Concordia University
Electrical and Computer Engineering

COEN 346 Lab Assignment #1 Description

Merge-Sort using multithreading

The program gets a list of integer values specified in an input file called input.txt. Using the recursive threading method and merge sort technique, the program should sort the input list. The output (output.txt) should be the sequence of the strings indicating the starting/stopping of each thread as well as the sorted sub-list corresponding to each thread.

An example of input and output:

```
Input.txt
              3304
              8221
              26849
              14038
              1509
              6367
              7856
              21362

Output.txt
              Thread 1 started
              Thread 10 started
              Thread 11 started
              Thread 101 started
              Thread 100 started
              Thread 110 started
              Thread 111 started
              Thread 1010 started
              Thread 1010 finished: 26849,
              Thread 1000 started
              Thread 1000 finished: 3304,
              Thread 1011 started
              Thread 1011 finished: 14038,
              Thread 1001 started
              Thread 1001 finished: 8221,
              Thread 100 finished: 3304, 8221,
              Thread 101 finished: 14038, 26849,
              Thread 1100 started
              Thread 1100 finished: 1509,
              Thread 1101 started
              Thread 1101 finished: 6367,
              Thread 1110 started
              Thread 1110 finished: 7856,
```

```
Thread 110 finished: 1509, 6367,
Thread 10 finished: 3304, 8221, 14038, 26849,
Thread 1111 started
Thread 1111 finished: 21362,
Thread 111 finished: 7856, 21362,
Thread 11 finished: 1509, 6367, 7856, 21362,
Thread 1 finished: 1509, 3304, 6367, 7856, 8221, 14038, 21362, 26849,
```

The assignment should be done in a group of three students. **Please not that you cannot change your group after submitting the first assignment.**

The deliverable consists of the following items:

1- A well-commented code
2- A two-page report with the following sections:
   - Names of group members
   - High level description of the code (description of the methods/functions/threads/data structures and the flow of the program).
   - A detailed conclusion, discussing you experience with the multi-threading of Merge-Sort.
   - A table detailing the contributions to this assignment of every team member. Note that every member of the team must contribute to the design and coding aspects of the assignment.

This assignment will count for 15% of your total mark for programming assignments. Also, for this assignment 80% of the mark is for the quality and correctness of your code, and 20% is for the quality of your report.

The code and the report should be submitted (by one team member on behalf of the whole team) in one zip file through Moodle by the beginning of the 2nd lab session for your lab section.

Also, you will have to demonstrate your work as a team (all team members must be present) to your Lab TA during a lab session after the submission.