Parallel Computing Laboratory
IT-300
Fall-2019

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This week the students will exercise the basic constructs and OpenMP variables studies. The students are free to choose their programming environment. But the preferred language is C, based on which the following assignments' guidance is given:

The file is saved as regular 'C' file name: filename.c

Compilation using GCC: **gcc -fopenmp filename.c**

You are free to use your own compiler and get the instruction for the compilation. It is also shared in OpenMP lecture notes.

All the required OpenMP syntaxes are available in OpenMP-API-Specification-5.0.pdf, which is openly available for reference.

Exercise 1: nowait clause

1. Write a serial program that has two independent jobs where work-sharing constructs can be applied. Record the time of execution.
2. Apply work-sharing constructs to parallelize the above program with out nowait usage. Record the time of execution.
3. Apply nowait to the above program and see whether any performance gains are obtained.
4. Otherwise, redefine your problem such that you can demonstrate the benefits of nowait.

Hint: Refer where nowait clause is used and define your problem such that it is most suitable for work-sharing construct

Exercise 2: Matrix Multiplication (MM)

1. Write a serial MM program.
2. Optimize the above program using OpenMP and comment on your observations.

Hint: Identify the parallelism in your application before you proceed with it and also identify which constructs are best for the identified parallelism.

Exercise 3: Scheduling

1. Write a serial program of your choice that has potential usage of work-sharing constructs.
2. Optimize the above program using OpenMP and comment on your observations.
3. Further optimize the above program using scheduling of your choice, while observing the thread computation allocation and noting the performance improvements.
4. Check all the scheduling mechanisms and report the behavior and performance.