EECE 528: Parallel and Reconfigurable Computing
ASSIGNMENTS 1, 2, 3 and 4

DUE DATES

Oct 6 Assignment 1 Parallel programming in MPI
Oct 13 Assignment 2 Parallel programming in pthreads
Oct 20 Assignment 3 Parallel programming with CUDA
Nov 3 Assignment 4 Parallel programming with Vectors

SUBMISSION (DO ALL!!)

1. DROPBOX (save assignX-yourid-report.pdf, assignX-yourid-src.zip)
2. HYDRA2 (eg: /data/home/eece528/2017/submit/yourid/assignX/)
3. IN CLASS submit printout of your report.pdf

NOTE: I must be able to run "make" in "assignX" directory on hydra2 to recompile your code.

Each assignment will take roughly 20 hours.

1. WARM-UP. Write the Gaussian Elimination algorithm in C. Like assignment 0, be sure that you make it go as fast as you can on one processor. **This step is vital because it serves as the baseline for the rest of the assignments in the course!**

2. For **Assignment 1**, solve the Gaussian Elimination problem, measuring forward elimination only in parallel on single-precision floating-point values, using OpenMPI.

3. For **Assignment 2**, repeat the previous Assignment using shared-memory with pthreads.

4. For **Assignment 3**, repeat the previous Assignment using CUDA.

5. For **Assignment 4**, repeat the previous Assignment using VectorBlox MXP with fixed-point numbers in Q16.16 format. Compare performance against your results in Assignments 1 and 2.
   - Instead of vector-divide, precompute the inverse (1/x) and use vector-multiply
   - For this assignment, instructions on vector programming will be provided

6. Your mark partially depends upon the efficiency of your code. Your sequential code must be fast, and you must get reasonable parallel speedup. Be sure to measure both!