# Lab 1: Vector Addition

## 1. Objective

The purpose of this lab is to get you familiar with using the CUDA API by implementing a simple vector addition kernel and its associated setup code. While the assignment directions below focus on the use of git to move code between your local machine and the GPU servers, you could also use sftp or scp.

## 2. Procedure

**Step 1:** Clone onto your local machine the repository that you will use for this assignment from GitHub Classroom by using the link in the Canvas page for this assignment.

git clone <github-classroom-repository-url>

**Step 2:** Edit the Makefile as appropriate at its "Todo" areas.

**Step 3:** Edit the file <lab-directory>/main.cu to implement the following where indicated:

1. Allocate device memory
2. Copy host memory to device
3. Initialize thread block and kernel grid dimensions and invoke CUDA kernel
4. Copy results from device to host
5. Free device memory

**Step 4:** Edit the file <lab-directory>/kernel.cu to implement the vector addition kernel code.

**Step 5:** Use git to push your project to Github.

**Step 6:** Use an **SSH program** to login to either artemis.emich.edu or apollo.emich.edu.

**Step 7:** Use git to clone your code onto the GPU server

git clone <github-classroom-repository-url>

cd <lab-directory-name>

**Step 8:** Compile and test your code. The code here assumes you've named the executable in Makefile to be *vecadd*.

make

./vecadd # Uses the default vector size

./vecadd <m> # Uses vectors of size m

**Step 9:** If you had compilation or runtime errors you can either modify your code directly on the server by using a text editor like nano or emacs, or make the changes back on your local machine and use git to transfer the updated version to the server (via *git push* on local and *git pull* on the server) and then try step 8 again.

**Step 10:** Submit your assignment. Your submission should be a zip file containing your two source code files and a transcript of your program running.:

* main.cu
* kernel.cu

**3. Grading:**

Due to its simplicity, this lab will be graded on a pass/fail basis.

*Note: This is a simple but essential exercise. Please write out the code and do not copy it from other examples or lecture slides. That process is most important.*