1) S1 = PVMF
S2 = PLAL

1 Gap

-PVMF	P-VMF	PV-MF
P-LAL	-PLAL	-PLAL
PL-AL	PL-AL	P-LAL
PLA-L	PLA-L	PL-AL
PLAL-	PLAL-	PLAL-

PVM-F
-PLAL
P-LAL
PL-AL
PLAL-

5 x 4 = 20 pairs

2) Dynamic Programming as it is used for global alignment does not distinguish opening a gap from extended gap. The penalty is linear.

3) $F(i,j) = \begin{cases} M(i,j) \mid x_i \text{ aligns with } y_i & \text{(best score)} \\ I_x(i,j) \mid x_i \text{ align with gap} & \text{(best score)} \\ I_y(i,j) \mid y_i \text{ aligned with gap} & \text{(best score)} \end{cases}$

$$M(i,j) = \max \begin{cases} M(i-1, j-1) + s(x_i, y_j) \\ I_x(i-1, j-1) + s(x_i, y_j) \\ I_y(i-1, j-1) + s(x_i, y_j) \end{cases}$$

4) $$I_y(i,j) = \max \begin{cases} M(i, j-1) + h + g \\ I_x \text{ or } I_y(i, j-1) + g \\ I_y(i, j-1) + h + g \end{cases}$$