**Concurrent and Parallel Programming**

**Practical Mid Term (2023-24)**

**Note: Attempt all questions.**

**Ques 1:** Write a Program that takes an array and its size as arguments. Later, try to use Merge sort to sort the array elements. As, in Merge sort, input array is divided into two halves, use two different threads to sort the two sub-arrays, recursively. Every thread would create two new threads, and would wait for them to complete. At the end, every thread would combine the sorted result of its child threads. **[7 Marks]**

**Ques 2:** WAP to implement producer consumer problem ( Using MUTEX) **[6 Marks]**

**Ques 3:** Write a program where 2 threads operate on a global variable “account” initialized to 1000. There is a deposit function which deposits a given amount in this “account”: int deposit(int amount)

There is a withdrawal function which withdraws a given amount from the “account”:

**int withdrawal(int amount)**

However there is a condition: withdrawal function should block the calling thread when the amount in the “account” is less than 1000, i.e. you can’t withdraw if the “account” value is less than 1000. Threads calling the deposit function should indicate to the withdrawing threads when the amount is greater than 1000. **[7 Marks]**