Shane Riegeladios

1.) $L[0,0] = 0$

$L[i,0] = i \cdot g \quad i \in 1...n$

$L[0,j] = j \cdot g \quad j \in 1...n$

$L[i,j] = \text{if } (P[i] \neq Q[j])$

$\qquad L[i,j] = \text{Minimum}(L[i-1,j-i] + d,$
$\qquad\qquad L[i,j-1] + g, \ L[i-1,j] + g)$

else

$\qquad L[i,j] = L[i-1, j-1]$

$\qquad i \in 1...n \quad j \in 1...m$

2) $L[0,0] \leftarrow 0$

for $(i \leftarrow 1 \text{ to } m)$

$\qquad L[0,j] = j \cdot g$

for $(i \leftarrow 1 \text{ to } n)$

$\qquad$ for $(j \leftarrow 1 \text{ to } m)$

$\qquad\qquad$ if $(P[i] \neq Q[j])$

$\qquad\qquad L[i,j] \leftarrow \text{Minimum}(L[i-1,j-1] + d, \ L[i,j-1] + g, \ L[i-1,j] + g)$

$\qquad\qquad$ else

$\qquad\qquad\qquad L[i,j] = L[i-1, j-1]$

$\text{Minimum}(a, b, c)$

$\qquad$ if $(a < b \ \& \ a < c)$

$\qquad\qquad$ return c

$\qquad$ else if $(b < a \ \& \ b < c)$

$\qquad\qquad$ return b

$\qquad$ else

$\qquad\qquad$ return c

3)
```
for (i ← n down to 1)
    for (j ← m down to 1)
        if (L[i,j] = (L[i-1,j-1] +d)  or
                    L[i,j] = L[i-1,j-1])
            print("P[i], Q[j]")
            i ← i - 1
            j ← j - 1
        elseif (L[i,j] = (L[i-1,j] + g)
            print("P[i-1], - ")
            i ← i - 1
        else
            print("-, Q[j-1]")
            j ← j - 1
```

4) n·m needed so space $= \Theta(n \cdot m)$ running $\Theta(n \cdot m + n \cdot m) +$

$\Theta(n + m) + \Theta(1) \in \Theta(2nm) \in \Theta(nm)$

5)

B	16	14	12	10	9	9	7	6	4	6	7		
A	14	12	10	8	8	7	5	4	5	6	8		
C	12	10	8	7	6	5	3	4	6	8	10		
F	10	9	7	5	4	3	4	6	8	10	12		
F	8	6	4	3	3	3	5	7	9	11	13		
B	6	4	2	2	3	5	7	9	11	13	15		
B	4	2	1	3	5	7	9	11	13	15	17		
C	2	1	3	5	7	9	10	12	15	16	18		
-	0	2	4	6	18	10	12	14	16	18	20		

- B B A B F C C B A A