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Assignment on Massively Parallel Algorithms - Sheet 3

Due Date

Exercise 1 (Histogram, *Credits*)

In class, you have learned the histogram algorithm (which uses atomic operations).

- What is the worst-case input? (in the sense that the GPU algorithm will take the longest time)
- What is the best-case input?
- In the best case, what is the probability that any two threads access the same memory location? Consider 1024 bins and 64 threads and only one warp. It could help to think about the probability of no collision.

Exercise 2 (Matrix Vector Multiplication, *Credits*)

In the given Framework `MatrixVectorMul` Matrix A is stored using a row major order.

Your tasks are the following:

a) Implement a Matrix Vector multiplication kernel for the above Matrix stored in row major order.

b) Implement a method to store the above Matrix in column major order and then modify the above Matrix vector multiplication kernel to handle matrix stored in column major order .

c) Compare run times between the above two implementations (**row major order vs column major order**) for different Matrix sizes and provide arguments for the differences/similarities between run times for these two implementations .