

Assignment 5. Histogram

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Problem 1

For the histogram kernel, how many atomic operations are being performed by your kernel? Explain.

- `inputLength` .
 - Each element of input needs one atomic operations.

Problem 2

For the histogram kernel, what contentions would you expect if every element in the array has the same value?

- If every element in the array has the same value, all threads attempt to update the same bin. Therefore, all threads must wait for other threads to complete their atomic operations on the same bin, introducing contention.

Problem 3

For the histogram kernel, what contentions would you expect if every element in the input array has the random value?

- If every element in the input array has a random value, load imbalance could occur. Some threads may need to update bins more frequently than others, leading to partial contention.

Problem 4

Your version of `template.cu` .

- Please refer to the attached `template.cu` .

Problem 5

The result as a table/graph of kernel execution times for different input data, with the system information where you performed your evaluation. Run your implementation with the input generated by the provided dataset generator. For time measurement, use `gpuTKTime_start` and `gpuTKTime_stop` functions (You can find details in `libgputk/README.md`).

- Please refer to the attached `evaluation.pdf` . 'Doing the computation on the GPU' column expresses the execution times of the kernel. Note that it is generated by `scripts/manage.py` .