CENG 465 ASSIGNMENT 1

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Question 1

	–	*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

When we fill a cell score matrix according to the algorithm, we look at the chosen cell's up , near and diagonal neighbors that comes before it. Up and near cells represents gap penalty and, diagonal cell is used if there is a match or mismatch.Between these 3 neighbor cells ,after applying the penalties and match or mismatch scores , we choose the maximum number.
Firstly , if we look at A with A alignment , we can see that diagonal ,up and near cells that comes right before the cell with number 7 is zero.Since A and A is a match and the cell number is 7 , match score is 7.Secondly if we look at the next cell which is A with G alignment , since it is a mismatch and the diagonal cell before it is already zero , the number 3 must come from either near or up cells before it.Since both near and up cells before it has number 7 and the cell number is 3 , we can conclude that gap penalty is -4 . Lastly if we look at the next alignment at the same line which is A with E alignment , the up and near cells before is 3 and we know that gap penalty is -4 , so the cell number 1 can only be calculated from the diagonal cell before it.Since the diagonal cell before it is 7 and A and E is a mismatch, we can conclude mismatch penalty is -6.
The best local alignment:
M A G E D
M A — E D
M-M,A-A ,E-E,D-D , four matches, 4 x 7 = 28

G — , one gap penalty = -4
The score of the best local alignment is 28 + (-4)=24 which is the score on the table above.

Question 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	-5	-9	-13	-17
C	-12	-3	10	6	2	0	8	-4	-8	-12
M	-16	-7	-4	7	11	7	4	13	9	5
E	-20	-11	-8	3	7	9	5	9	18	14
D	-24	-15	-12	-1	3	6	6	5	14	14
L	-28	-19	-16	-5	1	2	5	8	10	18

M C G M G C M E — L
— — G M — C M E D L