HW2 Report

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First section

File Name	Speedup
Img_128.bmp	1.635418
Img_256.bmp	1.564549
Img_512.bmp	1.564863
Img_768.bmp	1.562313
Img_1024.bmp	2.083218

Second section

1. Continuing to call the convolution function creates a new stack area and repeats the act of returning after performing it. It uses multiple registers more and is inefficient, so the performance was improved by combining the two functions into one function.

2. The roof of the existing code was for y after for x, which is extremely inefficient considering 'layout of C arrays in memory'. Therefore, I modified it to proceed with for x after for y. Through this, the spatial locality was increased.

3.malloc free is unnecessary, so it was removed.

4.It was stated that the image width is a multiple of 32. Considering this, the interval to check the boundary was adjusted. This reduced the unnecessary amount of computation.

5. When checking the range of the rgb value of the pixel, the locality was low in the existing code. It was implemented to continuously access the same variable and modified to have high temporal locality.

various attempts

1. The float type requires a lot of resources for computation, so I took this into consideration and changed it to int. However, due to frequent errors, the plan was discarded.

2. I changed the interval between checking the boundaries to 128 in consideration of the given bmp files, but the performance improvement was not as significant as I thought. Different sizes may fit in the test, so I gave up the change that did not have much benefit.