

Parallel Processing

Assignment 6

This assignment is individual assignment, every student should submit by himself.

Due: Next Section

1. True or False:

- a. Zero is an Identity element for the multiplication operator.
- b. Hillis & Steele Reduce algorithm is the best solution if we have a massive input size.
- c. We can program Histogram algorithm using Atomic operations which is the best solution to solve the algorithm in a parallel fashion

2. Compare between the complexity of the sequential scan problem solution with Naïve parallel solution, Hillis&Steele solution and Blelloch solution.

3. Write a sequential pseudocode to solve calculate the histogram problem.

4. Use the following array to answer the questions: [1, 2, 0, 5, 8, -4, 7]

- a. Apply a sum reduce on the given array.
- b. Apply a max reduce on the given array.
- c. Apply an inclusive multiplication scan on the given array.
- d. Apply an exclusive multiplication scan on the given array.
- e. Use Hillis & Steele algorithm to apply sum scan on the given array and show every step.
- f. Use Blelloch algorithm to apply sum scan on the given array and show every step.

5. (Bonus) Using Cimg and Cuda to write a program take an image and modify their luminosity (tone mapping) to lighten them. We could also darken the images, or apply changes only to parts of the images.

PS: Review the following program to help you:

<https://code.msdn.microsoft.com/windowsdesktop/HDR-Tone-Mapping-with-CUDA-93b83bf5>