Purpose

The purpose of this project morphology operations such as dilation and erosion. You can combine these operations to create opening and closing operations. An opening operation is an erosion followed by a dilation. A closing operation is a dilation followed by an erosion.

Method

For thresholded images we use a hit or miss operation in order to determine if a pixel should get colored. We use a structuring element and take the middle of the structuring element and pass it through the whole image. The structuring element I chose to use looks like this.

0 1 0
1 1 1
0 1 0

To do the dilation you want to pass the middle of the structuring element through the whole image. If any of the 1s in the structuring element hit a 255 then you color in the middle pixel. You continue this for the whole image. You also ignore any “fits” where all the 1s hit 255. Similarly for erosion you do the same thing except when you get a hit you color the middle pixel 0. Opening and Closing consist of these basic erosion and dilation operations in different orders.

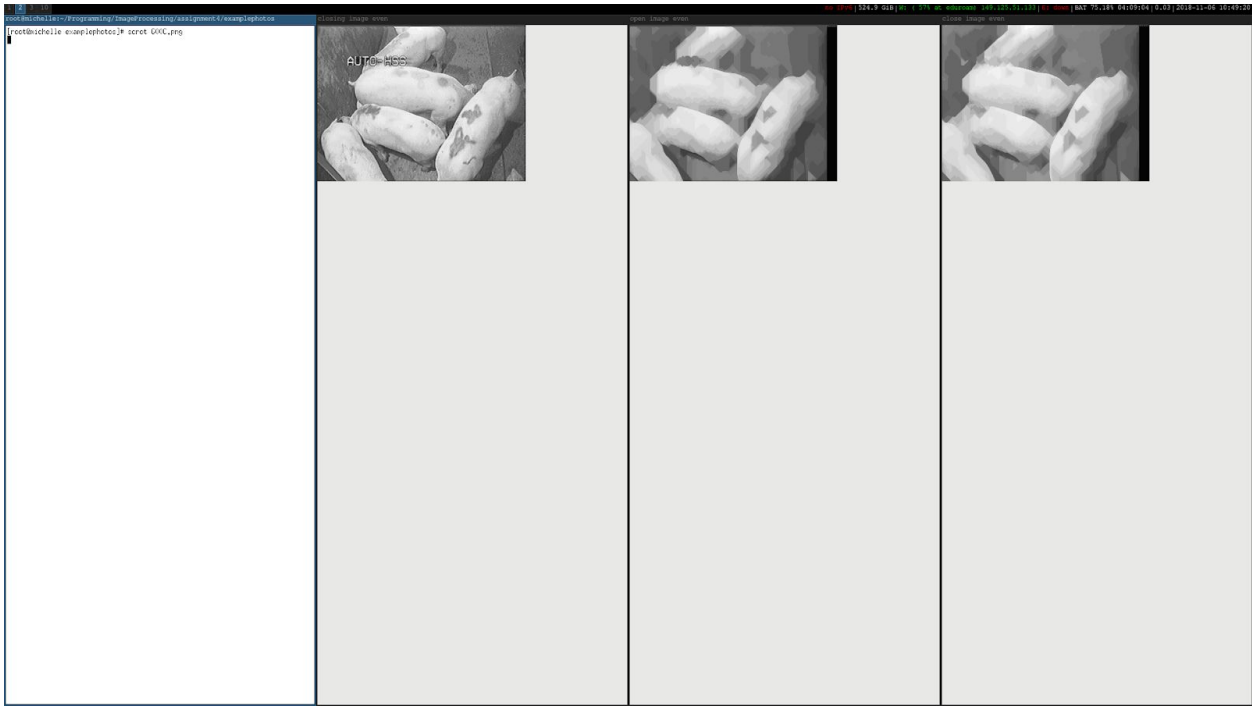
To do the dilation and erosion with a grayscale I used the following structuring element.

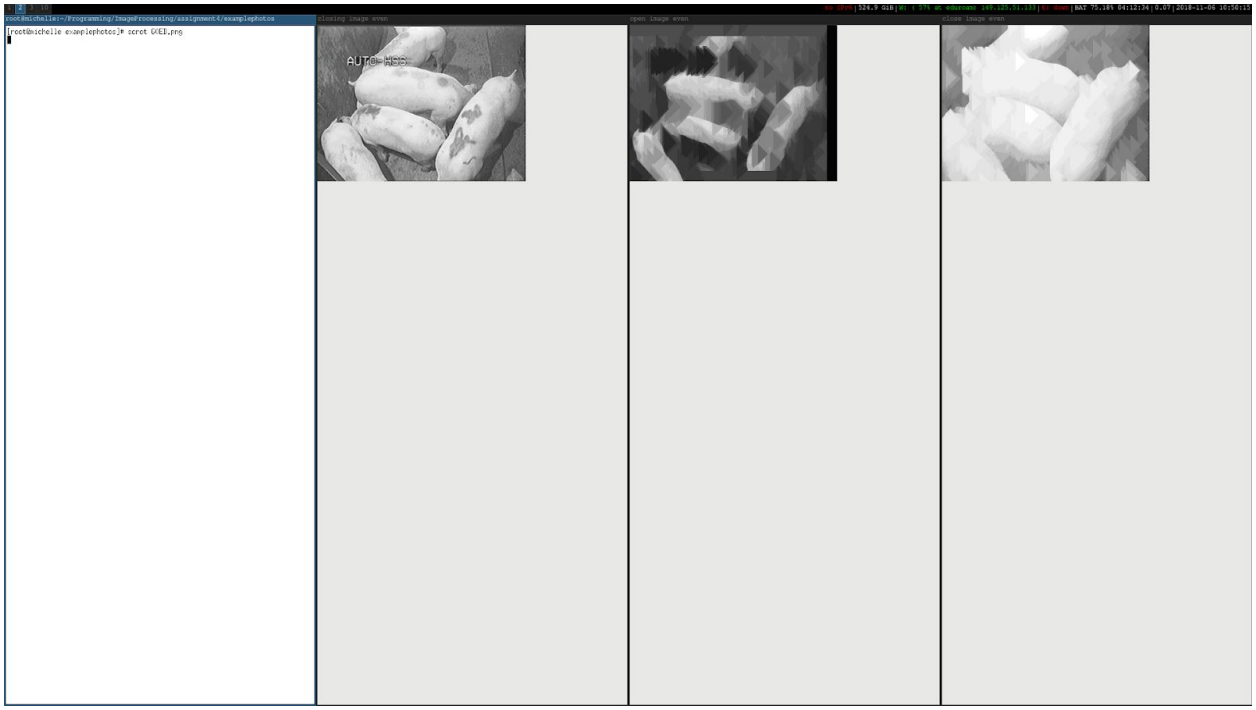
1 1 1
1 1 1
1 1 1

For dilation I take the max value found in the structuring element and color the middle pixel the max value. For erosion I do the same except I take the min value I find and use that for the middle pixel. You can also combine these operations to create grayscale opening and closing operations.

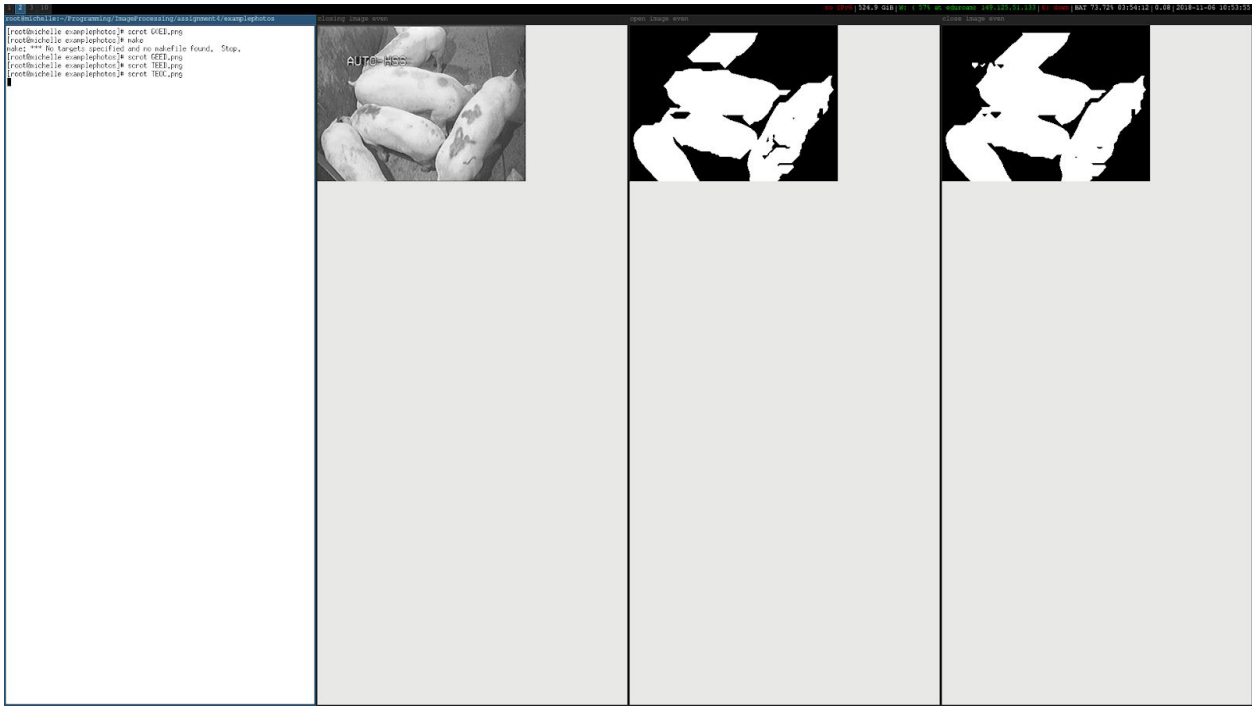
Results

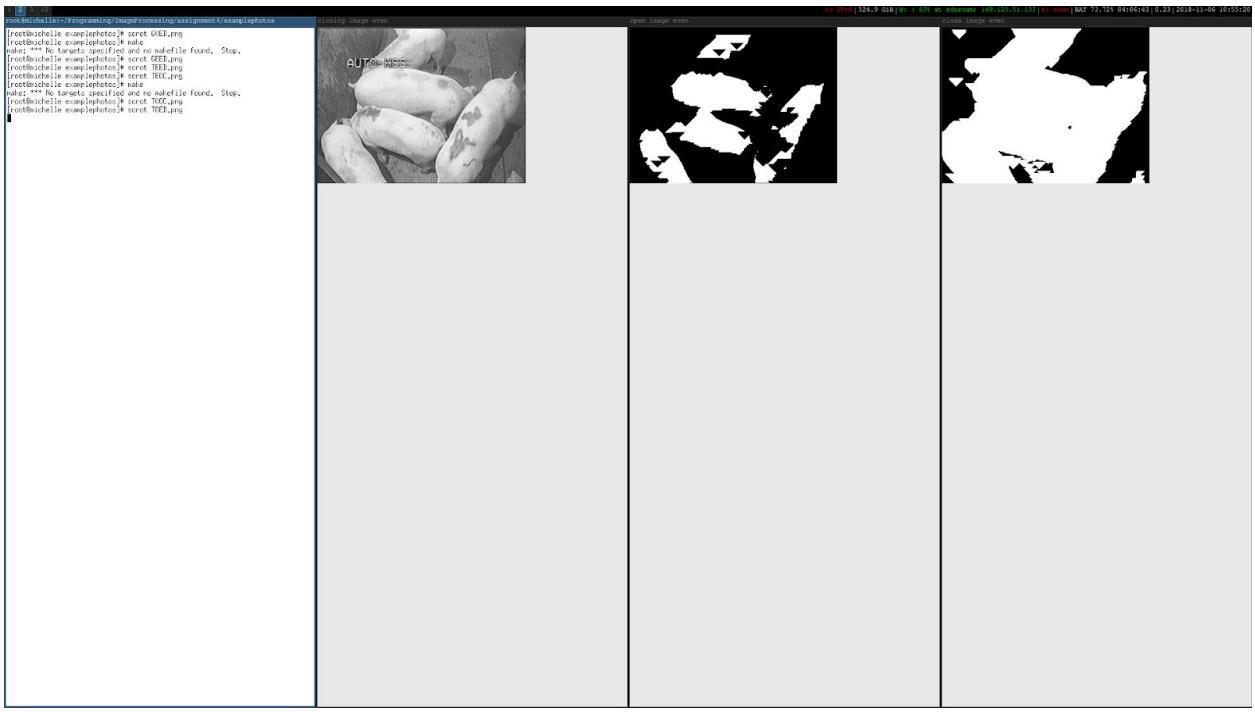
Gray scale operations applied 15 times (open and close, erosion and dilation) for both the even and odd image

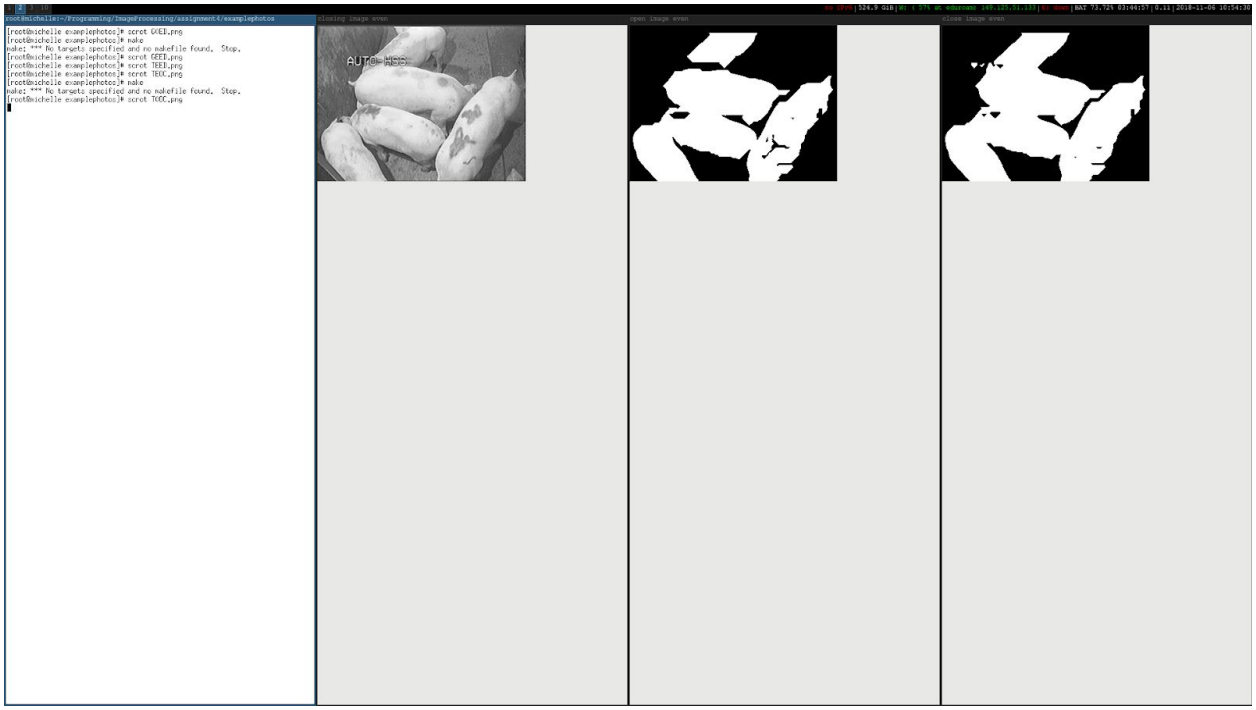


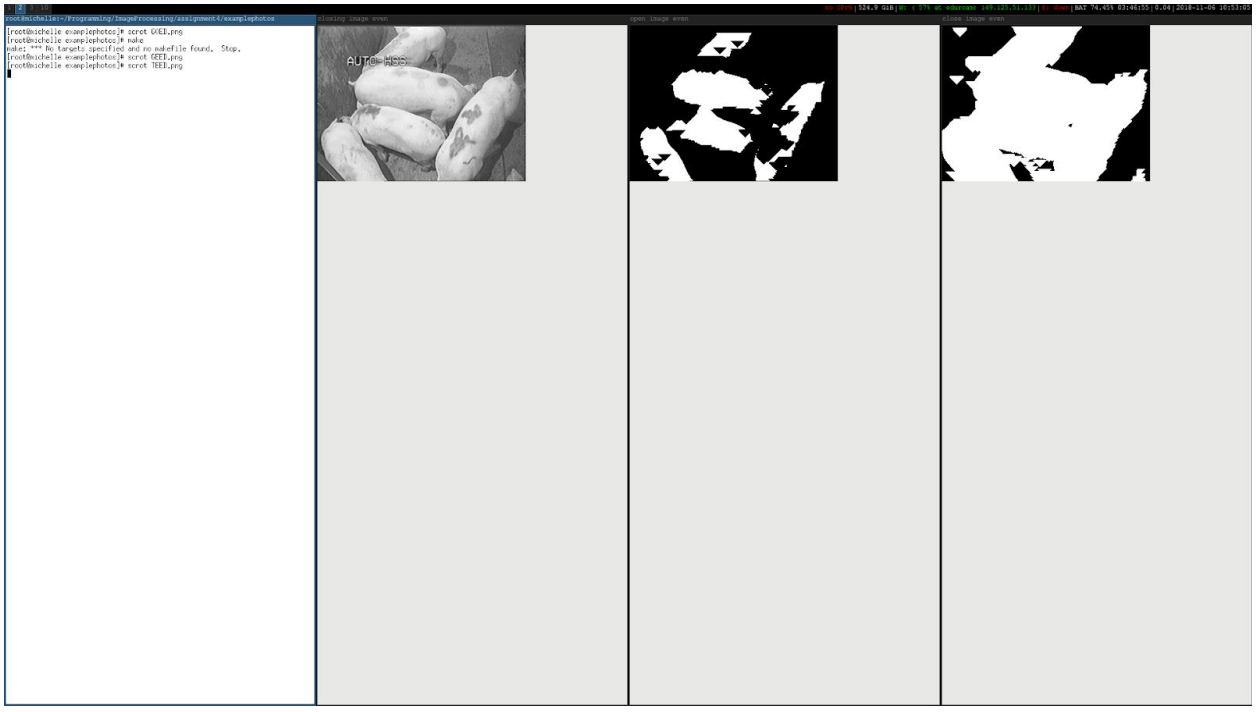


Binary image operations applied 10 times (open and close, erosion and dilation) for both the even and odd images


root@michelle:~/Programming/ImageProcessing/assignment4/examplephotos
[root@michelle examplephotos]# scrot GCEI.png
[root@michelle examplephotos]# make
make: *** No targets specified and no makefile found. Stop.
[root@michelle examplephotos]# scrot GEEI.png
[root@michelle examplephotos]# scrot TEEC.png
[root@michelle examplephotos]# scrot TEEC.png
closing image even
AUTO-HSS
open image even
close image even


root@michelle:~/Programming/ImageProcessing/assignment4/examplephotos
[root@michelle examplephotos]# scrot GCEI.png
[root@michelle examplephotos]# make
make: *** No targets specified and no makefile found. Stop.
[root@michelle examplephotos]# scrot GEEI.png
[root@michelle examplephotos]# scrot TEEE.png
[root@michelle examplephotos]# scrot TEOC.png
[root@michelle examplephotos]# make
make: *** No targets specified and no makefile found. Stop.
[root@michelle examplephotos]# scrot TCCC.png
[root@michelle examplephotos]# scrot TCEI.png
closing image even
AUTO-HSS
open image even
close image even


root@michelle:~/Programming/ImageProcessing/assignment4/examplephotos
[root@michelle examplephotos]# scrot GXEE.png
[root@michelle examplephotos]# make
make: *** No targets specified and no makefile found. Stop.
[root@michelle examplephotos]# scrot GEEE.png
[root@michelle examplephotos]# scrot TEEE.png
[root@michelle examplephotos]# scrot TCCC.png
[root@michelle examplephotos]# make
make: *** No targets specified and no makefile found. Stop.
[root@michelle examplephotos]# scrot TCCC.png
closing image even
AUTO-HSS
open image even
Close image even


root@michelle:~/Programming/ImageProcessing/assignment4/examplephotos
[root@michelle examplephotos]# scrot GXEE.png
[root@michelle examplephotos]# make
make: *** No targets specified and no makefile found. Stop.
[root@michelle examplephotos]# scrot GEEE.png
[root@michelle examplephotos]# scrot TEEE.png
closing image even
AUTO-HSS
open image even
Close image even