INDIVIDUAL PROJECT WORK
JUNE SEMESTER 2022

BACHELOR OF COMPUTER SCIENCE (HONS.)
(IN COLLABORATION WITH IUKL)

DISTRIBUTED AND PARALLEL COMPUTING
(CSC 2624)

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GENERAL INSTRUCTIONS

1. This question booklet consists of 2 pages including this page.
2. There is one **SECTION** in this question booklet.
3. Please submit assignment solution in **SOFT COPY.**
4. **The Deadline for Submission is on 25th August.**

1. The following C program sums up all the values in array "data" and displays the sum total.:

```
#include <stdio.h>

#define NUMDATA 10000
int data[NUMDATA];

void LoadData(int data[])
{
  for(int i = 0; i < NUMDATA; i++){
    data[i] = 1;
  }
}

int AddUp(int data[], int count)
{
  int sum = 0;
  for(int i = 0; i < count; i++){
    sum += data[i];
  }
  return sum;
}

int main(void) {
  int sum;

  LoadData(data);
  sum = AddUp(data, NUMDATA);
  printf("The total sum of data is %d\n", sum);
  return 0;
}
```

Convert it to MPI to run with any number of nodes including just one. (40 Marks)

2. The file "WarAndPeace.txt" attached herewith contains the entire text of the book "War and Peace" by Leo Tolstoy. Write an MPI program to count the number of times each letter of the alphabet occurs in the book. Count both the upper case and the lowercase as the same. Ignore any letter with accents such as " é " and so on.

Your MPI program should work with any number of processes from 1 to 100 process. Only Process rank 0 (zero) should read in the file and send the **appropriate** chunk of file to each other process. The other processes should not read in the file.

You should submit this program as "individualtask1.c" as part of your individual/group Assignment.

(60 Marks)