CSCD 439/539 GPU Computing Lab8
GPU Double Pointers and Text Processing

No Late Submissions are accepted. **Rules:** Your code must use C and CUDA C Language. If your program shows a compilation error, you get a zero for this lab assignment.

Submission: Wrap up all your **source files and other data files** into a single zip file. Name your zip file as *FirstInitialYourLastName*Lab8.zip. For example, if your legal name is Will Smith, you should name your zip file as wsmithlab8.zip. Please provide a simple makefile to compile your code into a target **lab8.**

Before you leave the laboratory, please show the TA or the instructor how your program works, they will give you a score for this Lab assignment.

For archive purpose, please also submit your single zip file on EWU Canvas by following CSCD439-01 Course → Assignments → Lab8 → Submit Assignment to upload your single zip file.

Problem Description:

Based on **lab6** and demo about double pointers on CUDA device, you are required to implement a simple word counting kernel. If the input is one line of text "good morning and I'm a good student!" (strip the quotes), the kernel will output an integer array,

g o o d m o r n i n g a n d I ' m a g o o d s t u d e n t !

0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 1 0 1 0 1 0 1 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0

The 1's in the output array, specifies a **valid** delimiter that can be used separate English words. Note that if you have another input like "for you:: he " (strip the quotes), the output should be like:

f o r y o u : : h e

0 0 0 1 0 0 0 1 0 0 0 0 1

Each thread in the grid should process only one character in the text. You have to implement the following features and answer the questions.

1, Read the provided code and comments, try to understand how all pointers to pointers are set up on cuda device. NOTE: Source code provided here differs from lab6 in the block shape and grid shape.

2, Please check the main function and understand what values are for grid size in x direction and y direction? what are values for block size in x direction and y direction?

3, Implement the empty kernel function. Your kernel has to use shared memory. Each block holds one rows of text for processing. Each thread loads one character into a corresponding spot in a piece of shared memory. Then you have to use the shared memory to compute an output array.

After you correctly write your code, you program should output like the following.(Please do not change the main function, all has been set up.)

```
good morning and I'm a good student!
good morning and I'm a good student!
good morning and I'm a good student!
good morning and I'm a good student!
good morning and I'm a good student!


Occurrence array obtained from device:
   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0   0   1   0   1   0   1   0   1   0   0   0   0   1   0   0   0   0   0   0   0   0   1   0   0   0
   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0   0   1   0   1   0   1   0   1   0   0   0   0   1   0   0   0   0   0   0   0   0   1   0   0   0
   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0   0   1   0   1   0   1   0   1   0   0   0   0   1   0   0   0   0   0   0   0   0   1   0   0   0
   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0   0   1   0   1   0   1   0   1   0   0   0   0   1   0   0   0   0   0   0   0   0   1   0   0   0
   0   0   0   0   1   0   0   0   0   0   0   0   1   0   0   0   1   0   1   0   1   0   1   0   0   0   0   1   0   0   0   0   0   0   0   0   1   0   0   0
```