

**CS 791v: Topics: Parallel Computing**

**Spring 2015**

**Programming Assignment 1**

**Experiments with Vector Addition**

**Assigned Date**

1/23/2015

**Due Date**

1/29/2015

**Overview**

1. Starting with vector addition
   1. Code

\_\_global\_\_ void add (int \*a,int \*b, int \*c) {

int tid = blockIdx.x \* blockDim.x + threadIdx.x;

if(tid < N) {

c[tid] = a[tid]+b[tid];

}

}

* 1. And the call

add<<<B,T>>>(dev\_a,dev\_b,dev\_c);

1. For this assignment, you will make changes to the vector addition code.
   1. Different sizes for the vectors – Replace the static declaration for a[N], b[N], and c[N] with dynamically allocated memory and add keyboard input statements to be to specify N.
      1. Use LARGE vectors (push the memory of the cards, should go to at least 1 million)
      2. Have versions with and without striding
   2. Different CUDA grid/block structures – Add keyboard statements to input different values for:
      1. Numbers of threads in a block (T)
      2. Number of blocks in a grid (B)
   3. Include checks for invalid input.
   4. Timing -- Add statements to time the execution of the code using CUDA events, both for the host-only (CPU) computation and with the device (GPU) computation, and display results.
   5. Compute and graph the appropriate metrics (runtime, speed-up factor,…).

**Project Requirements**

* 2 versions of the code:
  + A compiled and running sequential C program
  + A compiled and running CUDA program
* Multiple timings of runs of various sizes.
* Appropriate graphs

**Deliverables**

* Bring code and output to class for discussion on the day the project is due.
* Have a pdf of your writeup and a zip of your source code emailed to Fred Harris and Lee Barford (DO NOT send binaries).
  + Firstname dot Lastname at … (Fred is cse, Lee is gmail)