Due date:

This file contains Lab 5. You must submit your answers to the D2L Dropbox "Lab-5" **by the end of the lab today.**

Lab 5 requires Java programming. You can work in pairs (but you must still submit your own work to D2L).

Note that late assignments will not be graded. I will not accept any labs by email.

Please do not zip or compress your submissions. D2L allows you to upload multiple files.

You need to hand in the following to D2L:
1. Your java codes.
2. Print screen of your outputs.

1- Design and implement a **divide and conquer** algorithm for finding a position of the largest number in an array of n numbers. For example, if the input array A[0..8] = [2,5,8,3,6,9,1,6,5], your algorithm should return 5. [4 mark]

2- Consider the Mergesort algorithm, which is a **divide and conquer** sorting algorithm. The pseudocode for Mergesort is given in your textbook. Your task is to implement the algorithm, and know exactly how it works. [6 mark]

1. Create a java file with a main() and a method mergSort().
2. In main() initialize an unsorted ArrayList A.
3. Call mergesort() with A() as input.
4. Margsort() should return a sorted array.
5. Main outputs the original and sorted arrays.
6. Submit your final program to D2l. Do your own work… do not submit someone else's program!

This question is optional (ie: not included in gade for the lab).

3- Given a sorted array of distinct integers A[0..n-1], design and implement a **decrease and conquer** algorithm that find out whether there exists an index i for which A[i]=i.