OpenCL Homework

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Examples

There are 3 examples for your references, please copy it by command
$ cp -r /tmp/opencl.example .

- hello.world
- local.max
- vector.add

The programs can be compiled by using command:
$ make
The programs can be executed by using command:
$ make run

Examples

- How to compile a opencl program?
  $ gcc main.c -o main -lOpenCL
- How to execute the program?
  $ ./main

Final Homework

Goal

Implementing Median Filter in OpenCL.

What is Median Filter?

In signal processing, it is often desirable to be able to perform some kind of noise reduction on an image or signal. The median filter is a nonlinear digital filtering technique, often used to remove noise.

How does it work?

Find the median value in the 3x3 window

1	2	3	4	4	5
4	5	6	5	5	6
7	8	9	7	7	8

Ex: 1 2 **4** 5
Ex: 1 2 3 **4** 5 6
Ex: 1 2 3 4 **5** 6 7 8 9

Input

A NxN matrix from binary file, 5 inputs total, and 2 will give you in advance with answer.

- input.10.dat(1024x1024): 0.465 s
- input.11.dat(2048x2048): 1.851 s
- input.12.dat(4096x4096): 7.348 s
- input.13.dat(8192x8192): 29.32 s
- input.14.dat(16384x16348): 122.09 s

Program execution format:
$ ./[program name] [inputfile] [N]
EX:
$ ./medianfilter input.10.dat 10

Output

NxN matrix after median filtering to stdout in plaintext, the matrix is in single line.
Input:
1 2 3 4 5 6 7 8 9
Output:
4 4 5 5 5 6 7 7 8

Grading

If your answer is right, you will get 80% of the grade, and you will get another 20% if the execution time is short enough:

- input.10.dat: 2.37 s
- input.11.dat: 3.05 s
- input.12.dat: 4.41 s
- input.13.dat: 9.52 s
- input.14.dat: 32.49 s

Upload

Please upload your program to CEIBA, in the zip file contain a folder of your id and the program main.c, a readme.txt telling me how to compile and other files.
EX:

- r01922003
  - main.c
  - readme.txt
  - ...

Note

- Deadline: 6/25 14:00