

CS 435/535 Accelerated Computing Summer 2020

Homework #1

DUE Monday June 29 before 10 am

SUBMIT by email to: karavan@pdx.edu with subject ACCEL HW1

K&H Textbook: Programming Massively Parallel Processors Third Edition

Part A: Textbook

Read Chapters 1, 2 and 3 of the K&H textbook.

SUBMIT: answers to questions (email *attached* .pdf or attached .txt or .docx):

Chapter 2: 1, 2, 4, 5, 6

Chapter 3: 3, 4, 5, 6, 9

Note: you only need to record the question number and the letter answer.

Part B: Hands On

SUBMIT: email attached: your source code and a makefile to build your code

Using the example code for Vector Addition (VectorAdd.cu) as a guide, write a CUDA program for vector-vector multiplication as follows:

- You will have to write a `main` that creates and fills arrays with values, calls the functions, and prints the result.
- Your program should take one argument for vector size, one for number of threads per block, and one for number of blocks per grid. Then it should check at runtime, to see if these sizes are possible on the current device and return an error if not. Be sure to print out the capability number of the device being used.
- Include two functions, one to perform vector multiplication using the device, and one to perform vector multiplication on the CPU.
- Include timings in your output, so that you can compare the performance of CPU vs GPU
- Check at runtime, and print out the capability number of the device being used.

Notes:

For general information regarding the Linux lab and the software environment see

<https://cat.pdx.edu/students.html>

and

<https://cat.pdx.edu/linux.html>

To log in to a linux lab machine

```
ssh mylogin@linuxlab.cs.pdx.edu
```

To compile CUDA code:

```
nvcc mycode.cu
```

If nvcc is not found, use addpkg to configure your setup for cuda

GRADING (100 points):

Part A: 5 points each

Part B: 50 points total. Grading will be based on building your code with your makefile, then running and testing it for correctness. Evaluation will be done on the CS Linux Lab machines.