Operating system

Threads

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Introduction:-

I Implement two popular algorithms as multi-threaded ones.
They are as follows:

1) Matrix Multiplication

I implement two variations of this algorithm:

a. The computation of each element of the output matrix happens in a thread.

b. The computation of each row of the output matrix happens in a thread.

2) Merge Sort

Merge sort is an O (n log n) comparison-based sorting algorithm. It is a divide and conquer algorithm.

Conceptually, a merge sort works as follows:

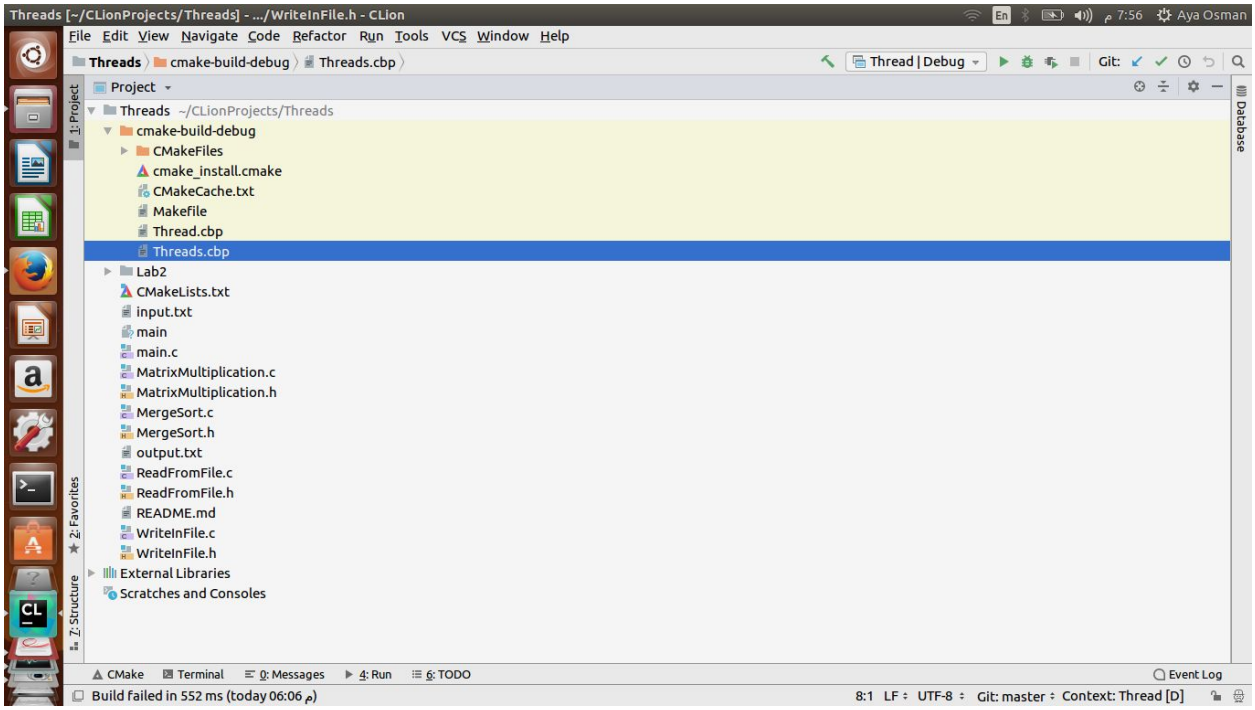
1)If the list is of length 0 or 1, then it is already sorted. Otherwise:

2)Divide the unsorted list into two sub-lists of about half the size.

3)Sort each sub-list recursively by re-applying the merge sort.

4)Merge the two sub-lists back into one sorted list.

Code Hirechy:-



Class Main:-

It contains only main function.

Function Description :-

Main run in two modes according to input argument:

if 1 matrix mode

If 2 or anything else it's on merge sort mode

Class MatrixMultiplication:-

Function Description :-

void *elementMethod(**void** *arg);	Execute every element in array in a separate thread
void *rowMethod(**void** *arg);	Evaluate every row in array in separate thread
Results * matrixMultiplication(matrixes * data);	Execute two ways to find matrix multipliatin.

matrixResult* intializeMR (matrixes * m);	Allocate space in memeory for new matrix

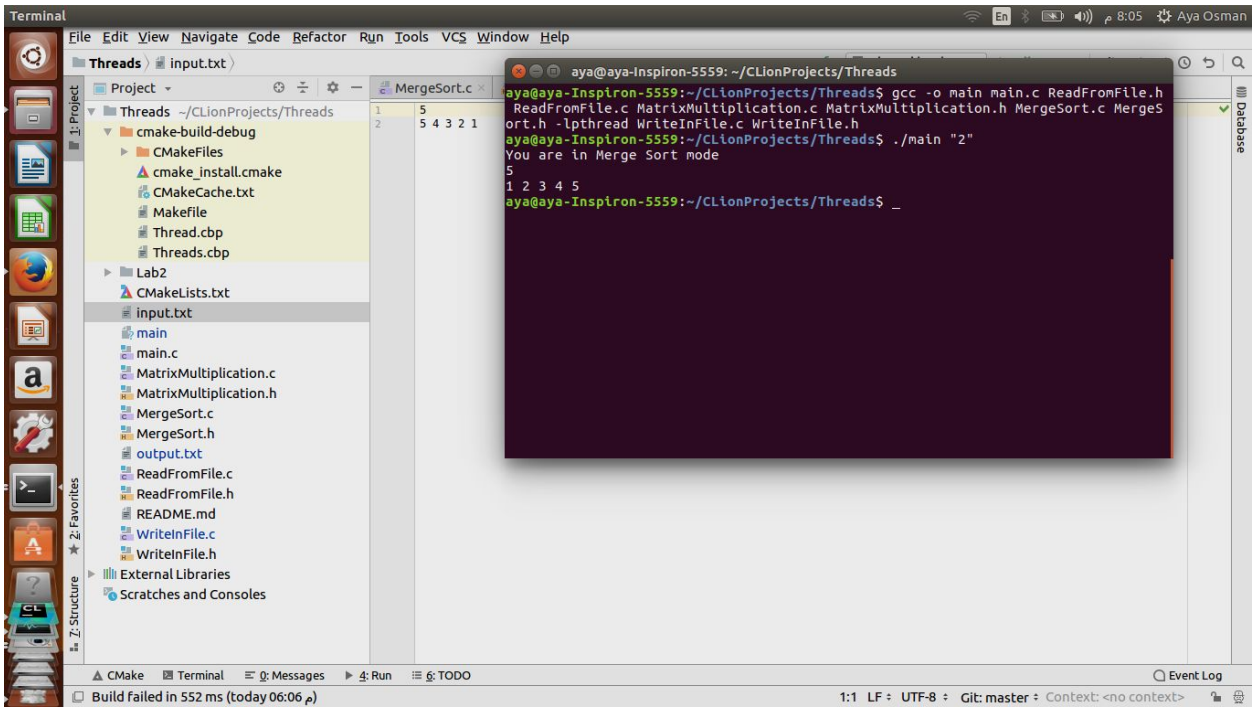
Class MergeSort:-

Function Description :-

void sort(arr * arr);	Take array from main memoey and create thread to begin sorting the array
void merge(**int** arr[], **int** left, **int** mid, **int** right);	Merge left side and right side for divided array
void* mergeSort(**void** *arg);	Create threads recurseviely

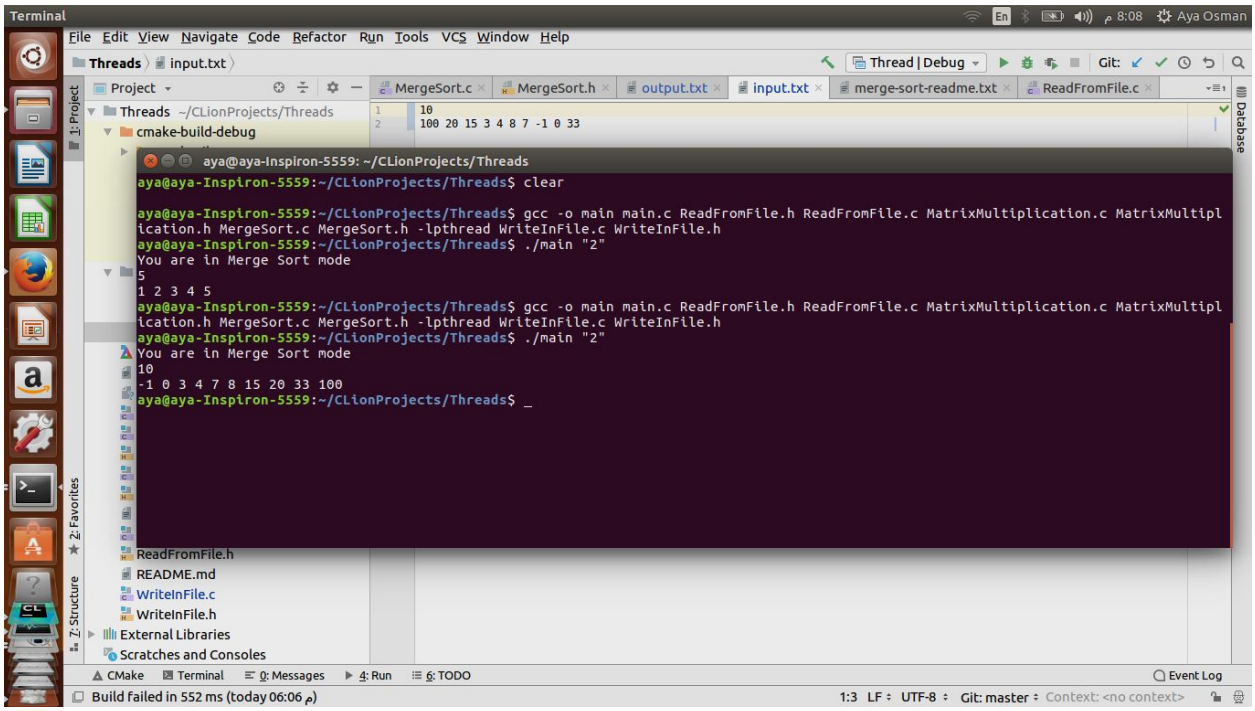
ScreenShot :-

Merge Sort:

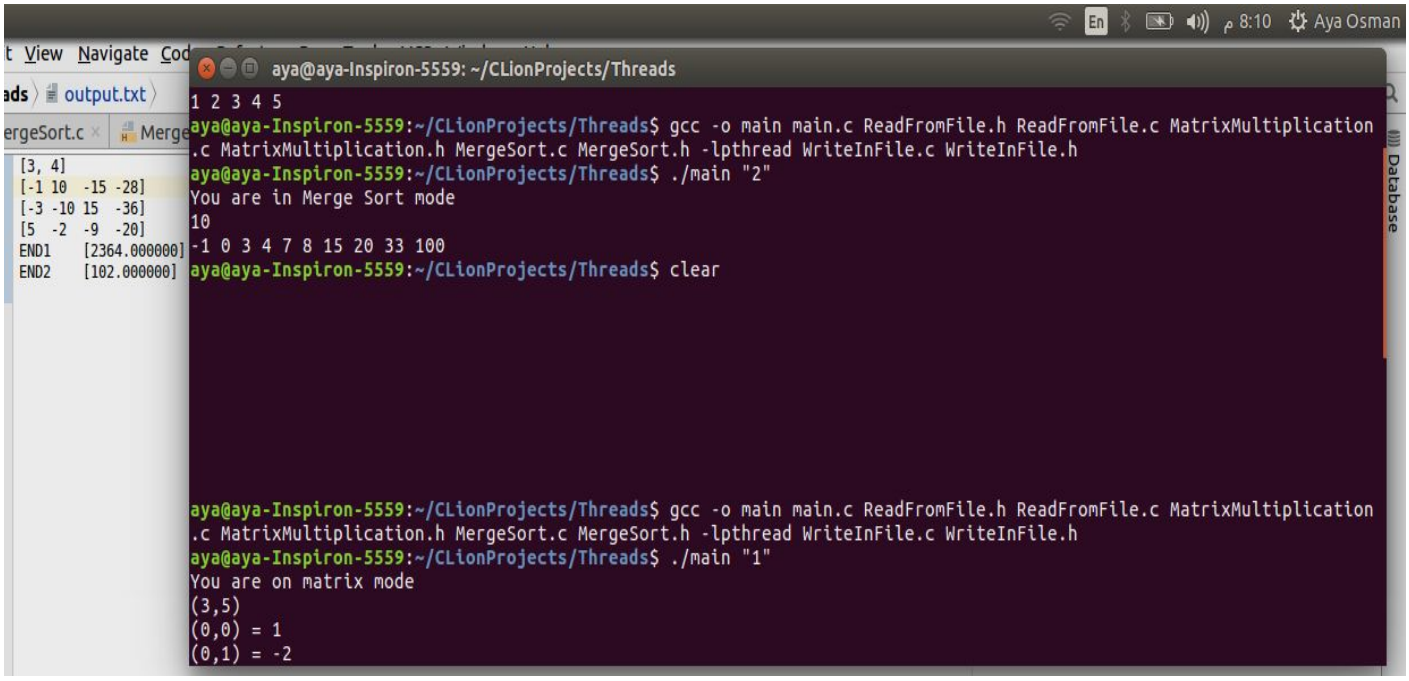


Example 2 :-

100 20 15 3 4 8 7 -1 0 33



2) Matrix Multiplication:



Reference:

https://matrix.reshish.com/multCalculation.php

https://piazza-resources.s3.amazonaws.com/jmf4l2eyeih2h1/jn8mf7hcjfa7jm/Threads.pdf?X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=ASIAR6AWVCBXSYVSUN55%2F20181101%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20181101T123607Z&X-Amz-Expires=10800&X-Amz-SignedHeaders=host&X-Amz-Security-Token=FQoGZXIvYXdzELz%2F%2F%2F%2F%2F%2F%2F%2F%2F%2FwEaDNzvO7EbjCrxkrRBZSK3A15DnnGWVJOXCO8lrQ9wp74rNlb3QeJRp%2BSxzZi4oK6usYliOQREqOSY7vSlErff0%2BKC67%2ByiIqU1bdom%2FRCO7utOky9BtXu88M1IAkhbvCA7%2F8kKyCUAqFR8SvwvZjsqhPCtQFMaDbwD77IAaZfToP7esJPCj%2FlR7clJFWAJ5NY1jSVm6w%2Fpl9zvziyx66rAFjjkaGEHh85s7u1rMAJJ5P7q7lTC%2FR8dyrL1p0XOT3s%2BY%2FDTw7qKWEm5IRO%2FZfp%2FzvW5%2BsMc%2B4SbXLdKjIP0T59KO18kzmn8j7KA6Q2mtOVVShv9Lqcn2raHz6rLFh4TsfP5c0qZMAu4VD02IzAkov4%2BKXmS5OcyWRvEaXdP9LCT3UxN2407D3H9jn6aMZYVIUhPIsS%2BO5kDJrcHVVkwhK3W70RXrDGSDva%2FmnjaK67M4owuOhexyTGajJ5G3QBCHTyf6sXyMOPAzWHKn92Jh8M1xPmpkcOeBJIEWzzoXfPwV5i6KH4z8nB2px18JACuqbwBCS8lRxtDlk%2BZLyxBmcl9WE0x8EByviIobrKUphArGOEDw6KgH8KFZlEQYZvJEvwVM%2BYSDcosLXr3gU%3D&X-Amz-Signature=c77b238d0e350e0fd945f5c448b69b07d2d9ad4df69902910ef1837127b1a334

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https://www.geeksforgeeks.org/merge-sort/