CUDA

Due:2014-11-24 23:59

➢ **Problems**

1. Convolution

References:

http://en.wikipedia.org/wiki/Convolution

http://en.wikipedia.org/wiki/Gaussian_blur

Requirements:

Read the wiki pages above and implement Gaussian Blur Algorithm using CUDA.You should test your algorithm on real 2D images and write a report about your thoughts and results.

2. PrefixSum

References:

http://en.wikipedia.org/wiki/Prefix_sum

Requirements:

Read the wiki pages above and implement PrefixSum Algorithm using CUDA.You should compare your algorithm with other methods and write a report about your thoughts and results.

3. Sparse Matrix Vector Multiplication

References:

http://en.wikipedia.org/wiki/Sparse_matrix

http://en.wikipedia.org/wiki/Sparse_matrix-vector_multiplication

Requirements:

Read the wiki pages above and implement Sparse Matrix Vector Multiplication using CUDA.Try your best to optimize your cache and memory and write a report about your thoughts and results.

4. Fast Fourier Transform

References:

http://en.wikipedia.org/wiki/Fast_Fourier_transform

Requirements:

Read the wiki pages above and implement 2D-FFT Algorithm using CUDA.You should apply your algorithm on real 2D images and write a report about your thoughts and results.

5. Discrete Cosine Transform

References:

http://en.wikipedia.org/wiki/Discrete_cosine_transform

Requirements:

Read the wiki pages above and implement DCT Algorithm using CUDA.You should apply your algorithm on image compression and write a report about your thoughts and results.

6. K-Means

References:

http://en.wikipedia.org/wiki/K-means_clustering

Requirements:

Read the wiki pages above and implement K-Means Algorithm using CUDA.You should apply your algorithm on text clustering and write a report about your thoughts and results.

7. Bilateral Filter

References:

http://en.wikipedia.org/wiki/Bilateral_filter

Requirements:

Read the wiki pages above and implement bilateral filter using CUDA.You should test your algorithm on real 2D images and write a report about your thoughts and results.

8. Non-local Means

References:

http://en.wikipedia.org/wiki/Non-local_means

Requirements:

Read the wiki pages above and implement Non-local Means Algorithm using CUDA.You should apply your algorithm on image denoising and write a report about your thoughts and results.

➤ Task Assignment

There are 8 problems above and you can get which problem your group should complete.

Group ID	Group Member	Problem ID
1	刘涛 陈宇翔	1
2	赵申剑 陈蕾宇	2
3	黄一峰 高脊 乐俊伟	3
4	刘天元 张阳	4
5	邱宇贤 马子泰 周浩	5
6	谢梦竹 蒋仕龙	6
7	袁野 钮敏哲	7
8	程尧 王欣 徐涵	8
9	黎俊 庞浦 徐文康	4

➤ NOTICE

1. Marking Criterion:We will evaluate your program from several aspects.
   - Optimize Technology(40%)
   - Execution Efficiency(30%)
   - Correctness(20%)
   - Code Style(10%)
2. The group leader should send the final version to TA before due date.You should archive your source code and report with name GroupX_Assinment3.rar(or any archive file types)(For Example:Group1_Assignment3.rar).
3. If you have any questions, please feel free to contact TA.
4. CUDA Tutorials: http://docs.nvidia.com/cuda/index.html
5. If you don't have CUDA devices,you can login into our server using the account allocated for your group.Please modify your password in case of data leakage.
   Account Information:[UserName/ Password:GroupX/GroupX,For Example:Group1/Group1]
   Login Command Using SSH:[ssh GroupX@202.120.38.28]

Server Configuration	
CUDA DEVICE	Tesla C2075@6GB
	GeForce GTS 450@1GB

CUDA VERSION	5.5.0
CPU	Intel(R) Xeon(R) CPU E5645@2.40GHz
MEMORY	24GB
OS	Arch Linux
GCC VERSION	4.8.1
IP	202.120.38.28

➢ Warning:

No cheating,please refer to 《上海交通大学学生学业诚信守则》,it is your responsibility to take the consequences if you violate the rule.