Operating System Homework 3 Report

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Detailed description of the implementation:

Number of threads:

HW3-1: 12 threads

HW3-2: 12 threads

The purpose of threads:

I divided the matrix in 12 threads when doing Grey, Gaussian, Sobel functions by columns. In order to make sure different threads doing distinctive jobs and will not encounter the race conditions, I deliver differ index into the threads to tell them which columns should they calculate.

How do you use mutex lock and semaphore?

In homework 3-1, I used 12 mutex locks with a view to make sure each threads doing Gaussian Filter Function will start after the end of every calculations of Grey Function. By the same token, I used 12 semaphores in homework 3-2 to make sure the start of Sobel Filter will be done after the end of Grey Function.

Your speed:

HW3-1: 410471μs (as the screenshot below)

HW3-2: 453136μs (as the screenshot below)

Problems encountered and solutions:

Problems:

Upon writing the code, the speed of my code is always not so fast. Moreover, I found out that it is hard to start to calculate Filter Function when only a partition of Grey Functions was done.

Solutions:

1. I started to use register integer instead of auto integer in my code. Furthermore, I decrease the using time of multiplication to shift operation or addition in my code.
2. Finally, I choose to finish all the calculation of Grey Function before doing Gaussian or Sobel Filter calculation.

Self Demo on linux2 work station: