**EE 382C/EE 361C** **Multicore Computing** **Fall 2018**

# Assignment 4

**Due: November 1**

**Instructor: Professor Vijay K. Garg (email: garg@ece.utexas.edu)**

The goal of this assignment is to learn CUDA programming. For each of the problems in this assignment use an efficient parallel algorithm.

1. **(20 points)** Write a parallel program in cuda that reads a text file "inp.txt" and performs various computations on the data in the file. The file contains a list of integers in the range [0-999] separated by commas. Your program should read this file in an array $A$ of integers.

   (a, 10 points) Compute $minA$, the minimum value in the array.

   (b, 10 points) Compute an array $B$ such that $B[i]$ is the last digit of $A[i]$ for all $i$.

2. **(40 points)** Read an array $A$ as in the first question.
   (a, 10 points) Create an array $B$ of size 10 that keeps a count of the entries in each of the ranges:$[0, 99], [100, 199], [200, 299], . .$
   For this part of the problem, maintain array $B$ in global memory of GPU.

   (b, 10 points) Repeat part (a) but first use the shared memory in a block for updating the local copy of $B$ in each block. Once every block is done, add all local copies to get the global copy of $B$.

   (c, 20 points) Create an array of size 10 that uses $B$ to compute $C$ which keeps count of the entries in each of the ranges:[0,99], [0,199], [0,299],. . . , [0, 999]. For this part of the problem, you must not use array $A$.

3. **(40 points)** Read an array $A$ as in the first question. Compute an array $D$ such that $D$ consists only of odd numbers in $A$. You would need to determine the total number of odd numbers in $A$, and then copy all the odd numbers from $A$ to $D$ preserving their order in $A$.