Department of Electrical and Computer Engineering
Queen's University

ELEC 374, Digital Systems Engineering

Machine Problem 1

Total Mark: 1%

Posted: Feb 16, 2023
Actual Deadline: **Mar 31, 2023** at 8:30am
3 days Grace Period: **Apr 3, 2023** at 8:30am
After grace period: **25% late penalty per day**

Device Query

The objective of this machine problem is to understand the capabilities of the NVIDIA GPU you will be working with for your machine problems. You will also test your environment and make sure you can build and run your CUDA programs.

Write a code that could identify the number and type of CUDA devices on the GPU servers, the clock rate, number of streaming multiprocessors (SM), number of cores, warp size, amount of global memory, amount of constant memory, amount of shared memory per block, number of registers available per block, maximum number of threads per block, maximum size of each dimension of a block, and the maximum size of each dimension of a grid.

For this and other machine problems, you may consult the Lecture Slides on GPU Architectures and Computing and the GPU Server and CUDA Environment Tutorial on the course website. You may also consult the NVIDIA CUDA C Programming Guide.

Submission Instructions:

This machine problem is to be done individually. Students must run through the assignment by themselves, include their own solutions and analyses, and turn in their own reports. Submit a **single zip file**, "MP1_YourLastName.zip", containing your code (e.g., MP1.cu, with your name and student ID on top of the code), and a report in pdf, MP1_YourLastName.pdf, where you present your work by including your CUDA code and the Visual Studio output screenshots, analyses of your results, and discussions of any outstanding issues. Students must abide by the academic integrity expectations, and include in their report a statement that says:

- *"I do hereby verify that this machine problem submission is my own work and contains my own original ideas, concepts, and designs. No portion of this report or code has been copied in whole or in part from another source, with the possible exception of properly referenced material".*

GPU Servers:

Four GPU (Tesla C2075) servers are available for the machine problems. The servers run Windows server operating system and provide the Visual Studio 2015 IDE for building CUDA projects. For remote connection to the GPU servers and information on CUDA and its environment, please consult the GPU

Server and CUDA Environment Tutorial. The servers use a load balancer to balance the workload on the GPU servers, and it is possible that you may log in to a different GPU server each time. Therefore, it is very important to back up your files.