Operating System Homework 4 Report

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Detailed description of the implementation:
Two threads were created for mean filter and Sobel filter respectively. So there are 4 stages in the process: the conversion to grey image, the mean filter, the Sobel filter, and the expansion to RGB image. I used 3 semaphores to connect and control the flow of each stage. And the later stages are allowed to process after 2 rows of its previous stage is done.

In bonus, gy_sobel filter and gx_sobel filter were separated from Sobel filter by creating additional 2 threads for them respectively, because these 2 synchronizable stages cost the most time in the whole process.

Your speed:
2 threads: 1.33x (1.98/1.49 sec)
Bonus: 2.20x (1.98/0.90 sec)

Problems encountered and solutions:
Actually this homework took me much more time than expected. I tried many solutions and algorithms to speed up, but the result was still frustrating in the end. And I realized that spatial locality takes an important role in speed.