

Programming Assignment 2

Due date: 11:59:59PM 3/8/2018

Reading:

You should read Sections 1, 2, 3.2.1, 3.2.2, and 3.2.3 of the CUDA programming guide (<http://docs.nvidia.com/cuda/cuda-c-programming-guide/index.html#axzz4M3rtzIpv>)

Problem 1 (50%): Figuring out the number of 1's in a matrix.

Input:

A file named m1.txt. The first line of the file has two numbers, specifying the width and height of the matrix. Each line after that represents a row in the matrix.

For example, the matrix $\begin{pmatrix} 1 & 2 & 3 & 4 \\ 0 & 1 & 2 & 7 \\ 4 & 1 & 9 & 2 \end{pmatrix}$ is encoded as:

4 3

1 2 3 4

0 1 2 7

4 1 9 2

Output:

The number of 1's in the matrix. In the example above, the output should be 3.

What you should submit :

Submit in Canvas a single file named Homework2_1.cu.

Problem 2 (50%): Transposing a matrix

Learn the mathematical meaning of matrix transpose from:

<https://en.wikipedia.org/wiki/Transpose>

Input:

A matrix file named m2.txt, whose format is the same as that in problem 1.

Output:

Write the transposed matrix to standard output in format defined in problem 1.

What you should submit:

Submit in Canvas a single file named Homework2_2.cu.

How to compile and run your code on the server eecs-hpc-1:

```
nvcc -o homework homework.cu -O3 -arch=sm_35 -D_FORCE_INLINES
```

```
./homework m1.txt
```

Note that the `-D_FORCE_INLINES` option is needed because of the poor support of CUDA by the new Linux installation.

Bonus points:

The five fastest implementations for problem 2 will get 10% bonus points.

Grading criteria for each problem:

30%: compilation success

70%: output correctness