2+

MSA → Multiple Sequence Alignment

① SP (Sum of Pairs method)

Ex
$x = TGCG$
$y = AGCTG$
$z = AGCG$

① خاصة x,y ⇒
$$\begin{bmatrix} T & - & G & C & - & G \\ \text{Gap} & A & G & C & T & G \\ \text{Gap} & A & G & C & - & G \end{bmatrix}$$
Alignment #1

② تعنيف z

Alignment #2
$$\begin{bmatrix} T & G & C & - & G \\ A & G & C & T & G \\ A & G & C & - & G \end{bmatrix}$$

$S(x,y) = 1$ when $x = y$ [match]
$S(x,y) = -1$ when $x \neq y$ [mismatch]
$S(x,-) = -2$: [Gap]
$S(-,y) = -2$: [gap]
$S(-,-) = 0$ to prevent double gap

$$Sp(m_i) = \sum_{k<i} S(m_i^k, m_i^l)$$

k in I Column | l in I Col.

$\sum SP = -2$

Alignment 1

T	G	C	–	G
–	A	G	C	T	G
–	A	G	C	–	G
m_1	m_2	m_3	m_4	m_5	m_6
-4	-3	3	3	-4	3

x,y → 1 Match

x,y → -1 Miss

-,y → -2

x,- → -2

-,- → 0

$m_1 = S(T,-) + S(-,-) + S(T,-) = -2 + 0 + -2 = -4$ #

اول و ثانی + ثانی و ثالث + اول و ثالث

Alignment 2

وهکذا مع کل Column

T	G	C	–	G
A	G	C	T	G
A	G	C	–	G
m_1	m_2	m_3	m_4	m_5
-1	3	3	-4	3

$\Rightarrow \sum SP = 4$

higher Score

$m_1 = S(T,A) + S(A,A) + S(T,A)$

اول و ثانی + ثانی و ثالث + اول و ثالث

$= -1 + 1 + -1$

$= -1$

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