**COMP 6521 – Advanced Databases Winter 2022**

**Assignment 1**

You may work alone or in a group of 2.

If you work in pairs, you must indicate the full name and ID of both group members in the assignment submission comment on Moodle.

You will need to demo your assignment to the TA.

In this assignment you will implement the two-phase multiway merge sort.

1. The first task is to develop a method that generates n ints between a minimum value and a maximum one randomly. That list should be saved in a text file where each number is on a line on its own. For example, the file may look something like:  
   1  
   8  
   4  
   0  
   5  
   This method should be able to create a text file with a maximum of 100,000 ints in it.
2. You need to develop the 2PMMS algorithm that takes the memory size as a parameter. The memory size basically indicates how many ints we can fit in the whole memory. For example, if the memory size is 10, then you can put a maximum of 10 ints in the RAM at any single point in time.
3. When your program runs, it should clearly display a header before each phase. For example,   
   Phase 1:  
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4. In phase 1, if we have n ints and if the size of the RAM is s, you need to display the n/s different blocks before and after each one of them is sorted. Feel free to use any sorting algorithm you prefer for this part. Just indicate which one you are using in your output.
5. In phase 2, you need to display the number of passes needed and the intermediate runs. You also need to display the full sorted list for testing purposes.
6. The Run 2PMMS option (see menu below), should read the numbers from a text file named input.txt located on the same folder as the app.
7. Feel free to provide a readme.pdf file to guide the user on how to run your app.
8. Feel free to use any of the following languages: Java, C#, C++, or C

When the program runs, it should display the following options:

1. Create a random list of integers
2. Display the random list (for debugging purposes only)
3. Run 2PMMS

**You need to submit:**

1. The code
2. Sample runs in pdf format. Sample runs must include the original unsorted list displayed at the beginning.
3. Do not forget to indicate the names and ID’s of group members if assignment was developed in a group of 2.

Have fun 😊