Assignment 4 – Getting Familiarized with OpenCL

Take a look at the example code in the Introduction to OpenCL lecture note and do the following experiments:

1. **Measuring benefit of OpenCL**

   Implement the vector addition code as given in the lecture note. Measure and report the quantities listed below while varying the data size from 1024, 2048, … , 64M (i=1024;i<64*1024*1024;i*=2)

   - the time it takes to complete memory copy from host to device
   - the time it takes to run the kernel
   - the time it takes to complete memory copy from device to host

   Also compare the results of the total time taken by the OpenCL implementation with that of the serial implementation on a CPU. Furthermore, compare the OpenCL implementation with your best thread implementation from Assignment 1. Plot the speed up for both cases (CPU vs OpenCL and thread vs OpenCL).

2. **Measuring impact of WorkGroup Size on Performance**

   In this experiment, you keep the size of the Vectors constant at 64M and vary the workgroup size from 1,2,4, … MAX_WORK_GROUP_SIZE (or you can simply increase the size of the work group until you get an error. But be very careful as errors are not displayed by default). It is possible to query the OpenCL device to know what the maximum work group size is. Plot the speed up as compared to the serial implementation on the CPU.

Furthermore, compare the OpenCL implementation with your best thread implementation from Assignment 1 and plot the speed up.

Please read the book Heterogeneous Computing with OpenCL. It teaches you OpenCL using examples.

Due Date: June 04, 2019 before class.