

# CSE 822 Homework 1

## Due: February 22, 2001

In this programming assignment, you are asked to parallelize two numerical (FORTRAN) applications from SPECfp 2000 on a SUN Enterprise SMP. You can use any directive to parallelize those two applications in the shared memory parallel programming model as long as you use the directives that are specified in the handouts for f77. You must read the handouts to learn how to parallelize these applications.

The source files (swim.f, mgrid.f) and inputs (swim.in, mgrid.in) are in `~cse822/Projects/HW1`. Copy these files in your home directory and modify them. After parallelization, compile (with `-O2` option) and run them on 1, 2, 3, and 4 processors on `arctic.cse.msu.edu` or `pacific.cse.msu.edu`. Report the speedups you obtained. The output from the parallel execution and the one from the sequential execution might be different in some error range, but the parallelized version should be correctly parallelized (i.e., it does not break data dependences), and your speedups should be better than automatically parallelized version with `-autopar` compiler option.

The following is what you need to submit (tar them and send the tar file to `cse822@cse.msu.edu`):

1. Your name and your student ID.
2. The parallelized version of the applications named `swim_P.f` and `mgrid_P.f`.
3. The ideal speedups you compute with 1, 2, 3, and 4 processors by using Amdahls' law.
4. The actual speedups you get on 1, 2, 3, and 4 processors. For example, run the same application on 2 processors in parallel 5 times and take the average of execution time. This will be used to compute the speedup of the application on 2 processors.
5. Brief explanation of your methods used to parallelize the applications and discussion on how to further improve the performance (2 or 3 pages).

Your score will be partly based on the speedups you get.