Communication and Information Engineering
Parallel and Distributed Computing (CIE564)
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Assignment 3

Student should submit a copy of his/her source codes in one zip file uisng the course assignment Google classroom link on or before 23:59 Sunday, Dec 1, 2019 – late submission is not allowed

Note: Please, Provide your complete visual studio solution for helping in the grading process

Counting Primes Problem

Students should write a parallel C program for "Counting Primes" using the following two methods ONLY **MPI_Send()** and **MPI_Receive()**.

Given

- Lower bound number x
- Upper bound number y

Output

- Count of prime numbers occurring between x and y.

Parallel Scenario

It is required to implement both **a serial scenario** and **a set of parallel scenarios** using different number of processes **p**. In each parallel scenario select one value for **p** from the set {2, 4, 6}. Compare the times of the different scenarios and submit a an excel sheet to list this comparison. Use different problem sizes where x is always 0 while y is selected from the set {200, 1000, 50000}.

Master Process:

- Calculate the sub range size **r=(y-x)/p** (if including master) or **(y-x)/(p-1)** (without master). Allow the master process to be included in the counting prime numbers task in one source code and to not to be included in another source code.
- Send **x** and **r** to each slave process using MPI_Send().
- Receive sub count from each slave process using MPI_Receive().
- Print total count of primes between x and y.

Slave Process:

- Receive **x** and **r** through MPI_Receive().
- Calculate the lower bound **a** and upper bound **b** according to its rank.
- Count primes in its sub range (between **a** and **b**).
- Send this partial count to the master process using MPI_Send().