Faculty of Computers and Information
Cairo University
Spring-2021

Parallel Processing- 2021

Assignment 1 –MPI

Deadline & Submission:

1. **The assignment is individual.**
2. **Code must be in C and MPI & you must run it before sending.**
3. **Cheating could lead to serious consequences.**

Assignment Title:

Counting Primes

Problem Statement:

Students should write a parallel c program for “Counting Primes” using the following two methods: MPI_Send and MPI_Receive ONLY

Given

- Lower bound number x
- Upper bound number y

Output

- **Count of prime numbers occurring between x and y**
- **Count of prime numbers occurring in each process.**

  Example:

  “Total number of prime numbers is: 20”

  “Total number of prime numbers in P1 is: 10”

  “Total number of prime numbers in P2 is: 6”

  “Total number of prime numbers in P3 is: 4”

Parallelization Scenario

Master Process:

- Calculate the sub range size **r=(y-x)/p**
- Note that **p** is the number of processes.
- Broadcast **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 the 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**).
- Print the partial count
- Send this partial count to the master process using the MPI_Send.

Grading:

Your code should be compiled without any errors or you will lose 50% of assignment grade, also the output of the run should be correct or you will lose 25% of assignment grade

You must use MPI_Send and MPI_Receive ONLY