CS 791a: Topics: Advanced Graphics

Spring 2011

Programming Assignment #5

Shared FIR Filter

Assigned Date
10/4/2011

Due Date
10/11/2011 12:29:59.99PM PST

Overview
For the previous assignment, you implemented a finite impulse response (FIR) filter using global memory in CUDA. For this assignment, implement it again using shared memory and compare its performance against the previous.
The program should behave as follows:

1. Generate an array A of N values, either randomly or from a file.
2. Given a filter kernel size K, generate an output array O of size N - K + 1, where O[i] = (A[i] + A[i + 1] + ... + A[i + K - 1]) / K.

Project Requirements

- Implement one version in CUDA using shared memory
    - Your code should handle arrays greater than the maximum number of available threads
- A writeup with graphs including time and throughput comparing the CPU and both GPU versions in terms of performance.

Recommendations

- Your shared memory segment should be of size numThreads + K - 1

- Depending on hardware, you may not find a significant difference between the GPU versions due to caching being available on later hardware.

Deliverables

- Bring code and output to class for discussion.
- Have a pdf of your writeup and a zip of your source code emailed to: Fred Harris and Lee Barford. Don't send binaries.
    - Firstname dot Lastname at .... (Fred is cse, Lee is gmail)