

# CEE 618 – Scientific Parallel Computing: Homework #5

Name: \_\_\_\_\_

Noon, Friday 14, 2013

1. (100 pts) GRE scores of a million ( $n = 10^6 - 1$ ) people (Verbal, Quantitative, and Analytical) are available as stored in 'gre.dat'. Do the followings in sequence.
  - (a) Let the master processor (id=0) read the data file using an array named `SCORE(n,3)` for the  $n$  record set. One record set indicates four numbers in a line of the data file: [ID, V, Q, A]. For example, `SCORE(99,2)` indicates 99<sup>th</sup> person's quantitative score. This is similar to  $y$ -coordinate of particle  $i(= 99)$ . The data generation code is attached.
  - (b) Master shares `SCORE` array to all 8 processors including itself.
  - (c) Let each worker processor calculates sums of verbal, quantitative, and analytical scores of (about) 1/8 of the whole data set.
  - (d) Master collects workers' results, calculates averages of [V, Q, A], and print out the result to screen.

## Tips

- Make a group of two people. One student programs master's part and another worker's part.
- Minimize the number of MPI communication events as much as you can. In other words, try to send/receive grouped data a few times, not individual numbers so many times.
- Whichever group makes the fastest (and shortest) code wins and get extra credit, possibly using advanced MPI subroutines.
- Sample codes are stored in the course directory.