

## CS 4412 : Algorithm Analysis

### Homework Assignment #14

Show all work neatly.

**Question 1:** (5) Find the optimal alignment using dynamic programming (by hand) of ATGCC and TACGCA . 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 DP table.
- Circle the optimal alignment cost.
- Extract the optimal alignment(s) from the table (keep back-pointers in the table if you want).

**Question 2:** (5) Knapsack.

Use dynamic programming to fill a knapsack without repetition having a weight capacity of 10 units with a load of maximum value from the following set of objects:

- Weights: 1, 2, 5, 6, and 7 units
- Values: 1, 7, 11, 21, and 31, respectively.

Your answer should include:

- a table with solutions to sub-problems
- the value of the optimal load
- the objects to be included in the optimal load (keep back-pointers in the table if you want)