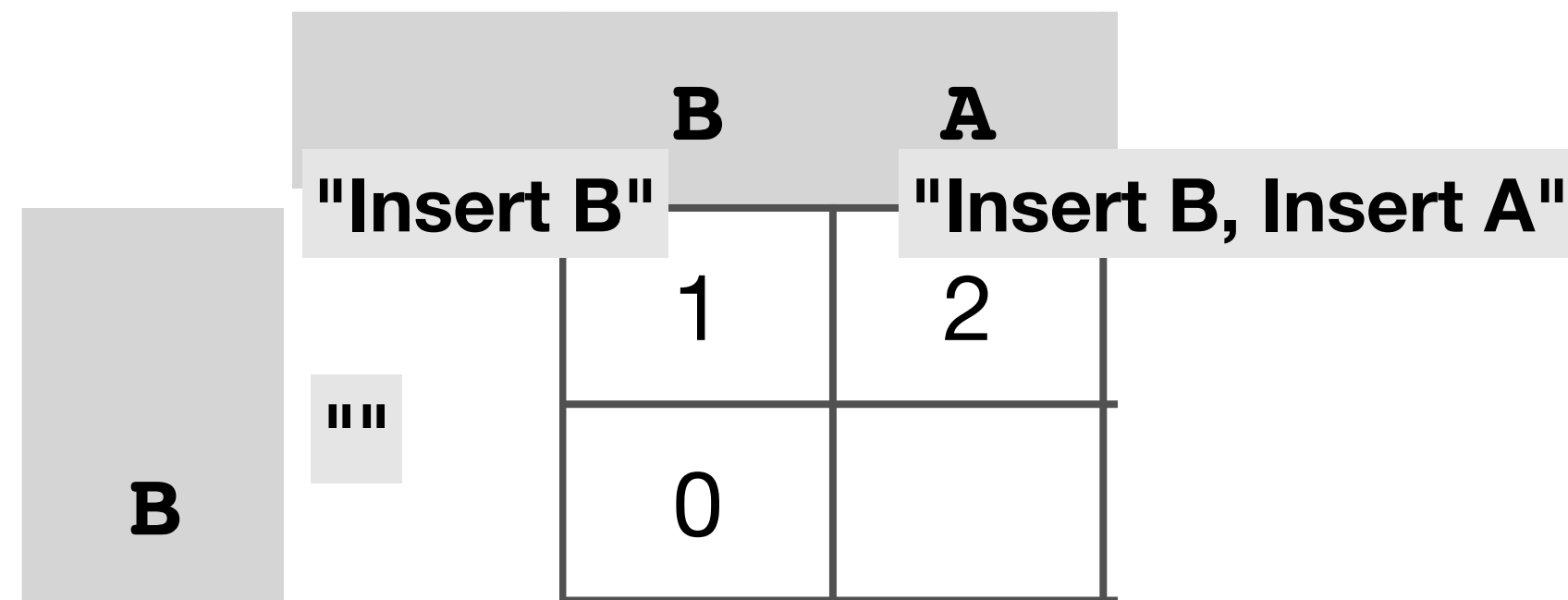
$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

BB =? BA

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

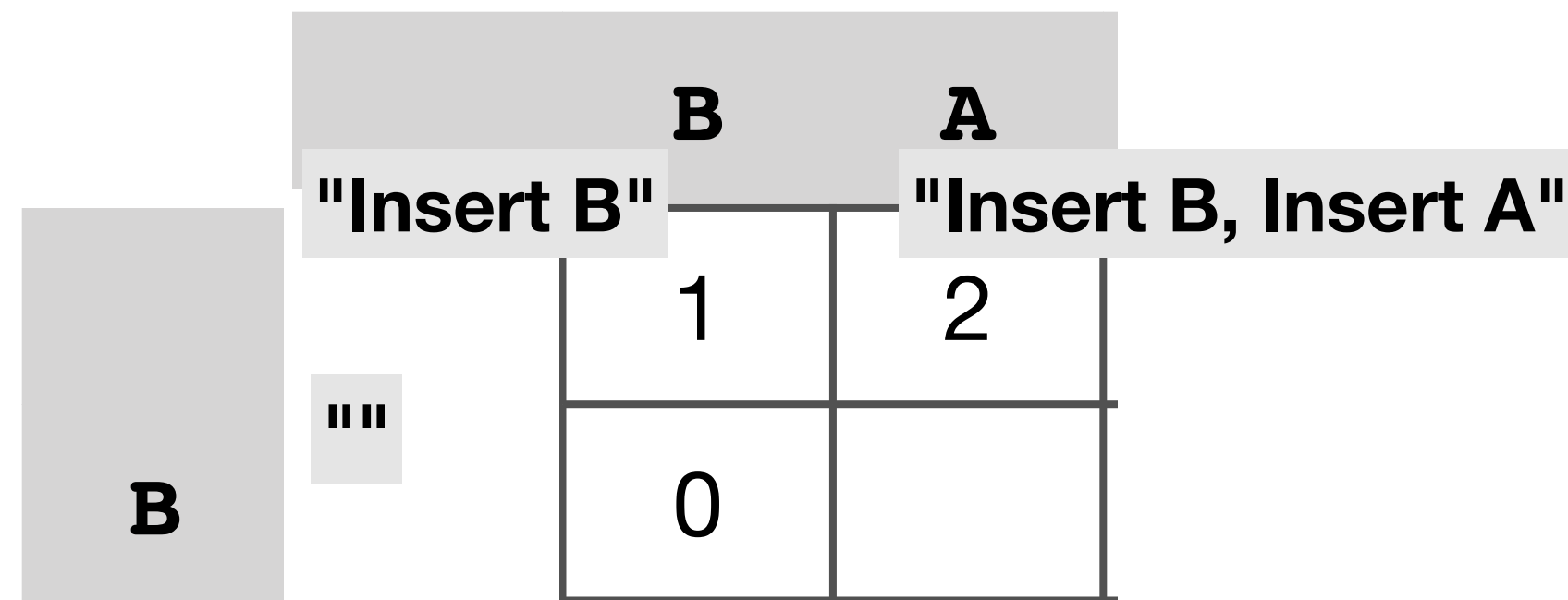


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

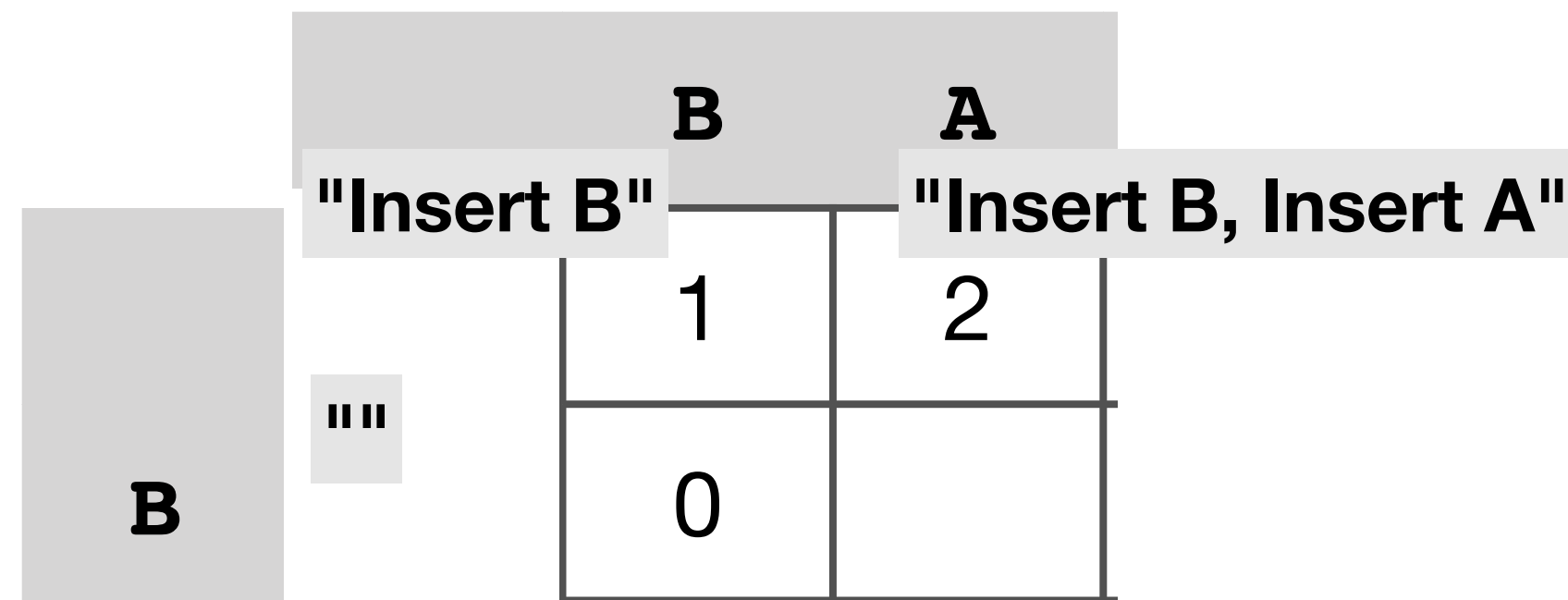


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B"} & \text{if } s_1[i] = s_2[j] \\ \text{"Insert B"} + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

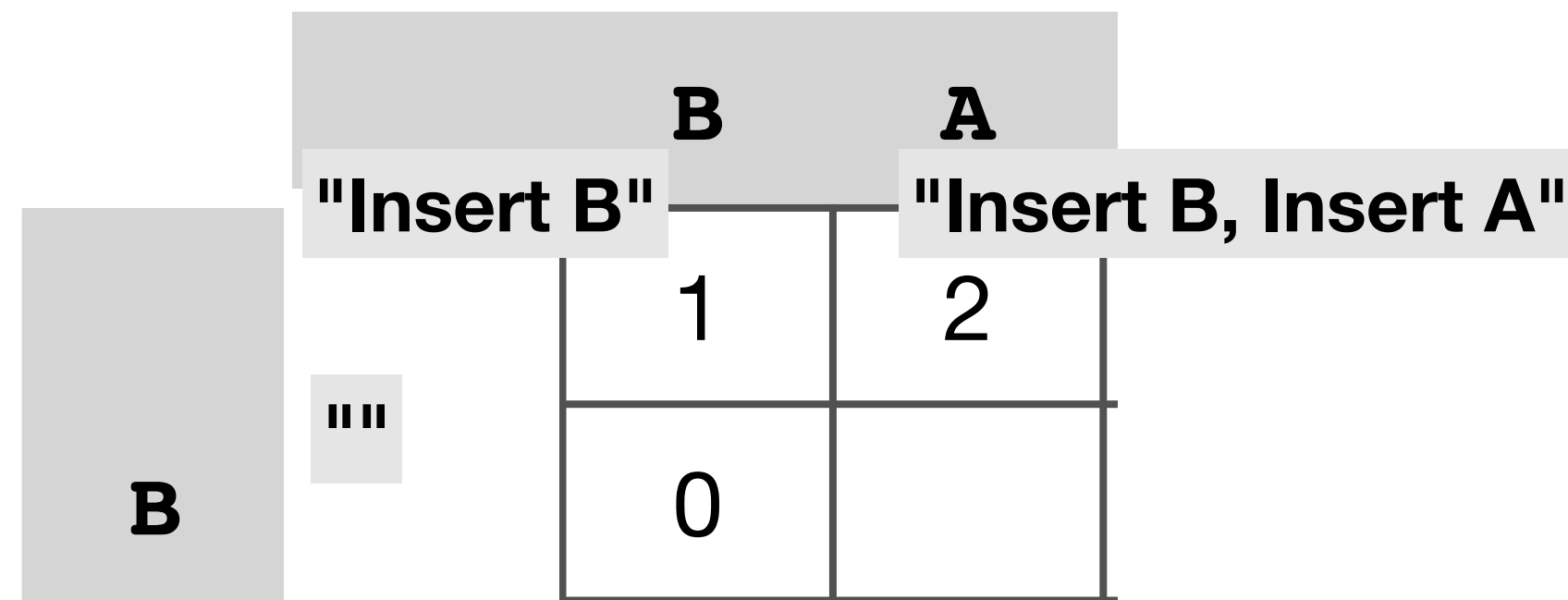


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B"} & \text{if } s_1[i] = s_2[j] \\ \text{"Insert B"} + \text{"Replace B with A"}[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

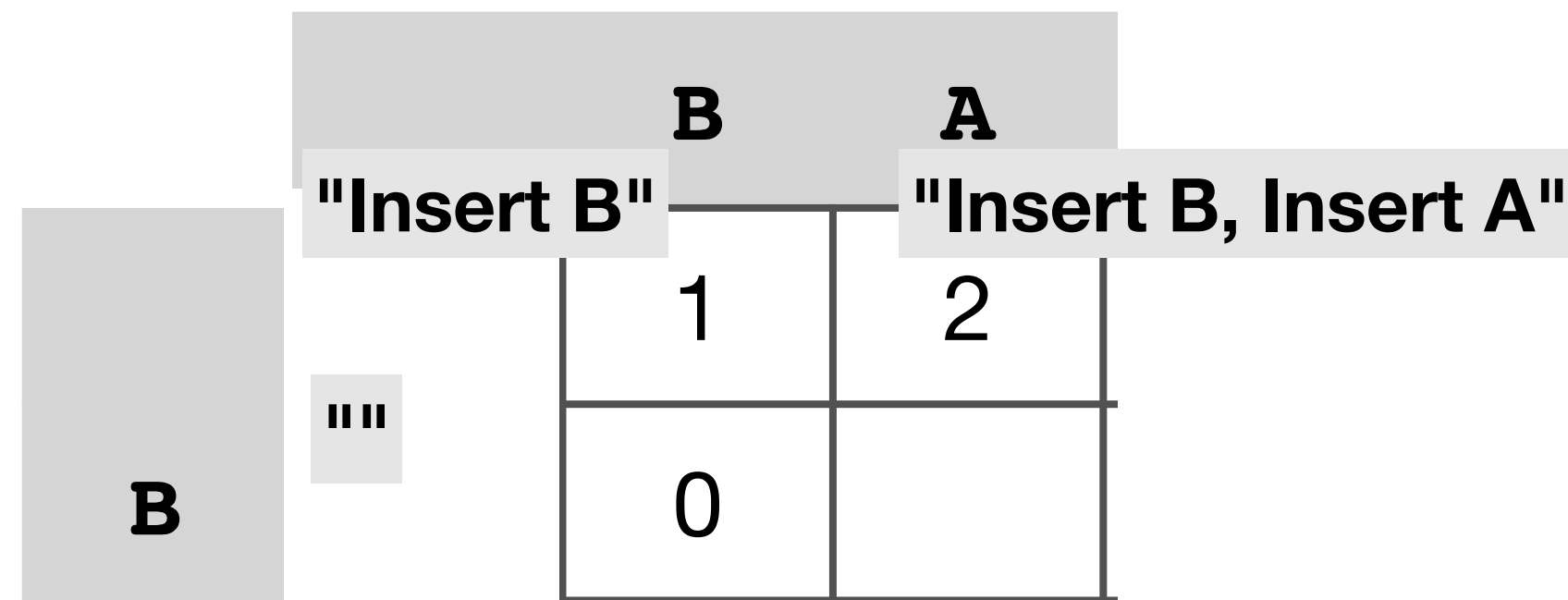


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B"} & \text{if } s_1[i] = s_2[j] \\ \text{"Insert B"} + \text{"Replace B with A"}[j] \\ \text{"Insert B, Insert A"} + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

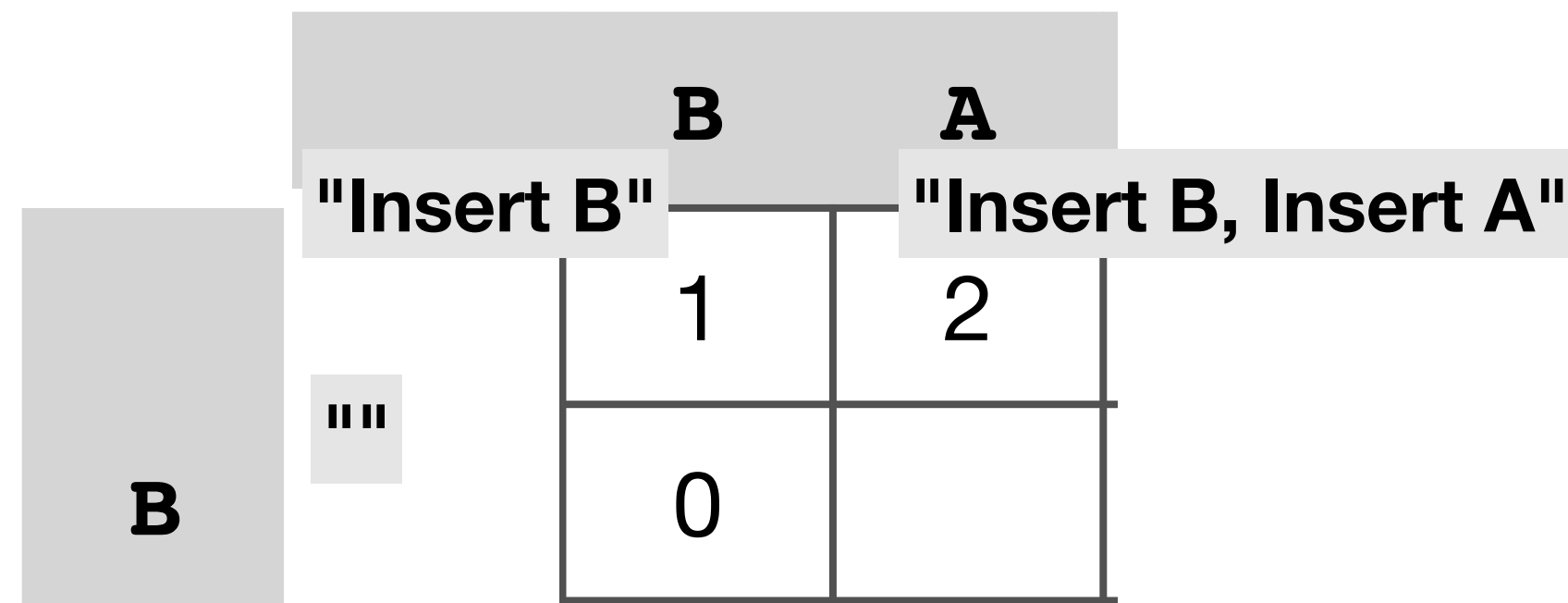


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B"} & \text{if } s_1[i] = s_2[j] \\ \text{"Insert B"} + \text{"Replace B with A"}[j] \\ \text{"Insert B, Insert A"} + \text{"Delete B"} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

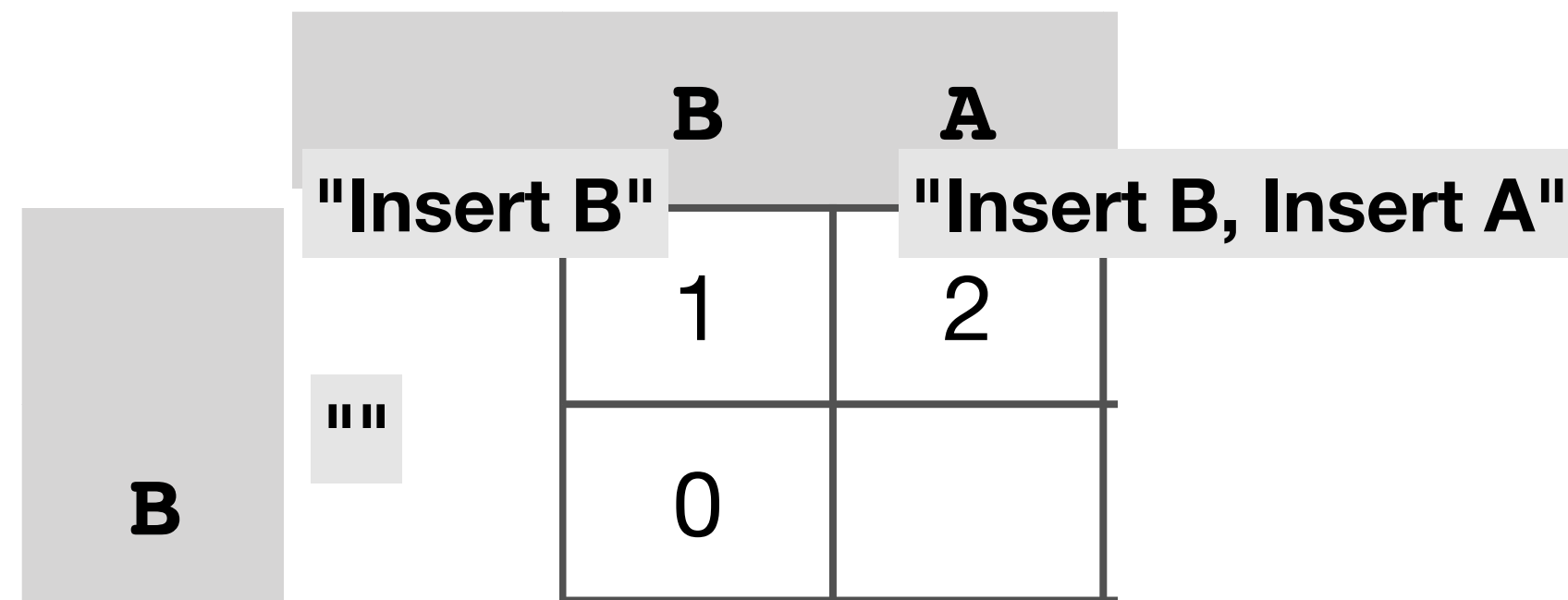


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \left\{ \begin{array}{l} \text{"Insert B"} + V[i-1, j] \quad \text{if } s_1[i] = s_2[j] \\ \text{"Insert B"} + \text{"Replace B with A"} [j] \\ \text{"Insert B, Insert A"} + \text{"Delete B"} \\ \text{"..."} + 1 \end{array} \right.$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

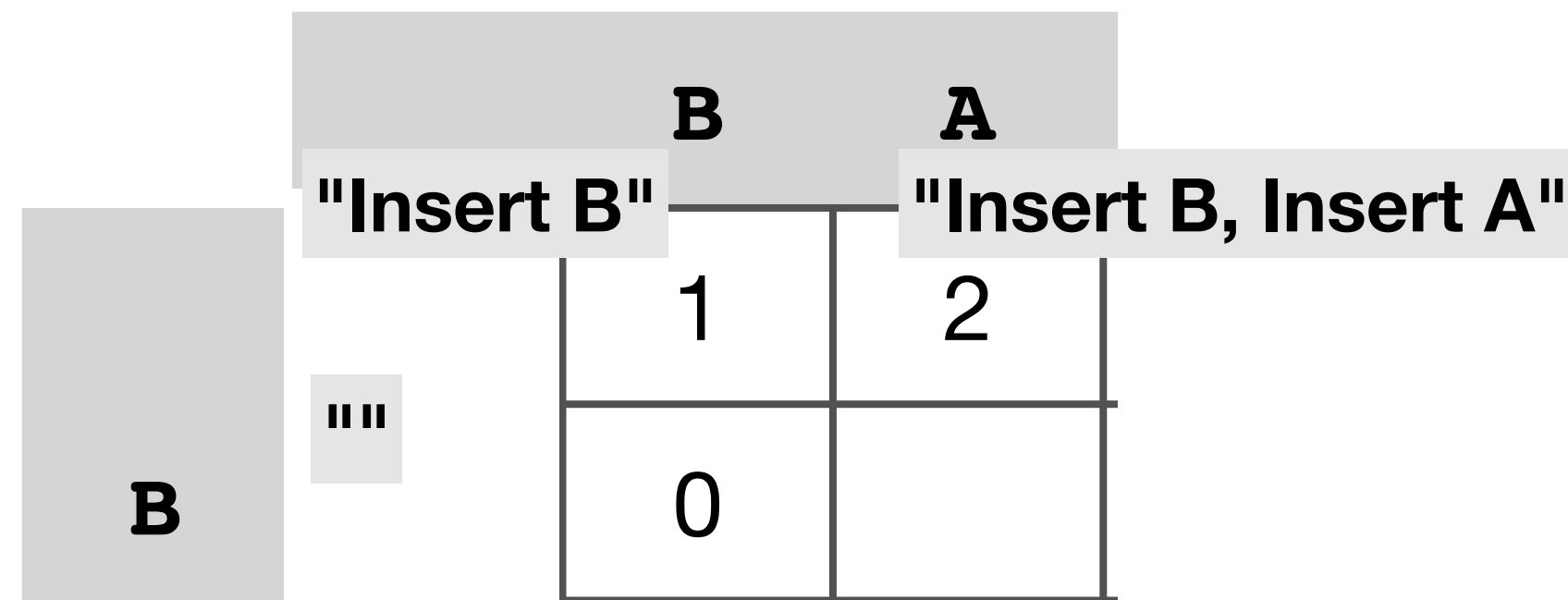


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \left\{ \begin{array}{l} \text{"Insert B"} + V[i-1, j] \\ \text{"Insert B"} + \text{"Replace B with A"}[j] \\ \text{"Insert B, Insert A"} + \text{"Delete B"} \\ \text{"Insert A"} \end{array} \right.$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

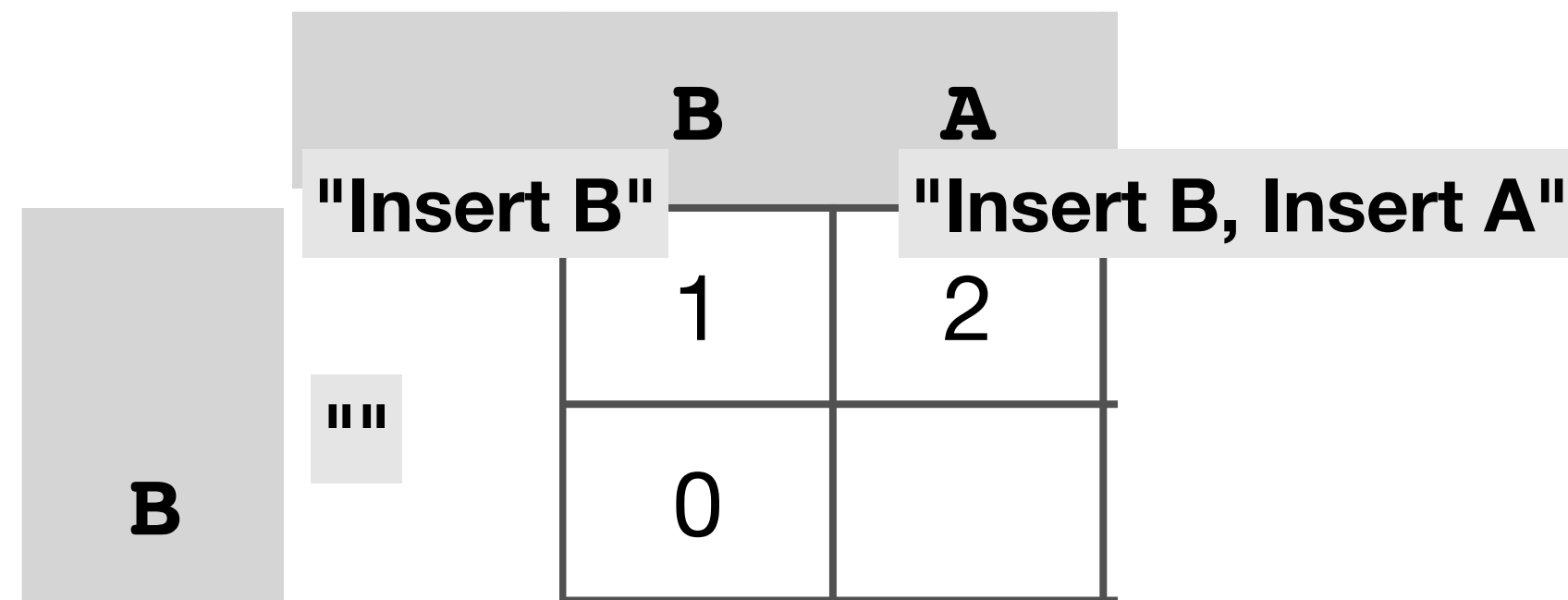


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \left\{ \begin{array}{l} \text{"~~Insert B~~" + "Replace B with A" [j]} \\ \text{"Insert B, Insert A" + "Delete B"} \\ \text{... + "Insert A"} \end{array} \right. \quad \mathbf{2}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

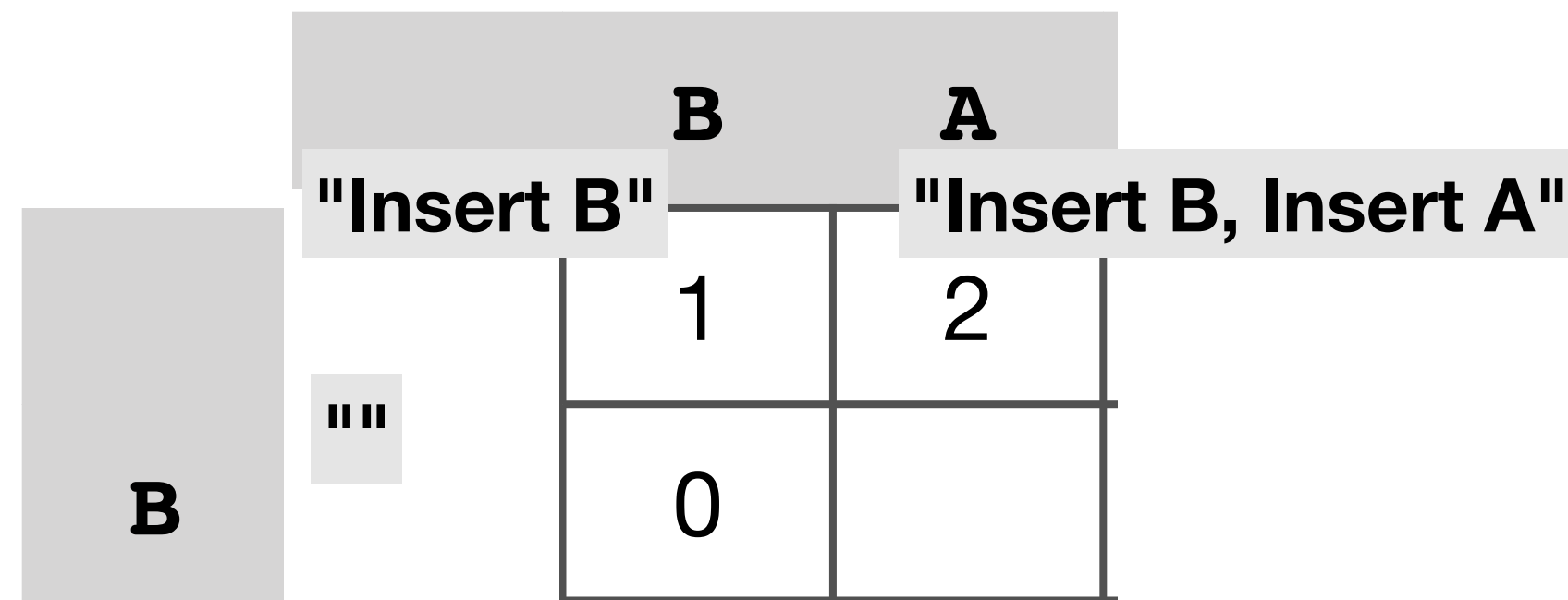


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B"} + V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ \text{"Insert B"} + \text{"Replace B with A"}[j] & \mathbf{2} \\ \text{"Insert B, Insert A"} + \text{"Delete B"} \\ \text{"..."} + \text{"Insert A"} & \mathbf{3} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance



$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B"} + V[i-1, j] & \text{if } s_1[i] = s_2[j] \\ \text{"Insert B"} + \text{"Replace B with A"} [j] & \mathbf{2} \\ \text{"Insert B, Insert A"} + \text{"Delete B"} \\ \text{""} + \text{"Insert A"} & \mathbf{1} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

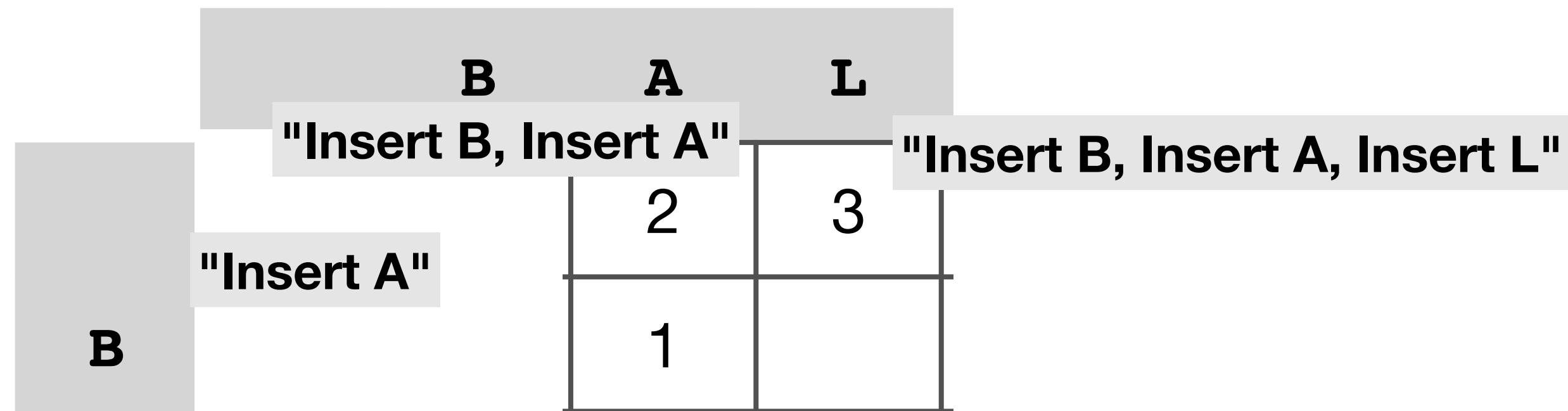
		B	A
B	"Insert B"	1	"Insert B, Insert A" 2
	"..."		
		0	1

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B"} + V[i, j-1] & \text{if } s_1[i] = s_2[j] \\ \text{"Insert B"} + \text{"Replace B with A"}[j] & \mathbf{2} \\ \text{"Insert B, Insert A"} + \text{"Delete B"} \\ \text{"..." + "Insert A"} & \mathbf{1} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

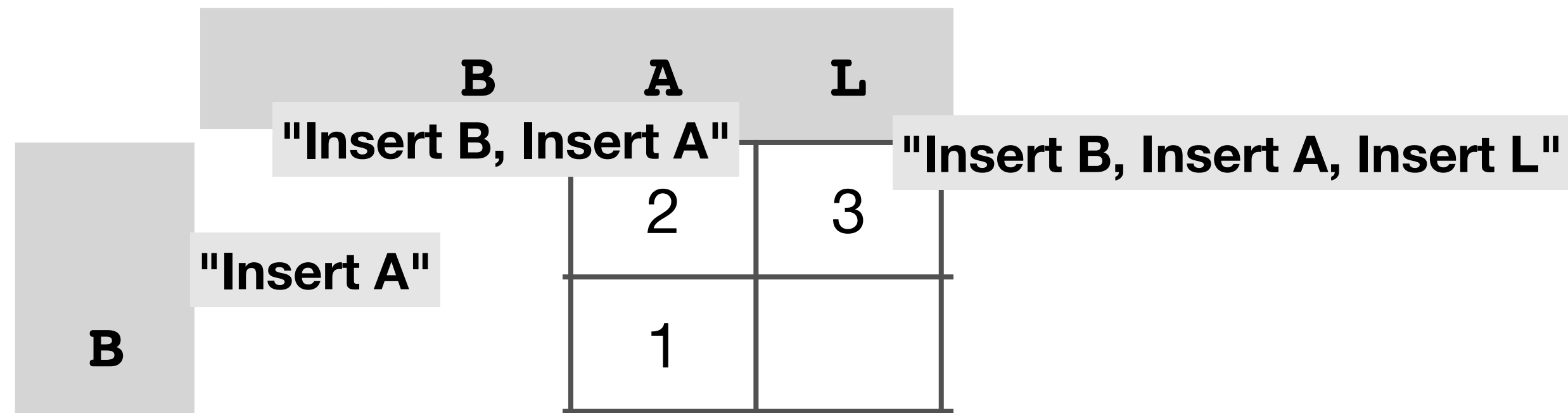


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

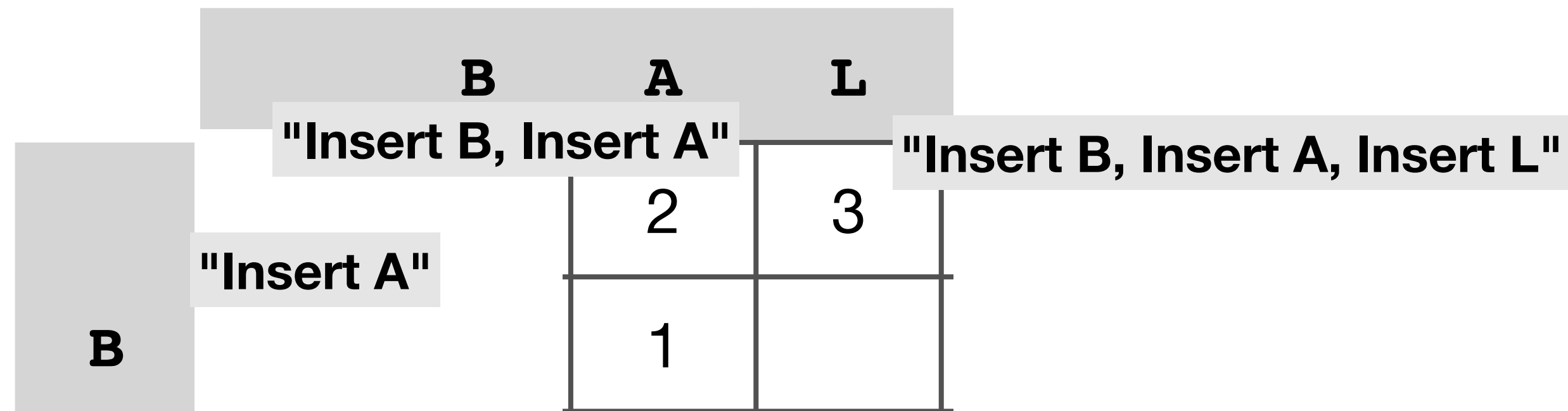


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B, Insert A"} = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

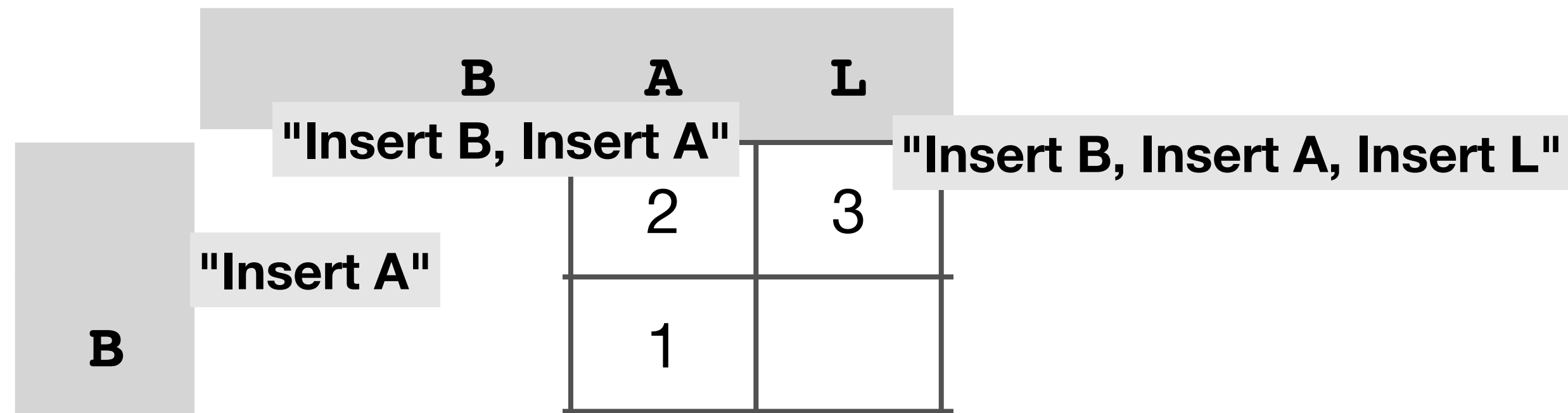


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{--- "Insert B, Insert A" ---} = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

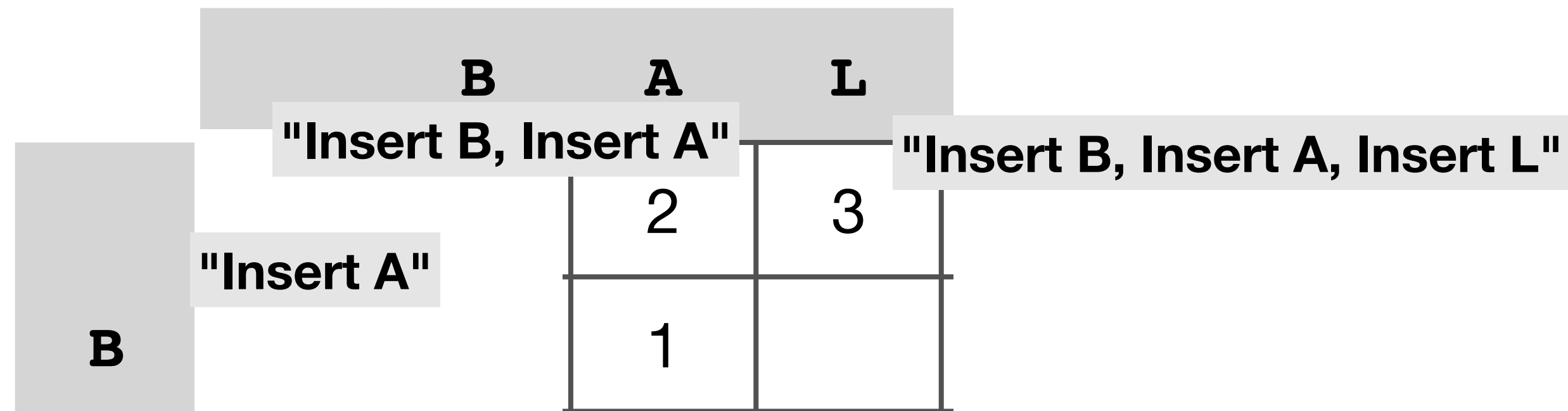


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{--- "Insert B, Insert A" ---} = s_2[j] \\ \text{"Insert B, Insert A" + 1} & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

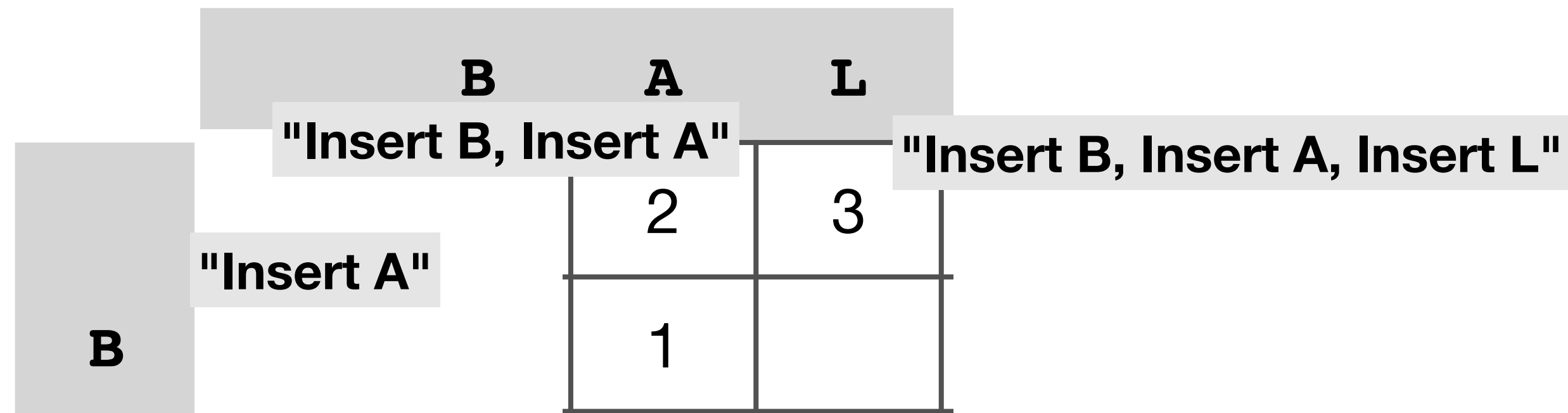


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{--- "Insert B, Insert A" --- } = s_2[j] \\ \text{"Insert B, Insert A" + "Replace B with L" } [j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

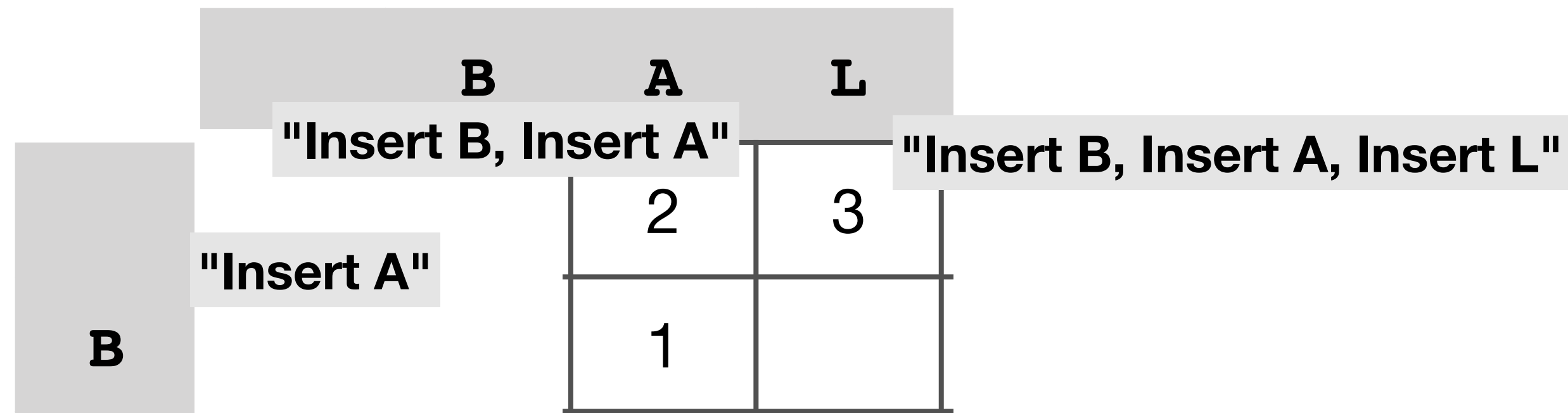


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{--- "Insert B, Insert A" ---} = s_2[j] \\ \text{"Insert B, Insert A" + "Replace B with L" } [j] \\ \text{"Insert B, Insert A, Insert L" } + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

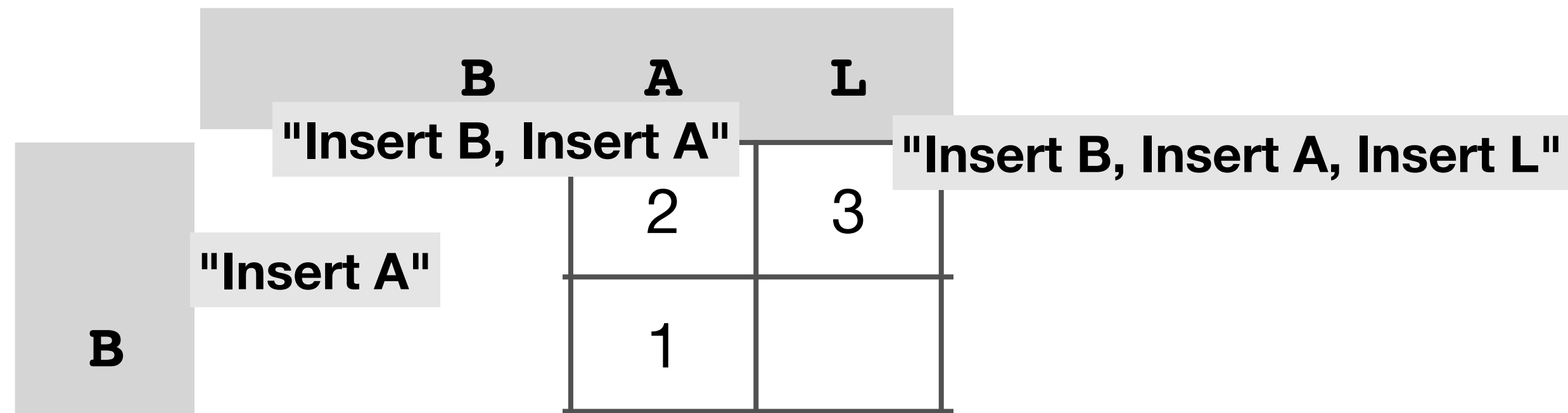


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{--- "Insert B, Insert A" ---} = s_2[j] \\ \text{"Insert B, Insert A" + "Replace B with L" } [j] \\ \text{"Insert B, Insert A, Insert L" + "Delete B"} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

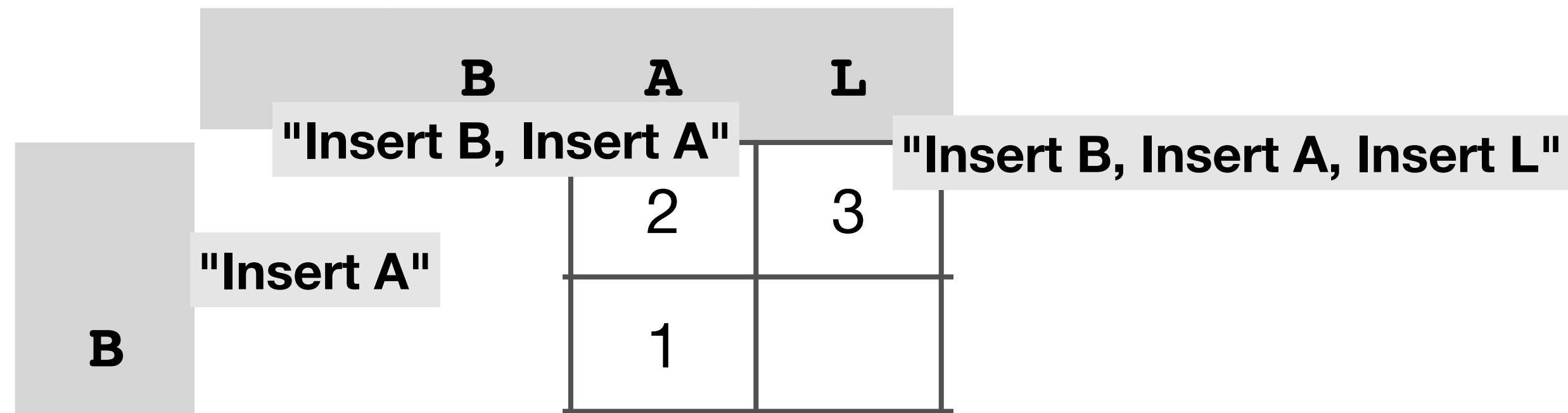


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B, Insert A"} + s_2[j] \\ \text{"Insert B, Insert A"} + \text{"Replace B with L"} [j] \\ \text{"Insert B, Insert A, Insert L"} + \text{"Delete B"} \\ \text{"Insert A"} + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

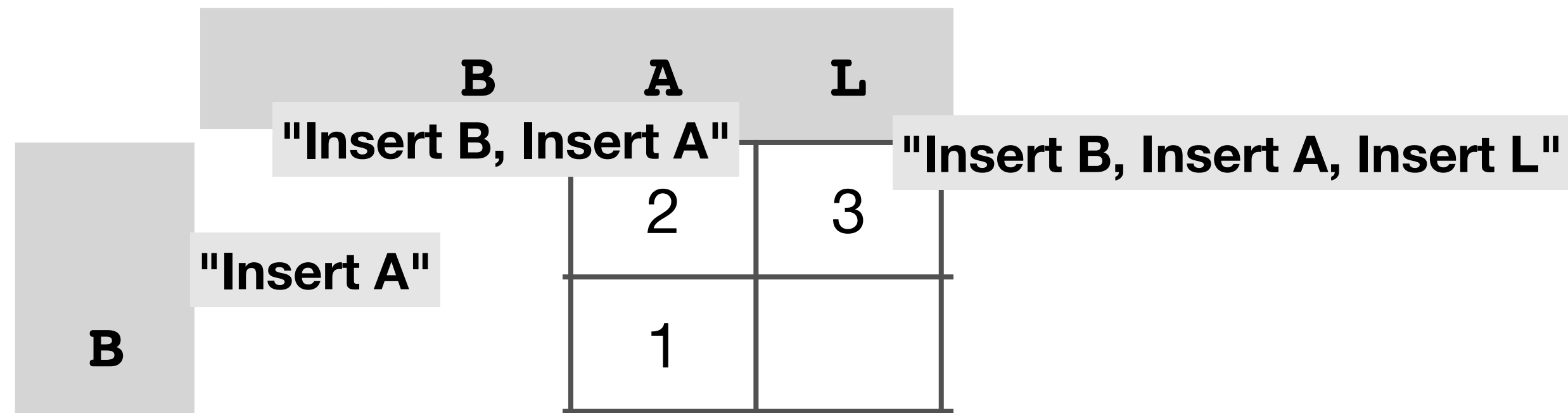


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \left\{ \begin{array}{l} \text{--- "Insert B, Insert A" --- } = s_2[j] \\ \text{"Insert B, Insert A" + "Replace B with L" } [j] \\ \text{"Insert B, Insert A, Insert L" + "Delete B"} \\ \text{"Insert A" + "Insert L"} \end{array} \right.$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

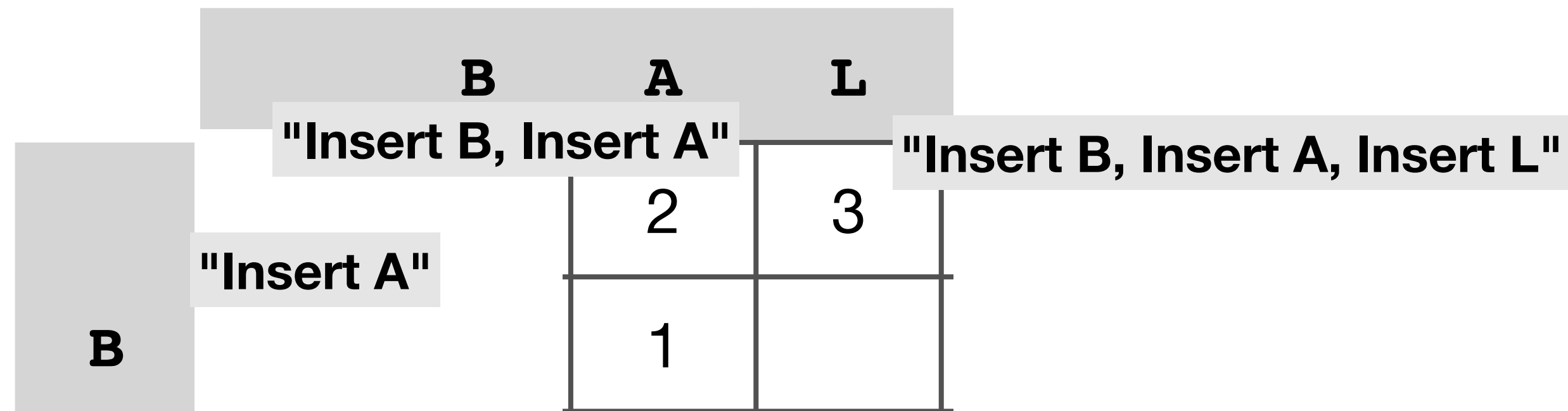


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \left\{ \begin{array}{l} \text{--- "Insert B, Insert A" --- } = s_2[j] \\ \text{"Insert B, Insert A" + "Replace B with L" } [j] \\ \text{"Insert B, Insert A, Insert L" + "Delete B"} \\ \text{"Insert A" + "Insert L"} \end{array} \right. \quad \mathbf{3}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

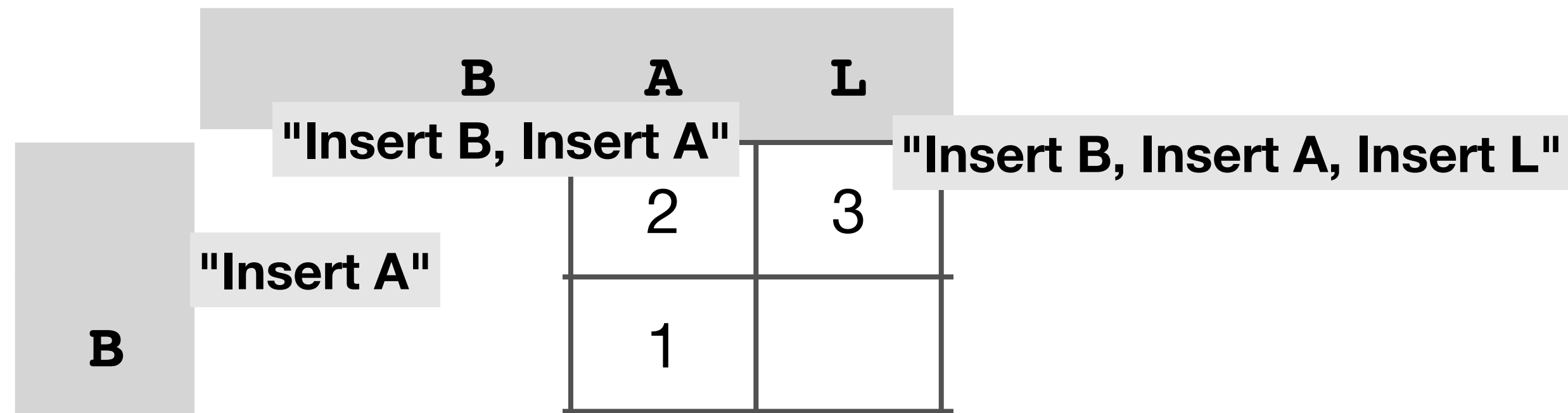


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \left\{ \begin{array}{l} \text{--- "Insert B, Insert A" --- } = s_2[j] \\ \text{"Insert B, Insert A" + "Replace B with L" } [j] \quad \mathbf{3} \\ \text{"Insert B, Insert A, Insert L" + "Delete B"} \quad \mathbf{4} \\ \text{"Insert A" + "Insert L"} \end{array} \right.$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

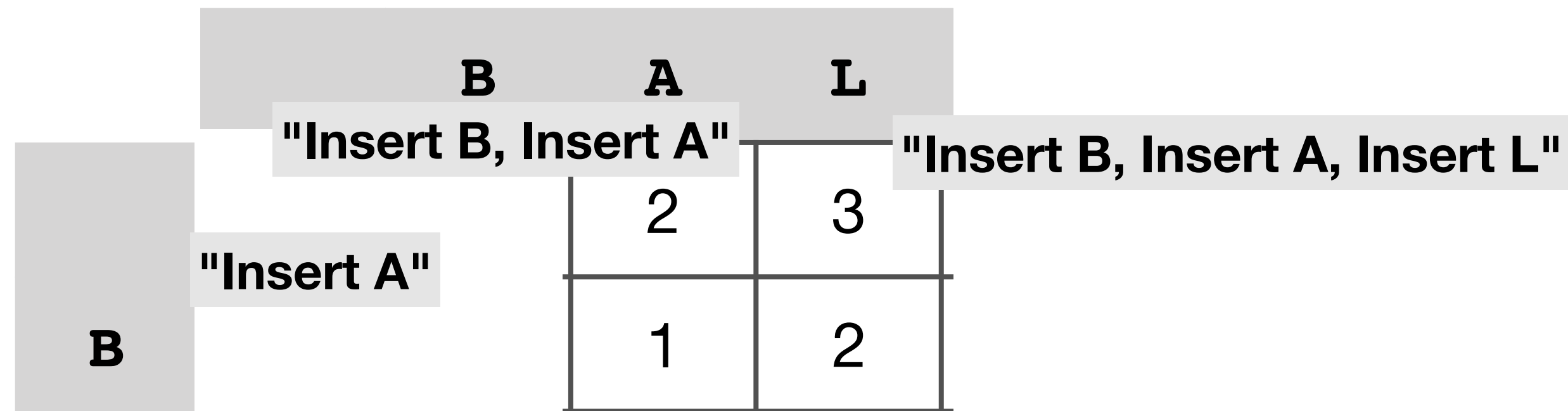


$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A" + "Replace B with L" [j]~~ & 3 \\ \text{"Insert B, Insert A, Insert L" + "Delete B"} & 4 \\ \text{"Insert A" + "Insert L"} & 2 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance



$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A"~~ + "Replace B with L" [j]} & \mathbf{3} \\ \text{"Insert B, Insert A, Insert L" + "Delete B"} & \mathbf{4} \\ \text{"Insert A" + "Insert L"} & \mathbf{2} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B A L L			
		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
B		"Insert A, Insert L"	2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B A L L			
		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
B		"Insert A, Insert L"			
			2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B, Insert A, Insert L"} = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B A L L			
		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
B		"Insert A, Insert L"	2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L
		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3	4	
B		"Insert A, Insert L"			
			2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \begin{cases} \text{"Insert B, Insert A, Insert L"} + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

~~"Insert B, Insert A, Insert L" = $s_2[j]$~~

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	
		"Insert B, Insert A, Insert L"			"Insert B, Insert A, Insert L, Insert L"	
				3	4	
B		"Insert A, Insert L"				
			2			

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A, Insert L"~~ + } s_2[j] \\ \text{"Insert B, Insert A, Insert L"} + \text{"Replace B with L"}[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	
		"Insert B, Insert A, Insert L"			"Insert B, Insert A, Insert L, Insert L"	
				3	4	
B		"Insert A, Insert L"				
				2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A, Insert L"~~ + } s_2[j] \\ \text{"Insert B, Insert A, Insert L" + "Replace B with L" } [j] \\ \text{"Insert B, Insert A, Insert L, Insert L" + 1} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L
B		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
		"Insert A, Insert L"			
			2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B, Insert A, Insert L"} + V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ \text{"Insert B, Insert A, Insert L"} + \text{"Replace B with L"} + V[i-1, j] \\ \text{"Insert B, Insert A, Insert L, Insert L"} + \text{"Delete B"} + V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L
B		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
		"Insert A, Insert L"			
			2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A, Insert L"~~ + } s_2[j] \\ \text{"Insert B, Insert A, Insert L" + "Replace B with L"} \\ \text{"Insert B, Insert A, Insert L, Insert L" + "Delete B"} \\ \text{"Insert A, Insert L" + 1} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L
B		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
		"Insert A, Insert L"			
			2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{"Insert B, Insert A, Insert L"} + s_2[j] \\ \text{"Insert B, Insert A, Insert L"} + \text{"Replace B with L"} [j] \\ \text{"Insert B, Insert A, Insert L, Insert L"} + \text{"Delete B"} \\ \text{"Insert A, Insert L"} + \text{"Insert L"} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L
B		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
		"Insert A, Insert L"			
			2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A, Insert L"~~ + } s_2[j] \\ \text{"Insert B, Insert A, Insert L" + "Replace B with L" } [j] \\ \text{"Insert B, Insert A, Insert L, Insert L" + "Delete B"} \\ \text{"Insert A, Insert L" + "Insert L"} \end{cases} \quad 4$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L
B		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
		"Insert A, Insert L"			
			2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A, Insert L"~~ + "Insert L" = } s_2[j] \\ \text{"Insert B, Insert A, Insert L" + "Replace B with L" } [j] & \mathbf{4} \\ \text{"Insert B, Insert A, Insert L, Insert L" + "Delete B" } & \mathbf{5} \\ \text{"Insert A, Insert L" + "Insert L" } \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L
B		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
		"Insert A, Insert L"			
			2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A, Insert L"~~ + $s_2[j]$ & 4 \\ "Insert B, Insert A, Insert L" + "Replace B with L" & 5 \\ "Insert B, Insert A, Insert L, Insert L" + "Delete B" & 5 \\ "Insert A, Insert L" + "Insert L" & 3 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L
B		"Insert B, Insert A, Insert L"		"Insert B, Insert A, Insert L, Insert L"	
			3		4
		"Insert A, Insert L"			
			2		3

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \text{~~"Insert B, Insert A, Insert L"~~ + } s_2[j] & \text{4} \\ \text{"Insert B, Insert A, Insert L"} + \text{"Replace B with L"} & \text{5} \\ \text{"Insert B, Insert A, Insert L, Insert L"} + \text{"Delete B"} & \text{3} \\ \text{"Insert A, Insert L"} + \text{"Insert L"} & \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C
B				4	5
				3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C
B				4	5
				3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B A L L C				
B				4	5	
				3		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad \mathbf{5}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B A L L C				
B				4	5	
				3		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{5} \\ V[i, j-1] + 1 & \mathbf{6} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C
B					4	5
					3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{5} \\ V[i, j-1] + 1 & \mathbf{6} \\ V[i-1, j] + 1 & \mathbf{4} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C
B					4	5
					3	4

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{5} \\ V[i, j-1] + 1 & \mathbf{6} \\ V[i-1, j] + 1 & \mathbf{4} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A
B					5	6
					4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A
B					5	6
					4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A
B					5	6
					4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad \mathbf{6}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B A L L C A					
B						5	6
						4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{6} \\ V[i, j-1] + 1 & \mathbf{7} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A
B					5	6
					4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{6} \\ V[i, j-1] + 1 & \mathbf{7} \\ V[i-1, j] + 1 & \mathbf{5} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A
B					5	6
					4	5

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{6} \\ V[i, j-1] + 1 & \mathbf{7} \\ V[i-1, j] + 1 & \mathbf{5} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A	P
B						6	7
						5	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A	P
B						6	7
						5	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A	P
B						6	7
						5	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad \mathbf{7}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A	P
B						6	7
						5	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{7} \\ V[i, j-1] + 1 & \mathbf{8} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A	P
B						6	7
						5	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{7} \\ V[i, j-1] + 1 & \mathbf{8} \\ V[i-1, j] + 1 & \mathbf{6} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A	L	L	C	A	P
B						6	7
						5	6

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{7} \\ V[i, j-1] + 1 & \mathbf{8} \\ V[i-1, j] + 1 & \mathbf{6} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
B		1	0
A		2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
B		1	0
A		2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
B		1	0
A		2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad \mathbf{2}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
B		1	0
A		2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{2} \\ V[i, j-1] + 1 & \mathbf{1} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
B		1	0
A		2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{2} \\ V[i, j-1] + 1 & \mathbf{1} \\ V[i-1, j] + 1 & \mathbf{3} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
B		1	0
A		2	1

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{2} \\ V[i, j-1] + 1 & \mathbf{1} \\ V[i-1, j] + 1 & \mathbf{3} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B A	
B		0	1
A		1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B A	
B		0	1
A		1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ \del{V[i-1, j-1] + 1} & \del{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A
B	0	1	
A	1		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] & \mathbf{0} \\ \cancel{V[i-1, j-1] + 1} & \cancel{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A
B	0	1	
A	1		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] & \mathbf{0} \\ \cancel{V[i-1, j-1] + 1} & \cancel{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 & \mathbf{2} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A
B	0	1
A	1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] & \mathbf{0} \\ \cancel{V[i-1, j-1] + 1} & \cancel{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 & \mathbf{2} \\ V[i-1, j] + 1 & \mathbf{2} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

	B	A
B	0	1
A	1	0

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] & \mathbf{0} \\ \cancel{V[i-1, j-1] + 1} & \cancel{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 & \mathbf{2} \\ V[i-1, j] + 1 & \mathbf{2} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A** **L**

B	1	2
A	0	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A** **L**

B
A

1	2
0	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A** **L**

B
A

1	2
0	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad \mathbf{2}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A** **L**

B
A

1	2
0	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \quad \mathbf{2} \\ V[i, j-1] + 1 \quad \mathbf{3} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A** **L**

B
A

1	2
0	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{2} \\ V[i, j-1] + 1 & \mathbf{3} \\ V[i-1, j] + 1 & \mathbf{1} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A** **L**

B
A

1	2
0	1

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{2} \\ V[i, j-1] + 1 & \mathbf{3} \\ V[i-1, j] + 1 & \mathbf{1} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

B
A

2	3
1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

B
A

2	3
1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

B
A

2	3
1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad \mathbf{3}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A** **L** **L**

B
A

2	3
1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \quad \mathbf{3} \\ V[i, j-1] + 1 & \mathbf{4} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

B
A

2	3
1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{3} \\ V[i, j-1] + 1 & \mathbf{4} \\ V[i-1, j] + 1 & \mathbf{2} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

B
A

2	3
1	2

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{3} \\ V[i, j-1] + 1 & \mathbf{4} \\ V[i-1, j] + 1 & \mathbf{2} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

B
A

3	4
2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

B
A

3	4
2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

B
A

3	4
2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad \mathbf{4}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

B
A

3	4
2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{4} \\ V[i, j-1] + 1 & \mathbf{5} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

B
A

3	4
2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{4} \\ V[i, j-1] + 1 & \mathbf{5} \\ V[i-1, j] + 1 & \mathbf{3} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

B
A

3	4
2	3

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{4} \\ V[i, j-1] + 1 & \mathbf{5} \\ V[i-1, j] + 1 & \mathbf{3} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

B
A

4	5
3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

B
A

4	5
3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ \del{V[i-1, j-1] + 1} & \del{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

B
A

4	5
3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ \cancel{V[i-1, j-1] + 1} & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad 4$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

B
A

4	5
3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] & \mathbf{4} \\ \cancel{V[i-1, j-1] + 1} & \cancel{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 & \mathbf{6} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

B
A

4	5
3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] & \mathbf{4} \\ \del{V[i-1, j-1] + 1} & \del{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 & \mathbf{6} \\ V[i-1, j] + 1 & \mathbf{4} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

B
A

4	5
3	4

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] & \mathbf{4} \\ \cancel{V[i-1, j-1] + 1} & \cancel{\text{if } s_1[i] \neq s_2[j]} \\ V[i, j-1] + 1 & \mathbf{6} \\ V[i-1, j] + 1 & \mathbf{4} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

B

A

5	6
4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

B

A

5	6
4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

B

A

5	6
4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases} \quad \mathbf{6}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

B

A

5	6
4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{6} \\ V[i, j-1] + 1 & \mathbf{7} \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

B

A

5	6
4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{6} \\ V[i, j-1] + 1 & \mathbf{7} \\ V[i-1, j] + 1 & \mathbf{5} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

B

A

5	6
4	5

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

$$V[i, j] := \min \begin{cases} \del{V[i-1, j-1]} & \del{\text{if } s_1[i] = s_2[j]} \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] & \mathbf{6} \\ V[i, j-1] + 1 & \mathbf{7} \\ V[i-1, j] + 1 & \mathbf{5} \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B

A

2

1

S

3

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
A	2	3	1
S	3		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
A	2	1	
S	3	3	2

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	
A	2	1	
S	3		

3 2
4

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

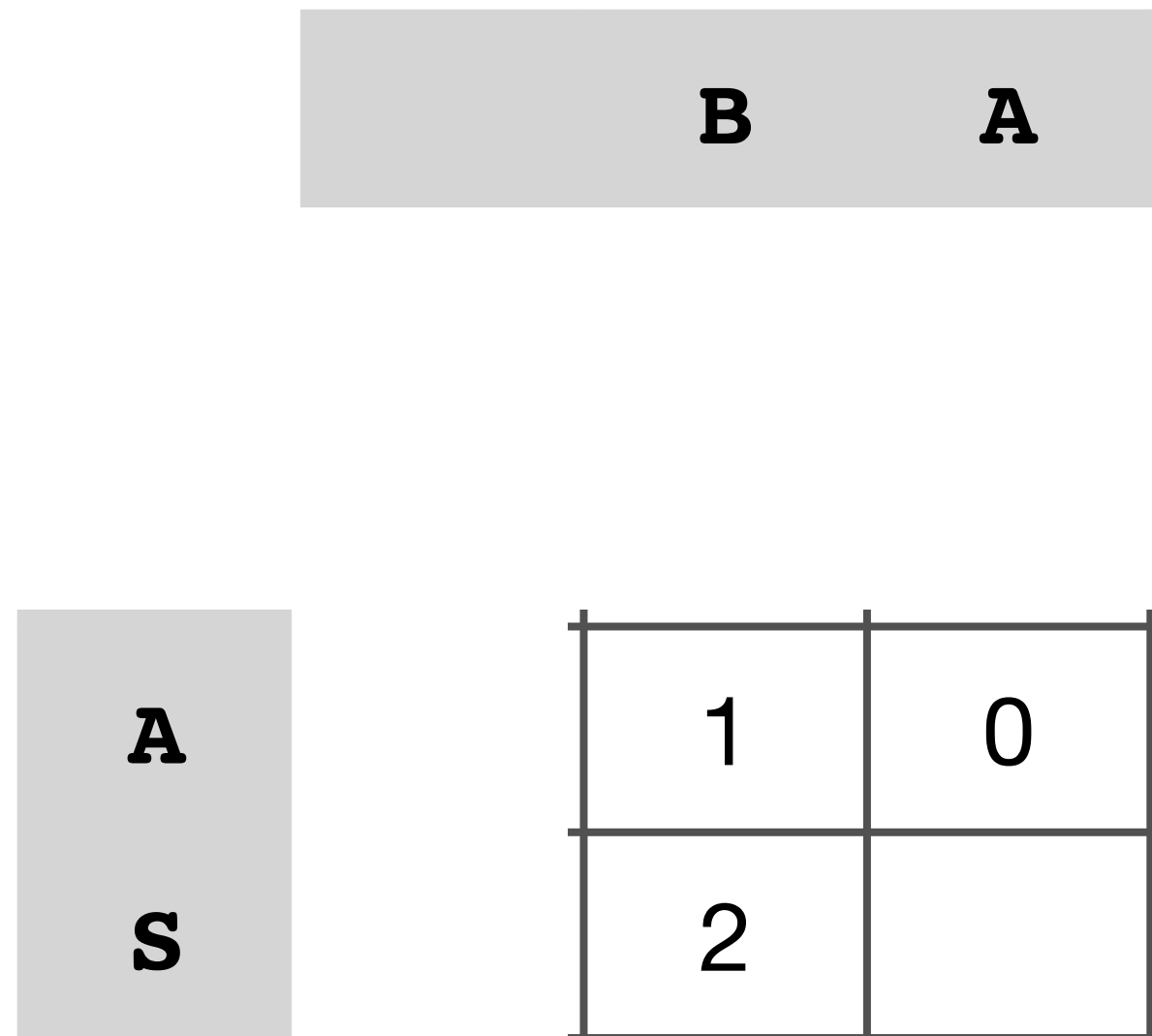
		B	
A	2	1	
S	3	2	

		3	2
	3	4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

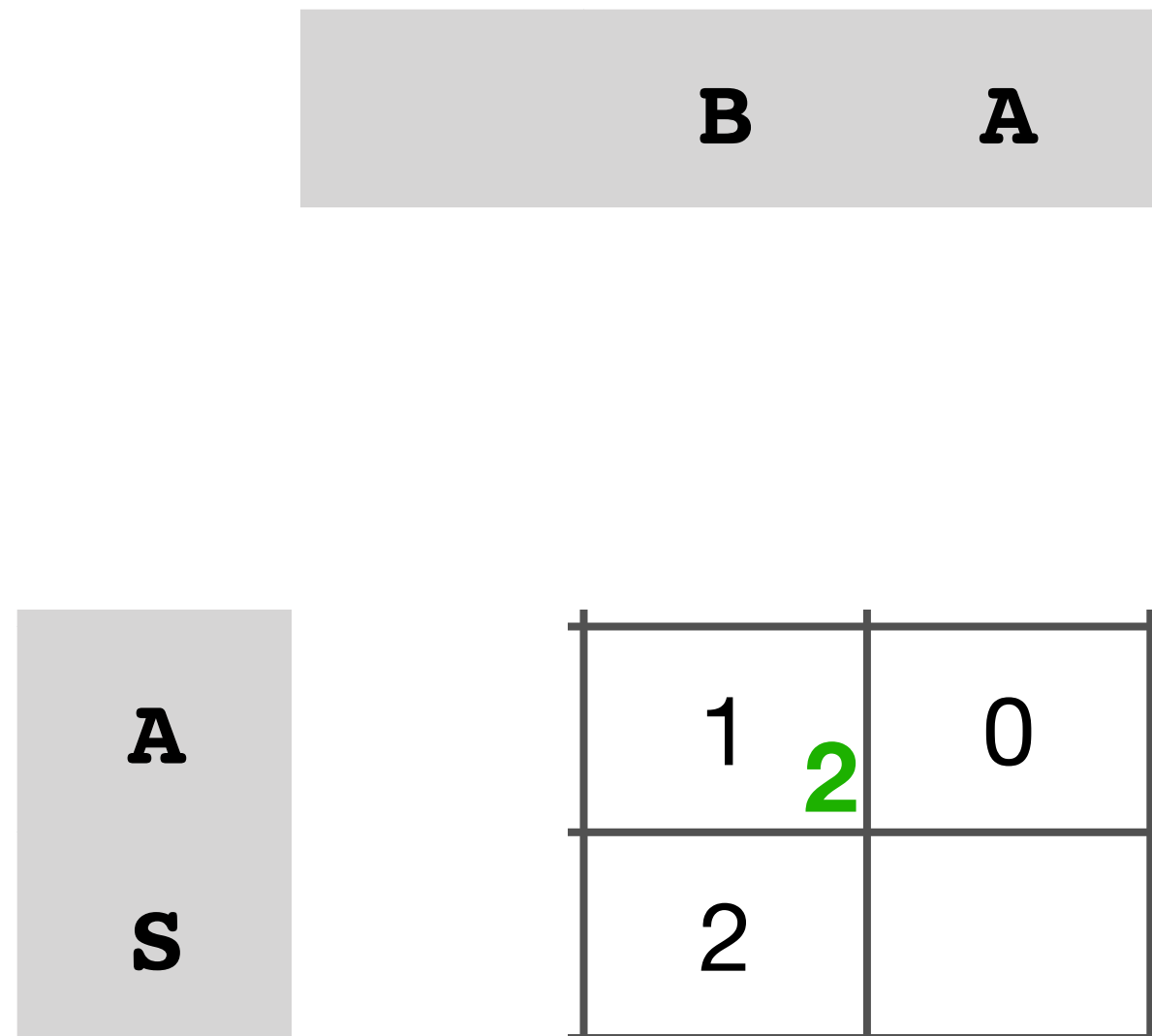
Edit Distance



$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

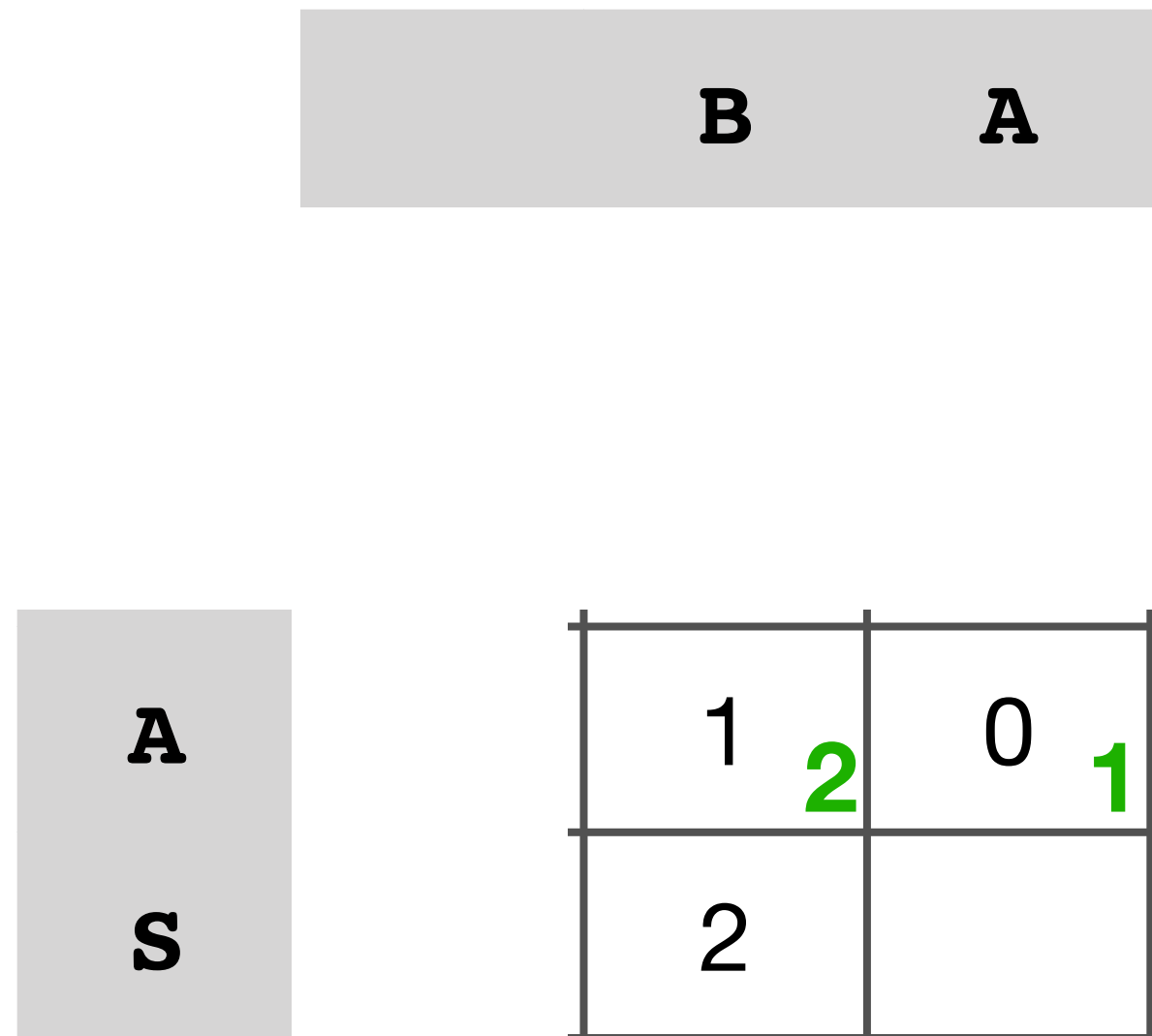
Edit Distance



$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

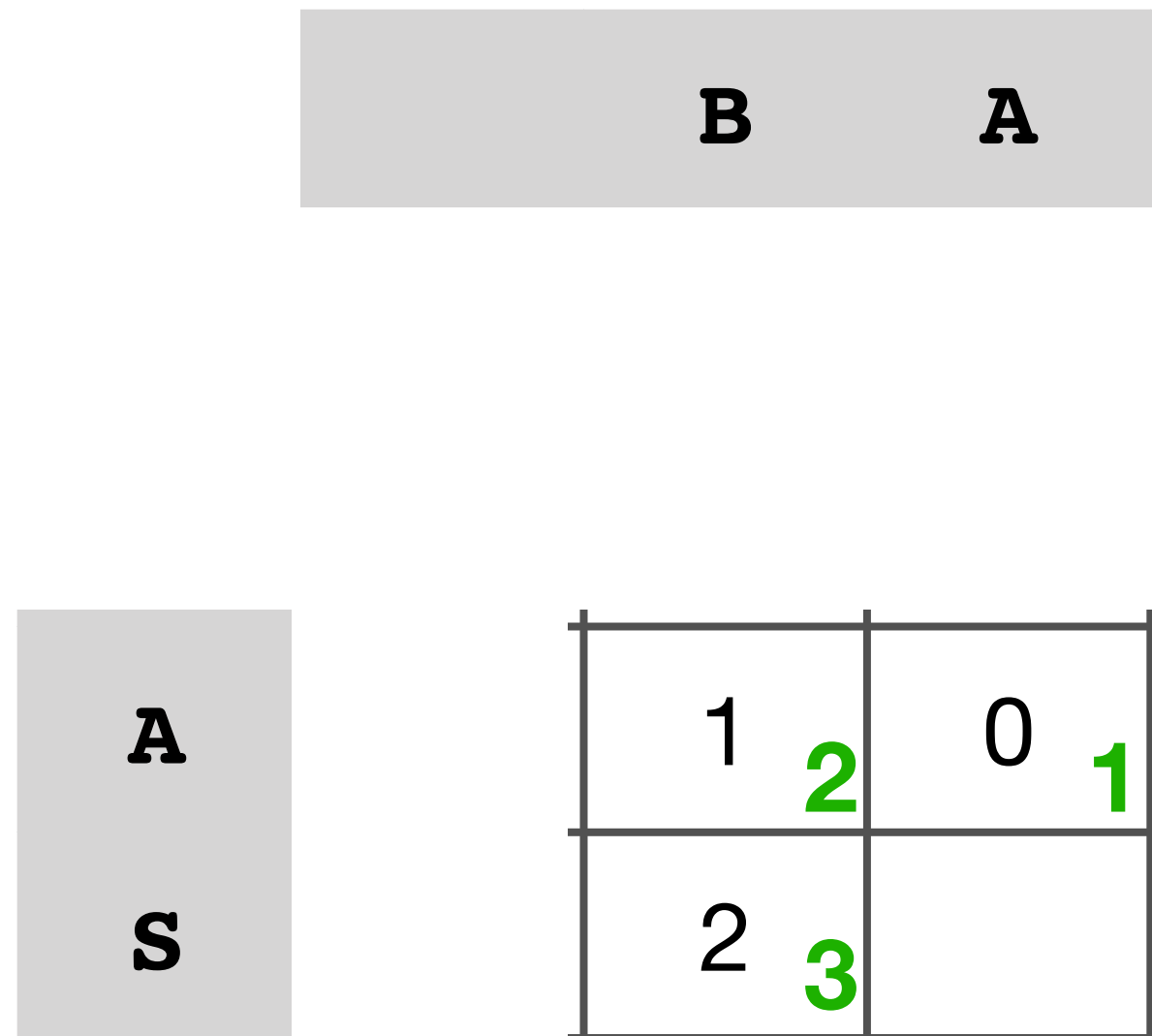
Edit Distance



$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

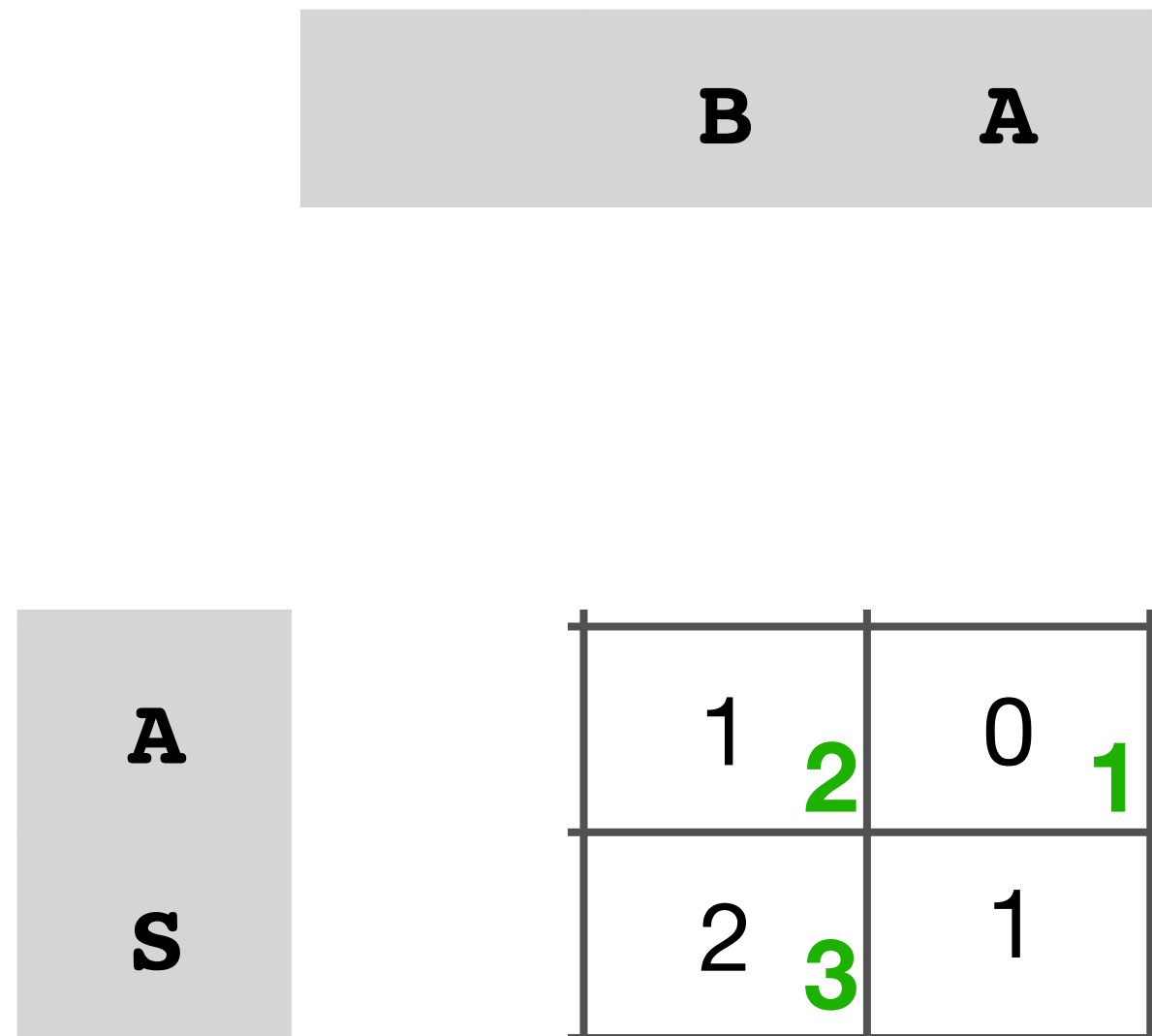
Edit Distance



$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance



$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L

A

S

0	1
1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L

A
S

0	1	1
1		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L

A
S

0	1
1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L

A
S

0	1	1	2
1	2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L

A
S

0	1	1
1	2	1

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

A
S

1	2
1	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

A
S

1	2	2
1		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

A
S

1	2	2	3
1			

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

A
S

1	2	2	3
1	2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

A
S

1	2	2	3
1	2	2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

A

S

2	3
2	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

A
S

2	3	3
2		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

A
S

2	3	3	4
2			

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

A
S

2	3	3	4
2	3		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

A
S

2	3	3	4
2	3	3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

A

S

3	4
3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

A

S

3	4	4
3		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

A
S

3	4	4	5
3			

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

A
S

3	4	4	5
3	4		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

A
S

3	4	4	5
3	4	4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

A

S

4	5
4	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

A

S

4	5	5
4		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

A
S

4	5	5	6
4			

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

A

S

4	5	5	6
4	5		

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

A
S

4	5	5	6
4	5	5	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

3

2

E

4

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B

S

3

2

E

4

3

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A**

S
E

2	1
3	

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B **A**

S

E

2	1
3	2

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

1	1
2	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

1	1
2	2

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

1	2
2	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

1	2
2	2

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

2	3
2	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

2	3
2	3

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

3	4
3	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

3	4
3	4

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

4	5
4	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

S

E

4	5
4	5

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

E	4	3	2	2	2	3	4	5
B	5							

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

E	4	3	2	2	2	3	4	5
B	5	4						

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

E	4	3	2	2	2	3	4	5
B	5	4	3					

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

E	4	3	2	2	2	3	4	5
B	5	4	3	3				

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

E	4	3	2	2	2	3	4	5
B	5	4	3	3	3			

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

E	4	3	2	2	2	3	4	5
B	5	4	3	3	3	3		

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

E	4	3	2	2	2	3	4	5
B	5	4	3	3	3	3	4	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

E	4	3	2	2	2	3	4	5
B	5	4	3	3	3	3	4	5

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B	5	4	3	3	3	3	4	5
A	6							

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B	5	4	3	3	3	3	4	5
A	6	5						

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B	5	4	3	3	3	3	4	5
A	6	5	4					

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B	5	4	3	3	3	3	4	5
A	6	5	4	4				

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B	5	4	3	3	3	3	4	5
A	6	5	4	4	4			

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B	5	4	3	3	3	3	4	5
A	6	5	4	4	4	4		

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B	5	4	3	3	3	3	4	5
A	6	5	4	4	4	4	3	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

B	5	4	3	3	3	3	4	5
A	6	5	4	4	4	4	3	4

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

A	6	5	4	4	4	4	3	4
L	7							

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

A	6	5	4	4	4	4	3	4
L	7	6						

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

A	6	5	4	4	4	4	3	4
L	7	6	5					

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

A	6	5	4	4	4	4	3	4
L	7	6	5	4				

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

A	6	5	4	4	4	4	3	4
L	7	6	5	4	4			

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

A	6	5	4	4	4	4	3	4
L	7	6	5	4	4	5		

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

A	6	5	4	4	4	4	3	4
L	7	6	5	4	4	5	4	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

A	6	5	4	4	4	4	3	4
L	7	6	5	4	4	5	4	4

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

L	7	6	5	4	4	5	4	4
L	8							

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

L	7	6	5	4	4	5	4	4
L	8	7						

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

L	7	6	5	4	4	5	4	4
L	8	7	6					

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

L	7	6	5	4	4	5	4	4
L	8	7	6	5				

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

L	7	6	5	4	4	5	4	4
L	8	7	6	5	4			

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

L	7	6	5	4	4	5	4	4
L	8	7	6	5	4	5		

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

L	7	6	5	4	4	5	4	4
L	8	7	6	5	4	5	5	

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

B A L L C A P

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

L	7	6	5	4	4	5	4	4
L	8	7	6	5	4	5	5	5

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:		:
(0,m)	(1,m)	...	(n,m)

Edit Distance

		B	A	L	L	C	A	P
B	0	1	2	3	4	5	6	7
A	1	0	1	2	3	4	5	6
S	2	1	0	1	2	3	4	5
E	3	2	1	1	2	3	4	5
B	4	3	2	2	2	3	4	5
B	5	4	3	3	3	3	4	5
A	6	5	4	4	4	4	3	4
L	7	6	5	4	4	5	4	4
L	8	7	6	5	4	5	5	5

$$V[i, j] := \min \begin{cases} V[i-1, j-1] & \text{if } s_1[i] = s_2[j] \\ V[i-1, j-1] + 1 & \text{if } s_1[i] \neq s_2[j] \\ V[i, j-1] + 1 \\ V[i-1, j] + 1 \end{cases}$$

(0,0)	(1,0)	...	(n,0)
(0,1)	(1,1)	...	(n,1)
:	:	:	:
(0,m)	(1,m)	...	(n,m)

Local Alignment

	R	E	A	C	T	S	B	A	D
C									
A									
C									
T									
U									
S									

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

$$\delta(-, x) = -1 \text{ for } x \in \Sigma$$

$$\delta(x, -) = -1 \text{ for } x \in \Sigma$$

$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Whats the alignment of two empty strings?

Local Alignment

		R	E	A	C	T	S	B	A	D
C	0									
A										
C										
T										
U										
S										

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

		R	E	A	C	T	S	B	A	D
C	0									
A										
C										
T										
U										
S										

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R	E	A	C	T	S	B	A	D
C	0								
A									
C									
T									
U									
S									

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Whats the best *local* alignment of the empty string and any other string?

Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0									
A	0									
C	0									
T	0									
U	0									
S	0									

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

$$\delta(-, x) = -1 \text{ for } x \in \Sigma$$

$$\delta(x, -) = -1 \text{ for } x \in \Sigma$$

$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + \delta(S[i], T[i]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

$$\delta(-, x) = -1 \text{ for } x \in \Sigma$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

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Local Alignment

	R	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + -1 & \text{insert} \end{cases}$$

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Local Alignment

	R	
C	0	0
	0	0

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + -1 & \text{insert} \end{cases}$$

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$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R		E
C	0	0	
	0		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R E	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ \text{0} + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R E	
C	0	0	
	0		

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Local Alignment

		R	E
C		0	0
		0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R E	
C		0	0
		0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R E	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R E	
C	0	0
	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + -1 & \text{insert} \end{cases}$$

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$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R		E
C	0	0	
	0	0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + -1 & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R	E	A
C		0	0
		0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R E A		
C		0	0
		0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ \text{0} + \delta(S[i], T[i]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R E A		
C		0	0	
		0		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

		R E A		
C		0	0	
		0		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ \text{0} + \text{-1} & \text{match/mismatch} \\ \text{0} + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

		R E A		
C		0	0	
		0		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A
C	0	0	
	0		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A
C	0	0	
	0		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + -1 & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A
C	0	0	
	0	0	

$$V(i,j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + -1 & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A	C
C			0	0
			0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A	C
C			0	0
			0	

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$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R	E	A	C
C			0	0
			0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + 2 & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A	C
C			0	0
			0	

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Local Alignment

	R	E	A	C
C			0	0
			0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + 2 & \text{match/mismatch} \\ 0 + (-1) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

$$\delta(-, x) = -1 \text{ for } x \in \Sigma$$

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Local Alignment

	R	E	A	C
C			0	0
			0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + 2 & \text{match/mismatch} \\ 0 + -1 & \text{delete} \\ 0 + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A	C
C			0	0
			0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ \text{0} + \text{2} & \text{match/mismatch} \\ \text{0} + \text{-1} & \text{delete} \\ \text{0} + \text{-1} & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A	C
C			0	0
			0	2

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + 2 & \text{match/mismatch} \\ 0 + (-1) & \text{delete} \\ 0 + (-1) & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A	C
C			0	0
			0	2

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Local Alignment

	R	E	A	C	T
C				0	0
				2	

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Local Alignment

	R	E	A	C	T
C				0	0
				2	

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Local Alignment

	R	E	A	C	T
C				0	0
				2	

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Local Alignment

	R	E	A	C	T
C				0	0
				2	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 2 + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, -) = -1 \text{ for } x \in \Sigma$$

$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

	R	E	A	C	T
C				0	0
				2	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 2 + -1 & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A	C	T
C				0	0
				2	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 2 + -1 & \text{delete} \\ 0 + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment



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Local Alignment

	R	E	A	C	T
C				0	0
				2	1

$$V(i,j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 2 + -1 & \text{delete} \\ 0 + -1 & \text{insert} \end{cases}$$

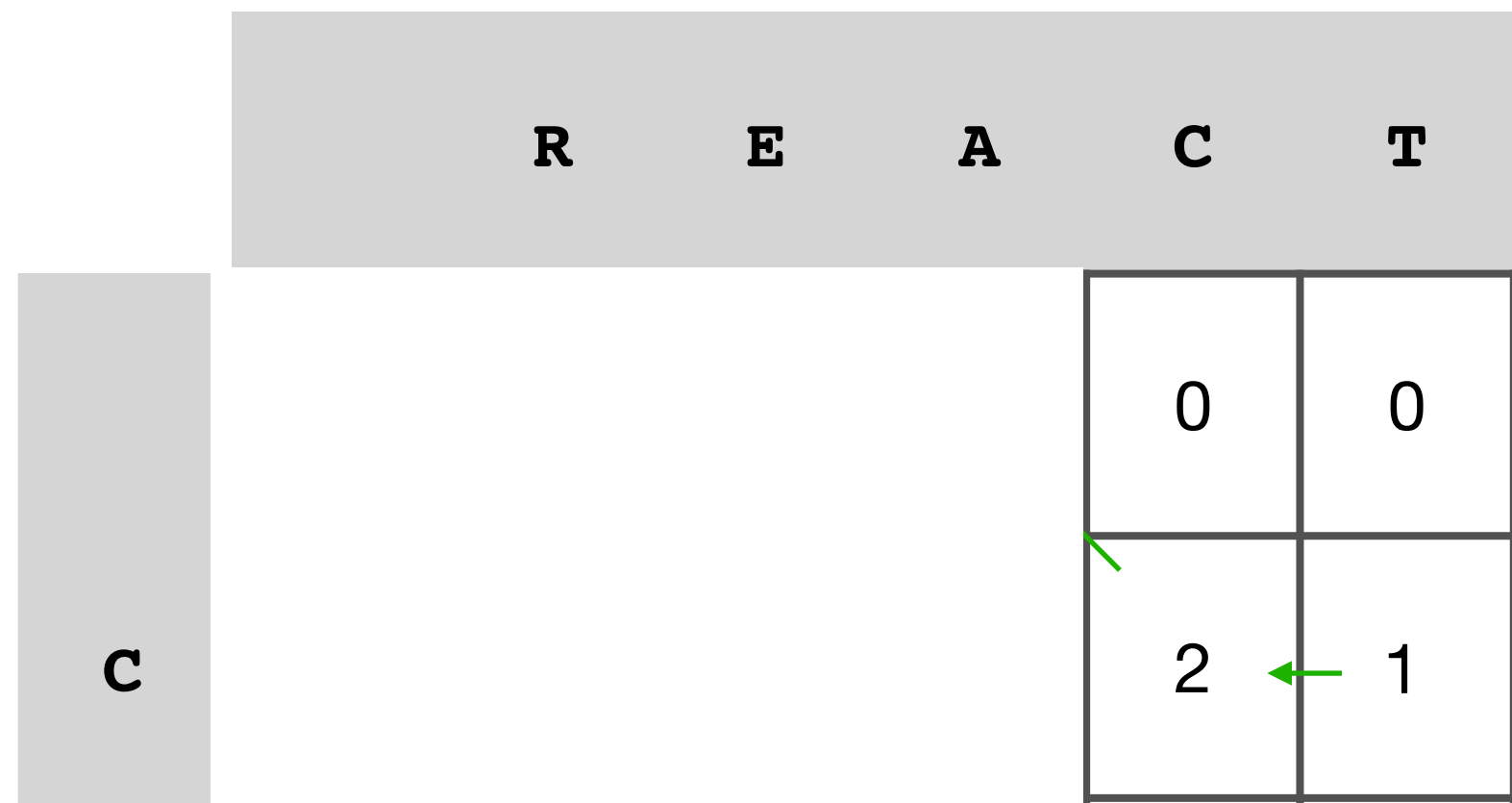
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Local Alignment



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Local Alignment

	R	E	A	C	T	S
C				0	0	
				← 1		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment



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Local Alignment

	R	E	A	C	T	S
C				0	0	
				1		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment



$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 1 + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment



$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + -1 & \text{match/mismatch} \\ 1 + -1 & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment



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Local Alignment



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Local Alignment



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Local Alignment



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Local Alignment

	R	E	A	C	T	S	B
C						0	0
						0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R E A C T S B						
C						0	0
					0		

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Local Alignment

	R	E	A	C	T	S	B
C						0	0
						0	

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Local Alignment

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C						0	0
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Local Alignment

	R E A C T S B						
C						0	0
					0		

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Local Alignment

		R	E	A	C	T	S	B
C							0	0
							0	
							0	

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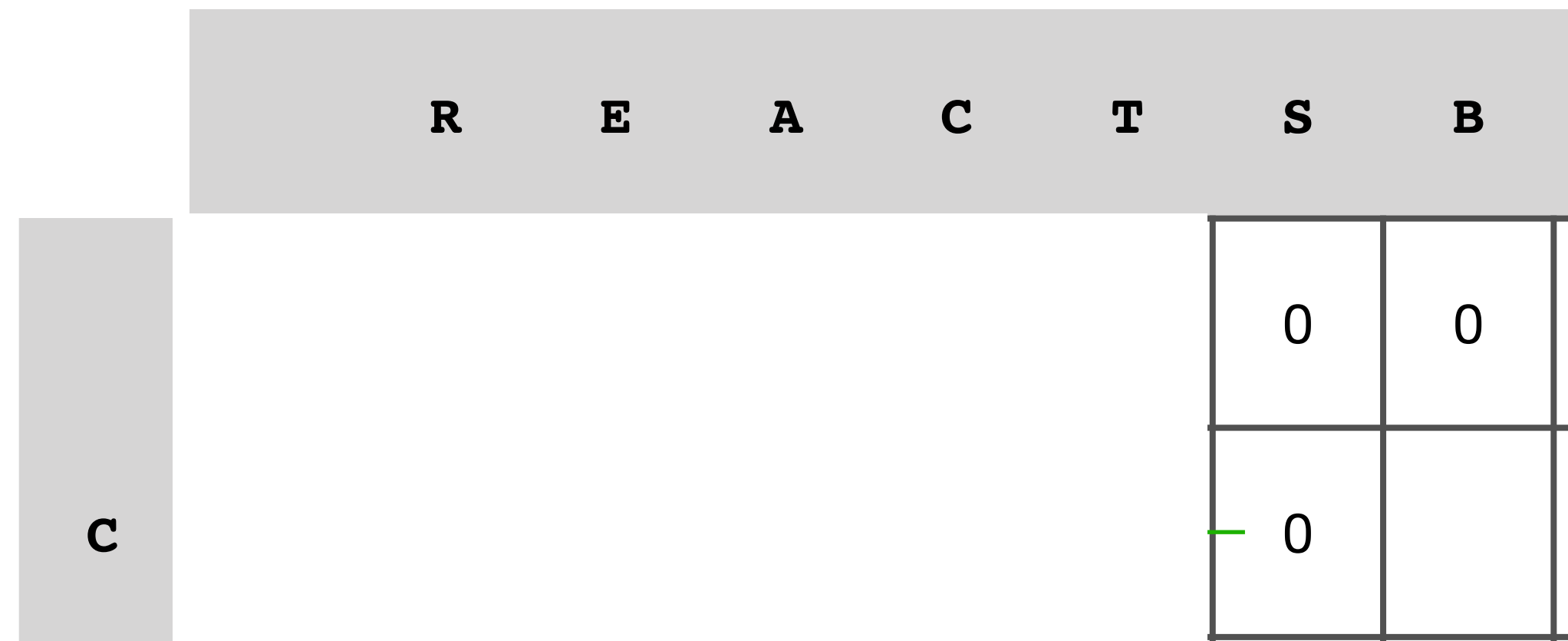
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Local Alignment

		R E A C T S B						
C								
						0	0	
						0	0	

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Local Alignment

	R	E	A	C	T	S	B	A
C							0	0
							0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

	R	E	A	C	T	S	B	A
C							0	0
							0	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ 0 + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment



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Local Alignment



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Local Alignment

	R	E	A	C	T	S	B	A	D
C								0	0
								0	

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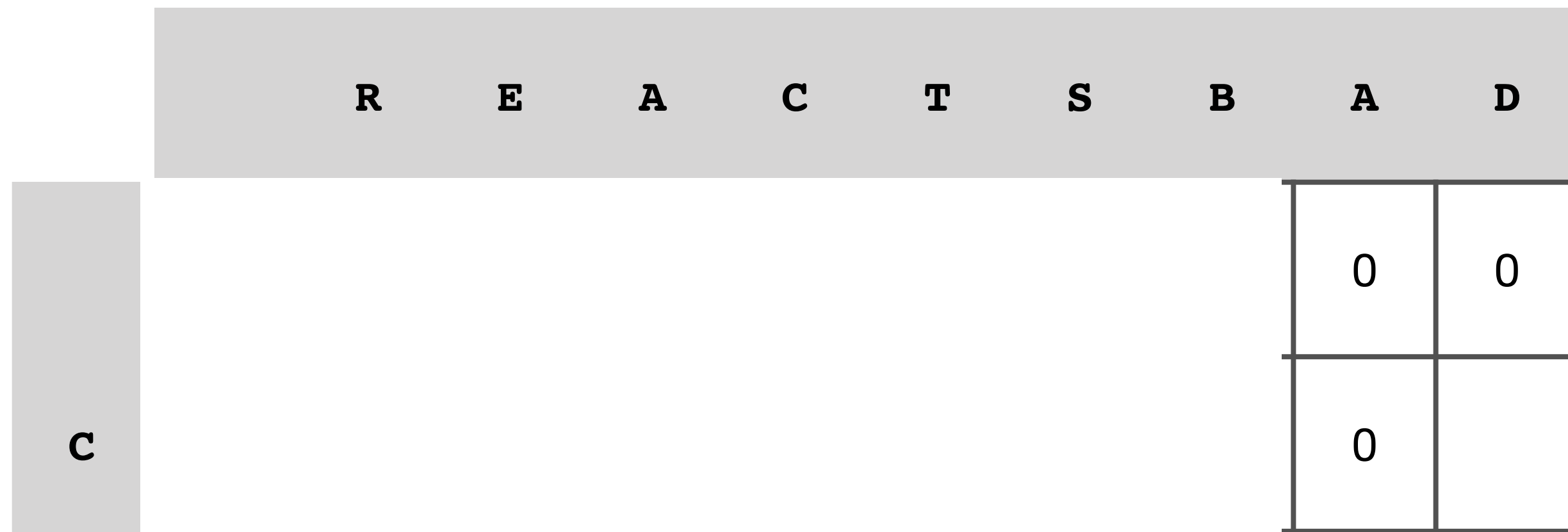
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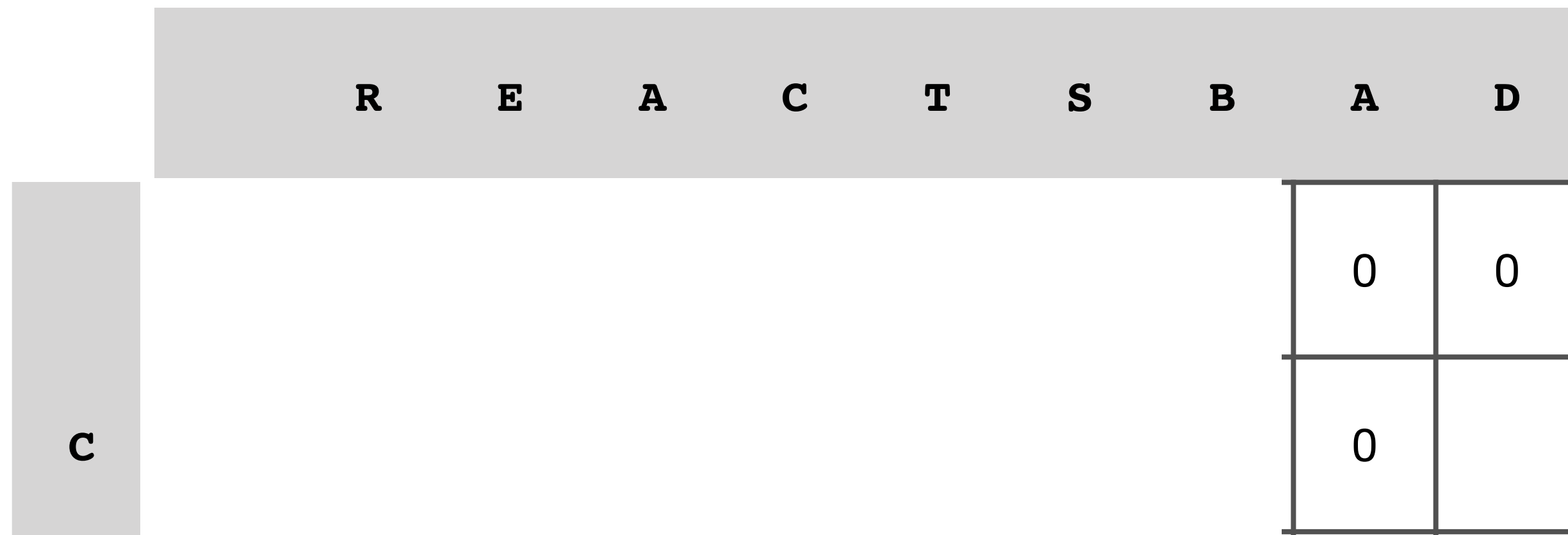
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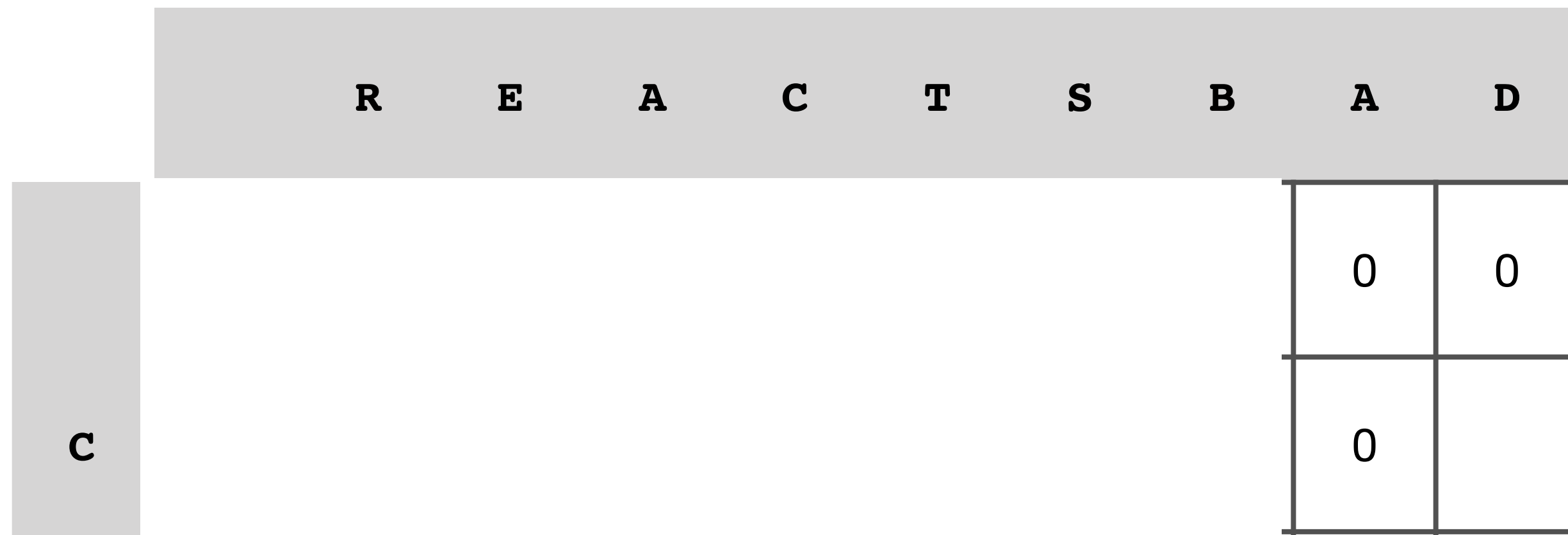
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Local Alignment

		R	E	A	C	T	S	B	A	D
C									0	0
									0	

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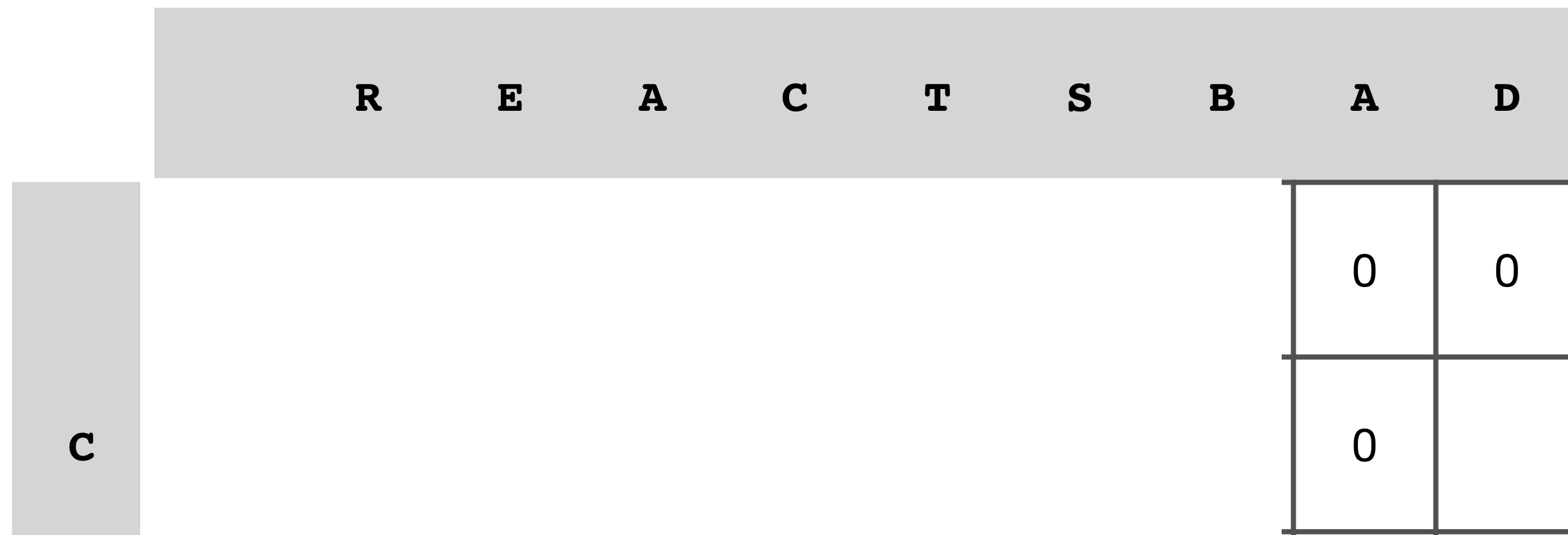
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Local Alignment



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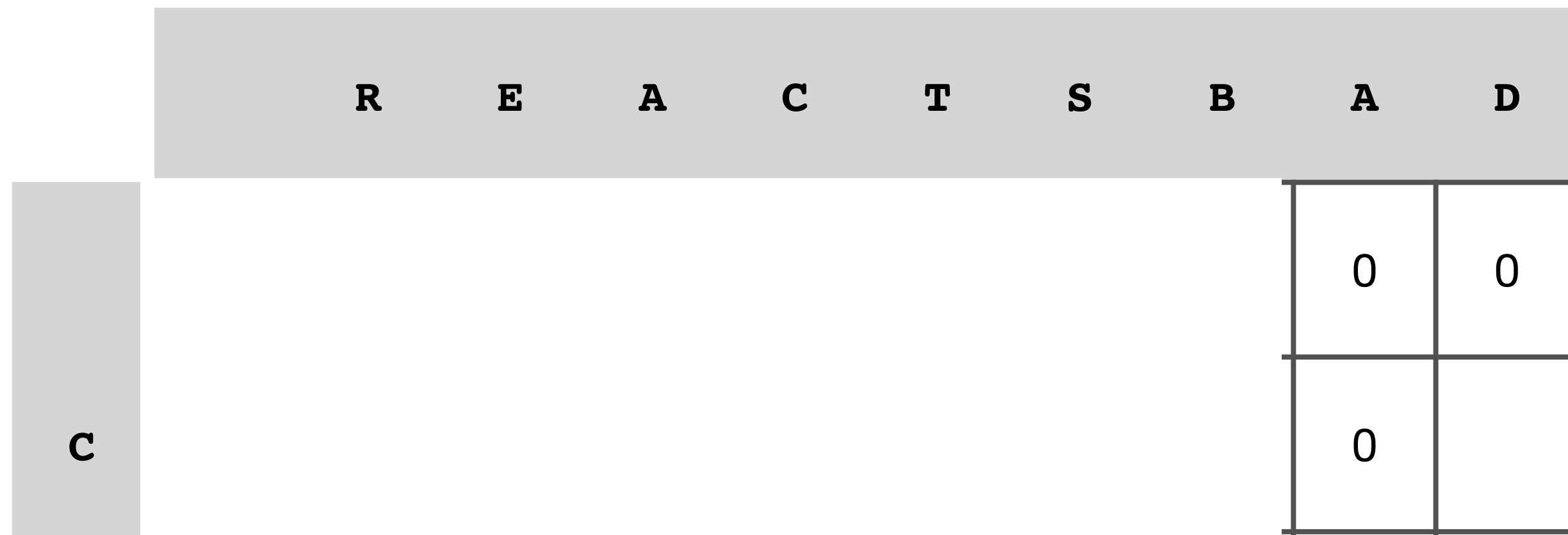
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Local Alignment

	R	E	A	C	T	S	B	A	D
C								0	0
								0	0

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0									

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0								

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0							

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2						

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1					

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1				

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0			

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Local Alignment

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	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0		

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0									

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0								

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Local Alignment

		R	E	A	C	T	S	B	A	D
		0	0	0	0	0	0	0	0	0
C		0	0	0	0	2	1	0	0	0
A		0	0	0	2	1	1	0	0	2
C		0	0	0						

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1						

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4					

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3				

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2			

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0									

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
		0	0	0	0	0	0	0	0	0
C		0	0	0	0	2	1	0	0	0
A		0	0	0	2	1	1	0	0	2
C		0	0	0	1	4	3	2	1	1
T		0	0							

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0							

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0						

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3					

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6				

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5			

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4		

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		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
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T	0	0	0	0	3	6	5	4	3	

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	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
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T	0	0	0	0	3	6	5	4	3	2
U	0									

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C	0	0	0	0	2	1	0	0	0	0
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C	0	0	0	0	2	1	0	0	0	0
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C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
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Local Alignment

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C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2					

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Local Alignment

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C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5				

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C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
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	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4		

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		R	E	A	C	T	S	B	A	D
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C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	

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		R	E	A	C	T	S	B	A	D
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C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2

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		R	E	A	C	T	S	B	A	D
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C	0	0	0	0	2	1	0	0	0	0
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C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0									

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = 2 \text{ for } y = x$$

$$\delta(x, y) = -1 \text{ for } y \neq x$$

Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0								

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0							

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0	0						

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0	0	1					

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0	0	1	4				

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
		0	0	0	0	0	0	0	0	0
C		0	0	0	0	2	1	0	0	0
A		0	0	0	2	1	1	0	2	1
C		0	0	0	1	4	3	2	1	1
T		0	0	0	0	3	6	5	4	3
U		0	0	0	0	2	5	5	4	3
S		0	0	0	0	1	4	7		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0	0	1	4	7	6		

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0	0	1	4	7	6	5	

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0	0	1	4	7	6	5	4

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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Local Alignment

		R	E	A	C	T	S	B	A	D
		0	0	0	0	0	0	0	0	0
C		0	0	0	0	2	1	0	0	0
A		0	0	0	2	1	1	0	0	2
C		0	0	0	1	4	3	2	1	1
T		0	0	0	0	3	6	5	4	3
U		0	0	0	0	2	5	5	4	3
S		0	0	0	0	1	4	7	6	5

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Local Alignment

		R	E	A	C	T	S	B	A	D
		0	0	0	0	0	0	0	0	0
C		0	0	0	0	2	1	0	0	0
A		0	0	0	2	1	1	0	0	2
C		0	0	0	1	4	3	2	1	1
T		0	0	0	0	3	6	5	4	3
U		0	0	0	0	2	5	5	4	3
S		0	0	0	0	1	4	7	6	5

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S
S

Local Alignment

		R	E	A	C	T	S	B	A	D
		0	0	0	0	0	0	0	0	0
C		0	0	0	0	2	1	0	0	0
A		0	0	0	2	1	1	0	2	1
C		0	0	0	1	4	3	2	1	1
T		0	0	0	0	3	6	5	4	3
U		0	0	0	0	2	5	5	4	3
S		0	0	0	0	1	4	7	6	5

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = -1 \text{ for } y \neq x$$

U S

- S

Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0	0	1	4	7	6	5	4

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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T U S

T - S

Local Alignment

		R	E	A	C	T	S	B	A	D
	0	0	0	0	0	0	0	0	0	0
C	0	0	0	0	2	1	0	0	0	0
A	0	0	0	2	1	1	0	0	2	1
C	0	0	0	1	4	3	2	1	1	1
T	0	0	0	0	3	6	5	4	3	2
U	0	0	0	0	2	5	5	4	3	2
S	0	0	0	0	1	4	7	6	5	4

$$V(i,j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1,j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1,j) + \delta(S[i], -) & \text{delete} \\ V(i,j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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$$\delta(x, y) = -1 \text{ for } y \neq x$$

CTUS

CT - S

Local Alignment

		R	E	A	C	T	S	B	A	D
		0	0	0	0	0	0	0	0	0
C		0	0	0	0	2	1	0	0	0
A		0	0	0	2	1	1	0	2	1
C		0	0	0	1	4	3	2	1	1
T		0	0	0	0	3	6	5	4	3
U		0	0	0	0	2	5	5	4	3
S		0	0	0	0	1	4	7	6	5

$$V(i, j) = \max \begin{cases} 0 & \text{align empty strings} \\ V(i-1, j-1) + \delta(S[i], T[j]) & \text{match/mismatch} \\ V(i-1, j) + \delta(S[i], -) & \text{delete} \\ V(i, j-1) + \delta(-, T[j]) & \text{insert} \end{cases}$$

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ACTUS

ACT - S