GPU Programming
Academic Year: 2021 - 22

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GPU Programming Assignment Submission Guide Lines

- Mail-ID: cs481.gpu.mec@gmail.com
- Sub:TEAM_NUM
- Attach.Name and Type: (TEAM_NUM).zip
- Late Submission<=3-Days:50%.
- Write a readme file to understand your solutions.
- Submit source files only.

Programming Assignment2 (Weightage 10%)
Due Date: March 23, 2022

Develop a parallel code for the following problems using OpenMP. Report the speedup of your implementations by varying the number of threads from 1 to 16 (i.e., 1, 2, 4, 6, 8, 10, 12, 14, and 16).

1. Generate all 24-digit binary numbers without any consecutive 1's.

2. We are given an unlimited supply of coins or notes with denominations: $\{1, 2, 5, 10, 20, 50, 100, 500, 2000\}$. Generate the distinct ways to get the desired change for 1 Million Rupees.

3. Find the shortest path between every pair of cities in INDIA and store the paths. Consider at least 1000 cities.

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4. Convolution Problem: Consider that you have a 1D or 2D input data and a kernel (which is simply a small matrix of weights). This kernel "slides" over the input data, performing an element-wise multiplication with the part of the input it is currently on, and then summing up the results into a single output cell. The kernel repeats this process for every location it slides over, converting a 1D or 2D matrix of features into yet another 1D or 2D matrix of features. Solve the convolution problem by considering the following problem instances:
   a. 1D array of size 4 Million and all elements are pre-filled with the numbers: 1 to 4 Million, in ascending order. Assume that your friend supplied eight 1D-kernels (with lengths 1, 2, 4, 8, 16, 32, 64, 128) and the kernels are initialized with binary values of 1, 3, 5, 7, -7, -5, -3, -1, respectively.
   b. 2D array of size 4000 X 4000 and every row of the array is pre-filled with the numbers: 1 to 4000, in ascending order. Assume that your friend supplied 8 kernels with dimensions: 1X2, 1X4, 1X16, 1X64, 2X4, 2X16, 2X64, 2X 256. All elements of the kernels are initialized with 1.

Thank You ☺

Any ? Please