

## Homework Week2

### Sequence Alignment Fundamentals

<http://thegrantlab.org>

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This unit's homework consists of both (1) an online knowledge assessment quiz (see online) and (2) a Needleman-Wunsch dynamic programming assessment exercise (this document). Both components contribute 50% to this unit's grade. For the later we have two sample sequences, and we'd like to use the Needleman-Wunsch algorithm discussed in class to align them.

	T	A	T	A	G	C
T	0 → -2 → -4 → -6 → -8 → -10 → -12					
G	-2	-1 → -3 → -5 → -7 → -9 → -11 → -12				
T	-4	0 → -2 → -1 → -3 → -5 → -7				
T	-6	-2 → -1 → 0 → -2 → -4 → -6				
A	-8	-4 → 0 → -2 → 2 → 0 → -2				
T	-10	-6 → -2 → 2 → 0 → 1 → -1				
C	-12	-8 → -4 → 0 → 1 → -1 → 3				

Sequence 1: TATAGC

Sequence 2: GTTATC

Using a **match score of +2**, a **mismatch score of -1**, and a **gap score of -2**. Fill in the table and translate it into a alignment.

Please submit your completed answer via **gradescope**. This should be titled "**02. Global Alignment HW Week2**". You can submit this document as a PDF or a photo of a separate page with your completed **alignment matrix** along with your **aligned sequences** and their **optimal score**.

optimal score : 3      aligned sequence : T A T A G C  
                                  | | | | |  
                                  G T T A T C

Step	Scoring Rubric/Assessment Criteria	Points	
1	Setup labeled alignment matrix	1	
2	Include initial column and row for GAPS	1	
3	All alignment matrix elements filled in	1	
4	Evidence for correct use of scoring scheme	1	
5	Direction arrows drawn between all cells	1	
6	Evidence of multiple arrows to a given cell if appropriate	1	D
7	Correct optimal score position in matrix used	1	C
8	Correct optimal score obtained for given scoring scheme	1	B
9	Traceback path(s) clearly highlighted	1	A
10	Correct alignment(s) yielding optimal score listed	1	A+

(10 Total points)