Homework 2

These should be run on the scholar queue or a machine that you have access to. Note that timings will only be accurate if running on a machine that your program is the only application running on it, which will be the case with Scholar.

A. Write and run an OpenMP program that:
Determines the number of processors available to run the program on a Scholar node machine using a version of the script provided for HW1. Print out a unique threadId for each thread using an OpenMP built-in function Determine which thread executes a *master* and one instance of a *single* statement of a parallel region.

B. Write and time 3 programs, two of which will be parallel.

Program 1: Initialize within the program a single-dimensioned array with 1,000,000 elements. The program will:

1. Perform a sequential reduction on the array and time and print the execution time.

2. Perform a reduction such as what is shown below, and time and print the execution time:
```
int nt = numberofthreads
int res[nt*8];
#pragma omp parallel for
for (i=0; i < 1,000,000; i++) {
  res[mythread*8] += a[i];
}
```

3. Perform a reduction using the OpenMP reduction, and time and print the execution time.

C. Write two sequential loops that sums the sequence 1.0 / i.

The first loop should be for (int I=0; I< 10,000,000; i++) {…}
The second loop should be for (int i=0; i<10,000,000; i++) {…}
The third summation should use an OpenMP reduction.

Answer briefly why you think the answers differ.

D. Run the programs slow.c and verySlow.c included in the directory MM answer briefly why they are so different

What to turn in:

Turn in a file called <login>.zip, where <login> is your Purdue career account ID. Please use .zip and not 7z, or other compressions programs – it slows down the grading. Also do not include binary files, i.e., executables, of your program – it just bloats the download file of the homeworks.

In a subdirectory of <login> called A, put the code for your program for Part A and the output of the execution in a .txt file.

In a subdirectory of <login> called B, put the code for your program for Part B and the output, with timings, for the program in a .txt file.

In a subdirectory of <login> called C, put the code for Part C, and a file that shows the output of the program and a brief explanation of why the answers differ for the three ways of adding the numbers. Also state which one(s) should be most correct.

In the <login> subdirectory, have a .txt file called *D.txt* that contains your brief answer on why verySlow.c is much slower than slow.C.