Department of Electrical and Computer Engineering
North South University

CSE 373: Design and Analysis of Algorithms
Sections: 1, 2, 3, 9
Semester: Fall 2020
Assignment 1
Deadline: 24/11/2020

Assignment Submission Instruction:

1. You are required to submit the assignment by the deadline through Google Classroom
2. Your assignment must be in the pdf format.
3. Any evidence of plagiarism will lead to zero mark

1 Suppose we are comparing implementations of insertion sort and merge sort on the same machine. For inputs of size n, insertion sort runs in $8n^2$ steps, while merge sort runs in 64n lg n steps. For which values of *n* does insertion sort beat merge sort? 5 marks

2 What is the smallest value of *n* such that an algorithm whose running time is $100n^2$ runs faster than an algorithm whose running time is 2^n on the same machine? 5 marks

3 Rewrite the INSERTION-SORT procedure to sort into non-increasing instead of non-decreasing order. 5 marks

4 Rewrite the MERGE procedure such that it does not use sentinels, instead stopping once either array *L* or *R* has had all of its elements copied back to *A* and then copying the remainder of the other array back into *A*. 5 marks