CS 413: Analysis of Algorithms
Homework 3: Programming assignment

Due on Friday 03/20/2020, 11:59 PM

This is a ***group*** homework assignment. Each group is supposed to work on the problems below together, including the writeup of the solutions to the questions below. For this assignment, please submit **one** neatly **typed** writeup only **per group**. You need to submit your assignment in the digital repository. You can pick a classmate (ONLY from your class and **NOT** another session of CS 413) to create **a group of size two**. If you prefer to work on the assignment **individually**, that's also fine.

As it appears in the course syllabus, for the homework assignments, students are encouraged to discuss the problems with others, but you are expected to turn in the results of your own effort (not the results of another group or person). Even when not explicitly asked, you should justify your answers concisely.

Consider the following problems and implement their corresponding algorithms in C++ or Java:

1) Counting inversions as seen in the class (the divide and conquer approach) (30 points)
2) Merge sort algorithm to sort a list of n number in **decreasing** order (30 points)

Submission rules:
To submit the solution to the above assignment, you need to prepare the following files:
1- The source code of your program that includes all .cpp or .java files.
2- A standalone executable file of your program for each given problem.
3- A brief report about the code you have written + analysis of the worst-case time complexity of your algorithm.

You will get a zero if any of the above cases are missing, or the grader is not able to run your code.

You need to put all the above files into a folder, compress it, and upload the compressed file on BB to the related repository.