

Cuda Image Processing

Jonathan Land

This program demonstrates image processing using Cuda c (e.g., gaussian blur, edge detection, and another method of choice). In what follows, I have put screenshots and a further discussion of these programs.

NOTE: The screenshots include how to produce the executable to compile in your Linux environment. GPUs are required, of course!

Kernel launch configuration: For the Gaussian blur program (hw4_main.cu) I used my own image reader to get the height and width via a struct, and then I passed this in to read the image. The gridsize I used was $\text{weight} * \text{height} + \text{blockzise}) / \text{blocksize}$. I tried this first ($\text{weight} * \text{height} + \text{blockzise})$), but when this did not work, I tried $(\text{width} * \text{height} + \text{blockSize} - 1) / \text{blockSize}$; for my gridsize. This did work.

Since the configuration approach and weighted blur worked for the Gaussian blur method, I tried to use the same configuration on edge detection. Basically the program got the edges, but it did not get *all* the edges of the *whole* picture. For the custom method, I used 8,8 threads per block and for number of blocks, I divided the width and height by 8. Ultimately, it changed the image pixilation quite a bit.

Choice method description: My method uses the edge detection algorithm described in class, and in the edge detection code submitted with the assignment, but it changes the colors of the pixels so that it prints other colors besides white when an edge is found.

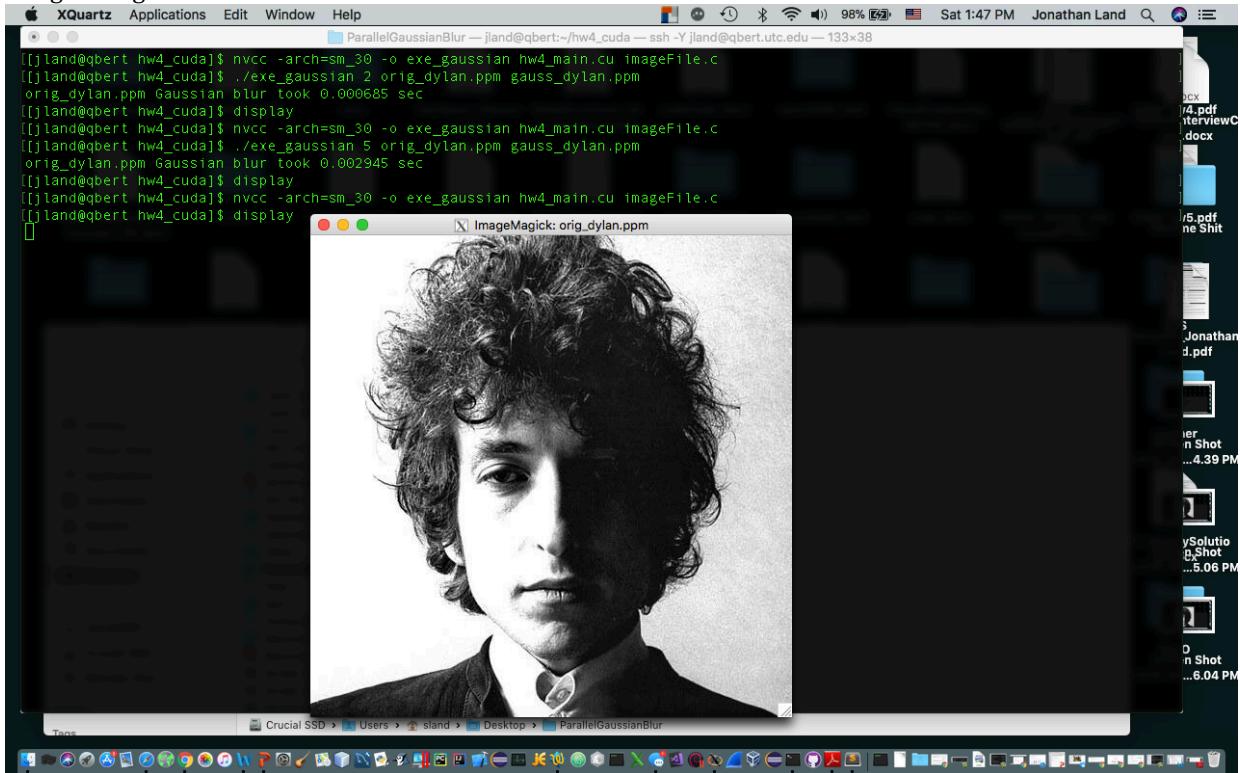
ppm Images used



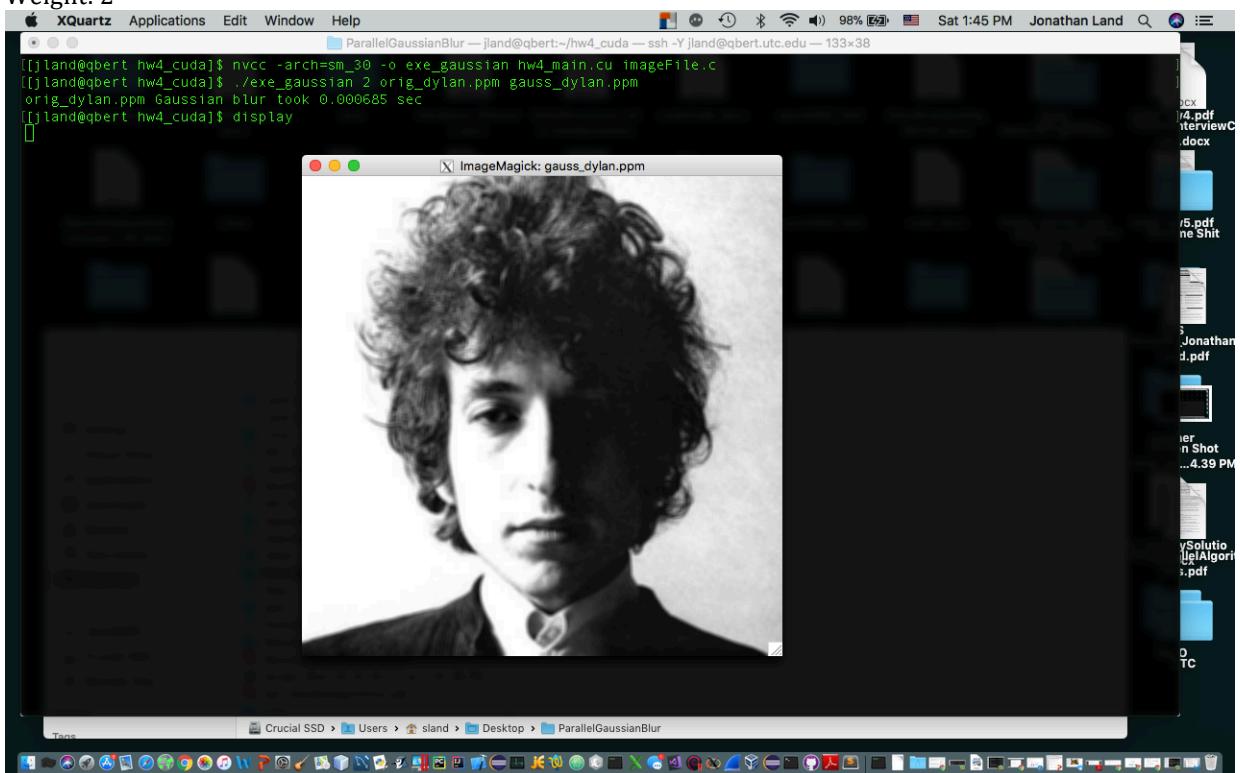


Weighted Gaussian blur and timings

Weight: original

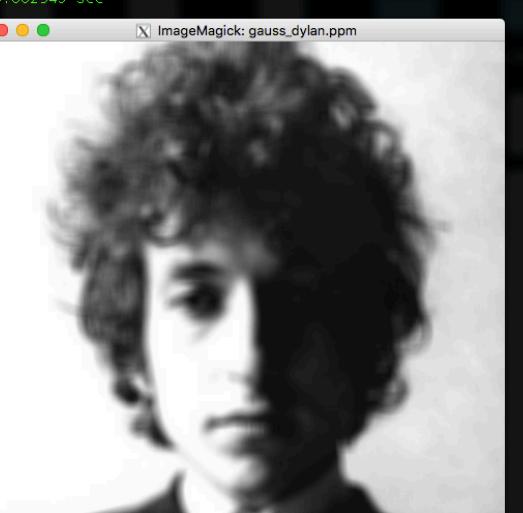


Weight: 2



Weight: 5

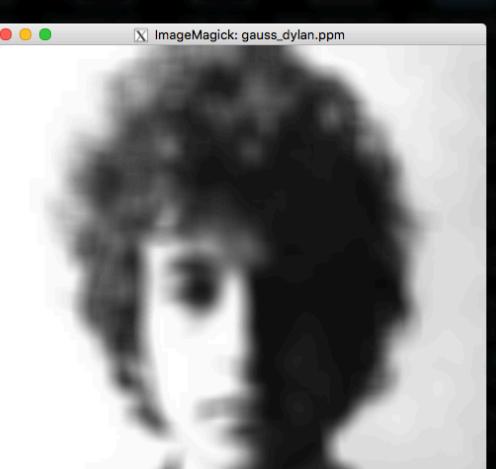
[[jland@qbert hw4_cuda]\$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[[jland@qbert hw4_cuda]\$./exe_gaussian 2 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000685 sec
[[jland@qbert hw4_cuda]\$ display
[[jland@qbert hw4_cuda]\$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[[jland@qbert hw4_cuda]\$./exe_gaussian 5 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.002945 sec
[[jland@qbert hw4_cuda]\$ display



Crucial SSD > Users > jland > Desktop > ParallelGaussianBlur

Weight: 10

```
laland@qbert hw4_cuda]$ ls
anymethod2_dylan2.ppm    anymethod_yosemite.ppm    exe_anymethod    gauss_yosemite.ppm    imageFile.c    orig_yosemite2.ppm
anymethod2_dylan.ppm      edgedetect_dylan2.ppm    exe_edgedetect   hw4_main.cu       imageFile.c    orig_yosemite.ppm
anymethod2_yosemite2.ppm  edgedetect_yosemite.ppm  exe_gaussian    hw4_main_edgedetection2.cu imageFile.h    orig_yosemite2.ppm
anymethod_dylan2.ppm     edgedetect_yosemite2.ppm  gauss_dylan.ppm  hw4_main_edgedetection.cu orig_dylan2.ppm
anymethod_dylan.ppm      edgedetect_yosemite.ppm  gauss_yosemite2.ppm imagefile.c    orig_dylan.ppm
laland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian nw4_main.cu imageFile.c
laland@qbert hw4_cuda]$ ./exe_gaussian 1 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000312 sec
laland@qbert hw4_cuda]$ display
laland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000688 sec
laland@qbert hw4_cuda]$ display
laland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
laland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.002913 sec
laland@qbert hw4_cuda]$ display
laland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
laland@qbert hw4_cuda]$ ./exe_gaussian 10 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.010255 sec
laland@qbert hw4_cuda]$ display
```



Weight: original

```
XQuartz Applications Edit Window Help ParallelGaussianBlur — jlard@qbert:~/hw4_cuda — ssh -Y jlard@qbert.utc.edu — 133x38
[[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000685 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.002945 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[[jlard@qbert hw4_cuda]$ ./exe_gaussian hw4_main.cu imageFile.c
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000194 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000504 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.000433 sec
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.001731 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.000434 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$
```



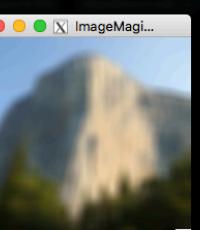
Weight: 2

```
XQuartz Applications Edit Window Help ParallelGaussianBlur — jlard@qbert:~/hw4_cuda — ssh -Y jlard@qbert.utc.edu — 133x38
[[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000685 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.002945 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[[jlard@qbert hw4_cuda]$ ./exe_gaussian hw4_main.cu imageFile.c
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000194 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000504 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.000433 sec
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.001731 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.000434 sec
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$ display
[[jlard@qbert hw4_cuda]$
```



Weight 5:

```
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000685 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.002945 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000194 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000504 sec
[jland@qbert hw4_cuda]$ display
```

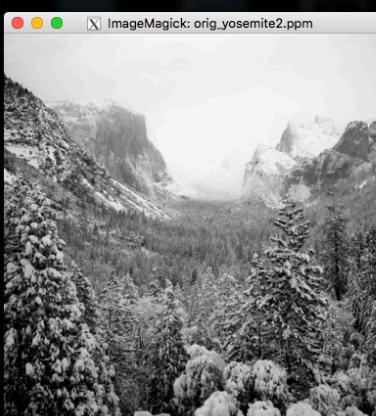


Weight: 2

XQuartz Applications Edit Window Help

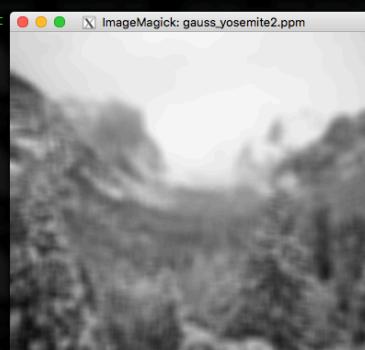
ParallelGaussianBlur — jlard@qbert:~/hw4_cuda — ssh -Y jlard@qbert.utm.edu — 139x38

```
[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000685 sec
[jlard@qbert hw4_cuda]$ display
[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.002945 sec
[jlard@qbert hw4_cuda]$ display
[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jlard@qbert hw4_cuda]$ display
[jlard@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000194 sec
[jlard@qbert hw4_cuda]$ display
[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000504 sec
[jlard@qbert hw4_cuda]$ display
[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.000433 sec
[jlard@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.001731 sec
[jlard@qbert hw4_cuda]$ display
[jlard@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.000434 sec
[jlard@qbert hw4_cuda]$ display
[jlard@qbert hw4_cuda]$ display
[jlard@qbert hw4_cuda]$ display
```



Weight: 5

```
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000685 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.002945 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000194 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000504 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.000433 sec
[jland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.001731 sec
[jland@qbert hw4_cuda]$ display
```



Edge detection



The photo is in the bottom corner of the right side. I was able to figure out how to do some of this method, but struggled to complete it. This one changes the hair color for some reason, but I think I got close to getting the algorithm correct, if you see the code.

```

[jland@qbert ~]$ ls
cudaprograms hw4      hw4_main_anyMethod.cu      hw4test      hw4_testmethods2 nvvp_workspace ParallelGaussianBlur-master
HW3_CODE      hw4_cuda  hw4_main_edgedetection.cu  hw4_testmethods intel          output.ppm    PosixProgram
[jland@qbert ~]$ mv hw4_main_anyMethod.cu hw4_cuda/
[jland@qbert ~]$ mv hw4_main_edgedetection.cu hw4_cuda/
[jland@qbert ~]$ ls
cudaprograms hw4      hw4test      hw4_testmethods2 nvvp_workspace ParallelGaussianBlur-master
HW3_CODE      hw4_cuda  hw4_testmethods intel          output.ppm    PosixProgram
[jland@qbert ~]$ cd hw4_cuda
[jland@qbert hw4_cuda]$ ls
anymethod2_dylan2.ppm  edgedetect_dylan2.ppm  exe_edgedetection gaussTest3_yos.ppm  imageFile.c
anymethod2_dylan.ppm   edgedetect_dylan.ppm   exe_gaussian    gauss_yosemite2.ppm imageFile.c
anymethod2_yosemite2.ppm edgedetect_yosemite2.ppm gauss_dylan.ppm gauss_yosemite.ppm imageFile.h
anymethod_dylan2.ppm   edgedetect_yosemite.ppm gaussTest1_dylan.ppm hw4_main_anyMethod.cu orig_dylan2.ppm
anymethod_dylan.ppm    edgeTest_dylan.ppm     gaussTest1_yos.ppm hw4_main.cu      orig_dylan.ppm
anymethod_yosemite.ppm exe_anymethod       gaussTest2_dylan.ppm hw4_main_edgedetection2.cu orig_yosemite2.ppm
anyTest_dylan.ppm      exe_anyMethod        gaussTest2_yos.ppm hw4_main_edgedetection.cu orig_yosemite.ppm
anyTest_yosemite.ppm   exe_edgedetect      gaussTest3_dylan.ppm imagefile.c
[jland@qbert hw4_cuda]$ hw4_main_anyMethod.cu
-bash: hw4_main_anyMethod.cu: command not found
[jland@qbert hw4_cuda]$ vi hw4_main_anyMethod.cu
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod hw4_main_anyMethod.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_dylan2.ppm anymethodTest1_dylan.ppm
orig_dylan2.ppm Any method took 0.000112 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod hw4_main_anyMethod.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_yosemite.ppm anymethodTest1_yosemiten.ppm
orig_yosemite.ppm Any method took 0.000113 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod hw4_main_anyMethod.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_yosemite.ppm anymethodTest1_yosemite.ppm
orig_yosemite.ppm Any method took 0.000100 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ vi hw4_main_edgedetection.cu
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_edgedetection hw4_main_edgedetection.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_edgedetection orig_dylan2.ppm edgedetectionTest1_dylan.ppm
orig_dylan2.ppm Edge detection took 0.000189 sec
[jland@qbert hw4_cuda]$ display

```

Any /custom operation

```

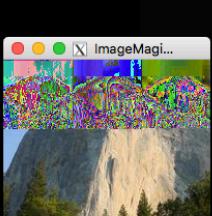
Warning: No xauth data; using fake authentication data for X11 forwarding.
Last login: Sat Apr 14 19:52:33 2018 from jlandmbp.wireless.utm.edu
#####
##### Welcome to qbert; if you use this cluster for published research, please use
##### the following excerpt to cite this cluster:
#####
##### This material is based upon work supported by the National Science Foundation
##### under Major Research Instrumentation (MRI) Grant No. 1229213. Any opinions,
##### findings, and conclusions or recommendations expressed in this material are
##### those of the authors and do not necessarily reflect the views of the National
##### Science Foundation
#####
[jland@qbert ~]$ ls
cudaprograms hw4      hw4_main_anyMethod.cu      hw4test      hw4_testmethods2 nvvp_workspace ParallelGaussianBlur-master
HW3_CODE      hw4_cuda  hw4_main_edgedetection.cu  hw4_testmethods intel          output.ppm    PosixProgram
[jland@qbert ~]$ mv hw4_main_anyMethod.cu hw4_cuda/
[jland@qbert ~]$ mv hw4_main_edgedetection.cu hw4_cuda/
[jland@qbert ~]$ ls
cudaprograms hw4      hw4test      hw4_testmethods2 nvvp_workspace ParallelGaussianBlur-master
HW3_CODE      hw4_cuda  hw4_testmethods intel          output.ppm    PosixProgram
[jland@qbert ~]$ cd hw4_cuda
[jland@qbert hw4_cuda]$ ls
anymethod2_dylan2.ppm  edgedetect_dylan2.ppm  exe_edgedetection gaussTest3_yos.ppm  imageFile.c
anymethod2_dylan.ppm   edgedetect_dylan.ppm   exe_gaussian    gauss_yosemite2.ppm imageFile.c
anymethod2_yosemite2.ppm edgedetect_yosemite2.ppm gauss_dylan.ppm gauss_yosemite.ppm imageFile.h
anymethod_dylan2.ppm   edgedetect_yosemite.ppm gaussTest1_dylan.ppm hw4_main_anyMethod.cu orig_dylan2.ppm
anymethod_dylan.ppm    edgeTest_dylan.ppm     gaussTest1_yos.ppm hw4_main.cu      orig_dylan.ppm
anymethod_yosemite.ppm exe_anymethod       gaussTest2_dylan.ppm hw4_main_edgedetection2.cu orig_yosemite2.ppm
anyTest_dylan.ppm      exe_anyMethod        gaussTest2_yos.ppm hw4_main_edgedetection.cu orig_yosemite.ppm
anyTest_yosemite.ppm   exe_edgedetect      gaussTest3_dylan.ppm imagefile.c
[jland@qbert hw4_cuda]$ hw4_main_anyMethod.cu
-bash: hw4_main_anyMethod.cu: command not found
[jland@qbert hw4_cuda]$ vi hw4_main_anyMethod.cu
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod hw4_main_anyMethod.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_dylan2.ppm anymethodTest1_dylan.ppm
orig_dylan2.ppm Any method took 0.000112 sec
[jland@qbert hw4_cuda]$ display

```

Yosemite (change colors)

```
Findings, and conclusions or recommendations expressed in this material are
those of the authors and do not necessarily reflect the views of the National
Science Foundation
#####
[jland@qbert ~]$ ls
cudaPrograms hw4      hw4_main_anyMethod.cu      hw4test          hw4_testmethods2 nvvp_workspace ParallelGaussianBlur-master
HW3_CODE      hw4_cuda  hw4_main_edgedetection.cu  hw4_testmethods intel           output.ppm    PosixProgram
[jland@qbert ~]$ mv hw4_main_anyMethod.cu hw4_cuda/
[jland@qbert ~]$ mv hw4_main_edgedetection.cu hw4_cuda/
[jland@qbert ~]$ ls
cudaPrograms hw4      hw4test          hw4_testmethods2 nvvp_workspace ParallelGaussianBlur-master
HW3_CODE      hw4_cuda  hw4_testmethods intel           output.ppm    PosixProgram
[jland@qbert ~]$ cd hw4_cuda
[jland@qbert hw4_cuda]$ ls
anymethod2_dylan2.ppm  edgedetect_dylan2.ppm  exe_edgedetection gaussTest3_yos.ppm  imageFile.c
anymethod2_dylan.ppm   edgedetect_dylan.ppm   exe_gaussian     gauss_yosemite2.ppm imageFile.c
anymethod2_yosemite2.ppm edgedetect_yosemite2.ppm gauss_dylan.ppm gauss_yosemite.ppm imageFile.h
anymethod_dylan2.ppm  edgedetect_yosemite.ppm gaussTest1_dylan.ppm hw4_main_anyMethod.cu orig_dylan2.ppm
anymethod_dylan.ppm   edgeTest_dylan.ppm     gaussTest1_yos.ppm hw4_main.cu        orig_dylan.ppm
anymethod_yosemite.ppm exe_anymethod       gaussTest2_dylan.ppm hw4_main_edgedetection2.cu orig_yosemite2.ppm
anyTest_dylan.ppm      exe_anymethod       gaussTest2_yos.ppm hw4_main_edgedetection.cu orig_yosemite.ppm
anyTest_yosemite.ppm   exe_edgedetect      gaussTest3_dylan.ppm imagefile.c

[jland@qbert hw4_cuda]$ hw4_main_anyMethod.cu
-bash: hw4_main_anyMethod.cu: command not found
[jland@qbert hw4_cuda]$ vi hw4_main_anyMethod.cu
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod hw4_main_anyMethod.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_dylan2.ppm anymethodTest1_dylan.ppm
orig_dylan2.ppm Any method took 0.000112 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod hw4_main_anyMethod.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_yosemite.ppm anymethodTest1_yosemiten.ppm
orig_yosemite.ppm Any method took 0.000113 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod hw4_main_anyMethod.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_yosemite.ppm anymethodTest1_yosemite.ppm
orig_yosemite.ppm Any method took 0.000100 sec
[jland@qbert hw4_cuda]$ display
[



```

Timings

Guasian blur

```
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.000685 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_dylan.ppm gauss_dylan.ppm
orig_dylan.ppm Gaussian blur took 0.002945 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_gaussian hw4_main.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000194 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite.ppm gauss_yosemite.ppm
orig_yosemite.ppm Gaussian blur took 0.000504 sec
[jland@qbert hw4_cuda]$ display
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.000433 sec
[jland@qbert hw4_cuda]$ ./exe_gaussian 5 orig_yosemite2.ppm gauss_yosemite2.ppm
orig_yosemite2.ppm Gaussian blur took 0.001731 sec
[jland@qbert hw4_cuda]$ display
```

```
[jland@qbert hw4_cuda]$ ./exe_gaussian 2 orig_yosemite2.ppm gauss_yosemite2.ppm  
orig_yosemite2.ppm Gaussian blur took 0.000434 sec
```

Edge Detection

```
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_edgedetect  
hw4_main_edgedetection.cu imageFile.c  
[jland@qbert hw4_cuda]$ ./exe_edgedetect orig_yosemite.ppm edgedetect_yosemite.ppm  
orig_yosemite.ppm Edge detection took 0.000099 sec  
[jland@qbert hw4_cuda]$ display  
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_edgedetect  
hw4_main_edgedetection.cu imageFile.c  
[jland@qbert hw4_cuda]$ ./exe_edgedetect orig_yosemite2.ppm  
edgedetect_yosemite2.ppm  
orig_yosemite2.ppm Edge detection took 0.000083 sec  
[jland@qbert hw4_cuda]$ display  
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_edgedetect  
hw4_main_edgedetection.cu imageFile.c  
[jland@qbert hw4_cuda]$ ./exe_edgedetect orig_dylan.ppm edgedetect_dylan.ppm  
orig_dylan.ppm Edge detection took 0.000084 sec  
[jland@qbert hw4_cuda]$ display  
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_edgedetection  
hw4_main_edgedetection.cu imageFile.c  
[jland@qbert hw4_cuda]$ ./exe_edgedetection orig_dylan2.ppm  
edgedetectionTest1_dylan.ppm  
orig_dylan2.ppm Edge detection took 0.000189 sec  
[jland@qbert hw4_cuda]$ display  
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_edgedetection  
hw4_main_edgedetection.cu imageFile.c  
[jland@qbert hw4_cuda]$ ./exe_edgedetection orig_yosemite.ppm  
edgedetectionTest1_yosemite.ppm  
orig_yosemite.ppm Edge detection took 0.000184 sec  
[jland@qbert hw4_cuda]$ display  
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_edgedetection  
hw4_main_edgedetection.cu imageFile.c  
[jland@qbert hw4_cuda]$ ./exe_edgedetection orig_yosemite2.ppm  
edgedetectionTest_yosemite.ppm  
orig_yosemite2.ppm Edge detection took 0.000009 sec
```

Any

```
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod  
hw4_main_anyMethod.cu imageFile.c  
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_dylan2.ppm  
anymethodTest1_dylan.ppm  
orig_dylan2.ppm Any method took 0.000112 sec  
[jland@qbert hw4_cuda]$ display  
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod  
hw4_main_anyMethod.cu imageFile.c  
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_yosemite.ppm  
anymethodTest1_yosemiten.ppm  
orig_yosemite.ppm Any method took 0.000113 sec  
[jland@qbert hw4_cuda]$ display  
[jland@qbert hw4_cuda]$ nvcc -arch=sm_30 -o exe_anymethod
```

```
hw4_main_anyMethod.cu imageFile.c
[jland@qbert hw4_cuda]$ ./exe_anymethod orig_yosemite.ppm
anymethodTest1_yosemite.ppm
orig_yosemite.ppm Any method took 0.000100 sec
```