SIT315 Programming Paradigms

Module3 Distributed and Hybrid Programming

TaskM3.T1P: MPI, OpenMP and OpenCL Matrix Multiplication

Overview of the task

To fulfill the requirements of this task, you will need to demonstrate your skills to use MPI and OpenCL in C/C++ to speed up sequential program. In this task, we use matrix multiplication as the example problem. See here (https://en.wikipedia.org/wiki/Matrix_multiplication)

Submission Details

Please make sure to provide the following:

- Source code of the MPI matrix multiplication program,
- Source code of the MPI and OpenMP (hybrid MPI to nodes and OpenMP in the nodes) program,
- Source code of the MPI and OpenCL (hybrid MPI to nodes and OpenCL in the nodes) program, and
- Evaluation of your program on different input sizes and number of threads in each of these three programs.

Instructions

1. Modify your matrix multiplication program to use MPI to distribute work on nodes.
2. Evaluate the performance of your program vs sequential and multi-threaded solution.
3. Modify your code to use OpenMP on the slave nodes.
4. Evaluate the performance of your program vs the other two.
5. Modify your code to use OpenCL.
6. Evaluate the performance of your programs.
7. Document your results and present your findings
8. Submit your task as detailed on the submission details section above to OnTrack.