System Programming HW2 Report

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1. Implementation results

Image size	128	256	512	768	1024
speedup	1.732750	1.762355	1.698389	1.738675	1.787374

2. Optimization approach

1) Convolution

- A very slight speedup was achieved through converting double to float.
- In the index calculation process, some speedup was achieved through Reducing Repeated Calculations.
- Because the convolution function had a fixed input value, the for statement could be completely eliminated through loop unrolling. Through this, the most speedup was achieved.
- In the process of checking the minmax value of rgb, getting a very small speedup through Using Ternary Operators for Simplification.
- Get some speedup through removing unnecessary function (memset) and header (<string.h>).

2) Filter_optimize

- Because the size of the image was variable, a size of 32x32 was processed in one loop through loop unrolling. Through this, obtaining a significant speedup, although it was less than convolution.
- By shortening the process of receiving and saving output, a reasonable speedup was achieved.