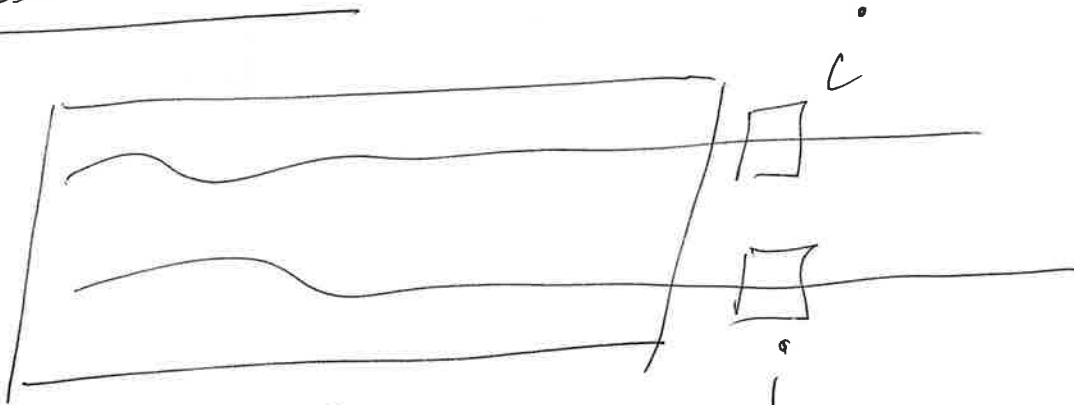


# Sequence Alignment

①

Basic idea

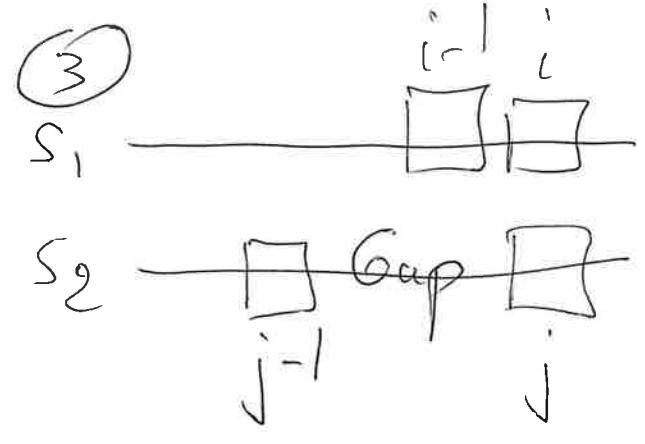
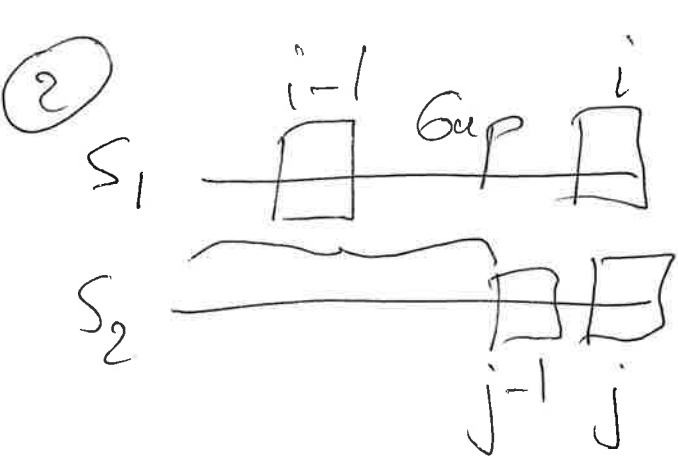
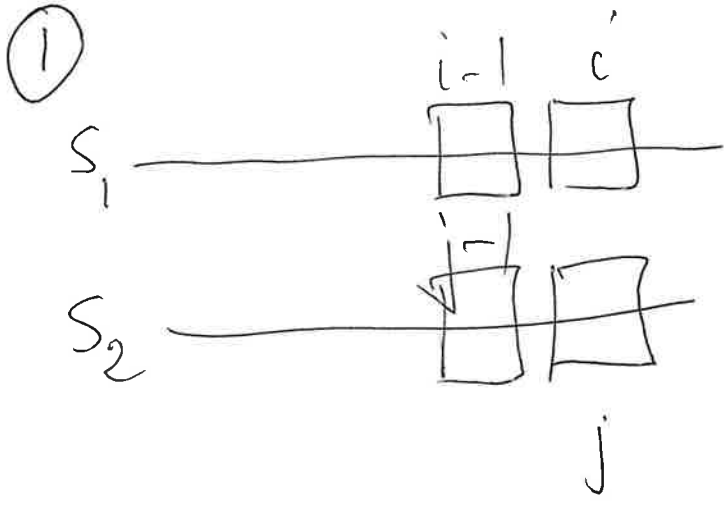
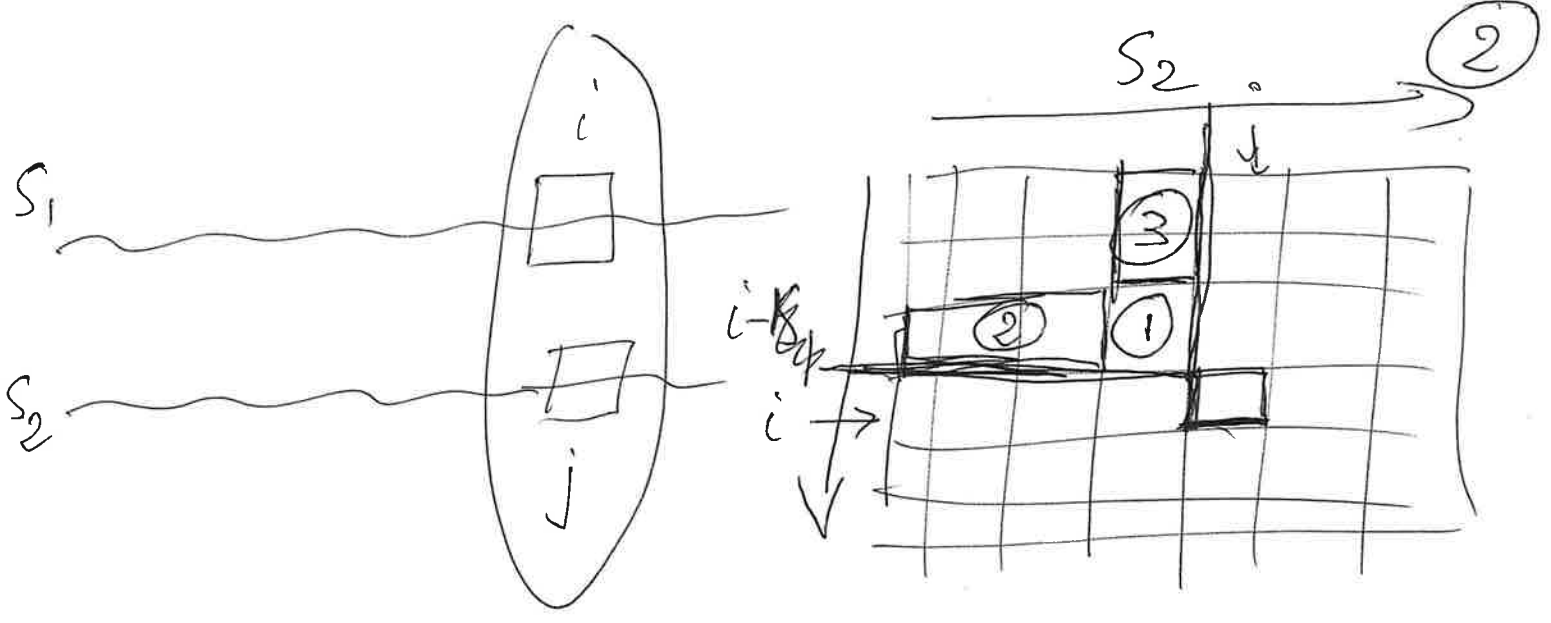


Best alignment before  $S(i, j)$

scores are additive

This is true for Blossum matrices by construction.

$$BL(a, b) = \log \frac{P_{ab}}{P_a P_b}$$



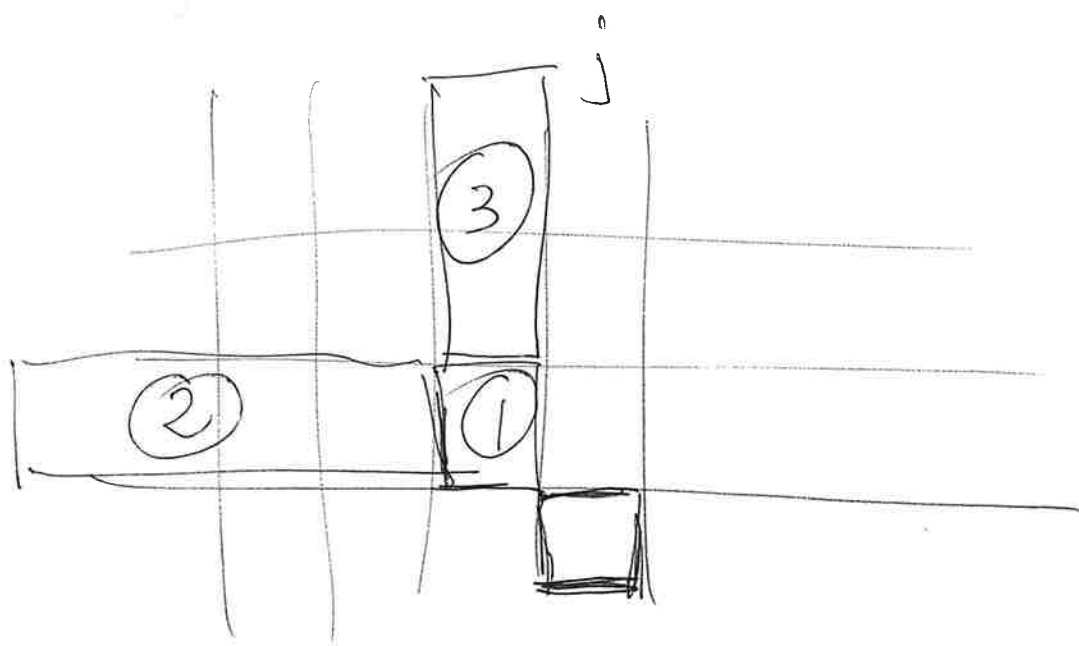
③

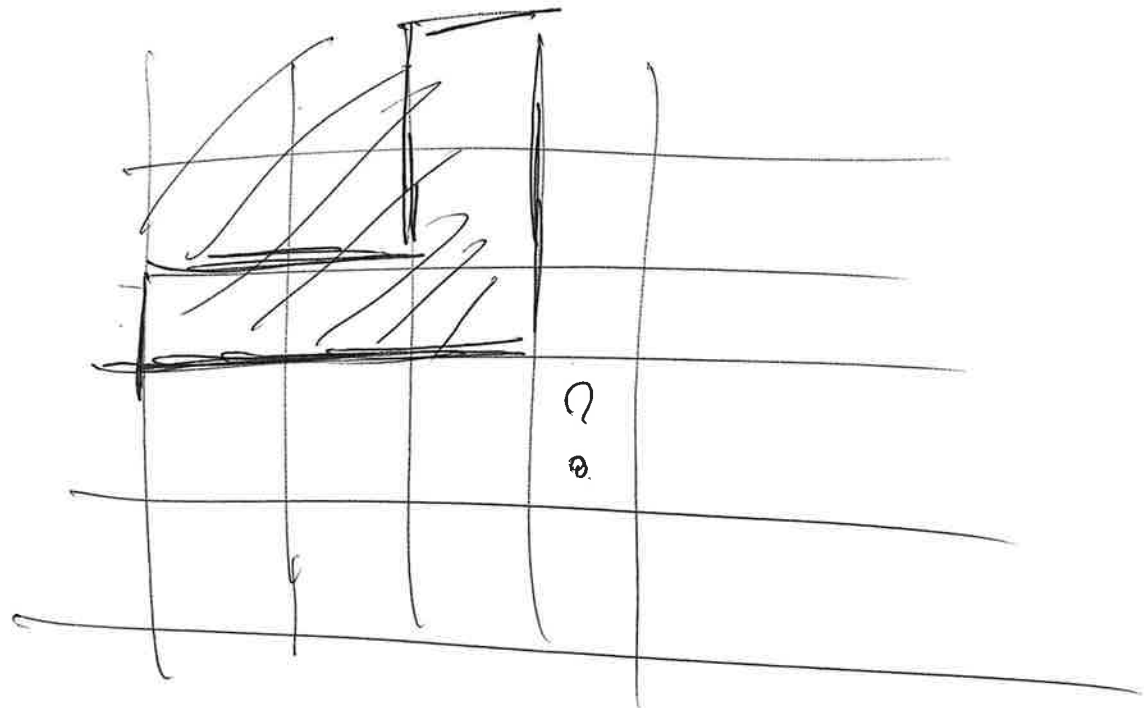
S<sub>1</sub>: A W V C D E C

S<sub>2</sub>: A W E C

$$S: \begin{cases} 10 = S(i, i) \\ 0 = S(i, j) \quad j \neq i \end{cases}$$

	A	W	V	C	D	E	C
A	10	0	0	0	0	0	0
W	0	20	10	10	10	10	10
E	0	10	20	20	20	30	20
C	0	10	20	30	20	20	40



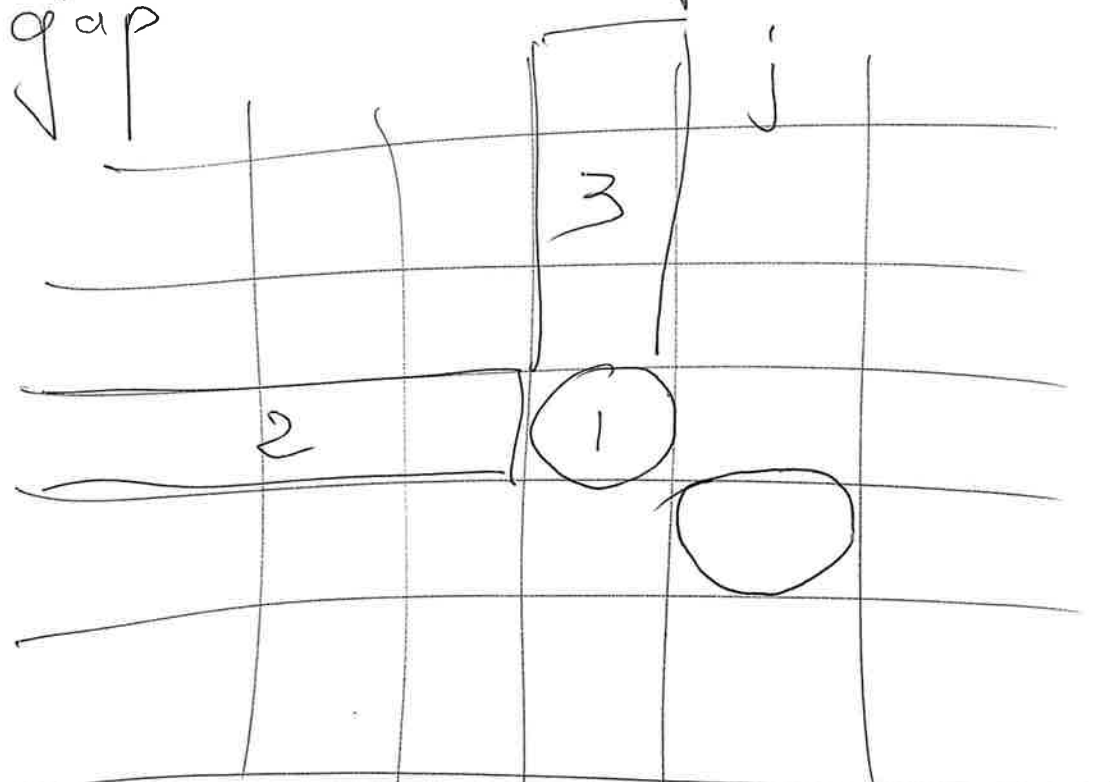


	A	W	V	C	D	E	C
A	10	0	0	0	0	0	0
W	0	20	10	10	10	10	10
E	0	10	20	20	20	30	20
C	0	10	20	30	20	20	40

Score of the alignment is 40

A W V C D E C  
 A W — — E C

Adding the cost of generating a gap



Score:  $\begin{matrix} 10 & i,i \\ 0 & i,j \end{matrix}$       Gap: -5

	A	A	T	G	C
A	10	5	-5	-5	-5
G	-5	10	5	15	5
G	-5	5	10	15	15
C	-5	5	5	10	25

Align A A T G C  
with A G G C

Score: | 10 s(i, i)  
0 otherwise.

	A	A	T	G	C
A	10	10	0	0	0
G	0	10	10	20	10
G	0	10	10	20	20
C	0	10	10	10	30

① AA T G C     A A T G C     A A T G C  
 A G - G C     - A G G C     A - G G C

30

AA T G - C     A A T G - C  
 - A - G G C     A - - G G C