Lab Session Week 5

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Task 2 - Code

A screen shot of a computer program

Description automatically generated

Task 3 - Code

A screenshot of a computer program

Description automatically generated

A computer screen shot of a code

Description automatically generated

Task 4 - Code

A screen shot of a computer program

Description automatically generated

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Description automatically generated

Task 5(a) – Code which includes comments

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Description automatically generated

Task 5(b) – Code which includes comments

A screen shot of a computer

Description automatically generated

Task 5(c) – Performance analysis (serial vs parallel), explanation about the speed up and behaviour of MPI functions.

Serial code overall time = 1.5481s

Parallel code overall time = 0.306057s

Speed up = 1.5481/0.306057 = 5.058 times

The performance of parallel code is better than serial code. It is faster than the serial code approximately 5 times. The ideal speed up should be 8 as I using 8 processors. There is a difference between actual and theoretical speed up is due to:

Communication Overhead:

* In parallel code there is overhead due to the communication between processors like broadcasting the N value and reducing the sum. This communication takes time and thus reduces the actual speedup.

Load Imbalance:

* if the workload is not perfectly balanced among the processors. Some of the processors will finish their tasks earlier than the other processors and remain idle. Thus, the program needs to wait for the other processors to finish their tasks. This lead to decrease in the actual speedup