**MPI Assignment 1 – Note that this is based on Workshop Exercises 1 and 2**

The aim of this assignment is to write an MPI program to calculate the Greatest Common Divisor (GCD) of 10,000 pairs of random integers. The GCD is the largest integer by which both of the numbers are divisible. To determine the GCD you should make use of Euclid’s algorithm.

In this program the two lists of integers should be created on process zero. Portions of the two lists should be sent to the other processes in order for them to do the calculations.

* The easiest way to achieve this is to divide up the lists evenly amongst all the processes, send them out and then wait for the results to be returned. This is the minimum requirement for this assignment (very similar to Workshop Exercises 1, but can also be done with non-blocking communications for more credit).
* As some processes might take longer than others to complete their tasks, instead of dividing all the tasks upfront, send only a portion of the data out to each process, with these processes sending the results back when they finish. A good cycle for process zero is to use MPI\_Test to check if each process has sent back data. If they have they can be sent more data to process and if no processes have sent back data then zero node can do some of the calculations itself while it waits. Send an empty list of data to a process to let it know that it can finish and exit. This is the harder, but more efficient method for distributing the task.

In addition to documented source code you should also hand in a short analysis in which you examine the parallel efficiency of your code – How long does the code take to complete as you increase the number of processes relative to how long it takes on a single process? How is this influenced by the size of the job (i.e. the number of integers in the list)?

**The due date for the assignment is midnight on Monday 11 March.**

Note that I do not mind you using, for instance, a version of Euclid’s algorithm that you find on the web, but if you do so you MUST reference in your code where you have obtained it from.