System Programming HW4

202211022 김민서

1. Speed up

File name	img_128.bmp	img_256.bmp	img_512.bmp	img_768.bmp	img_1024.bmp
Speed up	1.549103	1.658769	1.659910	1.655940	1.846290

2. Optimization approach

First, I tried to replace the matrix operation in the textbook PDF with a one-dimensional array, but the basic speedup was only 1.2, I wanted to apply a new method. In the process, I tried to reduce the overhead associated with frequent memory allocation and release by removing dynamic memory allocation within the loop and directly allocating the result to the output array. I also used a loop unrolling method to process four pixels at a time. I also tried to apply an identity filter as part of methodology, but I didn't see any noticeable performance benefits when I applied it. Also, I wanted to apply it more because I could see the biggest performance change (from 1.2 to 1.5) when I tried loop unrolling, but it was a little disappointing because of the difficulty in applying it. Alternatively, I didn't try it, but I think I could apply other methods in the textbook pdf, such as tiling, block-by-block computation, or FFT.