

Answer 1)

match = + 7

mismatch = -6

gap = -4

In every match of characters, there is a 7 point increase in the score matrix, for example when the related box to the match has score 0 the match becomes 7 and when it is 7 it becomes 14 and goes like that. That is why the match score is 7.

Since we are looking for the largest score in the boxes when we look at the decreased box scores it must either be a gap or a mismatch. When we look at the third character of the G A M A E D K which is M and 4th character of the M I M A G E D I L which is A there is a mismatch. We either put a gap penalty or mismatch but since the mismatch score is already 0 and since we must choose the largest score we see that the gap penalty is applied and 7 is decreased by 4 points and the box has 3 as a score which means gap penalty is -4.

When we look at the 4th character of G A M A E D K which is A and the 2nd character of the M I M A G E D I L which is I there is a mismatch and since we know the gap penalty which is -4 and the related boxes has score 3 if gap penalty was applied to this box it must be 0. Since it is 1 we see that the mismatch penalty is applied and 7 is decreased by 6 points and this makes our mismatch penalty -6.

	-	M	I	M	A	G	E	D	I	L
-	0	0	0	0	0	0	0	0	0	0
G	0	0	0	0	0	7	3	0	0	0
A	0	0	0	0	7	3	1	0	0	0
M	0	7	3	7	3	1	0	0	0	0
A	0	3	1	3	14	10	6	2	0	0
E	0	0	0	0	10	8	17	13	9	5
D	0	0	0	0	6	4	13	24	20	16
K	0	0	0	0	2	0	9	20	18	14

M A _ E D
M A G E D

There are 4 matches $7 \times 4 = 28$ and a gap $28 - 4 = 24$, the score of local alignment is 24. In the table it is also 24.

Answer 2)

	-	M	C	G	M	G	C	M	E	L
-	0	-4	-8	-12	-16	-20	-24	-28	-32	-36
G	-4	-3	-7	-2	-6	-10	14	18	-22	-26
M	-8	1	-3	-6	3	1	-3	-7	-11	-15
C	-12	-3	10	6	2	0	10	6	2	-2
M	-16	-7	6	7	11	7	6	15	11	7
E	-20	-11	2	4	7	9	5	11	20	16
D	-24	-15	-2	1	3	6	6	7	16	16
L	-28	-19	-6	-3	3	2	5	8	12	20

C G M G C M E _ L
| | | | | | | |
_ G M _ C M E D L