COMPSCI 260 - Problem Set 4, Problem 2
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Statement of collaboration and resources used (put None if you worked entirely without collaboration or resources; otherwise cite carefully): None

My solutions and comments for this problem are below.

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a)

	_	G	A	A	T	C	G	G	A
_	0	-2	-4	-6	-8	-10	-12	-14	-16
T	-2	-1	-3	-5	-4	-6	-8	-10	-12
A	-4	-3	1	-1	-3	-5	-7	-9	-8
G	-6	-2	-1	0	-2	-4	-3	-5	-7
T	-8	-4	-3	-2	2	0	-2	-4	-6
A	-10	-6	-2	-1	0	1	-1	-3	-2

b)

1					T	A	G	T	A	upmost
2		T		A			G	T	A	
3		T	A				G	T	A	
4			T	A			G	T	A	
5		T	A	G	T				A	downmost

b) The optimal score for these sequences is -2. The 5 scores shown in the image above achieve this score.

c) If an affine gap score was used instead of a linear gap score, alignments 2 and 4 would not be optimal since they have more than one gap in their sequence. When using affine gap score, opening a new gap requires a new gap penalty in addition to the regular gap penalty so the optimal alignment would require the minimal number of gaps, which in this scenario is 1 gap. Therefore, only alignments 1, 3, and 5 would remain optimal since they each achieve the optimal score with only a singular gap.