CSC8014 Topics: GPU Programming

Homework #5

1. Compile and run the attached CUDA code `hist_gpu_gmem_atomics.cu` of histogram. Record the outcome. Update kernel function by replacing `atomicAdd( &histo[buffer[i]], i)` with `histo[buffer[i]]++`. And then re-compile and run the code. Answer the following questions:
    a. Are the outcomes (before and after the update) different? Why?
    b. What does function `atomicAdd( &histo[buffer[i]], i)` do?
    c. What's difference between `atomicAdd( &histo[buffer[i]], i)` and `histo[buffer[i]]++`?
2. Compile and run the attached CUDA code `hist_gpu_shmem_atomics.cu` of histogram. Record the outcome. Please answer the following questions:
    a. Compare the outcomes of `hist_gpu_gmem_atomics.cu` (in problem 1)and `hist_gpu_shmem_atomics.cu`. What's the difference in outcomes?
    b. Which program is fast? Why?
3. What's the difference between `malloc()` and `cudaHostAlloc()`. What's the purpose of using `cudaHostAlloc()`. What is the trade-off of using `cudaHostAlloc()`.