CSE 551: Homework 4 (50 points)

November 2018

Submission Instructions: Deadline is **11:59pm on 11/13**. Late submissions will be penalized, therefore please *ensure* that you submit (file upload is completed) before the deadline. Submit your answers in a single PDF file. As usual, we will grade *any two* problems. Hence, please answer all the questions.

1. Given n integers, is there a way to partition the integers into two disjoint subsets so that the sums of the integers in each of the two subsets are equal? More formally, given $\{s_1, s_2, ..., s_n\}$ is there a subset I of $\{1, 2, ..., n\}$ such that,

$$\sum_{i \in I} s_i = \sum_{i \notin I} s_i$$

Give a dynamic programming algorithm for this problem. Estimate the run time of your algorithm.

2. The Longest Common Subsequence (LCS) problem discussed in class finds *one* LCS of two strings. Develop a dynamic programming algorithm to find *all* such LCSs. (LCS algorithm is available on slide set Dynamic Programming 1)

3. Given two strings, develop a dynamic programming algorithm to compute the minimum number of insertions/deletions/substitutions of characters needed to transform the first string into the second.

4. Develop a dynamic programming algorithm to compute the largest independent set of a tree.