CPE 412/512

Fall Semester 2010

Homework Assignment Number 2

1 On the altix.asc.edu system run the add_num_MPI.cpp program that was handed out in class (http://www.ece.uah.edu/~wells/cpe412_512_fl_10/material/hw/hw2/add_num_MPI.cpp). Identify its limitations.

2 Modify the original add_num_MPI.cpp program so that the maximum and minimum number is found and outputed in addition to the sum. Name this program *add_num_MPI_rv1.cpp*.

3 Then modify the add_num_MPI_rv1.cpp program of Problem 2 by adding additional statements to it that will allow for the number list size (i.e. number of numbers to be added) to be something other than a multiple of the number of processors. Give this file the name *add_num_MPI_rv2.c*pp. Verify that the program works correctly from 2 to 16 processors for a number set size of 2483 numbers.

4 Modify the add_num_MPI_rv2.cpp of Problem 3 by replacing the user written functions *send_all_int(), scatter(),* and reduce(), with equivalent collaborative communication routines from the MPI library. Give this file the name *add_num_MPI_rv3.c*pp. Verify that the program works correctly from 2 to 16 processors for a number set size of 2483 numbers.

5 A multiprocessor consists of 100 processors, each capable of a peak execution rate of 200 Gflops. What is the performance of the system as measured in Gflops when 15% of the code is sequential and 85% is parallelizable?

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Follow the program turn-in procedure outline below. *Due date for In-class students is Tuesday September 14, 2010. Due date for DL students is Tuesday September 16, 2010*

Homework Assignment Turn in Procedure

You are to turn in an electronic copy of the homework assignment on or before its due date. This copy should contain a printout of all source code and the resulting output of the program or some form of a log of interactive activity captured in a text file. Acceptable file formats include pdf, doc, and ascii text. All files should be sent as standard E-mail attachments and should include all source level files and brief instructions as how to compile and execute your code. No object code files should be included. The subject line of the E-mail should contain the following; CPE x12, HW #num, where x is 4 or 5, representing which course you are taking (412 or 512) and num is the homework assignment number (Example CPE 412 student would put CPE 412, HW #1 for the first homework assignment. The E-mail is to be set to wellsbe@uah.edu.