

HW4, CS4823/CS6643 Parallel Computing

OpenMP and PThreads Programming

Due Date

This assignment is due next Wed.

Materials to Review

Read Chapter 3. Review OpenMP/PThreads slides and try out demo programs.

OpenMP and PThreads Programming

(a) (20 points) Write a shared memory OpenMP program on Fox server to multiply two n -by- n matrices using p processors with $1 \leq p \leq 12$. Fill up the matrices with some constant values so that it would be easier for you to verify the resulting matrix for correctness.

(b) (5 point) Prepare a speedup plot (T_s/T_p) or a table with varying n and vary number of processes in the available range. Use pure sequential time with three nested loops for T_s (see below).

Hint: You may implement the sequential code in the same program and time it, followed parallel code and time that, and calculate the speedup. Experiment and choose sufficiently large n for a reasonable speedup. Larger n may result in better speedup.

Submission: Submit your source code and plot/table.

```
/* matrix-matrix product loop */
for (i = 0; i < dim; i++)
    for (j = 0; j < dim; j++)
        for (k = 0; k < dim; k++)
            c[i][j] += a[i][k] * b[k][j];
```

(c,d) (20+5 points) Repeat (a) and (b), respectively, using PThreads.