Parallel Processing

Assignment 8

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

Due: Next Section

1. Given the following matrices $\begin{bmatrix} 2 & 1 & 1 \\ 5 & 0 & 0 \\ 0 & 3 & 4 \end{bmatrix} \times \begin{bmatrix} 3 \\ 1 \\ 0 \end{bmatrix}$.

a. What the total work to multiply these matrices?
b. Convert the matrices to CPR format and apply the multiplication (show every step).
c. What is the total work to multiply these matrices using CPR format ?
d. Explain how can we program CPR multiplication in parallel?

2. Given a list of integers [2,0, 5, -1, 8, 4, 6, 9, 1, 3] answer the following:

a. Apply the Odd-Even sort, and show every step then calculate the steps and total work complexity.
b. Apply the Merge sort, and show every step then calculate the steps and total work complexity.
c. Apply the Radix sort, and show every step then calculate the steps and total work complexity.

3. Write a CUDA kernel to implement the Odd-Even sort algorithm.

4. (Bonus) Red Eye is a common image problem. Using CImg and CUDA and write a kernel to remove the Red Eye problem for a bmp image

PS: Refer to the following implementation for help
https://code.msdn.microsoft.com/windowsdesktop/Red-eye-Removal-with-CUDA-10965f4e