

Parallel Processing

Assignment 2

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

Due: Next Section

1. True or False:

- a. Gathering pattern may cause a write synchronization problem.
- b. From RGB Gray scale image is an application example of scatter pattern. .
- c. Transpose pattern represent a many to one relation between the input and the output.
- d. GPU consists of server streaming multiprocessors.
- e. Programmers are responsible for allocating blocks to SMs.
- f. Thread blocks are usually assigned to SMs in a specific order.
- g. A block may run on more than SM.
- h. All blocks in the kernel finish before any blocks in another kernel.
- i. Threads from two different blocks can access the same variable in global memory.
- j. Accessing global memory takes less time compared to accessing local memory.

2. Write a CUDA program to convert a RGB image to a grayscale image using the following formula for color conversion.

$$I = 0.2126 * R + 0.7152 * G + 0.0722 * B$$

3. Write a CUDA program to perform blurring over a given image using the following technique:

Suppose the following box is part of a given image:

1	5	4
6	x=7	6
13	35	9

Then the new value of x after blurring :

new x= (1+5+4+6+7+6+13+35+9)/9 where 9 is the number of summed pixel. Your program should apply this formula for each pixel in the original image.

PS 1: use the following templates to complete task 2 and 3

- [VS2013 template](#)
- [Linux template](#)

PS 2: Refer to the following video to understand how to handle image in a simple way

- [How to simply handle an image with CImg in CUDA](#)