

CS 312: Algorithm Analysis

Homework Assignment #13

Show all work neatly.

Question 1: (10) Gene Alignment with Edit Distance

Find the optimal alignment using dynamic programming (by hand) of AGTCGA and ATCGT. Use the Needleman-Wunsch cost function that you will use for the project, namely: $c_{\text{indel}} = 5$; $c_{\text{sub}} = 1$; and $c_{\text{match}} = -3$.

- Show your complete Dynamic Programming table. Include the edit distance score of each cell and show the previous pointer(s) from each cell.
- What is the Edit Distance of the 2 strings? -6
- Is there more than one optimal alignment? No
- Bold the previous pointers along the optimal path from the goal cell.
- Show the alignment of the two strings with the first above the second.

AGTCGA

A-TCGT

		A	T	C	G	T
	0	5	10	15	20	25
A	5	-3	2	7	12	17
G	10	2	-2	3	4	9
T	15	7	-1	-1	4	1
C	20	12	4	-4	0	5
G	25	17	9	1	-7	-2
A	30	22	14	6	-2	-6

i: *j*: