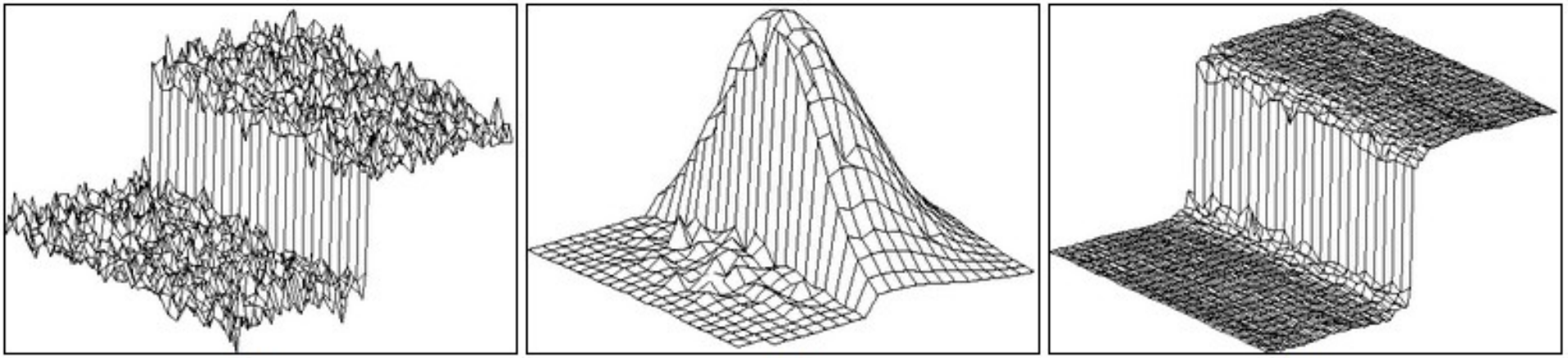
3DMM HW3

Bilateral filter

- http://homepages.inf.ed.ac.uk/rbf/CVonline/LOCAL_COPIES/MANDUCHI1/Bilateral_Filtering.html
- http://en.wikipedia.org/wiki/Bilateral_filter
- The CPU code is not hard to understand as long as you understand bilateral filter
- You have to implement the GPU version.



TODOs

- **`bilateral.cpp:bilateral_ocl & bilatera.cl`**
  - We have provided some hint but you can modify as long as you want.
- **`cl_helper.cpp`**
  - I have designed it so you can easily use it for your final project.
  - But I have removed some lines to let you practice and review OpenCL function calls.
- Do not modify the other parts!

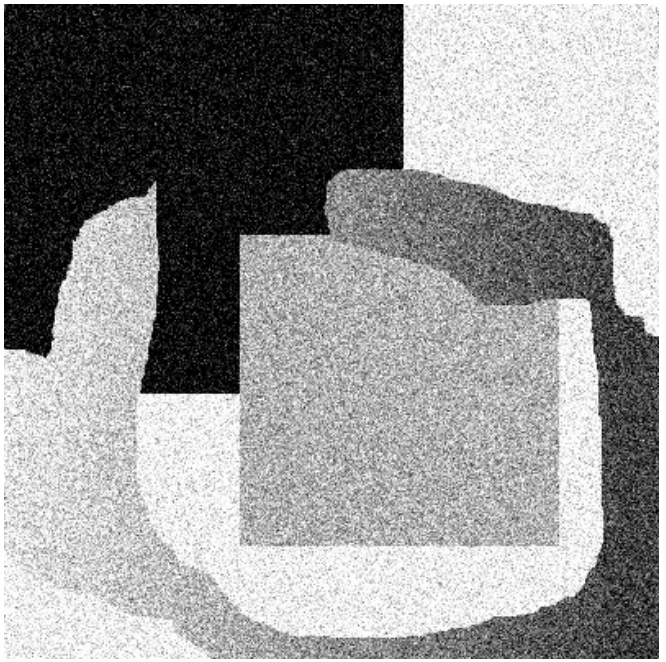
You code must pass these testing

```
./3dmm15s_hw3 -c_sigma 30 -r_sigma 5 -radius 15 test1.pgm
./3dmm15s_hw3 -c_sigma 30 -r_sigma 5 -radius 15 test2.pgm
./3dmm15s_hw3 -c_sigma 30 -r_sigma 5 -radius 15 test3.pgm
./3dmm15s_hw3 -c_sigma 60 -r_sigma 20 -radius 60 test1.pgm
./3dmm15s_hw3 -c_sigma 60 -r_sigma 20 -radius 60 test2.pgm
./3dmm15s_hw3 -c_sigma 60 -r_sigma 20 -radius 60 test3.pgm
```

- An example under my computer, note that you CANNOT have error pixel.
- 50x speedup can be easily achieved under naïve implementation.

```
1 platform(s) found
>>> Name: NVIDIA CUDA
1 device(s) found under some platform
>>> Name: GeForce GTX 970
Load 1024x695x1 image
Without OpenCL: 15942111us
With OpenCL: 287620us
Speedup: 55.4277x
123 warning pixels
899 error pixels
```

The testcases



Environment

- We have prepared a Linux workstation and its Makefile with for you
  - With GTX980 x2
  - Run your code with -device 1 if you want
  - IP/port/user/password: (announced at lecture)
- Local development
  - It's possible
  - Install NVIDIA OpenCL, you can find it on Internet.
  - glog, gflags are also required
  - VS 2013 is required for necessary C++11 support

Submission

- Deadline: 5/11 23:59:59
- Contact me: johnjohnlys@media.ee.ntu.edu.tw
- Server: ftp://140.112.174.82:2021
- Naming rule: r03943001_v1.zip
- Required files
  - Source code (Should be able to work on the server)
    - **`bilateral.cpp/cl, cl_helper.cpp`**